ID No. and jurisdiction	Regular	SSA part 1	SSA part 2	Reallocations
Trust Territories				
8-9338-00 Trust Territories	242,330.00	0.00	10,000.00	0.00
	242,330.00	0.00	10,000.00	0.00
Virgin Islands				
8-9340-00 Virgin Islands	94,949.00	0.00	10,000.00	0.00
	94,949.00	0.00	10,000.00	0.00
Total	104,966,000.00	18,910,636.00	5,129,494.00	1,126,300.37

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Part III

Environmental Protection Agency

40 CFR Part 260, et al.

Burning of Hazardous Waste in Boilers and Industrial Furnaces; Final Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 260, 261, 264, 265, 266, 270, and 271

[EPA/OSW-FR-91-012; SWH-FRL-3865-6]

RIN 2050-AA72

Burning of Hazardous Waste in Boilers and Industrial Furnaces

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: Under this final rule, the Environmental Protection Agency (EPA) is expanding controls on hazardous waste combustion to regulate air emissions from the burning of hazardous waste in boilers and industrial furnaces. Currently, such burning is exempt from regulation. EPA is promulgating this final rule after considering public comment on rules proposed on May 6, 1987, plus the comments on EPA's supplemental notices of October 26, 1989 and April 27, 1990.

These rules control emissions of toxic organic compounds, toxic metals, hydrogen chloride, chlorine gas, and particulate matter from boilers and industrial furnaces burning hazardous waste. In addition the rules subject owners and operators of these devices to the general facility standards applicable to hazardous waste treatment, storage, and disposal facilities. Further, today's final rule subjects hazardous waste storage units at regulated burner facilities to part 264 permit standards. Burner storage operations at existing facilities are generally now subject only to interim status standards under part 265.

Finally, today's rule takes final action on two pending petitions for rulemaking: (1) based on a petition by Dow Chemical Company, EPA is designating halogen acid furnaces as industrial furnaces under § 260.10; and (2) based on a petition by the American Iron and Steel Institute, EPA is classifying coke and coal tar fuels produced by recycling coal tar decanter sludge, EPA Hazardous Waste No. KO87, as products rather than solid waste. The rule also makes several technical corrections to regulations dealing with loss of interim status for facilities that achieved interim status as of November 7, 1984.

EFFECTIVE DATE: This final rule is effective on August 21, 1991. Technical corrections to § 270.73 are effective on publication.

The incorporation by reference of certain publications listed in the regulations is approved by the Director of the Federal Register as of August 21, 1991.

ADDRESSES: The official record for this rulemaking is identified as Docket Numbers F-87-BBFP-FFFFF and F-89-BBSP-FFFFF, and is located in the EPA RCRA Docket, room 2427, 401 M Street SW., Washington, DC 20460. The docket is available for inspection from 9 a.m. to 4 p.m., Monday through Friday, except on Federal holidays. The public must make an appointment to review docket materials by calling (202) 475-9327. The public may copy up to 100 pages from the docket at no charge. Additional copies cost $.15 per page.

FOR FURTHER INFORMATION CONTACT: For general information contact the RCRA Hotline at: (800) 424-9346 (toll-free) or (703) 920-9810 locally. For information on specific aspects of this final rule, contact Shiva Garg, Office of Solid Waste (OS-322W), U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460, (703) 308-8460.

EPA is planning to conduct six two-day implementation workshops beginning in mid February in the following cities: San Francisco, CA; Dallas, TX; Kansas City, KS; Atlanta, GA; Chicago, IL; and Philadelphia, PA. The purpose of the sessions is to explain responsibilities of owner/operators burning hazardous waste under this rule. The first day will be open only to government representatives involved in implementation, compliance, and enforcement of these regulations. The second day is open to the public. Preregistration is required to assure a reservation. Same day registration will be allowed as space is available. Interested parties should call 919-549-0722 to obtain further information and get on the mailing list for notices.

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Part One: Background

I. Legal Authority

These regulations are promulgated under authority of sections 1006, 2002, 3001 through 3007, 3010, and 7004 of the Solid Waste Disposal Act of 1970, as amended by the Resource Conservation and Recovery Act of 1976, the Quiet Communities Act of 1978, the Solid Waste Disposal Act Amendments of 1980, and the Hazardous and Solid Waste Amendments of 1984, 42 U.S.C. 6905, 6912, 6921 through 6927, 6930, and 6974.

II. Overview of the Final Rule

A. Controls for Emissions of Organic Compounds

Today's rule requires boilers and industrial furnances to comply with the same destruction and removal efficiency (DRE) standard currently applicable to hazardous waste incinerators: 99.9999% DRE of dioxin-listed waste, and 99.99% DRE for all other hazardous wastes. In addition, the rule controls emissions of products of incomplete combustion (PICs) by limiting flue gas concentrations of carbon monoxide (CO), and where applicable, hydrocarbons (HC) to ensure that the device is operated under good combustion conditions. Finally, emissions testing and health-risk assessment is required for chlorinated dioxins and furans for facilities meeting specified criteria where the potential for significant concentrations may exist.

B. Controls for Emissions of Toxic Metals

The rules establish emission limits for 10 toxic metals listed in appendix VIII of 40 CFR part 261 based on projected inhalation health risks to a hypothetical maximum exposed individual (MEI). The standards for the carcinogenic metals (arsenic, beryllium, cadmium, and chromium) limit the increased lifetime cancer risk to the MEI to a maximum of 1 in 100,000. The risk from the four carcinogens must be summed to ensure that the combined risk is no greater than 1 in 100,000. The standards for the noncarcinogenic metals (antimony, barium, lead, mercury, silver, and thallium) are based on Reference Doses (RfDs) below which adverse health effects have not been observed.

The standards are implemented through a three-tiered approach. Compliance with any tier is acceptable. The tiers are structed to allow higher emission rates (and feed rates) as the owner or operator elects to conduct more site-specific testing and analyses (e.g., emissions testing, dispersion modeling). Thus, the feed rate limits under each of the tiers are derived based on different levels of site-specific information related to facility design and surrounding terrain. Under Tier I, the Agency has provided very conservative waste feed rate limits in "reference" tables as a function of effective stack height and terrain and land use in the vicinity of the stack and assumed reasonable, worst-case dispersion. The owner or operator demonstrates compliance by waste analysis, not emissions testing or dispersion modeling. Consequently, the Tier I feed rate limits are based on an assumed reasonable, worst-case dispersion scenario, and an assumption that all metals fed to the device are emitted (i.e., no partitioning to bottom ash or product, and no removal by an air pollution control system (APCS)).

Under Tier II, the owner or operator conducts emissions testing (but not dispersion modeling) to get credit for partitioning to bottom ash or product, and APCS removal efficiency. Thus, the Agency has developed conservative emission rate limits in reference tables, again as a function of effective stack height and terrain and land use in the vicinity of the stack. The Agency also assumed reasonable, worst-case dispersion under Tier II.

Under Tier III, the owner or operator would conduct emissions testing and site-specific dispersion modeling to demonstrate that the actual (measured) emissions do not exceed acceptable levels considering actual (predicted) dispersion.

The standards are implemented through limits on specified operating parameters, including hazardous waste feed rate and metals composition, feed rate of metals from all feed streams, combustion chamber temperature, and APCS-specific parameters.

C. Controls for Emissions of Hydrogen Chloride and Chlorine Gas

The rules control emissions of hydrogen chloride (HCl) and free chlorine (Cl_2) under the same general approach as that used for metals. The owner and operator must comply with and implement the HCl and Cl_2 controls in the same manner as for metals.

D. Emission Standards for Particulate Matter

The rules limit particulate matter (PM) emissions of 0.08 gr/dscf, corrected to 7 percent oxygen (O_2). This is the same standard that currently applies to hazardous waste incinerators and is intended to supplement the risk-based metals controls. (Metals emissions are generally controlled by limiting feed rates of metals and controlling PM.) Compliance with the standard is demonstrated by emissions testing, and the standard is implemented by operating limits in the permit on parameters including: ash content of feed streams, feed rate of specific feed streams, and air pollution control system operating parameters. All boilers and industrial furnaces must comply with the standard; however, cement and aggregate kilns need not monitor the ash feed rate of all feed streams to demonstrate compliance with the standard given that particulate matter from these devices is generated primarily from raw materials. Instead, the rule provides that these devices must comply with the operating limits on the particulate matter control system to ensure continued operation at levels achieved during the compliance test (under interim status) or trial burn (under the part B permit application).

E. Permitting Procedures

The final rule requires similar permitting procedures for regulated BIFs that apply to hazardous waste incinerators. For example, owners and operators are required to submit a part B permit application for evaluation in order to be eligible for an operating permit. Permit applications will be called on a schedule considering the relative hazard to human health and enviroment the facility poses compared to other storage, treatment, and disposal facilities within the Director's purview.

F. Control During Interim Status

Today's final rule requires boilers and industrial furnaces that have interim status to comply with substantive emissions controls for metals, HCl, Cl_2, particulates, and CO (and, where applicable, HC and dioxins and furans). Owners and operators must certify compliance with the emissions controls under a prescribed schedule, establish limits on prescribed operating parameters, and operate within those limits throughout interim status.

G. Units Exempt from Air Emissions Standards

The rule conditionally exempts from regulation the following devices: (1) Boilers and industrial furnaces that burn small quantities of hazardous waste fuel (i.e., the small quantity burner exemption), and that operate the device under prescribed conditions; (2) smelting, melting, and refining furnaces that process hazardous waste solely for the purpose of metal reclamation and not partially for destruction or energy recovery; and (3) coke ovens if the only hazardous waste they process is K087.

The small quantity burner exemption—as provided in section 3004(q)(2)(B)—is a risk-based exemption specifically alluded to in the statute. The exemption is provided only to hazardous waste fuels generated on-site, and is conditioned on a number of requirements, including a one-time notification and recordkeeping.

The Agency is also providing a temporary exemption for metal reclamation furnaces from today's burner standards until we determine how best to apply rules designed for combusion process to noncombusion metal reclamation operations. (It should be noted that section 3004(q) requires EPA to issue rules controlling air emissions from devices burning hazardous waste for energy recovery by a specified date. Section 3004(q) does not apply to devices burning hazardous waste for the sole purpose of material recovery. Although EPA has authority to issue such regulations, the section 3004(q) deadline does not apply). To distinguish between waste that are processed solely for metal reclamation rather than (partial) destruction, the final rule considersd a hazardous waste processed by a smelting, melting, or refining furnace with a total concentration of appendix VIII, part 261 toxic organic constituents exceeding 500 ppm to be burned at least partially for treatment or destruction. To distinguish between processing for material recovery and burning for energy recovery, the final rule considers a hazardous waste processed by a metal reclamation furnace with a heating value exceeding 5,000 Btu/lb to be burned at least partially for energy recovery. Metals reclamation furnaces claiming the exemption must notify the Agency, sample and analyze their hazardous wastes to document compliance with the conditions of the exemption, and keep records of such documentation.

Coke ovens are exempt from today's rule if the only hazardous waste they process is K087 as an ingredient to produce coke. Given that K087 is for practical purposes just like other materials used to produce coke and comes from the same process as these

other materials, it would be anomalous to assert RCRA control over the coking process.

H. Pollution Prevention Impacts

This rule provides an incentive to reduce the generation of metal and chlorine-bearing hazardous waste at the source given that the metals and HCl emissions controls will be implemented by additional requirements attendant to the disposal of those wastes, i.e., feed rate limits for individual metals and total chlorine. These requirements are, in essence, tied to the economics of disposing of given volumes of waste since feed rates depend, in part, on the volume of waste the facility operator needs to burn. Thus, the metals and HCl controls do not simply require a percent reduction in emissions, irrespective of the volume and rate of incoming waste streams. Rather, the controls are health-based and, thus, provide limits on emissions rates of metals and HCl that would be implemented by feed rate limits.

Waste generators who send their waste to industrial furnaces such as cement kilns and light-weight aggregate kilns that act as commercial waste management facilities will have the incentive to reduce the generation of metal and chlorine-bearing wastes because waste management fees are likely to increase for such waste given that the burner has a fixed metal and chlorine feed rate allotment (due to prescribed feed rates and facility operating conditions). Wastes with extremely high metals content may no longer be acceptable for burning in many cases unless the waste generator reduces the metals content of the waste. Any alternative for the disposal of such wastes may be unavailable or the costs of such treatment may be high enough to create the incentive to reduce waste generation rates at the source. This is a typical scenario for pollution prevention measures to be undertaken by waste generators.

Similarly, generators who burn their wastes on site also have the incentive to reduce the generation of metal and chlorine-bearing wastes given that the rule will provide a fixed feed rate allotment for their boiler or industrial furnace.

III. Relationship to Other Rules

A. Regulations to be Promulgated Under the New Clean Air Act

Title III of the recent Clean Air Act Amendments of 1990, amending section 112 of the Act dealing with hazardous air pollutants, potentially addresses many of the same sources that would be regulated under today's rule. That section requires the Agency to develop a list of major and area sources of hazardous air pollutants (a major source is a stationary source that has the potential to emit up to 10 tons per year of a hazardous air pollutant, or 25 tons per year of a combination of such pollutants, and area sources are other stationary sources emitting hazardous air pollutants), and to develop technology-based controls for such sources over specified time periods. See Clean Air Act, amended sections 112(c), and (d). Additional controls shall be imposed within eight years after promulgation of each of these technology-based standards, if such controls are needed to protect public health with an ample margin of safety, or to prevent adverse environmental effect. (Cost, energy, and other relevant factors must be considered in determining whether regulation is appropriate in the case of environmental effects.) In addition, if the technology-based standards for carcinogens do not reduce the lifetime excess cancer risk for the most exposed individual to less than one a million (10–6), then EPA must promulgate health-based standards. See amended section 112(f)(2)(A).

It is premature for the Agency to attempt to provide a definitive opinion on the relationship of these provisions to today's rule. Sources covered by the present rule may not ultimately be required to be further regulated under amended section 112. In this regard, amended section 112(n)(7) provides that if sources' air emissions are regulated under subtitle C, "the Administrator shall take into account any regulations of such emissions * * * and shall, to the maximum extent practicable and consistent with the provisions of this section, ensure that the requirements of such subtitle and this section are consistent." Thus, at a minimum, Congress was concerned about the potential for duplicative regulation and urged the Agency to guard against it. Since the Agency regards today's rules as protective (based on present knowledge), it may be possible to avoid further air emissions regulation. (EPA notes, however, that these sources will likely be listed as major sources, and the Agency will study whether further emissions controls are required in the course of implementing amended section 112.)

B. April 27, 1990 Proposed Incinerator Amendments

On April 27, 1990 (55 FR 17862), EPA proposed amendments to the existing hazardous waste incinerator standards of subpart O, part 264 to make the incinerator standards conform to the emissions standards being promulgated today for boilers and industrial furnaces burning hazardous waste. The proposed rule would add emission standards for products of incomplete combustion (i.e., carbon monoxide and hydrocarbon limits), metals, and hydrogen chloride and chlorine gas.

In the proposed rule for incinerators, EPA also proposed to revise or to add definitions for a number of thermal treatment devices: Industrial furnace, incinerator, plasma arc and infrared incinerators. Those definitions are being promulgated in today's rule. In addition, EPA proposed in the incinerator rulemaking to clarify the regulatory status of carbon regeneration units. Those clarifications are also promulgated in today's final rule.

Finally, EPA proposed to revise the definition of principal organic hazardous constituents (POHCs) used to demonstrate destruction and removal efficiency (DRE). The revised definition would allow the Director on a case-by-case basis to approve as POHCs compounds that are neither constituents in the hazardous waste nor organic. That revised definition of POHC is finalized in today's rule as a part of the DRE standard to control organic emissions from boilers and industrial furnaces.

C. July 18, 1990 Proposed Amendment to Definition of Wastewater Treatment Unit to Exempt Sludge Dryers

On July 18, 1990 (see 55 FR 29280), EPA proposed to clarify the regulatory status of sludge dryers to make it clear that sludge dryers that meet the definition of a tank and that were a part of a wastewater treatment unit were exempt from RCRA regulation even if they heretofore met the definition of an incinerator. Today's final rule promulgates a definition of sludge dryer and revises the definition of incinerator to explicitly exclude sludge dryers. See Part Four, section II of today's preamble.

D. Land Disposal Restriction Standards

In the May 6, 1987 proposal, the Agency indicated that once the present rules became final, the Agency would amend certain of the land disposal restriction standards that specified incineration as a treatment standard (at that time, the standard for HOCs under the California list rule), to also include burning in boilers and industrial furnaces. See 52 FR at 17021. Since that time, the issue has become more involved. In particular, significant issues regarding the relationship of the Bevill amendment and land disposal

restrictions exist (which the Agency in fact referenced in the rulemaking record to the California list rule when considering this issue). The Agency believes it inappropriate to try and resolve these issues in this proceeding, given the time constraints created by the District Court's order and the fact that this rulemaking does not deal principally with issues relating to the land disposal restrictions program. The Agency consequently plans to address these questions in a later proceeding and not to finalize the May 1987 proposal at this time.

Part Two: Devices Subject to Regulation

I. Boilers

EPA defines a boiler in § 260.10 as an enclosed device using controlled flame combustion and having the following characteristics: (1) The combustion chamber and primary energy recovery section must be of integral design; (2) thermal recovery efficiency must be at least 60 percent; and (3) at least 75 percent of the recovered energy must be "exported" (i.e., not used for internal uses such as preheating of combustion air or fuel, or driving combustion air fans or feed water pumps).

Today's final rule applies to all boilers burning hazardous waste for any purpose—energy recovery or destruction. (We note, however, that an existing boiler may not burn hazardous waste for destruction (i.e., waste that is not a fuel) before certifying compliance with the interim status emissions standards.)

Nonindustrial boilers are currently prohibited from burning hazardous waste unless they are operated in conformance with the incinerator standards of subpart O of part 264 or 265. On the effective date of today's rule, however, nonindustrial boilers burning hazardous waste will be subject to these boiler and industrial furnace rules. We note that nonindustrial boilers generally cannot burn hazardous waste until they receive an operating permit under today's rule (unless they are already operating under the incinerator standards). This is because the prohibition is not rescinded until the effective date of the rule, and a facility would have to be "in existence" with respect to hazardous waste burning on that date to be eligible for interim status.

EPA believes that approximately 925 boilers burn hazardous waste fuels. Approximately 600 of these boilers burn very small quantities of hazardous waste and will be conditionally exempt under the small quantity burner provision of today's rule. See § 266.108. (We note that these boilers burn less than one percent of the total hazardous waste currently being burned in boilers and industrial furnaces.) EPA also believes that approximately 200 boilers will stop burning hazardous waste because they burn quantities exceeding the small quantity burner exemption but do not burn enough waste to justify the cost of complying with today's rule. Thus, approximately 125 boilers will continue to burn hazardous waste and will be subject to the interim status and permit standards provided by §§ 266.102 and 266.103 of today's rule.

II. Industrial Furnaces

Under today's revised definition, EPA defines an industrial furnace in § 260.10 as those designated devices that are an integral component of a manufacturing process and that use thermal treatment to recover materials or energy. With the addition of halogen acid furnaces by today's rule, the Agency has designated 12 devices as industrial furnaces: Cement kilns; lime kilns; aggregate kilns (including light-weight aggregate kilns and aggregate drying kilns used in the asphaltic concrete industry); phosphate kilns; coke ovens; blast furnaces; smelting, melting, and refining furnaces; titanium dioxide chloride process oxidation reactors; methane reforming furnaces; pulping liquor recovery furnaces; and combustion devices used in the recovery of sulfur values from spent sulfuric acid. The definition also includes criteria and procedures for designating additional devices as industrial furnaces.

Any industrial furnace burning or processing any hazardous waste for any purpose—energy recovery, material recovery, or destruction—is subject to today's rule, with certain exceptions. Furnaces (like boilers) burning small quantities of hazardous waste fuel are exempt from regulation under § 266.108, coke ovens are exempt from regulation if the only hazardous waste they burn is Hazardous Waste No. K087, and regulation of smelters processing hazardous waste solely for material recovery is deferred (see discussion in section II.D).

The Agency believes that approximately 75 industrial furnaces burn over one million tons of hazardous waste annually. The regulated universe appears to comprise approximately 40 cement kilns, 18 light-weight aggregate kilns, and 15 halogen acid furnaces. Each of these types of furnaces is described below.

A. Cement Kilns

Cement kilns are horizontal inclined rotating cylinders, refractory lined and internally fired, to calcine a blend of 80% limestone and 20% shale to produce Portland cement. There is a wet process and a dry process for producing cement. In the wet process, the limestone and shale are ground wet and fed into the kiln in a slurry. In the dry process, raw materials are ground dry. Wet process kilns are longer than dry process kilns in order to facilitate water evaporation from the wet raw material. Wet kilns can be more than 450 feet in length. Dry kilns are more thermally efficient and frequently use preheaters or precalciners to begin the calcining process before the raw material is fed into the kiln.

Combustion gases and raw materials move counterflow in kilns. The kiln is inclined, and raw materials are fed into the upper end while fuels are normally fed into the lower end. Combustion gases thus move up the kiln counter to the flow of raw materials. The raw materials get progressively hotter as they travel the length of the kiln. The raw materials eventually begin to soften and fuse at temperatures between 2,250 and 2,700 °F to form the clinker product. Clinker is then cooled, ground, and mixed with other materials such as gypsum to form Portland cement.

Combustion gases leaving the kiln typically contain from 6 to 30% of the feed solids as dust. Particulate emissions are typically controlled with electrostatic precipitators or fabric filters (baghouses), and are often recycled to the kiln feed system.

Dry kilns with a preheater or precalciner often use a by-pass duct to remove from 5 to 30% of the kiln off-gases from the main duct. The by-pass gas is passed through a separate air pollution control system to remove particulate matter. By-pass dust is not reintroduced into the kiln system to avoid a build-up of metal salts that can affect product quality.

Some cement kilns burn hazardous waste fuels to replace from 25 to 75% of normal fossil fuels. Most kilns burn liquid waste fuels but several burn small (e.g., six gallon) containers of viscous or solid hazardous waste fuels. Containers have been fired into the upper, raw material end of the kiln and at the midpoint of the kiln.

Several cement companies have also expressed an interest in using solid hazardous waste such as contaminated soils as an ingredient to produce cement. Cement kilns that burn hazardous waste as an ingredient are regulated by today's rule.[1] Under

[1] See discussion in section VII.H of Part Three of the text.

today's rule, a facility may burn (or process) hazardous waste solely as a bona fide ingredient during interim status beginning with the effective date of the rule. If a waste is burned partially for destruction or energy recovery, however, it is not burned solely as an ingredient and special restrictions apply during interim status (see discussion below). EPA considers a waste to be burned at least partially for destruction if it contains a total of 500 ppm or more by weight of nonmetal hazardous constituents listed in appendix VIII, part 261. Further, EPA considers a waste to be burned at least partially for energy recovery if it has a heating value of 5,000 Btu/lb or more.

Today's rule does not allow burning of a waste for the purpose of destruction during interim status prior to certification of compliance (see § 266.103(c)) with all applicable emission standards. Further, the rule applies special requirements during interim status on owners/operators who feed hazardous waste into a kiln system at any location other than the "hot" end where product is discharged. Hazardous waste burned (processed) solely as an ingredient, however, is not subject to the special requirements because emissions from such burning would not pose an adverse effect on human health and the environment.[2]

B. Light-Weight Aggregate Kilns

Light-weight aggregate (LWA) describes a special use aggregate with a specific gravity much less than sand and gravel which is used to produce insulation and nonstructural and light-weight concrete. LWA is produced much like cement, but the feedstocks are special clays, pumice, scoria, shale, or slate.

The LWA kiln is configured much like a cement kiln. The raw material is crushed and introduced at the upper end of a rotary kiln. In passing through the kiln, the materials reach temperatures of 1,900 to 2,100°F. Heat is provided by a burner at the lower end of the kiln where clinker is discharged.

LWA kilns are also major sources of particulate emissions and are equipped with wet scrubbers, fabric filters, or electrosatic precipitators. Wet scrubbers dominated the industry until recently. Many facilities are now converting to dry systems to reduce the cost of residue management by recycling the collected dust into the kiln.

LWA kilns that burn hazardous waste fuel typically burn 100% liquid hazardous waste fuels.

C. Halogen Acid Furnaces

The Dow Chemical Company (DOW) filed a rulemaking petition with EPA on March 31, 1986, in accordance with the provisions of 40 CFR 260.20, requesting that EPA designate their halogen acid furnaces (HAFs) as industrial furnaces. HAFs are typically modified firetube boilers that process secondary waste streams containing 20 to 70 percent chlorine or bromine to produce a halogen acid product by scrubbing acid from the combustion gases. Currently HAFs that produce steam meet the definition of a boiler while HAFs that do not generate steam meet the definition of an incinerator even though they use hazardous waste as a fuel and as an ingredient to produce halogen acid product. Today's rule designates HAFs that do not generate steam as an industrial furnace for the reasons given below.

DOW petitioned the Agency to designate their HAFs as industrial furnaces after the Agency changed the definition of incinerator in 1985 from a "purpose of burning test" to a "design test" and developed new classifications for boilers and industrial furnaces. The Agency inadvertently did not designate HAFs as industrial furnaces at the time which potentially left certain HAFs operating not in compliance with the incinerator standards promulgated in 1981. Although HAFs (prior to today's rule) technically meet the definition of incinerator, the Agency has indicated its intention since receiving the DOW petition to correct the problem and to properly designate HAFs as industrial furnaces.

On May 6, 1987 (52 FR 17033), EPA proposed to grant this petition and to add halogen acid furnaces (HAFs) to the list of devices that are designated as industrial furnaces under 40 CFR 260.10. On April 27, 1990 (55 FR 17917), the Agency proposed changes to the proposed designation of HAFs as industrial furnaces. With modifications based on additional information and comments, today's rule adds HAFs to the list of devices that are included in the definition of an industrial furnace under 260.10.

In today's rule, EPA is defining an "industrial furnace" in 260.10 as an enclosed device that uses thermal treatment to recover (or produce) materials or energy as an integral component of a manufacturing process.[3] EPA has previously designated 11 devices as industrial furnaces: (1) Cement kilns; (2) lime kilns; (3) aggregate kilns (including light-weight aggregate kilns and aggregate drying kilns used in the asphaltic concrete industry); (4) phosphate kilns; (5) coke ovens; (6) blast furnaces; (7) smelting, melting, and refining furnaces; (8) titanium dioxide chloride process oxidation reactors; (9) methane reforming furnaces; (10) pulping liquor recovery furnaces; and (11) combustion devices used to recover sulfur values from spent sulfuric acid.

The industrial furnace definition in 260.10 also provides criteria and procedures for adding devices to the list. A device may be defined as an industrial furnace if it meets one or more of the following criteria: (1) The device is designed and used primarily to recover material products; (2) the device is used to burn or reduce raw materials to make material products; (3) the device is used to burn or reduce secondary materials as effective substitutes for raw materials in processes that use raw materials as principal feedstocks; or (4) the device is used to burn or reduce secondary materials as ingredients in industrial processes to manufacture material products.

As explained below, the basis for designating HAFs as industrial furnaces under § 260.10 is that HAFs are integral components of a manufacturing process, they recover materials and energy, and they meet two of the criteria (1 and 4) described above for classifying a device as an industrial furnace.

1. Current Practices

Information available to EPA indicates that at least 3 companies in the United States operate at least 30 devices that may be halogen acid furnaces. These devices typically process chlorinated or brominated secondary materials with 20 to 70 percent halogen content (by weight) to produce an acid product, either hydrogen chloride (HCl) or hydrogen bromide (HBr), both of which have a halogen content that ranges from 3 to

[2] This is because nonmetal toxic constituents will not be present in the waste at significant levels (i.e., less than 500 ppm) and metal emissions will be adequately controlled under today's rule by the air pollution control system irrespective of where the waste is fed into the kiln system.

[3] This definition of industrial furnace is the revised definition as noticed on April 27, 1990 (55 FR 17969). The previous definition read "an enclosed device using controlled flame combustion to recover materials or energy as an integral component of a manufacturing process." Public comments on the proposal are discussed in the Comment Response Document for the BIF Regulations. EPA revised the definition to include nonflame devices (i.e., by referring to thermal treatment) because controlled-flame devices and nonflame devices can have the same emissions and pose the same hazard to human health and the environment.

greater than 25 percent (by weight). These secondary materials typically have as-fired heating values of approximately 9,000 Btu/lb and are typically produced on site.

Some of the HAFs currently in use are modified firetube boilers that generate and export steam. These HAFs meet the definition of a boiler under § 260.10, and, thus, will be regulated as boilers. The remaining HAFs, although modified firetube boilers, do not generate steam and thus do not meet EPA's definition of a boiler. Today's rule classifies these nonboiler HAFs as industrial furnaces. For the remainder of this discussion, the term "HAF" refers to these nonboiler HAFs.

2. Designation of HAFs as Industrial Furnaces

a. Dow's Petition. On March 31, 1986, the Dow Chemical Company (DOW) filed a rulemaking petition with EPA in accordance with the provisions of 40 CFR 260.20, requesting that HAFs at Dow Chemical be designated as industrial furnaces. EPA proposed to grant this petition in the May 6, 1987 proposal. Today's rule includes HAFs in the definition of an industrial furnace under § 260.10. Further background discussion on DOW's petition is contained in the May 6, 1987 proposed rule.

b. May 1987 and April 1990 Proposed Rules. EPA proposed to designate HAFs as industrial furnaces for the reasons discussed in the May 6, 1987 proposed rule. To ensure that a particular device was an industrial furnace involved in *bona fide* production of acid [4] as an integral component of a manufacturing process, and was not an incinerator equipped with hologen emissions removal devices, the 1987 proposed HAF definition required that: (1) The furnace by located on site at a chemical production facility; (2) the waste fed to the device be halogenated; and (3) the acid product from the device contain at least 6 percent halogen acid.

Based on comments received on the 1987 proposal and on further consideration by the Agency, EPA proposed revisions to the HAF definition in the April 1990 notice. These revisions were proposed for two reasons: (1) To better clarify the differences between HAFs and incinerators equipped with wet scrubbers to control halogen acid emissions, and (2) to better reflect industry practice.

To ensure that a particular device is an integral component of a chemical manufacturing process, the April 1990 proposal included requirements that at least 50 percent of the acid product be used on site and that any off-site waste fed to the HAF be generated by a SIC 281 (inorganic chemicals) or SIC 286 (organic chemicals) process. To ensure that the waste is burned as a *bona fide* ingredient to produce the halogen acid product, the April 1990 proposal also required that each waste fed to the HAF have an "as-generated" halogen content of at least 20 percent. In addition, to better reflect industry practice, the 1990 proposal required that the acid product have a halogen acid content of 3 percent rather than 6 percent, an amount that still clearly distinguished the HAF acid product from incinerator scrubber water, which has an acid content of well below 1 percent. Finally, EPA proposed in April 1990 to list hazardous waste fed to a HAF as inherently waste-like to ensure that halogenated waste fed to a HAF (and the HAF itself) would be subject to regulation. This would preclude a claim that the secondary materials were used as ingredients to make a product, and, thus, not a solid waste under § 261.2(e)(1)(i).

c. Summary of Public Comments. Commenters on the 1987 and 1990 proposed rules objected to the requirements that 50 percent of the acid product be used on site and that any off-site waste feed be limited to SIC 281 or 286 processes. The commenters argued that minimum specifications on the halogen content of the feed and/or the acid content of the HAF product are sufficient to distinguish *bona fide* HAF operations from incinerator operations, and that the requirement that a substantial portion of the product be used on site serves only to limit the legitimate treatment of halogenated wastes and the sale of *bona fide* HAF products without being necessary to protect human health and the environment.

After consideration of these commenters' concerns, the Agency believes that both the proposed off-site restriction for waste fed to HAFs and the proposed on-site acid product use restriction are indeed unnecessary to ensure that HAFs are integral components of manufacturing processes. The Agency agrees with the commenters that the requirements specifying the minimum halogen content of the waste feed and the minimum halogen acid concentration of the HAF product are sufficient to ensure that HAFs are integral components of a manufacturing process (i.e., the process of halogen acid production). EPA is not adopting these proposed conditions given that air emissions from HAFs will be regulated under today's rule, that these proposed conditions were directed at how to classify these devices rather than how to ensure their safe operation, and that HAF operations (as properly controlled) are environmentally advantageous in that they utilize acid values rather than dispose them and therefore should not needlessly be discouraged. Today's rule, therefore, does not restrict the use of HAF waste feeds generated off site or require that any percentage of the acid product be used on site.

In today's rule, the Agency considers a *bona fide* HAF operation as one in which a secondary material with a minimum as-generated halogen content of 20 percent by weight is processed into an acid product with a minimum halogen content of 3 percent by weight. The acid product must be used in a manufacturing process either on site or off site. The Agency maintains that this approach will allow the legitimate processing of highly halogenated secondary materials into usable products but will still clearly distinguish HAF product acid from incinerator halogen acid scrubber water.

Upon review of other comments submitted on the 1987 and 1990 proposed rules, the Agency has identified several issues pertaining to HAFs that require clarification in the regulations. Specifically, these issues concern: (1) The regulation of chlorine emissions from HAFs, (2) the operation of HAFs under the special operating requirements (SOR) exemption for boilers, and (3) the designation of hazardous waste fed to HAFs as inherently waste-like material.

One commenter to the 1987 proposed rule requested that the Agency clarify its position on limiting inorganic halide salts in feedstocks to boilers and industrial furnaces. The Agency has established limits on emissions of HCl and Cl_2 from industrial furnaces, and a HAF operator, like any other industrial furnace operator, must comply with these HCl and Cl_2 emission standards. To demonstrate compliance under the Tier I feed rate screening limits, a HAF operator must include inorganic chlorine as part of the total chlorine fed to the device. The Agency believes that this requirement is justified because recent testing indicates that even thermally stable compounds such as NaCl are

[4] The Agency's concern is that devices capturing some HCl in scrubber effluent not automatically be classified as HAFs if they find a way to utilize the scrubber effluent. The HCl content of the effluent from wet scrubbers used to control HCl emissions from the incineration of chlorine-bearing waste is normally on the order of 1 percent of less. EPA does not consider such low HCl content scrubber water a *bona fide* product for purposes of designation as an industrial furnace even if the scrubber water is beneficially used in a manner that specifically relates to its HCl content.

converted with high efficiency to HCl under laboratory conditions that simulate incineration.[5]

Another commenter to the 1987 proposal stated that HAFs are unjustly excluded from the automatic waiver of a trial burn to demonstrate 99.99% destruction and removal efficiency (DRE) when operated under the special operating requirements (SORs). The Agency acknowledges the commenter's concern, but notes that all industrial furnaces, including HAFs, are ineligible for the automatic DRE trial burn waiver. The Agency stated in the preamble to the 1987 proposal that modified boilers that produce and export steam (and thus meet EPA's definition of boiler in § 260.10) would be regulated as boilers. In such a case, the unit may be eligible for the automatic waiver of the DRE trial burn, which applies only to boilers. Any halogen acid furnace that is a modified fire-tube boiler not meeting the definition of a boiler in § 260.10, however, would not be eligible for the automatic waiver. The Agency's reasons for applying the automatic DRE trial burn waiver only to boilers are discussed further in Section II.C.2.d of this preamble.

Several commenters expressed concern that the April 27, 1990 proposal required a minimum heating value of 5,000 Btu/lb for secondary materials fed to HAFs. Today's final rule does not require a minimum heating value on secondary materials fed to HAFs. Although the Agency understands that most wastes burned in HAFs have a heating value greater than 5,000 Btu/lb and, so, that HAFs are engaged in energy recovery as well as materials recovery, not all wastes meeting the minimum halogen limit also have a heating value normally associated with energy recovery. The Agency believes that HAFs need not be required to recover both material and energy values from every hazardous waste fed to the device to meet the definition of an industrial furnace, and that the regulations adopted today for HAFs ensure that they will be operated in a protective manner even if energy values are not recovered.

Commenter's misconceptions regarding a minimum heating value for secondary materials may have arisen from the Agency's proposal pursuant to § 261.2(d)(2) to list hazardous waste fed to HAFs as inherently waste-like material. In today's rule, the Agency is listing as inherently waste-like any secondary material fed to HAFs that is identified or listed as a hazardous waste under 40 CFR part 261, subparts C and D. Without such materials being designated as inherently waste-like, HAFs burning hazardous wastes solely as ingredients (i.e., wastes that have low heating value and therefore, are not burned partially for energy recovery) to produce an acid product might not be regulated because the material they are burning might not be a solid waste pursuant to § 261.2(e)(1)(i). However, HAFs that burn hazardous wastes with high heating values (i.e., greater than 5,000 Btu/lb), would be subject to today's rule even without listing them as inherently waste-like because these wastes are considered under § 261.2(e)(2)(ii) to be burned at least partially for energy recovery. For reasons discussed in the April 27, 1990 proposed rule (55 FR 17892), the Agency believes that such an inconsistent result would not provide adequate protection of human health and the environment (the wastes burned by HAFs are some of the most toxic generated and regulation of emissions from burning these wastes certainly is needed to protect human health and the environment). Moreover, there are significant elements of treatment associated with burning in HAFs: toxic organic compounds are destroyed rather than recovered, and the burning if conducted improperly could become part of the waste disposal problem. Because the materials burned in HAFs meet the criteria of § 261.2(d) for inherently waste-likely materials, EPA today is adding to the list of inherently waste-like materials under § 261.(d)(2) secondary materials fed to HAFs that are listed or identified as hazardous waste under subparts C or D of part 261. While HAFs will not be precluded from burning secondary materials with low heating values, today's listing will prevent the HAFs that burn this material and the material itself from being unregulated. As a result, in all cases, hazardous waste fed to HAFs, and the HAFs themselves, will be subject to hazardous waste regulations under today's final rule.

d. Basis for Designating HAFs as Industrial Furnaces. EPA has defined an industrial furnace in § 260.10 as any of the specifically-designated enclosed devices that are integral components of a manufacturing process and that use thermal treatment to accomplish recovery of materials or energy. To date, 11 types of devices have been designated as industrial furnaces. The industrial furnace definition also provides criteria for adding devices to the list. As discussed above, these criteria include: (1) The design and use of the device primarily to accomplish recovery of material products; (2) the use of the device to burn or reduce raw materials to make a material product; (3) the use of the device to burn or reduce secondary materials as effective substitutes for raw materials in processes using raw materials as principal feedstocks; and (4) the use of the device to burn or reduce secondary materials as ingredients in an industrial process to make a material product. As explained below, HAFs, meet the definition of an industrial furnace as well as two of the above criteria, (1) and (4), for designating additional devices as industrial furnaces.

HAFs are Integral Components of a Manufacturing Process. HAFs are commonly located on-site at large scale chemical manufacturing processes that reclaim primarily secondary materials generated on-site and that typically use the halogen acid product on-site. In these cases, the Agency believes the device should clearly be considered an integral component of the manufacturing process and, thus, eligible for designation as an industrial furnace. The situation is less clear when the device receives halogen-bearing secondary materials from off-site or if the halogen acid product is sent off-site. In these situations, the Agency believes, nonetheless, that the device should be considered an integral component of a manufacturing process and, thus, eligible for consideration as an industrial furnace provided that the device is located on the site of a manufacturing process and that the halogen acid product is used by a manufacturing process.

HAFs Recover Materials and Energy. EPA believes that HAFs recover materials and energy to produce a *bona fide* product. Production of halogen acid (a 3 to 20 percent halogen acid solution) from the combustion of chlorine-bearing secondary materials constitutes materials recovery in the context of the designation of HAFs as industrial furnaces. HAFs can also be considered to burn secondary material as ingredients in an industrial process to make a material product (i.e., the product halogen acid). As discussed above, chlorine-bearing secondary materials are burned to produce the halogen acid product for use in a manufacturing operation.

HAFs also recover energy. Most halogen-bearing secondary materials reclaimed in HAFs are burned partially for energy recovery because substantial, usable heat energy is released by the materials during combustion. The

[5] U.S. EPA, Laboratory Method to Estimate Hydrogen Chloride Emission Potential Before Incineration of a Waste, February 1990.

materials typically have an as-fired heating value of approximately 9,000 Btu/lb, and the heat released results in the thermal degradation of chlorinated organic compounds to form HCl. Although under definitions in 260.10, energy recovery in a boiler is characterized by the recovery and export of energy, energy recovery in an industrial furnace need not involve any export of energy. Rather, energy recovery in an industrial furnace is based on the burning of materials with substantial heating values (greater than 5,000 Btu/lb) in a manner that results in the release of substantial usable heat energy. See 50 FR 49171–49174 (November 29, 1985).[6]

HAFs Meet Industrial Furnace Criteria. The Agency beleives that HAFs meet two of the above criteria (i.e., criteria (1) and (4)) for designating devices as industrial furnaces. EPA believes that restrictions on the halogen content of waste streams fed to HAFs and on the halogen content of the acid product ensure that the HAF is: (a) Designed primarily to recover halogen acid (and so is not engaged in incineration); and (b) used to burn secondary materials as ingredients in the process of halogen acid production to produce a material product (i.e., the product halogen acid).

Addition of HAFs to List of Industrial Furnaces. EPA believes that HAFs are integral components of a manufacturing process and that they are designed and operated to recover materials and energy. For these reasons EPA is today adding to the list of devices designated as industrial furnaces under § 260.10 HAFs defined as furnaces that: (1) Are located at the site of a manufacturing process; and (2) process hazardous wastes with a minimum as-generated halogen content of 20 percent by weight to produce an acid product with a minimum halogen content of 3 percent by weight and where the acid product is used in a manufacturing process.

e. Interim Status for HAFs. HAFs that are in existence on the effective date of today's rule are eligible for interim status like other boilers and industrial furnaces burning for energy or material recovery. Although certain HAFs may technically have met the amended definition of incinerator, EPA believes that there was legitimate confusion as to such unit's operating status. These devices would not have been incinerators under the original 1980 definition of incinerator because their primary purpose was not destruction of waste. When EPA amended that definition in 1985 to adopt a definition based on the unit's design rather than its operating purpose, the Agency did not intend to regulate HAFs as incinerators and noted that the regulatory change was not intended to (or expected to) affect the number and identity of regulated incinerator units. See 50 FR 625 (Jan. 4, 1985). Moreover, given that many HAFs met the definition of boiler, it would have been anomalous and unintended for some HAFs to be subject to full regulation and others to be unregulated (until the present rules were adopted). Given these circumstances, the Agency is finding pursuant to § 270.10(e)(2) that there was substantial confusion as to which HAF owners and operators were required to submit a part A application and that this confusion is attributable to ambiguities in the subtitle C rules. Accordingly, such owners and operators may submit part A applications by the effective date of today's regulation.

We note that this policy on interim status eligibility date does not apply to other devices that are currently subject to regulation as an incinerator but claim to be an industrial furnace subject to the BIF rule and its interim status eligibility date. An example is an aggregate kiln that currently burns hazardous waste for the purpose of treatment (destruction) and, so, is subject to the incinerator standards of subpart O, parts 264 and 265. There is no ambiguity about the regulatory status of such a device given that the Agency clearly intended for such burning to be subject to the incinerator standards, and the Agency's rules have always so stated. Thus, the date for interim status eligibility for such facilities is the 1981 date for incinerator interim status.

D. Smelting, Melting, and Refining Furnaces Burning Hazardous Waste to Recover Metals

In the October 1989 supplement to the proposed rule, EPA solicited further comment on an appropriate regulatory regime for smelting furnaces burning hazardous waste for the exclusive purpose of material recovery. See 54 FR 43733. This issue was closely connected with the question of jurisdictional limitations on the Agency's authority to regulate industrial furnaces burning secondary materials for material recovery, discussed under the rubric of indigenous wastes. *Id.* at 43731–32. The Agency noted generally that where it did not perceive jurisdictional limitations on its authority, it regarded regulation of organic emissions from smelting furnaces as unnecessary given the normal absence of organics in the material fed to the unit. We also indicated concern at the prospect of regulating emissions of metals that were not attributable to the processing of hazardous waste, and accordingly solicited comment as to a means of determining when burning of hazardous waste resulted in emissions in excess of those from processing other materials in the device. *Id.* at 43733. With respect to a test for determining when wastes are indigenous, the Agency reproposed a fairly broad test that would have had the effect of excluding many wastes and devices from the Agency's jurisdiction, but would have distinguished between wastes being burned for the purpose of conventional treatment, and for the purpose of material recovery treatment.

These proposals proved extremely controversial. Perhaps more importantly, after the proposal was issued, the question of indigenous waste was the partial subject of the District of Columbia Circuit Court of Appeals' decision *API* v. *EPA*, 906 F. 2d 726 (D.C. Cir. 1990). In that decision, the court stated that the Agency had been overly restrictive in interpreting the jurisdictional limitations imposed by the statutory definition of solid waste based upon the court's earlier opinion in *American Mining Congress* v. *EPA*, 824 F. 2d 1177 (D.C. Cir. 1987). That earlier opinion, the court held, is limited to situations involving continuous recycling processes that are not part of the waste disposal problem, and certainly does not mandate the type of indigenous principle that the Agency discussed in the 1989 notice. 906 F. 2d at 740–41. The court accordingly remanded and directed the Agency to rethink whether any type of indigenous principle is warranted given the court's clarification of its earlier opinion.[7] *Id.* at 741.

The court's opinion, as well as the many comments on this issue, raise complex issues that EPA has not yet resolved. (In this regard, the Agency notes that the mandate in section 3004(q) to regulate facilities burning hazardous waste for energy recovery as may be necessary to protect human health and the environment does not

[6] We note as discussed previously in the text that, although all hazardous wastes fed to a HAF must have an as-generated halogen content of at least 20%, all such wastes need not have a heating value of 5,000 Btu/lb.

[7] Technically, the court remanded the Agency's decision not to formally adopt a treatment standard under the land disposal restrictions program for the residue from processing a waste the Agency had indicated would be indigenous to a particular type of metal recovery furnace. *Id.* at 740. EPA has since indicated, in motions filed with the court, that it views the interim treatment standard based on stabilization as applying in all cases where the residue remains a hazardous waste.

apply to devices burning for the purpose of material recovery, H. Rep. No. 198, 98th Cong., 1st Sess. 40, and so the court-ordered December 31, 1990 issuance date does not apply.) In particular, the Agency is presently studying the question of jurisdiction as part of a comprehensive effort to determine if the Agency's rules on recycling should be amended (either as a regulatory matter or as part of RCRA reauthorization). In the interim, however, the Agency does not believe it prudent to apply regulations to a whole potential class of devices and wastes that the Agency has not fully evaluated (since these situations would have been excluded from regulation under the proposal). See provision for conditional deferral of smelting, melting, and refining furnaces under § 266.100(c). In addition, because EPA has placed most of its efforts into issuing the mandated portion of these regulations as soon as possible, the Agency has not resolved the questions of how to regulate raised in the 1989 notice even for the class of smelting furnaces where authority would have existed under the proposed view of indigenous waste. The issue of whether material recovery is a form of "treatment" is also presently submitted for decision to a panel of the DC Circuit in *Shell Oil* v. *EPA* (No. 80–1532), and the Agency believes it prudent to await the court's ruling.

Another reason for deferring regulation of these devices is that the Agency wishes to study further whether regulation under the Clean Air Act may be more appropriate than RCRA regulation. Smelting, melting, and refining furnaces have been traditional subjects of Clean Air Act regulation, and with the advent of amended section 112 of the Clean Air Act Amendments of 1990, technology-based controls on toxic air emissions are likely to apply to these devices. Given that in many instances the principal risks potentially posed by air emissions from these devices would come from the nonhazardous waste portion of feed (see 54 FR at 43733), and that Clean Air Act regulation may result in control of individual toxics, the Agency believes that further study of the most appropriate means of regulation is warranted. (The Agency specifically requests information on other devices that may burn hazardous waste solely for metal recovery. EPA will use such information to consider whether the deferral for smelting, melting, and refining furnaces should be broadened provided that the principles stated here apply to the other devices as well.)

At the same time, EPA is concerned that this deferral not become a license for sham recycling activities, or for operations motivated by conventional treatment objectives rather than recovery purposes. Accordingly, the Agency has crafted this deferral narrowly. First, only smelting, melting, and refining furnaces (as used in the § 260.10 definition of "industrial furnace") burning hazardous waste solely to recover metals would be eligible for this deferral. In the unlikely event that one of these devices would be used to recover organics or nonmetal inorganics, EPA believes that substantial amounts of organics would be destroyed showing that the purpose of the activity was either conventional treatment or energy recovery. (The Agency notes specifically that it intends to include as a smelting, melting, or recovery furnace the types of high temperature metal recovery devices used as the basis for the land disposal prohibition treatment standard for waste KO61, and other similar devices.)

Second, sham recovery operations would be viewed as conventional treatment operations and would require a permit to control emissions. Although it is difficult to quantify when operations are sham, two fundamental notions are that any waste involved must contain economically viable amounts of metals to recover (the best objective measure would be the same or greater levels of metal as in normal nonhazardous feed stocks), and that the person recovering the metal be in the business of producing metals for public sale (whether to an ultimate user or for further processing or manufacture). See also 53 FR at 522 (Jan. 8, 1988). The limitations on Btu level and levels on toxic organics discussed below are further efforts to ensure that only *bona fide* metal recovery activities be deferred from emissions regulation at this time.

Third, today's regulations are deferred only when these devices burn (process) hazardous waste exclusively for metal recovery and not partially for destruction or energy recovery as well. To implement this policy, today's rule provides that a waste with a heating value of 5,000 Btu/lb or more (either as-generated or as-fired) is burned (at least partially) as a fuel. The heating value limit is based on the Agency's long standing sham recycling policy (48 FR 11157 (March 16, 1983)) that wastes with a heating value of 5,000 Btu/lb or more are considered to be fuels. See also 50 FR at 49171–173 (Nov. 29, 1985) (partial burning for energy recovery is covered by section 3004(q) and Btu-rich wastes are burned at least partially for that purpose).

Finally, only wastes that contain less than 500 ppm total toxic organic constituents listed in appendix VIII, part 261, will be considered to recover metals. EPA believes that it is important to have an objective measure to determine when burning is for metal recovery, and that a 500 ppm level is within the zone of reasonable values that the Agency could select for this purpose. As noted in the supplemental proposal in a closely related context, a 500 ppm level for total toxic organic constituents reasonably distinguishes wastes destined for material recovery from wastes burned for nonrecovery purposes because: (1) It represents a concentration of material far exceeding trace levels (generally measured in single digit parts per million (ppm) or tens of ppm); (2) this level of hazardous constituents could create an incremental health risk if burned inefficiently, or with inadequate emission controls; and (3) this level is high enough to indicate that an objective of burning is waste treatment—destroying nontrace level organics—as opposed to material recovery. (The Agency's earlier proposal dealt with the question of when a waste might be considered to be indigenous to an industrial furnace burning for material recovery, and considered the issue of whether these devices were burning for a material recovery purpose, and proposed the 500 ppm level adopted in this rule as a means of objectively ascertaining that purpose. 54 FR 43731.)

In order to be informed of persons claiming this deferral, and in order to decrease potential abuse of the deferral, the Agency is requiring that all persons notify the Agency if they assert that their smelting, melting, or refining furnaces are deferred from regulation when burning hazardous wastes because the purpose of the activity is metal recovery. In addition, all such persons have to keep records documenting the basis for the claim (i.e., that the wastes meet the Btu and total toxic organic constituent thresholds, the wastes contain recoverable levels of metals, and the device is indeed engaged in producing a metal product for public use). Sampling and analysis procedures specified in SW–846 must be used to make these determinations. These conditions are consistent with existing § 261.2(f) which requires that all persons claiming to be exempt or excluded from regulation because of a recycling activity to have the burden of proof demonstrating that they are entitled to the exemption or exclusion. In addition, the Agency notes that a consistent recommendation of state and regional officials at the Agency's recent

public meetings on the regulatory definition of solid waste was to provide notification and recordkeeping so that regulatory officials know that a person is operating in an exempt status in order to verify their claim. The Agency is acting on these recommendations in this rule.

The Agency also notes that the derived from rule could apply to the residues from metal recovery if metals are being recovered from listed hazardous wastes. EPA believes this to be explicit from the remand in *API* v. *EPA* discussed earlier. The Court indicated that the Agency's explanation for not establishing a treatment standard for the slag residue from processing waste K061 was erroneous, and remanded the case to the Agency to reconsider its explanation. 906 F. 2d at 740–42. Implicit (or perhaps explicit) in this holding is the fact that the Court viewed the residue as a hazardous waste still coming under the terms of the K061 land disposal prohibition (the Court referred repeatedly to "k061 slag" and mentioned the derived from rule as the basis for the slag being a hazardous waste, *id.* at 742), at least until the Agency provides a different explanation as to why the slag might not be a hazardous waste. Thus, because EPA has not yet provided a new explanation regarding the indigenous principle (as explained above), at the present time, EPA views residues from metal recovery of listed hazardous wastes are considered to be derived from treatment of hazardous waste and thus hazardous themselves unless some other principle (such as the Bevill amendment, or in some cases, status under an authorized state program) operates to achieve a different result.

Finally, the Agency notes that the deferral applies only to the furnace itself. The hazardous waste is subject to transportation and storage controls prior to introduction into the furnace. See § 266.100(c).

The deferral of regulation of emission standards does not apply to cement kilns, aggregate kilns, and HAFs that burn hazardous waste for purposes other than energy recovery. The Agency has studied these devices carefully and determined that the regulatory standards in today's rule are appropriate for these devices when they burn hazardous wastes for a purpose other than energy recovery. Consequently, the Agency sees no reason to defer emission standards for these types of units.

Part Three: Standards for Boilers and Industrial Furnaces Burning Hazardous Waste

Today's rule establishes controls for emissions of particulate matter, toxic organic compounds, toxic metals, and hydrogen chloride and free chlorine. Those controls are discussed below.

EPA notes that in some cases, today's rule potentially requires limitations on the content of nonwaste input to a boiler or industrial furnace that is burning hazardous waste. For example, compliance with the limits for metals, PM, and HCl/Cl_2 requires controls not only on the hazardous waste input but also potentially controls on other fuels and industrial furnace feedstocks. EPA has adopted this approach not to regulate the nonwaste input to these devices, but rather to ensure that burning hazardous waste in the device does not pose unacceptable risks to human health and the environment. These limitations function as operating conditions on the unit to ensure compliance with the hazardous waste emission standards. For example, unless limitations are established on nonwaste parameters, owners and operators could initially demonstrate compliance by burning clean raw materials along with hazardous waste, and then change their raw material input in a manner that causes emissions to increase significantly. In addition, the approach adopted today allows owners and operators maximum flexibility in demonstrating compliance with the emission standards by allowing adjustments to nonwaste input as a means of achieving compliance. The alternative of demonstrating compliance only through alteration of hazardous waste feed is not only less flexible, but would create enormous administrative difficulties (and add significant expense) for both regulated entities and Agency permit writers. (For example, stack monitoring might no longer be a feasible means of demonstrating compliance because one could not ascertain what portions of the emissions are attributable to burning hazardous waste.) For these reasons, we think the approach adopted today is the most sensible means of demonstrating compliance.

I. Emission Standard for Particulate Matter

Boilers and industrial furnaces that burn hazardous waste may emit substantial quantities of particulate matter (PM). (Emissions of particulate matter can have adverse effects on human health and the environment even if toxics are not adsorbed on the particulate matter. However, the Agency's chief concern in this rule is control of adsorbed toxics.) Because toxic metals and organic compounds may adsorb onto smaller size PM that can be entrained in the lungs, unregulated particulate emissions could pose a significant threat to human health. Although there may be limitations to the health-based standards, the metals and organic emissions standards promulgated in today's rule provide protection of public health based on current knowledge about toxic pollutants and available risk assessment methodologies. The PM control standard promulgated today will provide additional protection by ensuring that adsorbed metal and organics are removed from stack gas with the PM.

In today's rule, EPA is establishing a standard for boilers and industrial furnaces which limits particulate emissions to 0.08 gr/dscf (grains/dry standard cubic foot) corrected to 7% oxygen. This limit was chosen because it provides a common measure of protection from particulate emissions from boilers, industrial furnaces, and incinerators burning hazardous waste. This standard may be redundant for: (1) A new, large capacity facility assigned to a specific source category which is governed by a New Source Performance Standard (NSPS); (2) a waste burning facility located in a non-attainment area subject to State Implementation Plan (SIP) standards; (3) a facility with standards for metals and HCl emissions that result in particulate emissions below 0.08 gr/dscf; and (4) a facility subject to a stricter standard based on Best Available Control Technology (BACT) imposed pursuant to the Clean Air Act's Prevention of Significant Deterioration (PSD) program. In such cases, the device would be subject to the more stringent particulate matter standard, not the RCRA 0.08 gr/dscf standard, and the additional burden of demonstrating compliance with the applicable particulate matter standard concurrently with the applicable emissions standards in today's rule for organic compounds, metals, and acid gases will not be substantial. We believe, however, that there are many situations where a BIF is either not currently subject to a particulate matter standard, or the standards is higher than the RCRA 0.08 gr/dscf standard.

The Agency has considered lowering the particulate standard to take advantage of technology advances made in air pollution control and to be consistent with the proposed standard of 0.015 gr/dscf for municipal waste incinerators. (We note that the proposed

standard for MWIs also served as a surrogate to control emissions of toxic metals. 54 FR 52219. In contrast, today's rule has separate emission standards for each toxic metal.) We are not prepared to do that at this time, however, because we have not conducted the studies to establish an appropriate PM standard that represents best demonstrated technology (BDT). Although many boilers and industrial furnaces may be able to achieve a PM standard lower than 0.08 gr/dscf (in fact, the PM NSPS for specific types of BIFs is lower than 0.08 gr/dscf), we are not certain that all BIFs can meet a standard of 0.015 gr/dscf. This is because some industrial furnaces have a very high (uncontrolled) particulate loading due to entrained particles of raw materials. Examples are cement kilns and light-weight aggregate kilns. Hence, a single PM standard of 0.015 gr/dscf cannot now be promulgated.

The Agency firmly believes that the 0.08 gr/dscf PM standard, when used as a supplement to the risk-based metal controls provided by today's rule, provides protection of human health and the environment. Given that hazardous waste burned in BIFs could contain virtually unlimited concentrations of toxic metals, the Agency believes that risk-based standards are needed to supplement the PM standard for hazardous waste burning irrespective of whether the PM standard represents best-demonstrated technology. Even under a PM standard as low as 0.015 gr/dscf, a large fraction of the PM emitted from a hazardous waste combustion device could be comprised of toxic metals that could result in substantial health risk.

Nonetheless, the Agency will consider if additional PM controls are warranted to control emissions of toxic metals. In that evaluation, the Agency will consider whether the additional controls, if any, should be promulgated in the future under the new Clean Air Act. See discussion in section III.A of part One of this preamble. Finally, we note that permit writers also could impose a lower PM standard where facts warrant, pursuant to the omnibus permit authority in section 3005(c)(3).[8]

[8] EPA notes that permit writers choosing to invoke the omnibus permit authority of § 270.32(b)(2) to add conditions to a RCRA permit must show that such conditions are necessary to ensure protection of human health and the environment and must provide support for the conditions to interested parties and accept and respond to comment. In addition, permit writers must justify in the administrative record supporting the permit any decisions based on omnibus authority.

A. Basis for Final Rule

Particulate matter (PM) is controlled from combustion sources to limit emissions of toxic metals and PM per se (i.e., because of human health and ecological impacts associated with PM that does not contain toxic metals). In the May 6, 1987 proposed rule, EPA suggested that a PM emission standard was not needed for boilers and industrial furnaces because the risk-based metals controls provide adequate control of metals emissions. The Agency reasoned that a standard intended to control PM per se would be more appropriately applied to these sources under authority of the Clean Air Act rather than RCRA.

EPA received numerous comments on the May 6, 1987 proposed rule suggesting the need for a particulate standard for boilers and furnaces burning hazardous waste. Many commenters believed that, notwithstanding the risk-based metals controls, unregulated PM emissions with adsorbed toxic metals and organic compounds could pose a significant heath risk. In addition, three commenters suggested that EPA address the issue of particulate control during soot-blowing cycles when levels of particulate emissions are 4 to 7.2 times the level of emissions under normal operation. The Agency carefully considered these comments and subsequently determined that the risk-based metals standards should be supplemented with a PM standard to provide a common measure of control for metals. This decision was based in part on a consideration of commenters' concerns about the limitations of risk-based metals standards. See 54 FR 43720–21. Hence, the Agency subsequently proposed a particulate emissions standard of 0.08 gr/dscf (grains/dry standard cubic foot) corrected to 7% oxygen in the October 26, 1989 supplement to the proposed rule. The standard would be applicable to all boilers and industrial furnaces not governed by a more stringent (NSPS or SIP) standard.

1. Alternatives Considered. In selecting the standard for boilers and industrial furnaces, the Agency considered the following alternatives: (1) Apply the current NSPS standard for steam generators burning waste; (2) apply the applicable NSPS; or (3) apply the existing hazardous waste incinerator standard. These options are discussed in the 1989 supplemental notice (54 FR 43720).

Many commenters supported the proposed particulate standard of 0.08 gr/dscf. Several commenters, however, opposed this limit, arguing against imposing a standard appropriate for incinerators on boilers and furnaces. Still other commenters suggested that the 0.08 gr/dscf limit did not go far enough in protecting the public health. These respondents argued for a lower limit comparable to that the Agency proposed for municipal waste incinerators.

The Agency continues to believe that the 0.08 gr/dscf PM standard, when used as a supplement to the risk-based metal controls provided by today's rule, provides substantial protection of human health and the environment.

2. Basis for Standard. Today's rule promulgates the proposed particulate emission limit of 0.08 gr/dscf because, as a supplement to the risk-based metals controls, it provides a common measure of protection from particulate emissions from boilers, industrial furnaces, and incinerators burning hazardous waste. In addition to providing control of particulate metals and adsorbed organic compounds, the 0.08 gr/dscf standard should also ensure that the Clean Air Act's National Ambient Air Quality Standard (NAAQS) for particulates is achieved in most cases. An analysis of existing sites shows that emissions of particulates at 0.08 gr/dscf could result in MEI levels of up to 30% of the maximum daily PM_{10} (particulate matter under 10 microns) NAAQS (150 mg/m^3). If background particulate levels at a site are high (i.e., the site is in a attainment area), particulate emissions from the device should also be addressed as part of the State Implementation Plan (SIP) (as they are now for hazardous waste incinerators in particulate non-attainment areas). Therefore, although the 0.08 gr/dscf standard may not ensure compliance with the NAAQS in every situation, this issue will be addressed by the SIP since the facility would be, by definition, in a non-attainment area for particulate emissions.

B. Interim Status Compliance Procedures

Facilities operating under interim status must comply with the PM emission standard. By the effective date of the rule, owners/operators must submit a certification of precompliance that documents their use of engineering judgment to show that, considering feed rates of ash from all feed streams, partitioning of ash to bottom ash or product, and the PM removal efficiency of the air pollution control system (APCS), PM emissions are not likely to exceed the 0.08 gr/dscf limit. Owners and operators must also establish and provide with the precompliance

certification limits on feed rates of ash in all feed streams consistent with those used to determine that emissions of particulate matter are not likely to exceed the standard. The facility may not exceed these feed rates during interim status (unless amended by a revised certification of precompliance). Further, within 18 months (unless extended) of promulgation, owners/operators must conduct emissions testing and certify that emissions do not exceed the limit. See section VII in part Three of this preamble for more information.

C. Implementation

Owners/operators must demonstrate compliance with the PM standard using Methods 1–5 of 40 CFR part 60, appendix A. The compliance test for certification during interim status and the trial burn for facilities applying for a RCRA operating permit must be representative of worst-case operating conditions with respect to particulate emissions that will occur during operation of the facility (i.e., because limits on operating conditions applicable for the remainder of interim status will be based on operating conditions during the compliance test).

The PM standard is implemented by limiting the feed rate of ash from all feed streams (i.e., hazardous waste, other fuels, raw materials) and by limits on APCS-specific operating parameters. The limits are established during interim status based on the compliance test, and in the operating permit based on the trial burn.

The final rule gives special consideration to cement and light-weight aggregate kilns because their raw material feed streams contain the vast majority of the ash input and resulting PM. Therefore, owners/operators of cement kilns and light-weight aggregate kilns are not required to monitor ash feed rates of feed streams. We emphasize, however, that cement kilns and lightweight aggregate kilns, like all BIFs, are still required to demonstrate conformance with the PM emission standard during a compliance test (under interim status) or trail burn (under a part B application). The Agency believes that the capacity limit on the facility (expressed in appropriate units such as raw material feed rate) and the limits on the air pollution control system (APCS) operating parameters applicable during both interim status and under a subsequent operating permit will ensure that cement and light-weight kilns continuously comply with the PM standard.[9]

II. Controls for Emissions of Toxic Organic Compounds

Burning hazardous waste that contains toxic organic compounds (i.e., organic compounds listed in appendix VIII of 40 CFR part 261) under poor combustion conditions can result in substantial emissions of the toxic compounds originally present in the waste as well as other compounds, due to partial but incomplete combustion of the constituents in the waste. The quantity of toxic organic compounds emitted depends on the concentrations of the toxic compounds in the waste, the waste firing rate (i.e., the percentage of total fuel provided by the hazardous waste to the boiler or industrial furnace), and the combustion conditions under which the waste is burned. The risk posed by the emissions depends on the quantity and toxicity of the compounds emitted and on the ambient levels to which persons are exposed. Hypothetical risk assessments show that under poor combustion conditions that achieve only 99 percent or 99.9 percent destruction and removal efficiency (DRE) of organic compounds, risks to the maximum exposed individual (MEI) from unburned carcinogenic organics found in hazardous waste can result in increased lifetime cancer risks of 10^{-4}.[10]

The Agency is controlling the emissions of toxic organic compounds from boilers and industrial furnaces that burn hazardous waste with two performance standards. First, a 99.99 percent destruction and removal efficiency (DRE) standard for principal organic hazardous constituents (POHCs) in waste feeds will ensure that constituents in the waste are not emitted at levels that could pose significant risk in virtually all scenarios of which the Agency is aware.[11] Second, limits on flue gas concentrations of carbon monoxide (CO) and, where specified, hydrocarbons (HC) will ensure that combustion devices operate continuously at high combustion efficiency and emit products of incomplete combustion (PICs) at levels that will not pose adverse effects on public health and the environment. The basis for these standards is discussed below.

A. DRE Standard

As proposed, the Agency is promulgating a 99.9999% DRE standard[12] for those acutely hazardous wastes listed because they contain dioxin[13] (and waste mixed with those wastes), and a 99.99 percent DRE performance standard for all other wastes. This standard is protective, it can be readily achieved by boilers and industrial furnaces, and it will ensure that the Agency's controls are consistent for all combustion devices (boilers, industrial furnaces, and incinerators) that pose similar risks.

Hypothetical risk assessments have shown that a 99.99 percent DRE standard for POHCs is protective of risks posed by emissions of organic constituents in the waste in virtually every scenario of which the Agency is aware.[14] (EPA considers elsewhere in this notice the issue of products of incomplete combustion.) Increased lifetime cancer risks to the maximum exposed individual (MEI) from an incinerator operating at 99.99 percent DRE would generally be 10^{-6} or less. Threshold (i.e., noncarcinogenic) organic compounds also would not be expected to be present in emissions from hazardous waste burned in boilers and industrial furnaces at levels that could pose a health hazard under the 99.99 percent DRE standard.

EPA is aware, however, that the DRE standard does not directly control the mass emission rate (e.g., pounds per hour) of unburned toxic organic constituents in the waste. Although three are hypothetical situations in which risks from POHCs could be significant under a 99.99 percent DRE standard (e.g., boilers or industrial furnaces located in urban areas burning high volumes of waste with high concentrations of highly potent carcinogenic organics), the Agency is not aware that any such situations are

[9] We note, moreover, that some boilers and many industrial furnaces are already subject to a particulate matter (PM) standard under a NSPS, SIP, or PSD program and the applicable PM standard is generally more stringent than the 0.08 gr/dscf standard provided by today's rule. Thus, these devices are already under a regulatory compliance program for a PM standard. We note further that the more stringent PM standard applies.

[10] Engineering-Science, Background Information Document for the Development of Regulations to Control the Burning of Hazardous Waste in Boilers and Industrial Furnaces, Volume III, January 1987 (NTIS # PB 87 173845).

[11] Except that 99.9999% DRE is required for dioxin-listed hazardous waste.

[12] The proposed formula for calculating DRE has been revised in the final rule (see § 266.104(a)) to make it mathematically correct considering use of significant figures.

[13] EPA Hazardous Wastes FO20, FO21, FO22, FO23, FO26, and FO27.

[14] Engineering Science, op. cit.

actually occurring. If, however, during the permit process, it appears that a high-risk scenario may exist, permit officials may use the omnibus permit authority[15] of section 3005(c)(3) of the Resource Conservation and Recovery Act (RCRA) codified at § 270.32(b)(2) to develop permit requirements, as necessary, to protect human health and the environment (e.g., by requiring a 99.9999 percent DRE, by limiting the feed rate of particular toxic compounds, or by setting a mass emissions rate).

1. Selection of POHCs for DRE Testing

In the April 27, 1990 proposed rule to amend the incinerator standards (55 FR 17890), EPA outlined the considerations to be made by applicants and permitting officials in selecting POHCs for DRE trial burns. Given that the DRE implementation procedures for boilers and industrial furnaces (BIFs) are identical to those for incinerators, the discussions in the incinerator proposed rule are pertinent to this rule.

A major factor in selecting a POHC for DRE testing is its incinerability relative to other toxic organic compounds. A number of indices can be used to predict incinerability including heat of combustion, autoignition temperature, thermal stability under excess oxygen conditions, and thermal stability under low oxygen (substoichiometric) conditions. An incinerability ranking based on thermal stability at low oxygen concentrations ($TSLoO_2$) shows promise and is currently seeing widespread use in incinerator permits. A number of commenters responded to EPA's request for comment on the use of the $TSLoO_2$ index for POHC selection. In general, they raised no problems with use of the index. Their main concern appeared to be that EPA choose one index and apply it consistently.

The Agency, however, is not requiring the use of a particular index. Due to the various "failure modes" different organic compounds are susceptible to during the destruction process in a combustion device, and the evolving state of knowledge in this area, the Agency feels that the POHC selection process is technically complex, and that it should involve a number of considerations, rather than simply one incinerability ranking. Thus, EPA instead recommends that permit writers and applicants consider these indices and other relevant factors and use their judgment and applicable guidance on a case-by-case basis to select POHCs for the trial burn.

2. Use of POHC Surrogates

A number of laboratory-scale, pilot-scale, and field-scale tests have been conducted to investigate the use of nontoxic tracer surrogates (e.g., sulfur hexafluoride (SF_6)) rather than POHCs selected from appendix VIII of part 261. Sulfur hexafluoride, in particular, shows promise as a conservative tracer surrogate for compounds which are susceptible to the thermal failure mode (i.e., it is difficult to destroy unless sufficiently high temperatures are reached). It is readily available commercially, and is inexpensive and nontoxic. POHCs that are listed on appendix VIII, especially in situations where spiking is required to increase concentrations in a waste for DRE testing, are often difficult to obtain, are expensive, and are a health hazard to operators. Sampling and analysis techniques for SF_6 are well documented because of its long use as a tracer gas for monitoring ambient air and are more straightforward (simpler) and less expensive than sampling techniques for appendix VIII, part 261, compounds (e.g., VOST and MM5).

Numerous commenters responded to EPA's request for information on an approach for simplifying and standardizing DRE testing. Commenters supported standardization of DRE testing provided the approach is equitable for all boilers, industrial furnaces, and incinerators. Comments were received in support of all three approaches proposed by EPA ("POHC soup," surrogates, and specific waste analysis). Commenters generally supported use of surrogates in lieu of extensive waste analysis for design of DRE tests. Other commenters suggested using a limited number of major waste constituents as POHCs, such as carbon tetrachloride, perchloroethylene, trichloroethylene, and monochlorobenzene, until it can be shown that a universal surrogate, such as sulfur hexafluoride (SF_6), is comparable in demonstrating DRE performance. Sulfur hexafluoride was recommended by some commenters as a good surrogate choice based on the high accuracy of results with the compound and ease of use.

However, since the April 27 proposed rule, data have become available showing cases where other organic compounds were more difficult to destroy than SF_6 under conditions of low oxygen. This is consistent with theory, since SF_6 can be destroyed under conditions of high temperature and low oxygen relatively easily compared to compounds which need oxygen to decompose. Thus, although SF_6 appears to show promise as a surrogate for testing the thermal failure mode because of its stability at high temperatures, it does not appear to be adequate as a "universal" surrogate, since it does not test for low oxygen or "mixing" failure.

Nevertheless, today's rule explicitly allows the use of surrogate, nontoxic compounds for selection as POHCs for DRE testing. As for any other type of POHC, the use of such compounds must be approved on a case-by-case basis by permit officials based on technical support provided by the applicant. The applicant's trial burn plan must adequately document the correlation between the DRE of the surrogate compound and the DREs of the appendix VIII compounds anticipated to be burned at the facility under the facility's permit.

3. Waiver of DRE Trial Burn for Boilers Operating Under the Special Operating Requirements

In 1987, the Agency proposed to waive the trial burn requirement to demonstrate DREs for boilers that operate under special operating requirements (SOR). The SOR required that, in addition to meeting the proposed 100 ppmv CO limit, a qualifying boiler must: (1) Burn at least 50 percent fossil fuel in the form of oil, gas, or coal; (2) operate at a load of at least 25 percent of its rated capacity; (3) burn hazardous waste fuel with an as-fired heating value of at least 8,000 Btu/lb; and (4) inject the hazardous waste fuel through an acceptable atomization firing system.

The SOR were based on the results of nonsteady-state boiler testing. From these results, the Agency believed that boilers operating under the SOR would maintain a hot, stable flame conducive to maintaining high combustion efficiency, resulting in maximum destruction of organic constituents in the hazardous waste fuel. The Agency believed that these boilers would achieve at least 99.99 percent DRE, and therefore, a trial burn to demonstrate DRE would not be necessary.

The Agency continues to believe that boilers operating under the SOR will achieve 99.99 percent DRE. However, based on comments received on the proposed SOR and on further examination of the previous steady-

[15] EPA notes that permit writers choosing to invoke the omnibus permit authority of § 270.32(b)(2) to add conditions to a RCRA permit must show that such conditions are necessary to ensure protection of human health and the environment and must provide support for the conditions to interested parties and accept and respond to comment. In addition, permit writers must justify in the administrative record supporting the permit any decisions based on omnibus authority.

state and nonsteady-state boiler test results, the Agency has made the following modifications to the SOR:

(1) Limit eligibility for the waiver to nonstoker, watertube boilers;

(2) Revise the requirement that the boiler fire 50 percent fossil fuel or fuels derived from fossil fuel to include tall oil, to allow permit officials to approve on a case-by-case basis other nonhazardous fuels with combustion characteristics comparable to fossil fuel, and to require for all such primary fuels (i.e., fossil fuels, tall oil, and other fuels approved on a case-by-case basis) a minimum heating value of 8,000 Btu/lb;

(3) Clarify that the hazardous waste fuel fired must have an as-fired heating value of 8,000 Btu/lb and require that each fuel fired in the burner where hazardous waste is fired must have an as-fired heating value of 8,000 Btu/lb;

(4) Increase the minimum load requirement from 25% to 40%; and

(5) Eliminate the lower viscosity requirements for the hazardous waste and decrease the upper viscosity limits for the hazardous waste to 300 seconds, Saybolt Universal (SSU), measured at the as-fired temperature of the fuel.

As proposed in 1987, boilers with a trial burn waiver under the SOR must meet the Tier I CO limit of 100 ppmv [16] and must comply with all other requirements of the final rule (e.g., metals standards, PM limit).

The revised SOR are presented below, along with the basis for the revisions.

a. The Boiler Must Be a Nonstoker, Watertube Boiler. Commenters stated that the nonsteady-state testing of only three stoker and firetube boilers is insufficient to determine whether 99.99 percent DRE would always be achieved under the SOR. Commenters also maintained that the stoker and firetube boilers tested were not representative of all types and sizes.

The Agency agrees that there is limited data demonstrating that stoker and firetube boilers can achieve 99.99% DRE under the SOR. In the Agency's steady-and nonsteady-state testing, only three firetube boilers and one stoker boiler were tested under steady-state conditions, and one stoker boiler was tested under nonsteady-state conditions. The remainder of the boilers tested were watertube boilers.

The results from one of the firetube boiler tests generally support the ability of firetube boilers to achieve 99.99 percent DRE, but this boiler was specially designed to combust hazardous waste. The Agency is concerned whether more conventionally designed firetube boilers could easily achieve this level of DRE. DREs could not be calculated at one of the other firetube boiler tests due to inadequate waste feed levels, and sampling and analytical problems occurred at the third firetube boiler test. The stoker boiler tested under steady-state conditions did not demonstrate 99.99 percent DRE. In addition to the limited data for these boiler types, a greater potential exists for poor distribution of combustion gases and localized cold spots in firetube and stoker boilers that can result in poor combustion conditions. This is because these boilers generally burn fuels with a large and variable particle size on a bed, thus, making even distribution of combustion air difficult. Therefore, the final rule precludes stoker or firetube boilers from the automatic waiver of a DRE trial burn.

b. A Minimum of 50 Percent of the Fuel fired to the Boiler Must Be High Quality "Primary" Fuel Consisting of Fossil Fuels or Fuels Derived From Fossil Fuels, Tall Oil, or, if Approved on a Case-By-Case Basis, Other Nonhazardous Fuel Comparable to Fossil Fuel, and All Such Primary Fuels Must Have a Minimum As-Fired Heating Value of 8,000 Btu/lb. Thirteen commenters found the 50 percent fossil fuel requirement to be overly restrictive. In particular, one commenter proposed that the requirement be rephrased to allow the burning of no more than 50 percent hazardous waste in mixtures such that nonhazardous waste fuel supplements can be fired. Another commenter suggested eliminating the fossil fuel requirement for wastes that have heating values comparable to fossil fuels. Eleven commenters supported the burning of high quality non-fossil fuels, such as tall oil (i.e., fuel derived from vegetable and rosin fatty acids) and the by-products derived from the fractional distillation of tall oil. Many of these commenters said they have burned these materials and claimed they have heating values and combustion characteristics similar to fossil fuels. Three commenters requested that the burning of wood wastes as a primary fuel be allowed. One of these commenters presented the results from six trial burns for wood waste boilers which demonstrated that combustion zone temperatures in these types of boilers are consistent, and that a hot, stable flame conducive to the destruction of organic constituents in the waste is present under these conditions.

Based on the comments and information presented regarding the use of tall oil (i.e., tall oil burns like commercial fuel oil), the Agency is revising the 50% primary fuel requirement to include tall oil. Also, the Agency believes that the combustion of other nonhazardous fuels that have heating values of at least 8,000 Btu/lb (representing the lower heating value range of most sub-bituminous coals), and combustion characteristics similar to fossil fuels, will ensure a hot, stable flame conducive to the destruction of organic constituents in the waste. An owner/operator who is planning to burn such a fuel supplement must present information on the supplement's combustion characteristics for the Director's review. Concerning wood wastes, the Agency continues to believe that these wastes may not provide the hot, stable combustion zone conditions needed to achieve 99.99 percent DRE. Due to the higher flue gas moisture, excess air, CO levels, and lower furnace temperatures accociated with wood firing, the potential for less than 99.99 percent DRE exists. Therefore, boilers that fire wood wastes must demonstrate DRE capabilities through a trial burn.

The 50 percent minimum primary fuel requirement, on a total heat or volume input basis, whichever results in the greater volume of primary fuel, also is needed to ensure appropriate combustion zone conditions. This limit was based on the maximum levels of hazardous waste burned in the boilers tested by EPA under nonsteady-state conditions.

Finally, the Agency recognized that the term "fossil fuel" can include peat or other fuels with heating values below 8,000 Btu/lb. Because the test data used to support the waiver were from boilers fired with primary fuels with heating values higher than 8,000 Btu/lb, the final rule applies the minimum 8,000 Btu/lb as-fired heating value limit to all fuels, including fossil fuels, used to meet the minimum 50% primary fuel requirement.

c. Boiler Load Must Be at Least 40 Percent. Several commenters addressed the proposed minimum load level of 25 percent. Only one commenter considered it to be too low. This commenter advocated an 80 percent load requirement unless high efficiency combustion can be demonstrated at the trial burn. One commenter considered the 25 percent requirement to be arbitrary, but within current practice. Another commenter recommended that the level be more flexible for multiple burner boilers. One commenter

[16] Boilers complying with the Tier II PIC controls where CO levels exceed 100 ppmv are not eligible for the automatic waiver of the DRE trial burn. This is because the DRE test data used to support the waiver was obtained for boilers operating at CO levels below 100 ppmv.

recommended that the requirement to maintain a boiler load of 25 percent be eliminated if the Btu value of the wastes burned is equivalent to that of coal thereby providing the heat input necessary to sustain normal combustion operations.

Boiler testing conducted at a load as low as 26 percent has demonstrated that certain boilers can achieve 99.99 percent DRE when operated at low loads. However, due to concerns related to flame stability, combustion control, and heat transfer effects associated with load turndown on some boilers, the Agency has raised the boiler load limit from 25 percent to 40 percent of design load. Operation of some boilers at loads of less than 40 percent can result in significantly higher excess air levels and localized decreases in flame temperatures. In addition, most of the boilers tested to develop the operating requirements operated at loads above 40%. Therefore, limiting the boiler to 40% is more consistent with the available test data. If an owner/operator expects to operate a unit at a lower load while firing hazardous waste, a trial burn to demonstrate 99.99 percent DRE is required.

d. The Heating Value of the Hazardous Waste Fuel Must Be at Least 8,000 Btu/lb, As-Fired, and Each Fuel Fired in a Burner Where Hazardous Waste Is Fired Must Have a Heating Value of at Least 8,000 Btu/lb, As-Fired. Eleven commenters expressed concern that the "as-fired" requirement proposed in 1987 will require the blending of wastes that have heating values of less than 8,000 Btu/lb with other wastes and/or the primary fuel before atomization. Four commenters documented a number of problems with blending low Btu wastes, including immiscibility and other mixing problems, increased quantity of materials requiring handling, difficulty of controlling feed during unit upsets, and impracticality for coal-fired systems. Five commenters requested that the heating value be determined on a total-burner basis, as a composite of primary fuel and waste. Three additional commenters recommended that the minimum heating value of wastes be lowered to 5,000 Btu/lb.

The Agency agrees that waste fuel blending can present problems in some instances. However, the Agency is concerned that allowing low Btu wastes to be fired separately from the fuel and then atomized in the flame region of the burner might make it difficult to ensure good atomization, proper feed system operation, and, consequently, adequate combustion of the hazardous waste. Therefore, the 8,000 Btu/lb requirement, which represents the lower range of heating values of fossil fuels, applies to the as-fired heating value of the hazardous waste and to the as-fired heating value of any other fuel fired in the same burner with the hazardous waste.[17]

If hazardous waste with a heating value below 8,000 Btu/lb [18] is mixed with the "primary" fuel to meet the as-fired minimum heating value for hazardous waste of 8,000 Btu/lb, that quantity of primary fuel may not be counted toward the 50% primary fuel requirement. This is because the purpose of requiring 50% of the fuel to be "primary" fuel is to ensure a hot, stable flame to combust the hazardous waste. If a portion of the primary fuel is blended with the hazardous waste to increase the heating value of the hazardous waste as-fired, then that portion of the primary fuel is not providing the hot, stable flame.

The following example shows how this requirement will work. Suppose a boiler is fired with 70% primary fuel and 30% hazardous waste, and that half of the primary fuel is blended with the hazardous waste to achieve an as-fired heating value of 8,000 Btu/lb. This boiler would not be eligible for the automatic waiver of the DRE trial burn because it is fired with only 35% primary fuel (half of the 70%) that is not blended with the hazardous waste to meet the minimum as-fired heating value limit of 8,000 Btu/lb.

e. The Hazardous Waste Must Be Fired with an Atomization System. Seven commenters argued that lower viscosity limits are unnecessary. Three commenters stated that it is common to atomize wastes well below 150–200 SSU, and that No. 2 oil has a viscosity of 32.6–37.9 SSU at 100 °F. One commenter indicated that the upper viscosity limits appear high for the atomization systems specified. One commenter disagreed and said that the high limits are in the correct range. Six commenters expressed concern that the particle size limits are overly restrictive. One commenters stated that diverse waste streams can be handled to achieve good destruction without particle size limits. Another commenter disagreed with EPA by stating that they are not familiar with nozzles designed for particle sizes as small as 200 mesh. Three commenters said the waste viscosity should be left to the discretion of the owner/operator since it is industry practice to operate at viscosities which provide optimum atomization.

Based on the commenters' arguments, the Agency has eliminated the lower viscosity requirements and reduced the upper limit to 300 SSU (Seconds, Saybolt Universal) measured at the as-fired temperature of the hazardous waste. We eliminated the lower level because, after consideration of comments and re-evaluation, we believe that the concern stated at proposal—formation of a fog at low viscosity levels which could result in poor combustion conditions—is not likely to occur. At proposal, the Agency established upper viscosity limits ranging from 300 to 5,000 SSU, depending on the type of atomization system. Commenters noted that, as a practical matter, wastes with as-fired viscosities greater than 300 are not fired in an atomization system. These modifications will give facilities the flexibility to preheat wastes before atomization and are consistent with general industry practice for good atomization.

Regarding particle size limits the final rule establishes the proposed limits. When high pressure air or steam atomizers, low pressure atomizers, or mechanical atomizers, 70% of the waste must pass a 200 mesh (74 micron) screen. When a rotary cup atomizer is used, 70% of the waste must pass a 100 mesh (150 micron) screen. These mesh sizes are consistent with the design droplet size of the atomizers.

Owners/operators of boilers who propose to fire hazardous waste outside these viscosity and particle size limits must conduct a DRE trial burn.

B. PIC Controls

The burning of hazardous waste, like virtually any combustion process, results in emissions of incompletely burned organic compounds, or products of incomplete combustion (PICs). PICs can be unburned organic compounds that were present in the waste, thermal decomposition products resulting from organic constituents in the waste, or compounds synthesized during or immediately after combustion. If a device is operated under poor combustion conditions, substantial emissions of PICs can result (even if

[17] We note that the 8,000 Btu/lb minimum heating value also applies to the "primary" fuel that must comprise at least 50% of the boiler's fuel requirements. However, the remainder of the boiler's fuel requirements may be provided by hazardous waste and other fuels. There are no restrictions on the other fuels unless they are fired in the same burner with the hazardous waste. In that case, those other fuels, like the hazardous waste and "primary" fuel, must have a minimum heating value of 8,000 Btu/lb.

[18] We note that, as discussed elsewhere in the text, the sham recycling policy stays into effect until an existing facility certifies compliance with the emissions standards (see § 266.103(c)). Thus, until that time, hazardous waste burned in a BIF must have an as-generated heating value of 5,000 Btu/lb, unless the waste is burned solely as an ingredient.

99.99% DRE is demonstrated for POHCs; this just means that the POHC is not being emitted in its original form). However, it should be noted that estimates of risk to public health resulting from PICs, based on available emissions data, indicate that PIC emissions do not pose significant risks when BIFs and incinerators are operated under good combustion conditions.

Nonetheless, the Agency is concerned about the potential health risk from PICs because the available information has serious limitations. It is very difficult to identify and quantify emissions of thousands of different compounds, some of which are present in minute quantities. Although elaborate and expensive sampling and analytical techniques have been developed that can identify many PICs, many others cannot be identified and quantified with current techniques. Further, health effects information adequate to conduct a health risk assessment considering exposure via direct inhalation is not currently available on many organic compounds that may be emitted from combustion systems. Finally, the available public health and environmental risk assessment tools are incomplete. Data are currently available to conduct indirect exposure analyses (e.g., exposure via the food chain, drinking water, dermal exposure) on only a few organic compounds, and it will be some time before the Agency will be able to quantify impacts on ecological resources on a site-specific basis for purposes of establishing emissions standards.

Given the limited information about the hazards that PIC emissions may pose, EPA believes it is prudent to require that boilers and industrial furnaces operate at a high combustion efficiency to minimize PIC emissions.

EPA is promulgating today a two-tiered approach to control PICs as discussed in the October 29, 1989, supplemental notice (54 FR 43721–28). Under Tier I, CO is limited to 100 ppmv. Under Tier II, the Agency is providing an alternative standard. The facility need not meet the 100 ppmv CO limit provided the facility can demonstrate that the hydrocarbon (HC) concentration in the stack gas does not exceed a good operating practice-based limit of 20 ppmv. The alternative CO limit under Tier II must be established during the test burn based on the average over all runs of the highest hourly rolling average for each run.

1. Use of a CO Limit to Control PICs.

Generally accepted combustion theory holds that low CO flue gas levels combined with low CO flue gas levels combined with low excess oxygen levels indicate a boiler, industrial furnace, or incinerator is operating at high combustion efficiency. Operating under high combustion efficiency helps to ensure minimum emissions of unburned (or incompletely burned) organics. In the first stage of the combustion of hazardous waste fuel, the POHCs thermally decompose in the flame to form other, usually smaller, compounds termed products if incomplete combustion. In this first stage of combustion, these PICs also decompose to form CO.

The second stage of combustion involves the oxidation of CO to CO_2 (carbon dioxide). The CO to CO_2 step is the slowest (rate-controlling) step in the combustion process because CO is considered to be more thermally stable (difficult to oxidize) than other intermediate products of the combustion of hazardous waste constituents. Because fuel is being fired continuously, these combustion stages occur simultaneously.

Thus, in the waste combustion process, the "destruction" of POHCs is independent of flue gas CO levels. CO flue gas levels cannot be correlated with DREs for POHCs, and may also not *correlate* well with PIC destruction. Although some emissions data indicate a weak correlation between CO and PICs, the data generally indicate that there is a relationship between the two parameters: When CO is low, PIC emissions are relatively low. The converse may not hold: when CO is high, PICs may or may not be high.

Low CO is an indicator of the status of the CO to CO_2 conversion process, the last rate-limiting oxidation process. Because oxidation of CO to CO_2 occurs after the destruction of a POHC and its (other) intermediates (PICs), the absence of CO is a useful indication of POHC and PIC destruction. The presence of high levels of CO in the flue gas is a useful indication of inefficient combustion, and at some level of elevated CO flue gas concentration, is an indication of the failure of the PIC and POHC destruction process.

EPA believes it is necessary to limit CO levels to levels that are indicative of high combustion efficiency because the precise CO level that indicates significant failure of the PIC and POHC destruction process is not known. In fact, this critical CO level may depend on site-specific and event-specific factors (e.g., fuel type, fuel mix, air-to-fuel ratios, and the rate and extent of changes in these and other factors that affect combustion efficiency). EPA believes that limiting CO levels is also reasonable because: (1) It is a widely practiced approach for monitoring combustion efficiency—some boilers and industrial furnaces are already equipped with CO monitors, and many are equipped with flue gas oxygen monitors; (2) the monitors may pay for themselves through fuel savings resulting from operation of the boiler or industrial furnace closer to maximum combustion efficiency; and (3) well-designed and well-operated boilers and industrial furnaces can readily be operated in conformance with either the 100 ppmv CO limit under Tier I, or the 20 ppmv HC limit under Tier II.

2. Tier I PIC Controls: 100 ppmv CO Limit

a. Basis for the 100 ppmv CO Limit. The May 6, 1987 proposed rule would have applied the same CO emission limits to all boilers and industrial furnaces: a lower limit of 100 ppmv over an hourly rolling average and a 500 ppmv limit over a 10-minute rolling average. The hazardous waste feed would be shut off automatically if either limit was exceeded. However, the hazardous waste would be cutoff immediately once the 500 ppmv limit was exceeded while the waste feed would be cutoff within 10 minutes if the 100 ppmv limit was exceeded. Further if the hazardous waste feed was cutoff more than 10 times in a month, the proposed rule would have prohibited further hazardous waste burning pending review and approval by enforcement officials. The lower limit of 100 ppmv was selected as representative of steady-state high efficiency combustion conditions resulting in PIC emissions that would not pose a significant risk. The higher limit of 500 ppmv was proposed to limit the frequency of emission spikes that inevitably accompany routine operational "upsets," such as load changes and start-ups of waste firing.

While two commenters stated that the proposed 100 ppmv CO limit is arbitrary, six commenters supported the Tier I CO limit of 100 ppmv. One commenter supported both the 100 ppmv CO limit over an hourly rolling average, and the 500 ppmv CO limit over a 10-minute rolling average. Three additional commenters also expressed support for the 500 ppmv CO limit over a 10-minute rolling average. Three other commenters supported a 500 ppmv CO limit over an hourly rolling average, and stated that a maximum 1,000 ppmv CO limit can be included in addition to a 10-minute average.

Many commenters opposed the CO trigger limits and associated limits on the number of waste feed cutoffs

proposed in May 1987. Primarily, commenters objected to one set of CO emission limits as applicable to all boilers and industrial furnaces. Further, they argued that PIC emissions will not be significant if, when the waste feed is cutoff, the combustion chamber temperatures are maintained while the waste remains in the chamber. Six commenters argued that the trigger limits will result in increased NO_x emissions. One commenter stated that NO_x and CO cannot be lowered simultaneously, and added that many low NO_x boilers may not be able to meet these CO limits. As an alternative, one commenter stated that a higher Tier I CO limit should be allowed for less toxic emissions; however, this commenter did not provide an alternative approach for identifying the toxicity of emissions. One commenter suggested that EPA retain two alternatives to the CO standard: establishing an alternative standard based on nonmethane, ethane hydrocarbon (NMEHC) emissions, and a case-by-case risk assessment approach.

As a result of these and other comments and further evaluation, EPA is promulgating the Tier I limits based on a maximum hourly rolling average CO limit of 100 ppmv, corrected to 7 percent flue gas oxygen content. If this limit is exceeded, the hazardous waste feed must be automatically and immediately cutoff. The final rule does not restrict the number of waste feed cutoffs because: (1) Combustion chamber temperatures must be maintained after a cutoff; and (2) the number of cutoffs will be minimized by allowing CO concentrations to be averaged over a 60-minute period (i.e., the hourly rolling average) and by the recommended use of pre-alarms to provide time to remedy the problem or to allow a staged waste cutoff before reaching the CO limit. Nonetheless, the Agency retains the authority to limit the frequency of cutoffs as the facts warrant. See § 266.102(e)(7)(ii). The final rule does not include the proposed 500 ppmv rolling average over a 10-minute limit on CO because we do not believe it is needed given that the final rule requires immediate waste feed cutoff when the 100 ppmv hourly rolling average limit is exceeded. In addition, several commenters argued that the 500 ppmv limit was arbitrary.

In addition, EPA is promulgating alternative (Tier II) standards (discussed below), as discussed in the October 1989 supplemental notice, for control of PIC emissions from boilers and industrial furnaces. The Agency believes that the alternative controls will allow facilities flexibility in meeting both the PIC controls and NO_x emissions standards (imposed under different regulatory authorities) simultaneously. The Agency believes that the alternative, Tier II standards for control of PIC emissions are needed to address issues and concerns raised by commenters on the proposed rule.

The 100 ppmv CO limit promulgated today for Tier I is indicative of steady-state (i.e., normal), efficient combustion conditions. The time-weighted average for the CO limit is provided to accommodate the CO spikes that inevitably occur during routine "upsets," such as when hazardous waste fuel firing starts, when there is a load change on an industrial boiler, or when the composition of fuels varies. Given that CO is a sensitive indicator of overall combustion conditions, and that it may be a conservative indicator of POHC and PIC destruction, EPA is implementing CO control limits based on time-weighted averages of exceedances rather than implementing fixed CO limits. Fixed limits that do not acknowledge inevitable CO spikes and that do not give owners and operators time to adjust combustion conditions actually could result in greater emissions of PICs because each time hazardous waste firing is interrupted, CO concentrations increase, and emissions of incompletely burned organics may also increase. (Note, however, that there is a requirement to maintain combustion chamber temperature after a waste feed cutoff while waste remains in the chamber that is intended to minimize HC emissions after a cutoff.) Thus, any controls on CO must balance the effects of organic emissions that may result from overly stringent CO limits that require frequent waste feed interruptions with the effects of emissions resulting from less stringent controls that acknowledge inevitable CO spikes.

The Agency has considered whether the 100 ppmv CO limit is, in fact, too stringent given that we acknowledge the limit was chosen from within the range of reasonable values that may be considered indicative of good combustion conditions—50 to 250 ppmv. We attempted to obtain CO/time profiles from a number of well-operated devices to determine the percentage of time the facilities operated within particular CO ranges.[19] We thought to use this data to predict the frequency of waste feed cutoffs that would be required at various CO limits. Unfortunately, the analyses could not be conducted because the facilities we evaluated were operating under specific CO limits and their CO levels never exceeded those limits when burning hazardous waste. We found that the facilities learned to comply with the CO limits they had to meet.

Moreover, we believe that the 100 ppmv CO limit is reasonable for a number of reasons. Not only is it within the range of CO levels that are indicative of good combustion conditions, but the Agency believes that it is not too low because: (1) It is higher than the technology-based 50 ppmv CO level EPA requires for boilers burning waste PCBs (see 40 CFR part 761); (2) it is higher than the CO limits included in many hazardous waste incinerator permits;[20] (3) the Agency explicitly encourages the use of pre-alarms to minimize the frequency of automatic waste feed cutoffs;[21] and (4) the limit is implemented on an hourly rolling average basis which allows and minimizes the effects of short-term CO spikes.

We also note that the Agency may soon promulgate regulations for municipal waste combustors (MWCs) that, among other controls, may limit CO concentrations to 50, 100, or 150 ppmv (as proposed), depending on the type of MWC, over a four hour rolling average and dry-corrected to 7% oxygen. The MWC limits are technology-based—they represent levels readily achievable by well-designed and well-operated units. EPA does not believe that the MWC limits present a conflict with the 100 ppmv (with provisions for an alternative higher limit if HC concentrations are less than 20 ppmv) limit for BIFs under today's rule. The Agency is confident that the BIF rule is protective because the Agency has determined that, when CO levels are less than 100 ppmv, PIC emissions do not pose significant risk. Thus, although the 100 ppmv limit is not a best demonstrated technology-based limit (many BIFs (and hazardous waste incinerators) readily operate at CO levels well below 100 ppmv), the 100

[19] Energy and Environmental Research Corporation, "Guidance on Metal and PIC Emissions from Hazardous Waste Incinerators", Final Report, September 21, 1990.

[20] We note that the Agency proposed on April 27, 1990 to apply to hazardous waste incinerators the same CO/HC limits that today's rule applies to BIFs.

[21] If the CO limit is "too low" for a given facility's design and operating conditions, then frequent waste feed cutoffs may occur. Frequent waste feed cutoffs may actually increase PIC emissions because the resulting perturbation to the combustion system may upset the termperature, oxygen, fuel relationships needed for complete combustion.

ppmv CO limit will ensure protection of human health and the environment.

As stated above, the CO limits are based on a flue gas oxygen content of 7 percent. One commenter indicated that EPA's reasoning for using the CO correction of 7 percent oxygen is not clear. The commenter believes the 7 percent correction factor is unfair for thermal units which, under normal conditions, need to operate at oxygen levels greater than 7 percent, yet operate with low levels of CO and HCs. EPA believes that correcting CO levels for flue gas oxygen content is necessary because without this correction, high CO flue gas concentrations could be diluted by high rates of excess oxygen. In today's rule, EPA is requiring that CO be corrected to a flue gas oxygen content of 7 percent because the majority of boilers and industrial furnaces achieve high combustion efficiency at optimum flue gas oxygen levels ranging from 3 percent to 10 percent. The optimum oxygen level to achieve high combustion efficiency for a given device will vary depending on factors such as fuel mix and boiler load. In general, large combustion devices (in terms of heat input capacity) have optimum oxygen requirements on the low end of the range of oxygen content, while smaller units require higher oxygen levels. EPA believes that a correction level of 7 percent is reasonable since this oxygen level is in the middle of the range of typical operation for all devices and since the majority of devices burning hazardous waste fuels have moderate heat input capacities (e.g., 20–150 MM Btu/hr). In addition, 7 percent oxygen is the reference level for the existing particulate standard for hazardous waste incinerators under 40 CFR 264.343(c).

Moreover, the oxygen level to which CO values are corrected is not significant since the CO levels for all facilities are corrected to a common basis. If the oxygen correction level were changed from 7% to some other value, then theoretically, the CO limit would have to be adjusted accordingly, and the effect on individual facilities would remain the same.

b. Implementation of the 100 ppmv CO Limit. The procedures used to implement the 100 ppmv CO limit are discussed below, including oxygen and moisture correction, format of the limit, and compliance with the limit.

Oxygen and Moisture Correction. The CO limit under Tier I (and Tier II) is on a dry gas basis corrected to 7 percent oxygen. The oxygen correction normalizes the CO data to a common base, accounting for the variation in design and operation of the various combustion devices. In-system leakage, facility size, and waste feed type are other factors that cause oxygen concentrations to vary widely in flue gases and were considered in selection of the oxygen correction factor. The correction for moisture normalizes the CO data that results from the different types of CO monitors used at facilities (e.g., extractive, in situ, etc.). EPA's evaluation indicates that application of the oxygen and moisture corrections can change measured CO levels by a factor of two in some cases.

Measured CO levels must be corrected continuously for the amount of oxygen in the stack gas according to the formula:

$$CO_c = CO_m \times 14/(E-Y)$$

Where:

CO_c is the corrected concentration of CO in the stack gas, CO_m is the measured CO concentration according to guidelines specified in Methods Manual for Compliance with the BIF Regulations (Methods Manual) [22], E is the percentage of oxygen contained in the air used for combustion, and Y is the measured oxygen concentration on a dry basis in the stack. Oxygen must be measured at the same stack location at which CO is measured under procedures that are also provided in the Methods Manual.

Format of the CO Limit. EPA proposed that the CO limits be implemented under either of two alternative formats, the hourly rolling average format or the time-above-a-limit format. Under this approach, applicants would select the preferred approach on a case-by-case basis. Comments were received in support of both alternative formats. Based on further evaluation of the two formats and for reasons explained below, EPA is requiring use of the hourly rolling average format for compliance with this rule.

Under the hourly rolling average format, a facility must measure and record CO levels as an hourly rolling average. This approach allows instantaneous CO peaks without requiring a cutoff provided that at other times during the previous hour CO levels were correspondingly below the limit. This approach requires a CO monitoring system that can continuously measure and adjust the oxygen correction factor and compute the hourly rolling averages.

Under the proposed time-above-a-limit format, dual CO limits would be established in the permit: the first as a never-to-exceed limit and the second as a lower limit for cumulative exceedances of no more than a specified period of time in an hour. These limits and the time duration of the exceedances would be established on a case-by-case basis by equating the mass emissions (peak areas) in both the formats (time-above-a-limit and hourly rolling average formats) so that the regulation would be equally stringent in both cases. The instruments needed for the time-above-a-limit format would include a CO monitor, a recorder, and a timer that could indicate the cumulative time of exceedances in every clock hour, at the end of which it would be recalibrated (manually or electronically). Oxygen would not be measured continuously in this format; instead an oxygen correction factor would be determined from operating data collected during the trial burn. Subsequently, oxygen correction factors would be determined annually or at more frequent intervals specified in the facility permit.

EPA has re-examined the time-above-the-limit format in light of several comments received and has decided to delete this alternative in today's final rule because:

1. Since a facility would not be required to measure oxygen continuously under this format, there would be no assurance that a facility would be operated reasonably close to the oxygen level at which it operated during the trial burn. Even with a daily determination of an oxygen correction factor, there would be the possibility of "gaming" by the facility (operating the facility at low oxygen levels during the short test period when the oxygen is measured, getting a favorable correction factor established on the basis, and thereafter letting the facility operate at high oxygen levels). Since the major advantage of this format was the cheaper cost due to the omission of the oxygen monitoring requirement, adding continuous oxygen monitoring to this format would remove this advantage as well; and

2. The proposed computations for converting hourly rolling averages to this format would be cumbersome, inexact, and above all, very restrictive. To obtain a conservative conversion, a permit writer would have to assume that CO levels will remain at the established never-to-exceed limit for the full specified time in the hour, and at the lower established limit the rest of the time. The CO limits obtained by these computations would be very restrictive. As an example, a conversion of a Tier I limit of 100 ppmv hourly rolling average for a facility having a single CO excursion of 4-minutes duration in which the peak level was 1,000 ppmv, would result in a permit specifying that for the remaining 56 minutes, CO could not exceed 34 ppmv, a very restrictive limit. For example, a CO profile of 30 ppmv for 55 minutes and 40 ppmv for the remaining 5 minutes would result in a violation.

[22] U.S. EPA, *Methods Manual for Compliance with the BIF Regulations*, December 1990. Available from the National Information Service NTIS), 5285 Port Royal Road, Springfield, VA 22161, (703) 487–4600. The document number is PB 91–120–006.

Compliance with the Tier I CO Limit. The Agency considered a number of alternative approaches for evaluating CO readings during trial burns to determine compliance with the 100 ppmv limit, including: (1) The time-weighted average (or the average of the hourly rolling averages); (2) the average of the highest hourly rolling averages for all trial burn runs; or (3) the highest hourly rolling average. The time-weighted average alternative provides the lowest CO level that could reasonably be used to determine compliance, and the highest hourly rolling average alternative provides the highest CO level that could reasonably be used. EPA is requiring the use of the most conservative of these approaches, the highest hourly rolling average approach, for interpreting trial burn CO emissions for compliance with the 100 ppmv Tier I limit. (This approach is conservative because trial burn CO levels are compared to the maximum CO allowed under Tier I—100 ppmv.) EPA believes this conservative approach is reasonable since compliance with the Tier I CO limit allows applicants to avoid the Tier II requirement of evaluating HC emissions to provide the additional assurance (or confirmation) that HC emissions do not exceed levels representative of good operating practice.

3. Tier II PIC Controls: Limits on CO and HC

a. Need for Tier II PIC Controls. Commenters indicated that several types of boilers and many cement kilns will not be able to meet the (Tier I) 100 ppmv CO limit proposed in May 1987 even though HC concentrations will not be high at elevated CO levels. For example, boilers that burn residual oil or coal typically operate with CO emission levels above the Tier I 100 ppmv CO limit because of inherent fuel combustion characteristics, equipment design constraints, routine transient combustion-related events, requirements for multiple fuel flexibility, and requirements for compliance with NO_x emission standards established under the Clean Air Act. Attempts to reduce CO emissions from these devices to meet the Tier I limit could prove unsuccessful. In addition, there is a possibility that thermal efficiency could be adversely affected if these attempts are successful.

Similarly, industry and trade groups for the cement industry voiced strong opposition to the 100 ppmv CO limit for cement kilns. These commenters indicated that some cement kilns, especially modern precalciners, routinely emit CO above the Tier I 100 ppmv limit. In general, commenters indicated that while the Tier I limit may be appropriate for combustion devices in which only fuel (fossil or hazardous waste) enters the combustion chamber, it is inappropriate for cement kilns and other product kilns in which massive amounts of feedstocks are processed. These feedstocks can generate large quantities of CO emissions which are unrelated to the combustion efficiency of burning the waste and fuel. Whereas all the CO from boilers and some industrial furnaces is combustion-generated, the bulk of the CO from product kilns can be the result of process events unrelated to the combustion conditions at the burner where wastes are introduced.[23] Therefore, limiting CO emissions from these combustion devices to the Tier I 100 ppmv level may be difficult and may not be warranted as a means of minimizing risk from PICs.

In summary, commenters argued that these are specific instances and classes of combustion devices for which the Tier I CO limit would be difficult or virtually impossible to meet, and thus this limit is inappropriate since EPA has not established a direct correlation between CO emissions, PIC emissions, and health risks.

In light of these concerns, commenters suggested that EPA establish CO limits for specific categories of combustion devices based on CO levels achieved by units operating under best operating practices (BOP). The Agency considered this approach but determined that equipment-specific CO trigger limits would be difficult to establish and support and would not necessarily provide adequate protection from PIC emissions. Nonetheless, EPA believes that the CO limits should be flexible to avoid major economic impacts on the regulated community since no direct correlation has been established between exceeding the 100 ppmv CO limit and increasing health risks from PIC emissions. EPA believes, however, that at some elevated CO level PIC emissions would pose significant risk. At this time, EPA is unable to identify a precise CO trigger level since the trigger level may vary by the type and design of the combustion device and the fuel mix used in the device. Consequently, EPA has established a two-tiered approach to control PICs. Under Tier I, CO is limited to 100 ppmv or less, as discussed above. Under Tier II, CO levels can exceed 100 ppmv provided that the owner or operator demonstrate that the HC concentration in the stack gas does not exceed a good operating practice-based limit of 20 ppmv (except that the Director may establish under § 266.104(f) an alternative HC limit for furnaces that feed raw material containing organic matter and, thus, cannot meet the 20 ppmv limit).

Under Tier II, the CO limit for a facility is based on the levels achieved during a successful compliance test. The Agency originally proposed two alternative approaches for establishing HC emission limits under the Tier II waiver: a health-based approach and a technology-based approach. These two alternatives and EPA's rationale for selecting the technology-based approach for the final rule are discussed below. Before moving to those discussions, however, it may be useful to summarize the conclusions of an evaluation by EPA's Science Advisory Board of the proposed PIC controls.

b. Comments by EPA's Science Advisory Board (SAB). We present below a summary of SAB's conclusions [24] on the scientific support for EPA's proposed PIC controls and EPA's response:

• *SAB*: The Agency has not documented that PICs from hazardous waste combustion can cause significant health risk to human health or the environment.

—*EPA Response:* While the Agency agrees that available data do not show that PICs are likely to pose a significant health risk, EPA's emissions testing to date has been able to identify and quantify only as much as 60% of the organic compounds being emitted during any test. During many of EPA's tests, less than 5 to 10% of organic emissions were characterized. The Agency is concerned that this large fraction of uncharacterized organic emissions could be comprised of compounds that can pose significant health risk. Therefore, the Agency believes that PICs have the potential to present a hazard and should be controlled.

• *SAB:* It is prudent to control PICs given the inability to show that they do not pose a health risk because of limitations of sampling and analytical techniques and health and environmental impact assessment data and methodologies.

[23] For example, CO can be generated from the trace levels of organic matter contained in the raw materials as the materials move down the kiln from the "cold" feed end to the "hot" end where the fuel and waste is fired and the product is discharged.

[24] U.S. EPA, "Report of the Products of Incomplete Combustion Subcommittee of the Science Advisory Board", Report #EPA-SAB-EC-90-004, January 1990.

—*EPA Response:* The Agency agrees. Additional emissions testing cannot be used to determine if, in fact, PICs can pose significant risk because the sampling and analytical techniques are not available to identify the unknown compounds. Moreover, even if the techniques were available, health effects data are not likely to be available for the compounds so that a risk assessment could not be conducted.

• *SAB:* The use of CO and HC to ensure high combustion efficiency seems to be a reasonable approach to control PIC emissions.

• *EPA Response:* The Agency agrees.

• *SAB:* Under the Tier II controls when CO exceeds 100 ppmv, HC should be monitored continuously.

—*EPA Response:* The Agency agrees. Today's final rule requires continuous HC monitoring under the Tier II controls (see § 266.104(c)) when CO levels exceed 100 ppmv, and for certain industrial furnaces irrespective of CO level (see §§ 266.104(d) for permit furnaces and 266.103(a)(5) for furnaces operating under interim status).

• *SAB:* There is no scientific support for the health-based approach to establish HC limits on a site-specific basis based on a calculated "unit risk" value for total HC and stack gas monitoring of HC concentrations.

—*EPA Response:* The final rule does not allow the use of the proposed health-based approach to control HC. HC are controlled under the technology-based limit of 20 ppmv. See § 266.104(c).

• *SAB:* The risk assessment procedures are adequate, however, to show that the technology-based HC limit of 20 ppmv appears to be protective of human health.

—*EPA Response:* The Agency agrees.

• *SAB:* The agency should show that the proposed limits for CO and HC do not result in frequent automatic waste feed cutoffs that may increase PIC emissions.

—*EPA Response:* See discussion in section B.2.a above.

Thus, the SAB supported the overall reasonableness of the course adopted in this rule to control potential risks from emissions of PICs.

c. Health-Based Approach for HC Limits. Under the Tier II health-based approach, the Agency proposed to allow applicants to demonstrate that PIC emissions from combustion devices pose an acceptable risk (i.e., less that 10^{-5}) to the maximum exposed individual (MEI). Under this approach, EPA proposed to require that applicants quantify HC emissions during trail burns and assume that all hydrocarbons are carcinogenic compounds with a unit risk value that would be calculated based on available data. The HC unit risk value would be 1.0×10^{-5} m^3/ug and would represent the adjusted 95th percentile weighted (i.e., by emission concentration) average unit risk of all the hydrocarbon emission data in EPA's database of field testing of boilers, industrial furnaces, and incinerators burning hazardous waste. The weighted unit risk value for HC considers emissions data for carcinogenic PICs (e.g., chlorinated dioxins and furans, benzene, chloroform, and, carbon tetrachloride) as well as data for PICs that are not suspected carcinogens and are considered to be relatively nontoxic (e.g., methane, and other C1 as well as C2 hydrocarbons.[25]

The Agency proposed to implement this provision by back-calculating an acceptable HC emission rate (and, based on stack gas flow rates, a HC concentration) from the acceptable ambient level based on the calculated "total HC" unit risk value discussed above and allowing an incremental cancer risk of 1 in 100,000.

A number of commenters supported the health-based approach while several others pointed out that the approach was seriously flawed. EPA's Science Advisory Board reviewed the approach as discussed above and concluded that the site-specific, health-based approach of controlling HC was not scientifically supportable.

Upon re-evaluation, EPA believes that basing the HC limit on a health-based approach is not supportable and, thus, has not selected this approach for the final rule. Given the limited data base on the types and concentrations of PICs emitted over a range of operating conditions, we are concerned that the potency value that the proposed approach would apply to the total mass of hydrocarbons emitted may not be appropriate. It is not clear whether the proposed potency value may overstate or understate the risk posed by HC emissions. In addition, we are concerned that we do not fully understand what types of hydrocarbon emissions are actually detected by the continuous monitoring equipment. For example, as we discussed at proposal, certain halogenated compounds are under reported by the HC detection system. Finally, as we noted at proposal, the proposed risk-based approach could allow extremely high HC concentrations—concentrations clearly indicated of combustion upset conditions.

d. Technology-Based Approach: 20 ppmv HC Limit. Under the technology-based approach, the Tier I CO limit of 100 ppmv will not have to be met if HC levels in the stack gas do not exceed a good operating practice-based limit of 20 ppmv [26] (measured on an hourly rolling average basis, reported as propane, dry corrected to 7% oxygen). As noted above, EPA developed this technology-based approach because of current scientific concerns (seconded by the SAB) related to a health-based approach. In addition, the health-based approach could allow HC levels of several hundred ppmv, levels that are clearly indicative of "upset" combustion conditions. The approach, as noted above, lacks a firm scientific basis and could allow facilities to operate under upset conditions. EPA would not authorize such operations unless reasonably certain they would not pose a significant risk to human health and the environment. Such reasonable certainty does not exist here.

One commenter agreed that the PIC standard should be protective without imposing a technology "fix." Although EPA believes the development of a health-based approach is a step in the right direction, the Agency is concerned about whether the health-based Tier II approach is adequately protective given the limited database on PIC emissions and the uncertainty as to what fraction of organic emissions would be detected by the HC monitoring system. Despite the limitations of the HC health risk assessment methodology, EPA believes (and the SAB concurs) it is reasonable to use this methodology to predict whether a technology-based limit appears to be protective. Accordingly, EPA used the health risk assessment methodology to show that a 20 ppmv HC limit would not result in an incremental lifetime cancer risk to the hypothetical maximum exposed individual greater than 1 in 100,000.

The final rule establishes limits for both CO and HC under the Tier II PIC controls. The CO limit is established as the average over all runs of the highest hourly rolling average for each run of the compliance test or trial burn. To demonstrate compliance with the HC limit, the highest hourly rolling average HC level during the compliance test or

[25] Additional information on the development of the unit risk factor can be found in U.S. EPA, Background Information Document for the Development of Regulations for PIC Emissions from Hazardous Waste Incinerators, October 1989.

[26] As discussed at proposal, the 20 ppmv limit represents a demarcation between good and poor combustion conditions based on HC emissions data from 24 facilities. The 20 ppmv limit is not based on best operating practice. A *best* operating practice limit would be set a level on the order of 5 ppmv.

trial burn cannot exceed 20 ppmv (except as otherwise provided for furnaces feeding raw materials containing organic matter), reported as propane, corrected to 7% oxygen on a dry basis.

The Agency considered whether to establish provision for a case-by-case waiver of the 20 ppmv HC limit based either on health-risk assessment or technical feasibility (i.e., feasibility of providing combustion conditions to minimize fuel-generated HC). The final rule does not provide for a waiver of the 20 ppmv HC limit as an indicator of good combustion conditions and minimum fuel-generated PIC emissions. (The final rule does, however, allow the Director to establish under the part B permit proceedings an alternative HC limit for industrial furnaces (e.g., cement kilns, light-weight aggregate kilns) to account for hydrocarbons that are emitted from trace levels of organic matter in the raw material. Any alternative HC limit established for a furnace will ensure that fuel-generated hydrocarbons (hazardous waste and other fuels) are less than 20 ppmv by establishing the HC limit based on HC concentrations when the system is designed and operated under good combustion conditions without burning hazardous waste.[27] See section II.B.5 of Part Three of this preamble for more discussion of the alternative HC limit for industrial furnaces.)

EPA did not provide a waiver of the HC limit in the final rule because: (1) The Agency believes, and SAB concurs, that a site-specific, health risk assessment approach to establishing HC limits (e.g., a waiver of the 20 ppmv limit) is not scientifically supportable; and (2) a technology-based waiver is not supportable because well-designed and operated hazardous waste combustion devices can readily meet a 20 ppmv HC limit.

Several commenters disagreed with EPA that both CO and HC should be monitored, stating that it is unnecessary to monitor CO if HC is monitored. The Agency continues to believe that it is reasonable to require both CO and HC monitoring when CO levels exceed 100 ppmv. When CO levels exceed the Tier I level, the facility is not operating at high combustion efficiency and the potential for high PIC emissions exists. The Agency believes that, since CO monitoring is a widely practiced approach for improving and monitoring combustion efficiency, and since CO emission levels may respond more quickly to process upsets than HC levels, the apparent redundancy in requiring both CO and HC monitoring is warranted to ensure protection of human health.

Another commenter added that HC monitoring could be supplemented by frequent testing for common PICs that respond poorly to HC monitors, such as carbon tetrachloride, formaldehyde, perchlorethylene, and chlorobenzene. At this time, the Agency believes that continuous HC monitoring combined with CO monitoring is adequate in most cases to detect when the facility is operating under combustion upset conditions (this is another reason, however, that monitoring both CO and HC is reasonable when CO levels exceed the level normally indicative of good combustion—100 ppmv). We note that, as discussed in section II.D below the final rule requires a hot HC monitoring system (i.e., unconditioned gas sample heated to a minimum of 150 °C) which ensures minimum loss of organic compounds. Nonetheless, the Agency is currently developing sampling and analytical techniques to continuously monitor indicator organic compounds such as those suggested by the commenter.

e. Basis for Final Rule. EPA believes that the 20 ppmv HC limit in the final rule for the Tier II PIC controls is representative of an HC limit that distinguishes between good and poor combustion conditions. (When a facility operates under poor combustion conditions, PIC emissions can increase and may result in adverse health effects to exposed individuals.) This HC limit is within the range of values reported in the Agency's data base for hazardous waste incinerators, boilers, and industrial furnaces that burn hazardous waste, and the limit is also protective of human health based on risk assessments conducted for 30 incinerators. See 54 FR 43723. Under Tier II, HC must be monitored continuously, recorded on an hourly rolling average basis, reported as ppmv propane, and corrected to 7 percent oxygen on a dry basis. In addition, CO must be monitored continuously, corrected to 7 percent oxygen on a dry basis, recorded on an hourly rolling average basis, and may not exceed the limit established during the test burn (i.e., the average over all runs of the highest hourly rolling average for each run).

4. Special Requirements for Furnaces

The final rule provides several special requirements for industrial furnaces stemming from the fact that: (1) Some industrial furnaces, notably cement kilns, are not able to meet the 20 ppmv HC limit because trace levels of organic matter in raw materials can emit substantial levels of hydrocarbons; and (2) the PIC controls may not be protective for furnaces (e.g., cement kilns and mineral wool cupolas) that feed hazardous waste at locations other than where normal fuels are fired. These special requirements are discussed below.

a. Alternative HC Limit. EPA requested comment on whether alternative HC limits may be appropriate for certain industrial furnaces. See 54 FR 43724 (Oct. 26, 1989) A number of commenters [28] requested that EPA allow cement kilns, light-weight aggregate kilns, and lime kilns that cannot meet the 20 ppmv HC limit because of the hydrocarbons generated by trace levels of organic materials in the normal raw materials to establish a site-specific alternative HC limit that does not allow HC levels when burning hazardous waste to be significantly higher than when burning normal fuels, processing normal raw materials, and producing normal products in a system that is designed and operated to minimize hydrocarbon concentrations in stack gas. Nineteen commenters pointed out that baseline HC emission levels from cement kilns can be attributed to the naturally-occurring raw materials that are used in the production of cement. Use of shale as a raw material, for example, can result in HC emissions from kerogens in the shale. Use of fly ash as a source of iron and silica could result in increased CO emissions from partial oxidation of free carbon in the fly ash. Commenters claim that approximately 6 to 10 cement plants may not be able to comply with the HC limit of 20 ppmv even though they generate minimal HC from sources other than raw materials (e.g., hazardous waste fuels, other fuels, organic compounds in slurry water). The organic compounds in normal raw materials would not ordinarily be hazardous, so that their emissions (e.g., through volatilization) would not raise the types of concerns normally addressed by RCRA. [29]

[27] We note that this approach should limit fuel-generated hydrocarbon concentrations to well below 20 ppmv because fuel-generated hydrocarbons from a well-designed and operated cement or light-weight aggregate kiln should not exceed 5 ppmv.

[28] In addition to comments on the October 26, 1989 supplement to the proposed rule, see minutes of the EPA meetings with the Cement Kiln Recycling Coalition of April 17, 1990; May 23, 1990; June 4, 1990; June 20, 1990; July 19, 1990; and October 10, 1990. See also minutes of the EPA meeting with Southdown, Inc. on May 11, 1990, and the letter from the Cement Kiln Recycling Coalition to Bob Holloway, EPA, dated June 15, 1990.

[29] We note, however, that nonhazardous organic constituents in feedstreams may be partially

Continued

The Agency believes that it will be possible in some situations to develop an approach on a case-by-case basis to effectively implement an alternative HC limit under the principle stated above. (If the 20 ppmv HC limit were health-based, the Agency would be more reluctant to develop an alternative to it. Given, however, that the limit is a measure of combustion efficiency, the Agency believes it reasonable to develop an alternative means for this class of furnaces to demonstrate combustion efficiency.) The Agency considered a number of approaches to establish an alternative HC level and determined in the time available that none appeared to be workable in all situations. The Agency is therefore adopting a more individualized approach in the present rule that allows permit writers to establish an alternative HC limit (i.e., a HC limit that exceeds 20 ppmv) in a facility's operating permit, and allows permit writers to grant an extension of time to comply with the HC limit during interim status, based on the following showings: (1) For cement kilns, the kiln is not equipped with a by-pass duct that meets the requirements of § 266.104(f)(1); (2) the applicant demonstrates that the facility is designed and operated to minimize hydrocarbon emissions from fuels and raw materials; (3) the applicant develops an approach to effectively monitor over time changes in the operation of the facility that could reduce baseline HC levels—for example, changes in raw materials, fuels, or operating conditions—which could result in establishing a new baseline and corresponding adjustment of the HC limit; and (4) the applicant demonstrates that the hydrocarbon emissions are not likely to pose a significant health risk. See § 266.104(f)(2). We explain these provisions in more detail below, along with an explanation of which provisions apply during interim status and which are part of permit application and issuance.

Interim Status Facilities. Today's rule requires facilities operating in interim status to comply with CO and, if required, a 20 ppmv HC limit within 18 months of the rule's date of promulgation. The rule provides for a case-by-case extension from these requirements (as well as the particulate, metals, and HCl/Cl_2 standards) "if compliance is not practicable for reasons beyond the control of the owner or operator." See § 266.103(c)(7)(ii). The situation where a furnace may be unable to achieve the 20 ppmv HC limit because of organics present at baseline conditions (i.e., when the facility is designed and operated to minimize HC emissions from raw materials and fuels while producing normal products under normal operating conditions and when no hazardous waste is burned) may be eligible for the extension of time provided the following conditions are satisfied:

1. The applicant for the extension of time must have submitted a complete part B permit application. The application must include the following information pertinent to the question of an alternative HC limit: (a) Documentation that the system is designed and operated to minimize HC emissions from all sources when the baseline level is established and when hazardous waste is burned; (b) documentation of the baseline HC flue gas concentrations when the facility is operated to minimize HC emissions and when feeding normal raw materials and normal fuels to produce normal products under normal operating conditions and when not burning hazardous waste; (c) a test protocol to confirm the baseline HC (and CO) level; (d) a trial burn protocol to demonstrate that, when hazardous waste is burned, HC (and CO) concentrations do not exceed the baseline level; and (e) a procedure to show if and when HC emissions from nonhazardous waste sources may decrease (in which case, the overall HC limit might be adjusted downward after a new baseline is established). See § 270.22(b). (The substantive basis for these requirements is explained in more detail below.)

2. During interim status, the applicant must not only conduct emissions testing when burning hazardous to certify compliance with all remaining emissions controls—dioxins and furans, PM, metals, and HCl/Cl_2—but also establish and comply with interim limits on CO and HC presented in the part B permit application as levels the applicant has determined by testing (without burning hazardous waste) are baseline levels. We note that the Director may not have time during the review of the extension request (and a preliminary review of the part B application) to confirm the adequacy of the interim CO and HC limits proposed by the applicant. Moreover, to do so would require the types of oversight of test protocols, emissions testing, and review of data that will be applied under the permit process. Thus, the interim limits are subject to revision based on (confirmation) testing in support of the operating permit. Nonetheless, EPA believes that establishing interim CO and HC limits and requiring the owner/operator to comply with them until a permit is issued (or denied) is reasonable and provides a measure of protection of human health and the environment.

It should be noted that the Agency does not believe that it is possible to establish an alternative HC limit during interim status. This is because the level of interaction between an applicant and permit writer over evaluation of the various protocols to establish a HC baseline and determine when it should be reduced, plus conducting test burns to confirm the HC baseline and that HC levels do not increase when hazardous waste is burned, plus conducting a health-risk assessment for organic emissions when hazardous waste is burned are beyond the scope of interim status. Consequently, the rule is structured so that the alternative HC limit (if warranted) would be established as part of the permit, and the interim status certification of compliance deadline can be extended, if the Director finds this is warranted, while the permit is being processed. The Director may also make the extension of time conditional on the time estimated to process the permit application or other factors, and can be conditioned on operating conditions than ensure the facility will operate in a manner that protects human health and the environment. Any such condition would be embodied in an interim status extension determination that is enforceable as a requirement of subtitle C (much as conditions in a closure plan are enforceable), and would be documented in an administrative record for the determination.

3. Cement kilns with a by-pass duct meeting the requirements of § 266.104(g)(2) are ineligible for an extension. The rule precludes cement kilns operating with a by-pass duct from eligibility for the extension of the certification of compliance date for compliance with the CO and HC limit, as well as for obtaining an alternative HC limit in a permit.

Fully Permitted Facilities. The Director may establish an alternative HC limit in the facility's operating permit provided that the applicant meets the following requirements. Information and data documenting compliance with these requirements must be included in the part B permit application. See § 270.22(b). First, the applicant must document in the permit application that facility is designed and operated to minimize HC emissions from all sources, including raw materials and fuels. Examples of situations where the system is not designed and operated to minimize HC (and CO) levels during baseline testing are when: (1) Coal is mixed with raw material which is fed into a cement kiln preheater such that the coal can contribute to HC emissions; (2) cement kiln slurry water contains enough organic compounds to significantly contribute to HC emissions; (3) waste fuels such as tires are burned in a manner that could contribute to HC emissions; (4) the furnace is not operated and designed to minimize emissions of hydrocabons emitted from raw material (in general, the more quickly the raw material is exposed to elevated temperatures, the lower the hydrocarbon emissions); and (5) normal fuels are not burned under good combustion conditions.

Second, the applicant must propose in the permit application baseline flue gas

combusted to form hazardous products of incomplete combustion.

CO and HC levels. These proposed baseline levels also serve as interim values under which the facility must operate under a conditional time extension for certification of compliance with the HC standard until permit issuance (or denial). The proposed baseline levels must be supported by emissions testing under baseline conditions (i.e., when the facility is designed and operated to minimize HC emissions from raw materials and fuels while producing normal products under normal operating conditions and when no hazardous waste is burned). Baseline levels must be determined from test data as the average over all valid runs of the highest hourly rolling average value for each run. This is the same approach specified by the rule to determine limits on other operating parameters (e.g., maximum feed rate limits, maximum temperatures, etc). EPA believes that this approach is workable for cement kilns [30] given that commenters have asserted that when hazardous waste is burned, hydrocarbon levels do not increase and often decrease. As discussed in section II.E of Part Three of the preamble, HC levels from a cement kiln with HC levels of 66 to 70 ppmv when burning coal decreased to 38 to 63 ppmv when burning hazardous waste fuel. If the facility cannot install continuous monitors for HC (and CO and oxygen) in time to conduct these baseline tests prior to submittal of the permit application (which must be sufficiently prior to 18 months after promulgation of the rule to give the Director time to consider whether to grant the time extension), the facility may use portable monitors. We note that the HC monitoring system must be a hot, unconditioned system. In addition, we note that different baseline values may be necessary for different modes of operation if the baseline HC (or CO) level changes significantly under those modes of operation. Examples are when the raw material mix is changed to make a different cement product or when different fuels are burned.

Third, the applicant must develop emissions testing protocols to: (1) Confirm the baseline HC and CO levels proposed in the permit application (and under which the facility must operate in interim status upon receipt of an extension of time to comply with the HC limit and until an operating permit is issued (or denied)); and (2) to demonstrate that, when hazardous waste is burned, HC and CO levels do not exceed baseline levels (and emissions of other pollutants do not exceed allowable levels). If a baseline HC or CO level is to be established for more than one mode of operation, a baseline confirmation test (comprised of at least three valid runs) must be run for each mode.

Fourth, the applicant must develop an approach to effectively monitor over time changes in the operation of the facility that could significantly reduce baseline HC or CO levels. If baseline levels are significantly reduced, then the alternative HC and CO limits that apply when burning hazardous waste must also be reduced. Such changes could include: (1) Changes in the concentration of organic matter in raw materials; (2) changes in the concentration of organic matter in the raw material mix due to changes in the mixture of raw materials needed to produce different types of product; (3) changes in fuels; and (4) changes in the concentration of organic compounds in slurry water used for a wet cement kiln. The approach must be workable and enforceable.

EPA is requiring this condition in order to avoid establishing a high baseline which is then reduced without also lowering the HC limit, potentially allowing the hazardous waste to be burned under poor combustion conditions creating high, but undetected, HC levels (i.e., hazardous waste could be burned under poor combustion conditions and could be emitting high HC levels even though the HC limit was not exceeded). (The Agency notes that the problem of establishing a HC baseline and for determining when the baseline might change for this type of industrial furnace is more difficult than determining when the raw material baseline changes in documenting when co-combustion of hazardous waste with raw materials in a Bevill device might affect the composition of residues. See section XIII of Part Three of the preamble. This is because, in the case of the HC baseline, not only must the raw materials' and fuels' composition be monitored, but the units design and operating conditions as well to determine whether the baseline has changed. Thus, the rule provides for more interaction in establishing baseline conditions and determining when they change for assessing alternative HC limits for cement kilns than it does when making determinations as to whether co-combustion of hazardous waste can remove residues from eligibility for exclusion under the Bevill amendment.)

Finally, EPA is concerned that hazardous waste burning may affect the type and concentration of organic compounds emitted from an industrial furnace that has elevated HC concentrations attributable to raw materials. For example, the chlorine in the hazardous waste may result in higher concentrations of chlorinated organic compounds. Therefore, the rule requires the owner or operator, as part of the permitting process, to use state-of-the-art emissions testing procedures and risk assessment to demonstrate that organic emissions are not likely to pose unacceptable health risk. The owner or operator must conduct emissions testing during the trial burn to identify and quantify the organic compounds listed in appendix VIII, part 261, that may be emitted using test procedures specified by the Director on a case-by-case basis. As noted above, although EPA does not believe such risk-based approaches to be adequate as the basis for a national risk-based PIC standard, we think the approach is part of the best means of assuring that cement kilns combust hazardous waste fuels properly in those instances where HC levels are greater than 20 ppmv as a result of organics in normal raw material feed.

Two sampling and analysis approaches that the Director may use are discussed below. One protocol involves the following steps to identify and quantify concentrations of organic compounds in stack emissions:

1. Sample volatile organic compounds using the VOST train of Method 0030 as prescribed in SW-846. Analytical work is conducted using GC/MS according to Method 5040 in SW-846.

2. Sample semi-volatile organic compounds using the sampling train prescribed in Method 0010 in SW-846. Analytical work is conducted using GC/MS according to Method 8270 in SW-846.

3. Sample aldehydes and ketones using an impinger train with 2-4-di-nitro-phenyl hydrazine. (2-4-DNPH) in the impinger solution as prescribed in Method 0011 in the *Methods Manual*, and analysis of impinger solution by high performance liquid chromatography (HPLC) as specified in "Analysis for Aldehydes and Ketones by High Performance Liquid Chromatography" in the *Methods Manual*.

Another protocol is a screening approach that has been described in the literature [31] that uses the following protocols as specified in SW-846:[31]

[30] Although any industrial furnace that cannot meet the 20 ppmv HC limit because of organic matter in raw material is eligible to apply for an alternative HC limit, only one commenter expressed concern that industrial furnaces other than cement kilns may not be able to meet the 20 ppmv HC limit.

[31] Johnson, Larry, et al., "Screening Approach for Principal Organic Hazardous Constituents and Products of Incomplete Combustion", JAPCA Journal, Volume 39, No. 5, May 1989.

1. Soxhlet extraction sample preparation;

2. Gas chromatography (GC) coupled with flame ionization detector (FID) or mass spectrography (MS) screening;

3. Total chromatographic organics (TCO) and gravimetric (GRAV) procedures; and

4. High performance liquid chromatography-ultraviolet/MS (HPLC-UV/MS) screening and compound identification.

To select an appropriate protocol, the Director will consider the state-of-the-art of sampling and analytical techniques and the expected nature of organic emissions considering emissions data or other information.

We note that, under this PIC risk assessment, emission rates must also be determined for the 2,3,7,8-chlorinated tetra-octa congeners of chlorinated dibenzo-*p*-dioxins and dibenzofurans (CDDs/CDFs) using Method 23, "Determination of Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans (PCDFs) from Stationary Sources" in Methods Manual for Compliance with the BIF Regulations (Methods Manual), incorporated in today's rule as appendix IX of part 266. The risks from these congeners must be estimated using the 2,3,7,8-TCDD toxicity equivalence factor prescribed in "Procedures for Estimating the Toxicity Equivalence of Chlorinated Dibenzo-p-Dioxin and Dibenzofuran Congeners" in Methods Manual.

The owner or operator must then conduct dispersion modeling to predict the maximum annual average ground level concentration of each such organic compound. On-site ground level concentrations must be considered if a person resides on-site; otherwise, only off-site concentrations may be considered. Dispersion modeling must be conducted in conformance with EPA's Guideline on Air Quality Models, EPA's "Hazardous Waste Combustion Air Quality Screening Procedure" provided in Methods Manual, or EPA's Screening Procedures for Estimating Air Quality Impact of Stationary Sources. The Methods Manual and the Guideline on Air Quality Models are incorporated in today's rule as appendices IX and X, respectively, to part 266. The Screening Procedures document is incorporated by reference in § 260.11.

Stack heights exceeding good engineering practice (GEP, as defined in 40 CFR 51.100(ii)) may not be used to predict ground level concentrations. See section V.B.1.c of Part Three of this preamble.

If the owner or operator applies for an alternative hydrocarbon limit for more than one industrial furnace such that emissions from the furnaces are from more than one stack, emissions testing must be conducted on all such stacks and dispersion modeling must consider emissions from all such stacks.

To demonstrate that the noncarcinogenic organic compounds listed in appendix IV of the rule do not pose an unacceptable health risk, the predicted ground level concentrations cannot exceed the levels established in that appendix.

To demonstrate that the carcinogenic organic compounds listed in appendix V of the rule do not pose an unacceptable health risk, the sum of the ratios of the predicted ground level concentrations to the levels established in the appendix cannot exceed 1.0. This is because the acceptable ambient levels established in appendix V are based on a 10^{-5} risk level. To ensure that the summed risk from all carcinogenic compounds does not exceed 10^{-5} (i.e., 1 in 100,000) the sum of the ratios described above must be used. (We note that the 2,3,7,8-TCDD toxicity equivalency factor is to be used to estimate the risk from 2,3,7,8-chlorinated CDDs/CDFs, and the risk from these congeners must be added to the risk from other PICs to ensure that the summed risk does not exceed 1 in 100,000.)

To demonstrate that other compounds for which the Agency does not have adequate health effects data to establish an acceptable ambient level are not likely to pose a health risk, the predicted ambient level cannot exceed 0.1 $\mu g/m^3$. This is the 5th percentile lowest reference air concentration for the compounds listed in appendix IV of the rule.

b. Feeding Waste at Locations other than the Hot End. If hazardous waste is fed into an industrial furnace at locations other than the "hot" end where the product is normally discharged and where fuels are normally fired, the rule requires the owner/operator to monitor HC irrespective of whether CO levels do not exceed the Tier I limit of 100 ppmv and to comply with special restrictions during interim status. These provisions are discussed below.

Mandatory HC Monitoring.[32] Except as indicated below, facilities that fire hazardous waste into an industrial furnace at locations other than the "hot" end where the product is normally discharged and where fuels are normally fired must comply with the HC limit even if CO levels do not exceed the Tier I limit of 100 ppmv. See § 266.104(d). This is because the Agency is concerned that the hazardous waste could conceivably be fired at a location in a manner such that nonmetal compounds in the waste may be merely evaporated or thermally cracked to form pyrolysis by-products rather than completely combusted. If so, little CO may be generated by the process and, thus, monitoring CO alone would not ensure that HC emissions were minimized.

However, if hazardous waste is burned (or processed) solely as an ingredient, HC monitoring is not automatically required because emissions of nonmetal compounds are not of concern. This is because the metals emissions controls will ensure that metals emissions do not pose a hazard. (The rule establishes the restrictions discussed below because we are concerned that the interim status controls on *organic* emissions may not be protective when hazardous waste is fed at locations other than the "hot" end of a furnace.) See discussion in section VII.H of Part Three of this preamble for when a waste is considered to be burned solely as an ingredient.[33]

Interim Status Restrictions. In addition to requiring HC monitoring when hazardous waste is fed into a furnace at locations other than the "hot" end where the product is discharged and where fuels are normally fired, today's rule applies other restrictions to hazardous waste burning during interim status. See § 266.103(a)(5). The hazardous waste may not be fed at any location where combustion gas temperatures are less than 1800 °F, and the owner or operator must demonstrate that adequate oxygen is present to combust the waste. In addition, for cement kilns, the hazardous waste must be fed into the kiln itself. These requirements are provided to ensure adequate destruction of the waste given that the DRE standard (which requires a demonstration by trial burn that organic constituents in the waste are destroyed)

[32] Continuous HC monitoring is required for a furnace if hazardous waste is fired at any location other than the "hot", product discharge end where fuels are normally fired irrespective of the CO level in stack emissions (i.e., irrespective if CO levels are lower than the Tier I limit of 100 ppmv) and irrespective of whether furnace off-gas is passed through another combustion chamber.

[33] Regulated entities have indicated that there is substantial confusion over the terms "use as an ingredient" and "material recovery". Under the RCRA hazardous waste regulatory program, EPA considers a hazardous waste to be burned or processed as an ingredient if it is used to produce a product. EPA considers a hazardous waste to be burned or processed for material recovery if one or more constituents of the waste is recovered as a product.

is not applicable during interim status. Like the requirement for mandatory HC monitoring, however, these restrictions do not apply if the hazardous waste is burned (processed) solely as an ingredient. For further discussion, see section VII.H of Part Three of this preamble.

5. Special Considerations for Cement Kilns

a. Monitoring in the By-Pass Duct of a Cement Kiln. The final rule provides that cement kilns with by-pass ducts may monitor CO and, if required, HC concentrations in the by-pass duct. Most precalciner and some preheater kilns are equipped with by-pass ducts where a portion (e.g., 5–30%) of the kiln off-gas is diverted to a separate air pollution control system (APCS) and, sometimes, a separate stack. A portion of the kiln gases are so diverted to avoid a build-up of metal salts that can adversely affect the calcination process. Dust collected from the by-pass APCS is usually disposed of while dust collected from the main APCS is usually recycled back into the kiln to make the clinker product.

Several comments were received regarding sampling at cement kilns. Five commenters suggested that HC (and CO) measurements should be allowed in the by-pass duct rather than in the main stack because: (1) The by-pass gas is representative of the kiln off-gas; and (2) this approach would preclude the problem of nonfuel HC emissions from the raw material exceeding the 20 ppmv limit. The raw material would be heated and partially calcined in the precalciner or preheater and HC from that process would be emitted from the main stack. The by-pass duct draws the kiln off-gas prior to the precalciner or preheater and, so, would not be affected by that process.

Another commenter specifically supported monitoring CO (and HC, if required) only in the bypass duct provided that hazardous waste is fed only to the kiln and not to the preheater or precalciner.

The Agency conducted testing [34] at a cement kiln to gather information relevant to the issue of HC monitoring in the bypass duct for preheater and precalciner cement kilns. The data showed that the gases in the bypass duct are representative of the combustion of waste in the kiln.

Based on this test data and public comment, the final rule allows CO and, where required, HC monitoring in the bypass duct of a cement kiln provided that: (1) Hazardous waste is fired only into the kiln (i.e., not at any location downstream from the kiln exit relative to the direction of gas flow); and (2) the bypass duct diverts a minimum of 10% of kiln off-gas. See § 266.104(g). The 10% diversion requirement is based on engineering judgment that, at this level of kiln-gas diversion, the bypass gas will be representative of the kiln off-gas. Industry representatives indicate [35] that the bypass duct capacity of most facilities actively involved in burning hazardous waste exceeds the 10% limit.

b. Use of Hazardous Waste as Slurry Water for Wet Cement Kilns. Some kiln operators have inquired as to what regulatory standards apply, if any, if hazardous wastes are used as slurry water. The Agency does not regard the practice as an excluded form of recycling. The Agency has long been skeptical of claims that hazardous wastes are "recycled" when they substitute for very commonly available and economically marginal types of raw materials. In particular, the Agency has been skeptical that liquid hazardous wastes serve as a substitute for water. Cf. 48 FR at 14489 (April 4, 1983). In the case of hazardous waste used as slurry water, the hazardous constituents in the waste are ordinarily unnecessary to the claimed recycling activity and are being gotten rid of through the slurrying process. Given the possibility of hazardous levels of air emission is high, the practice certainly can be part of the waste disposal problem. Consequently, the Agency regards such practice as a form of waste management subject to regulation under today's rule.

EPA considered prohibiting the use of hazardous waste as slurry water for wet cement kilns because of concern that toxic organic constituents in the waste could be volatilized and emitted without complete combustion. The final rule does not prohibit using (or mixing) hazardous waste with slurry water because we believe that the controls provided by the rule both during interim status and under a RCRA operating permit adequately address the hazard that the practice may pose.

If hazardous waste is fed into any industrial furnace during interim status at a location other than the hot, product discharge end, combustion gas temperatures must exceed 1800 °F at the point of introduction, and the owner or operator must document that adequate oxygen is present to combust organic constituents in the waste. See discussion above. EPA believes that these restrictions will, as a practical matter, preclude use of hazardous waste in slurry water during interim status.

Although these restrictions on hazardous waste burned at locations other than the hot end of an industrial furnace do not apply under a RCRA operating permit, the permit proceedings will ensure that organic constituents in a hazardous waste that is fed into the kiln in slurry water (or in the slurry itself) will be destroyed. The Director will require that toxic nonmetal constituents in the waste are destroyed to a 99.99% destruction and removal efficiency, and that adequate oxygen is present to completely destroy the organic compounds.

C. Automatic Waste Feed Cutoff Requirements

Today's rule requires that boilers and industrial furnaces combusting hazardous waste be equipped with automatic waste feed cutoff systems to limit emissions of hazardous compounds during combustion "upset" situations and to ensure stable combustion conditions. The automatic waste feed cutoff system must be connected to the CO and HC monitoring system, such that an exceedance of a CO or HC limit would trigger a cutoff of the waste feed. Additionally, the automatic waste feed cutoff system must engage when other key operating conditions deviate from specified unit operating limits, which are determined during compliance testing or which are based on manufacturer specifications. See §§ 266.102(e)(7)(ii) and 266.103(g).

Some commenters disagreed with the proposed automatic waste feed cutoff requirements. One commenter argued against any waste feed cutoffs for light-weight aggregate kilns. Six commenters expressed concern that waste feed cutoffs would increase the instability of the combustion conditions and would possibly increase air emissions. Three commenters requested a controlled waste feed reduction over several minutes rather than an automatic waste feed shutoff. Three commenters suggested different levels of CO emissions be set for waste feed cutoffs.

The Agency acknowledges that there can be performance and other problems associated with automatic waste feed cutoffs, and recognizes that they may be undesirable for some applications. For example, when the facility operates without the use of hazardous waste fuel, use of fossil fuel is increased, and the opportunity is lost for safe disposal of hazardous waste. Further, HC emissions may actually increase if the automatic waste feed cutoff is triggered frequently

[34] U.S. EPA, "Emissions Testing of a Precalciner Cement Kiln at Louisville, Nebraska", November 1990.

[35] Letter dated August 16, 1990, from Dr. Michael von Seebach, Southdown, Inc., to Dwight Hlustick, EPA.

even though combustion chamber temperatures must be maintained while hazardous waste or residues remain in the combustion chamber. However, the Agency continues to believe that automatic waste feed cutoff systems are necessary to avoid adverse effect on human health and the environment that could result if hazardous waste is fired into the device when it is operating under combustion upset conditions.

To address the concerns raised by commenters, EPA recommends installing pre-alarm systems that alert an owner/operator of potential problems and provide time either for corrective measures to be taken or for a staged cutoff of the hazardous waste feed. Thus, the use of pre-alarms should minimize waste feed cutoffs. In addition, we have included in the rule some additional requirements related to waste feed cutoffs and restarts, as discussed below.

One commenter stated that cutoffs are inappropriate for combustion devices where the waste is destroyed immediately upon injection into the combustion chamber (e.g., devices that burn liquid wastes), or if the combustion conditions supported by the waste fuel continue to destroy residual waste after waste feed cutoff. The Agency continues to believe that the best method for returning a combustion system to good operating conditions, thereby minimizing unacceptable emissions, is to stop the input of hazardous waste. Further, the burden associated with automatic cutoffs should not be substantial because frequent automatic waste feed cutoffs should not occur given that the parameters tied into the automatic cutoff system may be monitored on an hourly rolling average basis (which allows high values to be offset by low values) and that the Agency recommends the use of pre-alarms to warn the operator of a pending cutoff (which may give the operator time to take corrective measures to avoid an automatic cutoff).

In the event of a waste feed cutoff, monitoring for CO and HC (and other operating parameters for which limits in the permit are based on a rolling average basis) must continue, and the waste feed cannot be restarted until CO and HC levels (and levels of the other parameters) come within allowable limits. See § 266.102(e)(7)(ii). (For permit operating conditions not established on a rolling average basis, the Director will specify, on a case-by-case basis, an adequate period of time during which the parameters must remain within permit limits to demonstrate steady-state operation prior to restarting the hazardous waste feed.) In addition, consistent with the April 27, 1990 incinerator amendments proposal, the provision of the final boiler and industrial furnace rule requiring compliance with the permit operating conditions states that compliance must be maintained at any time there is waste in the unit. See § 266.102(e)(1). This language clarifies that activation of the automatic waste feed cutoff does not relieve the facility of its obligation to comply with the permit conditions if there is waste remaining in the unit (such as in a rotary kiln). Thus, for example, the air pollution control system must continue to be operated within the applicable permit conditions.

Furthermore, after a cutoff, the temperature in the combustion chamber must be maintained at levels demonstrated during the compliance test for as long as the hazardous waste or residue remains in the combustion chamber. The Agency believes this temperature requirement will help ensure that hydrocarbon emissions will be minimized after a cutoff.

To comply with this requirement, the operating permit must specify the minimum combustion chamber temperature after a waste feed cutoff while waste remains in the combustion chamber. An uninterruptable burner using auxiliary fuel (i.e., nonhazardous waste fuel) of adequate capacity may be needed to maintain the temperature in the combustion chamber(s) and to allow destruction of the waste materials and associated combustion gases left in the system after the waste feed is automatically cut off. The safe startup of the burners using auxiliary fuel requires approved burner safety management systems for prepurge, pilot lights, and induced draft fan starts. If these safety requirements preclude immediate startup of auxiliary fuel burners and such startup is needed to maintain temperatures (i.e., if the combustion chamber temperatures drop precipitously after waste feed cutoff), the auxiliary fuel may have to be burned continuously on "low fire" during nonupset conditions.

Furthermore § 266.102(e)(7)(ii)(B) requires that the combustion gases must continue to be routed through the air pollution control system as long as waste remains in the unit. One effect of this clarifying requirement, in combination with the requirement to maintain compliance with permit conditions as long as there is waste in the unit, is that opening of any type of air pollution control system bypass stack while there is waste in the boiler or furnace would be a violation of the permit (unless the facility demonstrates compliance with the performance standards during the trial burn, with the vent stack open).

Although we believe that such emergency bypass stacks are not prevalent on boilers and industrial furnaces, our discussion of this topic in the preamble to the incinerator amendments at 55 FR 17890 (April 27, 1990) would also apply to any boiler or industrial furnace with such a bypass or vent stack. We received a number of comments from the incinerator industry expressing concern that use of a bypass stack for safety purposes would be considered a violation. We agree that there can be mitigating circumstances to warrant the use of a bypass stack and do not discredit their use as a safety device. However, the Agency continues to believe that the facility can and should implement measures to minimize situations where use of the emergency vent stack is necessary.

One commenter stated that the use of hazardous waste should be prohibited during startup or shutdown periods for a cement kiln until normal operating temperatures are achieved. The final rule does not restrict hazardous waste burning during kiln startup or shutdown provided that the compliance (or trial burn) covers those periods of operations. In other words, hazardous waste may be burned during startup and shutdown if the facility demonstrates conformance with the standards during those operations.

Another commenter argued that accurate measurement of combustion chamber temperature for some combustion devices will be difficult. Because of this difficulty, the final rule does not require that this temperature be directly measured in the combustion chamber if an owner/operator can demonstrate to permitting officials that the combustion chamber temperature correlates with a more easily measured downstream gas temperature.

One commenter agreed with EPA's revised proposal not to limit the number of automatic waste feed cutoffs, but disagreed with EPA's requirement that combustion chamber temperatures must be maintained at the levels that occurred during the trail burn for the duration of time that the waste remains in the combustion chamber. This commenter believed that electric utility boilers and other burning devices will have difficulty in accurately measuring combustion chamber temperatures. For this reason, the commenter suggested that waste feed cutoffs alone be used to control HC emissions rather than also requiring that combustion chamber

temperatures be maintained. EPA believes that the flexibility that the final rule allows for monitoring combustion chamber temperature and in setting the frequency of waste feed cutoffs as discussed above should address this commenter's concerns.

Another commenter supported the proposed 10 times per month limit on the number of automatic waste feed cutoffs and the proposed requirement that any facility exceeding that frequency would be required to cease burning hazardous waste, to notify the Director, and not to resume burning hazardous waste until reauthorized by the Director. Another commenter supported monthly cutoff limits because they would provide an incentive for the facility to take corrective measures to preclude frequent cutoffs. Some commenters stated that this requirement is overly restrictive.

After careful consideration, EPA has decided to modify this requirement for the following reasons: (1) The Agency does not have data indicating a specific frequency of cutoffs which would be unacceptable at all boilers and furnaces given that the combustion chamber temperature and other conditions are maintained as described above; (2) the Agency believes that operating costs associated with cutoffs will provide sufficient incentive to encourage owners/operators to minimize automatic waste feed cutoff incidents; and (3) the recommended use of pre-alarm systems will reduce the number of waste feed cutoffs. However, the final rule allows the Director to use his discretion to determine whether a limit on the frequency of cutoffs is warranted at a specific facility.

Waste Feed Restarts. Today's rule provides that when the automatic waste feed cutoff is triggered by a CO limit or when applicable, an HC exceedance, the waste feed can be restarted only when the hourly rolling average CO/HC levels meet the permitted limits (e.g., 100 ppmv for CO under Tier I).

The Agency proposed two alternative approaches for restarting the waste feed when a cutoff is triggered by a CO exceedance: (1) Restart the waste feed after an arbitrary 10-minute time period to enable the operator to stabilize combustion conditions; or (2) restart the waste feed after the instantaneous CO level meets the hourly rolling average limit. Eight commenters supported restarting the waste feed after the instantaneous CO level meets the permit limit. Five commenters suggested that waste feed can be restarted once the instantaneous CO level meets the hourly rolling average limit. The Agency considered the comments, but continues to believe that allowing a waste feed restart after the hourly rolling average equals or falls below the permitted limit is preferable. After the waste feed is cutoff, the facility will be burning nonhazardous waste (typically fossil fuel), which should result in CO and HC levels well below the allowable limits. Therefore, the hourly rolling average should fall below the permitted limit within a relatively brief period of time. Allowing the waste feed to be restarted when the instantaneous CO level has dropped to the permitted level may not be desirable, because restarting the waste feed immediately may trigger another cutoff due to a CO spike when the waste feed is restarted.

Three commenters supported the proposed approach to require the HC hourly rolling average to be met before restarting the waste feed cutoff because of a HC exceedance. Three commenters opposed this approach. Instead, these commenters suggested a 10-minute waiting period be used. EPA considered these comments but continues to believe that meeting the hourly rolling average is a conservative approach and is appropriate after a HC exceedance, because the HC is a better surrogate for toxic organic emissions than CO.

D. CEM Requirements for PIC Controls

The final rule promulgates the proposed performance specifications for continuously monitoring CO, HC, and oxygen. See Methods Manual for Compliance with the BIF Regulations, incorporated as appendix IX of part 266 in today's rule. The performance specifications for HC monitoring, however, include specifications for both hot and cold monitoring. Although hot monitoring is generally required by the final rule, cold monitoring may be used for interim status facilities if they certify compliance with the emissions standards within 18 months of promulgation of the rule. Even if cold monitoring is used to certify initial compliance, however, hot monitoring is required for these facilities when they recertify compliance and when they are issued a RCRA operating permit.

One commenter stated that an HC monitoring system is readily available for continuous emissions monitoring (CEM), while five commenters maintained that HC analyzers have serious operational problems. Several commenters requested that alternate HC CEM methods be allowed, specifically monitors with non-dispersive infra-red (NDIR) detectors rather than the required flame ionization detector (FID). One commenter noted that EPA has not validated the FID method for HC analysis nor has it provided any critical discussion of the current methods of HC analysis.

The Agency considered the use of NDIR detectors for HC monitoring but believes that NDIR systems have limitations compared to FID systems. EPA believes that FID systems are more sensitive than NDIR systems and that an equivalent response is not found with NDIR detectors. The final rule requires the use of FID detectors for HC monitoring.

Four commenters recommended monitoring nonmethane hydrocarbons (NMOC) as opposed to "total" HC because methane, which is predominately emitted from fuel sources, has a high FID response factor. Furthermore, these commenters would like EPA to require testing for specific PICs that respond poorly to HC monitors during test burns. One commenter stated that HC monitors can be varied easily to detect NMOC. EPA does not agree with either suggestion. The Agency is requiring HC monitoring to indicate whether the device is operating under good combustion conditions. We acknowledge that the largest fraction of organic compounds that the HC monitoring system required by the final rule will detect for facilities operating under good combustion conditions will be compounds that are relatively nonhazardous (e.g., methane). In addition, some hazardous compounds, particularly highly chlorinated compounds) will be under-reported. Thus, although the promulgated approach would not be adequate for the purpose of assessing the risk that HC may pose from a given facility, the approach is adequate for its intended purpose—a measure of whether the facility continues to operate within good combustion conditions. This is because EPA's emissions testing has shown that when combustion conditions deteriorate, the compounds that are readily detected by the promulgated HC monitoring system increase correspondingly.

In addition, if a NMOC system were used, the 20 ppmv HC limit would have to be lowered to account for the methane fraction that would no longer be counted. Commenters did not provide support for so adjusting the proposed HC limit. Further, the Agency is concerned that NMOC detectors may not be able to provide continuous data due to the time required for methane separation. The Agency has also found that HC CEMs are more durable than NMOC CEMs, and thus less prone to reliability problems. As a result, the Agency has concluded that HC CEMs are more likely to provide a continuous

indication of combustion conditions than is possible with an NMOC monitor.

Hot Versus Cold HC Monitoring Systems. Except as indicated below, the final rule requires the use of a hot or unconditioned HC monitoring system that must be maintained at a temperature of at least 150 °C until the sample gas exits the detector. See performance specifications in Methods Manual for Compliance with the BIF Regulations (incorporated in today's rule as appendix IX of part 266). Given, however, that the technology has just recently been demonstrated [36] to be continuously operational on hazardous waste combustion devices, the final rule allows the use of a conditioned gas monitoring system during the initial phase of interim status operations. Facilities in interim status that certify compliance with the emission standards for metals, HCl, Cl_2, particulate matter, CO and HC within 18 months of promulgation of the final rule may use a conditioned gas system. Facilities that elect to obtain the automatic 12-month extension (or a case-by-case extension) of the 18-month certification deadline, however, may not use a conditioned gas system because the additional time provided by the extension will also provide time to install an unconditioned HC monitoring system. These facilities must demonstrate compliance with the HC limit using an unconditioned gas monitoring system. Further, facilities that certify initial compliance using a conditioned gas (cold) system must use an unconditioned gas (hot) system when they recertify compliance within three years of certifying initial compliance.

EPA is requiring the use of a hot monitoring system because it represents best demonstrated technology given that a larger fraction of HC emissions can be detected with a hot system. As discussed at proposal, a hot HC monitoring system can detect a substantially larger fraction of hydrocarbon emissions than a cold system. This is because the cold system uses a gas conditioning system that removes semi- and nonvolatile hydrocarbons and a substantial fraction of water-soluble volatile hydrocarbons.

EPA received numerous comments regarding gas conditioning (heated versus unheated) for HC monitoring. Eight commenters are in favor of gas conditioning. The purpose of gas conditioning is to remove moisture from the combustion gases that can degrade instruments or plug sample lines. Sample conditioning, however, can also remove some of the water soluble hydrocarbons and the semi- and nonvolatile hydrocarbons in the flue gas such that methane and other nonhazardous volatile hydrocarbons are frequently the dominant constituents measured by the detector. Some commenters were concerned that fewer PICs would be detected by a conditioned (i.e., cooled) monitoring system. However, one commenter stated that even though the constituents contributing most of the hypothetical risk are relatively nonvolatile they are relatively nondetectable through an unconditioned (heated) monitoring system because of their halogen content.

As discussed at proposal, the Agency is using HC monitoring to implement the technology-based HC limit of 20 ppmv as an indicator of good combustion conditions. The HC monitor is not used in an attempt to quantify organic emissions for risk assessment purposes. Emissions testing has shown that during combustion upset conditions, both the hot and cold HC monitoring systems detect an increase in HC levels because under upset conditions there is a substantial increase in hydrocarbon compounds that are readily detected by either monitoring system.[37]

One commenter suggested that, rather than specifying a range of 40–64 °F for operation on the conditioner as proposed, a specific conditioning temperature (32 °F) should be required to precisely define the conditioned sampling procedure. We agree that a minimum temperature should be specified rather than the range. The final rule allows a conditioned monitoring system during the initial phase of interim status, and requires that the sample gas temperature must be maintained at a minimum of 40 °F at all times prior to discharge from the detector. EPA selected a minimum temperature of 40 °F from the range of 40 to 64 °F to ensure that moisture was effectively removed from the gas sample to preclude plugging and fouling problems with the monitoring system.

Three commenters suggested that the HC limit of 20 ppmv be re-examined because gas conditioning temperatures or other changes in the measurement method may influence the amount of HC measured. Given that the 20 ppmv limit is based primarily on test burn data using heated (i.e., unconditioned) monitoring systems, the Agency considered lowering the 20 ppmv limit when a cold (i.e., conditioned) monitoring system is used. (Limited field test data indicate that a heated system would detect from 30% to 400% more of the mass of organic compounds than a conditioned system.) We believe, however, that the 20 ppmv HC limit is still appropriate when a conditioned system is used because: (1) The data correlating heated vs conditioned systems are very limited; (2) the data on HC emissions are limited (and there apparently is confusion in some cases as to whether the data were taken with a conditioned or unconditioned monitoring system); and (3) the Agency's risk methodology is not sophisticated enough to demonstrate that a HC limit of 5 or 10 ppmv using a conditioned system rather than an unconditioned system is needed to protect human health and the environment. The SAB [38] also concurs with this view. (More detailed responses to comments on this issue are found in a separate background document.)

E. Control of Dioxin and Furan Emissions

For facilities that may have the potential for significant emissions of chlorinated dibenzodioxins and dibenzofurans (CDD/CDF), the final rule requires emissions testing for both interim status and new facilities to determine emissions rates of all tetra-octa congeners, calculation of a toxicity equivalency factor, and dispersion modeling to demonstrate that the predicted maximum annual average ground level concentration (i.e., the hypothetical maximum exposed individual) does not exceed levels that would result in an increased lifetime cancer risk of more than 1 in 100,000.[39] The Agency considers a facility to have the potential for significant CDD/CDF emissions if it is equipped with a dry particulate matter control device (e.g., fabric filter or electrostatic precipitator)

[36] Entropy Environmental Inc., "Evaluation of heated THC Monitoring Systems for Hazardous Waste Incinerator Emission Measurement", Draft Final Report, October 1990; and Shamat, Nadim, et al., "Total Hydrocarbon Analyzer Study", Paper presented at the 63rd Water Pollution Control Federation Conference in Washington, DC, October 8, 1990.

[37] EPA is requiring the use of a hot, unconditioned HC monitoring system (except under certain circumstances during the initial phase of interim status) because hot systems are, nonetheless, more conservative in that they detect a larger fraction of organic compounds in emissions. Further, hot systems represent best demonstrated technology for monitoring HC levels.

[38] U.S. EPA, "Report of the Products of Incomplete Combustion Subcommittee of the Science Advisory Board", Report # EPA-SAB-EC-90-004, January 1990.

[39] EPA is not requiring that the estimated cancer risk from CDD/CDF be added to the risk from metal emissions to demonstrate that the summed risk to the maximum exposed individual is less than 10^{-5}. The Agency believes that it is inappropriate to sum the estimated health risk from metals that are known or probable human carcinogens with a toxicity equivalency factor for CDD/CDF that is designed to be very conservative.

with an inlet gas temperature within the range of 450 to 750 °F, or if it is an industrial furnace that has hydrocarbon levels exceeding 20 ppmv. See § 266.104.

Dispersion modeling must be conducted in conformance with EPA's "Hazardous Waste Combustion Air Quality Screening Procedure" provided in Methods Manual for Compliance with the BIF Regulations or EPA's Guideline on Air Quality Models (Revised) which are incorporated in today's rule as appendices IX and X, respectively, of part 266, or "EPA SCREEN Screening Procedure" as described in Screening Procedures for Estimating Air Quality Impact of Stationary Sources. The latter document is incorporated by reference in today's final rule at § 260.11. To evaluate potential cancer risk from the congeners, prescribed procedures must be used to estimate the 2,3,7,8-TCDD toxicity equivalence of 2,3,7,8-chlorinated congeners. See "Procedures for Estimating Toxicity Equivalence of Chlorinated Dibenzo-p-Dioxin and Dibenzofuran Congeners" in Methods Manual for Compliance with the BIF Regulations incorporated in the rule as appendix IX of part 266.

Studies conducted by the Agency [40] and others [41] during development of regulations for municipal waste combustors (MWCs) concluded that PM control devices operated at temperatures greater than 450 °F have the potential for emitting elevated levels of CDD/CDF. At these temperatures, precursor organic materials and chlorine in the flue gas can be catalyzed by PM captured in the PM collection device to form CDD/CDF. Based on these findings, the Agency proposed to restrict the combustion of hazardous waste in BIFs that operate with PM control device temperatures greater than 450 °F.

A number of commenters opposed the proposed limitation on the flue gas temperature to less than 450 °F. Several commenters pointed out technical distinctions among types of boilers and industrial furnaces that affect the ability of a unit to change flue gas temperature and the potential of an ESP to form CDD/CDF. For example, many boiler and industrial furnaces either combust wastes that are very low in chlorine or that have high levels of chlorine capture within the process (e.g., cement kilns). As a result, the CDD/CDF emission potential will vary for different boilers and industrial furnaces, as well as between boilers and industrial furnaces and MWCs. Commenters also stated that there is no direct evidence of CDD/CDF emissions from several types of boilers and industrial furnaces, and that compliance testing to demonstrate 99.99 percent DRE of POHCs and continuous monitoring of CO and HC levels is adequate to ensure minimal emissions of organic compounds.

The Agency has reviewed the available data on the theory of CDD/CDF formation as well as CDD/CDF emissions from BIFs. Based on this review, the Agency agrees that most, but not necessarily all, BIFs burning hazardous waste have low CDD/CDF emission rates. For example, EPA recently tested a cement kiln burning hazardous waste that operates with an ESP at a temperature of 500–500 °F and found it to have relatively high CDD/CDF emissions.[42] (EPA conducted a risk assessment, however, that estimated the increased lifetime cancer risk to the hypothetical maximum exposed individual from the CDD/CDF emissions ranged from 7 in 10,000,000 to 2 in 1,000,000 without burning hazardous waste and from 2 in 1,000,000 to 4 in 1,000,000 when burning hazardous waste, well under the 1 in 100,000 limit established in today's rule.) The Agency suspects that the elevated CDD/CDF concentrations in the stack gas at this cement kiln are the result of the ESP's operating temperature and the level of HC precursor material in the flue gas. HC concentrations ranged from 66 to 70 ppmv (measured with a hot system, reported as propane, and corrected to 7% oxygen, dry basis) without hazardous waste burning and from 38 ppmv to 63 ppmv with hazardous waste burning. (We note that to continue burning hazardous waste under today's rule, the Director must establish during the part B permit proceedings an alternative HC level for this kiln based on a demonstration by the applicant that HC levels are not higher when burning hazardous waste than under normal conditions and that the facility is designed and operated to minimize HC emissions from all sources—fuels and raw materials. At certification of compliance with the emissions controls other than the HC limit, this facility must also propose a HC concentration limit for the remainder of interim status (until that limit or another limit is established under permit proceedings) that will ensure that HC levels when hazardous waste is burned will not be higher than baseline levels (i.e., HC levels when the system is designed and operated to minimize HC emissions from all sources, when burning normal fuels and feeding normal raw materials to produce normal products, and when not burning hazardous waste).) In addition, trial burn emissions testing must demonstrate that emissions of organic compounds are not likely to result in an increased lifetime cancer risk to the hypothetical maximum exposed individual exceeding 1 in 100,000. See § 266.104(f) and discussion in section II.B.4.b of part three of this preamble.) There may be other factors that influence CDD/CDF levels at this facility (and other facilities), but this is uncertain. In addition, the exact HC concentration in combustion gas below which elevated CDD/CDF concentrations will not occur is unknown.

The Agency continues to believe that the operating temperature of the PM control device (and HC concentrations in flue gas) plays a significant role in CDD/CDF emissions. For a given HC concentration in the flue gas, the available data suggest that the potential for elevated CDD/CDF emissions is low if the PM control device operates at temperatures of less than 450 °F or above 750 °F. Consequently, today's rule does not require BIFs with PM control devices operating at temperatures outside of the 450–750 °F window to determine CDD/CDF emission rates (unless it is an industrial furnace with HC levels greater than 20 ppmv). Owners and operators of units operating within the temperature window, however, are required to conduct stack testing to determine CDD/CDF emission rates and to conduct a risk assessment using prescribed procedures to demonstrate that the estimated increased lifetime cancer risk to the hypothetical maximum exposed individual is less than 1 in 100,000.

The Agency notes that the final rule municipal waste combustors (MWCs) may take a slightly different approach to control dioxin and furans by limiting temperatures at the inlet of the PM air pollution control system to within 30 °F of those achieved in a dioxin/furan compliance test. The preamble to that rule, however, will probably continue to note the possibility of dioxin/furan formation in the temperature range of 230 °C (450 °F). In today's rule, the Agency believes that using temperature and HC levels as a trigger to dioxin/furan testing and risk assessment will be fully protective of human health and the

[40] See U.S. EPA, "Municipal Waste Combustion Study: Combustion Control of Organic Emissions", EPA/530-SW-87-021C, NTIS Order No. PB87-206090; U.S. EPA, "Municipal Waste Combustion Study: Flue Gas Cleaning Technology", EPA/530-SW-87-021D, NTIS Order No. PB87-208108; and 54 FR 52251 (December 20, 1989).

[41] Vogg H. and L. Stieglitz, "Thermal Behavior of PCDD/PCDF in Fly Ash from Municipal Waste Incinerators", Chemosphere, pp. 1373–1378, 1986.

[42] U.S. EPA, Emissions Testing of a Wet Cement Kiln at Hannibal, MO, December 1990.

environment and somewhat easier to implement than the MWC approach.

III. Risk Assessment Procedures

The Agency uses assessment of health risk to develop and implement the final rules for metals, hydrochloric acid (HCl), and chlorine gas (Cl_2). Specifically, the Agency has used risk assessment to: (1) Establish ambient air concentrations of appendix VIII compounds that do not pose an unacceptable health risk for purposes of this rulemaking; and (2) establish risk-based, conservative feed rate and emissions Screening Limits for metals and HCl. In addition, if facilities fail the Screening Limits or elect to conduct dispersion modeling to obtain less conservative limits, the rule allows facilities to use site-specific dispersion modeling to establish emission limits, and ultimately feed rate limits for metals and chlorine.

To establish health-based acceptable ambient concentrations for noncarcinogenic toxic metal and nonmetal compounds (except for HCl, Cl_2 and lead), EPA converted oral reference doses to reference air concentrations (RACs) by assuming average breathing volumes and body weights, and by applying a safety and a background level factor. See 54 FR at 43756. Health-based concentrations for carcinogenic pollutants were derived by converting cancer potency factors, or slopes (unique for each carcinogen), into Risk Specific Doses (RSDs) at a risk level of 1 in 100,000.[43] Since carcinogens are assumed to pose a small but finite risk of cancer even at very low doses, the RSD reflects a certain risk level, corresponding to 1 chance in 100,000, or 10^{-5} excess risk of cancer for the maximally exposed individual if exposed continuously to multiple carcinogenic chemicals for a 70-year lifetime. RACs for HC1 and Cl_2 are based on inhalation data, and a RAC for lead is based on the National Ambient Air Quality Standard (NAAQS).

To establish the Screening Limits for metals and HCl, air dispersion modeling was applied to back-calculate maximum acceptable feed rates and stack emissions rates from risk-based, acceptable ambient concentrations. These calculations were performed for various terrain types, effective stack heights, and land use classifications. The resulting permissible Screening Limits reflect plausible, reasonable worst-case assumptions about a generic facility that are not site-specific. The Screening Limits process provides a rapid and convenient risk-based mechanism to determine compliance. Conservative assumptions used to estimate health impacts exposure in the Screening Limit process include: (1) Use of reasonable, worst-case estimate of dispersion of stack emissions; and (2) for the Tier I feed rate Screening Limits, assuming that all metals and chlorine fed into the BIF in all feedstreams are emitted (i.e., there is no partitioning to bottom ash or product, and not removal by an air pollution control system.[44] See 52 FR 17002 (May 6, 1987) and 54 FR 43729 (October 26, 1989). Thus, assumptions and the Screening Limits tend to err intentionally on the side of protecting human health.[45]

If emission levels exceed the Screening Limits (or if the owner/operator so elects), the rule allows a facility to conduct its own site-specific air dispersion modeling in order to establish metals, HCl, and Cl_2 emission limits. Incorporation of site-specific information allows less conservative assumptions (than the reasonable worst-case, nonsite-specific defaults) to be used in the dispersion models. Consequently, site-specific air dispersion modeling may predict lower ambient concentrations than the nonsite-specific modeling reflected in the Screening Limits, thus allowing higher emissions and feed rate limits.

A. Health Effects Data

1. Carcinogens

Health effects evaluations for carcinogens have been summarized in Part Three, I. D, "Evaluation of Health Risk" in the April 27, 1990 proposal (see 55 FR 17873). To summarize briefly, in contrast to noncarcinogens, carcinogens are assumed to present a small but finite risk of causing cancer, even at very low doses. The slope of the dose-response curve in the low dose region is assumed to be linear for carcinogens. Because of this, the slope of the curve in the low dose region may be used as an estimate of carcinogenic potency. The unit risk is defined as the incremental lifetime risk estimated to result from exposure of an individual for a 70-year lifetime to a carcinogen in air containing 1 microgram of the compound per cubic meter of air ($\mu g/m^3$). At an air concentration of 1 $\mu g/m^3$, the cancer potency slope is numerically equivalent to the unit risk. Thus, at a preselected risk level, the corresponding air concentration which would cause that risk may be calculated by dividing the desired risk level by the unit risk value. Although the resulting value represents an air concentration with units of $\mu g/m^3$, this concentration is referred to as the Risk Specific Dose (RSD).

When exposed to more than one carcinogen, the Guidelines for Carcinogenic Risk Assessment (51 FR 33992 (September 24, 1986)) recommend adding risks from the individual carcinogens to obtain the aggregate risk (i.e., cancer risks from exposure to more than one carcinogen are assumed to be additive). For today's rule, the Agency has proposed that an aggregate risk level for metals (i.e., arsenic, beryllium, cadmium, and hexavalent chromium) of 10^{-5} is appropriate because it would limit the risk level for individual carcinogens to the order of 10^{-6}. The Agency points out, however, that in selecting the appropriate risk level for a particular regulatory program, it considers such factors as the particular statutory mandate involved, nature of the pollutants, control alternatives, fate and transport of the pollutant in different media, and potential human exposure. See, e.g., 54 FR at 38049 (Sept. 14, 1989). Particular factors bearing on the Agency's choice here include the wide array and potentially large volumes of carcinogenic pollutants that can be emitted by these devices (unlike the situation in such rules as the benzene NESHAP when a single pollutant with well-understood effects was at issue), the need to guard against environmental harm as well as harm to human health, potential synergistic effects of the carcinogens emitted by these devices (which effects are not accounted for by the risk assessment), and legislative history indicating Congressional preference for parity of regulation between BIFs burning hazardous waste fuels and hazardous waste incinerators (S. Rep. No. 284, 98th Cong. 1st Sess. 38)). In addition, the increased recognition of the need to control net air emissions of toxic pollutants generally, manifest in Title III of the Clean Air Act Amendments of

[43] We note that the cancer risk from the carcinogenic metals must be summed to ensure that the summed risk is not greater than 1 in 100,000. Thus, when more than one carcinogenic metal is emitted, the allowable ground level concentration for each carcinogenic metal is less than the 10^{-5} Risk Specific Dose for that metal.

[44] To obtain credit for partitioning to residue or product and for APCS removal efficiency, owners and operators must conduct emissions testing to demonstrate the overall System Removal Efficiency (SRE)—partitioning plus APCS removal efficiency. The Agency has not assumed an SRE in developing the Tier I feed rate Screening Limits because there are many site-specific factors that can affect the SRE.

[45] We note that the Screening Limits may not always be conservative, however. Today's rule identifies criteria whereby the Screening Limits may not be used because they may not be conservative. See § 266.106(6). That paragraph in the rule also gives the Agency authority to determine whether the Screening Limits may not be protective in a particular situation. In that case, the owner and operator must use the Tier III procedures—site-specific dispersion modeling.

1990, influences the Agency's choice of a conservative risk target in this rule. These same factors can also influence choice of a risk level where the Agency is making site-specific determinations.

The following section discusses comments on health effects data on carcinogens.

a. Unit Risk Factors/Risk Specific Doses. A few commenters argued for deletion of category C carcinogens from consideration in the risk assessment process.

Given that the carcinogenic metals arsenic, beryllium, cadmium, and hexavalent chromium are classified as either A or B carcinogens, this discussion pertains only to the C nonmetal appendix VIII compounds for which the Agency established 10^{-5} RSDs for purposes of implementing the low risk waste exemption, risk assessments for cement kilns with HC levels exceeding 20 ppmv, and health-based limits for Bevill excluded waste.

As a conservative element in the risk assessment process, and especially for purposes of implementing an exemption from some of the emission controls, EPA does not believe that exposure to category C carcinogens should be ignored at this time for those chemicals with cancer potency slopes. The classification schemes categorize chemicals based upon weight of the evidence, not carcinogenic potency. Therefore, a highly potent carcinogen may be classified in the C category and present a threat to health.

b. Quality of the Toxicological Data Base. Several commenters questioned the quality and extent of the toxicology data base and EPA's selection of specific studies used to calculate the cancer potency factors and unit risk values for a particular chemical. For example, one commenter noted that the molecular species of a metal compound emitted from an incinerator may be markedly different from the metallic complex actually tested for carcinogenicity and used to calculate that metal's cancer potency factor. This would distort the risk assessment process. This same commenter argued that beryllium oxide, which would be formed preferentially at the extreme temperatures of a furnace, is relatively inert compared to the molecular complex of beryllium which forms the basis of the cancer potency factor. Another commenter contended that, in general, the less water soluble (and, therefore, less bioavailable) metallic oxides are emitted from incinerators whereas the metallic species tested for cancer were more water soluble and bioavailable (i.e., absorbable into the organism).

EPA acknowledges the concern that the metal complex tested for carcinogenicity in animals reflects that to which humans are exposed. However, the particular metal complex being emitted may not have been tested in animals. In such cases, it is sometimes necessary to use that toxicological data which is available (on the same metal but complexed with a different ligand), limitations notwithstanding, until appropriate data on the complex of concern become available. EPA believes the use of the available data base will result in risk assessment methodology that is protective of human health and the environment.

Moreover, EPA notes that soluble metallic salts may also be emitted under some conditions (e.g., metallic chlorides). For screening purposes, the conservative assumption that soluble (i.e., bioavailable) metallic complexes are emitted, is assumed to protect health. For the site-specific risk assessment option, historical or test burn data may be used to identify probable emitted metallic species. If permit officials conclude during the permit process that appropriate fate, transport, and toxicological data exist for the actual emitted complex to support risk assessment, this could then be used in the site-specific risk assessment option.

c. High Dose to Low Dose Extrapolation. Several commenters questioned the scientific merit of extrapolating from high dose experimental data to low dose cancer risks using existing statistical models, asserting that the process is not biologically-based and is extremely conservative (i.e., overly health-protective). Two commenters asserted that the linearized multistage model should not be applied to non-genotoxic carcinogens because such "carcinogens" promote rather than initiate cancer, thus acting as a classical toxicant with a threshold. These commenters maintained that a chemical such as chloroform, which they claim is non-genotoxic (i.e., has not tested positive in mutation assays), would have a threshold below which there is no risk of cancer. Another commenter argued that biological evidence indicates a threshold for arsenic-induced cancer due to its known benefit as an essential trace element at low doses. This same commenter asserted that hexavalent chromium (Cr+6) is quickly converted in the body to the essential trace element Cr+3 and, therefore, should be treated as a "threshold carcinogen."

The Agency is following closely recent developments in scientific consensus regarding the basic molecular biology of cancer. EPA will revise its guidelines for carcinogen risk assessment, and other guidance documents, to reflect developing scientific theory on high to low dose extrapolation threshold effects, and other related issues. Until that time, EPA will continue to use its current approach, believing that a more conservative approach is warranted in the face of uncertainty.

d. Chromium Oxidation State. Several commenters argued that the current proposal does not differentiate chromium in the +6 oxidation state from chromium +3. They contend that most chromium emitted from boilers, industrial furnaces, and incinerators exists in the +3 state. Consequently, the proposed approach, which assumes that all chromium is +6, may overstate risks drastically. The commenters recommended that EPA assume that only a fraction of the chromium emitted by incinerators exists in the +6 oxidation state.

EPA concludes that assuming that 100% of the chromium is in the hexavalent oxidation state is a conservative assumption taken in the face of limited data. In a test [46] of hazardous waste incinerator emissions under varying levels of total chlorine in the waste burned, a high percentage of the total chromium emitted was in the hexavalent state under certain conditions. Until more data is available, showing consistently lower proportions of Cr^{+6} under a variety of combustion conditions, EPA believes it is health-protective to assume that chromium from incinerator emissions exists in the hexavalent state. Facilities may elect to conduct emissions testing to determine the actual emission rate of Cr^{+6}.

e. Additive Risks. One commenter criticized EPA's selection of 10^{-5} as the acceptable aggregate risk level (for carcinogenic metals) for deriving screening limits, and claimed the selection is arbitrary and inconsistent with other EPA policy. EPA policy, the commenter notes, has traditionally embraced a range of risks from 10^{-7} to 10^{-4}, with the final EPA-selected risk level dependent upon site-specific conditions (i.e., characteristics and size of the exposed population).

EPA's rationale for selecting 10^{-5} risk for the MEI is described in the October 26, 1989 supplemental notice (54 FR 43754). In summary, EPA continues to believe that the aggregate cancer risk to

[46] U.S. EPA, "Pilot Scale Evaluation of the Fate of Trace Metals in a Rotary Kiln Incinerator with a Venturi Scrubber/Packed Column Scrubber, Vol. I, Technical Results", April 1989.

the MEI of 10^{-5} for metals is appropriate because: (1) It provides adequate protection of public health; (2) it considers weight of evidence of human carcinogenicity; (3) it limits the risk from individual Group A and B carcinogens to risk levels on the order of 10^{-6}; and (4) it is within the range of risk levels the Agency has used for hazardous waste regulatory programs. See also the discussion in section III.A.1 of part three above.

2. Noncarcinogens. For toxic substances not known to display carcinogenic properties, there appears to be an identifiable exposure threshold below which adverse health effects usually do not occur. Noncarcinogenic effects are manifested when these pollutants are present in concentrations great enough to overcome the homeostatic, compensating, and adaptive mechanisms of the organism. Thus, protection against the adverse health effects of a toxicant is likely to be achieved by preventing total exposure levels that would result in a dose exceeding its threshold. Since other sources in addition to the controlled source may contribute to exposure, ambient concentrations associated with the controlled source should ideally take other potential sources into account. Therefore, the Agency has conservatively defined reference air concentrations (RACs) for noncarcinogenic compounds that are defined in terms of a fixed fraction of the estimated threshold concentration. The RACs for lead and hydrogen chloride, however, were established differently, as discussed below. The RACs established in today's final rule are identical to those proposed. (See appendix H of the Supplement to Proposed Rule at 54 FR 43762 (October 26, 1989)). (The Agency notes that it does not intend for RACs to be used as a means of setting air quality standards in other contexts. For instance, the RAC methodology does not imply a decision to supplant standards established under the Clean Air Act.)

We note, however, that the RACs proposed in appendix H of the supplement to proposed rule (and promulgated today as appendix IV to the rule) included both Agency-verified and unverified values. Unverified values are subject to revision as the Agency's Reference Dose Workgroup continues to establish verified inhalation RfDs. (Occasionally, the Agency may also revise verified values based on new and significant information.) Since the supplemental notice, the Workgroup has established inhalation RfDs for eight compounds on proposed appendix H (and promulgated appendix IV to the rule). The basis for the newly-verified RfDs is set forth in the Health Effects Assessment Summary Tables. Fourth Quarter—FY90, U.S. EPA, OERR 9200 6-303 (90-4), September 1990.[47] Consequently, RACs based on those RfDs are different from the proposed and promulgated RACs. The RACs based on verified inhalation RfDs are shown in the table below. EPA will use the omnibus permit authority of § 270.32(b)(2) to use these revised RACs where the facts warrant.[48]

Compound	RAC in appendix IV of final rule (μg/m³)	RAC based on recently verified RfD (μg/m³)
Acroelin (107-02-8)	20	0.03
Carbon Disulfide (75-15-0)	200	3
p-Dichlorobenzene (106-46-7)	10	200
Bromomethane (74-83-9)	0.8	2
Hydrogen Sulfide (7783-06-4)	3	0.2
Mercury (7439-97-6)	0.3	0.08
Methoxychlor (72-43-5)	50	4
Toluene (108-88-3)	300	500

RACs have been derived from oral reference doses (RfDs) for those noncarcinogenic compounds listed appendix VIII of 40 CFR part 261 (except for lead, HCl, and Cl_2) for which the Agency considers that it has adequate health effects data. An oral RfD is an estimate (with an uncertainty of perhaps an order of magnitude) of a daily oral dose (commonly expressed with units of mg/kg-day) for the human population (including sensitive subgroups) that is likely to be without an appreciable risk deleterious effects, even if exposure occurs daily for a lifetime. Since these oral RfDs are subject to change, EPA will undertake rulemakings as necessary if the derivative RACs change in a way that affects the regulatory standard (see also the discussion of this issue in the Boiler/Furnace supplemental notice published on October 26, 1989 at 54 FR 43718). We note that, in the interim before any such rulemaking is complete, and as discussed above, permit officials may use the omnibus permit authority[49] of the statute to consider revised health effects data in establishing permit conditions.

The Agency's rationale for using oral RfDs as a basis for RAC-derivation is described in 54 FR 43755 (October 26, 1989). EPA believes the approach to derive RACs is reasonable because: (1) the RfDs are verified by an EPA workgroup whose decisions are subject to public review; (2) the verification process addresses long term (lifetime) exposure; (3) the RfDs are based on the best available information meeting specific scientific criteria; (4) the most sensitive individuals are considered; and (5) the RfD determination takes into account the confidence in the quality of the information on which they are based. Nevertheless, the Agency's Inhalation RfD Workgroup is developing reference dose values (concentrations) for inhalation exposure for several chemicals, and some are currently available. As reference concentrations are established by the Workgroup, the Agency will consider the need to change the RACs established in today's rule as discussed above.

The final rule regulates HCl emissions based on an annual exposure (long-term) RAC of 7 μg/m³.[50] The RAC is based on the threshold of priority effects resulting from exposure to HCl. Background levels were considered to be insignificant given that there are not many large sources of HCl and that this pollutant generally should not be transported over long distances in the lower atmosphere.

The Agency also proposed a short-term (i.e., 3-minute exposure) RAC for HCl. The Agency agrees with commenters, however, that the proposed RAC was not technically supportable. See discussion in section V of part three of this preamble. Consequently, the final rule does not establish a short-term RAC for HCl.

To consider the health effects from lead emissions, we adjusted the National Ambient Air Quality Standard (NAAQS) by a factor of one-tenth to account for background ambient levels

[47] The document is available from the National Technical Information Service (NTIS), 5285 port Royal Road, Springfield, VA 22161, (703) 487-4600. The document number is PB90-921-104.

[48] EPA notes that permit writers choosing to invoke the omnibus permit authority of § 270.32(b)(2) to add conditions to a RCRA permit must show that such conditions are necessary to ensure protection of human health and the environment and must provide support for the conditions to interested parties and accept and respond to comment. In addition, permit writers must justify in the administrative record supporting the permit any decisions based on omnibus authority.

[49] EPA notes that permit writers choosing to invoke the omnibus permit authority of § 270.32(b)(2) to add conditions to a RCRA permit must show that such conditions are necessary to ensure protection of human health and the environment and must provide support for the conditions to interested parties and accept and respond to comment. In addition, permit writers must justify in the administrative record supporting the permit any decisions based on omnibus authority.

[50] U.S. EPA, Integrated Risk Information System (IRIS) Chemical Files.

and indirect exposure from the source in question. Thus, although the lead NAAQS is 1.5 $\mu g/m^3$, for purposes of this regulation, sources could contribute only up to 0.15$\mu g/m^3$. Given, however, that the lead NAAQS is based on a quarterly average, the equivalent annual exposure is 0.09 $\mu g/m^3$.

Finally, section 109 of the Clean Air Act (CAA) requires EPA to establish ambient standards for pollutants determined to be injurious to public health, allowing for an adequate margin of safety. Secondary NAAQS, also authorized by section 109, must be designed to protect public welfare in addition to public health, and, thus, are more stringent. As discussed above, the Reference Air Concentration (RAC) used in today's rule for Lead is based on the Lead NAAQS. As the Agency develops additional NAAQS for toxic compounds that may be emitted from hazardous waste incinerators, we will consider whether the acceptable ambient levels (and, subsequently, the feed rate and emission rate Screening Limits) ulimately established under this rule should be revised. We note again that the reference air concentration values (and risk-specific dose values for carcinogens) presented here in no way preclude the Agency from establishing NAAQS as appropriate for these compounds under authority of the CAA.

a. *Derivation of Oral RfDs/RACs.* Many commenters responded to the issue of derivation of oral RfDs/RACs, questioning the scientific basis for the oral RfDs and conversion of RfDs to RACs. Some commenters stated that use of oral RfDs do not factor in differences in routes of exposure (e.g., absorption, first-pass effects) when extrapolating from oral to inhalation routes of exposure. As discussed above, we acknowledge the limitations of developing RACs from oral RfDs but continue to believe the approach used is reasonable and the best available approach until the Agency's Inhalation RfD Workgroup can provide inhalation values.

Other commenters directed their comments exclusively to lead, indicating that the lead RAC was arbitrary. EPA has based the lead RAC on the National Ambient Air Quality Standard (NAAQS). This was done in part because no reference dose or cancer potency slope is currently available for this metal. The final rule uses 10%, rather than 25% as is used for other compounds, as an apportionment factor (as proposed) because the Agency is particularly concerned with: (1) The possible high contribution of lead exposure by indirect pathways, particularly in urban environments; and (2) the growing concern of low level lead exposure in children since the lead NAAQS was established. (The Agency currently plans to propose to readjust the lead NAAQS in 1991.)

b. Apportionment. Some commenters questioned EPA's proposal apportioning 75% of the RfD to other non-specified sources, thus causing the RAC to correspond to 25% of the RfD. The commenters indicated that the figure of 75% from other sources was arbitrary and could vary from one chemical to another. They suggested that unless other sources of exposure were identified, the RAC should reflect 100% of the RfD.

EPA has chosen a fraction (25%) of the RfD to serve as the basis for the RACs because indirect pathways, known to contribute to risks, are not quantified in these regulations. Even apart from exposures contributed by sources separate from the boiler, industrial furnace, or incinerator, indirect pathways from emissions from these devices themselves may contribute 75% or more to risk. Such indirect (i.e., non-inhalation) pathways include deposition of emitted chemicals on: (1) Gardens and crops directly consumed by humans; (2) meadows used for grazing by beef cattle and other edible livestock; and (3) meadows and fodder used by dairy cattle (and subsequent milk consumption by humans).

Such real exposures, which are not quantified in these rules, are accounted for by the allowance for 75% contribution from other sources. Moreover, it is questionable whether any single facility should be allowed to consume 100% of an individual's exposure allowance, above which any further exposure might cause adverse health effects.

B. Air Dispersion Modeling

The Agency used air dispersion modeling to develop the Screening Limits and dispersion modeling is available as the exposure assessment component of the site-specific risk assessment option. A more extensive discussion of air dispersion modeling is included in the 1989 supplemental notice (see 54 FR 43752–54). This discussion focuses on derivation of Screening Limits wherein the dispersion models are used to "back-calculate" emission rates from acceptable ground level concentrations. The section is also applicable to dispersion modeling used for the risk assessment option (where ground level concentrations are predicted from estimated emissions rates). The reader is referred to this discussion for further information about air dispersion modeling. It should be noted that for the purposes of the risk assessment option, more site-specific information may be used in place of some of the conservative default assumptions used to derive the Screening Limits, generally resulting in lower predicted ambient air concentrations.

1. Option for Site-Specific Modeling

In responding to this provision in the proposal, many commenters argued for procedures which would allow greater flexibility in the air dispersion modeling process. Many commenters seemed to confuse the issues of dispersion modeling used for the Screening Limits, and modeling for the site-specific risk assessment. EPA concedes that many assumptions used to develop the Screening Limits are, by design, conservative to ensure that the Limits are protective in most cases. These assumptions do not apply, however, when an owner or operator conducts site-specific dispersion modeling under the Tier III standards. For site-specific dispersion modeling, procedures specified in EPA's Guideline on Air Quality Models must be used.

2. Terrain-Adjusted Effective Stack Height

Two commenters stated that in adjusting the stack height to account for local terrain and differentiating for terrain in the screeing limits, EPA is "double counting" the influence of terrain unnecessarily. One commenter added that such terrain adjustment of stack height is not supported by the current EPA Guideline on Air Quality Models (Revised) and should be eliminated.

EPA acknowledged this "double counting" of terrain in the supplement to the proposed rule (54 FR 43759), stating that this additional conservatism is necessary to account for the wide range of terrain complexities encountered at real facilities. EPA continues to believe that this double counting is necessary. Without this conservatism, additional criteria would have to be added to the existing list (see § 266.106(b)(7)) for determining when the screening limits may not be conservative and, thus, may not be used. Commenters did not propose (and provide support for) additional criteria for determining when the use of less conservative screening limits would be appropriate. Further, EPA believes that additional criteria would complicate and delay the implementation of the rule by placing additional burden on regulatory officials. Moreover, if a facility cannot

meet the screening limits, then site-specific dispersion modeling may be used to demonstrate compliance with the Tier III standards. Detailed, comprehensive dispersion modeling generally costs less than $5,000 and, thus, should not pose a substantial burden. In fact many BIFs have already conducted such modeling to comply with applicable standards under the Clean Air Act. Finally, the final rule minimizes the burden of dispersion modeling by allowing the use of screening models.

3. Conservatism in Screening Limits

Five commenters stated that EPA's approach to setting the screening limits is overly conservative and illustrated this by calculating the difference in estimated ground level concentrations using site-specific information as opposed to the default assumptions recommended for the Screening Limits.

It should be noted that the Agency would expect that the use of site-specific information would lead to higher emission limits than under the screening limits. However, the Agency developed feed rate and emission rate screening limits with the intent of minimizing the need of site-specific dispersion modeling and thus reducing the burden of demonstrating compliance with the emissions standards. To ensure that the limits are protective in most cases, however, the Agency derived the limits using conservative assumptions. The Agency believes that, although the assumptions are reasonable, they would likely limit emissions by a factor of 2 to 20 times lower than would be allowed by site-specific dispersion modeling (54 FR 43758).

4. GEP Stack Height.

Two commenters stated that EPA should not impose a GEP stack height limitation for existing stacks. The commenters went on to state that EPA should allow modeling of emissions at actual stack height for existing stacks or, at a minimum, adopt a grandfather provision to exclude GEP from applying to stacks constructed prior to December 31, 1970. One commenter also indicated that EPA should recognize that the stack height used for conducting a site-specific dispersion modeling analysis may exceed GEP formula height, as allowed under section 123 of the Clean Air Act.

The Agency maintains that in complying with the metals and HCl/Cl_2 controls credit will not be allowed for stack heights greater than GEP. GEP stack heights are determined in a manner consistent with the Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations), Revised (EPA 450/480-023R).

EPA's position here is consistent with the prohibition on using physical stack height in excess of GEP in the development of emission limitations under EPA's Air Program at 40 CFR 51.118 and 40 CFR 51.164. Stack heights higher than GEP cannot be used for compliance purposes because such stacks merely provide added dispersion and dilution of ambient levels. EPA prefers that pollutants be removed from the stack gas to avoid build-up of persistent pollutants (e.g., metals) in the environment and subsequent indirect exposure through, for example, the food chain. In addition, better dispersion of emissions of carcinogenic compounds can merely expose larger populations to (albeit lower) concentrations of pollutants and may not decrease the aggregate population risk (i.e., cancer incidents/year in the affected population).

5. Plume Rise Table

One commenter recommended that EPA extend Table F-2 (plume rise) and Tables E-1 through E-10 (feed rate and emissions screening limits) of the October 26, 1989 supplemental notice to account for the high flow rates typical of many cement plant stacks. Another commenter stated that the effective stack height of most utility boilers exceeds the maximum stack height contained in Tables E-1 through E-10. One commenter indicated that the plume rise values presented in Table F-2 are not conservative for conditions of neutral atmospheric stability at average to high wind speeds or for stable atmospheric conditions at all typical wind speeds. This commenter added that the screening limits based on Table F-2 plume rise may not be conservative for regions having complex terrain.

For the final rule, the plume rise values presented in Table F-2 of the supplement to the proposed rule were revised and the table was expanded to include higher stack exit flow rates indicative of cement kiln stacks (exit flow rates were increased up to a level of 200 m^3/s). See appendix VI to the final rule. The plume rise table values were originally developed based on plume rise equations presented in the 1979 User's Guide to the Industrial Source Complex (ISC) model. The plume rise formulation in the ISC model has since been changed to correspond to the way other EPA models determine plume rise. Consequently, the entire table was revised, based on conservative application of the updated neutral and stable buoyant plume rise equations.[51] The revised values of plume rise represent the lowest value of conservative stable buoyant and neutral buoyant plume rise for each flow rate/temperature level.

The range of terrain-adjusted effective stack heights, shown in Tables E-1 through E-10 of the supplemental notice, was not increased beyond the height of 120 meters. This height was determined to be the maximum terrain-adjusted effective stack height based on the stack parameter and site location data used in the development of the dispersion coefficients (as described in appendix F of the proposed, supplemental rule). Facilities with terrain-adjusted effective stack heights that exceed 120 meters have the option of conducting site-specific dispersion modeling to demonstrate compliance.

6. Compliance by Manipulating Effective Stack Height

One commenter claimed that facilities may elect to circumvent compliance by manipulating their effective stack heights. This commenter added that additional exposures could result from the increased dispersion from taller stacks. The Agency acknowledges that an owner or operator could increase physical stack height up to the GEP maximum to achieve better dispersion and hence a higher allowable emission rate. The Agency maintains, however, that it is more protective of human health and the environment (see discussion in section III.B.4 above) and it may be more cost-effective to upgrade emission control equipment to state-of-the-art control, rather than to increase stack height, particularly given that the Agency plans to consider in the future whether additional controls are needed to better control metals emissions. See discussion in section I of Part Three of this preamble.

7. Effect of HCl Emissions on Acid Rain

One commenter disagreed with the use of Screening Limits for HCl which are based solely upon effective stack height, terrain and land use. This commenter maintained that this approach ignores the effects of HCl in atmospheric reactions and acid rain.

Addressing potential effects of HCl in atmospheric reactions and acid rain is beyond the scope of this rule. The screening limits were developed to

[51] Memorandum from Sue Templeman, Radian Corp., to Dwight Hlustick, EPA, entitled "Derivation of Plume Rise Values for BIFs", dated November 30, 1990.

protect human health in the vicinity of facilities burning hazardous waste.

8. Building Wake Effects

One commenter stated that emissions limits based on effective stack height, terrain, and land use would not be conservative in cases where stacks are subject to building wake effects. This commenter added that only consideration of building wake effects will lead to conservative concentrations for stacks influenced by nearby structures and recommended that site-specific dispersion modeling be required in all cases where the "Guideline for Air Quality Models (Revised)" indicates the necessity for consideration of building wake effects.

The development of the conservative dispersion coefficients incorporated an eleventh hypothetical source in order to represent facilities whose release heights do not meet good engineering practice and whose plumes would thus be subject to building wake effects (54 FR 43752). In addition, the Agency acknowledges that the dispersion coefficients used to establish the Tier I and II Screening Limits may not be conservative in extremely poor dispersion conditions or when the ambient-air receptor is located close to the source and has therefore defined five situations for which the permit writer should require site-specific dispersion modeling (54 FR 43754). Furthermore, the Agency is reserving the right to require that a site-specific dispersion modeling analysis be conducted, irrespective of whether the facility meets the specific Screening Limits. Thus, the permit writer has the option of overruling use of Tier I or II, if a probability exists that application of this methodology would not be protective of the health-based standards. The Tier III approach of conducting site-specific dispersion modeling requires incorporation of building wake effects, as necessary, in the modeling analysis. The Tier I and II Screening Limit methodology was not further modified to account for these factors, as it already embodies repeated use of conservative assumptions.

C. Consideration of Indirect Exposure and Environmental Impacts

1. Indirect Exposure

During the proposal stages of these regulations, a few commenters recommended incorporating indirect exposure pathways into the risk assessment process. Indirect exposure is defined, in these regulations, as any exposure pathway other than direct inhalation of emissions from a boiler or industrial furnace. One commenter maintained that emissions such as metals, chlorinated dioxins, and furans would be environmentally persistent and able to enter the food chain after deposition on the ground (including crops, pasture land, surface waters). Consequently, the commenter argued that indirect exposures should be factored into the risk assessment.

EPA recognizes that the contribution of indirect pathways may be significant. However, the Agency believes that other conservative procedures, such as apportioning 75% of exposures to either indirect pathways or other emission sources (that can contribute to background levels) in the calculation of RACs, will help offset the contribution of indirect pathways. Another significant source of conservatism, offsetting the contribution of indirect pathways, is represented by the inherent uncertainty, and consequent conservatism, in the models used to estimate unit risk values. Use of the MEI in the Screening Limits procedure comprises yet another conservative element in the risk assessment process which would offset direct estimation of indirect pathway exposure. Therefore, the Agency has not modified the risk assessment process to address indirect pathways.

2. Non-human Health Related Environmental Impacts

One commenter noted that for many pollutants, environmental standards for certain flora and fauna may be more stringent than for humans. Therefore, the effect on non-human receptors should not be ignored in the regulations and the environmental risks should be evaluated.

EPA is concerned about the potential effects of BIF emissions on non-human receptors. While some environmental standards are available for the protection of environmental receptors (notably EPA water quality criteria for aquatic organisms), methods for quantifying exposure and defining acceptable levels for non-human receptors are still largely in the developmental stages. Thus, until these critical procedures are better established, the Agency is not requiring such an evaluation at this time. However, as noted earlier, some of the conservatism in the human health risk assessment is designed to compensate for the absence of direct environmental standards.

D. Acceptable Risk Level for Carcinogens

Today's rule limits the incremental lifetime cancer risk to the hypothetical maximum exposed individual (MEI) to 10^{-5}. This risk level is within the range of levels historically used by EPA in its hazardous waste and emergency response programs—10^{-4} to 10^{-6}.

Under the rule, we are limiting the aggregate risk to the MEI from carcinogenic metals to 10^{-5}, and the aggregate risk from carcinogenic organic compounds (dioxins and furans and other PICs under provisions of the alternative HC limit) to 10^{-5}. This will limit in most cases the risk from individual carcinogenic compounds to levels on the order of 10^{-6} but below 10^{-5}. The rule does not require that the risk from carcinogenic organic compounds be added to the risk from carcinogenic metals. This is because the Agency does not believe it is appropriate to sum the risk from metals (i.e., arsenic, beryllium, cadmium, and chromium) that are known or probable human carcinogens (Group A or B carcinogens under the weight-of-evidence approach) with the risk from organic compounds, many of which are possible human carcinogens (Group C carcinogens).

In selecting a 10^{-5} aggregate risk threshold level for this rule, we considered risk thresholds in the range of 10^{-4} to 10^{-6}, the range the Agency generally uses for various aspects of its hazardous waste programs.

We considered limiting the aggregate risk of the MEI to 10^{-6} but determined that this risk threshold would be unnecessarily conservative for the purpose of this rule. In reaching this determination, we considered that, at an aggregate risk level of 10^{-6}, the risk level for individual metals would be on the order of 10^{-7}, which we believe is overly conservative for this rule.

Alternatively, we considered limiting the aggregate risk to the MEI to 10^{-4}. An aggregate risk threshold of 10^{-4} would result in limiting the risk level for individual carcinogens on the order of 10^{-5}. We did not select a 10^{-4} aggregate risk threshold for this proposed rule for a number of reasons. In selecting the appropriate risk level for a particular regulatory program, the Agency considers such factors as the particular statutory mandate involved, nature of the pollutants, control alternatives, fate and transport of the pollutant in different media, and potential human exposure. The Agency believes that a 10^{-5} risk level is appropriate for this rule because: (1) The rule limits emissions considering only direct exposure via inhalation of dispersed emissions. Other routes of exposure (e.g., soil ingestion, uptake through the food chain) are not accounted for by this methodology,

which means the risk is somewhat higher; (2) the carcinogenic metals that the rule controls are Group A or B (i.e., known or probable) human carcinogens; (3) we are concerned about the potential risks posed by the unknown pollutants these devices can emit—i.e., products of incomplete combustion (PICs);[52] and (4) the 10^{-5} risk level does not result in a rule that poses a substantial burden on the regulated community given that it is neither a major rule as defined by Executive Order 12291 nor will it significantly impact small entities.

When the proposed regulations were published and comments were solicited from affected parties, several commenters responded to the issue of acceptable risk levels for exposure to carcinogens. These commenters questioned the basis of 10^{-5} as representing an acceptable risk level. They maintained that the discussion in the rule, serving as the rationale or justification for selecting this level of risk, was inadequate. Others asserted that the selected acceptable level of cancer risk was not consistent with other regulations (specifically, 10^{-4} cancer risk to the MEI was used to set a national emission standard (NESHAP) for benzene, and 10^{-5} for individuals living "some distance from the source").

The Agency continues to believe that the aggregate cancer risk to the MEI of 10^{-5} is appropriate here because: (1) It provides adequate protection of public health; (2) it limits the risk from individual Group A and B carcinogens to risk levels on the order of 10^{-6}; and (3) it is within the range of risk levels the Agency has used for hazardous waste regulatory programs. See also discussion in section III.A above.

E. Use of MEI/Consideration of Aggregate Risk

The Agency considered the use of aggregate population risk or cancer incidence (i.e., cancer incidents per year) in developing the national emission limits and in site-specific risk assessments. This approach could, in some situations, be more conservative than considering only MEI risk because, even if the "acceptable" MEI risk level were not exceeded, large population centers may be exposed to emissions such that the increased cancer incidence could be significant. However, it would be difficult to develop acceptable aggregate cancer incidence rates. Nevertheless, it is likely that many facilities that perform a site-specific MEI exposure and risk analysis would also generate an aggregate population exposure and risk analysis that could be considered by the Agency.

Several commenters addressed the issue of using the maximum exposed individual (MEI) as a basis for risk estimation and recommended using population (aggregate) risks as a more realistic alternative. They maintained that health risks are overstated if based only on exposure of the Maximum Exposed Individual (MEI). Aggregate population-based exposures, which are usually much lower would more realistically represent site-specific health risks. Many commenters noted that using the MEI exposure implicitly assumes that population risks are similar.

EPA believes that evaluation of the MEI only (and not aggregate population risk) is usually a conservative feature of the risk assessment. For screening purposes, a simplified approach is necessary. While site-specific demographic data is usually readily available from 1980 census data, its incorporation into a screen would complicate the screening process unnecessarily. Calculation of screening limits based on the risks to the MEI requires much less site-specific information, facilitating application of the screen to a broad range of sites. If the facility does not meet the screening limits, the option of site-specific risk assessment is still available. While MEI exposures are estimated routinely in a site-specific risk assessment, aggregate population risks may also be estimated, if desired.

Several commenters also contended that even the risk estimates for the MEI may be overly health-protective since the MEI is assumed to reside at this high exposure location 24 hours per day, 365 days per year, for a 70-year lifetime. A more fair evaluation of MEI risk would account for the attenuating effects of time spent indoors and off-site, and include estimates of average residence times and facility lifetimes. Moreover, some exposure assessments assume the MEI is located at the point of maximum ground level concentration predicted by the dispersion model, when in fact, no one may live at this site.

EPA acknowledges that use of the hypothetical MEI is a conservative feature of the rule but maintains that it is reasonable to balance against the potentially nonconservative features of the rule discussed below.

F. Risk Assessment Assumptions

As indicated in the above discussion, we have used a number of assumptions in the risk assessment, some conservative and others nonconservative, to simplify the analysis or to address issues where definitive data do not exist.

Conservative assumptions include the following:

- Individuals reside at the point of maximum annual average ground level concentrations. Furthermore, risk estimates for carcinogens assume that the maximum exposed individual resides at the point of maximum annual average concentration for a 70-year lifetime.
- Indoor air contains the same levels of pollutants contributed by the source as outdoor air.
- For noncarcinogenic health determinations, background exposure already amounts to 75% of the RfD. This includes other routes of exposure, including ingestion and dermal. Thus, the BIF is only allowed to contribute 25% of the RfD via direct inhalation. The only exception is for lead, where a BIF is only allowed to contribute 10% of the NAAQS. This is because ambient lead levels in urban areas already represent a substantial portion (e.g., one-third or more) or the lead NAAQS. In addition, the Agency is particularly concerned about health risks from lead in light of health effects data available since the lead NAAQS was established. EPA is currently reviewing the lead NAAQS to determine if it should be lowered.
- Risks are considered for pollutants that are known, probable, and possible human carcinogens.
- Individual health risk numbers have large uncertainty factors implicit in their derivation to take into effect the most sensitive portion of the population.

Nonconservative assumptions include the following:

- For carcinogenic compounds, indirect routes of exposure are not considered, such as uptake of arsenic, beryllium, cadmium, and chromium through the food chain.
- Although emissions are complex mixtures, interactive effects of threshold or carcinogenic compounds have not been considered in this regulation because data on such relationships are inadequate.
- Environmental effects (i.e., effects on plants and animals) have not been considered because of a lack of adequate information. Adverse effects on plants and animals may occur at levels lower than those that cause adverse human health effects. (The Agency is also developing procedures and requesting Science Advisory Board review to consider environmental effects resulting from emissions from all

[52] This rule is, thus, unlike the Benzene NESHAP where EPA targeted one known pollutant will known effects.

categories of waste combustion facilities.)

Many commenters responded broadly on the impact of assumptions and uncertainty in risk assessment. While generally supporting the concept of risk assessment, some asserted that EPA's proposed assumptions were too conservative regarding estimated emission levels, dispersion modeling, and health impact estimation. Further, they maintained that assumptions were not well enough justified and the conservative bias used for each of the multiple assumptions required in a risk assessment tends to accumulate, resulting in gross over-estimation of health impacts. Some of the specific assumptions that commenters considered too conservative are discussed in the following paragraphs.

Two commenters asserted that emission control technology should not be assumed absent when estimating emission levels. One commenter recommended that sensitivity analysis be incorporated into the risk assessment process. This commenter also recommended incorporation into the risk assessment of population mobility (i.e., time spent away from the site), facility lifetimes less than 70 years, and an attenuation factor for time spent indoors, rather than assume 24 hr/day, 70-year exposure.

Many of the respondents argued that economic impacts resulting from overly-conservative risk assessments are substantial. To avoid some of the default assumptions is also burdensome in the commenters' judgment, requiring trial burns, emissions measurements, slag and product assays, and detailed air quality dispersion modeling.

Although many of the assumptions discussed by the commenters are conservative in nature, it is difficult to determine how less conservative assumptions could be used in light of the considerable associated uncertainty. Much of the conservatism referred to originates from assumptions used to derive screening levels. When screening levels are derived, either: (1) No site-specific information is available (nor may be assumed if the procedure is intended to screen a variety of sites); or (2) incorporation of site-specific information in the derivation of screening levels would so complicate the process as to render it prohibitively time-consuming and defeat its utility as a screen. Thus, in light of the uncertainty (i.e., no site specific-information), conservative assumptions are used to derive the screening limits that EPA believes to be protective of human health and the environment.

If the facility fails to meet the screening criteria, the option of site-specific risk assessment is still available. For site-specific risk assessment, more realistic and less conservative assumptions may be incorporated, reflecting actual site or facility conditions.

V. Controls for Emissions of Toxic Metals

The Agency has identified 12 toxic metals in appendix VIII of 40 CFR part 261 that may pose a hazard to human health and the environment: antimony, arsenic, barium, beryllium, cadmium, hexavalent chromium, lead, mercury, nickel, selenium, silver, and thallium. Five of these metals (or their compounds) are known or suspected carcinogens: arsenic, beryllium, cadmium, hexavalent chromium, and nickel.

Many of these toxic metals are contained in hazardous waste that is burned in boilers and industrial furnaces. Many hazardous waste fuels contain metals at levels orders of magnitude higher than levels found in No. 6 fuel oil. Metal-bearing wastes typically used as fuel in boilers and industrial furnaces include spent halogenated and nonhalogenated degreasing solvents used for metals cleaning, paint manufacturing wastes, and other organic liquid wastes with high heating values. Currently, metals emissions from the burning of these wastes are not controlled under RCRA for boilers and the types of industrial furnaces that burn hazardous wastes. Emissions of carcinogenic metals can potentially result in increased lifetime cancer risks of greater than 1×10^{-4} and emissions of noncarcinogenic metals such as lead can result in ambient levels that result in adverse health effects.

Today's final rule promulgates the controls as discussed in the October 1989 supplement to the proposed rule (see 54 FR 43728–29).[53] See § 266.106. The rules establish metals emission limits for 10 toxic metals)[54] listed in appendix VIII of 40 CFR part 261 based on projected inhalation health risks to a hypothetical maximum exposed individual (MEI). The standards for the carcinogenic metals (arsenic, beryllium, cadmium, and chromium) limit the increased lifetime cancer risk to the MEI to a maximum of 1 in 100,000. The risk from the four carcinogens must be summed to ensure that the combined risk is no greater than 1 in 100,000. The standards for the noncarcinogenic metals (antimony, barium, mercury, silver, and thallium) are based on Reference Doses (RfDs) below which adverse health effects have not been observed. The standard for lead is based on the National Ambient Air Quality Standard (NAAQS) for lead.

The owner and operator must analyze the hazardous waste to be burned and comply with the standard for each of the 10 metals that could reasonably be expected to be in the waste. The metals excluded from analysis must be indentified and the basis for their exclusion explained to ensure that there is adequate justification for not analyzing for a particular metal.

The standards are implemented through a three-tiered approach. Compliance with any tier is acceptable. The tiers are structured to allow higher emission rates (and feed rates) as the owner or operator elects to conduct more site-specific testing and analyses (e.g., emissions testing, dispersion modeling). Thus, the feed rate limits under each of the tiers are derived based on different levels of site-specific information related to facility design and surrounding terrain. Under tier I (see § 266.106(b)), the Agency has provided conservative waste feed rate limits in reference tables as a function of effective stack height and terrain and land use in the vicinity of the stack. The owner or operator demonstrates compliance by waste analysis, not emissions testing or dispersion modeling. Consequently, the Tier I feed rate limits are based on an assumed reasonable, worst-case dispersion scenario, and an assumption that all metals fed to the device are emitted (i.e. no partitioning to bottom ash or product, and no removal by an air pollution control device (APCD)).

Under Tier II (see § 266.106(c)), the owner or operator conducts emissions testing (but not dispersion modeling) to get credit for partitioning to bottom ash

[53] Given time constraints in developing the final rule for promulgation, response to major comments could not be provided in the preamble. Responses to comments are provided in the Comment Response Document for the BIF Regulation.

[54] As proposed, the rule does not limit emissions of nickel and selenium (see 54 FR 43729). Limits cannot be established for selenium because the Agency has inadequate health data to establish a reference air concentration. Nickel is not controlled because the two nickel compounds suspected at this time of being potential human carcinogens, nickel carbonyl and subsulfide, are not likely to be emitted from combustion devices, given their highly oxidizing conditions. In the 1989 supplemental notice to the proposed rule, EPA requested comments on whether the reduced carcinogenic forms of nickel were likely to be emitted from hazardous waste burning devices, especially those furnaces that may not use highly oxidized conditions. However, the Agency did not receive any comments on this issue pertinent to boilers and industrial furnaces.

or product, and APCD removal efficiency. Thus, the Agency has developed conservative emission rate limits in reference tables, again as a function of effective stack height and terrain and land use in the vicinity of the stack. The Agency also assumed reasonable, worst-case dispersion under Tier II.

Under Tier III (see § 266.106(d)), the owner or operator elects to conduct emissions testing and site-specific dispersion modeling to demonstrate that the actual (measured) emissions do not exceed acceptable levels considering actual (predicted) dispersion.

The metals controls apply both to facilities applying for a part B operating permit and to facilities operating during interim status. See section VII of part Three of this preamble for discussion of how the standards apply during interim status.

A. Background Information

The following sections summarize EPA's regulation of metals emissions from boilers and industrial furnaces under other statutes, the 1987 proposed rule and comments received on that proposal, and the basis for the 1989 revision to the proposed rule and comments received on that revised approach.

1. Metal Standards Under Other Statutes

As discussed below, EPA has promulgated standards applicable to boilers and industrial furnaces under other statutes for some but not all of the 10 toxic metals controlled by today's rule. Under the Clean Air Act (CAA), EPA established National Emissions Standards for Hazardous Air Pollutants (NESHAPS) for arsenic, beryllium, and mercury for certain categories of sources (40 CFR part 61). These emission standards were developed considering the quantities and types of metals emissions from various source categories, current control practices, and the economic impacts of reducing emissions. In addition, EPA has established National Ambient Air Quality Standards [55] (NAAQS) for lead and particulate matter. These ambient standards are implemented by states under the State Implementation Plan (SIP) program to control major sources of lead and particulate emissions. The Agency does not believe that lead emissions standards have been established under the SIPs for any boilers and for many industrial furnaces that burn hazardous waste fuels (e.g., cement and light-weight aggregate kilns) because they are not major lead emitters as defined under the NAAQS. Therefore, EPA believes that today's metals controls are not redundant to existing Agency standards, and, thus, are necessary to ensure adequate protection of human health and the environment.

Particulate emission standards, however, established under the SIPs in conformance with the particulate. NAAQS, or by EPA as New Source Performance Standards (NSPS), do apply to some boilers and industrial furnaces that burn hazardous waste. The particulate standards generally limit metals emissions to the extent that state-of-the-art particulate control technologies will allow. High efficiency electrostatic precipitators (ESPs) or fabric filters are usually required to meet these standards. However, these particulate emission standards may not adequately control metals emissions from the burning of hazardous wastes in many boilers and industrial furnaces for service reasons: (1) The particulate standards do not apply to gas and oil-fired boilers (which represent a large number of hazardous waste fuel burners); (2) smaller coal-fired boilers are not subject to NSPS standards and may not be required under the SIPs to be equipped with ESPs or fabric filters; (3) large volumes of hazardous waste fuels are burned by light-weight aggregate kilns that are equipped with low-pressure wet scrubbers that may not be highly efficient at collecting particulates in the less than 1 micron range, the size range that contains the bulk of the particulate metals; and (4) the risks posed by metals emissions from these boilers and industrial furnaces that are equipped with ESPs, fabric filters, and wet scrubbers can increase substantially when hazardous waste fuel is burned since the levels of some metals, particularly chromium and lead, can be much higher in hazardous waste than in coal.

2. 1987 Proposed Rule

The 1987 proposed rule would have established a four-tiered standard to control emissions of arsenic, cadmium, hexavalent chromium, and lead. Each tier represented a standard protective on its own, and demonstration of compliance with any Tier would have been sufficient. Tiers I through III established hazardous waste metals concentrations, feed rates, and emission screening limits, respectively, as a function of device type and thermal capacity. Tier IV would have provided for site-specific dispersion modeling to demonstrate that, when the screening limits were exceeded, emissions would nevertheless not pose an unacceptable health risk. Data available to the Agency indicated that only four of the 12 toxic metals listed in appendix VIII of part 261 were likely to be present in hazardous waste burned in boilers and industrial furnaces at levels posing a significant health risk. The permit writer would have determined on a case-by-case basis if any of the other toxic metals were present at levels posing a significant risk.

Public comments submitted on the 1987 proposal stated that EPA's database on the metals composition of hazardous waste was both limited and out of date in light of the Agency's data collection efforts at that time and the HSWA statutory requirement to pretreat waste that heretofore had been land disposed. As a result of HSWA, more hazardous waste is being burned, and pretreamtent operations are often likely to involve combustion. The hazardous waste burned currently and in the future in boilers and industrial furnaces may include toxic metals other than the four targeted for regulation in the 1987 proposal. Therefore, the Agency requested comment in the October 1989 supplemental notice on expanding the list of regulated metals to include all 10 appendix VIII metals. (Nickel and selenium were not included as discussed above.) In addition, if standards for all of the toxic metals were included in the rule, the burden on permit writers would actually be reduced because explicit standards would be provided for all metals of potential concern. Without explicit standards, permit writers would have to rely on the omnibus permit authority of the statute to add permit conditions as necessary to protect human health and the environment. Using the omnibus permit authority can involve a lengthy and cumbersome interaction between permit officials and the applicant.

3. 1989 Supplement to Proposed Rule

Based on public comments submitted on the 1987 proposed rule and on additional evaluation of the risk assessment approach used for the proposal, the Agency discussed in the 1989 supplemental notice whether to (1) expand the list of metals for which emissions standards would be established in the rule to include all the toxic metals listed in appendix VIII of part 261 (except nickel and selenium, for the reasons discussed above); (2) establish the screening limits as a function of effective stack height,

[55] We note that the reference air concentration values for noncarcinogens and risk-specific dose values for carcinogens established by today's rule are not intended to, and in no way, preclude the Agency from establishing NAAQS as appropriate for these compounds under authority of the Clean Air Act.

terrain, and land use rather than as a function of device type and capacity; and (3) rather than provide the screening limits in the rule itself as proposed in 1987, provide them in a guidance document that would be entitled "Risk Assessment Guideline (RAG) for Permitting Hazardous Waste Thermal Treatment Devices".

a. Expanded List of Metals. In the 1989 supplemental notice, EPA proposed to expand the list of metals for which emissions standards would be established in the rule to include antimony, arsenic, barium, beryllium, cadmium, hexavalent chromium, lead, mercury silver, and thallium. Thus, of the 12 toxic metals listed in appendix VIII, only selenium and nickel would not be controlled for reasons discussed above. Today's final rule establishes standards for all 10 metals. We note that the controls apply only to metals that are present in the hazardous waste feed at detectable levels using procedures specified in SW-846. See § 266.106(a).

b. Revised Basis for Screening Limits. In the 1989 supplemental notice, EPA also proposed to revise the bases for the feed rate and emission rate screening limits to correlate them with stack height and terrain and land use in the vicinity of the facility because these parameters more directly relate emission controls to key parameters that affect the dispersion of emissions, and ultimately, ambient levels (i.e., more so than the proposed approach of correlating the screening limits to device type and heat input capacity). When developing the Tier I through Tier III screening limits proposed in 1987, the Agency made a simplified assumption that effective stack height correlated with thermal capacity (e.g., if the thermal capacity of one device was 10 percent greater than the thermal capacity of another, the effective stack height was also 10 percent greater). The Agency acknowledges that this assumption may not always hold. Stack height is often more a function of the height of nearby buildings and surrounding terrain than a function of the heat input capacity of the device. Thus, the final rule correlates the Tier I and Tier II screening limits to stack height, terrain, and land use.

c. Establishing the Screening Limits in the Rule. As originally proposed in 1987, the final rule incorporates the Tier I feed rate screening limits and the Tier II emissions rate screening limits in the rule itself rather than in a separate guidance document. Our concern (and many commenters concurred) is that a guidance document would not carry the weight of a regulation—permit writers would be free to accept or reject the guidance (i.e., in this case, the screening limits and the reference air concentration (RACs) and risk-specific dose (RSD) values used to develop the limits). In addition, permit writers would be obligated to justify use and appropriateness of the guidance on a case-by-case basis. This would place a substantial burden on the permit writer and result in inconsistent, and perhaps, inappropriate permit conditions. Finally, implementing the emission standards during interim status as required by the final rule would be virtually impossible without incorporating the screening limits and RACs and RSDs in the rule.

We note that revisions to the RACs and RSD values will undoubtedly need to be made over time as the Agency obtains additional health effects information on the regulated pollutants, and corresponding revisions to the screening limits will be made by formal rulemaking (i.e., proposed revisions, opportunity for public comment, and promulgation of final revisions). In the interim, however, permit writers may apply stricter limits than contained in the rule (if the facts justify it) pursuant to the omnibus permit authority [56] in section 3005(c)(3).

In the 1989 proposal, as a possible alternative to monitoring waste feed rates and compositions, EPA requested comment on using the results of analyses of emission control residues to monitor compliance with the metals emission standards. Several commenters supported this approach. The final rule allows for this or other alternative approaches to implement the metals controls. See section IV.C.4 of Part Three of the preamble.

B. How the Standards Work

1. Tier III Standards

Tier III standards are discussed first because the Agency believes that the majority of facilities will elect to comply with these standards rather than the Tier I or Tier II screening limits to obtain more flexible permit limits. The Tier III standards (see § 266.106(d)) require: (1) Emissions testing to determine actual emissions taking into account partitioning of metals to combustion gas versus ash or product; and removal of metals from flue gas by the air pollution control system (APCS); and (2) site-specific dispersion modeling to take into account actual, predicted dispersion conditions at the facility.

To comply with the Tier III standards, predicted ambient concentrations of the carcinogenic metals, arsenic, beryllium, cadmium, and hexavalent chromium at the hypothetical maximum exposed individual (MEI) may not result in an increased cancer risk of more than 1 in 100,000. The risk from each metal must be summed to ensure that the summed risk does not exceed 1 in 100,000. As proposed, the final rule establishes a risk-specific dose (RSD) for each metal at the 10^{-5} (i.e., 1 in 100,000) risk level. If a person is exposed to the 10^{-5} RSD (an ambient air concentration) over a lifetime, the probability of increased cancer incidence is not expected to exceed 1 in 100,000. To ensure that the summed risk from the four carcinogens is no greater than 1 in 100,000, the ratios of the predicted ambient concentration to the 10^{-5} RSD must be summed for all metals to demonstrate that the sum does not exceed 1.0.[57]

For the noncarcinogenic metals, antimony, barium, mercury, silver, and thallium, predicted MEI ambient air concentrations may not exceed the reference air concentrations (RACs), as proposed. The RAC for lead is based on 10% of the National Ambient Air Quality Standard (NAAQS) for lead, as proposed. One commenter stated that the lead RAC may be appropriate for facilities in urban areas but that it is not appropriate for rural areas with low background lead levels. This commenter suggested a waiver of the lead RAC where a facility can show that measured ambient air lead levels do not exceed the NAAQS. Although this approach is reasonable, the final rule does not include a waiver provision for the lead RAC based on site-specific ambient air monitoring [58] because: (1) the lead

[56] EPA notes that permit writers choosing to invoke the omnibus permit authority of § 270.32(b)(2) to add conditions to a RCRA permit must show that such conditions are necessary to ensure protection of human health and the environment and must provide support for the conditions to interested parties and accept and respond to comment. In addition, permit writers must justify in the administrative record supporting the permit any decisions based on omnibus authority.

[57] To implement the metals controls, metals feed rates are limited to levels during the compliance test or trial burn. Thus, if the owner/operator would like to have the flexibility to burn wastes with varying (higher) levels of carcinogenic metals, he/she may choose to develop two or more operating modes with varying feed rates of carcinogenic metals. If so, a compliance test or trial burn would be required for each mode of operation to demonstrate that the summed risk from the carcinogenic metals does not exceed 1 in 100,000. Under this approach, the operator is required to identify the mode of operation at any time, and to comply with the metal feed rate limits for that mode of operation.

[58] We note, however, that EPA's Guideline on Air Quality Models allows the use of ambient air monitoring to develop site-specific dispersion models.

NAAQS may not be protective given that the Agency has been developing for some time a proposal to lower the NAAQS (perhaps by as much as 50%) based on health effects data obtained since the NAAQS was established initially (the Agency plans to propose a lower lead NAAQS in the fall of 1991); (2) the time and cost of conducting ambient monitoring in conformance with procedures established by EPA's Office of Air Quality Planning and Standards (OAQPS) would make this approach impracticable; (3) a waiver provision would add extra complexity to the rule; and (4) such a waiver would make eventual further regulation under amended section 112 of the Clean Air Act more likely.

a. Emissions Testing. Stack emissions testing for metals must be conducted in conformance with "Methodology for the Determination of Metals Emissions in Exhaust Gases from Hazardous Waste Incineration and Similar Combustion Processes" (Multiple Metals Train) provided in section 3.1 of Methods Manual for Compliance with the BIF Regulations (incorporated in today's rule as appendix IX of part 266).

b. Dispersion Modeling. Dispersion modeling must be conducted in conformance with EPA's "Hazardous Waste Combustion Air Quality Screening Procedure" provided in Methods Manual for Compliance with the BIF Regulations or EPA's Guideline on Air Quality Models (Revised) which are incorporated in today's rule as Appendices IX and X, respectively, of Part 266, or "EPA SCREEN Screening Procedure" as described in Screening Procedures for Estimating Air Quality Impact of Stationary Sources. The latter document is incorporated by reference in today's final rule at § 260.11. The Guideline on Air Quality Models is the Agency's primary guide for dispersion modeling. The "Hazardous Waste Combustion Air Quality Screening Procedure" is included in EPA's Guidance on Metals and Hydrogen Chloride Controls for Hazardous Waste Incinerators. Draft Final Report, August 1989. The derivation of this procedure, which was developed specifically for hazardous waste combustion facilities, is also included in that document. The data base used in the derivation is the same as that used for deriving the Tier I and Tier II screening limits as summarized in the October 26, 1989 supplement to the proposed BIF rule (54 FR 43752). Finally, the EPA SCREEN screening procedure has been in general use since 1988 when it was developed by EPA's Office of Air Quality Planning and Standards. It has been used by Regional Offices, States, and sources for air dispersion modeling required by EPA air regulations.

If a user determines that there is an inconsistency between either of the screening procedures discussed above and EPA's Guideline on Air Quality Models, the Guideline shall have primacy.

c. GEP Stack Height. As proposed, stack heights used to demonstrate conformance with the final rule may not exceed Good Engineering Practice (GEP) as defined in 40 CFR part 51.100(ii).

d. MEI. As proposed, the hypothetical MEI concentration is the maximum annual average ground level concentration at an off-site location. On-site MEI locations need not be used to demonstrate conformance with the standards, unless a person resides on-site.

e. Bubble Approach for Multiple Stacks. Given that the standards for metals (and HCl and Cl_2) are health risk-based, the final rules are implemented using a limited "bubble" approach as proposed. Under the limited bubble approach, emissions from all hazardous waste combustion stacks at a facility subject to metals and chlorine feed rate limits must be considered in demonstrating conformance with the acceptable ambient levels. This includes all boilers and industrial furnaces regulated under today's rule, and also those RCRA-regulated incinerators and thermal treatment units where feed rate or emission limits have been established for metals, chlorine, HCl, or Cl_2 by EPA. (The Agency considered expanding the bubble to consider other stack emissions such as from nonhazardous waste incinerators or process stacks, but believes that effective implementation would be difficult given the different types and levels of regulatory control and procedures applicable to a variety of stack emission sources.)

To implement the bubble approach, dispersion modeling must consider emissions from all regulated stacks (see discussion above) to predict the maximum annual average off-site ground level (i.e., MEI) concentration of each metal. The MEI location will generally vary for each metal.

2. Tier II Standards

See § 266.106(c). The final rule incorporates the Tier II emission rate screening limits (see appendix I of the final rule) as presented in the 1989 supplemental notice as a function of terrain-adjusted effective stack height, and noncomplex versus complex terrain and urban versus rural land use in the vicinity of the facility. The limits were back-calculated from the RACs and 10^{-5} RSDs established by today's rule using reasonable, worst-case dispersion scenarios. Conformance with the Tier II emission rate screening limits is demonstrated by emissions testing (i.e., the facility's actual emissions are compared to the maximum allowable screening limits).

The methodologies for determining terrain-adjusted effective stack height and terrain type are established in §§ 266.106(b) (3) and (4), and the methodology for determining land use in the vicinity of the stack are provided in "Simplified Land Use Classification Procedures for Compliance with Tier I and Tier II Limits in Methods Manual for Compliance with the BIF Regulations (incorporated in today's rule as appendix IX of part 266).

a. Special Requirements for Carcinogens. We note that the Tier II emission rate screening limits for the carcinogen metals arsenic, beryllium, cadmium, hexavalent chromium, are back-calculated from the 10^{-5} RSD for each metal. Thus, if the actual emission rate of one of those metals was at the Tier II screening limit, the resulting risk to the MEI is estimated to be 1 in 100,000. Given that the rule requires that the summed risk for all carcinogenic metals cannot exceed 1 in 100,000, the ratios of the actual emission rate to the Tier II allowable emission rate for all of the carcinogenic metals must be summed and the sum cannot exceed 1.0.

b. Bubble Approach for Multiple Stacks. Although we believe that most facilities will use Tier III dispersion modeling to demonstrate conformance with the metals (and HCl and Cl_2) controls when they have multiple stacks to obtain credit for actual dispersion conditions, Tier II (or Tier I) may be used. To use the Tier I feed rate limits or Tier II emissions rate limits for multiple stacks, the owner/operator must conservatively assume that all hazardous waste is fed to the source with the worst-case stack (i.e., considering dispersion). The worst-case stack must be determined from the following equation [59] as applied to each stack:

$K = HVT$

where:

K = a parameter accounting for relative influence of stack height and plume rise;
H = physical stack height (meters);
V = stack gas flow rate (M^3/second); and
T = exhaust temperature (Kelvin).

[59] This equation was proposed at 54 FR 43762 (Oct. 26,1989). It is derived from a similar equation on pp. 2–3 of Screening Procedures for Estimating Air Quality Impact of Stationary Sources, EPA–450/4–88–010, August 1988.

The stack with the lowest value of K must be used as the worst-case stack.

c. Facilities Ineligible To Use the Tier II (and Tier I) Screening Limits. The screening limits were back-calculated from the RACs and 10^{-5} RSDs established by today's rule using dispersion modeling scenarios that the Agency considers reasonable, worst-case dispersion scenarios. However, dispersion characteristics at a particular facility may, in fact, provide worse dispersion of emissions than used to calculate the screening limits. Consequently, the final rule, as discussed in the 1989 supplemental notice, establishes criteria for facilities that are ineligible to use the screening limits. See § 266.106(b)(7).

3. Tier I Standards

See § 266.106(b). The final rule incorporates the Tier I feed rate screening limits (see appendix I to the rule) as presented in the 1989 supplemental notice as a function of terrain adjusted effective stack height, and noncomplex versus complex terrain and urban versus rural land use in the vicinity of the facility. Conformance with the Tier I feed rate screening limits is demonstrated by sampling and analysis of all feed streams (hazardous waste, other fuels, and raw materials).

By complying with the conservative Tier I feed rate screening limits, applicants burning hazardous waste with very low concentrations of metals would not have to conduct emissions testing. The feed rate limits are back-calculated from the emission screening limits, assuming that all metals present in feedstreams are emitted to the atmosphere. Thus, no metals are assumed to partition to the bottom ash or product, and no allowance is made for removal of metals from the stack gas by an air pollution control system. Consequently, the Tier I feed rate screening limits are equivalent to the Tier II emission rate screening limits and are provided in the same table in appendix I to the rule. (At proposal, the feed rate and emission rate screening limits were provided in separate tables because the Agency presented the limits in different units—lb/hr (pound per hour) for feed rate limits, and g/s (grams per second) for emission rate limits. To avoid confusion and for simplicity, however, the final rule combines the Tier I and II screening limits and presents the limits in g/hr (grams per hour)).

The Tier II discussions above on special requirements for carcinogens also applies to the Tier I feed rate limits. Thus, to demonstrate conformance with the feed rate limits for the carcinogenic metals, the sum of the ratios of the actual feed rate to the Tier I allowable feed rate for all of the carcinogenic metals must be summed, and the sum cannot exceed 1.0.

In addition, the Tier II discussions above on the bubble approach for multiple stacks and criteria for facilities that are ineligible to use the screening limit apply to the Tier I feed rate screening limits as well.

Finally, we note that the Tier I feed rate limits may be adjusted upward to reflect site-specific dispersion modeling. This is a hybrid of Tiers I and III. See § 266.106(e). Under this approach, site-specific dispersion modeling may be conducted using the procedures discussed above to back-calculate allowable emission rates for each metal. These allowable emission rates then become the adjusted feed rate limits. Given that emissions testing is not conducted under this modified Tier I approach, no credit is given for partitioning of metals to bottom ash or product, or removal by the air pollution control system.

C. Implementation

As discussed above, EPA developed a three-tiered standard to ensure that metals emissions do not pose an unacceptable risk to human health and the environment. Tier I consists of conservative feed rate screening limits, Tier II establishes conservative emission rate screening limits, and Tier III allows the use of site-specific air dispersion modeling to demonstrate compliance. The decision of which tier to use depends on the physical characteristics of the facility and surrounding terrain, on the anticipated waste compositions and feed rates, and on the level of resources available for conducting the analysis. It is acceptable to use different tiers to comply with the standards for different metals.

1. Tier I Implementation

The Tier I feed rate limits are implemented by sampling and analysis as necessary and flow rate monitoring of each feedstream (i.e., hazardous waste, other fuels, and raw materials) to ensure that the total feed rate of each metal does not exceed the Tier I limit on either an hourly rolling average or instantaneous basis (i.e., at any time), except as provided for the carcinogenic metals and lead as discussed below.

a. Special Procedures for Carcinogenic Metals. Given that, for the carcinogenic metals, the sum of the ratios of the actual feed rates to the Tier I allowable feed rates cannot exceed 1.0, there are no fixed feed rate limits for individual carcinogenic metals. Rather, the operator must ensure that on an hourly rolling average or instantaneous basis (or as allowed below for carcinogenic metals and lead) that the mixture of carcinogenic metals fed into the BIF does not exceed allowable levels. To demonstrate conformance with this standard, the operator must: (1) Know the concentration of metals in each feedstream and the flow rate of each feedstream; (2) calculate on an hourly rolling average or instantaneous basis (or as allowed below for carcinogenic metals and lead) the sum of the ratios of the actual feed rate to the allowable feed rate; and (3) ensure that the sum of the ratios for all carcinogenic metals (on an hourly rolling average or instantaneous basis or as allowed below) does not exceed 1.0.

b. Averaging Periods. As discussed in the 1989 supplemental notice, the final rule provides an alternative averaging period to the hourly rolling average or instantaneous basis for the carcinogenic metals arsenic, beryllium, cadmium, and chromium, and for lead. For these metals, an averaging period not to exceed 24 hours (i.e., 24-hour rolling average) may be used provided that the feed rate at any time (i.e., instantaneously) does not exceed 10 times the feed rate on an hourly rolling average basis. The Agency believes that an averaging period greater than an hourly rolling average is reasonable given that the metals controls are based on lifetime exposures. However, the Agency is concerned that averaging periods greater than 24 hours may be difficult to enforce. A ten-fold higher emission rate should not pose adverse health effects from short-term exposures for the carcinogenic metals because the 24-hour rolling average would not exceed the level that could pose a 10^{-5} health risk over a lifetime of exposure and the threshold (i.e., noncancer) health effect would not be likely at exposures only ten times higher than the 10^{-5} RSD. A ten-fold higher instantaneous ambient level for lead should not pose adverse health effects given that the acceptable ambient level for long-term exposure to lead (i.e., the lead RAC) is based on only 10% of the National Ambient Air Quality Standard.

We do not believe that a similar approach for the other noncarcinogenic metals would be appropriate given the uncertainty in the level of protection provided by the long-term acceptable ambient (e.g., the RACs are based on oral RfDs converted 1 to 1 to inhalation values).

2. Tier II Implementation

Conformance with the Tier II emission rate screening limits is based on emissions testing (see section IV.B.1.a) using the Multiple Metals Train prescribed in Methods Manual for Compliance with the BIF Regulations (incorporated in today's rule as appendix IX of part 266). The Tier II emission limits are implemented by permit limits on the following parameters based on operations during the trial burn:

- Maximum feed rate of each metal in total feedstreams (e.g., hazardous waste, raw material, other fuel), except as discussed below;
- Maximum feed rate of each metal in total hazardous waste feedstreams;
- Maximum feed rate of each metal in all pumpable hazardous waste feedstreams;
- Maximum feed rate of total hazardous waste and pumpable hazardous waste;
- Maximum feed rate of chlorine in total feedstreams;
- Maximum production rate in appropriate units (e.g., total heat input, pounds of steam produced, raw material feed rate);
- Maximum temperature at the inlet to the air pollution control system (APCS);
- Maximum combustion chamber temperature; and
- Key parameters to ensure proper operation of the APCS.

The approach that must be used to measure these parameters and the approach to establish limits on each parameter based on trial burn data is specified in § 266.102(e)(6).

In addition, the permit must specify sampling and analysis procedures for all feedstreams and all flow rates of all feedstreams must be continuously monitored and recorded.

The final rule establishes limits on these parameters because they can affect metals emissions. The feed rate of metals in both total hazardous waste feeds and pumpable hazardous waste feeds is limited because the physical form of the waste (e.g., solid vs liquid) can affect the partitioning of the metal between bottom ash (for a boiler) or product (for a furnace) and combustion gas entering the PM control system. Metals partition to the combustion gas more readily when fired in a liquid or pumpable form.

The rule limits the metal feed rate from total feedstreams to account for metals in raw materials and nonhazardous fuels. When added to the emissions from hazardous waste, noncarcinogenic metals from these sources can cause the MEI concentration to exceed the threshold level for health effects and carcinogenic metals from these sources can cause the MEI concentration to exceed the incremental lifetime cancer risk limit for the rule of 1 in 100,000. Thus, these controls ensure that burning hazardous waste does not result in unacceptable risks.

The rule limits the chlorine feed rate because chlorine can increase the volatility of metals, thus increasing the rate of partitioning to the combustion gas and, in some cases, resulting in smaller metal particulates in flue gas that can be more difficult to control with a PM collection system.

The rule limits the maximum capacity of the device to ensure that, during the compliance test (under interim status) or the trial burn (under a part B permit application) the device is feeding raw materials and nonhazardous fuels at a rate that will not be exceeded after the compliance test or trial burn. Thus, the gas flow rate and particulate loading are maximized during the compliance test or trial burn, which tests the ability of the PM collection system to control metals.

The rule limits the maximum temperature at the inlet to the PM collection system because temperature affects the volatility of a metal—some metal species may be partially (or totally in the case of mercury) in the vapor form at high temperatures at the inlet to the PM collection system which will reduce the amount of the metal collected. Limiting the inlet temperature to that occurring during the compliance test or trial burn will ensure that the temperature cannot be increased later which could result in an increase in metals emissions.

Finally, the rule limits key operating parameters of the PM air pollution control system to ensure that it continues to operate as efficiently as it did during the compliance test or trial burn.

3. Tier III Implementation

Conformance with Tier III is demonstrated by emissions testing and site-specific dispersion modeling showing that ambient levels of metals do not exceed allowable levels. Permit limits are established for the same parameters as required for Tier II.

4. Special Requirements for Furnaces that Recycle Collected Particulate Matter

Metal emissions are not feasibly monitored on a continuous basis. Thus, some other means of demonstrating compliance is necessary. For most types of BIFs, compliance is demonstrated by monitoring feed rates of metals from all feedstreams. EPA requested comment on whether approaches other than monitoring feed rates of metals may be more appropriate to implement the metals controls. See 54 FR 43760 (Oct. 26, 1989). A number of commenters argued that the material balance approach for implementing the metals controls was impractical and nonconservative for cement kilns. The material balance approach for metals limits the feed rate of each metal in three types of feeds: (1) Pumpable hazardous waste; (2) total hazardous waste; and (3) total feedstreams. Although limiting the feed rate of each metal in the total hazardous waste feed and the pumpable hazardous waste feed was workable, commenters argued that limiting the feed rate of metals in total feedstreams was impractical for cement kilns because of the variety of raw materials they feed. Raw materials to a cement kiln are a blend of several components including calcium sources such as limestone, sea shells, marl, or chalk, silica sources such as clay, shale, slate, or sand, and iron sources such as iron ore or mill grindings. The proportions of the components of the blend are changed frequently according to the type of cement desired and the composition of the sources. This can make it very difficult to accurately determine the metals feed rate in the blended raw materials.

Of even more concern to the Agency, however, is the fact that the material balance approach is not likely to be conservative (i.e., protective) for furnaces, like cement kilns, that recycle collected PM back into the furnace. Because the dust is recycled, an increase in the feed rate of a metal in one of the feedstreams—such as spiking during a compliance test (under interim status) or a trial burn (under a part B permit application)—leads to a gradual increase in the concentration (and feed rate) of the metal in the recharged kiln dust which leads to a gradual increase in the metal emissions. Several recharge cycles may be necessary for the kiln to reach steady state condition. Thus, until the system reaches equilibrium, metals feed rates do not correlate with metals emissions.

EPA considered a number of alternatives to address the problem that the recycled dust creates a system that is out of equilibrium when a metal is spiked. We considered handling the recycled dust as another feedstream. Under this approach, the feed rate of metals in the recycled dust would be considered along with those from other feedstreams. (Or alternatively, the feed

rate of metals in the recycled dust would be considered as a fourth level of metals feed rate controls—that is, the feed rate of metals in pumpable hazardous waste, total hazardous waste, recycled dust, and total feedstreams would be limited.) We did not adopt this approach because: (1) The recycled dust is an internal recycled stream so that limits on the recycled dust coupled with limits on other feedstreams would probably correlate with metals emissions in the kiln off-gas, but not necessarily with stack emissions; and (2) during an emissions test when metals are spiked, the system will not be in equilibrium and we do not know enough about metal behavior in the system to determine whether the metals feed rate in the dust would be higher or lower after reaching equilibrium (i.,e., we did not know whether this approach would be conservative).

To address this concern that the material balance approach to implementing metals controls is not likely to be conservative (i.e., protective) for furnaces that recylce dust, today's rule requires owners and operators of such devices to comply with one of three alternatives: (1) Daily monitoring of collected PM to ensure that metals levels do not exceed limits that relate concentration of the metal in the collected PM to emitted PM; (2) daily stack sampling for metals; or (3) conditioning of the furnace system prior to compliance testing to ensure that metals emissions are at equilibrium with metals feed rates. We discuss each of these procedures below.

We note first, however, that today's rule gives owners and operators the option of selecting one of these methods only during interim status. The Director will determine under the part B permit application proceeding which of these methods (or whether another method) may be more appropriate on a case-by-case basis considering the facts. See § 266.106(f). In addition, we note that experience with these methods during interim status may indicate the need to refine them for use under a RCRA operating permit. Finally, we note that this provision of the permit standards is not limited to furnaces that recycle collected PM. (However, the methods discussed below may be used during interim status only by furnaces that recycle collected PM.) The permit standards provide this flexibility because, although we believe that these methods (as they may be refined with experience) or other methods that adequately address the concerns described below must be required for systems that recycle collected PM, the first two methods (i.e., monitoring collected PM or daily stack sampling) may be preferable for other types of devices as well. This is because these first two alternative methods address not only the special problem caused by recycled PM but also the problem of the difficulty (and imprecision) associated with limiting metals emission rates by the material balance approach given the variability of waste and raw material matrices and variability of the concentrations of metals in feedstreams, a problem that also exists for these furnaces and will exist for other devices as well.[60]

a. Monitoring Metals in Collected PM. This approach will control metals emission rates by establishing limits on all of the parameters discussed above for implementing the Tier II and Tier III controls, except for limits on the feed rate of each metal in total feedstreams. In lieu of that parameter, the final rule limits the concentration of each metal in collected PM. See "Alternative Methodology for Implementing Metals Controls" in Method Manual for Compliance with the BIF Regulations (incorporated in today's rule as appendix IX of part 266). The concentration limit is calculated by determining the maximum allowable concentration of each metal in the emitted PM and by empirically relating the concentration of the metal in the emitted PM to the concentration of the metal in collected PM (i.e., the enrichment factor). The maximum allowable concentration of each metal in the emitted PM is determined by dividing the allowable emission rate for the metal in pounds per hour by the applicable PM standard [61] in pounds per hour. The enrichment factor (i.e., concentration of a metal in emitted PM divided by the concentration in collected PM) is determined initially by a series of 10 emissions tests over a two-week period. Quarterly testing is required thereafter to determine if the enrichment factor changes substantially. If so, the series of 10 emissions tests must be conducted again to establish the revised enrichment factor.

EPA acknowledges certain potential limitations to this approach: (1) The Agency has limited data to support the main assumption of this approach—that the enrichment factor will remain constant over the range of normal operating conditions that occur between the initial series of 10 tests to establish the enrichment factor and the quarterly confirmation tests; and (2) that a problem with emissions is detected after the fact. However, we have built into the approach conservative features that should address concern about whether the enrichment factor may change over time. First, the approach assumes that the facility is always operating at its maximum allowable PM emission limit. Although allowable metal concentrations in collected PM would be higher when the facility operates at lower PM emission levels, the limits do not change. Thus, for example, for every 10% the facility operates under its PM standard, the limit on metals concentrations in collected PM are conservative (lower than necessary) by 10%. Second, the enrichment factor is statistically determined based on test data as the lower of: (1) Twice the enrichment factor at the 95% confidence level; or (2) the enrichment factor at the 99% confidence level. Where there is significant scatter in the data, twice the enrichment factor at the 95% confidence level is likely to govern. Thus, when the enrichment factor varies significantly during the 10 tests, not only is the enrichment factor based on the 95% confidence level, but an additional margin of safety is provided by doubling the factor at the 95% confidence level for purposes of determining the metal limit in collected PM.[62]

As for detection after the fact, sampling of collected dust is required every eight hours to form a daily composite sample. The operator is allowed up to 48 hours to analyze the daily composite [63] given that the analytical procedures can take 24 to 48 hours even for on-site laboratories. In addition, if the sample fails the concentration limit for a metal, the operator may analyze two duplicate samples that he may have elected to obtain to determine if the failed sample is an outlier. Analyses of these back-up samples will also take up to 48 hours. Thus, it could take up to four days to confirm that a dust sample has failed the

[60] We also note that these methods may be preferable to the material balance approach in some situations for implementing the metals controls for hazardous waste incinerators.

[61] The applicable PM standard is 0.08 gr/dscf or any more stringent standard that may apply under the NSPS or SIP.

[62] In addition, the methodology requires that a "safe enrichment factor" of 100 be used when a metal is at nondetect levels in the collected PM. Mercury, for example, may be at nondetect levels because it is likely to be in the vapor form (and not collected as PM) in an ESP or baghouse.

[63] Except for "noncritical" metals where 30 continuous days of analyses demonstrate that the dust concentration for the metal does not exceed 10% of the concentration limit. For these metals, weekly composite samples must be analyzed. If a weekly composite exceeds 10% of the dust concentration limit, however, daily analyses would be again required.

concentration limit and that a violation of the metals emissions controls may have occurred.[64]

Notwithstanding this provision of the method, EPA expects that owners and operators that want to comply with the spirit of the controls and to operate in a manner that is protective of human health and the environment will conduct triplicate analyses of samples for those metals that may exceed the "conservative" metal limit to avoid the time delay of subsequently analyzing back-up samples if the initial sample fails the concentration limit. Owners/operators should use historical data to determine whether a metal may be close to exceeding a concentration limit and, thus, routinely analyze "back-up" samples concurrently with the "required" sample for such metals. Further, EPA expects that enforcement officials will consider whether the owner/operator has taken such precautions to minimize the time during which they may be operating under violation conditions (if the dust concentration actually exceeds the "violation" limit) in determining appropriate enforcement action.

Notwithstanding these potential limitations, EPA believes that this methodology is preferable to the material balance approach. Rather than attempt to limit emissions by limiting metal feed rates and extrapolating through a number of not well-understood processes for furnaces that recycle dust, the methodology in the final rule goes to the material that is closest to to what is being emitted, collected PM, to extrapolate to emissions.

Limits on the operating parameters discussed above will be established under this methodology during a minimum of three "compliance tests" of the first five of the ten emissions tests required to establish the enrichment factor for each metal. Consequently, during three of the ten runs, feed rates of metals in total hazardous waste and pumpable hazardous waste will be at the maximum level that the facility may operate during the remainder of interim status. Although the feed rate of metals in the hazardous waste during the other tests need not be at the maximum level established during the three "compliance tests", the feed rate must be at least 25% [65] of the compliance test level, and the facility must operate at the compliance test capacity (i.e., the maximum capacity at which the facility may operate during the remainder of interim status). The owner and operator must demonstrate compliance with the applicable PM standard and the metals emissions standards of § 266.106(c) or (d) during all ten tests required to establish enrichment factors. The rule requires that the ten emissions tests to determine enrichment factors be conducted in a two week period with not more than two tests per day, and that the three compliance tests (when metals feed rates from the hazardous waste will be maximized to establish limits for the remainder of interim status) be among the first five tests. EPA is providing these restrictions to ensure that the enrichment factors are representative of operations over several days when operating conditions can vary, and to ensure that any effect on enrichment factors from the high metals loading from spiked hazardous waste during the three compliance tests will be detected during the subsequent tests.

The testing and operating requirements for this methodology are prescribed in detail in "Alternative Methodology for Implementing Metals Controls" in the Methods Manual.

b. Daily Emissions Testing. Under this option, the owner or operator must conduct daily emissions testing to confirm that the metals emission limits are not exceeded. Sampling must be conducted for a minimum of 6 hours each day when hazardous waste is burned. To ensure that sampled emissions are representative of normal emissions that day, the testing must be conducted when burning normal hazardous waste for that day (i.e., considering metals content, point of induction into the system, and physical form of the waste) at normal feed rates for that day and when the air pollution control system is operated under normal conditions. See § 266.103(c)(3)(ii)(B).

Given that actual emissions sampling is used under this option to determine compliance with emission standards, those operating conditions that apply to other BIFs after certification of compliance that are designed to control metals emissions are not necessary. See § 266.103(c)(1). The operating parameters that need not be limited at certification of compliance under this method are:

- Maximum feed rate of each metal in total feedstreams, total hazardous waste feedstreams, or pumpable hazardous waste feedstreams;
- Maximum feed rate of pumpable hazardous waste;
- Maximum feed rate of chlorine in total feedstreams;
- Maximum combustion chamber temperature and temperature at the inlet to the air pollution control system (APCS); and
- Key parameters to ensure proper operation of the APCS.

This approach has one drawback—there is a time delay before a violation of the emissions limits is determined given that it normally takes a week or more to obtain the results of the stack sampling. To minimize the impact of this problem, the operator is required to know the metals concentration and feed rate of hazardous waste at all times and must determine if a change in metal feed rate from the hazardous waste is likely to result in exceedance of a metal emission limit.

c. Conditioning Prior to Compliance Testing. Under this approach (see § 266.103(c)(3)(ii)(C)), the operator must condition the furnace to ensure that metals emissions are in equilibrium with metals fed into the system from all feedstreams. The owner or operator must determine using engineering judgment when the system has reached equilibrium (i.e., how long the system must be conditioned). During conditioning, hazardous waste and raw materials having the same metals content as will be fed during the compliance test must be fed at feed rates that will be fed during the compliance test.

Under this method, limits for all operating parameters under § 266.103(c)(1) must be established during the compliance test.

5. Trial Burns

A trial burn, or data in lieu of the trial burn (e.g., emissions data from interim

[64] The methodology requires that two dust concentration limits be established for each metal: a "conservative" limit and a "violation" limit. For example, the conservative limit is based on the safe enrichment factor of twice the enrichment factor at the upper 95% confidence level, while the violation limit is based on the enrichment factor at the upper 95% confidence level. If the conservative limit is failed more than 3 times out of 60 times, the owner/operator must notify the Director and he may burn hazardous waste for a total of 720 hours during which: (1) The series of 10 emissions tests must be conducted to revise the enrichment factor and the dust concentration limits; and (2) the maximum feed rate of each metal in the hazardous waste is reduced by 50% (except during the three compliance tests). If the violation limit is exceeded, however, the operator is in violation of the metals controls (and he must also notify the Director, reduce the feed rate of metals in hazardous waste, and conduct the series of 10 tests to calculate the revised concentration limits.)

[65] We are not requiring the facility operate at the maximum (i.e., compliance test) metals feed rate from hazardous waste (or other feedstreams) during all ten emissions tests because the purpose of the remaining tests is to obtain data to statistically determine the enrichment factor. Thus, it is important to determine how the enrichment factor may change as the feed rate of metals from various feedstreams varies. Nonetheless, the metal feed rate in the hazardous waste must be a minium of 25% of compliance test limits during the remaining 7 enrichment factor determinations tests.

status compliance testing) is required to demonstrate the performance capabilities of a system and to establish the operating limits of a facility for the duration of the operating permit. Compliance limits will be based on the operating conditions and emission rates observed during the trial burn. Therefore, to obtain the most flexible compliance limits, an owner/operator should conduct test burns and the trial burn under worst-case conditions (those that maximize emissions without exceeding the established limits). These conditions include feeding the waste used in the trial burn at a feed rate and metals concentration that reflect the highest levels expected in present or future operations.

Spiking with Metals. To achieve the maximum allowable concentration of metals, the owner/operator may wish to spike the waste to artificially high concentrations of the metals during the pre-trial burn period and during the trial burn. However, the owner/operator may not feed metals at levels higher than those documented in the part B permit application as those not likely to result in emissions exceeding allowable levels. Permit officials will consider this documentation in establishing pre-trial burn permit conditions for new permits.

6. Monitoring and Analysis Requirements

a. Emissions Testing. Emissions testing and analysis for metals must be conducted using "Methodology for the Determination of Metal Emissions in Exhaust Gases from Hazardous Waste Incineration and Similar Combustion Processes" provided in Methods Manual for Compliance with the BIF Regulations [66], incorporated in today's rule as appendix IX of part 266. The methodology describes the use of a multiple metals sampling train. The methodology also describes and provides references to the appropriate analytical techniques in Test Methods for Evaluation Solid Wastes (SW-846), incorporated by reference in § 260.11, that must be used to analyze samples.

b. Analysis of Feedstreams. Feedstreams must be analyzed for each of the 10 regulated metals that could reasonably be expected to be in the hazardous waste. If a particular metal is excluded from the analysis, the basis for exclusion must be documented and included in the operating record. Methods for sampling and analysis of feedstreams for metals are prescribed in SW-846.

[66] U.S. EPA, *Methods Manual for Compliance with the BIF Regulations*, December 1990, EPA/530-SW-91-010. NTIS publication number PB91-120-006.

D. Interim Status Compliance Requirements

As prescribed in $266.103, and discussed in section VII of part three of this preamble, boilers and industrial furnaces operating under interim status must comply with the metals emissions standards during interim status.

V. Controls for Emissions of Hydrogen Chloride and Chlorine Gas

Today's final rule uses a three-tiered regulatory approach to limit HCl and Cl_2 emissions (see § 266.107), an approach identical to that used to control noncarcinogenic toxic metals emissions.

A. Background Information

In the 1987 proposed rule, EPA stated its intention to develop risk-based HCl emission standards in the same format and for the same reasons as the proposed metals emission limits. The HCl emission limits for a particular device would have been based on the device type and capacity, and on the type of surrounding terrain. In the 1989 supplemental notice, EPA discussed an alternative approach to make the standards a function of stack height, terrain, and land use rather than a function of device type and capacity. The reasons for the change were the same as those described above in the discussion of the metals standards.

Controls on Cl_2 were proposed on April 27, 1990 (55 FR 17866) because Cl_2 can be emitted from devices burning chlorinated wastes if insufficient hydrogen is available (i.e., from other hydrocarbon compounds or water vapor) to react with all of the chlorine present in the waste. In recent tests [67] of a cement kiln, EPA found that approximately 50% of gaseous chlorine emissions were in the form of Cl_2 (and the other 50% was in the form of HCl). In the April 1990 proposal, the Agency proposed a Cl_2 RAC of 0.4 $\mu g/m^3$.

In the 1989 supplemental notice, EPA also discussed the possibility of using continuous HCl monitors in lieu of the waste feed analysis approach for monitoring HCl emissions are likely to be close to allowable emissions. The Agency continues to believe that this is a reasonable approach and believes that it can be effectively implemented during the permit process as necessary using the omnibus authority.[68]

[67] U.S. EPA, Emission Testing of a Precalciner Cement Kiln at Louisville, Nebraska, November 1990. Document No. EPA/530-SW-91-016.

[68] EPA notes that permit writers choosing to invoke the omnibus permit authority of § 270.32(b)(2) to add conditions to a RCRA permit must show that such conditions are necessary to ensure protection of human health and the environment and must provide support for the conditions to interested parties and accept and respond to comment. In addition, permit writers must justify in the administrative record supporting the permit any decisions based on omnibus authority.

B. Response to Comments

The Agency received a number of comments on the proposed HCl and Cl_2 controls as discussed below.

1. Short Term HCl RAC

A number of commenters stated that the Agency's support for the proposed 3-minute RAC for HCl was inadequate. The Agency is currently developing a new methodology for evaluating health effects data to develop a no-adverse-effect short-term exposure level.[69] Given that the new methodology has not been approved by the Agency, today's final rule does not establish a short-term RAC for HCl.

We note that the Tier I chlorine feed rate limits proposed in the 1989 supplemental notice were based on the short-term HCl RAC because the short-term exposure RAC provided more restrictive feed rate limits than the long-term RAC. Consequently, the 1989 proposed chlorine feed rate limits are not included in today's final rule. In establishing the Tier I feed rate limits for chlorine in today's final rule, the Agency considered both the long-term HCl RAC (i.e., 7 $\mu g/m^3$) and the Cl_2 RAC (i.e., 0.4 $\mu g/m^3$), and the partitioning between the two pollutants in stack gases. Given that the Agency has tested for Cl_2 emissions at only two facilities, and at one of the facilities more than 50% of the chlorine partitioned to Cl_2, the Agency conservatively assumed in calculating feed rate limits that 100% of the chlorine would be partitioned to Cl_2. Because the Cl_2 RAC is more than an order of magnitude lower than the HCl RAC, the Tier I chlorine limits were based on 100% conversion of chlorine to Cl_2. If applicants believe that this assumption is too conservative, they may conduct emissions testing to document Cl_2 and HCl emission rates.

2. Need for Cl_2 Controls

Many commenters stated that Cl_2 controls are unnecessary. One commenter believed that very little hydrogen is needed to react with Cl_2 to form HCl. Another commenter believed that operating conditions for boilers and industrial furnaces are not conducive to the formation of Cl_2. Another commenter stated that the proposed limits to control

[69] Memorandum dated September 18 from Susan Griffin, EPA, to Bob Holloway, EPA, entitled "Derivation of Short-Term RAC for HCl"

HCl emissions will provide adequate control of Cl_2 emissions as well.

The Agency does not agree with these commenters. As discussed above, emissions testing indicates that a substantial fraction of gaseous chlorine can be emitted in the form of Cl_2. In addition, the HCl controls may not be adequate to control Cl_2 emissions. Because Cl_2 has a much lower solubility in water than does HCl, the use of wet scrubbers as the principle emissions control device for HCl is not likely to significantly reduce emissions of Cl_2. Cl_2 emissions can be controlled, however, by increasing the hydrogen content of feedstreams (e.g., by adding steam) or by decreasing the feed rate of chlorine. Moreover, EPA does not believe that high Cl_2 emissions relative to HCl emissions is a widespread occurence.

3. HCl Emission Test Procedures

A number of commenters who own or operate cement kilns expressed concern that EPA's HCl stack sampling and analysis procedure (see section 3.3 in Methods Manual for Compliance with the BIF Regulations) was inappropriate because it counted as HCl chlorine in inorganic chloride salts and chloride ions that are emitted as ammonium chloride. The Agency has determined [70] that the filter in the sample probe, in fact, effectively removes fine particulate chloride salts so that they do not interfere with the HCl determination. The Agency agrees, however, with commenters that the procedure may consider as HCl chloride ions that are emitted as ammonium chloride.[71] Although the Agency has not developed a sampling and analysis procedure that would correct this problem, we do not believe that any such over-reporting of HCl will cause a cement kiln to exceed the HCl standard. This is because the highly alkaline particulate matter resulting from the limestone raw materials effectively neutralizes much of the chlorine generated from hazardous waste fed into the kiln.

4. Technology-Based HCl controls

Several commenters stated that technology-based HCl emission controls applicable to hazardous waste incinerators (i.e., 99% reduction of emissions in the stack gas) should also apply to BIFs. As discussed in the proposed rule, the Agency continues to believe that a 99% reduction standard for BIFs to control HCl emissions may be neither technically feasible nor necessary to protect human health and the environment. The Agency believes that the process chemistry of some industrial furnaces (e.g., cement kilns) generally results in low HCl emissions and concerns about tube corrosion generally limit HCl concentrations in boiler emissions. Given the low uncontrolled HCl concentrations in many BIFs, a 99% reduction standard in addition to the health-based standard required by today's final rule, may not be cost-effective. Commenters did not provide data or information that would support the need for, and the cost-effectiveness of a technology-based standard in addition to the health-based standard provided by the final rule.

We note that the Agency is currently developing health effects data for two other acid gases: hydrogen fluoride and hydrogen bromide.

C. Implementation

Procedures for implementing the HCl and Cl_2 controls are virtually identical to those for the metals controls discussed above.

1. Emissions Testing

Collection and analysis of HCl and Cl_2 in stack gas emission samples must be conducted according to the procedures prescribed in section 3.3 of the Methods Manual for Compliance with the BIF Regulations, (Methods Manual) incorporated in today's rule as appendix IX of part 266. The Methods Manual describes two procedures for sampling emissions for HCl and Cl_2: Methods 0050 and 0051. Method 0050 collects a sample isokinetically and is, therefore, particularly suited for sampling at sources emitting acid particulate matter (e.g., HCl dissolved in water droplets), such as those controlled by wet scrubbers. Method 0051 uses a midget impinger train sampling method designed for sampling sources of HCl and Cl_2 emissions not in particulate form. Samples collected using either method must be analyzed using Method 9057 which is also described in the Methods Manual.

2. Wastes Analysis

Methods for sampling and analysis of feedstreams for total chlorine and chloride are described in detail in SW-846.

3. Interim Status Compliance Requirements.

As discussed in section VII of part three of this preamble, boilers and industrial furnaces operating under interim status must comply with the HCl and Cl_2 emissions standards during interim status.

VI. Nontechnical Requirements

As proposed, the final rule requires BIFs to comply with the nontechnical standards applicable to other hazardous waste treatment, storage, and disposal facilities. These nontechnical standards address the potential hazards from spills, fires, explosions, and unintended egress; require compliance with the manifest system to complete the cradle to grave tracking system; ensure that hazardous wastes (and hazardous residues) are removed from the site upon closure; and ensure that the owners and operators are financially capable of complying with the standards. BIFs burning hazardous waste fuels that operate storage facilities must already comply with these standards under existing § 266.35(c).

We also note, in particular, that owners and operators of BIFs are subject to the waste analysis requirements of §§ 264.13 and 265.13 by reference. See §§ 266.102(a)(2)(ii) for permitted facilities and 266.103(a)(4)(ii) for interim status facilities. Before a waste is stored or burned, the owner or operator must obtain a detailed chemical and physical analysis of a representative sample of the waste sufficient to enable the owner or operator to comply with today's rule.

The nontechnical standards provided in today's rule are identical to those that currently apply to hazardous waste incinerators. In today's rule, § 266.102(a)(2) applies these standards to permitted BIFs and § 266.103(a)(4) applies these standards to BIFs operating in interim status.

Finally, we note that, as proposed, today's rule applies the same controls on fugitive emissions that currently apply to hazardous waste incinerators. The controls apply to facilities operating under a permit (see § 266.102(e)(7)(i) and, on the effective date of the rule, to facilities operating under interim status (see § 266.103(h)). The controls provide for alternative control strategies including: (1) Keeping the combustion zone where hazardous waste is burned (or where emissions from such burning may migrate) totally sealed; and (2) maintaining the combustion zone pressure lower than atmospheric pressure.

VII. Interim Status Standards

In addition to the nontechnical standards discussed above, today's final rule requires facilities with interim status to comply with substantive

[70] U.S. EPA, Emission Testing of a Precalciner Cement Kiln at Louisville, Nebraska, November 1990. Document No. EPA/530-SW-91-016.

[71] U.S. EPA, Emissions Testing of a Wet Cement Kiln at Hannibal, MO, December 1990. Document No. EPA/530-SW-91-017.

emission controls for metals, HCl, Cl_2 particulates, and CO (and, where applicable, HC and dioxins and furans). Owners and operators must certify compliance with the emissions controls under a prescribed schedule, establish limits on prescribed operating parameters, and operate within those limits throughout interim status.

Given that interim status requirements are self-implementing, the Agency has developed comprehensive interim status requirements to ensure that the standards are implemented effectively. To assist the regulated community in complying with the requirements, EPA is developing a guidance document entitled Interim Status Guidance Document for BIFs (ISGD). The guidance document will be available shortly after publication of the final rule in the **Federal Register.** The ISGD will summarize the provisions of the rule, provide example forms that may be used to submit data and information required by the certifications of precompliance and compliance (see discussions below), and provide guidance on developing a compliance test protocol. To provide further assistance to the regulated community, EPA plans to conduct a series of workshops open to the public to explain how the interim status standards work. The workshops are scheduled to begin shortly after publication of the final rule in the **Federal Register.** To obtain a copy of the ISGD or information on the dates and locations of the workshop, contact the sources identified at the beginning of this preamble under **"FOR FURTHER INFORMATION CONTACT".**

The following sections summarize how the interim status standards work.

A. Certification Schedule

1. Certification of Precompliance

The BIF rule is effective 6 months after the date of promulgation. By the effective date, an owner/operator must submit a certification of precompliance providing prescribed information supporting a determination that emissions of individual metals, HCl, Cl_2, and particulates are not likely to exceed allowable levels. See § 266.103(b)(2). For certification of precompliance, the owner/operator must use engineering judgment to evaluate available information and data (or must use EPA-prescribed default data provided in sections 8.0 and 9.0 of Methods Manual for Compliance with the BIF Regulations, incorporated in today's rule as Appendix IX of part 266) to determine that, under the operating limits (for EPA-prescribed parameters) that the owner/operator establishes, emissions are not likely to exceed the allowable emissions provided by §§ 266.105, 266.106, and 266.107. The owner and operator must then comply with these operating conditions (see discussion in section VII.B below) submitted in the precompliance certification during the interim status period of operation until a revised precompliance certification is submitted or until a certification of compliance is submitted as discussed below.

In addition, by the effective date of the rule, the owner or operator must submit a notice for publication in a major local newspaper of general circulation providing the general facility information prescribed by § 266.103(b)(6). The information that must be provided in the notice includes: The name and address of the owner and operator of the facility; the type of facility, the type and quantity of hazardous waste burned; the location where the operation record of the facility can be viewed; a notification that a facility mailing list is being established so that interested parties may notify the Agency that they wish to be placed on the mailing list to receive future information and notices about the facility; a brief summary of the RCRA regulatory system for BIFs; and the address of the EPA Regional Office where additional information on the RCRA regulatory system may be obtained. EPA is requiring this public notice to ensure that the local citizenry is aware that the BIF is burning hazardous waste and that, to the extent desired, the local citizenry may become better informed about the facility operations through site inspections and review of data in the operating record. In turn, this opportunity for local involvement in facility operations should provide an added incentive for the owner and operator to comply with the spirit and letter of the interim status standards.

EPA notes that facilities that meet the definition of "in existence" of § 266.103(a)(1)(ii) but that are not burning hazardous waste on the effective date of the rule must nonetheless submit a certification of precompliance based on planned operations. The certification may be revised at any time in the future if necessary. See § 266.103(b)(8).

2. Certification of Compliance

Within 18 months of promulgation, the owner/operator must conduct compliance testing [72] and submit a certification of compliance with the standards for individual metals (§ 266.106), HCl and Cl_2 (§ 266.107), particulates (§ 266.105), and CO, and, where applicable, HC and dioxins/furans (§ 266.104 (b) through (e)). The certification of compliance is based on emissions testing and establishes operating limits for EPA-prescribed parameters based on the compliance test. See § 266.103(c)(1).

If the owner/operator cannot submit the certification of compliance within 18 months of promulgation however, he must either: (1) Notify the Director that he is taking an automatic 12-month extension under which hazardous waste burning is limited to a total of 720 hours; (2) obtain a case-by-case extension of time for reasons beyond his control; or (3) stop burning hazardous waste and begin closure of the hazardous waste portion of the facility. See § 266.103(c)(7).

The case-by-case time extension will be provided by the Director if he determines that the owner or operator has made a good faith effort to comply with the requirements in a timely manner but, for reasons beyond his/her control, are not able to meet the certification of compliance deadline. Reasons could include inability to complete modifications to an air pollution control system in time to conduct the compliance test to support the certification, or a major, unplanned outage of the facility (e.g., need to replace refractory in a kiln) just prior to scheduled compliance testing, or as discussed earlier, HC levels attributable to organics in raw materials. The Director may use his discretion to determine the length of the extension.[73] The Director also may impose conditions that ensure that the boiler or industrial furnace will be operated in a manner that protects human health and the environment, provided that the Director documents the basis for adding such a condition and provides the applicant opportunity to comment on it.

[72] We note that compliance testing may be conducted only under operating conditions for which the facility has submitted a certification of precompliance. This is because the facility may only operate after the effective date of the rule and prior to submittal of a certification of compliance under conditions for which it has certified precompliance. If any applicable emission standard is exceeded during the compliance test (or during pretesting), the facility must immediately submit a revised certification of precompliance establishing revised (i.e., more stringent) operating limits.

[73] We would not expect for the Director normally to limit the hours that hazardous waste may be burned under a case-by-case extension given that the owner/operator must support the need for the extension and, if granted, the extension must be for a legitimate need. In contrast, the hours of burning are limited for the automatic 12-month extension because there is no judgement by the Director that, in fact, the extension is warranted.

In addition, we note that a case-by-case extension may be requested and granted for any interim status certification deadline under § 266.103 (c) or (d). A case-by-case extension may be granted after an owner/operator has elected to take the 12-month automatic extension, an extension may be granted if the owner/operator cannot comply with the recertification schedule (see discussion below), and an existing extension may be extended.

3. Recertification

Owners and operators must periodically conduct compliance testing and recertify compliance with the standards for individual metals, HCl and Cl_2 particulates, and CO, and, where applicable, HC and dioxins/furans within three years of the previous certification while they remain in interim status (i.e., until an operating permit is issued under § 270.66). See § 266.103(d). EPA is requiring recertifications primarily to ensure that air pollution control systems do not deteriorate over time.

4. Failure to Comply with the Certification Schedule

If the owner or operator does not comply with the certification schedule, all hazardous waste burning must cease as of the date of the missed deadline, and closure must commence. See § 266.103(e). Any burning of hazardous waste by such a device after failure to comply with the certification schedule must be under a RCRA operating permit. See § 270.66.

To comply with the certification schedule, complete and accurate certifications of precompliance and compliance must be submitted by the applicable deadlines. (Although the deadline for certification of compliance may be extended (see § 266.103(c)(7)), the deadline for certification of precompliance may not be extended.) In addition to terminating interim status if the owner and operator do not comply with the certification schedule, EPA will also take appropriate enforcement action.

When closing a BIF, all hazardous waste and hazardous waste residues, including, but not limited to, ash, scrubber water, and scrubber sludges, must be removed from the affected BIF. In addition, the owner/operator must comply with the general interim status closure requirements of §§ 265.111–265.115, as amended. These requirements, which are incorporated by reference into today's rule, specify closure performance standards; submission of and compliance with a written closure plan; disposal or decontamination of equipment, structures, and soils; and certification procedures for closure.

We note that under amended § 265.112(d)(2), for an owner or operator who fails to submit a complete certification of compliance by the applicable compliance deadline (including the automatic 12-month extension or the case-by-case extension under § 266.103(c)(7)(i), the date that he "expects to begin closure" is within 30 days after the applicable deadline. Therefore, for example, for an owner who takes the automatic 12-month extension, the closure notification requirements of § 265.112(d)(1) or the closure activity requirements of § 265.113 would not be triggered unless and until the owner fails to submit a complete certification of compliance by the 12-month extended deadline and a case-by-case extension beyond the 12-month extension was not obtained.

For any other BIF owner or operator closing during interim status operation (i.e., one who closes between the effective date of the rule but before the interim status compliance deadline of 18 months after promulgation of the rule, or one who submits a complete certification of compliance by the applicable 18-month compliance deadline, the 12-month automatic extension, or case-by-case extension, and closes during interim status), the date when he "expects to begin closure" under § 265.112(d)(2) will remain either within 30 days after the date on which any hazardous waste management unit receives the known final volume of hazardous waste, or if there is a reasonable possibility that the unit will receive additional hazardous waste, no later than one year after the date on which the unit received the most recent volume of hazardous waste.

5. Development of the Certification Schedule

In the 1989 supplemental notice, the Agency requested comment on alternative schedules for requiring compliance with the emissions standards during interim status. The Agency selected a certification deadline of 18 months (with provision for extensions) because we believe that most facilities will be able to install the necessary monitoring equipment, conduct any precompliance testing that may be necessary, and conduct compliance testing within that time period. Although 18 months from the date of promulgation is a fairly short period of time, we note that Agency staff have made numerous public presentations and have had numerous discussions [74] with the regulated community, including, in particular, the development of interim status compliance procedures. Thus, facility owners/operators have had some advance indication of the general regulatory approach taken in the final rule.

The Agency received a comment that the air emission standards for cement kilns should be instituted more quickly than the schedule proposed. The commenter believed that accelerating the schedule will not place an excessive burden on these facilities because the regulations were proposed far enough in advance for cement kilns to come into compliance. The Agency has considered this comment and: (1) Sees no compelling reason to single out cement kilns from other BIFs for an accelerated schedule; and (2) continues to believe that an 18-month compliance period is representative of the time required to implement necessary plant design or process modifications, install monitoring and compliance equipment, conduct facility compliance testing, and submit a certification of compliance testing that documents key operating limits during the remainder of the interim status period. In fact, the Agency is concerned that in some situations, where, for example, the air pollution control system may need to be modified, an 18-month deadline may not provide enough time to complete modifications, "shake-down" the system, conduct pre-testing [75], conduct compliance testing, and analyze test data and submit a certification of compliance. Thus, the final rule includes provisions for time extensions to all certification deadlines except for certification of precompliance under § 266.103(b).

B. Limits on Operating Parameters

Limits on operating parameters during interim status are established at certification of precompliance and at certification of compliance following emissions testing 18 months (unless extended) after promulgation of the rule. The operating conditions can be revised prior to certification of compliance by submitting a revised certification of precompliance. The operating conditions can be revised after certification of

[74] See the public docket for this rulemaking for summaries of meetings held with groups including: Cement Kiln Recycling Coalition, Chemical Manufacturers Association, National Solid Waste Management Association, Council of Industrial Boiler Operators, and Hazardous Waste treatment Council.

[75] Although pretesting is not required, EPA believes that most facilities will conduct pretesting before conducting the formal compliance testing with all its attendant QA/QC requirements.

compliance by conducting emissions testing and submitting a revised certification of compliance.

After the effective date of the rule and prior to certification of compliance with the emissions standards based on emissions testing, a facility may operate only under those conditions for which the facility has submitted a "precompliance" certification demonstrating that emissions of individual metals, HCl, Cl_2, and particulates are not likely to exceed allowable levels. The operating conditions for which limits are established by precompliance are (see § 266.103(b)(3)):

• Feed rate of each of the 10 metals in:

—Total feed streams, except for furnaces that recycle collected particulate matter (see discussion in section VII.I below)

—Total hazardous waste feed streams

—Total pumpable hazardous waste feed streams;

• Total feed rate of chlorine and chloride in all feed streams;

• Total feed rate of ash in all feed streams, except for cement and light-weight aggregate facilities for which ash content of feed streams is not an operating parameter;

• Total feed rate of hazardous waste and feed rate of pumpable hazardous waste; and

• Maximum capacity in appropriate units such as heat input, steam production, or raw material feed rate.

In addition, the following parameters must be considered in demonstrating precompliance and must be continuously monitored (and records maintained in the operating log) when monitoring systems are installed (see § 266.103(b)(6)):

• Maximum combustion zone temperature;

• Maximum flue gas temperature entering the PM APCS; and

• Limits for APCS-specific operating parameters.

Once a facility has conducted compliance testing and certified compliance with the emissions standards, limits for all of the above parameters, as well as for CO (and, where applicable, HC) are established based on the compliance test and remain in force until recertification under new conditions. See § 266.103(c)(1).

C. Automatic Waste Feed Cutoff

Upon certification of compliance, an automatic hazardous waste feed cutoff system must engage when the limits (established in the certification) for the following operating parameters are exceeded (see § 266.103(g)):

• Total feed rate of hazardous waste and feed rate of pumpable hazardous waste;

• Limits on CO and, where applicable, HC;

• Maximum production rate in appropriate units such as heat input, steam production, or raw material feed rate;

• Maximum combustion zone temperature;

• Maximum flue gas temperature entering the PM APCS; and

• Limits for APCS-specific operating parameters.

Facilities operating during interim status after certification of compliance must test the automatic waste feed shutoff system once every 7 days to ensure that it is operating properly, unless an owner/operator can document that weekly testing will result in unsafe conditions. See § 266.103(j)(3). In all cases, testing at least every 30 days is required. Owners/operators are required to document the results of these tests and all automatic waste feed shutoffs that occur during normal operations.

D. Sham Recycling Policy

The BIF rules supersede the Agency's sham recycling policy (see 48 FR 11157 (March 16, 1983)) after the owner or operator certifies during interim status compliance with the emissions standards for metals, HCl, Cl_2, particulates, and CO (and, where applicable, HC and dioxins and furans). Thus, after certification of compliance, a BIF may burn hazardous waste (other than waste fed solely as an ingredient or solely for material recovery) with a heating value lower than the 5,000 Btu/lb limit generally considered heretofore to be the minimum for a legitimate hazardous waste fuel. Although the Agency considers such burning to be treatment, we believe that conformance with the emissions standards upon certification of compliance under § 266.103(c) will ensure protection of human health and the environment. (Prior to today's rule, BIFs burning a hazardous waste that was not considered to be a legitimate fuel were subject to the subpart O incinerator standards of parts 264 and 265, assuming burning was not for some other legitimate recycling purpose, such as material recovery.)

Although we indicated above that a BIF may burn hazardous waste for the purpose of treatment upon certification of compliance, today's rule allows BIFs to burn such hazardous waste for a total period of time not to exceed 720 hours prior to certification of compliance. See § 266.103(a)(6). The rule allows such burning only for purposes of compliance testing (and pretesting to prepare for compliance testing) to determine that the device can comply with the emissions standards while burning waste for treatment. The rule limits such burning to a total of 720 hours because we believe that period of time is adequate to complete any pretesting and compliance testing, and it is the same period of time that new BIFs may burn hazardous waste during the pretrial burn period under § 270.66(b)(1).

The Agency discussed three options in the 1989 supplemental notice for superseding the sham recycling policy: Rescinding the sham recycling policy on the effective date of the final rule; rescinding the sham recycling policy when a facility comes into compliance with the interim status emission standards; or leaving the sham recycling policy in effect until a RCRA operating permit is issued.

The Agency received comments supporting all three of the options. Eight commenters supported the first option, rescinding the sham recycling policy on the effective date of the final rule, because the policy is considered guidance. Eight commenters supported the second option, rescinding the sham policy when facilities come into compliance with the interim status emission standards, because the standards are protective of human health and the environment. Five commenters supported the third option, leaving the sham recycling policy in effect until a facility is issued a RCRA operating permit, because the permit writer oversight during the permit process is necessary to ensure that a facility complies with the appropriate regulations.

The Agency believes that the procedures required for certification of the interim status emissions standards are adequate to ensure effective implementation and enforcement of the standards. The only emissions standard applicable to permitted facilities that is not required during interim status is the destruction and removal efficiency (DRE) standard requiring a trial burn to demonstrate 99.99% DRE. The Agency does not believe that this is necessary because emissions testing of boilers and industrial furnaces indicates that facilities with CO and HC levels within the limits established by today's rule also are likely to achieve 99.99% DRE.

It should be noted that in rescinding the sham recycling policy for these types of regulated boilers and industrial furnaces, the Agency is not altering in

any way what secondary materials are defined as solid and hazardous wastes when burned for legitimate energy recovery. Thus, all spent materials, sludges, and by-products are solid wastes when burned for recovery, as are off-specification commerical chemical products which are burned as fuels (or used as a component of fuels) in lieu of their original intended use. See §§ 261.2(c)(2) and 261.33. (Non-listed hazardous commercial chemical products (i.e., those that exhibit a characteristic but are not listed in § 261.33) are likewise solid wastes when they are recycled in ways that differ from their normal use. 50 FR at 14219 (April 11, 1985).) With respect to the issue of what constitutes a normal manner of use for an off-specification commercial chemical product that has some Btu value, or the issue of when such a material is used "in lieu of [its] original intended use" (§ 261.33) and so is a solid and hazardous waste, the Agency notes that not every type of burning ostensibly for energy recovery is considered to qualify. Inappropriate modes of burning thus do not render such materials non-wastes. For example, if ignitable off-specification natural gas condensate is burned as a motor fuel, or reactive jet fuel (U 133, hydrazine) is burned as conventional fuel oil, such materials are solid and hazardous wastes and subject to subtitle C controls. This is because the mode of burning is not at all like these materials' original intended use.

E. Submittal of Part B Applications

Permit writers will require owners and operators to submit part B applications for operating permits on a schedule considering the relative hazard to human health and environment the facility poses compared to other storage, treatment, and disposal facilities within the Director's purview.

F. DRE Testing

As proposed, testing to demonstrate 99.99% destruction and removal efficiency (DRE) of organic compounds in the waste is not required under interim status. The complexity and costs of DRE testing, as well as the substantial interaction needed between owners/operators and regulatory officials, make such testing impracticable during interim status. EPA expects that the control requirements for CO and HC will result in low levels of emissions of organic compounds.

G. Chlorinated Dioxins and Furans

As proposed, hazardous waste containing or derived from any of the following dioxin-listed wastes cannot be burned in a boiler or industrial furnace operating under interim status: EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, and F027. Burning these dioxin-containing wastes during interim status is prohibited because boilers and industrial furnaces cannot be assumed to achieve the 99.9999 percent DRE required for these wastes.

Even though these wastes may not be burned during interim status, chlorinated dioxins and furans may be emitted as PICs under certain conditions (i.e., when the PM control device is operated within the temperature range of 450–750°F, or when HC concentrations exceed 20 ppmv) as discussed in section II.E of part three of the preamble. EPA believes that the emissions testing and risk assessment requirements of § 266.104(e) can be effectively implemented during interim status without significant EPA interaction. Thus, the rule requires the owner or operator to certify compliance with those requirements, as applicable.

H. Special Requirements for Furnaces

Today's rule provides special interim status requirements for industrial furnances that feed hazardous waste, except hazardous waste fed solely as an ingredient,[76] at locations other than the "hot" end where the product is discharged and fuels are normally fired to ensure adequate combustion of hazardous waste prior to conducting a trial burn during the part B permit process (see § 266.103(a)(5)) as follows: (1) The combustion gases must have a minimum temperature of 1800 °F at the point where the waste is introduced; [77] (2) the owner or operator must determine (and include such determination in the operating record) that there is sufficient oxygen present to combust the waste; (3) the continuous hydrocarbon monitoring controls provided by § 266.104(d) apply; and (4) for cement kilns, hazardous waste must be fed into the kiln itself;

EPA established a minimum temperature of 1800 °F for the location of hazardous waste firing and is requiring that the owner/operator demonstrate that adequate oxygen is present to sustain combustion given that it is generally accepted that organic compounds are readily destroyed at temperatures above 1800 °F in the presence of adequate oxygen. The demonstration of adequate oxygen is particularly important for cement kilns because they are operated close to stoichiometric oxygen levels (i.e., with little excess oxygen in the kiln) to efficiently maintain the high temperatures necessary to calcine and sinter the raw materials. Although higher excess oxygen levels would better ensure more complete combustion of fuels, operating at higher oxygen levels is less thermally efficient and reduces the kiln production capacity.

In addition, continuous hydrocarbon (HC) monitoring is required to demonstrate that HC levels do not exceed the regulatory limit of 20 ppmv on a hourly rolling average basis (or alternative level established under § 266.104(f)) irrespective of whether the CO level is less than 100 ppmv where HC monitoring is not normally required. See § 266.103(a)(5). EPA is requiring HC monitoring because of the concern that CO monitoring alone may not be an adequate indicator of good combustion conditions when hazardous waste is fed at locations other than where (nonhazardous) fuels are normally fired. See discussion in part three, section II.B.4.a of this preamble. Continuous monitoring of HC and compliance with the applicable operating limit is required upon certification of compliance (or, for furnances that feed raw materials containing organic matter and that receive a time extension to certify compliance, upon receipt of the time extension.[78]

The Agency considered whether the hydrocarbon controls were redundant to the operating requirements specified above and concluded that HC monitoring is needed to effectively

[76] Hazardous waste is burned solely as an ingredient if it is burned for neither energy recovery (i.e., it has a heating value less than 5,000 Btu/lb) nor treatment or destruction (i.e., it contains a total of less than 500 ppm toxic nonmetal constituents listed in appendix VIII, part 261).

[77] EPA is aware that cement companies have experimented with feeding containerized waste into the upper, raw material feed end of the kiln using feed chutes that propel the containers down into the kiln before they rupture and expose the waste to the combustion gas (and begin to release hydrocarbons). In such a situation, the temperature limit applies at the point that the waste may begin to release hydrocarbons—the point where the container impacts the charge bed. The temperature limit does not apply to the point where the container is actually charged into the kiln. (If, however, a noncontainerized waste is fired into the kiln at the upper end, the 1800 °F temperature limit applies at the location where the waste exits the firing system.) Although this discussion pertains to cement kilns, EPA notes that the subject requirements apply to any industrial furnance that feeds hazardous waste at a location other than the "hot" end as described in the text.

[78] We note, as discussed elsewhere in the text, the time extension will be conditional on, among other things, HC (and CO) levels not exceeding an interim limit established in the extension.

implement and enforce the controls on organic emissions. Although the operating requirements alone should be adequate to limit organic emissions, absent HC monitoring there would be no continuous verification that the operating requirements were, in fact, adequate and that the owner/operator maintained compliance with the operating requirements.

Finally, the rule requires that hazardous waste be fired into a cement kiln itself to ensure that the waste is not introduced at a location that may not be conducive to complete combustion of the waste. For example, cement companies have considered burning hazardous waste in the precalciner of a cement kiln. Although such practices may prove during the permit process to be acceptable, EPA has not tested emissions from a kiln burning waste at locations other than in the kiln itself, and is concerned that complete combustion of organic constituents may not be ensured. Thus, burning hazardous waste in a cement kilns precalciner is not allowed during interim status. (This restriction is limited to cement kilns because this is the only type of kiln of which the Agency is aware where hazardous waste may be fired at a location that is clearly not designed for optimum combustion conditions. A cement kiln precalciner is designed primarily to achieve calcining of raw materials and may not provide adequate combustion of hazardous waste.)

The special requirements do not apply to hazardous waste that is burned (processed) solely as an ingredient [79] because such waste does not contain significant levels of hazardous nonmetal constituents (i.e., compounds listed in appendix VIII, part 261) and, thus, nonmetal emissions will not pose significant risk to human health and the environment. (Metal emissions will be adequately controlled by today's rule irrespective if where the waste is fed into the system because metals are controlled by a PM control device.) Thus, emissions of nonmetal compounds are not of concern when a waste is burned (processed) solely as an ingredient. EPA considers a waste to be burned solely as an ingredient in a kiln if it is not burned partially as a fuel or for conventional treatment (i.e., destruction). The Agency considers a waste that is fed to boilers and industrial furnaces to be burned at least partially for energy recovery and not as an ingredient if it has a heating value of 5,000 Btu/lb or greater, as-generated, and at least partially for treatment (i.e., destruction) if it contains more than a total of 500 ppm (by weight) of appendix VIII, part 261, nonmetal hazardous constituents. See 54 FR at 43731–32 where EPA discussed use of a 500 ppm standard for distinguishing between recycling activities tantamount to production and those constituting conventional treatment.

The Agency notes in addition that it ordinarily does not consider metal-bearing wastes hazardous wastes to be used as ingredients when they are placed in industrial furnaces purportedly to contribute to producing a product. (The use of metal-bearing wastes for material recovery is discussed earlier in the preamble, and this discussion does not deal with the issue of when such wastes are burned for legitimate material recovery in industrial furnaces.) To be considered legitimate use as an ingredient, it would normally need to be demonstrated to EPA (or an authorized State) pursuant to § 261.2(f) that the hazardous metal constituents in the waste are necessary for the product (i.e., are contributing to product quality) and are not present in amounts in excess of those necessary to contribute to product quality. See 50 FR at 638 (Jan. 4, 1985). This would normally require some demonstration that these hazardous metal constituents do not render the product unsafe for its intended use. (The other sham recycling criteria discussed frequently by EPA would also have to be satisfied. See, e.g., 53 FR at 522 (Jan. 8, 1988).) The types of uses of hazardous wastes in industrial furnaces to produce waste-derived products of which the Agency is aware, such as using hazardous wastes to produce aggregate or cement (the Agency is not actually aware of cement kilns using hazardous wastes ostensibly as ingredients, although some facilities have contemplated engaging in the practice) do not appear to satisfy these criteria. In addition, the Agency notes the discussion earlier in this preamble (in the context of hazardous waste used as slurry water) to the effect that the more common and less valuable the raw material the hazardous waste is replacing, the more likely the activity is to be some form of surrogate treatment.

I. Special Metals Controls for Furnaces that Recycle Collected Particulate Matter

For reasons discussed in section IV.C.4 of this preamble, the final rule requires owners and operators of furnaces (e.g., cement kilns, light-weight aggregate kilns with dry particulate matter (PM) control systems) that recycle collected PM back into the furnace to implement the metals emissions controls of § 266.106 (c) or (d) under one of the three alternative methods. The discussion in section IV.C.4 of the preamble summarizes procedures for certification of compliance under the methods. For certification of precompliance, the standard procedures will be used for both the "daily emissions testing" option, and the "conditioning prior to compliance testing" option. Precompliance procedures are different, however, for the "monitoring metals in collected PM" method, as discussed below.

Under the "monitoring metals in collected PM" method, operating limits will be established for all of the parameters listed in section VII.B. above except for the feed rate limit on each metal in total feedstreams. In lieu of that parameter, the special procedures limit the concentration of each metal in collected PM. See "Alternative Methodology for Implementing Metals Controls" in Methods Manual for Compliance with the BIF Regulations (incorporated in today's rule as appendix IX of part 266).

For certification of precompliance, the owner/operator must estimate the enrichment factor for each metal using engineering judgment or EPA prescribed default values. EPA default values are 100 for mercury and 10 for all other metals. The enrichment factors are then used to calculate precompliance dust metal concentration limits using the allowable emission rate for each metal and the applicable PM standard using the same procedures applicable for certification of compliance. Daily (or weekly for noncritical metals) analysis of dust samples is required. If more than 3 of the previous 60 samples fail, the owner/operator must notify the Director. The owner/operator is then allowed to burn hazardous waste for up to 720 hours before a revised certification of precompliance must be submitted that revises the estimated enrichment factors and establishes revised precompliance dust metals concentration limits. The revised enrichment factors must be based on testing or engineering judgment using

[79] Under the RCRA hazardous waste regulatory program, EPA considers a hazardous waste to be burned or processed as an ingredient if it is used to produce a product. EPA considers a hazardous waste to be burned or processed for material recovery if one or more constituents of the waste is recovered as a product. Nonetheless, the criteria are the same for determining when a waste is burned (or processed) as an ingredient or for materials recovery versus when it is burned for the partial purpose of energy recovery or conventional treatment.

data or information not considered in the original estimate.

J. Recordkeeping

Over the period of interim status, facilities will be required to generate and maintain data and records designed to demonstrate routine compliance with established limits on operating parameters. These records must be sufficient to allow a RCRA inspector to review and evaluate recent and past operation of the facility for compliance purposes. Records must be maintained for a period of three years or until an operating permit is issued under § 270.66, whichever is later.

VIII. Implementation of Today's Rule

There are three types of treatment, storage, and disposal facilities (TSDF's) which may be affected by today's rule: (1) Facilities which are subject to RCRA permit requirements for the first time as a result of today's rule; (2) facilities which are already operating under interim status; and (3) facilities that have been issued a RCRA permit. The following sections describe the compliance obligations for facilities that have units subject to permitting due to today's rule.

A. Newly Regulated Facilities

Prior to receiving a permit, newly regulated facilities (i.e., facilities which only contain the types of units newly regulated by today's final rule) must qualify for interim status by the effective date of the rule in order to continue managing hazardous wastes in units newly regulated by today's rule. To obtain interim status, the eligible facility must meet three criteria: (1) On the effective date of the BIF rule, the facility must be "in existence" with respect to hazardous waste burning or processing activities; (2) within 90 days of the date of publication, the owner or operator must notify EPA or an authorized State (if not previously required to do so) of the facility's hazardous waste burning or processing activities; and (3) within 180 days of the date of publication, the owner or operator must submit part A of the permit application.

1. Definition of "In Existence".

To meet the definition of an existing facility, the boiler or industrial furnace must either be in operation burning or processing hazardous waste on or before the effective date of the rule, or construction of the facility (including the hazardous waste burning or processing equipment) must have commenced on or before the effective date of the rule. See § 266.103(a)(1)(ii). A facility has commenced construction if the owner or operator has obtained the Federal, State, and local approvals or permits necessary to begin physical construction; and either:

(a) A continuous on-site, physical construction program has begun; or

(b) The owner or operator has entered into contractural obligations—which cannot be cancelled or modified without substantial loss—for physical construction of the facility to be completed within a reasonable time. See § 270.2.

2. Section 3010 Notification

BIF owners and operators burning hazardous waste fuels have already been required to notify of their hazardous waste fuel activities under existing § 266.35 and need not renotify. (See section 3010(a) which allows EPA to waive notification if the information is considered unnecessary.) Although today's rule requires small quantity burners and owners and operators of smelting, melting, and refining furnaces to notify, this notification is not a section 3010 notice and so is not a prerequisite to obtaining interim status.

Facilities which have not submitted a section 3010 notification form to EPA must do so by May 22, 1991. This is done by completing a section 3010 notification form and sending it to the appropriate EPA Regional Office. (See EPA form 8700-12, dated 7/90. See 55 FR 31389, August 2, 1990 for a copy of the form. Notification instructions are set forth in 45 FR 12746.)

3. Part A Permit Application

Newly regulated facilities must also submit a part A permit application to the appropriate EPA Regional Office by August 21, 1991, which is the effective date of today's rule. (See 270.70(a) and EPA Form 8700-23, dated 1/90.)

B. Interim Status Facilities

Interim status facilities that contain units newly regulated by today's rule must file an amended part A permit application under 40 CFR 270.10(g) if they are to continue managing hazardous waste in these newly regulated units. The facilities must file the necessary amendments to EPA by August 21, 1991, the effective date of the rule, or they will have to cease management of hazardous waste in these units. In authorized states, the facility should also send a copy of the submission to the State program.

Today's rule amends § 270.72 to allow interim status facilities to add newly regulated units as a change in interim status without prior Agency approval. The current procedures for the addition of new units in § 270.72(a)(3) require Agency approval prior to making the change. Section 270.72(a)(1) allows the addition of newly listed or identified wastes, and any newly regulated units associated with them, to be added to the part A application without prior Agency approval. Today's addition of § 270.72(a)(6) extends this ability to any newly regulated unit. Today's rule also eliminates the reconstruction limit for the addition of newly regulated types of units. (As noted earlier, the Agency proposed this specific change for boilers and industry furnaces, but realized in the course of implementing the proposal that the problem was more endemic and called for a general solution.) This provision is located in § 270.72(b)(7).

In order to add a unit as a change in interim status under the new § 270.72(a)(6), the owner or operator must file the amended part A permit application by the effective date of the rule that subjects the unit to regulation.

Technical Correction to § 270.73 (f), (g). In the course of developing today's rule, the Agency discovered that particular regulatory provisions dealing with loss of interim status are miscodified. See §§ 270.73 (f), (g). We are amending these provisions in today's notice to match the implementing statutory language. The result will be that neither boilers nor industrial furnaces, nor other units which achieve interim status after Nov. 7, 1984, are subject to the automatic statutory loss of interim status provisions.

The 1984 HSWA amendments provided that each facility which achieved interim status prior to the effective date of the amendments would automatically lose its interim status on a specified date, unless by an earlier specified date the facility applied for a final determination regarding the issuance of a permit (i.e., submitted part B of of its permit application. See RCRA sections 3005 (c)(2), (e)(2). The dates for part B submission and loss of interim status vary according to whether the facility is a land disposal facility, incinerator, or other facility. *Id.* Of relevance to today's technical correction, HSWA provided that interim status for incinerators would terminate five years after the enactment of HSWA (i.e., on November 8, 1989), unless the part B application was submitted within two years after the enactment (i.e., by November 8, 1986); interim status for other non-land disposal facilities would terminate eight years after the HSWA amendments (i.e., November 8, 1992) unless the part B application was submitted within four years (i.e.,

November 8, 1988). See RCRA section 3005(c)(2).

EPA amended its regulations on July 15, 1985 to incorporate these and other HSWA changes. See 50 FR at 28703. EPA's intention in promulgating these amendments was simply to reflect the new statutory provisions; for the most part, the Agency simply codified into the regulations the new HSWA language. *Id.* at 28703. In light of the largely ministerial nature of the regulations, and in view of the need to move quickly to incorporate HSWA, EPA published these 1985 regulations without opportunity for public comment. *Id.* (The D.C. Circuit eventually sustained the legality of these procedures in *United Technologies Corp.* v. *EPA*, 821 F.2d at 714 (D.C. Cir. 1987).)

Section 270.73 (f), (g) sets forth the dates on which interim status for incinerators and other non-land disposal facilities terminates if the facilities fail to submit their part B applications. However, in contrast to the HSWA amendments, the sections by their terms apply to all incinerator and other non-land disposal facilities, instead of being limited only to those facilities which had obtained interim status on November 8, 1984, the date of the HSWA amendments. In fact, it is impossible for units newly subject to regulation after the specified dates for submission of part B permit applications (such as the boilers and furnaces regulated by today's rule, or certain facilities newly subject to regulation under the recent Toxicity Characteristic rule) to comply with the rules as codified. EPA did not intend for these rules to deviate from statutory language. As the preamble to the 1985 codification regulations stated, the Agency simply intended for section 270.73 (f), (g) to reflect the HSWA termination-of-interim status provisions. *Id.* at 28723.

The Agency is today making a technical correction to these sections to correct this mistake, and to avoid the unintended (and possibly illegal) result that large classes of newly regulated units are ineligible for interim status because they failed to submit part B applications at a time they were unregulated. EPA is proceeding without proposing the correction for public comment, and believes that public comment is unnecessary, for the following reasons: (1) This correction simply conforms the language of the regulations to the Agency's original expressed intent in promulgating the 1985 regulations, which themselves were validly promulgated without the opportunity for comment; (2) this correction simply conforms the regulations to HSWA's plain language; (3) the amendment conforms the regulations to the Agency's actual practice in implementing the regulations and RCRA 3005(c)(2); (4) the amendment is necessary to avoid rendering units newly regulated after specified part B permit application submittal dates from being ineligible for interim status even though they meet all of the statutory interim status eligibility criteria; and (5) the amendment can be viewed as an interpetative rule, which does not require prior notice and public comment.

C. Permitted Facilities

Some permitted facilities contain boiler and furnace units that are newly subject to subtitle C regulation as a result of today's rule. These permitted facilities must therefore submit permit modifications to EPA Regional offices, and comply with federal permit modification procedures in order to continue to manage hazardous waste in these units. The modification will be processed under Federal permit modification procedures rather than authorized state procedures because this rule is promulgated under HSWA authority.[80] However, because the permit undergoing modification is most likely a jointly issued EPA-state RCRA permit, a copy of the modification request should also be submitted to the state if it is an authorized state.

1. Amendment to § 270.42(g)

Today's rule contains a new permit modification procedure in § 270.42 for the addition of any newly regulated waste management units used to manage hazardous wastes (*see* § 270.42(g)). This two-step procedure essentially allows the permittee to notify the Agency of its newly regulated boilers and furnaces using the Class 1 permit modification procedures, and to continue to handle hazardous wastes. Subsequently, the permittee must submit a Class 2 or 3 permit modification request to initiate a permanent change to the permit. The self-implementing interim status standards of § 266.103 would apply until the permit was modified using the Class 2 or 3 modification procedures. This new permit modification provision only applies to newly regulated units that were not previously subject to the permitting requirements of subtitle C of RCRA.

Today's new permit modification provision for newly regulated units is essentially identical to the special procedure in § 270.42(g) for newly regulated wastes. The purpose of today's amendment is to extend the same opportunities and procedures that are available for newly regulated waste streams (and any units used to manage them) to those situations where the unit becomes newly regulated in absence of a new waste identification. (See 53 FR 37922, September 28, 1988.) EPA believes that the same rationale applies to newly regulated types of units, and is therefore clarifying this provision in today's rule.

Without the procedure in § 270.42(g), the facility would need to obtain an approved permit modification if the facility were to continue managing hazardous wastes past the effective date of today's rule, which establishes management standards for boilers and industrial furnaces. If the modifications were not approved within six months, these facilities would be barred from handling hazardous wastes, disrupting the ongoing operations of many of these facilities as well as other RCRA facilities that would then need to manage the wastes. As discussed below, EPA believes that the addition of a boiler or industrial furnace to a facility's permit is a Class 3 modification. Because of the time allowed for preparation of the modification request by the facility and public participation in the permit modification procedures, the Agency would be unable to review and make a final determination on the modification request in the six month period.

Today's technical correction rectifies a potential inequity between permitted facilities and newly regulated facilities. Newly regulated facilities are required only to submit part A of the permit application, and submit the RCRA section 3010 Notification form, if necessary, to obtain interim status. Both activities can be easily completed by the effective date of today's rule, allowing them to continue operations, while permitted facilities, who have undergone the scrutiny of the permitting process, would likely be barred from doing so.

2. Procedures to Modify Permits

Under today's new procedures in § 270.42(g), a unit that is "in existence" as a unit by managing hazardous waste on or before the effective date of today's rule must submit a Class I modification by that date. Essentially, this modification is a notification to the Agency that the facility is managing hazardous wastes in these newly regulated units. It could consist of a revised part A application form clearly indicating all activities that are newly

[80] Except, however, the provisions for sludge dryers, carbon regeneration units, infrared incinerators, and plasma arc incinerators are not promulgated under HSWA authority.

regulated as a result of today's rule. As part of the Class 1 procedure, the permittee must also notify the public regarding the modification within 90 days of submittal to the Agency.

Next, within 180 days of the effective date, the permittee must submit a Class 2 or 3 modification request to the Agency. It is at this time that the detailed part B information must be submitted. The Agency believes that the Class 3 permit modification procedures are mostly likely applicable to the addition of boilers or industrial furnace units. The Class 3 modification requires an initial public notice by the facility owner of the modification request, a 60 day public comment period, and an informal meeting between the owner and the public within the 60 day period. After the end of the 60 day public comment period, the Agency will develop a draft permit modification, open a second public comment period of 45 days and hold a public hearing. After the public comment period, the Agency will make a final decision on the modification request.

Today's rule also amends appendix I to § 270.42 to classify the permit modifications for boilers and industrial furnaces. Section L is revised to include boilers and industrial furnaces with incinerators, and to specify additional permit conditions to conform with today's rule (and the conditions added to incinerator permits under the omnibus authority of § 270.32(b)(2). For more information on these permit modification procedures, see 53 FR 37912, September 28, 1988.

D. Addition of Storage Units as Direct Transfer Facilities That Obtain Interim Status

As discussed in section XII.C of part Three of this preamble, the requirements for boilers and industrial furnaces are being promulgated under section 3004(q) of RCRA, which is a HSWA provision. As a result, under section 3006(g), EPA will implement these requirements in both authorized and unauthorized States until the State is authorized to implement these requirements in lieu of EPA. Based on comments received during the rulemaking, EPA is aware that many interim status facilities newly-regulated under this rule may wish to add storage units to their facilities in the future rather than continue direct transfer operations (direct firing of the burner from the transport vehicle). Furthermore, EPA recommends that facilities install tanks and reduce or eliminate direct transfer practices because of the additional hazards associated with the practice. As discussed in more detail below, EPA believes that such units can be added to the facility without awaiting complete permitting.

1. Unauthorized States

Facilities that wish to shift to storage from direct transfer operations and that are located in unauthorized states, will generally be able to add such units to the facility as a change in interim status under 40 CFR 270.72(a)(3). In order to qualify for addition of units under this provision, the facility must: (1) Obtain interim status for the boiler or industrial furnace; and (2) submit a revised part A application to the EPA Regional Office prior to adding the storage units with a justification for the change. Because EPA strongly encourages the discontinuation of direct transfer operations at boilers and industrial furnaces, EPA believes that the addition of storage units at such facilities constitutes a change necessary to meet federal requirements under 40 CFR 270.72(a)(3)(ii). The Regional Office must approve the interim status change, unless it is covered by amended § 270.72(a)(6) just discussed. Although 40 CFR 270.72(b) limits the extent of an addition that can be made during interim status, the addition of associated storage units under today's rule would be exempt from this limitation pursuant to § 270.72(b)(2).

2. Authorized States

Interim status facilities located in authorized states that wish to discontinue direct transfer operations will also generally be able to add such units to the facility pursuant to 40 CFR 270.72(a)(3). In states which are not authorized to implement the HSWA storage requirements for boilers and industrial furnaces, the procedure for adding storage units at new interim status boilers or industrial furnaces is the same as described above for facilities located in unauthorized states. Because EPA is implementing both the rule promulgated today and the associated storage requirements in such states, the federal rules governing changes in interim status apply to both the boilers and industrial furnaces and the addition of associated storage facilities.

In states which have been authorized to implement the HSWA storage requirements for boilers and industrial furnaces, facilities newly regulated under today's rule must comply with the authorized state requirements concerning the addition of associated storage units. In some cases, the authorized state may require the facility to obtain a permit prior to constructing or operating such storage units.

E. Compliance with BIF Versus Incinerator Rules

Existing rules (see § 266.31(c)) require that cement kilns burning hazardous waste that are located in urban areas must comply with the hazardous waste incinerator standards. In addition, existing rules allow owners/Operators of any boiler or industrial furnace to obtain an incinerator permit. These provisions exist because the Agency had not yet established regulatory controls for BIFs. In fact, the statutory provision (section 3004(q)(2)(c)) requiring that cement kilns in urban areas be regulated as incinerators states that the "* * * regulations remain in effect until the Agency develops substantive standards for cement kilns burning hazardous waste." Therefore, on the effective date of the BIF rule, both of these regulatory provisions will be rescinded except as discussed below.

Commenters questioned what regulations should more appropriately apply under three scenarios: (1) If a BIF is operating in interim status under the subpart O, part 265, incinerator standards; (2) if a BIF has already been issued an incinerator operating permit under subpart O, Part 264; and (3) if a BIF has previously submitted a part B application for an incinerator permit and the permit review process has progressed substantially by the effective date of the BIF rule. A BIF currently operating under the interim status incinerator regulations must comply with the BIF regulations on their effective date in lieu of the incinerator regulations so that it is subject to the more stringent BIF rule. A BIF currently operating under an incinerator permit will continue under that permit until it is reviewed or the permit term otherwise expires. At that time, the BIF rule will apply. Although the Agency's general policy is that BIFs are to be regulated only under the BIF rules, we believe permit officials should use their discretion to determine whether to grant exceptions for the third situation given the protectiveness of the standards, and the desirability of avoiding further delay and expense by having to duplicate the permit process under these BIF rules. For example, if a BIF is operating under the incinerator interim status standards but has submitted part B of the incinerator permit and the permit proceedings have progressed substantially, the Director may continue processing the permit (and issue it) under the incinerator standards and use

omnibus authority [81] to add conditions to the permit as necessary to conform with the BIF rule.

IX. Permit Procedures

A. Part B Information

As proposed on May 6, 1987 (52 FR 17015), § 270.22 provides specific information requirements for part B of the permit application. Paragraph (a) requires a trial burn to demonstrate conformance with the performance standards of §§ 266.104 through 266.107, except where the trial burn is waived. Although the regulatory language is substantively the same as proposed, it has been restructured for clarity, by specifying the documentation required to support a waiver from each type of trial burn: DRE trial burn, particulate matter trial burn, metals trial burn, and HCl/Cl_2 trial burn.

In addition, the rule specifics under § 270.22(a)(6) that owners and operators may submit data from previous compliance testing of the device, or from testing of similar boilers or industrial furnaces burning similar wastes, in lieu of a trial burn provided that the data is determined adequate and sufficient documentation of similarity is provided.

Paragraphs (b) through (e) were added to § 270.22 to provide information requirements related to other regulatory provisions being promulgated today for boilers and industrial furnaces. Paragraph (d) requires information describing the automatic waste feed cutoff system. Paragraph (e) requires owners and operators using direct transfer operations to feed hazardous waste from transport vehicles directly to the boiler or industrial furnace to submit information supporting conformance with the direct transfer standards at § 266.111. Under paragraph (e), owners and operators that claim their residues are excluded from regulation under § 266.112 must submit information adequate to demonstrate conformance with those provisions.

B. Special Forms of Permits

As proposed, the final rule adds § 270.66 to subpart F of part 270. This section establishes special forms of permits (see discussion below) for new boilers and new industrial furnaces, and sets forth requirements for the various periods of operation under which a boiler or industrial furnace operates, depending on applicable trial burn requirements. This section also establishes trial burn procedures. Finally, this section discusses special procedures for permitting existing facilities. Although these provisions were described in the preamble to the proposal, at 52 FR 17016, they are described briefly below, in order to highlight minor changes from the proposed requirements.

1. Permits for New Boilers and Industrial Furnances.

Paragraph (b) specifies four operating periods of a permit for a new facility. The provisions have been restructured from those proposed in recognition of the fact that all boilers and industrial furnaces subject to a permit must undergo some type of trial burn. Although a facility could conceivably meet the requirements for a waiver of the DRE trial burn, particulate matter trial burn, metals trial burn, and HCl/Cl_2 trial burn, all regulated facilities must demonstrate conformance with the carbon monoxide, and where applicable, hydrocarbon limits or § 266.104.

In addition, minor revisions to this section have been made to make the permit process for new boilers and industrial furnaces consistent with the way the hazardous waste incinerator permitting process is implemented, i.e., one permit with four periods of operations rather than an individual permit for each period of operation.

Thus, the final rule provides for permits addressing four periods of operation for all boilers and furnaces: The pre-trial burn period, the trial burn period, the post-trial burn period, and the final permit period.

Conditions addressing compliance with each performance standard (or corresponding waiver requirement) will be set in the permit for each period of operation. Applicants must submit a statement with part B of the permit application that suggests the conditions necessary to operate in conformance with the performance standards of §§266.104 through 266.107. For those performance standards for which a trial burn is required, the Director will use his engineering judgment, and consideration of the applicant's proposal, in setting operating conditions in the permit sufficient to meet the performance standards. Once the trial burn data are available, they will be used to modify, if necessary, the final operating conditions in the permit. For those performance standards for which a trial burn demonstration is not required (for example, when the applicant has chosen to comply with Tier I of the metals limitations under § 266.106(b)), appropriate conditions (in the above example, metals feed rate limits specified under § 266.102(e)(4)) will be set for all periods of operation.

The pre-trial burn period begins with initial introduction of hazardous waste into the boiler or industrial furnace and extends for the minimum time required, not to exceed 720 hours of hazardous waste burning, to bring the device to a point of operational readiness to conduct a trial burn. This period may be extended once by the Director if good cause is shown. The trial burn period covers the period when the trial burn is conducted. This period is followed by the post-trial burn period, which extends for the minimum time necessary to allow analysis, data computation, and submission of the trial burn results and modification of the permit by the Director if necessary to reflect the trial burn results. Such modifications will proceed under the permit modification provisions at § 270.42.

Paragraph (c) specifies information that must be included in the trial burn plan. Paragraph (d) establishes trial burn procedures, including criteria for approval of trial burn plans and requirements for submission of trial burn data. Paragraph (e) establishes procedures for selection of POHCs when a DRE trial burn is required. Finally, paragaph (f) establishes the determinations that the applicant must make based on the trail burn results—the data, analyses, and computations that must be submitted to support conformance with the applicable emissions standards.

2. Permit Procedures for Interim Status Facilities.

Applicants owning or operating existing boilers or industrial furnaces will be permitted under § 270.66(g). This paragraph addresses submission of trial burn plans and trial burn data for existing boilers and furnaces. These provisions differ from the proposal in that they specifically require that the applicable trial burn data be submitted and considered prior to permit issuance. This language conforms with the January 30, 1989 change to the hazardous waste incinerator regulations, promulgated at 54 FR 4286 providing clarification of this point.

X. Exemption of Small Quantity Burners

Section 3004(q)(2)(B) of RCRA provides EPA with explicit authority to exempt from regulation facilities that burn small quantities of hazardous

[81] EPA notes that permit writers choosing to invoke the omnibus permit authority of § 270.32(b)(2) to add conditions to a RCRA permit must show that such conditions are necessary to ensure protection of human health and the environment and must provide support for the conditions to interested parties and accept and respond to comment. In addition, permit writers must justify in the administrative record supporting the permit any decisions based on omnibus authority.

wastes if the wastes are burned at the same facility at which they are generated. The Administrator is to ensure that such waste fuels are burned in devices designed and operated in a manner sufficient to ensure adequate destruction and removal to protect human health and the environment.

The Agency has carefully evaluated the risks posed by small quantity burning and concluded that a conditional exemption for small quantity burners should be allowed where hazardous waste combustion poses insignificant risk. A discussion of the original May 1987 proposal and the subsequent October 1989 proposed revisions is presented below.

On May 6, 1987 (52 FR 17034), the Agency proposed to exempt facilities that burn small quantities of hazardous waste that they generate on site because even in the absence of regulatory control, the health risk posed by such burning would not be significant. Eligibility for the exemption would have been base on the quantity of waste burned per month, established as a function of device type and thermal capacity. In order to be exempt, in addition to restricting the quantity of waste burned, a facility was required to notify the Regional Administrator that it is a small quantity burner, limit the maximum instantaneous waste firing rate to 1% of total fuel burned, and refrain from burning acutely toxic waste containing dioxin.

On October 26, 1989 (54 FR 43730), the Agency proposed several revisions to the exemption in the 1987 notice. Rather than establish hazardous waste quantity limits as a function of device type and capacity, EPA proposed quantity limits that vary as a function of effective stack height. The exempt quantities proposed in October 1989, and promulgated today, include several changes to the risk assessment methodology. In particular, the quantities are based on evaluation of risks from hydrocarbon (HC) emissions instead of a PIC/POHC ratio as originally proposed. This change was made to better account for organic emissions from combustion. In addition, the procedures for evaluation of facilities with multiple stacks were revised to reduce over-regulation in these situations.

A. Response to Comments

Numerous commenters to the 1987 and 1989 proposals objected to conservatism of the calculated quantity limits and/or the 1% limit on hazardous waste firing. The commenters stated that the assumptions used in calculating the exempt limits are overly conservative, and that the 1% limit on firing of hazardous waste is based on unrealistic and unjustifiable conclusions. The commenters, however, did not provide data or analysis to support their arguments that assumptions used in the small quantity burner exemption (SQBE) calculations and conditions (including limits on the waste to be burned) for exemption eligibility were too restrictive. Absent technical support for alternate approaches, the Agency continues to believe that the approach proposed in October 1989 is reasonable and appropriate. In addition, using less conservative assumptions to derive the exempt quantities could allow relatively large amounts of hazardous waste to be burned, a result somewhat at odds with the statutory language referring to small "quantities" of hazardous waste. See § 266.108(a)(2) which limits the maximum hazardous waste firing rate at any time to 1% of the total fuel requirements of the device on a volume basis. See also § 266.108(a)(3) which requires the hazardous waste to have a minimum heating value of 5,000 Btu/lb, as-generated, to ensure that the exemption is limited to fuels as intended by section 3004(q)(2)(B) and to ensure adequate destruction of toxic organic constituents.

One commenter requested credit for the presence of air pollution control devices (APCDs). The Agency believes that it is no appropriate to allow credit for APCDs because, without requirements for an oversight of the operation and maintenance of the devices, there is no assurance that collection efficiencies are being met.

Four commenters to the 1987 proposal urged EPA to delete the small quantity burner exemption. These commenters were concerned that the large number of boilers and industrial furnaces burning hazardous waste that do not have to meet any design requirements would have a detrimental effect on human health and the environment. The Agency continues to believe that the exemption is protective of human health and the environment because it is health-based, incorporating quantity limits and conservative assumptions designed to be protective regardless of size and location of the device, or conditions of operation.

Two commenters stated that the exemption should apply to facilities that generate hazardous waste at off-site facilities under the same ownership and operational control. The Agency is concerned, however, that contrary to Congress's intent, this approach could allow a large quantity generator to distribute their hazardous wastes in small quantities to TSDFs (including entities that are parent corporations, joint ventures, subsidiaries of the generator, etc.) that would then burn the wastes without regulation. Consequently, the final rule limits the exemption to facilities that burn only hazardous waste generated on-site.

One commenter to the 1987 proposal urged the Agency to clarify that the 1% limit on the hazardous waste firing is to be applied only to unmixed hazardous waste fuel, not to a mixture of hazardous and non-hazardous fuel. The Agency acknowledges the ambiguity in the proposed rule language and intended the proposal to require that the quantity determination take into account only the hazardous waste fuel prior to mixing with a nonhazardous waste fuel. Today's final rule contains language to that effect and requires the exempt facility to keep records to document that the quantity of hazardous waste prior to mixing with a nonhazardous fuel complies with the quantity limitations.

Six commenters to the 1989 proposal suggested that quantity limits be based on 1% of the total fuel burned and not the stack height, which relies upon dispersion only. The Agency, however, continues to believe that terrain-adjusted stack height is the important criterion, because it is possible that even a 1% limit, with large dispersion and low stack height, could pose a threat to human health and the environment.

B. Basis for Today's Final Rule

In order to calculate allowable exempt quantities under today's rule, worst-case dispersion coefficients (based on incinerator modeling), and an HC unit risk factor of 2×10^{-5} $m^3/\mu g$ (based on a 10^{-5} risk limit) were assumed, as proposed in the October 1989 supplemental notice. Allowable emission rates of hydrocarbons (HCs) were then back-calculated as a function of effective stack height, terrain type, and land use. The assumption used in this back-calculation was an HC concentration in the stack gas of 150 ppmv at 99.99% DRE. Finally, the exempt quantities were calculated using the HC emission rates and an empirically-derived ratio of combustion gas volume to mass of waste. The most conservative allowable emission rates calculated for each stack height were then used as the established quantity limits.

A detailed description of the methodology used to derive quantity limits for the exemption is available in the docket for the supplemental notice.

As mentioned above, the use of effective stack height to determine eligible quantity limits reflects one of the revisions proposed in the October

26, 1989 supplemental notice. The Agency notes that we have not established separate exempt quantity limits for the different terrain types and land use classifications. Rather, the revised quantities are based on assumptions of terrain and land use that result in the lowest (i.e., most conservative) exempt quantities. We believe that this conservative approach is appropriate given that there would be no EPA or State agency oversight of an operator's determination of a facility's terrain and land use classification. Some key assumptions used to arrive at the quantity limits are described below.

EPA evaluated the risks posed by emissions of organic compounds, metals, and hydrogen chloride, the parameters controlled in the substantive regulations promulgated in today's rule.[82] The analysis demonstrates that the risks posed by organic emissions from waste-as-fuel activities are overwhelmingly dominated by the risks posed by carcinogenic (as opposed to noncarcinogenic) waste constituents. Accordingly, the initial evaluation performed in support of the small quantity burner exemption focused exclusively on carcinogenic risks, on the assumption that controls ensuring insignificant risks from organic carcinogenic emissions will ensure protection against non-carcinogenic releases. This assumption was confirmed by evaluating the potential risks from metals and hydrogen chloride that would result when those quantities of waste indicated by the risk analysis for organic carcinogens were burned.

The risks from burning small quantities of hazardous waste are determined primarily by the following factors:

- Composition of the waste stream being burned;
- Toxicities and concentrations of hazardous constituents in the waste stream;
- Destruction and removal efficiency achieved by the device;
- Local meteorology, which influences the amount of dispersion of stack emissions;
- Clustering and size of sources; and
- The effective stack height of the device.

The values of these parameters can and do vary widely. Reasonable, worst-case assumptions were made for these parameters in the Agency's calculations of exempt quantities and evaluation of risks. In the risk analysis, EPA assumed an acceptable cancer risk level of 1.0×10^{-5} to an individual residing for 70 years at the ground level point of maximum exposure to reasonable, worst-case stack emissions. Reasonable, worst-case dispersion coefficients based on effective stack heights were used. The dispersion coefficients were those developed in the risk analysis for the proposed amendments to the hazardous waste incinerator regulations (See 54 FR 43752 and 55 FR 17871). The dispersion coefficients differ by terrain type, land use, and effective stack height. Separate calculations were made for noncomplex and complex terrain and urban and rural land use, resulting in three different sets of quantity eligibility limits for each effective stack height. The rationale for the assumptions used in the risk analysis is discussed below.

1. Composition of Hazardous Waste Stream

Composition data on hazardous waste-derived fuels is scarce. Information gathered by the mail questionnaire survey and other industry contacts indicate that most of the materials burned are organic solvents that are usually classified as hazardous based on ignitability and/or toxicity. The actual concentrations of carcinogens in wastes burned by 21 facilities during EPA's field testing program for boilers and industrial furnaces ranged from 0 to 17% with an average of approximately 4%.

The quantity of PICs measured in EPA test burns was found to be independent of specific POHC species and was a function of hydrocarbon (HC) content of the fuel only. This is supported by comparisons made by MRI of PICs from hazardous waste and fossil fuel combustion. Since it is impossible to differentiate between the PICs from fuel and those from hazardous waste during most tests, it was assumed that the boilers in the EPA test burns were using fuels of 100% HC and all PICs are the result of hazardous waste burning. Additionally, HC emissions are presumed to be an acceptable measurement of PICs; historic data indicate that HC measures from 75 to 95% of all PICs emitted.

The hazardous waste was assumed to contain concentrations of cadmium, chromium, nickel, and lead that were obtained from the state sampling reports of the Keystone Cement Company. Arsenic, barium, and mercury concentrations were based on 90th percentile levels from the Engineering Science Background Document.

2. Toxicity of Hazardous Constituents

The average unit risk of those PICs that were identified during EPA trial burns was 1.0×10^{-5} m^3/μg. However, it is likely that the PICs resulting from incineration under the 99% DRE assumption for the small quantity burner analysis would have a higher toxicity than those measured under the 99.99% DRE in the EPA boiler tests. EPA therefore estimates the unit risk for total HCs to be 2.0×10^{-5} m^3/μg. This corresponds to a carcinogenic potency of $Q_1^* = 0.07$ for hydrocarbons (HC). As explained in the October 1989 notice, this potency factor was used rather than a Q_1^* value of 1.0 for products of incomplete combustion as originally proposed in the May 6, 1987 proposed rule because the Agency was concerned about possible nonconservative features of PIC estimation. (See 54 FR 43730.)

3. Destruction Efficiency

The burner destruction efficiency determines the quantity of unburned hazardous wastes that will be emitted from the stack. Assumed values for boiler and furnace performance were selected based upon review of test data generated in support of this rule and based on the professional judgment of Agency staff members familiar with the destruction and removal efficiencies (DRE) typically achieved by boilers. It was assumed that, in the worst case, boilers and furnaces would only achieve 99% DRE [83] of organic constituents. This represents a very poorly performing combustion device. In fact, as explained previously, most boilers and furnaces can be expected to achieve 99.99% DRE of organic waste constituents even when operated under less than optimal conditions.

4. Assumptions Regarding Metals and Chlorine in Waste Fuels

A similar reasonable, worst-case analysis was performed to evaluate the potential risks posed by emissions of toxic metals (including carcinogens) and hydrogen chloride from small quantity burners. As a result, it was determined that, at the volume cut-offs specified by the exemption and the assumed waste concentrations as discussed above, metals emissions caused by cofiring of hazardous wastes would not pose a significant risk. The analysis also considered hydrogen chloride emissions assuming a chlorine content of 50% in the hazardous waste fuel. The chlorine

[82] U.S. EPA, "Analysis for Calculating a *de Minimis* Exemption for Burning Small Quantities of Waste in Combustion Devices", August 1989.

[83] We note that we assumed 99% DRE to derive the small quantity burner exempt quantities rather than the 99.9% that the owner/operator must assume under the low risk waste exemption of § 266.109 because monitoring of CO is not required for the small quantity burner exemption to ensure that good combustion conditions are maintained. CO monitoring is required under the low risk waiver of the DRE trial burn.

content in actual hazardous wastes seldom exceeds 3%; however, the highest chlorine content measured in a hazardous waste fuel fired in a boiler of which EPA is aware was 43%. Predicted ground level concentrations of HCl also did not exceed the reference aid concentrations.

The assumptions used to determine the effect of local meteorology/dispersion and the clustering of sources (stacks at the facility) are discussed in the following section.

C. How the Exemption Is Implemented

1. Use of Terrain-Adjusted Effective Stack Height

In the 1987 proposal, the Agency used a set of assumptions about local meteorology, dispersion modeling, terrain conditions, etc., to determine eligible quantity limitations. As mentioned above, today's rule uses terrain-adjusted effective stack height along with the most conservative assumptions of terrain and land use to determine quantity limits for exemption eligibility. See § 266.108.

2. Multiple Stacks

As explained in the October 1989 notice, in today's final rule the exempt quantities for a facility with multiple stacks from boilers or industrial furnaces burning hazardous waste are limited according to the following equation:

$$\sum_{i=1}^{n} \frac{\text{Actual Quantity Burned}_{(i)}}{\text{Allowable Quantity Burned}_{(i)}} < 1.0$$

Where:

- n means the number of stacks
- Actual Quantity Burned, means the waste quantity per month burned in stack "i"
- Allowable Quantity Burned, means the maximum allowable exempt quantity for stack "i"

For example, if a site had two stacks with effective stack heights (ESH) of 30 and 10 meters, the following equation would hold:

$$\frac{X}{140} + \frac{Y}{40} \leq 1.0$$

Where:

- 140 and 40 are the exempt quantities from § 266.108 for stack heights of 30 and 10 meters, respectively
- X is the waste quantity burned in the device with the 30 meter stack
- Y is the waste quantity burned in the device with the 10 meter stack

In this example, if Y is burning 15 gallons/month, then X could burn no more than 87.5 gallons/month.

D. Wastes Ineligible for Exemption

Boilers and furnaces burning hazardous waste fuels containing or derived from any of the following dioxin-containing hazardous wastes are not eligible for the exemption: EPA Hazardous Waste Nos. F020, F021, F022, F023, FO26, and F027. See § 266.108(a)(4). Given the toxicity of these wastes, EPA does not believe it is appropriate to exempt facilities burning them from regulation. Hazardous waste fuels containing or derived from these dioxin-containing wastes must be burned at a 99.9999% destruction and removal efficiency (DRE). We cannot expect boilers and furnaces to achieve that level of DRE when operating outside of the Agency's regulatory system.

E. Exemption of Associated Storage

Hazardous fuel storage practices prior to burning vary from site to site. Many facilities burning relatively large quantities of hazardous waste fuels hold the fuels in a storage system and then pump the waste fuels through a dedicated line into the combustion zone of the boiler. Other facilities mix hazardous waste fuels with other fuels (typically virgin fuel oil) in a storage/mixing tank prior to burning the blended material. These tanks are not feasibly emptied of hazardous waste every 90 days and so are in most cases ineligible for the generator accumulation provisions in § 262.34.

Under today's rule, facilities storing unmixed hazardous waste fuels are responsible for complying with all applicable standards for the storage of the hazardous waste fuel. Owners and operators that are eligible for the small quantity burner exemption and who mix toxic hazardous waste fuels would, however, be exempt from the storage standards after such mixing, as proposed. See § 266.101(c)(2). The basis for this exemption is discussed below.

The Agency is promulgating an exemption for storage of such storage/mixing tanks (for small quantity burners) in order for the small quantity burner exemption in section 3004(q)(2)(B) to have a practical application. Congress evidently envisioned a class of facilities capable of burning small amounts of hazardous wastes safely absent regulation and viewed such burning as a superior means of managing these small amounts of waste. Furthermore, assuming that small quantity waste storage is conducted safely, the Agency assumes that Congress also envisioned exemption of the storage since permitting storage would discourage safe on-site burning just as much as regulating the burning itself.

We believe that storage of small amounts of hazardous wastes mixed with virgin fuels would pose no significant incremental risks over storage of the virgin fuels. The monthly volumes of hazardous waste fuel covered by the small quantity burner exemption, for example, represent less than 1% of the fuel flow rate through these tanks. Under these circumstances, we think the statutory exemption can reasonably be read to encompass this limited class of storage practices as well.

We note further that the Agency is studying other situations where hazardous waste-containing mixtures may not be appropriately subject to regulation and will consider whether to issue rules addressing the issue generically. It appears to us justifiable to address the question for the limited class of burning facilities in advance of other types of situations because Congress has singled out small quantity burning facilities for exemption where appropriate. We note further that to the extent these small quantity waste-virgin fuel tanks are underground storage tanks (as defined in RCRA section 9001(1)), they would be subject to regulation under Subtitle I if they contain petroleum.

F. Notification and Recordkeeping Requirements

As proposed in the October 26, 1989 supplemental notice, the final rule requires (conditionally) exempt small quantity burners to provide a one-time written notification to EPA (see § 266.108(d)) of their status as a small quantity burner and a certification that they are in compliance with the requirements of § 266.108. To assist enforcement efforts, the owner or operator must also indicate in the notification the maximum allowable quantity that may be burned per month as provided by § 266.108(a)(1). In addition, the final rule requires small quantity burners to keep records to document that they comply with the conditions of the exemption including: quantities of hazardous waste burned per month; quantities of hazardous waste and other fuels burned at any time to demonstrate conformance with the 1% hazardous waste firing rate limit; and heating value of the hazardous waste.

XI. Exemption of Low-Risk Waste from DRE Standard and Particulate Matter Emission Standard

The final rule defines two types of "low-risk" wastes: (1) waste that is low risk with respect to feed rate of hazardous (i.e., appendix VIII, part 261) nonmetal constituents and, thus, is exempt from the requirement to demonstrate 99.99% DRE; and (2) waste that is low risk with respect to both nonmetal constituents and metals (i.e., the waste meets the Tier I feed rate limits for metals provided by § 266.106(b)) and, thus, is exempt from both the DRE standard and the 0.08 gr/dscf particulate standard. See § 266.109.

The following sections explain these exemptions and how they operate.

A. Exemption from Compliance with the DRE Standard

In the May 6, 1987 proposed rule, the Agency proposed a risk-based, site-specific waiver of the DRE trial burn and the flue gas CO limits for facilities burning waste that poses insignificant health risks absent those controls (52 FR 17002). Today's final rule retains the exemption from the DRE standard, but requires the facility to monitor CO continuously and to comply with the Tier I PIC controls of § 266.104(b) (i.e., CO cannot exceed the 100 ppmv limit on an hourly rolling average basis).

In the 1987 proposal, EPA explained the basis for the DRE exemption for boilers or industrial furnaces that burn low-risk waste (52 FR 17002). After further consideration, however, the Agency believes that controls on emissions of PICs are needed. This is because a waste with low levels of toxic organic constituents can nonetheless pose signficant health risk if it is burned under poor combustion conditions conducive to formation of PICs. Toxic PICs can form from poor combustion of nontoxic organic compounds.

The final rule does not allow a burner to operate under the alternative CO limit provided by § 266.104(c), which allows higher CO levels provided that HC levels do not exceed 20 ppmv, because the Agency believes that only those devices operating under best demonstrated technology combustion conditions should be granted an exemption from the DRE requirement. (We note that this is consistent with the CO restriction for the automatic waiver of the DRE trial burn for boilers operating under the special operating conditions provided by § 266.110.) Devices operating at CO levels above 100 ppmv on an hourly rolling average are not operating under best demonstrated technology combustion conditions even if they can show that hydrocarbon levels do not exceed 20 ppmv (or the HC limit established under § 266.104(f)). As discussed at proposal (see 54 FR 43723 c.3), the 20 ppmv HC level represents a demarcation between good and poor combustion conditions. HC levels under best demonstrated technology combustion conditions would generally be less than 5 ppmv on an hourly rolling average basis.

B. Exemption from Compliance with the Particulate Standard

Today's final rule provides a waiver of the particulate standard for facilities that both obtain the DRE standard waiver and meet the Tier I requirements for all metals. (Because the PM standard guards against risks from both adsorbed organic compounds and metals, only facilities with waste that is low risk for both organic constituents and metals are eligible for the PM waiver.)

The basis for imposing a particulate standard on boilers and industrial furnaces firing hazardous waste, as explained in the October 26, 1989 supplemental notice (54 FR 43719), is primarily the concern over adsorption of toxic organics and metals onto the emitted particulates. Consequently, the Agency believes that an exemption from the particulate standard for boilers and industrial furnaces is appropriate provided that the facility can demonstrate that emissions of toxic organics and metals do not pose unacceptable human health risks.

C. Eligibility Requirements

Three eligibility requirements for the low-risk waste exemption were detailed in the 1987 proposed rule. Many commenters objected to the first of these requirements, that 50 percent of the fuel fired in the boiler or industrial furnace must consist of oil, natural gas, coal, or other fossil fuels derived from these fuels. These commenters requested that EPA allow the cofiring of various other fuels, including tall oil, off-specification fuel oils, and wood chips.

Although some of these fuels may provide a hot, stable flame that will support good combustion, the Agency is concerned that others may not. In today's rule, the Agency is requiring for this exemption the same conditions on the primary fuel as required for the special operating requirements for boilers seeking the automatic waiver from a DRE trial burn (see section II.A.3 of part three of this preamble): a minimum of 50% of the fuel fired to the boiler must be high quality "primary" fuel consisting of fossil fuels or fuels derived from fossil fuels, tall oil, or, if approved by the Director on a case-by-case basis, other nonhazardous fuel comparable to fossil fuel, and all such primary fuels must have a minimum as-fired heating value of 8,000 Btu/lb.

The two remaining eligibility requirements, that the hazardous waste must have an as-fired heating value of at least 8,000 Btu/lb, and that the waste must be fired into the flame zone of the combustion chamber, are being promulgated as proposed in 1987. The reasons for these requirements are the same as discussed in section II.A.3 of part three of this preamble in the context of the automatic waiver of the DRE trial burn for boilers.

D. How the Low-Risk Waste Exemption Works

1. Constituents of Concern

The low-risk waste exemption is intended to exempt a waste from either or both the DRE standard and the particulate standard if the owner/operator demonstrates that, absent regulatory controls (i.e., under a reasonable, worst-case emissions scenario), emissions from the facility will not result in ambient levels of toxic organic compounds and/or metals that exceed acceptable levels. The organic constituents of concern are the hazardous organic compounds listed in appendix VIII of 40 CFR part 261 and the metals of concern are the 10 regulated metals.

2. Estimation of Worst-Case Emissions

The requirements for estimating worst-case emissions were discussed in the May 1987 proposed rule and are being promulgated in today's rule with slight modifications.

To estimate reasonable, worst-case emissions of toxic organic constituents in hazardous waste fuel, an owner or operator must: (1) Identify every nonmetal appendix VIII constituent that could reasonably be expected to be found in the waste; and (2) assume a reasonable, worst-case destruction and removal efficiency (DRE) for each constituent of 99.9 percent in calculating the worst-case emissions (by considering waste concentration and feed rate) from the stack for each constituent. This assumed DRE of 99.9 percent is less conservative than the proposed 99 percent assumption in the 1987 notice. The Agency is making this change in response to the many commenters who objected to the 99 percent DRE assumption. Specifically, the commenters' objection was that 99.9 percent was the worst DRE measured by the Agency in its nonsteady-state testing of boilers operated under intentionally

upset (i.e., high CO and smoke) conditions. The Agency believes that changing the assumed DRE from 99 percent to 99.9 percent is justified because today's rule, unlike the 1987 proposal, does not provide a waiver of the continuous CO emission monitoring (CEM) requirements. Compliance with continuous CO monitoring requirements will ensure that these devices do not operate under upset conditions and will achieve a DRE of at least 99.9 percent.

The Agency has eliminated the proposed requirement that emissions of products of incomplete combustion (PICs) be estimated using a ratio of PICs to principal organic hazardous constituents (POHCs). As explained in the April 1989 notice (54 FR 43730), use of the PIC:POHC ratio may not be a conservative method for estimating PIC emissions.

An estimate of worst-case emissions is not necessary for metals. To be eligible for the exemption from the particulate standard, the waste must be low-risk with respect to organic compounds and must meet the Tier I metals feed rate limits. See § 266.106(b). Those metals feed rate limits assume that all metals fed into the device are emitted.

3. Dispersion Modeling

Dispersion modeling must be used to predict the maximum annual average ground level concentration of each toxic nonmetal compound in the waste using procedures identical to those required to implement the Tier III metals controls. See 266.109(a)(2)(iii)(A).

4. Acceptable Ambient Levels

Predicted maximum annual average ground level concentrations of each toxic nonmetal compound may not exceed levels the Agency proposed as acceptable for purposes of this rule. The acceptable ambient concentrations were developed for carcinogenic and noncarcinogenic compounds using the same procedures used to develop the RACs and 10^{-5} RSDs for the 10 toxic metals.

To demonstrate that the noncarcinogenic nonmetal compounds listed in appendix IV of the rule do not pose an unacceptable health risk, the predicted ground level concentrations cannot exceed the levels established in that appendix.

To demonstrate that the carcinogenic nonmetal compounds listed in appendix V of the rule do not pose an unacceptable health risk, the sum of the ratios of the predicted ground level concentrations to the levels established in the appendix cannot exceed 1.0. This is because the acceptable ambient levels established in appendix V are based on a 10^{-5} risk level. To ensure that the summed risk from all carcinogenic compounds does not exceed 10^{-5} (i.e., 1 in 100,000), the sum of the ratios described above must be used.

To demonstrate that other compounds for which the Agency does not have adequate health effects data to establish an acceptable ambient level are not likely to pose a health risk, the predicted ambient level cannot exceed 0.1 $\mu g/m^3$. This is the 5th percentile lowest reference air concentration for the compounds listed in appendix IV of the rule.

5. Constituents with Inadequate Health Effects Data

At the time of the 1987 proposal, the Agency had data adequate for establishing RACs and RSDs for only about 150 of the over 400 compounds listed in appendix VIII, part 261. In the preamble to the May 1987 proposal, EPA stated that, to be eligible for the exemption, health effects data (i.e., RACs and RSDs) must be available for each constituent in the waste. In response to comments concerning the inadequacy of current health effects data to establish a RAC or RSD for a large number of compounds, we have established in today's rule a conservative RAC value for such constituents determined as the 5th percentile lowest RAC for all of the nonmetal appendix VIII, part 261, constituents—0.1 $\mu g/m^3$ (see note to appendix IV of the final rule). EPA believes that this approach will be protective of human health and the environment and will not unreasonably restrict owners/operators from eligibility for the exemption.

XII. Storage Standards

A. Permit Standards for Storage

Under the administrative controls for hazardous waste marketers, burners, and blenders of hazardous waste burned in boilers and industrial furnaces promulgated on November 29, 1985, and codified in subpart D of part 266, EPA subjected existing burner storage facilities (effective May 29, 1986) to only the interim status standards of part 265. The permit standards of part 264 were not applied to existing storage facilities in order to avoid two-stage permitting, given that today's rule for permitting boiler and industrial furnace facilities was under development at that time. The Agency wanted to avoid requiring a boiler or industrial furnace owner or operator to obtain a permit for their hazardous waste fuel storage facility and to soon thereafter obtain another permit for operation of the boiler or industrial furnace under today's rule.

Today's rule does, therefore, subject such existing burner storage facilities to the permit standards of part 264. See § 266.101(c).

Numerous comments on the May 6, 1987 proposed rule to subject burner storage units to the permit standards of part 264 agreed that the interim status standards currently in force are not adequate and permit standards are needed. Several commenters were concerned about the potential mishanding of waste fuels stored on-site in and around residential areas. One commenter requested that preburn transport and storage regulations for hazardous waste apply to all hazardous waste blends, mixtures, or diluted hazardous materials.

With the promulgation of today's rule, all hazardous waste storage units will be subject to applicable part 264 and 265 standards. Since hazardous waste storage units standards are designed to be protective of human health and the environment regardless of the location of the facility, on-site storage associated with boilers and industrial furnaces burning hazardous waste is not restricted to areas in or around residential areas. These standards apply to the storage of any hazardous waste blends, mixtures, or dilutions that will be burned at these facilities, due to the "mixture rule" of 40 CFR 261.3. Whereas nonindustrial boilers were previously prohibited from burning hazardous wastes unless they were operated in conformance with the incinerator standards of subpart O of parts 264 or 265, today's rule eliminates the distinction between industrial and nonindustrial boilers. Consequently, today's rule establishes standards that are protective when hazardous waste is burned in any boiler.

One commenter recommended that the final rule allow the 90-day "on-site" accumulation provision to include wastes received at the BIF from off-site, company-owned locations. The 90-day accumulation provision referred to by the commenter is contained in 40 CFR 262.34(a) and only applies to generators of hazardous wastes. The Agency does not intend to apply this provision to hazardous waste treatment, storage, or disposal facilities.

B. Consideration of Requirement for Liquid Waste Fuel Blending Tanks

In the October 26, 1989 supplemental notice, the Agency requested comment on a requirement that all boiler and industrial furnaces use blending and surge storage tanks (i.e., other than other

modes of waste fuel transfer) to avoid flow interruptions and waste stratification which could affect the ability of a combustion device to meet performance standards. The majority of commenters opposed requiring blending and surge storage tanks for BIFs and suggested that such a requirement would not be necessary to ensure compliance with performance standards. Several commenters believed that a uniform requirement for tanks, containers, and/or surge tanks may not be universally appropriate. These commenters noted that some secondary materials such as lead acid batteries, flue dust, and various scraps and slags cannot be transferred to furnaces from a tank or container system. Another commenter suggested that in some instances, such as feeding incompatible wastes, direct transfer may be preferable due to health and safety concerns. A few commenters concurred with this view, but felt that storage and blending tanks should be required in all other instances. One commenter suggested that storage tanks should be required only if transport vehicles do not meet Department of Transportation requirements, secondary containment is not used in transfer operations, and if operations are not covered by site-specific contingency or SPCC plans. One commenter agreed that hazardous wastes should generally be fed from storage tanks and supported a final rule that would allow a "window of opportunity" to install storage tanks, thus providing an incentive for a company to reduce their reliance on direct burning from transport vehicles.

In today's rule, the Agency is not requiring storage and blending tanks for boilers and industrial furnaces burning hazardous waste because we continue to believe that such tanks are not requisite to demonstrating conformance with the emission standards of §§ 266.104 through 266.107. However, as indicated in the supplement to the proposed rule, EPA believes that facilities that install blending and storage tanks may be better able to control flow interruptions and waste stratification. Consequently, boilers and industrial furnaces with blending and/or storage tanks may operate with greater efficiency and thereby may more readily meet performance standards for emissions.

We also note that, once an owner/operator is in interim status, the part A application may be revised to convert from direct transfer operations to the use of storage units. See discussion in section VIII.D of Part Three of the preamble.

C. Standards for Direct Transfer Operations

In the October 26, 1989, supplement to the proposed rule, EPA identified permitting authorities' concerns about the practice of feeding hazardous waste fuels directly from transport vehicles to boilers and industrial furnaces. These concerns included: (1) The potential for fires, explosions, and spills during transfer operations; and (2) the stratification of waste in the transport container and the potential for waste fuel flow interruptions which, in turn, could affect the ability of the burner to consistently provide efficient combustion of the waste. EPA requested comment on two approaches to regulate direct transfer operations. One approach was for permit writers to use the RCRA omnibus authority to establish additional permit conditions as necessary to ensure adequate protection of human health and the environment from such operations. The other approach was to require that facilities burning hazardous waste use blending and surge storage tanks to avoid the flow interruptions and waste stratification, which would address permit writers' concerns.

In the April 27, 1990 **Federal Register** notice, EPA noted that commenters on the October 1989 notice stated that controls on transfer operations were needed during interim status. As a result, the Agency requested comment on the need and appropriateness of regulating direct transfer operations under interim status standards for containers and tank systems of subparts I and J of part 265. EPA received numerous comments in response to these solicitations. The majority of commenters recommended that EPA allow direct transfer with proper controls and restrictions, such as: (1) Allow direct transfer approval for facilities granted interim status or a RCRA operating permit; (2) establish direct transfer standards similar to subparts I and J of 40 CFR part 265 for facilities with a contingency or SPCC plan; and (3) allow direct transfer during test burns alone. Some respondents suggested that instead of allowing direct transfer, EPA should require storage and blending tanks for all facilities burning hazardous waste.

The Agency is today promulgating standards regulating direct transfer operations. See § 266.111. The Agency believes that these standards will adequately address potential risks to human health and the environment.

EPA considers direct transfer operations to be a part of the hazardous waste firing system, not a storage activity. Hence, facilities that are not subject to the burner standards of §§ 266.102 (permit standards) or 266.103 (interim status standards) are not subject to the direct transfer standards. Examples of facilities not subject to the direct transfer standards are small quantity burners exempt from regulation under § 266.108, metals reclamation furnaces deferred under § 266.100(c), and coke ovens exempt under § 266.100(b)(4).

These direct transfer standards reference extensively the subpart I container standards and the subpart J tank standards of parts 264 and 265 and will apply equally to facilities operating under a permit as well as those operating under interim status. The regulations address the area in which transport vehicles are located and piping and other ancillary equipment (termed "direct transfer equipment" in today's rule) used to transfer waste from the vehicle to the burner. The standards provide general operating requirements and controls on equipment integrity, containment and detection of releases, response to leaks or spills, design and installation of new direct transfer equipment, and closure.

1. General Operating Requirements

Facilities that directly transfer hazardous waste to boilers and industrial furnaces from transport vehicles must comply with general operating requirements that specify safe management practices for handling incompatible wastes, spill prevention controls, and automatic waste feed cutoffs. These general operating requirements apply to both containerized and bulk hazardous waste. General performance standards for safe operation in today's rule include measures for conducting direct transfer operations such that fire, explosion, violent reactions, and other conditions that could threaten human health or the environment do not occur. Direct transfer from open-top containers is prohibited. Direct transfer equipment, which is any device that distributes, meters, or controls hazardous waste flow between a transport vehicle and a BIF, must also be closed except when necessary to add or remove the waste. Safe management practices for handling incompatible wastes are also required. Transport vehicles or direct transfer equipment holding ignitable or reactive hazardous waste must be located at least 50 feet from the receiving facility's property line.

2. Inspections and Recordkeeping

All equipment and areas where direct transfer occurs must be inspected hourly for leaks during direct transfer operations. Control equipment, direct transfer equipment monitoring data, and other equipment ensuring compliance with direct transfer standards must also be inspected hourly. Finally, the rule provides recordkeeping requirements to document results of inspections.

We note that only daily inspection is required under subpart J of parts 264 and 265 for tank systems (i.e., piping, valves and other direct transfer equipment). EPA is requiring hourly inspections of direct transfer operations because, unlike tank systems that use hard piping, direct transfer operations use flexible hoses and quick change coupling devices that have a greater potential for leaks or spills.

3. Equipment Integrity

Equipment integrity requirements address direct transfer equipment (e.g., piping or conveyors from the transport vehicle to the burner). The standards promulgated today require the transfer of waste to other equipment if equipment holding hazardous waste leaks or is in poor condition, and specify safe management practices for transferring wastes to other containers or transport vehicles. An assessment is required of existing direct transfer equipment that does not meet the secondary containment requirements discussed below to determine if the direct transfer equipment is leaking or unfit for use and must be certified by a qualified, registered professional engineer. If equipment is found to be leaking or unfit for use, the owner/operator must comply with the requirements addressing responses to leaks or spills.

4. Containment and Detection of Releases

The rule requires secondary containment for underground direct transfer equipment. See § 266.111(e)(1). Inspections and leak tests of direct transfer equipment and recordkeeping requirements are also required. Existing direct transfer equipment subject to the secondary containment requirements of § 265.193 (by reference in § 266.111(e)(1) of today's rule) must comply with those secondary containment requirements within two years after the effective date of the rule. EPA believes that two years (30 months from promulgation) is a reasonable amount of time to enable owners and operators to retrofit existing equipment with secondary containment as necessary given that direct transfer operations generally do not involve the use of extensive equipment subject to secondary containment.

5. Response to Leaks or Spills

Action required to be followed in the event of a leak or spill are based on those required in subpart J, part 265. See § 266.11(e)(5). Should a leak or spill occur, equipment use must cease (to prevent the flow or addition of wastes into the direct transfer equipment or secondary containment system) and the system must be inspected to determine the cause of the release. The waste must be removed from the direct transfer equipment or secondary containment system and visible releases to the environment must be contained. In the event of a leak or spill, the Director must be notified of the incident in writing. Secondary containment, repair, or closure of the leaking equipment, and certification of major repairs must be provided.

6. Design and Installation of New Equipment

New direct transfer equipment must meet the design and installation standards specified in today's rule as defined in § 265.192 for tank systems. See § 266.111(e)(4) in today's rule referencing that section. The standards include: Specifications for assessing the design of new direct transfer equipment; backfill requirements for new underground direct transfer equipment; tightness tests; equipment support and protection requirements; corrosion protection; and written certification that these requirements have been met.

7. Closure

Today's rule applies by reference the closure requirements for direct transfer equipment provided by § 265.197 (except paragraphs (c)(2) through (c)(4)). See § 266.111(e)(6). That section requires the removal or decontamination of waste residues, system components, and contaminated soils, structures, and equipment.

XIII. Applicability of the Bevill Exclusion to Combustion Residues When Burning Hazardous Waste

Under the Agency's existing regulations, wastes that are derived from the treatment of listed hazardous wastes are also considered to be hazardous unless and until they are delisted (see 40 CFR 261.3(c)(2) and (d)(2)). The combustion or processing of hazardous waste in a device that uses elevated temperatures as the primary means to change the chemical, physical, or biological character or composition of the hazardous waste, is a type of treatment no matter what type of device is used in the process, or for what purpose the waste is burned or processed. Accordingly, under the Agency's existing rules, residues from thermal combustion (or processing) of listed hazardous wastes remain the listed hazardous wastes until they are delisted.

When the device burning hazardous waste is (1) a boiler burning primarily coal or other fossil fuels, (2) an industrial furnace processing primarily ores or minerals, or (3) a cement kiln processing primarily raw materials, the applicability of the Bevill exclusion must be considered (see RCRA section 3001(b)(3)(A)(i-iii)). The Bevill exclusion refers to residues resulting from burning or processing certain materials whereby the residues are not considered to be hazardous waste at this time because they require special study to determine whether they should be regulated under subtitle C.

To determine whether the Bevill exclusion continues to apply when the devices described above burn or process hazardous waste, today's final rule promulgates the case-by-case determination involving a two-part test as discussed in the October 1989 supplement to the proposed rule. See § 266.112. Under this test, owners and operators must determine on a site-specific basis whether the co-combustion of hazardous waste has significantly affected the character of the residue. The residue is considered to be significantly affected if both: (1) Concentrations of toxic (appendix VIII, part 261) compounds in the waste-derived residue are significantly higher than in normal (i.e., without burning/processing hazardous waste) residue; and (2) toxic compounds are present in the waste-derived at levels that could pose significant risk to human health. If the case-by-case determination demonstrates that the residue has been significantly affected (or if the owner or operator does not obtain data and information adequate to support a demonstration that the residue has not been significantly affected), such derived-from residues are subject to regulation as hazardous waste because the residues are no longer the type of material Congress commanded the Agency to study before regulation. Such residues are no longer deemed to be from processing ores or minerals, burning fossil fuels, or making cement. Rather, they are from treating hazardous waste.

The following sections discuss the basis for applying the Bevill exclusion to derived-from residues, the evolution of

the Agency's interpretations on the applicability of the Bevill exclusion to waste-derived residues, and how today's case-by-case determination works.

A. Basis for Applying the Bevill Exclusion to Derived-From Residues

A number of comments questioned whether the Agency has the legal authority to determine that some residues from coprocessing hazardous waste with Bevill raw materials could remain excluded under the Bevill amendment pending completion of the section 8002 studies. Because the Agency's previous determination of this question (50 FR 49190 (Nov. 29, 1985)) could have been more fully explained, the Agency has decided to reopen the question in this rule and to respond to the public comments.

The Agency's consistent position on this issue is that so long as the processing of hazardous waste does not significantly affect the character of the waste residues as high volume/low hazard, then those wastes can remain excluded under the Bevill amendment. Put another way, the wastes can potentially remain the type of material that Congress told the Agency to study before imposing subtitle C regulation.

Instead of focusing on the question of whether coprocessing hazardous waste affects the composition of the residues from a Bevill device, some commenters would have it that the mixture and derived-from rules apply to the residues, so that the residues are subject to subtitle C (assuming listed wastes are coprocessed) regardless of the actual effect of burning hazardous waste. At the least, the statute does not compel this result. In the case of utility boilers burning fossil fuels, the statute states explicity that wastes "generated primarily from the combustion of coal or other fossil fuels" is to be excluded. See section 3001(b)(3)(A)(i). Thus, some type of co-combustion is expressly authorized. With respect to the two remaining categories of Bevill waste (wastes from processing ores and minerals and cement kiln dust), the Bevill amendment (section 3001(b)(3)(A)) does not use the term "primarily", but does not expressly address the question of whether the exemption applies when the residues are produced in part from burning hazardous waste. Thus, read literally, dust from a cement kiln that burns hazardous waste along with normal raw materials could be termed "cement kiln dust." [84]

If there were doubt on this point, the Agency is convinced that it is dispelled by the 1984 amendments. Sections 3004(q)(1) and 3010(a) both state explicitly that "(n)othing in this subsection shall be construed to affect or impair the provisions of section 3001(b)(3)" (the Bevill amendment). This language would be meaningless unless it allowed some residues from Bevill devices burning hazardous wastes (specifically hazardous waste fuels) to remain within the scope of the Bevill amendment. Although commenters argued, based on passages from the legislative history, that the provision should not be given this natural meaning, the Agency does not find the argument persuasive. Rather, the legislative history appears to state that Bevill devices burning hazardous waste fuels will be subject to the emission standards developed pursuant to section 3004(q). See H. Rep. No. 198, 98th Cong. 1st Sess. 41; S. Rep. No. 284, 98th Cong. 1st Sess. 37. Today's rules accomplish that result.

At the same time, the Agency is concerned about reading the Bevill amendment in a manner that gives it undue scope, such as by allowing Bevill devices to serve as a dumping ground for other hazardous wastes. We do not view the interpretation adopted today as allowing the exemption to have undue scope. In the first place, emissions from the Bevill device itself are regulated. Second, the facility becomes subject to the facility-wide corrective action provisions of sections 3008(h) and 3004(u) by virtue of regulation of the combustion activity. Thus, potential problems relating to mismanagement of waste residues must be evaluated and addressed no later than during the permitting process.

Most importantly, the Agency believes that the reading adopted strikes a reasonable balance between the terms of the Bevill amendment and other provisions and regulations relating to hazardous waste management. A reading that would disqualify residues from the Bevill amendment if any hazardous waste is burned in the device would exalt form over substance by barring from Bevill eligibility a residue that was not discernably affected by burning hazardous waste. Given that such material could be exactly the high volume/low hazard residue that Congress told the Agency to study before regulating, EPA does not agree with an interpretation that automatically forecloses it from Bevill status.[85] In addition, use of Bevill devices for combusting hazardous wastes provides needed treatment capacity for a number of hazardous wastes, and the Agency would be reluctant to adopt an interpretation that discouraged safe processing of hazardous waste by necessarily imposing hazardous waste disposal costs on residues that might not be affected by the hazardous waste combustion.

For all of these reasons, therefore, the Agency is reading the statute in a way that does not automatically disqualify residues from coprocessing hazardous wastes in Bevill devices from eligibility for Bevill exempt status.

B. Evolution of Interpretations

To determine whether the Bevill exclusion continues to apply when the devices described above [86] burn hazardous waste fuel, the Agency stated in 1985 (see 50 FR 49190 (Nov. 29, 1985)) that the exclusion continues to apply as long as the hazardous waste is burned for energy recovery (i.e., not for destruction). The underlying principle for this determination was that when hazardous waste is used as fuel, the character of the residue would continue to be determined by the Bevill material (e.g., coal, ores or minerals, or cement raw materials) being burned or processed. Thus, the residue should remain within the Bevill exclusion pending special study before it could be regulated under subtitle C.

In the May 6, 1987 proposed rule (52 FR 17012–013), the Agency suggested refining these determinations to address residues from industrial furnaces processing ores or minerals and that also process hazardous waste for materials recovery, and residues from cement kilns that may process hazardous waste as an ingredient.

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[84] EPA does not accept the argument that the omission of the word "primarily" in regard to ore/mineral processing wastes and cement kiln dust means that the residues must come exclusively from processing raw materials exclusively. This type of negative inference is not a compelled reading of the statute, and the legislative history to the provision in fact indicates that Congress used the term "primarily" with respect to utility wastes to overrule a 1978 EPA proposed regulation on the scope of utility wastes, rather than to affect the scope of the remaining two Bevill categories. 126 Cong. Rec. 3363 (1980).

[85] EPA notes that in assessing whether residues have been affected by hazardous waste burning it is using a somewhat more rigorous test for assessing inorganic contamination—use of the TCLP rather than the synthetic acid rain leaching procedure—than it used in making the high volume/low hazard determination for mineral processing wastes. 54 FR at 36630 (Sept. 1, 1989). The Agency views this as an additional safeguard to assess the possible effect coprocessing of hazardous waste may have had on the residues.

[86] This is, a boiler burning primarily coal, an industrial furnace processing primarily ores or minerals, or a cement kiln processing primarily raw materials.

Under that proposal, such residues would remain within the Bevill exclusion provided that at least 50 percent of the raw material fed to the device consisted of a virgin ore, mineral, or normal raw material. However, residues from devices burning hazardous waste for the purpose of destruction (i.e., for neither energy nor materials recovery) would not qualify for the Bevill exclusion.

The Agency has evaluated these interpretations of the applicability of the Bevill exclusion to waste-derived residues in light of its stated principle that residue that results from coburning hazardous waste and Bevill raw materials should remain within the Bevill exclusion provided that the character of the residue is determined by the Bevill material (i.e., the residue is not significantly affected by the hazardous waste). As discussed in the October 1989 supplement to the proposed rule (54 FR 43733–36), the Agency does not believe that its data base for making these interpretations is sufficient to ensure that, in every case, the residue would not be significantly affected by the hazardous waste. Further, the Agency has reconsidered whether the interpretation that residues generated by the subject devices when burning waste for destruction are not within the Bevill amendment is consistent with the stated principle. Consequently, the Agency proposed in the supplemental notice to require case-by-case determinations of the effect of burning hazardous waste on residuals. That case-by-case approach is promulgated in today's rule.

C. Case-By-Case Determinations

We discuss below which devices are eligible for the Bevill exclusion of residues and how the two-part test works for determining whether combustion of the waste has significantly affected the residue.

1. Eligible Devices

Until further studies were completed, Congress intended to exclude from subtitle C regulation residues from: (1) Devices that burn primarily fossil fuel; (2) industrial furnaces that process ores or minerals; and (3) cement kilns. As the Agency reads these provisions, to be eligible for exclusion from subtitle C regulation under the Bevill amendment, the waste-derived residue must be generated from: (1) A boiler burning primarily coal [87] (2) an industrial furnace processing primarily ores or minerals (otherwise, residues could not be said to come from processing ores and minerals, but rather from processing other materials), or (3) a cement kiln processing primarily raw materials. To implement the provision that, to be eligible for the Bevill exclusion the device must burn primarily Bevill material, EPA is requiring that a boiler must burn at least 50 percent coal, an industrial furnace must process at least 50 percent ores or minerals, and at least 50 percent of the feed stock to a cement kiln must consist of normal raw materials. This requirement also confirms the Agency's long-standing interpretation that the Bevill exclusion applies only to primary facilities and not to secondary facilities such as secondary smelters.[88] See § 266.112(a).

2. Two-Part Test

Today's rule requires a case-by-case determination as to whether the hazardous waste being burned or processed significantly affects the character of the residue with respect to inorganic and organic toxic (i.e., appendix VIII, part 261) constituents. The residue is considered to be significantly affected if both: (1) Concentrations of toxic (Appendix VIII) compounds in the waste-derived residue are significantly higher than in normal (i.e., without burning/processing hazardous waste) residue; and (2) toxic compounds are present in the waste-derived residue at levels that could pose significant risk to human health. Part One of the test need not be conducted if the waste-derived residue passes Part Two of the test (i.e., if the health-based concentration limits are not exceeded). Such a waste would still meet the high volume/low hazard Bevill threshold.

a. Part One—Comparison with Normal Residues. Part One of the test requires a comparison of hazardous waste-derived residues with normal residues to determine if toxic compounds are present at statistically significant higher levels. See § 266.112((b)(1). The toxic compounds of concern are any compound listed on appendix VIII, part 261, that may reasonably be expected to be a constituent in the hazardous waste plus the list (see appendix VIII to the rule) of organic compounds that are common products of incomplete combustion (PICs) from burning hazardous waste. The total concerntration of each compound of concern in the residues must be determined.[89] Analytical procedures are provided in Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW–846) incorporated by reference in § 260.11(a).

The rule requires the use of a statistical test to compare the concentrations of toxic constituents in samples of normal (without burning/processing hazardous waste) residues with samples of waste-derived residues. In the statistical test, the 95th percent confidence interval about the mean of the normal residue concentrations (using a "t" distribution) is used to determine the upper 95th percent confidence interval about the mean. Procedures that must be used to determine the upper 95th percent confidence interval about the mean are prescribed in "Statistical Methodology for Bevill Residue Determinations" in Methods Manual for Compliance with the BIF Regulation, incorporated in today's rule as appendix IX of part 266. A minimum of ten composite samples must be obtained and analyzed to represent the normal residue in order to effectively calculate the upper 95th percent confidence interval about the mean. This is the concentration that the waste-derived residue may not exceed to pass Part One of the test. The waste-derived residue must be characterized by composite samples with a composite period not to exceed 24 hours to ensure that residues are managed properly and promptly (i.e., as exempt residues or hazardous waste) and to provide for effective enforcement. The sampling approach must be based on (and be consistent with) representative sampling protocols described in SW–846 and must be documented by recordkeeping.

If operating conditions change so that concentrations of toxic compounds in normal residue may (would have) decrease(d), the owner and operator must re-establish the "baseline" concentrations in normal residue and use the lower baseline levels for the test. This is necessary to ensure that owners/operators do not use the most contaminated raw materials in order to burn more hazardous waste, and then switch back to their normal raw materials.

[87] The Agency has determined that residues from cofiring hazardous waste with oil or gas are not excluded under the Bevill amendment because the character of the residue would be determined by the hazardous waste. This is because oil and gas generally produce little residue when burned and, thus, toxic constituents from the hazardous waste can significantly affect any residue generated. See 50 FR 49190 (Nov. 29, 1985). The Agency is not reopening this determination in today's rule.

[88] In support of this reading, one court has held that residues from a secondary lead smeler are not covered by the Bevill amendment. *Ilco Co.* versus *EPA* (W.D. Ala. 1986).

[89] We note that Part One of the test considers the total concentration of each compound, while Part Two of the test considers, for metals, the concentration in an extract generated from the Toxicity Characteristic Leachate Procedure (TCLP).

b. Part Two.—Comparison With Health-Based Limits. Part Two of the test requires a comparison of the concentration of toxic constituents in the waste-derived residues with health-based limits the Agency has established in appendix VII to the rule. The comparison is made to determine if toxic compounds in the waste-derived residue are present at levels higher than the health-based limits. The toxic compounds of concern are the same as for Part One of the test—any compound listed on appendix VIII, part 261, that may reasonably be expected to be a constituent in the hazardous waste plus the list (see appendix VIII to the rule) of organic compounds that are common products of incomplete combustion (PICs) from burning hazardous waste. The total concentration of each nonmetal compound of concern in the waste-derived residue must be compared with the health-based limit. In addition, the concentration of each metal of concern in an extract from the Toxicity Characteristic Leaching Procedure (TCLP) must not exceed the health-based limits.

The Agency does not have adequate health effects data (e.g., MCLs, RfDs, unit risk values) to establish health-based limits for many compounds listed in appendix VIII, part 261. Consequently, we have conservatively established a health-based limit for such compounds based on the 5th lowest percentile value of the health-based values for nonmetal compounds established in appendix VII to the rule. That value is 0.002 ug/kg. This is the same approach EPA used to establish a RAC for compounds where insufficient health effects data were available to establish a RAC or RsD for the compound.

The rule requires the use of total concentrations of nonmetal compounds rather than extract concentrations for the test of health significance because of burning toxic nonmetal compounds in these devices should be to destroy the compounds. (Use of total nonmetal concentrations thus serves as a partial check that combustion is being conducted properly.) The health-based limits for the metals in appendix VII of the rule are the Toxicity Characteristic (TC) limits (see § 261.24) for those metals for which TC limits have been established. To establish health-based limits for the other metals, the Agency applied the same 100 fold dilution factor to leachate concentrations used to establish the TC limits. The Agency has also used this same dilution factor in assessing whether mineral processing wastes satisfy the low hazard prong of the Bevill test. See 54 FR 36630 (Sept. 1, 1989).

To determine if the concentrations of toxic compounds in the waste-derived residues are higher than the health-based limits, owners and operators must obtain and analyze composite samples of waste-derived residues with a composite period not to exceed 24 hours. The sampling approach must be based on (and be consistent with) representative sampling protocols described in SW-846 and must be documented by recordkeeping.

D. Recordkeeping

Owners and operators must maintain for a period of three years records of sampling and analyses of residues to support claims that the waste-derived residue retains the Bevill exclusion.

E. Other Considerations

1. Generic Determinations

In the October 26, 1989 supplement to the proposed rule, the Agency requested data and information that it could use to support: (1) Generic determinations of levels of toxic constituents in normal (i.e., generated without burning/processing hazardous waste) residues; and (2) generic determinations that certain waste-derived residues are not significantly affected by burning/processing hazardous waste, and, thus, remain excluded without the need to make the case-by-case demonstration.

a. Normal Residues. After review of comments on the 1989 supplemental notice, the Agency concluded that it is not practicable to establish generic concentrations of toxic constituents in normal residues. Commenters noted that there were so many site-specific variables that affect the concentration of toxic constituents in normal residues that this approach was not workable. Variables include the type of industrial furnace, type of fuels burned, and type and source of raw materials used by industrial furnaces. The Agency initially considered establishing generic concentration levels in normal residues to avoid giving an advantage to facilities that use fuels or raw materials with high (i.e., higher than normal for the industry) levels of toxic constituents. Normal residues from such facilities would have high levels of toxic constituents. Thus, waste-derived residues from such facilities could also have high levels of toxic constituents. Consequently, such facilities could burn/process hazardous waste with high levels of toxic constituents without losing the Bevill exclusion of residues. We note that enforcement officials will give priority consideration to those facilities whose residues fail part 2 (health-based limits) of the test to determine Bevill applicability and rely on part 1 (comparison with normal residues) to retain the exclusion. Owners and operators must be able to support, at any time, that the nonhazardous waste feedstreams being fed into the device when hazardous waste is fired are the same (or would not decrease the concentrations of toxic constituents in residues) as those fired when the concentrations of toxic constituents in normal residues were determined. If the concentrations of toxic constituents in nonhazardous feedstreams decrease significantly from those concentrations when the normal residue was generated for purposes of establishing normal concentrations of toxic constituents (or if design or operating conditions change such that levels of toxic constituents in normal residue could decrease significantly), then the owner/operator must establish new, lower, concentrations for normal residue.

b. Excluded Residues. The Agency also concluded that it is not practicable to make generic determinations that certain waste-derived residues are not significantly affected by burning or processing of hazardous waste and, so, remain excluded. This approach is not workable given that the exclusion would have to be conditioned on a number of factors including: (1) The composition, feed rate, and method of feeding the harzardous waste; (2) the type of device; (3) the composition, feed rate, and method of feeding any other fuels; and (3) the composition, feed rate, and method of feeding any raw materials. The data base to support such determination is not available. Moreover, any such generic exclusion that is necessarily conditioned on so many factors would be of little practical use to the regulated community given the variability of normal operations.

2. Burning for Destruction

The case-by-case approach to determine the effect of coburning on residues from Bevill devices focuses on the residues that are actually generated rather than on the purpose for which the hazardous waste is burned. Thus, residues generated from burning hazardous waste in boilers and industrial furnances for the purpose of destruction [90] are eligible to retain the

[90] For example, wastes with low heating value that are not burned for materials recovery or as an ingredient are burned for destruction. We note that such wastes may be burned only by new facilities as incinerators under an operating permit or by those existing facilities operating under interim status that also have certified compliance with the applicable emissions standards.

Bevill exclusion. The Agency's historic approach to the issue of cogenerated residues has been to focus on the character of the residues to ascertain what determines their character—the Bevill material or the hazardous waste being burned/processed (see 50 FR 49190 (November 29, 1987)). The statute itself does not directly specify that the purpose of the burning is a relevant criterion, but instead states that certain types of waste are excluded from subtitle C regulation pending completion of required special studies. Since the Bevill devices would still be engaged in the Bevill activity, and composition of the residues would potentially be unaffected, the Agency sees no absolute bar to allowing Bevill status for such residues.

Part Four: Miscellaneous Provisions

I. Regulation of Carbon Regeneration Units

A. Basis for Regulating Carbon Regenerating Units as Thermal Treatment Units

In today's rule, EPA is clarifying the regulatory status of carbon regeneration [91] units. Since 1980, controlled flame (direct flame) carbon regeneration units which destroy organic contaminants adsorbed onto activated carbon have met the definition of incinerator and were subject to regulation as such, while carbon regeneration nonflame thermal units were treated as exempt reclamation units. Today's rule defines carbon regeneration unit and incinerator (see § 260.10) to ensure that both direct flame and nonflame thermal carbon regeneration units are regulated as thermal treatment units under the interim status standards of part 265, subpart P, and the permit standards of part 264, subpart X.

One commenter expressed concern that the thermal treatment standards of subpart X were vague. EPA disagrees and points out that subpart X, part 264 covers miscellaneous hazardous waste management units that do not or may not fit the description of any of the units covered by other part 264 regulations. Without subpart X, these unregulated units could only operate as interim status facilities and could not be fully permitted, thereby preventing the construction of new units or some expansions of existing units. EPA recognized that some types of new units that were not previously allowed to be constructed could reduce risks to human health and the environment from the management of hazardous waste. Promulgation of subpart X generic permitting standards was intended to allow such construction and flexibility for technical development and innovation and to cover diverse technologies and units. The subpart X standards specify that health and environmental safety must be a primary concern during the management of hazardous wastes in miscellaneous units. If the need arises, the Agency may develop specific technology standards in the future (see 52 FR 46964, December 10, 1987). Although several commenters supported the application of part 264, subpart O incinerator standards to direct flame and nonflame devices, EPA has decided against this since demonstration of conformance with the DRE standards (and the proposed CO/THC standards) may not be achievable or warranted for carbon regeneration units considering the relatively low levels of toxic organic compounds adsorbed onto the activated carbon.

B. Definition of Carbon Regeneration Unit and Revised Definition of Incinerator

Several commenters requested that EPA consider revising the definition of a carbon regeneration unit so that certain units used for air emissions control, wet oxidation, and general recycling, would not be regulated. Activated carbon units used as air emission control devices of gaseous industrial process emissions will not necessarily be regulated because trapped organics in such columns are not hazardous wastes because the gas originally being treated is not a solid waste (it is an uncontained gas [92]), and therefore any condensed organics do not derive from treatment of a hazardous waste. (The nongas residues from these devices could be hazardous wastes if they are listed or if they exhibit a characteristic, however.) However, regeneration or reactivation of carbon used to control air emissions from hazardous waste treatment, storage, or disposal facilities (e.g., under 40 CFR parts 264 and 265, subpart AA, June 21, 1990, 55 FR 25454) is subject to regulations as a RCRA thermal treatment unit.

We considered whether other units truly are engaged in reclamation, or whether the regeneration of the carbon is just the concluding aspect of the waste treatment process that commenced with the use of activated carbon to adsorb waste contaminants, which are now destroyed in the "regeneration" process (just as rinsing out a container of hazardous waste is a stage in the storage process and does not constitute recycling of the container). Irrespective of whether these units are better classified as waste treatment or recycling units (or whether the units are flame or nonflame devices), we are concerned, as indicated above, that emissions from the regeneration process can pose a serious hazard to public health if not properly controlled, and therefore are clarifying today that they are regulated as thermal treatment units.

We note that this revision also applies to those carbon regeneration units that, while in active service treating wastewater, meet the definition of wastewater treatment units in § 260.10. Such units are exempt from RCRA permitting standards while treating wastewater. However, these units are not exempt from RCRA regulation when they are being regenerated because they are not treating wastewater during the regeneration process. Rather, the activated carbon columns themselves are being treated thermally. The thermal regeneration unit is subject to part 265, subpart P (existing units) or part 264, subpart X (new units).

C. Units in Existence on the Effective Date of the Rule are Eligible for Interim Status

Although certain carbon regeneration units may technically have met either the 1980 or 1985 definitions of incinerator, the Agency believes that there has been legitimate doubt as to these units' regulatory status (which is why the Agency undertook this rulemaking to clarify the status). The units might potentially have been classified as incinerators, thermal treatment units, or perhaps exempt recycling units. It would also have been confusing to interpret the rules in a manner that carbon regeneration units were not all regulated in the same way, given that their functions and activities are roughly identical whether or not the units are direct-fired. In fact, the most natural classification of these units, and the one the Agency intended, is as thermal treatment units. (EPA does not believe that these are recycling units, but rather that regeneration is a continuation of the waste treatment process, that process consisting of removal of pollutants by adsorption followed by their destruction. Nor does the Agency believe that incinerator standards make technical sense for these devices, as noted above). In addition, few if any of these units have actually been regulated as incinerators in practice.

[91] The term "regeneration" includes reactivation of used carbon for reuse.

[92] See 47 FR at 27530 (June 30, 1982) and 54 FR at 50973 (Dec. 11, 1989).

For these reasons, EPA is finding pursuant to § 270.10(e)(2) that there was substantial confusion as to which owners or operators of carbon regeneration units were required to submit a part A application and that this confusion is attributable to ambiguities in the subtitle C rules. Accordingly, such owners and operators may submit part A applications by the effective date of today's regulations and be eligible for interim status under part 265, subpart P (assuming they meet remaining requirements for interim status eligibility, and the facility is not already subject to interim status for other units).

II. Sludge Dryers

In today's rule, the Agency is clarifying the regulatory status of sludge dryers. In particular, the rule adds a definition of "sludge dryer" to § 260.10 and amends the definition of "incinerator" in § 260.10 to specifically exclude sludge dryers.

On November 17, 1980 (45 FR 76074), EPA suspended the applicability of the RCRA permitting requirements (40 CFR part 122, which is now codified as part 270) and hazardous waste management facility standards (40 CFR parts 264 and 265) to owners and operators of devices meeting the definition of "wastewater treatment unit" in 40 CFR 260.10 and 270.2.

Since promulgation of this wastewater treatment unit exclusion from RCRA permitting requirements, the Agency has received numerous requests to determine if certain types of units satisfy the definition of "wastewater treatment unit" and, therefore, would not require a RCRA permit. Many of these requests have concerned the regulatory status of thermal treatment units, particularly sludge dryers. Commenters have also requested clarification of the regulatory status of sludges from thermal treatment units. Most of the requests have been from owners and manufacturers of sludge dryers. The Agency believes that approximately 40 sludge dryers are currently being used in the metal finishing industry to dehydrate metal hydroxide sludges (EPA Hazardous Waste F006) generated in the treatment of wastewater.

In response to these inquiries, EPA distributed policy memoranda to the Regional offices explaining that a sludge dryer is included within the scope of the wastewater treatment tank exclusion, provided that it meets the definition of "wastewater treatment unit." (See OSWER Policy Directives 9503.52-1A and 9503.51-1A, available upon request from the RCRA Hotline.) In addition, with respect to the status of the sludges themselves, they are hazardous waste if identified or listed (including by application of the mixture and derived-from rules) and are subject to regulation when removed from the tanks.

Despite the original November 17, 1980 preamble discussion and the policy clarification, the regulatory status of sludge dryers has continued to be unclear. One reason for the confusion is because it is not clear whether a sludge dryer satisfies the third component of the definition of wastewater treatment unit (i.e., whether it meets the definition of a "tank" or "tank system"). The Agency has determined that sludge dryers that are integrally equipped with feed or discharge hoppers that provide for an accumulation of waste satisfy the definition of "tank system." [93] Based on information available to EPA at this time, it appears that most sludge dryers are so equipped. (Those sludge dryers that are not so designed may still be considered tanks, but a case-by-case decision must be made.) The Agency has also determined that other types of equipment not obviously meeting the "tank" definition, such as presses, filters, sumps, and other types of processing equipment, are covered within the meaning of the term "tank" or "tank system" when used in the context of this exclusion (see OSWER Policy Directive 9503.52-1A).

Another reason that the regulatory status of sludge dryers has been the subject of many questions may be because some sludge dryers technically meet the current definition of an "incinerator," although EPA never intended to regulate direct-flame (or nonflame) sludge dryers as incinerators. When EPA amended the definition of "incinerator" to use physical design criteria rather than a primary purpose test (i.e., purpose of burning) to define an incinerator, it did not intend to bring sludge dryers under regulatory control as incinerators. (See 50 FR 625, January 4, 1985, indicating that the revised definition would not bring large numbers of devices other than incinerators under incinerator standards.) Under the former primary purpose definition, sludge dryers were not incinerators. Although under the 1985 revised definition of incinerator sludge dryers could be classified as incinerators, this was not EPA's intention. The Agency is clarifying this ambiguity by clearly regulating all nonexempt sludge dryers (i.e., those not meeting the definition of "wastewater treatment unit" under today's rule, as discussed below) under the interim status standards of part 265, subpart P ("Thermal Treatment"), and the permit standards of part 264, subpart X ("Miscellaneous Units"). See 55 FR 17866 (April 27, 1990) for details. Given that such units managing hazardous waste always were subject to some type of regulation, they are not newly eligible for interim status as a result of today's clarification.

Even though as a result of this amendment sludge dryers are potentially subject to regulation under subpart P of part 265 and subpart X of part 264 as other thermal treatment units, sludge dryers that meet the § 260.10 definitions of "wastewater treatment unit" and "tank" or "tank system" continue to be exempt wastewater treatment units under §§ 264.1(g)(6) and 265.1(c)(10). The Agency believes that virtually all sludge dryers meet the tank/tank system definition and, therefore, would be exempt when used as part of a wastewater treatment system.

A. July 1990 Proposal

To better clarify the regulatory status of sludge dryers, the Agency proposed on July 18, 1990 (55 FR 29280) a definition for "sludge dryer" to clearly distinguish them from other thermal treatment units: Sludge dryer means any enclosed thermal treatment device that is used to dehydrate sludge and that has a maximum total thermal input of 1,500 Btu/lb of sludge treated on a wet-weight basis.

In the same notice, the Agency also proposed to amend the definition of a wastewater treatment unit to say that sludge dryers were the only thermal treatment devices (heretofore) meeting the definition of a wastewater treatment unit that were exempt from regulation.

Today's rule clarifies that sludge dryers meeting the definition of a wastewater treatment unit are exempt from regulation (by promulgating a definition of sludge dryer and revising the definition of incinerator to exclude sludge dryers). EPA also proposed a further clarification that other devices that use heat to treat wastewaters were not to be considered eligible for the wastewater treatment tank exemption. The Agency indicated, without discussion, that it had not intended for such units to be eligible for the exemption and that the proposal was a simple clarification which reflected common understanding within the Agency and the regulated community.

[93] We note that sludge dryers that are a part of a wastewater treatment facility that is subject to regulation under either section 402 or 307(b) of the Clean Water Act and that *do not* meet the definition of a tank system are subject to RCRA regulation as thermal treatment units, just like sludge dryers that are not a part of a wastewater treatment system.

Commenters disagreed with this assessment of the regulations, and the Agency has since studied the issue in more depth. It appears that the Agency was mistaken in its assessment both of the current intended scope of the rule and of common understanding of what the rule covers. With respect to such devices as evaporators and steam strippers used in wastewater treatment, the Agency has in fact traditionally regarded such units as eligible for the wastewater treatment exemption. See 55 FR at 25467 (June 21, 1990). Commenters likewise indicated their understanding that current rules exempt such devices.

Given the narrow scope of the proposal, the clear indication that any change would not be a clarification of existing rules (as indicated) but rather a potentially far-reaching alteration, and the absence of any discussion (or study) of whether a substantive change in regulatory status of these devices is warranted, EPA cannot go forward. Consequently, we are not adopting any other part of the definition of wastewater treatment unit discussed in the 1990 notice.

B. Summary of Public Comments

EPA received comments regarding the status of sludge dryers in response to the April 27, 1990 BIF notice and the July 18, 1990 notice discussed above.

Many of the commenters to these notices supported the inclusion of sludge dryers in the wastewater treatment unit (WWTU) definition. The commenters, however, requested clarification on whether units similar to sludge dryers (e.g., evaporators) would also be eligible for the WWTU exclusion. As discussed above, other devices using heat that meet the definition of wastewater treatment unit would continue to be exempt from RCRA regulation (except, of course, an incinerator, boiler, or industrial furnace burning hazardous waste).

Eleven commenters to these proposals stated that the maximum 1,500 Btu/lb thermal input requirement in the sludge dryer definition is too low. Citing low thermal efficiencies (especially for indirect-fired dryers), these commenters recommended thermal input requirements ranging from 1,700 to 3,300 Btu/lb.

After consideration of the commenters' concerns and further review of the technical background information on the thermal input limit, the Agency is today revising the thermal input limit to 2,500 Btu/lb wet sludge. The Agency believes that depending on the nature of the treatment system, the thermal input to a *bona fide* sludge dryer (i.e., a device that is not an incinerator) can be as high as 2,500 Btu/lb.

Several commenters also requested that EPA clarify that the total thermal input limit was not to include the heating value of the sludge itself given that a number of sludges that are dried have as-fired heating values of 1,000 to 2,700 Btu/lb. The Agency agrees. The final rule explicitly excludes the heating value of the sludge from the 2,500 Btu/lb limit on thermal input. With this clarification, however, we note that the primary purpose test—dehydration—is the primary distinction between a sludge dryer and an incinerator. This is because a sludge incinerator can readily meet the thermal heat input limit of 2,500 Btu/lb when the heating value of the sludge itself is not included. However, the primary purpose of a sludge dryer is dehydration while the primary purpose of an incinerator is volume reduction to produce an ash residue. Thus, we believe that the definition in today's rule adequately distinguishes between sludge dryers and incinerators. Nevertheless, it should be noted that any person claiming the wastewater treatment unit exemption for a sludge dryer must have documentation to support that the primary purpose of the device is to dehydrate sludge, not to destroy sludge to produce an ash residue.

The Agency received many responses to its request for comments on whether it is necessary to specify a minimum percent volume reduction in the definition of a sludge dryer. Although one commenter stated that a percent volume reduction should be specified in the sludge dryer definition, twelve of the commenters stated that such a requirement would be arbitrary, confusing, unworkable, and costly to enforce. Two of the commenters stated that a minimum percent weight reduction would be more appropriate. In today's rule, the Agency has decided not to specify a minimum percent volume (or weight) reduction in the definition of a sludge dryer. The Agency believes that such a specification would be difficult to support and would not be needed to distinguish sludge dryers from incinerators.

Several commenters stated that the Agency should address emissions of volatile organics from units such as sludge dryers. In addition, two commenters recommend a 1,000 Btu/lb thermal input limit for the device to control volatile emissions from sludge dryers. EPA recognizes the need to address volatile emissions from sludge dryers and intends to evaluate alternatives for regulating these units at a later date. However, because this rule simply clarifies that EPA intended for sludge dryers that meet the definition of a wastewater treatment unit to be exempt from the RCRA rules, it would be inappropriate to address volatile organic emissions at this time. Nonetheless, sludge dryers that do not meet the definition of a wastewater treatment unit (e.g., sludge dryers that are not a part of a wastewater treatment facility that is subject to regulation under either section 402 or 307(b) of the Clean Water Act) are subject to regulation as thermal treatment units under subpart X of part 264. Under those standards, the Agency may apply controls on volatile organic (and other) emissions as necessary to protect human health and the environment.

After considering comments on the proposed sludge dryer definition, EPA is today promulgating the following definitions:

Sludge dryer means any enclosed thermal treatment device that is used to dehydrate sludge and that has a maximum total thermal input, excluding the heating value of the sludge itself, of 2,500 Btu/lb of sludge treated on a wet-weight basis.

Incinerator means any enclosed device that: (1) uses controlled flame combustion and neither meets the criteria for classification as a boiler, carbon regeneration unit, or a sludge dryer, nor is listed as an industrial furnace; or (2) meets the definition of infrared incinerator or plasma arc incinerator.

III. Classification of Coke and By-Product Coal Tar

A. AISI Petition

The American Iron and Steel Institute (AISI) petitioned EPA with respect to the practice of recycling tar decanter sludge by the following means:

1. Applying the sludge to coal prior to or just after charging the coal into the coke oven; and

2. Combining the sludge with coal tar prior to its being sold.

The coke and the coal tar are often used as fuel and so have been classified as solid wastes and hazardous wastes since they are fuels produced or otherwise containing a hazardous waste—EPA Hazardous Waste No. K087, tar decanter sludge. See § 261.2(c)(2)(i)(B). These hazardous waste fuels have been exempt from regulation under § 261.6(a)(3)(vii) and 50 FR 49170–171 (November 29, 1985). The AISI has requested that EPA not classify such coke or coal tar as solid wastes. AISI submits that recycling the decanter sludge in this manner does not

significantly affect the concentration of toxic metal and organic constituents of the coke or coal tar. EPA has indicated that waste-derived fuels could be classified as products under such circumstances, "since the more waste-derived fuels from a process are like products from the same process produced by virgin materials, the less likely EPA is to classify the waste-derived fuel as a waste." 50 FR 49169 (Nov. 29, 1985). To support its request, the AISI submitted data on the metals and organic constituents in coke, coal tar, and tar decanter sludge both with and without sludge recycling. the data and the Agency's response are discussed below.

B. Process Description

Coke used for making iron is manufactured through the destructive distillation of coal in ovens. A typical oven holds aproximately 13 tons of coal which is heated to a temperature of about 2000°F. Generally 20 to 100 ovens are located adjacent to each other in a "coke oven battery." The destructive distillation or "coking" process takes about 15–18 hours. During that time period, about 20–35 percent of the coal is converted to coke oven gas (COG) consisting of water vapor, tar, light oils, heavy hydrocarbons, and other chemical compounds. The COG is collected from the top of the coke oven and, in most cases, sent to the by-product plant via the coke battery main. The COG is then cleaned by removing wastes and by-products prior to being burned, generally in the coke oven under-firing system. As a first step in the COG cleaning process, the coal tars, consisting of heavy hydrocarbons, are condensed from the gas. In addition, most of the particulate that escapes from the ovens is collected in the tar. This particulate is believed to consist principally of coal fines. The particulate or solids are then removed from the tar in the tar decanter. The coal tar is then burned as fuel or sold for use in various products such as roofing cement. The sludge has been listed as EPA Hazardous Waste No. K087 and is disposed of or recycled either by mixing with coal prior to being charged to the coke oven or mixing with coal tar after physical processing (grinding) prior to sale.

Approximately 8–12 gallons of tar are produced per ton of coke. In addition, approximately one pound of tar decanter sludge is produced for every 40 pounds of tar produced.

C. Basis for Approval of the AISI Petition

The AISI submitted data from metal and organic chemical analyses for the coke, coal tar, and tar decanter sludge from four plants. The Agency reviewed these results and determined the following:

1. The recycling of tar decanter sludge by application to the coal charge does not appear to have a significant effect on the chemical composition of coke;

2. The organic chemical composition of the tar decanter sludge does not appear to be significantly different from the coal tar; and,

3. The concentration of one metal, lead, in the sludge appears to be slightly higher than in the coal tar. However, the increase does not appear to be statistically significant due to the high variability of the concentration values.

Based on the above and the fact that there is such a small quantity of sludge relative to the quantity of coke and coal tar produced by the coking process, EPA believes that sludge recycling, as described here, does not significantly affect the concentration of toxic metals and organic constituents in coal tar or coke. Furthermore, coke, coal tar, and the decanter tank tar sludge are similar materials formed in a single process and contain the same contaminants. In this circumstance, when the coke and the decanter tank tar sludge are very nearly the identical substance and, moreover, come from a single process, the Agency is warranted in exercising its discretion to determine that this management of the sludge is "not part of the waste diposal problem", and hence that the coke product is no longer a RCRA solid waste. *American Mining Congress* v. *EPA*, 907 F. 2d 1179, 1186 (D.C. Cir. 1990). Therefore, in today's rule, EPA is classifying such coke and coal tar as products, not wastes. As a result, the coke and coal tar will be excluded under 40 CFR 261.4 from the definition of solid waste and not subject to RCRA hazardous waste management regulations, when used as a fuel. A necessary corollary to this action is also to exclude the coking process from regulation when K087 is used as an ingredient to produce coke. Given that K087 is for practical purposes just like other materials used to produce coke and comes the the same process as these other materials, it would be anomalous to assert RCRA control over the coking process. Again, this form of sludge management—which is the same as raw material management—does not appear to EPA to be part of the waste disposal problem.[94] (In addition, coke ovens are subject to a special regulatory regime under amended section 112(i)(8) of the Clean Air Act, and RCRA regulation of this particular practice could disrupt the Clean Air Act regulatory scheme. Thus, the Agency views RCRA regulation of this practice as inappropriate in any case.)

This exemption applies only to the waste-derived fuels and only when derived from tar decanter sludge, K087. Thus the tar decanter sludge, K087, is subject to full RCRA regulation prior to recycling. In addition, the exemption does not extend to coke or coal tar produced from hazardous waste (e.g., spent solvents) other than tar decanter sludge, EPA Hazardous Waste K087.

IV. Regulation of Landfill Gas

In the November 29, 1985 final rules regulating hazardous waste burned for energy recovery, the Agency indicated that gas recovered from hazardous waste landfills that is burned for energy recovery in boilers or industrial furnaces is not regulated under the waste-as-fuel rules. 50 FR 49171. EPA took this action in order to study further the extent to which there might be jurisdictional limits on the Agency's authority under section 3004(n) of RCRA to regulate gaseous emissions from hazardous waste. *Id.* In today's rule, we are amending this language slightly by indicating that the exemption also applies to gas recovered from solid waste landfills. Therefore, gas recovered from a solid waste landfill that exhibits a hazardous characteristic would also be exempt from today's rule when burned for energy recovery in a boiler and industrial furnace.

In addition, the Agency solicited comment, in the May 6, 1987 proposed rule, on whether the hydrocarbon phase of the condensate removed from recovered gas should also be exempt from regulation when burned as fuel (52 FR 17021). Two commenters responded that the condensate contains chemical constituents similar to fossil fuels such as kerosene or gasoline and that the handling and burning of the gas condensate poses no significant hazard to human health. The commenters encouraged the Ageny not to regulate the hydrocarbon phase of the landfill gas condensate unless the hydrocarbons exhibit a subtitle C characteristic of a hazardous waste. However, data on condensate composition provided by one respondent was vague and represented only one source of condensate. Absent adequate data EPA

[94] The Agency is not aware of any other hazardous wastes that are burned in coke ovens as an ingredient that are just like other materials used to produce coke. If such materials are used, the Agency would encourage the industry to provide the necessary information in order to determine whether the exclusion should be modified.

is not promulgating an exemption from regulation of the hydrocarbon phase of the landfill gas condensate at this time. Facilities that wish to burn a landfill gas condensate may consider whether they are eligible for the small quantity burner exemption promulgated in this rule.

V. Definitions of Infrared and Plasma Arc Incinerators

Today's rule establishes definitions for infrared and plasma arc incinerators and revises the definition of incinerator to explicitly include these devices. As discussed in the April 27, 1990 proposed amendments to the incinerator standards (55 FR at 17869–70), EPA is clarifying that these devices are incinerators rather than (other) thermal treatment units subject to regulation under subpart X of part 264 (or subpart P of part 265 for interim status units) because: (1) although these devices use nonflame sources of thermal energy to treat waste in the primary chamber, they invariably employ controlled flame afterburners to combust hydrocarbons driven off by the primary process (and, thus, they meet the definition of an "incinerator" under § 260.10); and (2) the incinerator standards are workable and protective for these units.

We note that today's action merely clarifies the regulatory status of these devices. It does not subject them to regulation for the first time; they have been regulated since 1980. Thus, interim status is not reopened for these devices.

Part Five: Administrative, Economic, and Environmental Impacts, and List of Subjects

I. State Authority

A. Applicability of Rules in Authorized States

Under section 3006 of RCRA, EPA may authorize qualified States to administer and enforce the RCRA program within the State. (See 40 CFR part 271 for the standards and requirements for authorization.) Following authorization, EPA retains enforcement authority under sections 3008, 7003 and 3013 of RCRA, although authorized States have primary enforcement responsibility.

Prior to the Hazardous and Solid Waste Amendments of 1984 (HSWA), a State with final authorization administered its hazardous waste program entirely in lieu of EPA administering the Federal program in that State. The Federal requirements no longer applied in the authorized State, and EPA could not issue permits for any facilities in the State which the State was authorized to permit. When new, more stringent Federal requirements were promulgated or enacted, the State was obliged to enact equivalent authority within specified time frames. New Federal requirements did not take effect in an authorized State until the State adopted the requirements as State law.

In contrast, under section 3006(g) of RCRA, 42 U.S.C. 6926(g), new requirements and prohibitions imposed by HSWA take effect in authorized States at the same time that they take effect in nonauthorized States. EPA is directed to carry out those requirements and prohibitions in authorized States, including the issuance of permits, until the State is granted authorization to do so. While States must still adopt HSWA-related provisions as State law to achieve or retain final authorization, the HSWA applies in authorized States in the interim.

The majority of today's rule is promulgated pursuant to section 3004(q) of RCRA, a provision added by HSWA. (The provisions that are not promulgated pursuant to HSWA are the provisions for sludge dryers, carbon regeneration units, infrared incinerators, and plasma arc incinerators.) Therefore, the Agency is adding the requirements (except the non-HSWA provisions) to Table 1 in § 271.1(j) which identifies the Federal program requirements that are promulgated pursuant to HSWA and that take effect in all States, regardless of their authorization status. States may apply for either interim or final authorization for the HSWA provisions identified in Table 1, as discussed in the following section of this preamble.

B. Effect on State Authorizations

As noted above, EPA will implement the majority of the provisions of today's rule in authorized States until they modify their programs to adopt these rules and the modification is approved by EPA. Because these provisions of the rules are promulgated pursuant to HSWA, a State submitting a program modification may apply to receive either interim or final authorization under section 3006(g)(2) or 3006(b), respectively, for these provisions on the basis of requirements that are substantially equivalent or equivalent to EPA's. The procedures and schedule for State program modifications for either interim or final authorization are described in 40 CFR 271.21. It should be noted that all HSWA interim authorizations will expire January 1, 1993. (See § 271.24(c).)

The provisions of today's rule that are not promulgated pursuant to HSWA—provisions for sludge dryers, carbon regeneration units, infrared incinerators, and plasma are incinerators—are not effective in authorized States. Thus, these requirements will be applicable only in those States that do not have final authorization. In authorized States, the requirements will not be applicable until the State revises its program to adopt equivalent requirements under State law.

40 CFR 271.21(e)(2) requires that States that have final authorization must modify their programs to reflect Federal program changes, and must subsequently submit the modifications to EPA for approval. The deadline by which the State must modify its program to adopt the HSWA portion of today's rule is July 1, 1993 if a statutory change is not needed, or July 1, 1994 if a statutory change is needed. The deadline by which the State must modify its program to adopt the non-HSWA portion of today's rule is July 1, 1992 if a statutory change in not needed, or July 1, 1993 if a statutory change is needed. These deadlines can be extended in certain cases (40 CFR 271.21(e)(3)). Once EPA approves the modification, the State requirements become Subtitle C RCRA requirements.

States with authorized RCRA programs may already have requirements similar to those in today's rule. These State regulations have not been assessed against the Federal regulations being promulgated today to determine whether they meet the tests for authorization. Thus, a State is not authorized to implement these requirements in lieu of EPA until the State program modification is approved. Of course, States with existing standards may continue to administer and enforce their standards as a matter of State law.

In implementing the Federal program for the HSWA portion of today's rule, EPA will work with States under cooperative agreements to minimize duplication of efforts. In many cases, EPA will be able to defer to the States in their efforts to implement their programs, rather than take separate actions under Federal authority.

States that submit their official applications for final authorization less than 12 months after the effective date of these standards are not required to include standards equivalent to these standards in their application. However, the State must modify its program by the deadlines set forth in § 271.21(e). States that submit official applications for final authorization 12 months after the effective date of these standards must include standards equivalent to these standards in their application. 40 CFR 271.3 sets forth the requirements a State

must meet when submitting its final authorization application.

II. Regulatory Impacts

A. Cost Analysis

1. Background

Prior to publication of the proposed regulations in May 1987, the Agency examined the projected compliance costs, economic impacts, and risk reductions associated with the proposed rules. This effort consisted of a detailed examination of the pre-proposal draft as it was drafted in mid-1986 and a supplement prepared in late 1986 [95] that examined several changes in tax policy and regulatory approach that occurred after the first analysis was completed.[96]

The analyses estimated that of the approximately 1,000 BIFs identified as firing hazardous wastes, approximately 20 percent were likely to discontinue burning hazardous wastes because of the rules, 60 percent would burn small amounts of waste and would qualify for the small quantity burner exemption (SQBE), and the remaining 15 percent would obtain full permits. Because the final 15 percent of devices represent large facilities, however, the impact on the total quantity of waste burned would be small. For example, under the "base case" scenario, although 20 percent of the devices would discontinue burning hazardous wastes and a number of other devices would reduce the quantity of hazardous waste they combust in order to qualify for the SQBE, only 3 percent of the quantity of waste combusted in the absence of regulations would be diverted to other devices. The mid-1986 analysis estimated that under this scenario, the aggregate after-tax cost of compliance to individual firms would be $5.2 million per year and that the before-tax social cost would be $8.2 million per year. Under other sets of assumptions (i.e., other scenarios), these costs were likely to be higher, but in all cases were estimated to be less than $100 million per year.

Based on these analyses, the Agency concluded that the total social costs, impact on market competition, and the impact on small businesses were such that the proposed regulations did not constitute a major rule, and that a formal Regulatory Impact Analysis as described in Executive Order 12291 was not required.

[95] U.S. EPA, "Regulatory Analysis for Waste-As-Fuel Technical Standards", Draft Report, October 1986.

[96] U.S. EPA, "Effects of Recent Changes on the Estimated Costs and Benefits of the Proposed Waste As Fuel Technical Standards", January 1987.

A number of comments on the economic analysis were received from affected businesses and other groups. Most of these commenters contended that the cost of compliance had been underestimated by the Agency. Based on these comments, as well as changes made in the final regulation compared to the proposed requirements, the Agency has reexamined and updated the earlier analyses.

2. Revised Cost Analysis

As indicated earlier, there have been a number of changes made in the regulations that are expected to increase the cost of compliance. In addition, the Federal tax code was changed in late 1986, the cost of goods and services to the economy as a whole has increased due to inflation, and the estimated cost of specific requirements associated with the BIF regulations have been reexamined. The new analysis focused on assessing the impact of changes in compliance costs on typical facilities, and did not reexamine the impact of these changes on the selection of regulatory options by individual facilities. In addition, no effort was made to explicitly examine the impact of the final rules on the economic competitiveness of individual firms or industries, nor on the reduction in public health risks.

The primary changes that have occurred in the regulations subsequent to proposal have been revised requirements for continuous emission monitoring of CO and HC; addition of the PM standard, interim status compliance procedures, and limits on emissions of several additional metals and Cl_2; and increases in recordkeeping, sampling, and analysis requirements. The impact of these changes plus the impact of tax code changes and inflation on the before- and after-tax costs of the BIF regulations are summarized in Table 1. When combined with the original "base case" cost estimates prepared in 1986, the revised cost estimate for the promulgated rule is $15.2 million per year before taxes and $10.3 million per year after-taxes.

The increased cost for CO and HC monitoring reflects the costs for installation of a more comprehensive CO monitoring system than was originally estimated and the cost of installing HC monitors on an estimated 20 devices (primarily cement kilns) that will operate under the Tier II CO and HC limits. The zero cost increase associated with the PM emission standard reflects the expectation that BIFs complying with the metals standards will achieve the 0.08 gr/dscf standard, and that most existing industrial furnaces and some boilers are already subject to this emission level (or a more stringent level) as the result of State Implementation Plans or New Source Performance Standards. As a result, no incremental increase for compliance with the PM emission limit is projected.

The additional costs for interim status compliance reflects the increase in annualized costs (over a 10 year period) for preparation of the precompliance and compliance certification packages (including compliance testing) by approximately 150 BIFs. The additional cost for the Cl_2 standard is based on the incremental cost of analysis for Cl_2 beyond that already required to determined HCl emissions.

The increase in annual recordkeeping, sampling, and analysis costs reflects a reassessment of the estimated costs in the 1986 analysis. These increased costs reflect a before-tax increase of approximately $2.4 million for recordkeeping and $0.6 million for sampling and analysis.

The impact of the 1986 tax code changes was to reduce the marginal tax rate imposed on before-tax profits and, thus, has the affect of increasing the impact of compliance costs on after-tax profits. As a result, the change in the 1986 tax code is to increase the after-tax cost of the regulations by an estimated $0.6 million per year. The increase in costs due to inflation reflects an estimated increase in compliance cost of 20 percent between the time of the initial analysis (based on 1985 dollars) and 1990.

TABLE 1

Cost element	Before taxes	After taxes	Note
CO and HC Monitoring	1,930,000	1,200,000	1
PM Standard	0	0	2
Interim Status Compliance	980,000	590,000	3
Cl_2 Standards	30,000	20,000	4
Recordkeeping/Sampling & Analysis	3,050,000	1,700,000	5
Tax Code Changes	0	600,000	6
Inflation	1,640,000	980,000	7
Total	7,630,000	5,090,000	

Notes:
1. Based on installing 20 CO monitors using capital and O&M costs from the revised ICR.
2. No incremental costs because BIFs already meet standard by meeting metals limits and existing SIP and NSPS limits.
3. Assumes all not small quantity burner BIFs submit precompliance and compliance certification packages, 50% of BIFs submit a revised certification of precompliance, and 75% of compliance test can be used in lieu of the trial burn to obtain an operating permit, thus reducing the cost of the Part B permit.

4. Assumes all BIFs complying with emissions limits (and not Tier I feed rate limits) conduct Cl_2 testing during compliance certification and trial burn tests ($165/sample).

5. Increases waste sampling and analysis costs over those estimated at proposal for all non-small quantity burners by $300/month. Provides an additional 16 hours per month for all non-small quantity burners and 2 hours per month for small quantity burners for additional recordkeeping.

6. The 1986 revisions to the Federal tax code reduced the Federal marginal tax rate (MTR) from 48% to 34%. The 1986 analysis assumed a MTR of 50% (48% Federal plus 2% State). The revised analysis assumes a MTR of 40% (34% Federal plus 6% State).

7. Adjustment for 20% inflation between 1985 and 1990 ($8.2 million before tax cost estimate in 1985 dollars, adjusted to after-tax basis assuming a marginal tax rate of 40%.

B. Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) requires Federal regulatory agencies to evaluate the impacts of regulations on small entities. The RFA requires an initial screening analysis to determine whether the proposed rule will have a significant impact on a substantial number of small businesses. As indicated at proposal (52 FR 17030), the Agency estimates that a substantial number of small entities will not be significantly impacted by the rule. Although the Agency estimates that changes to the rule since proposal and re-evaluation of some cost estimates made during the initial impact analysis will result in a higher cost to the regulated industry, the Agency continues to believe that a substantial number of small entities will not be significantly impacted by the rule.

C. Paperwork Reduction Act

The information collection requirements in this rule have been submitted for approval to the Office of Management and Budget (OMB) under the *Paperwork Reduction Act* 44 U.S.C. 3501 *et seq.*, and assigned OMB Control number 2050–0073.

III. List of Subjects in 40 CFR Parts 260, 261, 264, 265, 266, 270, and 271

Administrative practices and procedures, Confidential business information, Hazardous materials transportation, Hazardous waste, Indian lands, Insurance, Incorporation by reference, Intergovernmental relations, Packaging and containers, Penalties, Recycling, Reporting and recordkeeping requirements, Security measures, Security bonds, Water pollution control, Water supply.

Dated: December 31, 1990.

F. Henry Habicht II,

Deputy Administrator and Acting Administrator.

PART 260—HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL

I. In part 260:

1. The authority citation for part 260 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6921 through 6927, 6930, 6934, 6935, 6937, 6938, 6939, and 6974.

2. Section 260.10 is amended by: (1) revising the introductory text; (2) revising the definition of "incinerator"; (3) amending the definition of "industrial furnace" by revising the introductory text and redesignating paragraph (12) as (13) and by adding new paragraph (12); and (4) adding, in alphabetical order, definitions for "carbon regeneration unit", "infrared incinerator", "plasma arc incinerator" and "sludge dryer" to read as follows:

§ 260.10 Definitions.

When used in parts 260 through 266 and 268 of this chapter, the following terms have the meanings given below:

* * * * *

Carbon regeneration unit means any enclosed thermal treatment device used to regenerate spent activated carbon.

* * * * *

Incinerator means any enclosed device that:

(1) Uses controlled flame combustion and neither meets the criteria for classification as a boiler, sludge dryer, or carbon regeneration unit, nor is listed as an industrial furnace; or

(2) Meets the definition of infrared incinerator or plasma arc incinerator.

* * * * *

Industrial furnace means any of the following enclosed devices that are integral components of manufacturing processes and that use thermal treatment to accomplish recovery of materials or energy:

* * * * *

(12) Halogen acid furnaces (HAFs) for the production of acid from halogenated hazardous waste generated by chemical production facilities where the furnace is located on the site of a chemical production facility, the acid product has a halogen acid content of at least 3%, the acid product is used in a manufacturing process, and, except for hazardous waste burned as fuel, hazardous waste fed to the furnace has a minimum halogen content of 20% as-generated.

* * * * *

Infrared incinerator means any enclosed device that uses electric powered resistance heaters as a source of radiant heat and which is not listed as an industrial furnace.

* * * * *

Plasma arc incinerator means any enclosed device using a high intensity electrical discharge or arc as a source of heat and which is not listed as an industrial furnace.

* * * * *

Sludge dryer means any enclosed thermal treatment device that is used to dehydrate sludge and that has a maximum total thermal input, excluding the heating value of the sludge itself, of 2,500 Btu/lb of sludge treated on a wet-weight basis.

* * * * *

3. Paragraph (a) of § 260.11 is amended by adding to the first listing the following reference in alphabetical order:

§ 260.11 References.

(a) * * *

U.S. EPA, *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources*, August 1988, Available from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161, (703) 487–4600. The document number is PB89–159–396.

* * * * *

PART 261—IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

II. In part 261:

1. The authority citation for part 261 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6921, 6922, and 6938.

2. Section 261.2 is amended by redesignating paragraph (d)(2) as (d)(3) and adding new paragraph (d)(2) to read as follows:

§ 261.2 Definition of solid waste.

* * * * *

(d) * * *

(2) Secondary materials fed to a halogen acid furnace that exhibit a characteristic of a hazardous waste or are listed as a hazardous waste as defined in subparts C or D of this part.

3. Section 261.4 is amended by adding paragraph (a)(10) and revising paragraphs (b)(4), the first sentence of (b)(7), and (b)(8) to read as follows:

§ 261.4 Exclusions.

(a) * * *

(10) When used as a fuel, coke and coal tar from the iron and steel industry that contains or is produced from decanter tank tar sludge, EPA Hazardous Waste K087. The process of producing coke and coal tar from such decanter tank tar sludge in a coke oven is likewise excluded from regulation.

(b) * * *

(4) Fly ash waste, bottom ash waste, slag waste, and flue gas emission control waste, generated primarily from

the combusion of coal or other fossil fuels, except as provided by § 266.112 of this chapter for facilities that burn or process hazardous waste.

* * * * *

(7) Solid waste from the extraction, beneficiation, and processing of ores and minerals (including coal, phosphate rock and overburden from the mining of uranium ore), except as provided by § 266.112 of this chapter for facilities that burn or process hazardous waste.

* * *

(8) Cement kiln dust waste, except as provided by § 266.112 of this chapter for facilities that burn or process hazardous waste.

* * * * *

4. Section 261.6 is amended by removing paragraph (a)(3)(vii) and redesignating paragraphs (a)(3) (viii) and (ix) as (a)(3) (vii) and (viii) respectively.

PART 264—STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

III. In part 264:

1. The authority citation for part 264 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6924, and 6925.

2. Section 264.112 is amended by revising paragraph (d)(1) to read as follows:

§ 264.112 Closure of plan; amendment of plan.

* * * * *

(d) *Notification of partial closure and final closure.* (1) The owner or operator must notify the Regional Administrator in writing at least 60 days prior to the date on which he expects to begin closure of a surface impoundment, waste pile, land treatment or landfill unit, or final closure of a facility with such a unit. The owner or operator must notify the Regional Administrator in writing at least 45 days prior to the date on which he expects to begin final closure of a facility with only treatment or storage tanks, container storage, or incinerator units to be closed. The owner or operator must notify the Regional Administrator in writing at least 45 days prior to the date on which he expects to begin partial or final closure of a boiler or industrial furnace, whichever is earlier.

* * * * *

3. Section 264.340 is amended by revising paragraph (a) to read as follows:

§ 264.340 Applicability.

(a) The regulations of this subpart apply to owners and operators of hazardous waste incinerators (as defined in § 260.10 of this chapter), except as § 264.1 provides otherwise.

* * * * *

PART 265—INTERIM STATUS STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

IV. In part 265:

1. The authority citation for part 265 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6924, 6925, and 6935.

2. Section 265.112 is amended by revising paragraphs (a), (d)(1), and (d)(2) to read as follows:

§ 265.112 Closure plan; amendment of plan.

(a) *Written plan.* By May 19, 1981, or by six months after the effective date of the rule that first subjects a facility to provisions of this section, the owner or operator of a hazardous waste management facility must have a written closure plan. Until final closure is completed and certified in accordance with § 265.115, a copy of the most current plan must be furnished to the Regional Administrator upon request, including request by mail. In addition, for facilities without approved plans, it must also be provided during site inspections, on the day of inspection, to any officer, employee, or representative of the Agency who is duly designated by the Administrator.

* * * * *

(d) *Notification of partial closure and final closure.* (1) The owner or operator must submit the closure plan to the Regional Administrator at least 180 days prior to the date on which he expects to begin closure of the first surface impoundment, waste pile, land treatment, or landfill unit, or final closure if it involves such a unit, whichever is earlier. The owner or operator must submit the closure plan to the Regional Administrator at least 45 days prior to the date on which he expects to begin partial or final closure of a boiler or industrial furnace. The owner or operator must submit the closure plan to the Regional Administrator at least 45 days prior to the date on which he expects to begin final closure of a facility with only tanks, container storage, or incinerator units. Owners or operators with approved closure plans must notify the Regional Administrator in writing at least 60 days prior to the date on which he expects to begin closure of a surface impoundment, waste pile, landfill, or land treatment unit, or final closure of a facility involving such a unit. Owners or operators with approved closure plans must notify the Regional Administrator in writing at least 45 days prior to the date on which he expects to begin partial or final closure of a boiler or industrial furnace. Owners or operators with approved closure plans must notify the Regional Administrator in writing at least 45 days prior to the date on which he expects to begin final closure of a facility with only tanks, container storage, or incinerator units.

(2) Except for boilers and industrial furnaces that operate under interim status as specified by § 266.103(c)(7)(i) (B) or (C), the date when he "expects to begin closure" must be either within 30 days after the date on which any hazardous waste management unit receives the known final volume of hazardous wastes, or, if there is a reasonable possibility that the hazardous waste management unit will receive additional hazardous wastes, no later than one year after the date on which the unit received the most recent volume of hazardous waste. If the owner or operator of a hazardous waste management unit can demonstrate to the Regional Administrator that the hazardous waste management unit or facility has the capacity to receive additional hazardous wastes and he has taken, and will continue to take, all steps to prevent threats to human health and the environment, including compliance with all interim status requirements, the Regional Administrator may approve an extension to this one-year limit. For boilers and industrial furnaces that operate under interim status as specified by § 266.103(c)(7)(i) (B) or (C), the date when he "expects to begin closure" must be within 30 days after failure to submit a complete certification of compliance by the applicable deadline under § 266.103(c)(7)(i) (B) or (C).

* * * * *

3. Section 265.113 is amended by revising paragraphs (a), introductory text, and (b), introductory text, to read as follows:

§ 265.113 Closure; time allowed for closure.

(a) Within 90 days after receiving the final volume of hazardous wastes at a hazardous waste management unit or facility, or within 90 days after approval of the closure plan, whichever is later, or, for a boiler or industrial furnace that does not submit a complete certification

of compliance by the applicable deadline under § 266.103(c)(7)(i) (B) or (C), within 90 days after the applicable deadline, the owner or operator must treat, remove from the unit or facility or dispose of on-site, all hazardous wastes in accordance with the approved closure plan. The Regional Administrator may approve a longer period if the owner or operator demonstrates that:

* * * * *

(b) The owner or operator must complete partial or final closure activities in accordance with the approved closure plan and within 180 days after receiving the final volume of hazardous wastes at the hazardous waste management unit or facility, or 180 days after approval of the closure plan, if that is later, or, for a boiler or industrial furnace that does not submit a complete certification of compliance by the applicable deadline under § 266.103(c)(7)(i) (B) or (C), within 180 days after the applicable deadline. The Regional Administrator may approve an extenstion to the closure period if the owner or operator demonstrates that:

* * * * *

4. Section 265.340 is amended by revising paragraph (a) to read as follows:

§ 265.340 Applicability.

(a) The regulations of this subpart apply to owners and operators of hazardous waste incinerators (as defined in § 260.10 of this chapter), except as § 265.1 provides otherwise.

* * * * *

PART 266—STANDARDS FOR THE MANAGEMENT OF SPECIFIC HAZARDOUS WASTES AND SPECIFIC TYPES OF HAZARDOUS WASTE MANAGEMENT FACILITIES

V. In part 266:

1. The authority citation for part 266 continues to read as follows:

Authority: Secs. 1006, 2002(a), 3004, and 3014 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6905, 6912(a), 6924, and 6934).

2. Subpart D is hereby removed and reserved and subpart H is added to read as follows:

Subpart H—Hazardous Waste Burned in Boilers and Industrial Furnaces

Sec.
266.100 Applicability.
266.101 Management prior to burning.
266.102 Permit standards for burners.
266.103 Interim status standards for burners.
266.104 Standards to control organic emissions.
266.105 Standards to control particulate matter.
266.106 Standards to control metals emissions.
266.107 Standards to control hydrogen chloride (HCl) and chlorine gas (Cl_2) emissions.
266.108 Small quantity on-site burner exemption.
266.109 Low risk waste exemption.
266.110 Waiver of DRE trial burn for boilers.
266.111 Standards for direct transfer.
266.112 Regulation of residues.

§ 266.100 Applicability.

(a) The regulations of this subpart apply to hazardous waste burned or processed in a boiler or industrial furnace (as defined in § 260.10 of this chapter) irrespective of the purpose of burning or processing, except as provided by paragraphs (b), (c), and (d) of this section. In this subpart, the term "burn" means burning for energy recovery or destruction, or processing for materials recovery or as an ingredient. The emissions standards of §§ 266.104, 266.105, 266.106, and 266.107 apply to facilities operating under interim status or under a RCRA operating permit as specified in §§ 266.102 and 266.103.

(b) The following hazardous wastes and facilities are not subject to regulation under this subpart:

(1) Used oil burned for energy recovery that is also a hazardous waste solely because it exhibits a characteristic of hazardous waste identified in subpart C of part 261 of this chapter. Such used oil is subject to regulation under subpart E of part 266 rather than this subpart;

(2) Gas recovered from hazardous or solid waste landfills when such gas is burned for energy recovery.

(3) Hazardous wastes that are exempt from regulation under §§ 261.4 and 261.6(a)(3) (v–viii) of this chapter, and hazardous wastes that are subject to the special requirements for conditionally exempt small quantity generators under § 261.5 of this chapter.

(4) Coke ovens, if the only hazardous waste burned is EPA Hazardous Waste No. K087, decanter tank tar sludge from coking operations.

(c) Owners and operators of smelting, melting, and refining furnaces (including pyrometallurgical devices such as cupolas, sintering machines, roasters, and foundry furnaces, but not including cement kilns, aggregate kilns, or halogen acid furnaces burning hazardous waste) that process hazardous waste solely for metal recovery are conditionally exempt from regulation under this subpart, except for §§ 266.101 and 266.112.

(1) To be exempt from §§ 266.102 through 266.111, an owner or operator must:

(i) Provide a one-time written notice to the Director indicating the following:

(A) The owner or operator claims exemption under this paragraph;

(B) The hazardous waste is burned solely for metal recovery consistent with the provisions of paragraph (c)(2) of this section;

(C) The hazardous waste contains recoverable levels of metals; and

(D) The owner or operator will comply with the sampling and analysis and recordkeeping requirements of this paragraph;

(ii) Sample and analyze the hazardous waste and other feedstocks as necessary to comply with the requirements of this paragraph under procedures specified by Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW–846, incorporated by reference in § 260.11 of this chapter; and

(iii) Maintain at the facility for at least three years records to document compliance with the provisions of this paragraph including limits on levels of toxic organic constituents and Btu value of the waste, and levels of recoverable metals in the hazardous waste compared to normal nonhazardous waste feedstocks.

(2) A hazardous waste meeting either of the following criteria is not processed solely for metal recovery:

(i) The hazardous waste has a total concentration of organic compounds listed in part 261, appendix VIII, of this chapter exceeding 500 ppm by weight, as-generated, and so is considered to be burned for destruction; or

(ii) The hazardous waste has a heating value of 5,000 Btu/lb or more, as-generated or as-fired into the furnace, and so is considered to be burned as fuel.

(d) The standards for direct transfer operations under § 266.111 apply only to facilities subject to the permit standards of § 266.102 or the interim status standards of § 266.103.

(e) The management standards for residues under § 266.112 apply to any boiler or industrial furnace burning hazardous waste.

(Approved by the Office of Management and Budget under control number 2050–0073)

§ 266.101 Management prior to burning.

(a) *Generators.* Generators of hazardous waste that is burned in a boiler or industrial furnace are subject to part 262 of this chapter.

(b) *Transporters.* Transporters of hazardous waste that is burned in a

boiler or industrial furnace are subject to part 263 of this chapter.

(c) *Storage facilities.* (1) Owners and operators of facilities that store hazardous waste that is burned in a boiler or industrial furnace are subject to the applicable provisions of subparts A through L of part 264, subparts A through L of part 265, and part 270 of this chapter, except as provided by paragraph (c)(2) of this section. These standards apply to storage by the burner as well as to storage facilities operated by intermediaries (processors, blenders, distributors, etc.) between the generator and the burner.

(2) Owners and operators of facilities that burn, in an on-site boiler or industrial furnace exempt from regulation under the small quantity burner provisions of § 266.108, hazardous waste that they generate are exempt from regulation under subparts A through L of part 264, subparts A through L of part 265, and part 270 of this chapter with respect to the storage of mixtures of hazardous waste and the primary fuel to the boiler or industrial furnace in tanks that feed the fuel mixture directly to the burner. Storage of hazardous waste prior to mixing with the primary fuel is subject to regulation as prescribed in paragraph (c)(1) of this section.

§ 266.102 Permit standards for burners.

(a) *Applicability*—(1) *General.* Owners and operators of boilers and industrial furnaces burning hazardous waste and not operating under interim status must comply with the requirements of this section and §§ 270.22 and 270.66 of this chapter, unless exempt under the small quantity burner exemption of § 266.108.

(2) *Applicability of part 264 standards.* Owners and operators of boilers and industrial furnaces that burn hazardous waste are subject to the following provisions of part 264 of this chapter, except as provided otherwise by this subpart:

(i) In subpart A (General), 264.4;

(ii) In subpart B (General facility standards), §§ 264.11–264.18;

(iii) In subpart C (Preparedness and prevention), §§ 264.31–264.37;

(iv) In subpart D (Contingency plan and emergency procedures), §§ 264.51–264.56;

(v) In subpart E (Manifest system, recordkeeping, and reporting), the applicable provisions of §§ 264.71–264.77;

(vi) In subpart F (Corrective Action), §§ 264.90 and 264.101;

(vii) In subpart G (Closure and post-closure), §§ 264.111–264.115;

(viii) In subpart H (Financial requirements), §§ 264.141, 264.142, 264.143, and 264.147–264.151, except that States and the Federal government are exempt from the requirements of subpart H; and

(ix) Subpart BB (Air emission standards for equipment leaks), except §§ 264.1050(a).

(b) *Hazardous waste analysis.* (1) The owner or operator must provide an analysis of the hazardous waste that quantifies the concentration of any constituent identified in appendix VIII of part 261 of this chapter that may reasonably be expected to be in the waste. Such constituents must be identified and quantified if present, at levels detectable by analytical procedures prescribed by Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods (incorporated by reference, see § 260.11 of this chapter). The appendix VIII, part 261 constituents excluded from this analysis must be identified and the basis for their exclusion explained. This analysis will be used to provide all information required by this subpart and § 270.22 and § 270.66 of this chapter and to enable the permit writer to prescribe such permit conditions as necessary to protect human health and the environment. Such analysis must be included as a portion of the part B permit application, or, for facilities operating under the interim status standards of this subpart, as a portion of the trial burn plan that may be submitted before the part B application under provisions of § 270.66(g) of this chapter as well as any other analysis required by the permit authority in preparing the permit. Owners and operators of boilers and industrial furnaces not operating under the interim status standards must provide the information required by §§ 270.22 or 270.66(c) of this chapter in the part B application to the greatest extent possible.

(2) Throughout normal operation, the owner or operator must conduct sampling and analysis as necessary to ensure that the hazardous waste, other fuels, and industrial furnace feedstocks fired into the boiler or industrial furnace are within the physical and chemical composition limits specified in the permit.

(c) *Emissions standards.* Owners and operators must comply with emissions standards provided by §§ 266.104 through 266.107.

(d) *Permits.* (1) The owner or operator may burn only hazardous wastes specified in the facility permit and only under the operating conditions specified under paragraph (e) of this section, except in approved trial burns under the conditions specified in § 270.66 of this chapter.

(2) Hazardous wastes not specified in the permit may not be burned until operating conditions have been specified under a new permit or permit modification, as applicable. Operating requirements for new wastes may be based on either trial burn results or alternative data included with part B of a permit application under § 270.22 of this chapter.

(3) Boilers and industrial furnaces operating under the interim status standards of § 266.103 are permitted under procedures provided by § 270.66(g) of this chapter.

(4) A permit for a new boiler or industrial furnace (those boilers and industrial furnaces not operating under the interim status standards) must establish appropriate conditions for each of the applicable requirements of this section, including but not limited to allowable hazardous waste firing rates and operating conditions necessary to meet the requirements of paragraph (e) of this section, in order to comply with the following standards:

(i) For the period beginning with initial introduction of hazardous waste and ending with initiation of the trial burn, and only for the minimum time required to bring the device to a point of operational readiness to conduct a trial burn, not to exceed a duration of 720 hours operating time when burning hazardous waste, the operating requirements must be those most likely to ensure compliance with the emission standards of §§ 266.104 through 266.107, based on the Director's engineering judgment. If the applicant is seeking a waiver from a trial burn to demonstrate conformance with a particular emission standard, the operating requirements during this initial period of operation shall include those specified by the applicable provisions of § 266.104, § 266.105, § 266.106, or § 266.107. The Director may extend the duration of this period for up to 720 additional hours when good cause for the extension is demonstrated by the applicant.

(ii) For the duration of the trial burn, the operating requirements must be sufficient to demonstrate compliance with the emissions standards of §§ 266.104 through 266.107 and must be in accordance with the approved trial burn plan;

(iii) For the period immediately following completion of the trial burn, and only for the minimum period sufficient to allow sample analysis, data computation, submission of the trial burn results by the applicant, review of

the trial burn results and modification of the facility permit by the Director to reflect the trial burn results, the operating requirements must be those most likely to ensure compliance with the emission standards §§ 266.104 through 266.107 based on the Director's engineering judgment.

(D) For the remaining duration of the permit, the operating requirements must be those demonstrated in a trial burn or by alternative data specified in § 270.22 of this chapter, as sufficient to ensure compliance with the emissions standards of §§ 266.104 through 266.107.

(e) *Operating requirements*—(1) *General.* A boiler or industrial furnace burning hazardous waste must be operated in accordance with the operating requirements specified in the permit at all times where there is hazardous waste in the unit.

(2) *Requirements to ensure compliance with the organic emissions standards*— (i) *DRE standard.* Operating conditions will be specified either on a case-by-case basis for each hazardous waste burned as those demonstrated (in a trial burn or by alternative data as specified in § 270.22) to be sufficient to comply with the destruction and removal efficiency (DRE) performance standard of § 266.104(a) or as those special operating requirements provided by § 266.104(a)(4) for the waiver of the DRE trial burn. When the DRE trial burn is not waived under § 266.104(a)(4), each set of operating requirements will specify the composition of the hazardous waste (including acceptable variations in the physical and chemical properties of the hazardous waste which will not affect compliance with the DRE performance standard) to which the operating requirements apply. For each such hazardous waste, the permit will specify acceptable operating limits including, but not limited to, the following conditions as appropriate:

(A) Feed rate of hazardous waste and other fuels measured and specified as prescribed in paragraph (e)(6) of this section;

(B) Minimum and maximum device production rate when producing normal product expressed in appropriate units, measured and specified as prescribed in paragraph (e)(6) of this section;

(C) Appropriate controls of the hazardous waste firing system;

(D) Allowable variation in boiler and industrial furnace system design or operating procedures;

(E) Minimum combustion gas temperature measured at a location indicative of combustion chamber temperature, measured and specified as prescribed in paragraph (e)(6) of this section;

(F) An appropriate indicator of combustion gas velocity, measured and specified as prescribed in paragraph (e)(6) of this section, unless documentation is provided under § 270.66 of this chapter demonstrating adequate combustion gas residence time; and

(G) Such other operating requirements as are necessary to ensure that the DRE performance standard of § 266.104(a) is met.

(ii) *Carbon monoxide and hydrocarbon standards.* The permit must incorporate a carbon monoxide (CO) limit and, as appropriate, a hydrocarbon (HC) limit as provided by paragraphs (b), (c), (d), (e) and (f) of § 266.104. The permit limits will be specified as follows:

(A) When complying with the CO standard of § 266.104(b)(1), the permit limit is 100 ppmv;

(B) When complying with the alternative CO standard under § 266.104(c), the permit limit for CO is based on the trial burn and is established as the average over all valid runs of the highest hourly rolling average CO level of each run, and the permit limit for HC is 20 ppmv (as defined in § 266.104(c)(1)), except as provided in § 266.104(f).

(C) When complying with the alternative HC limit for industrial furnaces under § 266.104(f), the permit limit for HC and CO is the baseline level when hazardous waste is not burned as specified by that paragraph.

(iii) *Start-up and shut-down.* During start-up and shut-down of the boiler or industrial furnace, hazardous waste (except waste fed solely as an ingredient under the Tier I (or adjusted Tier I) feed rate screening limits for metals and chloride/chlorine, and except low risk waste exempt from the trial burn requirements under §§ 266.104(a)(5), 266.105, 266.106, and 266.107) must not be fed into the device unless the device is operating within the conditions of operation specified in the permit.

(3) *Requirements to ensure conformance with the particulate standard.* (i) Except as provided in paragraphs (e)(3) (ii) and (iii) of this section, the permit shall specify the following operating requirements to ensure conformance with the particulate standard specified in § 266.105:

(A) Total ash feed rate to the device from hazardous waste, other fuels, and industrial furnace feedstocks, measured and specified as prescribed in paragraph (e)(6) of this section;

(B) Maximum device production rate when producing normal product expressed in appropriate units, and measured and specified as prescribed in paragraph (e)(6) of this section;

(C) Appropriate controls on operation and maintenance of the hazardous waste firing system and any air pollution control system;

(D) Allowable variation in boiler and industrial furnace system design including any air pollution control system or operating procedures; and

(E) Such other operating requirements as are necessary to ensure that the particulate standard in § 266.111(b) is met.

(ii) Permit conditions to ensure conformance with the particulate matter standard shall not be provided for facilities exempt from the particulate matter standard under § 266.105(b);

(iii) For cement kilns and light-weight aggregate kilns, permit conditions to ensure compliance with the particulate standard shall not limit the ash content of hazardous waste or other feed materials.

(4) *Requirements to ensure conformance with the metals emissions standard.* (i) For conformance with the Tier I (or adjusted Tier I) metals feed rate screening limits of paragraphs (b) or (e) of § 266.106, the permit shall specify the following operating requirements:

(A) Total feed rate of each metal in hazardous waste, other fuels, and industrial furnace feedstocks measured and specified under provisions of paragraph (e)(6) of this section;

(B) Total feed rate of hazardous waste measured and specified as prescribed in paragraph (e)(6) of this section;

(C) sampling and metals analysis program for the hazardous waste, other fuels, and industrial furnace feedstocks;

(ii) For conformance with the Tier II metals emission rate screening limits under § 266.106(c) and the Tier III metals controls under § 266.106(d), the permit shall specify the following operating requirements:

(A) Maximum emission rate for each metal specified as the average emission rate during the trial burn;

(B) Feed rate of total hazardous waste and pumpable hazardous waste, each measured and specified as prescribed in paragraph (e)(6)(i) of this section;

(C) Feed rate of each metal in the following feedstreams, measured and specified as prescribed in paragraphs (e)(6) of this section:

(1) Total feed streams;

(2) Total hazardous waste feed; and

(3) Total pumpable hazardous waste feed;

(D) Total feed rate of chlorine and chloride in total feed streams measured and specified as prescribed in paragraph (e)(6) of this section;

(E) Maximum combustion gas temperature measured at a location indicative of combustion chamber temperature, and measured and specified as prescribed in paragraph (e)(6) of this section;

(F) Maximum flue gas temperature at the inlet to the particulate matter air pollution control system measured and specified as prescribed in paragraph (e)(6) of this section;

(G) Maximum device production rate when producing normal product expressed in appropriate units and measured and specified as prescribed in paragraph (e)(6) of this section;

(H) Appropriate controls on operation and maintenance of the hazardous waste firing system and any air pollution control system;

(I) Allowable variation in boiler and industrial furnace system design including any air pollution control system or operating procedures; and

(J) Such other operating requirements as are necessary to ensure that the metals standards under §§ 266.106(c) or 266.106(d) are met.

(iii) For conformance with an alternative implementation approach approved by the Director under § 266.106(f), the permit will specify the following operating requirements:

(A) Maximum emission rate for each metal specified as the average emission rate during the trial burn;

(B) Feed rate of total hazardous waste and pumpable hazardous waste, each measured and specified as prescribed in paragraph (e)(6)(i) of this section;

(C) Feed rate of each metal in the following feedstreams, measured and specified as prescribed in paragraph (e)(6) of this section:

(1) Total hazardous waste feed; and

(2) Total pumpable hazardous waste feed;

(D) Total feed rate of chlorine and chloride in total feed streams measured and specified prescribed in paragraph (e)(6) of this section;

(E) Maximum combustion gas temperature measured at a location indicative of combustion chamber temperature, and measured and specified as prescribed in paragraph (e)(6) of this section;

(F) Maximum flue gas temperature at the inlet to the particulate matter air pollution control system measured and specified as prescribed in paragraph (e)(6) of this section;

(G) Maximum device production rate when producing normal product expressed in appropriate units and measured and specified as prescribed in paragraph (e)(6) of this section;

(H) Appropriate controls on operation and maintenance of the hazardous waste firing system and any air pollution control system;

(I) Allowable variation in boiler and industrial furnace system design including any air pollution control system or operating procedures; and

(J) Such other operating requirements as are necessary to ensure that the metals standards under §§ 266.106(c) or 266.106(d) are met.

(5) *Requirements to ensure conformance with the hydrogen chloride and chlorine gas standards.* (i) For conformance with the Tier I total chloride and chlorine feed rate screening limits of § 266.107(b)(1), the permit will specify the following operating requirements:

(A) Feed rate of total chloride and chlorine in hazardous waste, other fuels, and industrial furnace feedstocks measured and specified as prescribed in paragraph (e)(6) of this section;

(B) Feed rate of total hazardous waste measured and specified as prescribed in paragraph (e)(6) of this section;

(C) A sampling and analysis program for total chloride and chorline for the hazardous waste, other fuels, and industrial furnace feestocks;

(ii) For conformance with the Tier II HCl and Cl_2 emission rate screening limits under § 266.107(b)(2) and the Tier III HCl and Cl_2 controls under § 266.107(c), the permit will specify the following operating requirements:

(A) Maximum emission rate for HCl and for Cl_2 specified as the average emission rate during the trial burn;

(B) Feed rate of total hazardous waste measured and specified as prescribed in paragraph (e)(6) of this section;

(C) Total feed rate of chlorine and chloride in total feed streams, measured and specified as prescribed in paragraph (e)(6) of this section;

(D) Maximum device production rate when producing normal product expressed in appropriate units, measured and specified as prescribed in paragraph (e)(6) of this section;

(E) Appropriate controls on operation and maintenance of the hazardous waste firing system and any air pollution control system;

(F) Allowable variation in boiler and industrial furnace system design including any air pollution control system or operating procedures; and

(G) Such other operating requirements as are necessary to ensure that the HCl and Cl_2 standards under § 266.107 (b)(2) or (c) are met.

(6) *Measuring paramenters and establishing limits based on trial burn data*—(i) *General requirements.* As specified in paragraphs (e)(2) through (e)(5) of this section, each operating parameter shall be measured, and permit limits on the parameter shall be established, according to either of the following procedures:

(A) *Instantaneous limits.* A parameter may be measured and recorded on an instantaneous basis (i.e., the value that occurs at any time) and the permit limit specified as the time-weighted average during all valid runs of the trial burn; or

(B) *Hourly rolling average.* (*1*) The limit for a parameter may be established and continuously monitored on an hourly rolling average basis defined as follows:

(*i*) A continuous monitor is one which continuously samples the regulated parameter without interruption, and evaluates the detector response at least once each 15 seconds, and computes and records the average value at least every 60 seconds.

(*ii*) An hourly rolling average is the arithmetic means of the 60 most recent 1-minute average values recorded by the continuous monitoring system.

(2) The permit limit for the parameter shall be established based on trial burn data as the average over all valid test runs of the highest hourly rolling average value for each run.

(ii) *Rolling average limits for carcinogenic metals and lead.* Feed rate limits for the carcinogenic metals (i.e., arsenic, beryllium, cadmium and chromium) and lead may be established either on an hourly rolling average basis as prescribed by paragraph (e)(6)(i) of this section or on (up to) a 24 hour rolling average basis. If the owner or opeator elects to use an average period from 2 to 24 hours:

(A) The feed rate of each metal shall be limited at any time to ten times the feed rate that would be allowed on an hourly rolling average basis;

(B) The continuous monitor shall meet the following specifications:

(*1*) A continuous monitor is one which continuously samples the regulated parameter without interruption, and evaluates the detector response at least once each 15 seconds, and computes and records the average value at least every 60 seconds.

(2) The rolling average for the selected averaging period is defined as the arithmetic mean of the most recent one hour block average for the average period. A one hour block average is the arithmetic mean of the one minute averages recorded during the 60-minute period beginning at one minute after the beginning of preceding clock hour; and

(C) The permit limit for the feed rate of each metal shall be established based on trial burn data as the average over all valid test runs of the highest hourly rolling average feed rate for each run.

(iii) *Feed rate limits for metals, total chloride and chlorine, and ash.* Feed rate limits for metals, total chlorine and chloride, and ash are established and monitored by knowing the concentration of the substance (i.e., metals, chloride/chlorine, and ash) in each feedstream and the flow rate of the feedstream. To monitor the feed rate of these substances, the flow rate of each feedstream must be monitored under the continuous monitoring requirements of paragraphs (e)(6) (i) and (ii) of this section.

(iv) *Conduct of trial burn testing.* (A) If compliance with all applicable emissions standards of §§ 266.104 through 266.107 is not demonstrated simultaneously during a set of test runs, the operating conditions of additional test runs required to demonstrate compliance with remaining emissions standards must be as close as possible to the original operating conditions.

(B) Prior to obtaining test data for purposes of demonstrating compliance with the emissions standards of §§ 266.104 through 266.107 or establishing limits on operating parameters under this section, the facility must operate under trial burn conditions for a sufficient period to reach steady-state operations. The Director may determine, however, that industrial furnaces that recycle collected particulate matter back into the furnace and that comply with an alternative implementation approach for metals under § 266.106(f), need not reach steady state conditions with respect to the flow of metals in the system prior to beginning compliance testing for metals emissions.

(C) Trial burn data on the level of an operating parameter for which a limit must be established in the permit must be obtained during emissions sampling for the pollutant(s) (i.e., metals, PM, HCl/Cl_2, organic compounds) for which the parameter must be established as specified by paragraph (e) of this section.

(7) *General requirements*—(i) *Fugitive emissions.* Fugitive emissions must be controlled by:

(A) Keeping the combustion zone totally sealed against fugitive emissions; or

(B) Maintaining the combustion zone pressure lower than atmospheric pressure; or

(C) An alternate means of control demonstrated (with part B of the permit application) to provide fugitive emissions control equivalent to maintenance of combustion zone pressure lower than atmospheric pressure.

(ii) *Automatic waste feed cutoff.* A boiler or industrial furnace must be operated with a functioning system that automatically cuts off the hazardous waste feed when operating conditions deviate from those established under this section. The Director may limit the number of cutoffs per an operating period on a case-by-case basis. In addition:

(A) The permit limit for (the indicator of) minimum combustion chamber temperature must be maintained while hazardous waste or hazardous waste residues remain in the combustion chamber,

(B) Exhaust gases must be ducted to the air pollution control system operated in accordance with the permit requirements while hazardous waste or hazardous waste residues remain in the combustion chamber; and

(C) Operating parameters for which permit limits are established must continue to be monitored during the cutoff, and the hazardous waste feed shall not be restarted until the levels of those parameters comply with the permit limits. For parameters that may be monitored on an instantaneous basis, the Director will establish a minimum period of time after a waste feed cutoff during which the parameter must not exceed the permit limit before the hazardous waste feed may be restarted.

(iii) *Changes.* A boiler or industrial furnace must cease burning hazardous waste when changes in combustion properties, or feed rates of the hazardous waste, other fuels, or industrial furnace feedstocks, or changes in the boiler or industrial furnace design or operating conditions deviate from the limits as specified in the permit.

(8) *Monitoring and Inspections.* (i) The owner or operator must monitor and record the following, at a minimum, while burning hazardous waste:

(A) If specified by the permit, feed rates and composition of hazardous waste, other fuels, and industrial furnace feedstocks, and feed rates of ash, metals, and total chloride and chlorine;

(B) If specified by the permit, carbon monoxide (CO), hydrocarbons (HC), and oxygen on a continuous basis at a common point in the boiler or industrial furnace downstream of the combustion zone and prior to release of stack gases to the atmosphere in accordance with operating requirements specified in paragraph (e)(2)(ii) of this section. CO, HC, and oxygen monitors must be installed, operated, and maintained in accordance with methods specified in appendix IX of this part.

(C) Upon the request of the Director, sampling and analysis of the hazardous waste (and other fuels and industrial furnace feedstocks as appropriate), residues, and exhaust emissions must be conducted to verify that the operating requirements established in the permit achieve the applicable standards of §§ 266.104, 266.105, 266.106, and 266.107.

(ii) All monitors shall record data in units corresponding to the permit limit unless otherwise specified in the permit.

(iii) The boiler or industrial furnace and associated equipment (pumps, values, pipes, fuel storage tanks, etc.) must be subjected to thorough visual inspection when it contains hazardous waste, at least daily for leaks, spills, fugitive emissions, and signs of tampering.

(iv) The automatic hazardous waste feed cutoff system and associated alarms must be tested at least once every 7 days when hazardous waste is burned to verify operability, unless the applicant demonstrates to the Director that weekly inspections will unduly restrict or upset operations and that less frequent inspections will be adequate. At a minimum, operational testing must be conducted at least once every 30 days.

(v) These monitoring and inspection data must be recorded and the records must be placed in the operating record required by § 264.73 of this chapter.

(9) *Direct transfer to the burner.* If hazardous waste is directly transferred from a transport vehicle to a boiler or industrial furnace without the use of a storage unit, the owner and operator must comply with § 266.111.

(10) *Recordkeeping.* The owner or operator must keep in the operating record of the facility all information and data required by this section for not less than three years.

(11) *Closure.* At closure, the owner or operator must remove all hazardous waste and hazardous waste residues (including, but not limited to, ash, scrubber waters, and scrubber sludges) from the boiler or industrial furnace.

(Approved by the Office of Management and Budget under control number 2050-0073)

§ 266.103 Interim status standards for burners.

(a) *Purpose, scope, applicability.*—(1) *General.* (i) The purpose of this section is to establish minimum national standards for owners and operators of "existing" boilers and industrial furnaces that burn hazardous waste where such standards define the

acceptable management of hazardous waste during the period of interim status. The standards of this section apply to owners and operators of existing facilities until either a permit is issued under § 266.102(d) or until closure responsibilities identified in this section are fulfilled.

(ii) *Existing or in existence* means a boiler or industrial furnace that on or before August 21, 1991 is either in operation burning or processing hazardous waste or for which construction (including the ancillary facilities to burn to process the hazardous waste) has commenced. A facility has commenced construction if the owner or operator has obtained the Federal, State, and local approvals or permits necessary to begin physical construction; and either:

(A) A continuous on-site, physical construction program has begun; or

(B) The owner or operator has entered into contractual obligations—which cannot be canceled or modified without substantial loss—for physical construction of the facility to be completed within a reasonable time.

(iii) If a boiler or industrial furnace is located at a facility that already has a permit or interim status, then the facility must comply with the applicable regulations dealing with permit modifications in § 270.42 or changes in interim status in § 270.72 of this chapter.

(2) *Exemptions.* The requirements of this section do not apply to hazardous waste and facilities exempt under §§ 266.100(b), or 266.108.

(3) *Prohibition or burning dioxin-listed wastes.* Hazardous waste listed for dioxin or derived from any of the following dioxin-listed wastes may not be burned in a boiler or industrial furnace operating under interim status: EPA Hazardous Waste Numbers F020, F021, F022, F023, F026, or F027.

(4) *Applicability of part 265 standards.* Owners and operators of boilers and industrial furnaces that burn hazardous waste and are operating under interim status are subject to the following provisions of part 265 of this chapter, except as provided otherwise by this section:

(i) In subpart A (General), § 265.4;

(ii) In subpart B (General facility standards), §§ 265.11–265.17;

(iii) In subpart C (Preparedness and prevention), §§ 265.31–265.37;

(iv) In subpart D (Contingency plan and emergency procedures), §§ 265.51–265.56;

(v) In subpart E (Manifest system, recordkeeping, and reporting), §§ 265.71–265.77, except that §§ 265.71, 265.72, and 265.76 do not apply to owners and operators of on-site facilities that do not receive any hazardous waste from off-site sources;

(vi) In subpart G (Closure and post-closure), §§ 265.111–265.115;

(vii) In subpart H (Financial requirements), §§ 265.141, 265.142, 265.143, and 265.147–265.151, except that States and the Federal government are exempt from the requirements of subpart H; and

(viii) Subpart BB (Air emission standards for equipment leaks), except § 265.1050(a).

(5) *Special requirements for furnaces.* The following controls apply during interim status to industrial furnaces (e.g., kilns, cupolas) that feed hazardous waste for a purpose other than solely as an ingredient (see paragraph (a)(5)(ii) of this section) at any location other than the hot end where products are normally discharged and where fuels are normally fired:

(i) *Controls.* (A) The hazardous waste shall be fed at a location where combustion gas temperatures are at least 1800 °F;

(B) The owner or operator must determine that adequate oxygen is present in combustion gases to combust organic constituents in the waste and retain documentation of such determination in the facility record;

(C) For cement kiln systems, the hazardous waste shall be fed into the kiln; and

(D) The hydrocarbon controls of § 266.104(c) or paragraph (c)(7)(ii) of this section apply upon certification of compliance under paragraph (c) of this section irrespective of the CO level achieved during the compliance test.

(ii) *Burning hazardous waste solely as an ingredient.* A hazardous waste is burned for a purpose other than solely as an ingredient if it meets either of these criteria:

(A) The hazardous waste has a total concentration of nonmetal compounds listed in part 261, appendix VIII, of this chapter exceeding 500 ppm by weight as-generated (and, so, is considered to be burned for destruction); or

(B) The hazardous waste has a heating value of 5,000 Btu/lb or more, as-generated or as-fired (and, so, is considered to be burned as fuel).

(6) *Restrictions on burning hazardous waste that is not a fuel.* Prior to certification of compliance under paragraph (c) of this section, owners and operators shall not feed hazardous waste (other than hazardous waste burned solely as an ingredient) in a boiler or industrial furnace that has a heating value less than 5,000 Btu/lb, as-generated, except for purposes of compliance testing (or testing prior to compliance testing) for a total period of time not to exceed 720 hours.

(7) *Direct transfer to the burner.* If hazardous waste is directly transferred from a transport vehicle to a boiler or industrial furnace without the use of a storage unit, the owner and operator must comply with § 266.111.

(b) *Certification of precompliance*—(1) *General.* The owner or operator must provide complete and accurate information specified in paragraph (b)(2) of this section to the Director on or before August 21, 1991, and must establish limits for the operating parameters specified in paragraph (b)(3) of this section. Such information is termed a "certification of precompliance" and constitutes a certification that the owner or operator has determined that, when the facility is operated within the limits specified in paragraph (b)(3) of this section, the owner or operator believes that, using best engineering judgment, emissions of particulate matter, metals, and HCl and Cl_2 are not likely to exceed the limits provided by §§ 266.105, 266.106, and 266.107. The facility may burn hazardous waste only under the operating conditions that the owner or operator establishes under paragraph (b)(3) of this section until the owner or operator submits a revised certification of precompliance under paragraph (b)(8) of this section or a certification of compliance under paragraph (c) of this section, or until a permit is issued.

(2) *Information required.* The following information must be submitted with the certification of precompliance to support the determination that the limits established for the operating parameters identified in paragraph (b)(3) of this section are not likely to result in an exceedance of the allowable emission rates for particulate matter, metals, and HCl and Cl_2:

(i) General facility information:

(A) EPA facility ID number;

(B) Facility name, contact person, telephone number, and address;

(C) Description of boilers and industrial furnaces burning hazardous waste, including type and capacity of device;

(D) A scaled plot plan showing the entire facility and location of the boilers and industrial furnaces burning hazardous waste; and

(E) A description of the air pollution control system on each device burning hazardous waste, including the temperature of the flue gas at the inlet to the particulate matter control system.

(ii) Except for facilities complying with the Tier I feed rate screening limits for metals or total chlorine and chloride

provided by §§ 266.106 (b) or (e) and 266.107 (b)(1) or (e) respectively, the estimated uncontrolled (at the inlet to the air pollution control system) emissions of particulate matter, each metal controlled by § 266.106, and hydrogen chloride and chlorine, and the following information to support such determinations:

(A) The feed rate (lb/hr) of ash, chlorine, antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, silver, thallium in each feedstream (hazardous waste, other fuels, industrial furnace feedstocks);

(B) The estimated partitioning factor to the combustion gas for the materials identified in paragraph (b)(ii)(A) of this section and the basis for the estimate and an estimate of the partitioning to HCl and Cl_2 of total chloride and chlorine in feed materials. To estimate the partitioning factor, the owner or operator must use either best engineering judgment or the procedures specified in appendix IX of this part.

(C) For industrial furnaces that recycle collected particulate matter (PM) back into the furnace and that will certify compliance with the metals emissions standards under paragraph (c)(3)(ii)(A), the estimated enrichment factor for each metal. To estimate the enrichment factor, the owner or operator must use either best engineering judgment or the procedures specified in "Alternative Methodology for Implementing Metals Controls" in appendix IX of this part.

(D) If best engineering judgment is used to estimate partitioning factors or enrichment factors under paragraphs (b)(ii)(B) or (b)(ii)(C) respectively, the basis for the judgment. When best engineering judgment is used to develop or evaluate data or information and make determinations under this section, the determinations must be made by a qualified, registered professional engineer and a certification of his/her determinations in accordance with § 270.11(d) of this chapter must be provided in the certification of precompliance.

(iii) For facilities complying with the Tier I feed rate screening limits for metals or total chlorine and chloride provided by §§ 266.106 (b) or (e) and 266.107 (b)(1) or (e), the feed rate (lb/hr) of total chloride and chlorine, antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, silver, and thallium in each feedstream (hazardous waste, other fuels, industrial furnace feedstocks).

(iv) For facilities complying with the Tier II or Tier III emission limits for metals or HCl and Cl_2 (under §§ 266.106 (c) or (d) or 266.107(b)(2) or (c)), the estimated controlled (outlet of the air pollution control system) emissions rates of paticulate matter, each metal controlled by § 266.106, and HCl and Cl_2, and the following information to support such determinations:

(A) The estimated air pollution control system (APCS) removal efficiency for particulate matter, HCl, Cl_2, antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, silver, and thallium.

(B) To estimate APCS removal efficiency, the owner or operator must use either best engineering judgment or the procedures prescribed in appendix IX of this part.

(C) If best engineering judgment is used to estimate APCS removal efficiency, the basis for the judgment. Use of best engineering judgment must be in conformance with provisions of paragraph (b)(2)(ii)(D) of this section.

(v) Determination of allowable emissions rates for HCl, Cl_2, antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, silver, and thallium, and the following information to support such determinations:

(A) For all facilities:

(*1*) Physical stack height;

(*2*) Good engineering practice stack height as defined by 40 CFR 51.100(ii);

(*3*) Maximum flue gas flow rate;

(*4*) Maximum flue gas temperature;

(*5*) Attach a US Geological Service topographic map (or eqivalent) showing the facility location and surrounding land within 5 km of the facility.

(*6*) Identify terrain type: complex or noncomplex; and

(*7*) Identify land use: urban or rural.

(B) For owners and operators using Tier III site specific dispersion modeling to determine allowable levels under § 266.106(d) or § 266.107(c), or adjusted Tier I feed rate screening limits under §§ 266.106(e) or 266.107(e):

(*1*) Dispersion model and version used;

(*2*) Source of meterological data;

(*3*) The dilution factor in micrograms per cubic meter per gram per second of emissions for the maximum annual average off-site (unless on-site is required) ground level concentration (MEI location); and

(*4*) Indicate the MEI location on the map required under paragraph (b)(2)(v)(A)(*5*);

(vi) For facilities complying with the Tier II or III emissions rate controls for metals or HC1 and Cl_2, a comparison of the estimated controlled emissions rates determined under paragraph (b)(2)(iv) with the allowable emission rates determined under paragraph (b)(2)(v);

(vii) For facilities complying with the Tier I (or adjusted Tier I) feed rate screening limits for metals or total chloride and chlorine, a comparison of actual feed rates of each metal and total chlorine and chloride determined under paragraph (b)(2)(iii) of this section to the Tier I allowable feed rates; and

(viii) For industrial furnaces that feed hazardous waste for any purpose other than solely as an ingredient (as defined by paragraph (a)(5)(ii) of this section) at any location other than the product discharge end of the device, documentation of compliance with the requirements of paragraphs (a)(5)(i) (A), (B), and (C) of this section.

(ix) For industrial furnaces that recycle collected particulate matter (PM) back into the furnace and that will certify compliance with the metals emissions standards under paragraph (c)(3)(ii) (A) of this section:

(A) The applicable particulate matter standard in lb/hr; and

(B) The precompliance limit on the concentration of each metal in collected PM.

(3) *Limits on operating conditions.* The owner and operator shall establish limits on the following parameters consistent with the determinations made under paragraph (b)(2) of this section and certify (under provisions of paragraph (b)(9) of this section) to the Director that the facility will operate within the limits during interim status when there is hazardous waste in the unit until revised certification of precompliance under paragraph (b)(8) of this section or certification of compliance under paragraph (c) of this section:

(i) Feed rate of total hazardous waste and (unless complying with the Tier I or adjusted Tier I metals feed rate screening limits under § 266.106(b) or (e)) pumpable hazardous waste;

(ii) Feed rate of each metal in the following feed streams;

(A) Total feed streams, except that industrial furnaces that comply with the alternative metals implementation approach under paragraph (b)(4) of this section must specify limits on the concentration of each metal in collected particulate matter in lieu of feed rate limits for total feedstreams;

(B) Total hazardous waste feed; and

(C) Total pumpable hazardous waste feed, unless complying with the Tier I or adjusted Tier I metals feed rate screening limits under § 266.106 (b) or (e);

(iii) Total feed rate of chlorine and chloride in total feed streams;

(iv) Total feed rate of ash in total feed streams, except that the ash feed rate for cement kilns and light-weight aggregate kilns is not limited; and

(v) Maximum production rate of the device in appropriate units when producing normal product.

(4) *Operating requirements for furnaces that recycle PM.* Owners and operators of furnaces that recycle collected particulate matter (PM) back into the furnace and that will certify compliance with the metals emissions controls under paragraph (c)(3)(ii)(A) of this section must comply with the special operating requirements provided in "Alternative Methodology for Implementing Metals Controls" in appendix IX of this part.

(5) *Measurement of feed rates and production rate*—(i) *General requirements.* Limits on each of the parameters specified in paragraph (b)(3) of this section (except for limits on metals concentrations in collected particulate matter (PM) for industrial furnaces that recycle collected PM) shall be established and continuously monitored under either of the following methods:

(A) *Instantaneous limits.* A limit for a parameter may be established and continuously monitored on an instantaneous basis (i.e., the value that occurs at any time) not to be exceeded at any time; or

(B) *Hourly rolling average limits.* A limit for a parameter may be established and continuously monitored on an hourly rolling average basis defined as follows:

(1) A continuous monitor is one which continuously samples the regulated parameter without interruption, and evaluates the detector response at least once each 15 seconds, and computes and records the average value at least every 60 seconds.

(2) An hourly rolling average is the arithmetic mean of the 60 most recent 1-minute average values recorded by the continuous monitoring system.

(ii) *Rolling average limits for carcinogenic metals and lead.* Feed rate limits for the carcinogenic metals (arsenic, beryllium, cadmium, and chromium) and lead may be established either on an hourly rolling average basis as prescribed by paragraph (b)(5)(i)(B) or on (up to) a 24 hour rolling average basis. If the owner or operator elects to use an averaging period from 2 to 24 hours:

(A) The feed rate of each metal shall be limited at any time to ten times the feed rate that would be allowed on a hourly rolling average basis;

(B) The continuous monitor shall meat the following specifications:

(1) A continuous monitor is one which continuously samples the regulated parameter without interruption, and evaluates the detector response at least once each 15 seconds, and computes and records the average value at least every 60 seconds.

(2) The rolling average for the selected averaging period is defined as the arithmetic mean of the most recent one hour block averages for the averaging period. A one hour block average is the arithmetic mean of the one minute averages recorded during the 60-minute period beginning at one minute after the beginning of preceding clock hour.

(iii) *Feed rate limits for metals, total chloride and chlorine, and ash.* Feed rate limits for metals, total chlorine and chloride, and ash are established and monitored by knowing the concentration of the substance (i.e., metals, chloride/chlorine, and ash) in each feedstream and the flow rate of the feedstream. To monitor the feed rate of these substances, the flow rate of each feedstream must be monitored under the continuous monitoring requirements of paragraphs (b)(5) (i) and (ii) of this section.

(6) *Public notice requirements at precompliance.* On or before [the effective date of this rule] the owner or operator must submit a notice with the following information for publication in a major local newspaper of general circulation and send a copy of the notice to the appropriate units of State and local government. The owner and operator must provide to the Director with the certification of precompliance evidence of submitting the notice for publication. The notice, which shall be entitled "Notice of Certification of Precompliance with Hazardous Waste Burning Requirements of 40 CFR 266.103(b)", must include:

(i) Name and address of the owner and operator of the facility as well as the location of the device burning hazardous waste;

(ii) Date that the certification of precompliance is submitted to the Director;

(iii) Brief description of the regulatory process required to comply with the interim status requirements of this section including required emissions testing to demonstrate conformance with emissions standards for organic compounds, particulate matter, metals, and HCl and Cl_2;

(iv) Types and quantities of hazardous waste burned including, but not limited to, source, whether solids or liquids, as well as an appropriate description of the waste;

(v) Type of device(s) in which the hazardous waste is burned including a physical description and maximum production rate of each device;

(vi) Types and quantities of other fuels and industrial furnace feedstocks fed to each unit;

(vii) Brief description of the basis for this certification of precompliance as specified in paragraph (b)(2) of this section;

(viii) Locations where the operating record for the facility can be viewed and copied by interested parties. These locations shall at a minimum include:

(A) The Agency office where the supporting documentation was submitted or another location designated by the Director; and

(B) The facility site where the device is located;

(ix) Notification of the establishment of a facility mailing list whereby interested parties shall notify the Agency that they wish to be placed on the mailing list to receive future information and notices about this facility; and

(x) Location (mailing address) of the applicable EPA Regional Office, Hazardous Waste Division, where further information can be obtained on EPA regulation of hazardous waste burning.

(7) *Monitoring other operating parameters.* When the monitoring systems for the operating parameters listed in paragraphs (c)(1)(v through xiii) of this section are installed and operating in conformance with vendor specifications or (for CO, HC, and oxygen) specifications provided by appendix IX of this part, as appropriate, the parameters shall be continuously monitored and records shall be maintained in the operating record.

(8) *Revised certification of precompliance.* The owner or operator may revise at any time the information and operating conditions documented under paragraphs (b)(2) and (b)(3) of this section in the certification of precompliance by submitting a revised certification of precompliance under procedures provided by those paragraphs.

(i) The public notice requirements of paragraph (b)(6) of this section do not apply to recertifications.

(ii) The owner and operator must operate the facility within the limits established for the operating parameters under paragraph (b)(3) of this section until a revised certification is submitted under this paragraph or a certification of compliance is submitted under paragraph (c) of this section.

(9) *Certification of precompliance statement.* The owner or operator must include the following signed statement with the certification of precompliance submitted to the Director:

"I certify under penalty of law that this information was prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated the information and supporting documentation. Copies of all emissions tests, dispersion modeling results and other information used to determine conformance with the requirements of § 266.103(b) are available at the facility and can be obtained from the facility contact person listed above. Based on my inquiry of the person or persons who manages the facility, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I also acknowledge that the operating limits established in this certification pursuant to § 266.103(b) (3) and (4) are enforceable limits at which the facility can legally operate during interim status until: (1) A revised certification of precompliance is submitted, (2) a certification of compliance is submitted, or (3) an operating permit is issued."

(c) *Certification of compliance.* On or before August 21, 1992, the owner or operator shall conduct emissions testing to document compliance with the emissions standards of §§ 266.104 (b) through (e), 266.105, 266.106, 266.107, and paragraph (a)(5)(i)(D) of this section, under the procedures prescribed by this paragraph, except under extensions of time provided by paragraph (c)(7). Based on the compliance test, the owner or operator shall submit to the Director a complete and accurate "certification of compliance" (under paragraph (c)(4) of this section) with those emission standards establishing limits on the operating parameters specified in paragraph (c)(1).

(1) *Limits on operating conditions.* The owner or operator shall establish limits on the following parameters based on operations during the compliance test (under procedures prescribed in paragraph (c)(4)(iv) of this section) and include these limits with the certification of compliance. The boiler or industrial furnace must be operated in accordance with these operating limits at all times when there is hazardous waste in the unit until an operating permit is issued.

(i) Feed rate of total hazardous waste and (unless complying the Tier I or adjusted Tier I metals feed rate screening limits under § 266.106 (b) or (e)), pumpable hazardous waste;

(ii) Feed rate of each metal in the following feedstreams:

(A) Total feedstreams, except that industrial furnaces that must comply with the alternative metals implementation approach under paragraph (c)(3)(ii) of this section must specify limits on the concentration of each metal in collected particulate matter in lieu of feed rate limits for total feedstreams;

(B) Total hazardous waste feed (unless complying with the Tier I or adjusted Tier I metals feed rate screening limits under § 266.106 (b) or (e)); and

(C) Total pumpable hazardous waste feed:

(iii) Total feed rate of chlorine and chloride in total feed streams;

(iv) Total feed rate of ash in total feed streams, except that the ash feed rate for cement kilns and light-weighted aggregate kilns is not limited;

(v) Carbon monoxide concentration, and where required, hydrocarbon concentration in stack gas. When complying with the CO controls of § 266.104(b), the CO limit is 100 ppmv, and when complying with the HC controls of § 266.104(c), the HC limit is 20 ppmv. When complying with the CO controls of § 266.104(c), the CO limit is established based on the compliance test;

(vi) Maximum production rate of the device in appropriate units when producing normal product;

(vii) Maximum combustion chamber temperature where the temperature measurement is as close to the combustion zone as possible and is upstream of any quench water injection, (unless complying with the Tier I adjusted Tier I metals feed rate screening limits under § 266.106 (b) or (e));

(viii) Maximum flue gas temperature entering a particulate matter control device (unless complying with Tier I or adjusted Tier I metals feed rate screening limits under § 266.106 (b) or (e));

(ix) For systems using wet scrubbers, including wet ionizing scrubbers (unless complying with the Tier I or adjusted Tier I metals feed rate screening limits under § 266.106 (b) or (e) and the total chlorine and chloride feed rate screening limits under § 266.107(b) (1) or (e)):

(A) Minimum liquid to flue gas ratio;

(B) Minimum scrubber blowdown from the system or maximum suspended solids content of scrubber water; and

(C) Minimum pH level of the scrubber water;

(x) For systems using venturi scrubbers, the minimum differential gas pressure across the venturi (unless complying the Tier I or adjusted Tier I metals feed rate screening limits under § 266.106 (b) or (e) and the total chlorine and chloride feed rate screening limits under § 266.107(b) (1) or (e));

(xi) For system using dry scrubbers (unless complying with the Tier I or adjusted Tier I metals feed rate screening limits under § 266.106 (b) or (e) and the total chlorine and chloride feed rate screening limits under § 266.107(b) (1) or (e)):

(A) Minimum caustic feed rate; and

(B) Maximum flue gas flow rate:

(xii) For systems using wet ionizing scrubbers or electrostatic precipitators (unless complying with the Tier I or adjusted Tier I metals feed rate screening limits under § 266.106 (b) or (e) and the total chlorine and chloride feed rate screening limits under § 266.107(b) (1) or (e)):

(A) Minimum electrical power in kilovolt amperes (kVA) to the precipitator plates; and

(B) Maximum flue gas flow rate;

(xiii) For systems using fabric filters (baghouses), the minimum pressure drop (unless complying with the Tier I or adjusted Tier I metals feed rate screening limits under § 266.106 (b) or (e) and the total chlorine and chloride feed rate screening limits under § 266.107(b)(1) or (e)).

(2) *Prior notice of compliance testing.* At least 30 days prior to the compliance testing required by paragraph (c)(3) of this section, the owner or operator shall notify the Director and submit the following information:

(i) General facility information including:

(A) EPA facility ID number;

(B) Facility name, contact person, telephone number, and address;

(C) Person responsible for conducting compliance test, including company name, address, and telephone number, and a statement of qualifications;

(D) Planned date of the compliance test;

(ii) Specific information on each device to be tested including:

(A) Description of boiler or industrial furnace;

(B) A scaled plot plan showing the entire facility and location of the boiler or industrial furnace;

(C) A description of the air pollution control system;

(D) Identification of the continuous emission monitors that are installed, including:

(*1*) Carbon monoxide monitor;

(*2*) Oxygen monitor;

(*3*) Hydrocarbon monitor, specifying the minimum temperature of the system and, if the temperature is less than 150 °C, an explanation of why a heated system is not used (see paragraph (c)(5)

of this section) and a brief description of the sample gas conditioning system;

(E) Indication of whether the stack is shared with another device that will be in operation during the compliance test;

(F) Other information useful to an understanding of the system design or operation.

(iii) Information on the testing planned, including a complete copy of the test protocol and Quality Assurance/Quality Control (QA/QC) plan, and a summary description for each test providing the following information at a minimum:

(A) Purpose of the test (e.g., demonstrate compliance with emissions of particulate matter); and

(B) Planned operating conditions, including levels for each pertinent parameter specified in paragraph (c)(1) of this section.

(3) *Compliance testing*—(i) *General.* Compliance testing must be conducted under conditions for which the owner or operator has submitted a certification of precompliance under paragraph (b) of this section and under conditions established in the notification of compliance testing required by paragraph (c)(2) of this section.

(ii) *Special requirements for industrial furnaces that recycle collected PM.* Owners and operators of industrial furnaces that recycle back into the furnace particulate matter (PM) from the air pollution control system must comply with one of the following procedures for testing to determine compliance with the metals standards of § 266.106(c) or (d):

(A) The special testing requirements prescribed in "Alternative Method for Implementing Metals Controls" in appendix IX of this part; or

(B) Stack emissions testing for a minimum of 6 hours each day while hazardous waste is burned during interim status. The testing must be conducted when burning normal hazardous waste for that day at normal feed rates for that day and when the air pollution control system is operated under normal conditions. During interim status, hazardous waste analysis for metals content must be sufficient for the owner or operator to determine if changes in metals content may affect the ability of the facility to meet the metals emissions standards established under § 266.106(c) or (d). Under this option, operating limits (under paragraph (c)(1) of this section) must be established during compliance testing under paragraph (c)(3) of this section only on the following parameters:

(*1*) Feed rate of total hazardous waste;

(*2*) Total feed rate of chlorine and chloride in total feed streams;

(*3*) Total feed rate of ash in total feed streams, except that the ash feed rate for cement kilns and light-weight aggregate kilns is not limited;

(*4*) Carbon monoxide concentration, and where required, hydrocarbon concentration in stack gas;

(*5*) Maximum production rate of the device in appropriate units when producing normal product; or

(C) Conduct compliance testing to determine compliance with the metals standards to establish limits on the operating parameters of paragraph (c)(1) of this section only after the kiln system has been conditioned to enable it to reach equilibrium with respect to metals fed into the system and metals emissions. During conditioning, hazardous waste and raw materials having the same metals content as will be fed during the compliance test must be fed at the feed rates that will be fed during the compliance test.

(iii) *Conduct of compliance testing.* (A) If compliance with all applicable emissions standards of §§ 266.104 through 266.107 is not demonstrated simultaneously during a set of test runs, the operating conditions of additional test runs required to demonstrate compliance with remaining emissions standards must be as close as possible to the original operating conditions.

(B) Prior to obtaining test data for purposes of demonstrating compliance with the applicable emissions standards of §§ 266.104 through 266.107 or establishing limits on operating parameters under this section, the facility must operate under compliance test conditions for a sufficient period to reach steady-state operations. Industrial furnaces that recycle collected particulate matter back into the furnace and that comply with paragraphs (c)(3)(ii)(A) or (B) of this section, however, need not reach steady state conditions with respect to the flow of metals in the system prior to beginning compliance testing for metals.

(C) Compliance test data on the level of an operating parameter for which a limit must be established in the certification of compliance must be obtained during emissions sampling for the pollutant(s) (i.e., metals, PM, HCl/Cl_2, organic compounds) for which the parameter must be established as specified by paragraph (c)(1) of this section.

(4) *Certification of compliance.* Within 90 days of completing compliance testing, the owner or operator must certify to the Director compliance with the emissions standards of §§ 266.104(b), (c), and (e), 266.105, 266.106, 266.107, and paragraph (a)(5)(i)(D) of this section. The certification of compliance must include the following information:

(i) General facility and testing information including:

(A) EPA facility ID number;

(B) Facility name, contact person, telephone number, and address;

(C) Person responsible for conducting compliance test, including company name, address, and telephone number, and a statement of qualifications;

(D) Date(s) of each compliance test;

(E) Description of boiler or industrial furnace tested;

(F) Person responsible for quality assurance/quality control (QA/QC), title, and telephone number, and statement that procedures prescribed in the QA/QC plan submitted under § 266.103(c)(2)(iii) have been followed, or a description of any changes and an explanation of why changes were necessary.

(G) Description of any changes in the unit configuration prior to or during testing that would alter any of the information submitted in the prior notice of compliance testing under paragraph (c)(2) of this section, and an explanation of why the changes were necessary;

(H) Description of any changes in the planned test conditions prior to or during the testing that alter any of the information submitted in the prior notice of compliance testing under paragraph (c)(2) of this section, and an explanation of why the changes were necessary; and

(I) The complete report on results of emissions testing.

(ii) Specific information on each test including:

(A) Purpose(s) of test (e.g., demonstrate conformance with the emissions limits for particulate matter, metals, HCl, Cl_2, and CO)

(B) Summary of test results for each run and for each test including the following information:

(*1*) Date of run;

(*2*) Duration of run;

(*3*) Time-weighted average and highest hourly rolling average CO level for each run and for the test;

(*4*) Highest hourly rolling average HC level, if HC monitoring is required for each run and for the test;

(*5*) If dioxin and furan testing is required under § 266.104(e), time-weighted averge emissions for each run and for the test of chlorinated dioxin and furan emissions, and the predicted maximum annual average ground level concentration of the toxicity equivalency factor;

(*6*) Time-weighted average particulate matter emissions for each run and for the test;

(*7*) Time-weighted average HCl and Cl_2 emissions for each run and for the test;

(*8*) Time-weighted average emissions for the metals subject to regulation under § 266.106 for each run and for the test; and

(*9*) QA/QC results.

(iii) Comparison of the actual emissions during each test with the emissions limits prescribed by §§ 266.104 (b), (c), and (e), 266.105, 266.106, and 266.107 and established for the facility in the certification of precompliance under paragraph (b) of this section.

(iv) Determination of operating limits based on all valid runs of the compliance test for each applicable parameter listed in paragraph (c)(1) of this section using either of the following procedures:

(A) *Instantaneous limits.* A parameter may be measured and recorded on an instantaneous basis (i.e., the value that occurs at any time) and the operating limit specified as the time-weighted average during all runs of the compliance test; or

(B) *Hourly rolling average basis.* (*1*) The limit for a parameter may be established and continuously monitored on an hourly rolling average basis defined as follows:

(*i*) A continuous monitor is one which continuously samples the regulated parameter without interruption, and evaluates the detector response at least once each 15 seconds, and computes and records the average value at least every 60 seconds.

(*ii*) An hourly rolling average is the arithmetic mean of the 60 most recent 1-minute average values recorded by the continuous monitoring system.

(*2*) The operating limit for the parameter shall be established based on compliance test data as the average over all test runs of the highest hourly rolling average value for each run.

(C) *Rolling average limits for carcinogenic metals and lead.* Feed rate limits for the carcinogenic metals (i.e., arsenic, beryllium, cadmium and chromium) and lead may be established either on an hourly rolling average basis as prescribed by paragraph (c)(4)(iv)(B) of this section or on (up to) a 24 hour rolling average basis. If the owner or operator elects to use an averaging period from 2 to 24 hours:

(*1*) The feed rate of each metal shall be limited at any time to ten times the feed rate that would be allowed on a hourly rolling average basis;

(*2*) The continuous monitor shall meet the following specifications:

(*i*) A continuous monitor is one which continuously samples the regulated parameter without interruption, and evaluates the detector response at least once each 15 seconds, and computes and records the average value at least every 60 seconds.

(*ii*) The rolling average for the selected averaging period is defined as the arithmetic mean of the most recent one hour block averages for the averaging period. A one hour block average is the arithmetic mean of the one minute averages recorded during the 60-minute period beginning at one minute after the beginning of preceding clock hour; and

(*3*) The operating limit for the feed rate of each metal shall be established based on compliance test data as the average over all test runs of the highest hourly rolling average feed rate for each run.

(D) *Feed rate limits for metals, total chloride and chlorine, and ash.* Feed rate limits for metals, total chlorine and chloride, and ash are established and monitored by knowing the concentration of the substance (i.e., metals, chloride/chlorine, and ash) in each feedstream and the flow rate of the feedstream. To monitor the feed rate of these substances, the flow rate of each feedstream must be monitored under the continuous monitoring requirements of paragraphs (c)(4)(iv) (A) through (C) of this section.

(v) *Certification of compliance statement.* The following statement shall accompany the certification of compliance:

"I certify under penalty of law that this information was prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated the information and supporting documentation. Copies of all emissions tests, dispersion modeling results and other information used to determine conformance with the requirements of § 266.103(c) are available at the facility and can be obtained from the facility contact person listed above. Based on my inquiry of the person or persons who manages the facility, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I also acknowledge that the operating conditions established in this certification pursuant to § 266.103(c)(4)(iv) are enforceable limits at which the facility can legally operate during interim status until a revised certification of compliance is submitted."

(5) *Special requirements for HC monitoring systems.* When an owner or operator is required to comply with the hydrocarbon (HC) controls provided by §§ 266.104(c) or paragraph (a)(5)(i)(D) of this section, a conditioned gas monitoring system may be used in conformance with specifications provided in appendix IX of this part provided that the owner or operator submits a certification of compliance without using extensions of time provided by paragraph (c)(7) of this section.

(6) *Special operating requirements for industrial furnaces that recycle collected PM.* Owners and operators of industrial furnaces that recycle back into the furnace particulate matter (PM) from the air pollution control system must:

(i) When complying with the requirements of paragraph (c)(3)(ii)(A) of this section, comply with the operating requirements prescribed in "Alternative Method to Implement the Metals Controls" in appendix IX of this part; and

(ii) When complying with the requirements of paragraph (c)(3)(ii)(B) of this section, comply with the operating requirements prescribed by that paragraph.

(7) *Extensions of time.* (i) If the owner or operator does not submit a complete certification of compliance for all of the applicable emissions standards of §§ 266.104, 266.105, 266.106, and 266.107 by August 21, 1992, he/she must either:

(A) Stop burning hazardous waste and begin closure activities under paragraph (1) of this section for the hazardous waste portion of the facility; or

(B) Limit hazardous waste burning to a total period of 720 hours for the period of time beginning August 21, 1992, submit a notification to the Director by August 21, 1992 stating that the facility is operating under restricted interim status and intends to resume burning hazardous waste, and submit a complete certification of compliance by August 23, 1993; or

(C) Obtain a case-by-case extension of time under paragraph (c)(7)(ii) of this section.

(ii) The owner or operator may request a case-by-case extension of time to extend any time limit provided by paragraph (c) of this section if compliance with the time limit is not practicable for reasons beyond the control of the owner or operator.

(A) In granting an extension, the Director may apply conditions as the facts warrant to ensure timely compliance with the requirements of this section and that the facility operates in a manner that does not pose a hazard to human health and the environment;

(B) When an owner and operator request an extension of time to enable them to obtain a RCRA operating permit

because the facility cannot meet the HC limit of § 266.104(c) of this chapter:

(*1*) The Director shall, in considering whether to grant the extension:

(*i*) Determine whether the owner and operator have submitted in a timely manner a complete Part B permit application that includes information required under § 270.22(b) of this chapter; and

(*ii*) Consider whether the owner and operator have made a good faith effort to certify compliance with all other emission controls, including the controls on dioxins and furans of § 266.104(e) and the controls on PM, metals, and HCl/Cl_2

(2) If an extension is granted, the Director shall, as a condition of the extension, require the facility to operate under flue gas concentration limits on CO and HC that, based on available information, including information in the part B permit application, are baseline CO and HC levels as defined by § 266.104(f)(1).

(8) *Revised certification of compliance.* The owner or operator may submit at any time a revised certification of compliance (recertification of compliance) under the following procedures:

(i) Prior to submittal of a revised certification of compliance, hazardous waste may not be burned for more than a total of 720 hours under operating conditions that exceed those established under a current certification of compliance, and such burning may be conducted only for purposes of determining whether the facility can operate under revised conditions and continue to meet the applicable emissions standards of §§ 266.104, 266.105, 266.106, and 266.107;

(ii) At least 30 days prior to first burning hazardous waste under operating conditions that exceed those established under a current certification of compliance, the owner or operator shall notify the Director and submit the following information:

(A) EPA facility ID number, and facility name, contact person, telephone number, and address;

(B) Operating conditions that the owner or operator is seeking to revise and description of the changes in facility design or operation that prompted the need to seek to revise the operating conditions;

(C) A determination that when operating under the revised operating conditions, the applicable emissions standards of §§ 266.104, 266.105, 266.106, and 266.107 are not likely to be exceeded. To document this determination, the owner or operator shall submit the applicable information required under paragraph (b)(2) of this section; and

(D) Complete emissions testing protocol for any pretesting and for a new compliance test to determine compliance with the applicable emissions standards of §§ 266.104, 266.105, 266.106, and 266.107 when operating under revised operating conditions. The protocol shall include a schedule of pre-testing and compliance testing. If the owner and operator revises the scheduled date for the compliance test, he/she shall notify the Director in writing at least 30 days prior to the revised date of the compliance test;

(iii) Conduct a compliance test under the revised operating conditions and the protocol submitted to the Director to determine compliance with the applicable emissions standards of §§ 266.104, 266.105, 266.106, and 266.107; and

(iv) Submit a revised certification of compliance under paragraph (c)(4) of this section.

(d) *Periodic Recertifications.* The owner or operator must conduct compliance testing and submit to the Director a recertification of compliance under provisions of paragraph (c) of this section within three years from submitting the previous certification or recertification. If the owner or operator seeks to recertify compliance under new operating conditions, he/she must comply with the requirements of paragraph (c)(8) of this section.

(e) *Noncompliance with certification schedule.* If the owner or operator does not comply with the interim status compliance schedule provided by paragraphs (b), (c), and (d) of this section, hazardous waste burning must terminate on the date that the deadline is missed, closure activities must begin under paragraph (l) of this section, and hazardous waste burning may not resume except under an operating permit issued under § 270.66 of this chapter.

(f) *Start-up and shut-down.* Hazardous waste (except waste fed solely as an ingredient under the Tier I (or adjusted Tier I) feed rate screening limits for metals and chloride/chlorine) must not be fed into the device during start-up and shut-down of the boiler or industrial furnace, unless the device is operating within the conditions of operation specified in the certification of compliance.

(g) *Automatic waste feed cutoff.* During the compliance test required by paragraph (c)(3) of this section, and upon certification of compliance under paragraph (c) of this section, a boiler or industrial furnace must be operated with a functioning system that automatically cuts off the hazardous waste feed when the applicable operating conditions specified in paragraphs (c)(1) (i) and (v through xiii) of this section deviate from those established in the certification of compliance. In addition:

(1) To minimize emissions or organic compounds, the minimum combustion chamber temperature (or the indicator of combustion chamber temperature) that occurred during the compliance test must be maintained while hazardous waste or hazardous waste residues remain in the combustion chamber, with the minimum temperature during the compliance test defined as either:

(i) If compliance with the combustion chamber temperature limit is based on a hourly rolling average, the minimum temperature during the compliance test is considered to be the average over all runs of the lowest hourly rolling average for each run; or

(ii) If compliance with the combustion chamber temperature limit is based on an instantaneous temperature measurement, the minimum temperature during the compliance test is considered to be the time-weighted average temperature during all runs of the test; and

(2) Operating parameters limited by the certification of compliance must continue to be monitored during the cutoff, and the hazardous waste feed shall not be restarted until the levels of those parameters comply with the limits established in the certification of compliance.

(h) *Fugitive emissions.* Fugitive emissions must be controlled by:

(1) Keeping the combustion zone totally sealed against fugitive emissions; or

(2) Maintaining the combustion zone pressure lower than atmospheric pressure; or

(3) An alternate means of control that the owner or operator can demonstrate provide fugitive emissions control equivalent to maintenance of combustion zone pressure lower than atmospheric pressure. Support for such demonstration shall be included in the operating record.

(i) *Changes.* A boiler or industrial furnace must cease burning hazardous waste when changes in combustion properties, or feed rates of the hazardous waste, other fuels, or industrial furnace feedstocks, or changes in the boiler or industrial furnace design or operating conditions deviate from the limits specified in the certification of compliance.

(j) *Monitoring and Inspections.* (1) The owner or operator must monitor and

record the following, at a minimum, while burning hazardous waste:

(i) Feed rates and composition of hazardous waste, other fuels, and industrial furnace feed stocks, and feed rates of ash, metals, and total chloride and chlorine as necessary to ensure conformance with the certification of precompliance or certification of compliance;

(ii) Carbon monoxide (CO), oxygen, and if applicable, hydrocarbons (HC), on a continuous basis at a common point in the boiler or industrial furnace downstream of the combustion zone and prior to release of stack gases to the atmosphere in accordance with the operating limits specified in the certification of compliance. CO, HC, and oxygen monitors must be installed, operated, and maintained in accordance with methods specified in Appendix IX of this part.

(iii) Upon the request of the Director, sampling and analysis of the hazardous waste (and other fuels and industrial furnace feed stocks as appropriate) and the stack gas emissions must be conducted to verify that the operating conditions established in the certification of precompliance or certification of compliance achieve the applicable standards of §§ 266.104, 266.105, 266.106, and 266.107.

(2) The boiler or industrial furnace and associated equipment (pumps, valves, pipes, fuel storage tanks, etc.) must be subjected to thorough visual inspection when they contain hazardous waste, at least daily for leaks, spills, fugitive emissions, and signs of tampering.

(3) The automatic hazardous waste feed cutoff system and associated alarms must be tested at least once every 7 days when hazardous waste is burned to verify operability, unless the owner or operator can demonstrate that weekly inspections will unduly restrict or upset operations and that less frequent inspections will be adequate. Support for such demonstration shall be included in the operating record. At a minimum, operational testing must be conducted at least once every 30 days.

(4) These monitoring and inspection data must be recorded and the records must be placed in the operating log.

(k) *Recordkeeping.* The owner or operator must keep in the operating record of the facility all information and data required by this section for a period of three years.

(l) *Closure.* At closure, the owner or operator must remove all hazardous waste and hazardous waste residues (including, but not limited to, ash, scrubber waters, and scrubber sludges) from the boiler or industrial furnace and must comply with §§ 265.111–265.115 of this chapter.

(Approved by the Office of Management and Budget under control number 2050-0073)

§ 266.104 Standards to control organic emissions.

(a) *DRE standard*—(1) *General.* Except as provided in paragraph (a)(3) of this section, a boiler or industrial furnace burning hazardous waste must achieve a destruction and removal efficiency (DRE) of 99.99% for all organic hazardous constituents in the waste feed. To demonstrate conformance with this requirement, 99.99% DRE must be demonstrated during a trial burn for each principal organic hazardous constituent (POHC) designated (under paragraph (a)(2) of this section) in its permit for each waste feed. DRE is determined for each POHC from the following equation:

$$DRE = \left[\frac{1 - W_{out}}{W_{in}} \right] \times 100$$

where:

W_{in} = Mass feed rate of one principal organic hazardous constituent (POHC) in the hazardous waste fired to the boiler or industrial furnace; and

W_{out} = Mass emission rate of the same POHC present in stack gas prior to release to the atmosphere.

(2) *Designation of POHCs.* Principal organic hazardous constituents (POHCs) are those compounds for which compliance with the DRE requirements of this section shall be demonstrated in a trial burn in conformance with procedures prescribed in § 270.66 of this chapter. One or more POHCs shall be designated by the Director for each waste feed to be burned. POHCs shall be designated based on the degree of difficulty of destruction of the organic constituents in the waste and on their concentrations or mass in the waste feed considering the results of waste analyses submitted with part B of the permit application. POHCs are most likely to be selected from among those compounds listed in part 261, appendix VIII of this chapter that are also present in the normal waste feed. However, if the applicant demonstrates to the Regional Administrator's satisfaction that a compound not listed in appendix VIII or not present in the normal waste feed is a suitable indicator of compliance with the DRE requirements of this section, that compound may be designated as a POHC. Such POHCs need not be toxic or organic compounds.

(3) *Dioxin-listed waste.* A boiler or industrial furnace burning hazardous waste containing (or derived from) EPA Hazardous Wastes Nos. F020, F021, F022, F023, F026, or F027 must achieve a destruction and removal efficiency (DRE) of 99.9999% for each POHC designated (under paragraph (a)(2) of this section) in its permit. This performance must be demonstrated on POHCs that are more difficult to burn than tetrra-, penta-, and hexachlorodibenzo-*p*-dioxins and dibenzofurans. DRE is determined for each POHC from the equation in paragraph (a) of this section. In addition, the owner or operator of the boiler or industrial furnace must notify the Director of intent to burn EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, or F027.

(4) *Automatic waiver of DRE trial burn.* Owners and operators of boilers operated under the special operating requirements provided by § 266.110 are considered to be in compliance with the DRE standard of paragraph (a)(1) of this section and are exempt from the DRE trial burn.

(5) *Low risk waste.* Owners and operators of boilers or industrial furnaces that burn hazardous waste in compliance with the requirements of § 266.109(a) are considered to be in compliance with the DRE standard of paragraph (a)(1) of this section and are exempt from the DRE trial burn.

(b) *Carbon monoxide standard.* (1) Except as provided in paragraph (c) of this section, the stack gas concentration of carbon monoxide (CO) from a boiler or industrial furnace burning hazardous waste cannot exceed 100 ppmv on an hourly rolling average basis (i.e., over any 60 minute period), continuously corrected to 7 percent oxygen, dry gas basis.

(2) CO and oxygen shall be continuously monitored in conformance with "Performance Specifications for Continuous Emission Monitoring of Carbon Monoxide and Oxygen in Hazardous Waste Incinerators, Boilers, and Industrial Furnaces" in appendix IX of this part.

(3) Compliance with the 100 ppmv CO limit must be demonstrated during the trial burn (for new facilities or an interim status facility applying for a permit) or the compliance test (for interim status facilities). To demonstrate compliance, the highest hourly rolling average CO level during any valid run of the trial burn or compliance test must not exceed 100 ppmv.

(c) *Alternative carbon monoxide standard.* (1) The stack gas concentration of carbon monoxide (CO)

from a boiler or industrial furnace burning hazardous waste may exceed the 100 ppmv limit provided that stack gas concentrations of hydrocarbons (HC) do not exceed 20 ppmv, except as provided by paragraph (f) of this section for certain industrial furnaces.

(2) HC limits must be established under this section on an hourly rolling average basis (i.e., over any 60 minute period), reported as propane, and continuously corrected to 7 percent oxygen, dry gas basis.

(3) HC shall be continuously monitored in conformance with "Performance Specifications for Continuous Emission Monitoring of Hydrocarbons for Incinerators, Boilers, and Industrial Furnaces" in appendix IX of this part. CO oxygen shall be continuously monitored in conformance with paragraph (b)(2) of this section.

(4) The alternative CO standard is established based on CO data during the trial burn (for a new facility) and the compliance test (for an interim status facility). The alternative CO standard is the average over all valid runs of the highest hourly average CO level for each run. The CO limit is implemented on an hourly rolling average basis, and continuously corrected to 7 percent oxygen, dry gas basis.

(d) *Special requirements for furnaces.* Owners and operators of industrial furnaces (e.g., kilns, cupolas) that feed hazardous waste for a purpose other than solely as an ingredient (see § 266.103(a)(5)(ii)) at any location other than the end where products are normally discharged and where fuels are normally fired must comply with the hydrocarbon limits provided by paragraphs (c) or (f) of this section irrespective of whether stack gas CO concentrations meet the 100 ppmv limit of paragraph (b) of this section.

(e) *Controls for dioxins and furans.* Owners and operators of boilers and industrial furnaces that are equipped with a dry particulate matter control device that operates within the temperature range of 450–750 °F, and industrial furnaces operating under an alternative hydrocarbon limit established under paragraph (f) of this section must conduct a site-specific risk assessment as follows to demonstrate that emissions of chlorinated dibenzo-*p*-dioxins and dibenzofurans do not result in an increased lifetime cancer risk to the hypothetical maximum exposed individual (MEI) exceeding 1 in 100,000:

(1) During the trial burn (for new facilities or an interim status facility applying for a permit) or compliance test (for interim status facilities), determine emission rates of the tetra-octa congeners of chlorinated dibenzo-*p*-dioxins and dibenzofurans (CDDs/CDFs) using Method 23, "Determination of Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans (PCDFs) from Stationary Sources", in appendix IX of this part.

(2) Estimate the 2,3,7,8-TCDD toxicity equivalence of the tetra-octa CDDs/CDFs congeners using "Procedures for Estimating the Toxicity Equivalence of Chlorinated Dibenzo-p-Dioxin and Dibenzofuran Congeners" in appendix IX of this part. Multiply the emission rates of CDD/CDF congeners with a toxicity equivalence greater than zero (see the procedure) by the calculated toxicity equivalence factor to estimate the equivalent emission rate of 2,3,7,8-TCDD.

(3) Conduct dispersion modeling using methods recommended in *Guideline on Air Quality Models (Revised)* or the "Hazardous Waste Combustion Air Quality Screening Procedure", which are provided in appendices X and IX, respectively, of this part, or "EPA SCREEN Screening Procedure" as described in *Screening Procedures for Estimating Air Quality Impact of Stationary Sources* (incorporated by reference in § 260.11) to predict the maximum annual average off-site ground level concentration of 2,3,7,8-TCDD equivalents determined under paragraph (e)(2) of this section. The maximum annual average on-site concentration must be used when a person resides on-site; and

(4) The ratio of the predicted maximum annual average ground level concentration of 2,3,7,8-TCDD equivalents to the risk-specific dose for 2,3,7,8-TCDD provided in appendix V of this part 2.2×10^{-7}) shall not exceed 1.0.

(f) *Alternative HC limit for furnaces with organic matter in raw material.* For industrial furnaces that cannot meet the 20 ppmv HC limit because of organic matter in normal raw material, the Director may establish an alternative HC limit on a case-by-case basis (under a part B permit proceeding) at a level that ensures that flue gas HC (and CO) concentrations when burning hazardous waste are not greater than when not burning hazardous waste (the baseline HC level) provided that the owner or operator complies with the following requirements. However, cement kilns equipped with a by-pass duct meeting the requirements of paragraph (g) of this section, are not eligible for an alternative HC limit.

(1) The owner or operator must demonstrate that the facility is designed and operated to minimize hydrocarbon emissions from fuels and raw materials when the baseline HC (and CO) level is determined. The baseline HC (and CO) level is defined as the average over all valid test runs of the highest hourly rolling average value for each run when the facility does not burn hazardous waste, and produces normal products under normal operating conditions feeding normal feedstocks and fuels. More than one baseline level may be determined if the facility operates under different modes that may generate significantly different HC (and CO) levels;

(2) The owner or operator must develop an approach to monitor over time changes in the operation of the facility that could reduce the baseline HC level;

(3) The owner or operator must conduct emissions testing during the trial burn to:

(i) Determine the baseline HC (and CO) level;

(ii) Demonstrate that, when hazardous waste is burned, HC (and CO) levels do not exceed the baseline level; and

(iii) Identify the types and concentrations of organic compounds listed in appendix VIII, part 261 of this chapter, that are emitted and conducts dispersion modeling to predict the maximum annual average ground level concentration of each organic compound. On-site ground level concentrations must be considered for this evaluation if a person resides on site.

(A) Sampling and analysis of organic emissions shall be conducted using procedures prescribed by the Director.

(B) Dispersion modeling shall be conducted according to procedures provided by paragraph (e)(2) of this section; and

(iv) Demonstrate that maximum annual average ground level concentrations of the organic compounds identified in paragraph (f)(3)(iii) of this section do not exceed the following levels:

(A) For the noncarcinogenic compounds listed in appendix IV of this part, the levels established in appendix IV;

(B) For the carcinogenic compounds listed in appendix V of this part, the sum for all compounds of the ratios of the actual ground level concentration to the level established in appendix V cannot exceed 1.0. To estimate the health risk from chlorinated dibenzo-p-dioxins and dibenzofuran congeners, use the procedures prescribed by paragraph (e)(3) of this section to estimate the 2,3,7,8-TCDD toxicity equivalence of the congeners.

(C) For compounds not listed in appendix IV or V, 0.1 micrograms per cubic meter.

(4) All hydrocarbon levels specified under this paragraph are to be monitored and reported as specified in paragraphs (c)(1) and (c)(2) of this section.

(g) *Monitoring CO and HC in the by-pass duct of a cement kiln.* Cement kilns may comply with the carbon monoxide and hydrocarbon limits provided by paragraphs (b), (c), and (d) of this section by monitoring in the by-pass duct provided that:

(1) Hazardous waste is fired only into the kiln and not at any location downstream from the kiln exit relative to the direction of gas flow; and

2. The by-pass duct diverts a minimum of 10% of kiln off-gas into the duct.

(h) *Use of emissions test data to demonstrate compliance and establish operating limits.* Compliance with the requirements of this section must be demonstrated simultaneously by emissions testing or during separate runs under identical operating conditions. Further, data to demonstrate compliance with the CO and HC limits of this section or to establish alternative CO or HC limits under this section must be obtained during the time that DRE testing, and where applicable, CDD/CDF testing under paragraph (e) of this section and comprehensive organic emissions testing under paragraph (f) is conducted.

(i) *Enforcement.* For the purposes of permit enforcement, compliance with the operating requirements specified in the permit (under § 266.102) will be regarded as compliance with this section. However, evidence that compliance with those permit conditions is insufficient to ensure compliance with the requirements of this section may be "information" justifying modification or revocation and re-issuance of a permit under § 270.41 of this chapter.

§ 266.105 Standards to control particulate matter.

(a) A boiler or industrial furnace burning hazardous waste may not emit particulate matter in excess of 180 milligrams per dry standard cubic meter (0.08 grains per dry standard cubic foot) after correction to a stack gas concentration of 7% oxygen, using procedures prescribed in 40 CFR part 60, appendix A, methods 1 through 5, and appendix IX of this part.

(b) An owner or operator meeting the requirements of § 266.109(b) for the low risk waste exemption is exempt from the particulate matter standard.

(c) For the purposes of permit enforcement, compliance with the operating requirements specified in the permit (under § 266.102) will be regarded as compliance with this section. However, evidence that compliance with those permit conditions is insufficient to ensure compliance with the requirements of this section may be "information" justifying modification or revocation and re-issuance of a permit under § 270.41 of this chapter.

§ 266.106 Standards to control metals emissions.

(a) *General.* The owner or operator must comply with the metals standards provided by paragraphs (b), (c), (d), (e), or (f) of this section for each metal listed in paragraph (b) of this section that is present in the hazardous waste at detectable levels using analytical procedures specified in Test Methods for Evaluation Solid Waste, Physical/Chemical Methods (SW-846), incorporated by reference in § 260.11 of this chapter.

(b) *Tier I feed rate screening limits.* Feed rate screening limits for metals are specified in appendix I of this part as a function of terrain-adjusted effective stack height and terrain and land use in the vicinity of the facility. Criteria for facilities that are not eligible to comply with the screening limits are provided in paragraph (b)(7) of this section.

(1) *Noncarcinogenic metals.* The feed rates of antimony, barium, lead, mercury, thallium, and silver in all feed streams, including hazardous waste, fuels, and industrial furnace feed stocks shall not exceed the screening limits specified in appendix I of this part.

(i) The feed rate screening limits for antimony, barium, mercury, thallium, and silver are based on either:

(A) An hourly rolling average as defined in § 266.102(e)(6)(i)(B); or

(B) An instantaneous limit not to be exceeded at any time.

(ii) The feed rate screening limit for lead is based on one of the following:

(A) An hourly rolling average as defined in § 266.102(e)(6)(i)(B);

(B) An averaging period of 2 to 24 hours as defined in § 266.102(e)(6)(ii) with an instantaneous feed rate limit not to exceed 10 times the feed rate that would be allowed on an hourly rolling average basis; or

(C) An instantaneous limit not to be exceeded at any time.

(2) *Carcinogenic metals.* (i) The feed rates of arsenic, cadmium, beryllium, and chromium in all feed streams, including hazardous waste, fuels, and industrial furnace feed stocks shall not exceed values derived from the screening limits specified in appendix I of this part. The feed rate of each of these metals is limited to a level such that the sum of the ratios of the actual feed rate to the feed rate screening limit specified in appendix I shall not exceed 1.0, as provided by the following equation:

$$\sum_{i=1}^{n} \frac{AFR_{(i)}}{FRSL_{(i)}} < 1.0$$

where:

n = numer of carcinogenic metals

AFR = actual feed rate to the device for metal "i"

FRSL = feed rate screening limit provided by appendix I of this part for metal "i".

(ii) The feed rate screening limits for the carcinogenic metals are based on either:

(A) An hourly rolling average; or

(B) An averaging period of 2 to 24 hours with an instantaneous feed rate limit not to exceed 10 times the feed rate that would be allowed on an hourly rolling average basis.

(3) *TESH.* (i) The terrain-adjusted effective stack height is determined according to the following equation:

$$TESH = Ha + H1 - Tr$$

where:

Ha = Actual physical stack height

H1 = Plume rise as determined from appendix VI of this part as a function of stack flow rate and stack gas exhaust temperature.

Tr = Terrain rise within five kilometers of the stack.

(ii) The stack height (Ha) may not exceed good engineering practice as specified in 40 CFR 51.100(ii).

(iii) If the TESH for a particular facility is not listed in the table in the appendices, the nearest lower TESH listed in the table shall be used. If the TESH is four meters or less, a value of four meters shall be used.

(4) *Terrain type.* The screening limits are a function of whether the facility is located in noncomplex or complex terrain. A device located where any part of the surrounding terrain within 5 kilometers of the stack equals or exceeds the elevation of the physical stack height (Ha) is considered to be in complex terrain and the screening limits for complex terrain apply. Terrain measurements are to be made from U.S. Geological Survey 7.5-minute topographic maps of the area surrounding the facility.

(5) *Land use.* The screening limits are a function of whether the facility is located in an area where the land use is urban or rural. To determine whether land use in the vicinity of the facility is urban or rural, procedures provided in appendices IX or X of this part.

(6) *Multiple stacks.* Owners and operators of facilities with more than one on-site stack from a boiler, industrial furnace, incinerator, or other thermal treatment unit subject to controls of metals emissions under a RCRA operating permit or interim status controls must comply with the screening limits for all such units assuming all hazardous waste is fed into the device with the worst-case stack based on dispersion characteristics. The worst-case stack is determined from the following equation as applied to each stack:

K=HVT

Where:

K=a parameter accounting for relative influence of stack height and plume rise;
K=physical stack height (meters);
K=stack gas flow rate (m^3/second); and
T=exhaust temperature (°K).

The stack with the lowest value of K is the worst-case stack.

(7) *Criteria for facilities not eligible for screening limits.* If any criteria below are met, the Tier I (and Tier II) screening limits do not apply. Owners and operators of such facilities must comply with the Tier III standards provided by paragraph (d) of this section.

(i) The device is located in a narrow valley less than one kilometer wide;

(ii) The device has a stack taller than 20 meters and is located such that the terrain rises to the physical height within one kilometer of the facility;

(iii) The device has a stack taller than 20 meters and is located within five kilometers of a shoreline of a large body of water such as an ocean or large lake;

(iv) The physical stack height of any stack is less than 2.5 times the height of any building within five building heights or five projected building widths of the stack and the distance from the stack to the closest boundary is within five building heights or five projected building widths of the associated building; or

(v) The Director determines that standards based on site-specific dispersion modeling are required.

(8) *Implementation.* The feed rate of metals in each feedstream must be monitored to ensure that the feed rate screening limits are not exceeded.

(c) *Tier II emission rate screening limits.* Emission rate screening limits are specified in Appendix I as a function of terrain-adjusted effective stack height and terrain and land use in the vicinity of the facility. Criteria for facilities that are not eligible to comply with the screening limits are provided in paragraph (b)(7) of this section.

(1) *Noncarcinogenic metals.* The emission rates of antimony, barium, lead, mercury, thallium, and silver shall not exceed the screening limits specified in Appendix I of this part.

(2) *Carcinogenic metals.* The emission rates of arsenic, cadmium, beryllium, and chromium shall not exceed values derived from the screening limits specified in Appendix I of this part. The emission rate of each of these metals is limited to a level such that the sum of the ratios of the actual emission rate to the emission rate screening limit specified in Appendix I shall not exceed 1.0, as provided by the following equation:

$$\sum_{i=1}^{n} \frac{AER_{(i)}}{ERSL_{(i)}} \leq 1.0$$

where:

n=number of carcinogenic metals
AER=actual emission rate for metal "i"
ERSL=emission rate screening limit provided by appendix I of this part for metal "i".

(3) *Implementation.* The emission rate limits must be implemented by limiting feed rates of the individual metals to levels during the trial burn (for new facilities or an interim status facility applying for a permit) or the compliance test (for interim status facilities). The feed rate averaging periods are the same as provided by paragraphs (b)(1)(i) and (ii) and (b)(2)(ii) of this section. The feed rate of metals in each feedstream must be monitored to ensure that the feed rate limits for the feedstreams specified under §§ 266.102 or 266.103 are not exceeded.

(4) *Definitions and limitations.* The definitions and limitations provided by paragraph (b) of this section for the following terms also apply to the Tier II emission rate screening limits provided by paragraph (c) of this section: terrain-adjusted effective stack height, good engineering practice stack height, terrain type, land use, and criteria for facilities not eligible to use the screening limits.

(5) *Multiple stacks.* (i) Owners and operators of facilities with more than one onsite stack from a boiler, industrial furnace, incinerator, or other thermal treatment unit subject to controls on metals emissions under a RCRA operating permit or interim status controls must comply with the emissions screening limits for any such stacks assuming all hazardous waste is fed into the device with the worst-case stack based on dispersion characteristics.

(ii) The worst-case stack is determined by procedures provided in paragraph (b)(6) of this section.

(iii) For each metal, the total emissions of the metal from those stacks shall not exceed the screening limit for the worst-case stack.

(d) *Tier III site-specific risk assessment*—(1) *General.* Conformance with the Tier III metals controls must be demonstrated by emissions testing to determine the emission rate for each metal, air dispersion modeling to predict the maximum annual average off-site ground level concentration for each metal, and a demonstration that acceptable ambient levels are not exceeded.

(2) *Acceptable ambient levels.* Appendices IV and V of this part list the acceptable ambient levels for purposes of this rule. Reference air concentrations (RACs) are listed for the noncarcinogenic metals and 10^{-5} risk-specific doses (RSDs) are listed for the carcinogenic metals. The RSD for a metal is the acceptable ambient level for that metal provided that only one of the four carcinogenic metals is emitted. If more than one carcinogenic metal is emitted, the acceptable ambient level for the carcinogenic metals is a fraction of the RSD as described in paragraph (d)(3) of this section.

(3) *Carcinogenic metals.* For the carcinogenic metals, arsenic, cadmium, beryllium, and chromium, the sum of the ratios of the predicted maximum annual average off-site ground level concentrations (except that on-site concentrations must be considered if a person resides on site) to the risk-specific dose (RSD) for all carcinogenic metals emitted shall not exceed 1.0 as determined by the following equation:

$$\sum_{i=1}^{n} \frac{\text{Predicted Ambient Concentration}_{(i)}}{\text{Risk-Specific Dose}_{(i)}} \leq 1.0$$

where: n=number of carcinogenic metals

(4) *Noncarcinogenic metals.* For the noncarcinogenic metals, the predicted maximum annual average off-site ground level concentration for each metal shall not exceed the reference air concentration (RAC).

(5) *Multiple stacks.* Owners and operators of facilities with more than one on-site stack from a boiler, industrial furnace, incinerator, or other thermal treatment unit subject to controls on metals emissions under a RCRA operating permit or interim status controls must conduct emissions testing and dispersion modeling to demonstrate that the aggregate emissions from all such on-site stacks do not result in an exceedance of the acceptable ambient levels.

(6) *Implementation.* Under Tier III, the metals controls must be implemented by limiting feed rates of the individual metals to levels during the trial burn (for new facilities or an interim status facility applying for a permit) or the compliance test (for interim status facilities). The feed rate averaging periods are the same as provided by paragraphs (b)(1) (i) and (ii) and (b)(2)(ii) of this section. The feed rate of metals in each feedstream must be monitored to ensure that the feed rate limits for the feedstreams specified under §§ 266.102 or 266.103 are not exceeded.

(e) *Adjusted Tier I feed rate screening limits.* The owner or operator may adjust the feed rate screening limits provided by appendix I of this part to account for site-specific dispersion modeling. Under this approach, the adjusted feed rate screening limit for each metal is determined by back-calculating from the acceptable ambient levels provided by appendices IV and V of this part using dispersion modeling to determine the maximum allowable emission rate. This emission rate becomes the adjusted Tier I feed rate screening limit. The feed rate screening limits for carcinogenic metals are implemented as prescribed in paragraph (b)(2) of this section.

(f) *Alternative implementation approaches.* (1) The Director may approve on a case-by-case basis approaches to implement the Tier II or Tier III metals emission limits provided by paragraphs (c) or (d) of this section alternative to monitoring the feed rate of metals in each feedstream.

(2) The emission limits provided by paragraph (d) of this section must be determined as follows:

(i) For each noncarcinogenic metal, by back-calculating from the RAC provided in appendix IV of this part to determine the allowable emission rate for each metal using the dilution factor for the maximum annual average ground level concentration predicted by dispersion modeling in conformance with paragraph (h) of this section; and

(ii) For each carcinogenic metal; by:

(A) Back-calculating from the RSD provided in appendix V of this part to determine the allowable emission rate for each metal if that metal were the only carcinogenic metal emitted using the dilution factor for the maximum annual average ground level concentration predicted by dispersion modeling in conformance with paragraph (h) of this section; and

(B) If more than one carcinogenic metal is emitted, selecting an emission limit for each carcinogenic metal not to exceed the emission rate determined by paragraph (f)(2)(ii)(A) of this section such that the sum for all carcinogenic metals of the ratio of the selected emission limit to the emission rate determined by that paragraph does not exceed 1.0.

(g) *Emission testing*—(1) *General.* Emission testing for metals shall be conducted using the Multiple Metals Train as described in appendix IX of this part.

(2) *Hexavalent chromium.* Emissions of chromium are assumed to be hexavalent chromium unless the owner or operator conducts emissions testing to determine hexavalent chromium emissions using procedures prescribed in Appendix IX of this part.

(h) *Dispersion modeling.* Dispersion modeling required under this section shall be conducted according to methods recommended in appendix X of this part, the "Hazardous Waste Combustion Air Quality Screening Procedure" described in appendix IX of this part, or "EPA SCREEN Screening Procedure" as described in Screening Procedures for Estimating Air Quality Impact of Stationary Sources (the latter document is incorporated by reference, see § 260.11) to predict the maximum annual average off-site ground level concentration. However, on-site concentrations must be considered when a person resides on-site.

(i) *Enforcement.* For the purposes of permit enforcement, compliance with the operating requirements specified in the permit (under § 266.102) will be regarded as compliance with this section. However, evidence that compliance with those permit conditions is insufficient to ensure compliance with the requirements of this section may be "information" justifying modification or revocation and re-issuance of a permit under § 270.41 of this chapter.

§ 266.107 Standards to control hydrogen chloride (HCl) and chlorine gas (Cl_2) emissions.

(a) *General.* The owner or operator must comply with the hydrogen chloride (HCl) and chlorine (Cl_2) controls provided by paragraphs (b), (c), or (d) of this section.

(b) *Screening limits*—(1) *Tier I feed rate screening limits.* Feed rate screening limits are specified for total chlorine in Appendix II of this part as a function of terrain-adjusted effective stack height and terrain and land use in the vicinity of the facility. The feed rate of total chlorine and chloride, both organic and inorganic, in all feed streams, including hazardous waste, fuels, and industrial furnace feed stocks shall not exceed the levels specified.

(2) *Tier II emission rate screen limits.* Emission rate screening limits for HCl and Cl_2 are specified in Appendix III of this part as a function of terrain-adjusted effective stack height and terrain and land use in the vicinity of the facility. The stack emission rates of HCl and Cl_2 shall not exceed the levels specified.

(3) *Definitions and limitations.* The definitions and limitations provided by § 266.106(b) for the following terms also apply to the screening limits provided by this paragraph: terrain-adjusted effective stack height, good engineering practice stack height, terrain type, land use, and criteria for facilities not eligible to use the screen limits.

(4) *Multiple stacks.* Owners and operators of facilities with more than one on-site stack from a boiler, industrial furnace, incinerator, or other thermal treatment unit subject to controls on HCl or Cl_2 emissions under a RCRA operating permit or interim status controls must comply with the Tier I and Tier II screening limits for those stacks assuming all hazardous waste is fed into the device with the worst-case stack based on dispersion characteristics.

(i) The worst-case stack is determined by procedures provided in § 266.106(b)(6).

(ii) Under Tier I, the total feed rate of chlorine and chloride to all subject devices shall not exceed the screening limit for the worst-case stack.

(iii) Under Tier II, the total emissions of HCl and Cl_2 from all subject stacks shall not exceed the screening limit for the worst-case stack.

(c) *Tier III site-specific risk assessments*—(1) *General.* Conformance with the Tier III controls must be demonstrated by emissions testing to determine the emission rate for HCl and Cl_2, air dispersion modeling to predict the maximum annual average off-site ground level concentration for each compound, and a demonstration that acceptable ambient levels are not exceeded.

(2) *Acceptable ambient levels.* Appendix IV of this part lists the reference air concentrations (RACs) for HCl (7 micrograms per cubic meter) and Cl_2 (0.4 micrograms per cubic meter).

(3) *Multiple stacks.* Owners and operators of facilities with more than one on-site stack from a boiler, industrial furnace, incinerator, or other thermal treatment unit subject to controls on HCl or Cl_2 emissions under a RCRA operating permit or interim status controls must conduct emissions testing and dispersion modeling to demonstrate that the aggregate emissions from all such on-site stacks do not result in an

exceedance of the acceptable ambient levels for HCl and Cl_2.

(d) *Averaging periods.* The HCl and Cl_2 controls are implemented by limiting the feed rate of total chlorine and chloride in all feedstreams, including hazardous waste, fuels, and industrial furnace feed stocks. Under Tier I, the feed rate of total chloride and chlorine is limited to the Tier I Screening Limits. Under Tier II and Tier III, the feed rate of total chloride and chlorine is limited to the feed rates during the trial burn (for new facilities or an interim status facility applying for a permit) or the compliance test (for interim status facilities). The feed rate limits are based on either:

(i) An hourly rolling average as defined in § 266.102(e)(6); or

(ii) An instantaneous basis not to be exceeded at any time.

(e) *Adjusted Tier I feed rate screening limits.* The owner or operator may adjust the feed rate screening provided by Appendix I of this part to account for site-specific dispersion modeling. Under this approach, the adjusted feed rate screening limit is determined by back-calculating from the acceptable ambient level for Cl_2 provided by Appendix IV of this part using dispersion modeling to determine the maximum allowable emission rate. This emission rate becomes the adjusted Tier I feed rate screening limit.

(f) *Emissions testing.* Emissions testing for HCl and Cl_2 shall be conducted using the procedures described in Appendix IX of this part.

(g) *Dispersion modeling.* Dispersion modeling shall be conducted according to the provisions of § 266.106(h).

(h) *Enforcement.* For the purposes of permit enforcement, compliance with the operating requirements specified in the permit (under § 266.102) will be regarded as compliance with his section. However, evidence that compliance with those permit conditions is insufficient to ensure compliance with the requirements of this section may be "information" justifying modification or revocation and re-issuance of a permit under § 270.41 of this chapter.

§ 266.108 Small quantity on-site burner exemption.

(a) *Exemption quantities.* Owners and operators of facilities that burn hazardous waste in an on-site boiler or industrial furnace are exempt from the requirements of this section provided that:

(1) The quantity of hazardous waste burned in a device for a calendar month does not exceed the limits provided in the following table based on the terrain-adjusted effective stack height as defined in § 266.106(b)(3):

EXEMPT QUANTITIES FOR SMALL QUANTITY BURNER EXEMPTION

Terrain-adjusted effective stack height of device (meters)	Allowable hazardous waste burning rate (gallons/month)	Terrain-adjusted effective stack height of device (meters)	Allowable hazardous waste burning rate (Gallons/month)
0 to 3.9	0	40.0 to 44.9	210
4.0 to 5.9	13	45.0 to 49.9	260
6.0 to 7.9	18	50.0 to 54.9	330
8.0 to 9.9	27	55.0 to 59.9	400
10.0 11.9	40	60.0 to 64.9	490
12.0 to 13.9	48	65.0 to 69.9	610
14.0 to 15.9	59	70.0 to 74.9	680
16.0 to 17.9	69	75.0 to 79.9	760
18.0 to 19.9	76	80.0 to 84.9	850
20.0 to 21.9	84	85.0 to 89.9	960
22.0 to 23.9	93	90.0 to 94.9	1,100
24.0 to 25.9	100	95.0 to 99.9	1,200
26.0 to 27.9	110	100.0 to 104.9	1,300
28.0 to 29.9	130	105.0 to 109.9	1,500
30.0 to 34.9	140	110.0 to 114.9	1,700
35.0 to 39.9	170	115.0 or greater.	1,900

(2) The maximum hazardous waste firing rate does not exceed at any time 1 percent of the total fuel requirements for the device (hazardous waste plus other fuel) on a volume basis;

(3) The hazardous waste has a minimum heating value of 5,000 Btu/lb, as generated; and

(4) The hazardous waste fuel does not contain (and is not derived from) EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, or F027.

(b) *Mixing with nonhazardous fuels.* If hazardous waste fuel is mixed with a nonhazardous fuel, the quantity of hazardous waste before such mixing is used to comply with paragraph (a).

(c) *Multiple stacks.* If an owner or operator burns hazardous waste in more than one on-site boiler or industrial furnace exempt under this section, the quantity limits provided by paragraph (a)(1) of this section are implemented according to the following equation:

$$\sum_{i=1}^{n} \frac{\text{Actual Quantity Burned}_{(i)}}{\text{Allowable Quantity Burned}_{(i)}} < 1.0$$

where:

n means the number of stacks;

Actual Quantity Burned means the waste quantity burned per month in device "i";

Allowable Quantity Burned, means the maximum allowable exempt quantity for stack "i" from the table in (a)(1) above.

Note: Hazardous wastes that are subject to the special requirements for small quantity generators under § 261.5 of this chapter may be burned in an off-site device under the exemption provided by § 266.108, but must be included in the quantity determination for the exemption.

(d) *Notification requirements.* The owner or operator of facilities qualifying for the small quantity burner exemption under this section must provide a one-time signed, written notice to EPA indicating the following:

(1) The combustion unit is operating as a small quantity burner of hazardous waste;

(2) The owner and operator are in compliance with the requirements of this section; and

(3) The maximum quantity of hazardous waste that the facility may burn per month as provided by § 266.108(a)(1).

(e) *Recordkeeping requirements.* The owner or operator must maintain at the facility for at least three years sufficient records documenting compliance with the hazardous waste quantity, firing rate, and heating value limits of this section. At a minimum, these records must indicate the quantity of hazardous waste and other fuel burned in each unit per calendar month, and the heating value of the hazardous waste.

(Approved by the Office of Management and Budget under control number 2050-0073)

§ 266.109 Low risk waste exemption.

(a) *Waiver of DRE standard.* The DRE standard of § 266.104(a) does not apply if the boiler or industrial furnace is operated in conformance with (a)(1) of this section and the owner or operator demonstrates by procedures prescribed in (a)(2) of this section that the burning will not result in unacceptable adverse health effects.

(1) The device shall be operated as follows:

(i) A minimum of 50 percent of fuel fired to the device shall be fossil fuel, fuels derived from fossil fuel, tall oil, or, if approved by the Director of a case-by-case basis, other nonhazardous fuel with combustion characteristics comparable to fossil fuel. Such fuels are termed "primary fuel' for purposes of this section. (Tall oil is a fuel derived from vegetable and rosin fatty acids.) The 50 percent primary fuel firing rate shall be determined on a total heat or volume input basis, whichever results in the larger volume of primary fuel fired;

(ii) Primary fuels and hazardous waste fuels shall have a minimum as-fired heating value of 8,000 Btu/lb;

(iii) The hazardous waste is fired directly into the primary fuel flame zone of the combustion chamber; and

(iv) The device operates in conformance with the carbon monoxide controls provided by § 266.104(b)(1)

Devices subject to the exemption provided by this section are not eligible for the alternative carbon monoxide controls provided by § 266.104(c).

(2) Procedures to demonstrate that the hazardous waste burning will not pose unacceptable adverse public health effects are as follows:

(i) Identify and quantify those nonmetal compounds listed in appendix VIII, part 261 of this chapter that could reasonably be expected to be present in the hazardous waste. The constituents excluded from analysis must be identified and the basis for their exclusion explained;

(ii) Calculate reasonable, worst case emission rates for each constitutent identified in paragraph (a)(2)(i) of this section by assuming the device achieves 99.9 percent destruction and removal efficiency. That is, assume that 0.1 percent of the mass weight of each constitutent fed to the device is emitted.

(iii) For each constituent identified in paragraph (a)(2)(i) of this section, use emissions dispersion modeling to predict the maximum annual average ground level concentration of the constituent.

(A) Dispersion modeling shall be conducted using methods specified in § 266.106(h).

(B) Owners and operators of facilities with more than one on-site stack from a boiler or industrial furnace that is exempt under this section must conduct dispersion modeling of emissions from all stacks exempt under this section to predict ambient levels prescribed by this paragraph.

(iv) Ground level concentrations of constituents predicted under paragraph (a)(iii) of this section must not exceed the following levels:

(A) For the noncarcinogenic componds listed in appendix IV of this part, the levels established in appendix IV;

(B) For the carcinogenic compounds listed in appendix V of this part, the sum for all constituents of the ratios of the actual ground level concentration to the level established in appendix V cannot exceed 1.0; and

(C) For constituents not listed in appendix IV or V, 0.1 micrograms per cubic meter.

(b) *Waiver of particular matter standard.* The particulate matter standard of § 266.105 does not apply if:

(1) The DRE standard is waived under paragraph (a) of this section; and

(2) The owner or operator complies with the Tier I metals feed rate screening limits provided by § 266.106 (b) or (e).

§ 266.110 Waiver of DRE trial burn for boilers.

Boilers that operate under the special requirements of this section, and that do not burn hazardous waste containing (or derived from) EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, or F027, are considered to be in conformance with the DRE standard of § 266.104(a), and a trial burn to demonstrate DRE is waived. When burning hazardous waste:

(a) A minimum of 50 percent of fuel fired to the boiler shall be fossil fuel, fuels derived from fossil fuel, tall oil, or, if approved by the Director on a case-by-case basis, other nonhazardous fuel with combustion characteristics comparable to fossil fuel. Such fuels are termed "primary fuel" for purposes of this section. (Tall oil is a fuel derived from vegetable and rosin fatty acids.) The 50 percent primary fuel firing rate shall be determined on a total heat or volume input basis, whichever results in the larger volume of primary fuel fired;

(b) Boiler load shall not be less than 40 percent. Boiler load is the ratio at any time of the total heat input to the maximum design heat input;

(c) Primary fuels and hazardous waste fuels shall have a minimum as-fired heating value of 8,000 Btu/lb, and each material fired in a burner where hazardous waste is fired must have a heating value of at least 8,000 Btu/lb, as-fired;

(d) The device shall operate in conformance with the carbon monoxide standard provided by § 266.104(b)(1). Boilers subject to the waiver of the DRE trial burn provided by this section are not eligible for the alternative carbon monoxide standard provided by § 266.104(c);

(e) The boiler must be a watertube type boiler that does not feed fuel using a stoker or stoker type mechanism; and

(f) The hazardous waste shall be fired directly into the primary fuel flame zone of the combustion chamber with an air or steam atomization firing system, mechanical atomization system, or a rotary cup atomization system under the following conditions:

(1) *Viscosity.* The viscosity of the hazardous waste fuel as-fired shall not exceed 300 SSU;

(2) *Particle size.* When a high pressure air or steam atomizer, low pressure atomizer, or mechanical atomizer is used, 70% of the hazardous waste fuel must pass through a 200 mesh (74 micron) screen, and when a rotary cup atomizer is used, 70% of the hazardous waste must pass through a 100 mesh (150 micron) screen;

(3) *Mechanical atomization systems.* Fuel pressure within a mechanical atomization system and fuel flow rate shall be maintained within the design range taking into account the viscosity and volatility of fuel;

(4) *Rotary cup atomization systems.* Fuel flow rate through a rotary cup atomization system must be maintained within the design range taking into account the viscosity and volatility of the fuel.

§ 266.111 Standards for direct transfer.

(a) *Applicability.* The regulations in this section apply to owners and operators of boilers and industrial furnaces subject to §§ 266.102 or 266.103 if hazardous waste is directly transferred from a transport vehicle to a boiler or industrial furnace without the use of a storage unit.

(b) *Definitions.* (1) When used in this section, the following terms have the meanings given below:

Direct transfer equipment means any device (including but not limited to, such devices as piping, fittings, flanges, valves, and pumps) that is used to distribute, meter, or control the flow of hazardous waste between a container (i.e., transport vehicle) and a boiler or industrial furnace.

Container means any portable device in which hazardous waste is transported, stored, treated, or otherwise handled, and includes transport vehicles that are containers themselves (e.g., tank trucks, tanker-trailers, and rail tank cars), and containers placed on or in a transport vehicle.

(2) This section references several requirements provided in subparts I and J of parts 264 and 265. For purposes of this section, the term "tank systems" in those referenced requirements means direct transfer equipment as defined in paragraph (b)(1) of this section.

(c) *General operating requirements.* (1) No direct transfer of a pumpable hazardous waste shall be conducted from an open-top container to a boiler or industrial furnace.

(2) Direct transfer equipment used for pumpable hazardous waste shall always be closed, except when necessary to add or remove the waste, and shall not be opened, handled, or stored in a manner that may cause any rupture or leak.

(3) The direct transfer of hazardous waste to a boiler or industrial furnace shall be conducted so that it does not:

(i) Generate extreme heat or pressure, fire, explosion, or violent reaction;

(ii) Produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health;

(iii) Produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions;

(iv) Damage the structural integrity of the container or direct transfer equipment containing the waste;

(v) Adversely affect the capability of the boiler or industrial furnace to meet the standards provided by §§ 266.104 through 266.107; or

(vi) Threaten human health or the environment.

(4) Hazardous waste shall not be placed in direct transfer equipment, if it could cause the equipment or its secondary containment system to rupture, leak, corrode, or otherwise fail.

(5) The owner or operator of the facility shall use appropriate controls and practices to prevent spills and overflows from the direct transfer equipment or its secondary containment systems. These include at a minimum:

(i) Spill prevention controls (e.g., check valves, dry discount couplings); and

(ii) Automatic waste feed cutoff to use if a leak or spill occurs from the direct transfer equipment.

(d) *Areas where direct transfer vehicles (containers) are located.* Applying the definition of container under this section, owners and operators must comply with the following requirements:

(1) The containment requirements of § 264.175 of this chapter;

(2) The use and management requirements of subpart I, part 265 of this chapter, except for §§ 265.170 and 265.174; and

(3) The closure requirements of § 264.178 of this chapter.

(e) *Direct transfer equipment.* Direct transfer equipment must meet the following requirements:

(1) *Secondary containment.* Owners and operators shall comply with the secondary containment requirements of § 265.193 of this chapter, except for paragraphs 265.193 (a), (d), (e), and (i) as follows:

(i) For all new direct transfer equipment, prior to their being put into service; and

(ii) For existing direct transfer equipment within 2 years after August 21, 1991.

(2) *Requirements prior to meeting secondary containment requirements.* (i) For existing direct transfer equipment that does not have secondary containment, the owner or operator shall determine whether the equipment is leaking or is unfit for use. The owner or operator shall obtain and keep on file at the facility a written assessment reviewed and certified by a qualified, registered professional engineer in accordance with § 270.11(d) of this chapter that attests to the equipment's integrity by August 21, 1992.

(ii) This assessment shall determine whether the direct transfer equipment is adequately designed and has sufficient structural strength and compatibility with the waste(s) to be transferred to ensure that it will not collapse, rupture, or fail. At a minimum, this assessment shall consider the following:

(A) Design standard(s), if available, according to which the direct transfer equipment was constructed;

(B) Hazardous characteristics of the waste(s) that have been or will be handled;

(C) Existing corrosion protection measures;

(D) Documented age of the equipment, if available, (otherwise, an estimate of the age); and

(E) Results of a leak test or other integrity examination such that the effects of temperature variations, vapor pockets, cracks, leaks, corrosion, and erosion are accounted for.

(iii) If, as a result of the assessment specified above, the direct transfer equipment is found to be leaking or unfit for use, the owner or operator shall comply with the requirements of §§ 265.196 (a) and (b) of this chapter.

(3) *Inspections and recordkeeping.* (i) The owner or operator must inspect at least once each operating hour when hazardous waste is being transferred from the transport vehicle (container) to the boiler or industrial furnace:

(A) Overfill/spill control equipment (e.g., waste-feed cutoff systems, bypass systems, and drainage systems) to ensure that it is in good working order;

(B) The above ground portions of the direct transfer equipment to detect corrosion, erosion, or releases of waste (e.g., wet spots, dead vegetation); and

(C) Data gathered from monitoring equipment and leak-detection equipment, (e.g., pressure and temperature gauges) to ensure that the direct transfer equipment is being operated according to its design.

(ii) The owner or operator must inspect cathodic protection systems, if used, to ensure that they are functioning properly according to the schedule provided by § 265.195(b) of this chapter:

(iii) Records of inspections made under this paragraph shall be maintained in the operating record at the facility, and available for inspection for at least 3 years from the date of the inspection.

(4) *Design and installation of new ancillary equipment.* Owners and operators must comply with the requirements of § 265.192 of this chapter.

(5) *Response to leaks or spills.* Owners and operators must comply with the requirements of § 265.196 of this chapter.

(6) *Closure.* Owners and operators must comply with the requirements of § 265.197 of this chapter, except for § 265.197 (c)(2) through (c)(4).

(Approved by the Office of Management and Budget under control number 2050–0073)

§ 266.122 Regulation of residues.

A residue derived from the burning or processing of hazardous waste in a boiler or industrial furnace is not excluded from the definition of a hazardous waste under § 261.4(b) (4), (7), or (8) unless the device and the owner or operator meet the following requirements:

(a) The device meets the following criteria:

(1) *Boilers.* Boilers must burn coal and at least 50% of the heat input to the boiler must be provided by the coal;

(2) *Ore or mineral furnaces.* Industrial furnaces subject to § 261.4(b)(7) must process at least 50% by weight normal, nonhazardous raw materials;

(3) *Cement kilns.* Cement kilns must process at least 50% by weight normal cement-production raw materials;

(b) The owner or operator demonstrates that the hazardous waste does not significantly affect the residue by demonstrating conformance with either of the following criteria:

(1) *Comparison of waste-derived residue with normal residue.* The waste-derived residue must not contain appendix VIII, part 261 constituents (toxic constituents) that could reasonably be attributable to the hazardous waste at concentrations significantly higher than in residue generated without burning or processing of hazardous waste, using the following procedure. Toxic compounds that could reasonably be attributable to burning or processing the hazardous waste (constituents of concern) include toxic constituents in the hazardous waste, and the organic compounds listed in appendix VIII of this part that may be generated as products of incomplete combustion. Sampling and analyses shall be in conformance with procedures prescribed in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* incorporated by reference in § 260.11(a) of this chapter.

(i) *Normal residue.* Concentrations of toxic constituents of concern in normal residue shall be determined based on analyses of a minimum of 10 composite samples. The upper 95% confidence level about the mean of the concentration in the normal residue shall be considered

the statistically-derived concentration in the normal residue. If changes in raw materials or fuels reduce the statistically-derived concentrations of the toxic constituents of concern in the normal residue, the statistically-derived concentrations must be revised or statistically-derived concentrations of toxic constituents in normal residue must be established for a new mode of operation with the new raw material or fuel. To determine the upper 95% confidence level about the mean of the concentration in the normal residue, the owner or operator shall use statistical procedures prescribed in "Statistical Methodology for Bevill Residue Determinations" in appendix IX of this part.

(ii) *Waste-derived residue.* Concentrations of toxic constituents of concern in waste-derived residue shall be determined based on analysis of samples composited over a period of not more than 24 hours. The concentration of a toxic constituent in the waste-derived residue is not considered to be significantly higher than in the normal residue if the concentration in the waste-derived residue does not exceed the concentration established for the normal residue under paragraph (b)(1)(i) of this section; or

(2) *Comparison of waste-derived residue concentrations with health-based limits*—(i) *Nonmetal constituents.* The concentrations of nonmetal toxic constituents of concern (specified in paragraph (b)(1) of this section) in the waste-derived residue must not exceed the health-based levels specified in appendix VII of this part. If a health-based limit for a constituent of concern is not listed in appendix VII of this part, then a limit of 0.002 micrograms per kilogram or the level of detection (using analytical procedures prescribed in SW-846), whichever is higher, shall be used; and

(ii) *Metal constituents.* The concentration of metals in an extract obtained using the Toxicity Characteristic Leaching Procedure of § 261.24 of this chapter must not exceed the levels specified in appendix VII of this part; and

(c) Records sufficient to document compliance with the provisions of this section must be retained for a period of three years. At a minimum, the following shall be recorded:

(1) Levels of constituents in appendix VIII, part 261, that are present in waste-derived residues;

(2) If the waste-derived residue is compared with normal residue under paragraph (b)(1) of this section:

(i) The levels of constituents in appendix VIII, part 261, that are present in normal residues; and

(ii) Data and information, including analyses of samples as necessary, obtained to determine if changes in raw materials or fuels would reduce the concentration of toxic constituents of concern in the normal residue.

3. Appendices I through X are added to part 266 as follows:

Appendix I.—Tier I and Tier II Feed Rate and Emissions Screening Limits for Metals

TABLE I-A.—TIER I AND TIER II FEED RATE AND EMISSIONS SCREENING LIMITS FOR CARCINOGENIC METALS FOR FACILITIES IN NONCOMPLEX TERRAIN

[Values for urban areas]

Terrain adjusted eff. stack ht. (m)	Antimony (g/hr)	Barium (g/hr)	Lead (g/hr)	Mercury (g/hr)	Silver (g/hr)	Thallium (g/hr)
4	6.0E+01	1.0E+04	1.8E+01	6.0E+01	6.0E+02	6.0E+01
6	6.8E+01	1.1E+04	2.0E+01	6.8E+01	6.8E+02	6.8E+01
8	7.6E+01	1.3E+04	2.3E+01	7.6E+01	7.6E+02	7.6E+01
10	8.6E+01	1.4E+04	2.6E+01	8.6E+01	8.6E+02	8.6E+01
12	9.6E+01	1.7E+04	3.0E+01	9.6E+01	9.6E+02	9.6E+01
14	1.1E+02	1.8E+04	3.4E+01	1.1E+02	1.1E+03	1.1E+02
16	1.3E+02	2.1E+04	3.6E+01	1.3E+02	1.3E+03	1.3E+02
18	1.4E+02	2.4E+04	4.3E+01	1.4E+02	1.4E+03	1.4E+02
20	1.6E+02	2.7E+04	4.6E+01	1.6E+02	1.6E+03	1.6E+02
22	1.8E+02	3.0E+04	5.4E+01	1.8E+02	1.8E+03	1.8E+02
24	2.0E+02	3.4E+04	6.0E+01	2.0E+02	2.0E+03	2.0E+02
26	2.3E+02	3.9E+04	6.8E+01	2.3E+02	2.3E+03	2.3E+02
28	2.6E+02	4.3E+04	7.8E+01	2.6E+02	2.6E+03	2.6E+02
30	3.0E+02	5.0E+04	9.0E+01	3.0E+02	3.0E+03	3.0E+02
35	4.0E+02	6.6E+04	1.1E+02	4.0E+02	4.0E+03	4.0E+02
40	4.6E+02	7.8E+04	1.4E+02	4.6E+02	4.6E+03	4.6E+02
45	6.0E+02	1.0E+05	1.8E+02	6.0E+02	6.0E+03	6.0E+02
50	7.8E+02	1.3E+05	2.3E+02	7.8E+02	7.8E+03	7.8E+02
55	9.6E+02	1.7E+05	3.0E+02	9.6E+02	9.6E+03	9.6E+02
60	1.2E+03	2.0E+05	3.6E+02	1.2E+03	1.2E+04	1.2E+03
65	1.5E+03	2.5E+05	4.3E+02	1.5E+03	1.5E+04	1.5E+03
70	1.7E+03	2.8E+05	5.0E+02	1.7E+03	1.7E+04	1.7E+03
75	1.9E+03	3.2E+05	5.8E+02	1.9E+03	1.9E+04	1.9E+03
80	2.2E+03	3.6E+05	6.4E+02	2.2E+03	2.2E+04	2.2E+03
85	2.5E+03	4.0E+05	7.6E+02	2.5E+03	2.5E+04	2.5E+03
90	2.8E+03	4.6E+05	8.2E+02	2.8E+03	2.8E+04	2.8E+03
95	3.2E+03	5.4E+05	9.6E+02	3.2E+03	3.2E+04	3.2E+03
100	3.6E+03	6.0E+05	1.1E+03	3.6E+03	3.6E+04	3.6E+03
105	4.0E+03	6.8E+05	1.2E+03	4.0E+03	4.0E+04	4.0E+03
110	4.6E+03	7.8E+05	1.4E+03	4.6E+03	4.6E+04	4.6E+03
115	5.4E+03	8.6E+05	1.6E+03	5.4E+03	5.4E+04	5.4E+03
120	6.0E+03	1.0E+06	1.8E+03	6.0E+03	6.0E+04	6.0E+03

TABLE I-B.—TIER I AND TIER II FEED RATE AND EMISSIONS SCREENING LIMITS FOR NONCARCINOGENIC METALS FOR FACILITIES IN NONCOMPLEX TERRAIN

[Values for rural areas]

Terrain adjusted eff. stack ht. (m)	Antimony (g/hr)	Barium (g/hr)	Lead (g/hr)	Mercury (g/hr)	Silver (g/hr)	Thallium (g/hr)
4	3.1E+01	5.2E+03	9.4E+00	3.1E+01	3.1E+02	3.1E+01
6	3.6E+01	6.0E+03	1.1E+01	3.6E+01	3.6E+02	3.6E+01
8	4.0E+01	6.8E+03	1.2E+01	4.0E+01	4.0E+02	4.0E+01
10	4.6E+01	7.8E+03	1.4E+01	4.6E+01	4.6E+02	4.6E+01
12	5.8E+01	9.6E+03	1.7E+01	5.8E+01	5.8E+02	5.8E+01
14	6.8E+01	1.1E+04	2.1E+01	6.8E+01	6.8E+02	6.8E+01
16	8.6E+01	1.4E+04	2.6E+01	8.6E+01	8.6E+02	8.6E+01
18	1.1E+02	1.8E+04	3.2E+01	1.1E+02	1.1E+03	1.1E+02
20	1.3E+02	2.2E+04	4.0E+01	1.3E+02	1.3E+03	1.3E+02
22	1.7E+02	2.8E+04	5.0E+01	1.7E+02	1.7E+03	1.7E+02
24	2.2E+02	3.6E+04	6.4E+01	2.2E+02	2.2E+03	2.2E+02
26	2.8E+02	4.6E+04	8.2E+01	2.8E+02	2.8E+03	2.8E+02
28	3.5E+02	5.8E+04	1.0E+02	3.5E+02	3.5E+03	3.5E+02
30	4.3E+02	7.6E+04	1.3E+02	4.3E+02	4.3E+03	4.3E+02
35	7.2E+02	1.2E+05	2.1E+02	7.2E+02	7.2E+03	7.2E+02
40	1.1E+03	1.8E+05	3.2E+02	1.1E+03	1.1E+04	1.1E+03
45	1.5E+03	2.5E+05	4.6E+02	1.5E+03	1.5E+04	1.5E+03
50	2.0E+03	3.3E+05	6.0E+02	2.0E+03	2.0E+04	2.0E+03
55	2.6E+03	4.4E+05	7.8E+02	2.6E+03	2.6E+04	2.6E+03
60	3.4E+03	5.8E+05	1.0E+03	3.4E+03	3.4E+04	3.4E+03
65	4.6E+03	7.6E+05	1.4E+03	4.6E+03	4.6E+04	4.6E+03
70	5.4E+03	9.0E+05	1.6E+03	5.4E+03	5.4E+04	5.4E+03
75	6.4E+03	1.1E+06	1.9E+03	6.4E+03	6.4E+04	6.4E+03
80	7.6E+03	1.3E+06	2.3E+03	7.6E+03	7.6E+04	7.6E+03
85	9.4E+03	1.5E+06	2.8E+03	9.4E+03	9.4E+04	9.4E+03
90	1.1E+04	1.8E+06	3.3E+03	1.1E+04	1.1E+05	1.1E+04
95	1.3E+04	2.2E+06	3.9E+03	1.3E+04	1.3E+05	1.3E+04
100	1.5E+04	2.6E+06	4.6E+03	1.5E+04	1.5E+05	1.5E+04
105	1.8E+04	3.0E+06	5.4E+03	1.8E+04	1.8E+05	1.8E+04
110	2.2E+04	3.6E+06	6.6E+03	2.2E+04	2.2E+05	2.2E+04
115	2.6E+04	4.4E+06	7.8E+03	2.6E+04	2.6E+05	2.6E+04
120	3.1E+04	5.0E+06	9.2E+03	3.1E+04	3.1E+05	3.1E+04

TABLE I-C.—TIER I AND TIER II FEED RATE AND EMISSIONS SCREENING LIMITS FOR NONCARCINOGENIC METALS FOR FACILITIES IN COMPLEX TERRAIN

Values for urban and rural areas

Terrain adjusted eff. stack ht. (m)	Antimony (g/hr)	Barium (g/hr)	Lead (g/hr)	Mercury (g/hr)	Silver (g/hr)	Thallium (g/hr)
4	1.4E+01	2.4E+03	4.3E+00	1.4E+01	1.4E+02	1.4E+01
6	2.1E+01	3.5E+03	6.2E+00	2.1E+01	2.1E+02	2.1E+01
8	3.0E+01	5.0E+03	9.2E+00	3.0E+01	3.0E+02	3.0E+01
10	4.3E+01	7.6E+03	1.3E+01	4.3E+01	4.3E+02	4.3E+01
12	5.4E+01	9.0E+03	1.7E+01	5.4E+01	5.4E+02	5.4E+01
14	6.8E+01	1.1E+04	2.0E+01	6.8E+01	6.8E+02	6.8E+01
16	7.8E+01	1.3E+04	2.4E+01	7.8E+01	7.8E+02	7.8E+01
18	8.6E+01	1.4E+04	2.6E+01	8.6E+01	8.6E+02	8.6E+01
20	9.6E+01	1.6E+04	2.9E+01	9.6E+01	9.6E+02	9.6E+01
22	1.0E+02	1.8E+04	3.2E+01	1.0E+02	1.0E+03	1.0E+02
24	1.2E+02	1.9E+04	3.5E+01	1.2E+02	1.2E+03	1.2E+02
26	1.3E+02	2.2E+04	3.6E+01	1.3E+02	1.3E+03	1.3E+02
28	1.4E+02	2.4E+04	4.3E+01	1.4E+02	1.4E+03	1.4E+02
30	1.6E+02	2.7E+04	4.6E+01	1.6E+02	1.6E+03	1.6E+02
35	2.0E+02	3.3E+04	5.8E+01	2.0E+02	2.0E+03	2.0E+02
40	2.4E+02	4.0E+04	7.2E+01	2.4E+02	2.4E+03	2.4E+02
45	3.0E+02	5.0E+04	9.0E+01	3.0E+02	3.0E+03	3.0E+02
50	3.6E+02	6.0E+04	1.1E+02	3.6E+02	3.6E+03	3.6E+02
55	4.6E+02	7.6E+04	1.4E+02	4.6E+02	4.6E+03	4.6E+02
60	5.8E+02	9.4E+04	1.7E+02	5.8E+02	5.8E+03	5.8E+02
65	6.8E+02	1.1E+05	2.1E+02	6.8E+02	6.8E+03	6.8E+02
70	7.8E+02	1.3E+05	2.4E+02	7.8E+02	7.8E+03	7.8E+02
75	8.6E+02	1.4E+05	2.6E+02	8.6E+02	8.6E+03	8.6E+02
80	9.6E+02	1.6E+05	2.9E+02	9.6E+02	9.6E+03	9.6E+02
85	1.1E+03	1.8E+05	3.3E+02	1.1E+03	1.1E+04	1.1E+03
90	1.2E+03	2.0E+05	3.6E+02	1.2E+03	1.2E+04	1.2E+03
95	1.4E+03	2.3E+05	4.0E+02	1.4E+03	1.4E+04	1.4E+03
100	1.5E+03	2.6E+05	4.6E+02	1.5E+03	1.5E+04	1.5E+03
105	1.7E+03	2.8E+05	5.0E+02	1.7E+03	1.7E+04	1.7E+03
110	1.9E+03	3.2E+05	5.8E+02	1.9E+03	1.9E+04	1.9E+03
115	2.1E+03	3.6E+05	6.4E+02	2.1E+03	2.1E+04	2.1E+03
120	2.4E+03	4.0E+05	7.2E+02	2.4E+03	2.4E+04	2.4E+03

TABLE I-D.—TIER I AND TIER II FEED RATE AND EMISSIONS SCREENING LIMITS FOR CARCINOGENIC METALS FOR FACILITIES IN NONCOMPLEX TERRAIN

	Values for use in urban areas			Values for use in rural areas				
Terrain adjusted eff. stack ht. (m)	Arsenic (g/hr)	Cadmium (g/hr)	Chromium (g/hr)	Beryllium (g/hr)	Arsenic (g/hr)	Cadmium (g/hr)	Chromium (g/hr)	Beryllium (g/hr)
4	4.6E−01	1.1E+00	1.7E−01	8.2E−01	2.4E−01	5.8E−01	8.6E−02	4.3E−01
6	5.4E−01	1.3E+00	1.9E−01	9.4E−01	2.8E−01	6.6E−01	1.0E−01	5.0E−01
8	6.0E−01	1.4E+00	2.2E−01	1.1E+00	3.2E−01	7.6E−01	1.1E−01	5.6E−01
10	6.8E−01	1.6E+00	2.4E−01	1.2E+00	3.6E−01	8.6E−01	1.3E−01	6.4E−01
12	7.6E−01	1.8E+00	2.7E−01	1.4E+00	4.3E−01	1.1E+00	1.6E−01	7.8E−01
14	8.6E−01	2.1E+00	3.1E−01	1.5E+00	5.4E−01	1.3E+00	2.0E−01	9.6E−01
16	9.6E+01	2.3E+00	3.5E−01	1.7E+00	6.8E−01	1.6E+00	2.4E−01	1.2E+00
18	1.1E+00	2.6E+00	4.0E−01	2.0E+00	8.2E−01	2.0E+00	3.0E−01	1.5E+00
20	1.2E+00	3.0E+00	4.4E−01	2.2E+00	1.0E+00	2.5E+00	3.7E−01	1.9E+00
22	1.4E+00	3.4E+00	5.0E−01	2.5E+00	1.3E+00	3.2E+00	4.8E−01	2.4E+00
24	1.6E+00	3.9E+00	5.8E−01	2.8E+00	1.7E+00	4.0E+00	6.0E−01	3.0E+00
26	1.8E+00	4.3E+00	6.4E−01	3.2E+00	2.1E+00	5.0E+00	7.6E−01	3.9E+00
28	2.0E+00	4.8E+00	7.2E−01	3.6E+00	2.7E+00	6.4E+00	9.8E−01	5.0E+00
30	2.3E+00	5.4E+00	8.2E−01	4.0E+00	3.5E+00	8.2E+00	1.2E+00	6.2E+00
35	3.0E+00	6.8E+00	1.0E+00	5.4E+00	5.4E+00	1.3E+01	1.9E+00	9.6E+00
40	3.6E+00	9.0E+00	1.3E+00	6.8E+00	8.2E+00	2.0E+01	3.0E+00	1.5E+01
45	4.6E+00	1.1E+01	1.7E+00	8.6E+00	1.1E+01	2.8E+01	4.2E+00	2.1E+01
50	6.0E+00	1.4E+01	2.2E+00	1.1E+01	1.5E+01	3.7E+01	5.4E+00	2.8E+01
55	7.6E+00	1.8E+01	2.7E+00	1.4E+01	2.0E+01	5.0E+01	7.2E+00	3.6E+01
60	9.4E+00	2.2E+01	3.4E+00	1.7E+01	2.7E+01	6.4E+01	9.6E+00	4.8E+01
65	1.1E+01	2.8E+01	4.2E+00	2.1E+01	3.6E+01	8.6E+01	1.3E+01	6.4E+01
70	1.3E+01	3.1E+01	4.6E+00	2.4E+01	4.3E+01	1.0E+02	1.5E+01	7.6E+01
75	1.5E+01	3.6E+01	5.4E+00	2.7E+01	5.0E+01	1.2E+02	1.8E+01	9.0E+01
80	1.7E+01	4.0E+01	6.0E+00	3.0E+01	6.0E+01	1.4E+02	2.2E+01	1.1E+02
85	1.9E+01	4.6E+01	6.8E+00	3.4E+01	7.2E+01	1.7E+02	2.6E+01	1.3E+02
90	2.2E+01	5.0E+01	7.8E+00	3.9E+01	8.6E+01	2.0E+02	3.0E+01	1.5E+02
95	2.5E+01	5.8E+01	9.0E+00	4.4E+01	1.0E+02	2.4E+02	3.6E+01	1.8E+02
100	2.8E+01	6.8E+01	1.0E+01	5.0E+01	1.2E+02	2.9E+02	4.3E+01	2.2E+02
105	3.2E+01	7.6E+01	1.1E+01	5.6E+01	1.4E+02	3.4E+02	5.0E+01	2.6E+02
110	3.6E+01	8.6E+01	1.3E+01	6.4E+01	1.7E+02	4.0E+02	6.0E+01	3.0E+02
115	4.0E+01	9.6E+01	1.5E+01	7.2E+01	2.0E+02	4.8E+02	7.2E+01	3.6E+02
120	4.6E+01	1.1E+02	1.7E+01	8.2E+01	2.4E+02	5.8E+02	8.6E+01	4.3E+02

TABLE I-E.—TIER I AND TIER II FEED RATE AND EMISSIONS SCREENING LIMITS FOR CARCINOGENIC METALS FOR FACILITIES IN COMPLEX TERRAIN

	Values for use in urban and rural areas			
Terrain adjusted eff. stack ht. (m)	Arsenic (g/hr)	Cadmium (g/hr)	Chromium (g/hr)	Beryllium (g/hr)
4	1.1E−01	2.6E−01	4.0E−02	2.0E−01
6	1.6E−01	3.9E−01	5.8E−02	2.9E−01
8	2.4E−01	5.8E−01	8.6E−02	4.3E−01
10	3.5E−01	8.2E−01	1.3E−01	6.2E−01
12	4.3−01	1.0E+00	1.5E−01	7.6E−01
14	5.0E−01	1.3E+00	1.9E−01	9.4E−01
16	6.0E−01	1.4E+00	2.2E−01	1.1E+00
18	6.8E−01	1.6E+00	2.4E−01	1.2E+00
20	7.6E−01	1.8E+00	2.7E−01	1.3E+00
22	8.2E−01	1.9E+00	3.0E−01	1.5E+00
24	9.0E−01	2.1E+00	3.3E−01	1.6E+00
26	1.0E+00	2.4E+00	3.6E−01	1.8E+00
28	1.1E+00	2.7E+00	4.0E−01	2.0E+00
30	1.2E+00	3.0E+00	4.4E−01	2.2E+00
35	1.5E+00	3.7E+00	5.4E−01	2.7E+00
40	1.9E+00	4.6E+00	6.8E−01	3.4E+00
45	2.4E+00	5.4E+00	8.4E−01	4.2E+00
50	2.9E+00	6.8E+00	1.0E+00	5.0E+00
55	3.5E+00	8.4E+00	1.3E+00	6.4E+00
60	4.3E+00	1.0E+01	1.5E+00	7.8E+00
65	5.4E+00	1.3E+01	1.9E+00	9.6E+00
70	6.0E+00	1.4E+01	2.2E+00	1.1E+01
75	6.8E+00	1.6E+01	2.4E+00	1.2E+01
80	7.6E+00	1.8E+01	2.7E+00	1.3E+01
85	8.2E+00	2.0E+01	3.0E+00	1.5E+01
90	9.4E+00	2.3E+01	3.4E+00	1.7E+01
95	1.0E+01	2.5E+01	4.0E+00	1.9E+01
100	1.2E+01	2.8E+01	4.3E+00	2.1E+01
105	1.3E+01	3.2E+01	4.8E+00	2.4E+01
110	1.5E+01	3.5E+01	5.4E+00	2.7E+01
115	1.7E+01	4.0E+01	6.0E+00	3.0E+01
120	1.9E+01	4.4E+01	6.4E+00	3.3E+01

Appedix II.—Tier I Feed Rate Screening Limits for Total Chlorine and Chloride

TIER I FEED RATE SCREENING LIMITS FOR CHLORINE FOR FACILITIES IN NONCOMPLEX AND COMPLEX TERRAIN

Terrain-adjusted effective stack height (m)	Noncomplex		Complex
	Urban (lb/hr)	Rural (lb/hr)	(lb/hr)
4	1.8E−02	9.2E−03	4.1E−03
6	2.0E−02	1.0E−02	6.1E−03
8	2.2E−02	1.2E−02	9.0E−03
10	2.5E−02	1.4E−02	1.3E−02
12	2.9E−02	1.7E−02	1.6E−02
14	3.3E−02	2.0E−02	2.0E−02
16	3.7E−02	2.5E−02	2.3E−02
18	4.1E−02	3.2E−02	2.5E−02
20	4.7E−02	3.9E−02	2.9E−02
22	5.3E−02	5.0E−02	3.1E−02
24	6.0E−02	6.3E−02	3.5E−02
26	6.8E−02	8.1E−02	3.8E−02
28	7.6E−02	1.0E−01	4.2E−02
30	8.7E−02	1.3E−01	4.7E−02
35	1.2E−01	2.1E−01	5.8E−02
40	1.4E−01	3.2E−01	7.2E−02
45	1.8E−01	4.4E−01	8.8E−02
50	2.3E−01	5.8E−01	1.1E−01
55	2.9E−01	7.7E−01	1.4E−01
60	3.6E−01	1.0E+00	1.7E−01
65	4.3E−01	1.4E+00	2.0E−01
70	5.0E−01	1.6E+00	2.3E−01
75	5.6E−01	1.9E+00	2.5E−01
80	6.3E−01	2.2E+00	2.9E−01
85	7.3E−01	2.8E+00	3.2E−01
90	8.3E−1	3.2E+00	3.6E−01
95	9.3E−01	3.8E+00	4.0E−01
100	1.1E+00	4.6E+00	4.4E−01
105	1.2E+00	5.4E+00	5.0E−01
110	1.4E+00	6.5E+00	5.6E−01
115	1.6E+00	7.7E+00	6.2E−01
120	1.8E+00	9.1E+00	7.1E−01

Appendix III.—Tier II Emission Rate Screening Limits for Free Chlorine and Hydrogen Chloride

TIER II EMISSIONS SCREENING LIMITS FOR Cl_2 AND HCl IN NONCOMPLEX TERRAIN

Terrain-adjusted effective stack height (m)	Values for use in urban areas		Values for use in rural areas	
	Cl_2 (g/sec)	HCl (g/sec)	Cl_2 (g/sec)	HCl (g/sec)
4	2.3E−03	4.0E−01	1.2E−03	2.0E−01
6	2.5E−03	4.4E−01	1.3E−03	2.3E−01
8	2.8E−03	4.9E−01	1.5E−03	2.6E−01
10	3.2E−03	5.6E−01	1.7E−03	3.0E−01
12	3.6E−03	6.3E−01	2.1E−03	3.7E−01
14	4.1E−03	7.2E−01	2.5E−03	4.4E−01
16	4.7E−03	8.2E−01	3.2E−03	5.6E−01
18	5.2E−03	9.1E−01	4.0E−03	7.0E−01
20	5.9E−03	1.0E+00	4.9E−03	8.6E−01
22	6.7E−03	1.2E+00	6.3E−03	1.1E+00
24	7.6E−03	1.3E+00	8.0E−03	1.4E+00
26	8.5E−03	1.5E+00	1.0E−02	1.8E+00
28	9.6E−03	1.7E+00	1.3E−02	2.3E+00
30	1.1E−02	1.9E+00	1.6E−02	2.8E+00
35	1.5E−02	2.6E+00	2.7E−02	4.7E+00
40	1.7E−02	3.0E+00	4.0E−02	7.0E+00
45	2.3E−02	4.0E+00	5.6E−02	9.8E+00
50	2.9E−02	5.1E+00	7.3E−02	1.3E+01
55	3.6E−02	6.3E+00	9.7E.02	1.7E+01
60	4.5E−02	7.9E+00	1.3E−01	2.2E+01
65	5.5E−02	9.6E+00	1.7E−01	3.0E+01
70	6.3E−02	1.1E+01	2.0E−01	3.5E+01
75	7.1E−02	1.2E+01	2.4E−01	4.2E+01
80	8.0E−02	1.4E+01	2.8E−01	4.9E+01
85	9.2E−02	1.6E+01	3.5E−01	6.1E+01
90	1.0E−01	1.8E+01	4.0E−01	7.0E+01
95	1.2E−01	2.1E+01	4.8E−01	8.4E+01

TIER II EMISSIONS SCREENING LIMITS FOR Cl_2 AND HCl IN NONCOMPLEX TERRAIN—Continued

Terrain-adjusted effective stack height (m)	Values for use in urban areas		Values for use in rural areas	
	Cl_2 (g/sec)	HCl (g/sec)	Cl_2 (g/sec)	HCl (g/sec)
100	1.3E−01	2.3E+01	5.7E−01	1.0E+02
105	1.5E−01	2.6E+01	6.8E−01	1.2E+02
110	1.7E−01	3.0E+01	8.1E−01	1.4E+02
115	2.0E−01	3.5E+01	9.7E−01	1.7E+02
120	2.3E−01	4.0E+01	1.1E+00	2.0E+02

TIER II EMISSIONS SCREENING LIMITS FOR Cl_2 AND HCl IN COMPLEX TERRAIN

Terrain-adjusted effective stack height (m)	Values for use in urban and rural areas	
	Cl_2 (g/sec)	HCl (g/sec)
4	5.2E−04	9.1E−02
6	7.7E−04	1.4E−01
8	1.1E−03	2.0E−01
10	1.6E−03	2.8E−01
12	2.0E−03	3.5E−01
14	2.5E−03	4.4E−01
16	2.9E−03	5.1E−01
18	3.2E−03	5.6E−01
20	3.6E−03	6.3E−01
22	3.9E−03	6.8E−01
24	4.4E−03	7.7E−01
26	4.8E−03	8.4E−01
28	5.3E−03	9.3E−01
30	5.9E−03	1.0E+00
35	7.3E−03	1.3E+00
40	9.1E−03	1.6E+00
45	1.1E−02	1.9E+00
50	1.3E−02	2.3E+00
55	1.7E−02	3.0E+00
60	2.1E−02	3.7E+00
65	2.5E−02	4.4E+00
70	2.9E−02	5.1E+00
75	3.2E−02	5.6E+00
80	3.6E−02	6.3E+00
85	4.0E−02	7.0E+00
90	4.5E−02	7.9E+00
95	5.1E−02	8.9E+00
100	5.6E−02	9.8E+00
105	6.3E−02	1.1E+01
110	7.1E−02	1.2E+01
115	7.9E−02	1.4E+01
120	8.9E−02	1.6E+01

APPENDIX IV.—REFERENCE AIR CONCENTRATIONS*

Constituent	CAS No.	RAC (ug/m³)
Acetaldehyde	75-07-0	10
Acetonitrile	75-05-8	10
Acetophenone	98-86-2	100
Acrolein	107-02-8	20
Aldicarb	116-06-3	1
Aluminum Phosphide	20859-73-8	0.3
Allyl Alcohol	107-18-6	5
Antimony	7440-36-0	0.3
Barium	7440-39-3	50
Barium Cyanide	542-62-1	50
Bromomethane	74-83-9	0.8
Calcium Cyanide	592-01-8	30
Carbon Disulfide	75-15-0	200
Chloral	75-87-6	2
Chlorine (free)		0.4
2-Chloro-1,3-butadiene	126-99-8	3
Chromium III	16065-83-1	1000
Copper Cyanide	544-92-3	5
Cresols	1319-77-3	50
Cumene	98-82-8	1

APPENDIX IV.—REFERENCE AIR CONCENTRATIONS*—Continued

Constituent	CAS No.	RAC (ug/m³)
Cyanide (free)	57-12-15	20
Cyanogen	460-19-5	30
Cyanogen Bromide	506-68-3	80
Di-n-butyl Phthalate	84-74-2	100
o-Dichlorobenzene	95-50-1	10
p-Dichlorobenzene	106-46-7	10
Dichlorodifluoromethane	75-71-8	200
2,4-Dichlorophenol	120-83-2	3
Diethyl Phthalate	84-66-2	800
Dimethoate	60-51-5	0.8
2,4-Dinitrophenol	51-28-5	2
Dinoseb	88-85-7	0.9
Diphenylamine	122-39-4	20
Endosulfan	115-29-1	0.05
Endrin	72-20-8	0.3
Fluorine	7782-41-4	50
Formic Acid	64-18-6	2000
Glycidyaldehyde	765-34-4	0.3
Hexachlorocyclopentadiene	77-47-4	5
Hexachlorophene	70-30-4	0.3
Hydrocyanic Acid	74-90-8	20
Hydrogen Chloride	7647-01-1	7
Hydrogen Sulfide	7783-06-4	3
Isobutyl Alcohol	78-83-1	300
Lead	7439-92-1	0.09
Maleic Anyhdride	108-31-6	100
Mercury	7439-97-6	0.3
Methacrylonitrile	126-98-7	0.1
Methomyl	16752-77-5	20
Methoxychlor	72-43-5	50
Methyl Chlorocarbonate	79-22-1	1000
Methyl Ethyl Katone	78-93-3	80
Metyl Parathion	298-00-0	0.3
Nickel Cyanide	557-19-7	20
Nitric Oxide	10102-43-9	100
Nitrobenzene	98-95-3	0.8
Pentachlorobenzene	608-93-5	0.8
Pentachlorophenol	87-86-5	30
Phenol	108-95-2	30
M-Phenylenediamine	108-45-2	5
Phenylmercuric Acetate	62-38-4	0.075
Phosphine	7803-51-2	0.3
Phthalic Anhydride	85-44-9	2000
Potassium Cyanide	151-50-8	50
Potassium Silver Cyanide	506-61-6	200
Pyridine	110-86-1	1
Selenious Acid	7783-60-8	3
Selenourea	630-10-4	5
Silver	7440-22-4	3
Silver Cyanide	506-64-9	100
Sodium Cyanide	143-33-9	30
Strychnine	57-24-9	0.3
1,2,4,5-Tetrachlorobenzene	95-94-3	0.3
2,3,4,6-Tetrachlorophenol	58-90-2	30
Tetraethyl Lead	78-00-2	0.0001
Tetrahydrofuran	109-99-9	10
Thallic Oxide	1314-32-5	0.3
Thallium	7440-28-0	0.5
Thallium (I) Acetate	563-68-8	0.5

APPENDIX IV.—REFERENCE AIR CONCENTRATIONS*—Continued

Constituent	CAS No.	RAC (ug/m³)
Thallium (I) Carbonate	6533-73-9	0.3
Thallium (I) Chloride	7791-12-0	0.3
Thallium (I) Nitrate	10102-45-1	0.5
Thallium Selenite	12039-52-0	0.5
Thallium (I) Sulfate	7446-18-6	0.075
Thiram	137-26-8	5
Toluene	108-88-3	300
1,2,4-Trichlorobenzene	120-82-1	20
Trichloromonofluoromethane	75-69-4	300
2.4.5-Trichlorophenol	95-95-4	100
Vanadium Pentoxide	1314-62-1	20
Warfarin	81-81-2	0.3
Xylenes	1330-20-7	80
Zinc Cyanide	557-21-1	50
Zinc Phosphide	1314-84-7	0.3

*The RAC for other Appendix VIII Part 261 constituents not listed herein or in Appendix V of this Part is 0.1 ug/m³.

APPENDIX V.—RISK SPECIFIC DOSES (10^{-5})

Constituent	CAS No.	Unit risk (m3/ug)	RsD (ug/m3)
Acrylamide	79-06-1	1.3E−03	7.7E−03
Acrylonitrile	107-13-1	6.8E−05	1.5E−01
Aldrin	309-00-2	4.9E−03	2.0E−03
Aniline	62-53-3	7.4E−06	1.4E+00
Arsenic	7440-38-2	4.3E−03	2.3E−03
Benz(a)anthracene	56-55-3	8.9E−04	1.1E−02
Benxene	71-43-2	8.3E−06	1.2E+00
Benzidine	92-87-5	6.7E−02	1.5E−04
Benzo(a)pyrene	50-32-8	3.3E−03	3.0E−03
Beryllium	7440-41-7	2.4E−03	4.2E−03
Bis(2-chloroethyl)ether	111-44-4	3.3E−04	3.0E−02
Bis(chloromethyl)ether	542-88-1	6.2E−02	1.6E−04
Bis(2-ethylhexyl)-phthalate	117-81-7	2.4E−07	4.2E+01
1,3-Butadiene	106-99-0	2.8E−04	3.6E−02
Cadmium	7440-43-9	1.8E−03	5.6E−03
Carbon Tetrachloride	56-23-5	1.5E−05	6.7E−01

APPENDIX V.—RISK SPECIFIC DOSES (10^{-5})—Continued

Constituent	CAS No.	Unit risk (m3/ug)	RsD (ug/m3)
Chlordane	57-74-9	3.7E−04	2.7E−02
Chloroform	67-66-3	2.3E−05	4.3E−01
Chloromethane	74-87-3	3.6E−06	2.8E+00
Chromium VI	7440-47-3	1.2E−02	8.3E−04
DDT	50-29-3	9.7E−05	1.0E−01
Dibenz(a,h)anthracene	53-70-3	1.4E−02	7.1E−04
1,2-Dibromo-3-chloropropane	96-12-8	6.3E−03	1.6E−03
1,2-Dibromoethane	106-93-4	2.2E−04	4.5E−02
1,1-Dichloroethane	75-34-3	2.6E−05	3.8E−01
1,2-Dichloroethane	107-06-2	2.6E−05	3.8E−01
1,1-Dichloroethylene	75-35-4	5.0E−05	2.0E−01
1,3-Dichloropropene	542-75-6	3.5E−01	2.9E−05
Dieldrin	60-57-1	4.6E−03	2.2E−03
Diethylstilbestrol	56-53-1	1.4E−01	7.1E−05
Dimethylnitrosamine	62-75-9	1.4E−02	7.1E−04
2,4-Dinitrotoluene	121-14-2	8.8E−05	1.1E−01
1,2-Diphenylhydrazine	122-66-7	2.2E−04	4.5E−02
1,4-Dioxane	123-91-1	1.4E−06	7.1E+00
Epichlorohydrin	106-89-8	1.2E−06	8.3E+00
Ethylene Oxide	75-21-8	1.0E−04	1.0E−01
Ethylene Dibromide	106-93-4	2.2E−04	4.5E−02
Formaldehyde	50-00-0	1.3E−05	7.7E−01
Heptachlor	76-44-8	1.3E−03	7.7E−03
Heptachlor Epoxide	1024-57-3	2.6E−03	3.8E−03
Hexachlorobenzene	118-74-1	4.9E−04	2.0E−02
Hexachlorobutadiene	87-68-3	2.0E−05	5.0E−01
Alpha-hexachlorocyclohexane	319-84-6	1.8E−03	5.6E−03
Beta-hexachlorocyclohexane	319-85-7	5.3E−04	1.9E−02
Gamma-hexachlorocyclohexane	58-89-9	3.8E−04	2.6E−02
Hexachlorocyclohexane, Technical		5.1E−04	2.0E−02
Hexachlorodibenxo-p-dioxin(1,2 Mixture)		1.3E+0	7.7E−06
Hexachloroethane	67-72-1	4.0E−06	2.5E+00
Hydrazine	302-01-2	2.9E−03	3.4E−03
Hydrazine Sulfate	302-01-2	2.9E−03	3.4E−03
3-Methylcholanthrene	56-49-5	2.7E−03	3.7E−03
Methyl Hydrazine	60-34-4	3.1E−04	3.2E−02
Methylene Chloride	75-09-2	4.1E−06	2.4E+00
4,4'-Methylene-bis-2-chloroaniline	101-14-4	4.7E−05	2.1E−01
Nickel	7440-02-0	2.4E−04	4.2E−02
Nickel Refinery Dust	7440-02-0	2.4E−04	4.2E−02
Nickel Subsulfide	12035-72-2	4.8E−04	2.1E−02
2-Nitropropane	79-46-9	2.7E−02	3.7E−04
N-Nitroso-n-butylamine	924-16-3	1.6E−03	6.3E−03
N-Nitroso-n-methylurea	684-93-5	8.6E−02	1.2E−04
N-Nitrosodiethylamine	55-18-5	4.3E−02	2.3E−04
N-Nitrosopyrrolidine	930-55-2	6.1E−04	1.6E−02
Pentachloronitrobenzene	82-68-8	7.3E−05	1.4E−01
PCBs	1336-36-3	1.2E−03	8.3E−03
Pronamide	23950-58-5	4.6E−06	2.2E+00
Reserpine	50-55-5	3.0E−03	3.3E−03
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	4.5E+01	2.2E−07
1,1,2,2-Tetrachloroethane	79-34-5	5.8E−05	1.7E−01
Tetrachloroethylene	127-18-4	4.8E−07	2.1E+01
Thiourea	62-56-6	5.5E−04	1.8E−02
1,1,2-Trichloroethane	79-00-5	1.6E−05	6.3E−01
Trichloroethylene	79-01-6	1.3E−06	7.7E+00
2,4,6-Trichlorophenol	88-06-2	5.7E−06	1.8E+00
Toxaphene	8001-35-2	3.2E−04	3.1E−02
Vinyl Chloride	75-01-4	7.1E−06	1.4E+00

APPENDIX VI.—STACK PLUME RISE

[Estimated Plume Rise (in Meters) Based on Stack Exit Flow Rate and Gas Temperature]

Flow rate (m3/s)	Exhaust Temperature (K°)										
	<325	325-349	350-399	400-449	450-499	500-599	600-699	700-799	800-999	1000-1499	>1499
<0.5	0	0	0	0	0	0	0	0	0	0	0
0.5-0.9	0	0	0	0	0	0	0	0	1	1	1
1.0-1.9	0	0	0	0	1	1	2	3	3	3	4
2.0-2.9	0	0	1	3	4	4	6	6	7	8	9
3.0-3.9	0	1	2	5	6	7	9	10	11	12	13
4.0-4.9	1	2	4	6	8	10	12	13	14	15	17
5.0-7.4	2	3	5	8	10	12	14	16	17	19	21
7.5-9.9	3	5	8	12	15	17	20	22	22	23	24
10.0-12.4	4	6	10	15	19	21	23	24	25	26	27
12.5-14.9	4	7	12	18	22	23	25	26	27	28	29
15.0-19.9	5	8	13	20	23	24	26	27	28	29	31
20.0-24.9	6	10	17	23	25	27	29	30	31	32	34
25.0-29.9	7	12	20	25	27	29	31	32	33	35	36
30.0-34.9	8	14	22	26	29	31	33	35	36	37	39
35.0-39.9	9	16	23	28	30	32	35	36	37	39	41
40.0-49.9	10	17	24	29	32	34	36	38	39	41	42
50.0-59.9	12	21	26	31	34	36	39	41	42	44	46
60.0-69.9	14	22	27	33	36	39	42	43	45	47	49
70.0-79.9	16	23	29	35	38	41	44	46	47	49	51
80.0-89.9	17	25	30	36	40	42	46	48	49	51	54
90.0-99.9	19	26	31	38	42	44	48	50	51	53	56
100.0-119.9	21	26	32	39	43	46	49	52	53	55	58

APPENDIX VI.—STACK PLUME RISE—Continued

[Estimated Plume Rise (in Meters) Based on Stack Exit Flow Rate and Gas Temperature]

Flow rate (m3/s)	Exhaust Temperature (K°)										
	<325	325–349	350–399	400–449	450–499	500–599	600–699	700–799	800–999	1000–1499	>1499
120.0–139.9	22	28	35	42	46	49	52	55	56	59	61
140.0–159.9	23	30	36	44	48	51	55	58	59	62	65
160.0–179.9	25	31	38	46	50	54	58	60	62	65	67
180.0–199.9	26	32	40	48	52	56	60	63	65	67	70
>199.9	26	33	41	49	54	58	62	65	67	69	73

Appendix VII.—Health-Based Limits for Exclusion of Waste-Derived Residues*

METALS—TCLP EXTRACT CONCENTRATION LIMITS

Constituent	CAS No.	Concentration limits (mg/kg)
Antimony	7440-36-0	1xE+00
Arsenic	7440-38-2	5xE+00
Barium	7440-39-3	1xE+02
Beryllium	7440-41-7	7xE−03
Cadmium	7440-43-9	1xE+00
Chromium	7440-47-3	5xE+00
Lead	7439-92-1	5xE+00
Mercury	7439-97-6	2xE−01
Nickel	7440-02-0	7xE+01
Selenium	7782-49-2	1xE+00
Silver	7440-22-4	5xE+00

NONMETALS—RESIDUE CONCENTRATION LIMITS

Constituent	CAS No.	Concentration limits for residues (mg/kg)
Acetonitrile	75-05-8	2xE−01
Acetophenone	98-86-2	4xE+00
Acrolein	107-02-8	5xE−01
Acrylamide	79-06-1	2xE−04
Acrylonitrile	107-13-1	7xE−04
Aldrin	309-00-2	2xE−05
Allyl alcohol	107-18-6	2xE−01
Aluminum phosphide	20859-73-8	1xE−02
Aniline	62-53-3	6xE−02
Barium cyanide	542-62-1	1xE+00
Benz(a)anthracene	56-55-3	1xE−04
Benzene	71-43-2	5xE−03
Benzidine	92-87-5	1xE−06
Bis(2-chloroethyl) ether.	111-44-4	3xE−04
Bis(chloromethyl) ether	542-88-1	2xE−06
Bis(2-ethylhexyl) phthalate.	117-81-7	3xE+01
Bromoform	75-25-2	7xE−01
Calcium cyanide	592-01-8	1xE−06
Carbon disulfide	75-15-0	4xE+00
Carbon tetrachloride	56-23-5	5xE−03
Chlordane	57-74-9	3xE−04
Chlorobenzene	108-90-7	1xE+00
Chloroform	67-66-3	6xE−02
Copper cyanide	544-92-3	2xE−01
Cresols (Cresylic acid)	1319-77-3	2xE+00
Cyanogen	460-19-5	1xE+00
DDT	50-29-3	1xE−03
Dibenz(a, h)-anthracene	53-70-3	7xE−06

NONMETALS—RESIDUE CONCENTRATION LIMITS—Continued

Constituent	CAS No.	Concentration limits for residues (mg/kg)
1,2-Dibromo-3-chloropropane.	96-12-8	2xE−05
p-Dichlorobenzene	106-46-7	7.5xE−02
Dichlorodifluoromethane.	75-71-8	7xE+00
1,1-Dichloroethylene	75-35-4	5xE−03
2,4-Dichlorophenol	120-83-2	1xE−01
1,3-Dichloropropene	542-75-6	1xE−03
Dieldrin	60-57-1	2xE−05
Diethyl phthalate	84-66-2	3xE+01
Diethylstilbesterol	56-53-1	7xE−07
Dimethoate	60-51-5	3xE−02
2,4-Dinitrotoluene	121-14-2	5xE−04
Diphenylamine	122-39-4	9xE−01
1,2-Diphenylhydrazine	122-66-7	5xE−04
Endosulfan	115-29-7	2xE−03
Endrin	72-20-8	2xE−04
Epichlorohydrin	106-89-8	4xE−02
Ethylene dibromide	106-93-4	4xE−07
Ethylene oxide	75-21-8	3xE−04
Fluorine	7782-41-4	4xE+00
Formic acid	64-18-6	7xE+01
Heptachlor	76-44-8	8xE−05
Heptachlor epoxide	1024-57-3	4xE−05
Hexachlorobenzene	118-74-1	2xE−04
Hexachlorobutadiene	87-68-3	5xE−03
Hexachlorocyclopentadiene.	77-47-4	2xE−01
Hexachlorodibenzo-p-dioxins.	19408-74-3	6xE−08
Hexachloroethane	67-72-1	3xE−02
Hydrazine	302-01-1	1xE−04
Hydrogen cyanide	74-90-8	7xE−05
Hydrogen sulfide	7783-06-4	1xE−06
Isobutyl alcohol	78-83-1	1xE+01
Methomyl	16752-77-5	1xE+00
Methoxychlor	72-43-5	1xE−01
3-Methylcholanthrene	56-49-5	4xE−05
4,4'-Methylenebis (2-chloroaniline).	101-14-4	2xE−03
Methylene chloride	75-09-2	5xE−02
Methyl ethyl ketone (MEK).	78-93-3	2xE+00
Methyl hydrazine	60-34-4	3xE−04
Methyl parathion	298-00-0	2xE−02
Naphthalene	91-20-3	1xE+01
Nickel cyanide	557-19-7	7xE−01
Nitric oxide	10102-43-9	4xE+00
Nitrobenzene	98-95-3	2xE−02
N-Nitrosodi-n-butylamine.	924-16-3	6xE−05
N-Nitrosodiethylamine	55-18-5	2xE−06
N-Nitroso-N-methylurea.	684-93-5	1xE−07
N-Nitrosopyrrolidine	930-55-2	2xE−04

NONMETALS—RESIDUE CONCENTRATION LIMITS—Continued

Constituent	CAS No.	Concentration limits for residues (mg/kg)
Pentachlorobenzene	608-93-5	3xE−02
Pentachloronitrobenzene (PCNB).	82-68-8	1xE−01
Pentachlorophenol	87-86-5	1xE+00
Phenol	108-95-2	1xE+00
Phenylmercury acetate	62-38-4	3xE−03
Phosphine	7803-51-2	1xE−02
Polychlorinated biphenyls, N.O.S.	1336-36-3	5xE−05
Potassium cyanide	151-50-8	2xE+00
Potassium silver cyanide.	506-61-6	7xE+00
Pronamide	23950-58-5	3xE+00
Pyridine	110-86-1	4xE−02
Reserpine	50-55-5	3xE−05
Selenourea	630-10-4	2xE−01
Silver cyanide	506-64-9	4xE+00
Sodium cyanide	143-33-9	1xE+00
Strychnine	57-24-9	1xE−02
1,2,4,5-Tetrachlorobenzene.	95-94-3	1xE−02
1,1,2,2-tetrachloroethane.	79-34-5	2xE−03
Tetrachloroethylene	127-18-4	7xE−01
2,3,4,6-Tetrachlorophenol.	58-90-2	1xE−02
Tetraethyl lead	78-00-2	4xE−06
Thallium	7440-28-0	7xE+00
Thallic oxide	1314-32-5	2xE−03
Thallium(I) acetate	563-68-8	3xE−03
Thallium(I) carbonate	6533-73-9	3xE−03
Thallium(I) chloride	7791-12-0	3xE−03
Thallium(I) nitrate	10102-45-1	3xE−03
Thallium selenite	12039-52-0	3xE−03
Thallium(I) sulfate	7446-18-6	3xE−03
Thiourea	62-56-6	2xE−04
Toluene	108-88-3	1xE+01
Toxaphene	8001-35-2	5xE−03
1,1,2-Trichloroethane	79-00-5	6xE−03
Trichloroethylene	79-01-6	5xE−03
Trichloromonofluoromethane.	75-69-4	1xE+01
2,4,5-Trichlorophenol	95-95-4	4xE+00
2,4,6-Trichlorophenol	88-06-2	4xE+00
Vanadium pentoxide	1314-62-1	7xE−01
Vinyl chloride	75-01-4	2xE−03

* **Note:** The health-based concentration limits for Appendix VIII Part 261 constituents for which a health-based concentration is not provided below is 2xE−06 mg/kg.

Appendix VIII.—Potential PICs for Determination of Exclusion of Waste-Derived Residues

PICs FOUND IN STACK EFFLUENTS

Volatiles	Semivolatiles
Benzene	Bis(2-ethylhexyl)phthalate
Toluene	Naphthalene
Carbon tetrachloride	Phenol
roform	Diethyl phthalate
Methylene chloride	Butyl benzyl phthalate
Trichloroethylene	2,4-Dimethylphenol
Tetrachloroethylene	o-Dichlorobenzene
1,1,1-Trichloroethane	m-Dichlorobenzene
robenzene	p-Dichlorobenzene
cis-1,4-Dichloro-2-butene	Hexachlorobenzene
Bromochloromethane	2,4,6-Trichlorophenol
Bromodichloromethane	Fluoranthene
Bromoform	o-Nitrophenol
Bromomethane	1,2,4-Trichlorobenzene
Methylene bromide	o-Chlorophenol
Methyl ethyl ketone	Pentachlorophenol
	Pyrene
	Dimethyl phthalate
	Mononitrobenzene
	2,6-Toluene diisocyanate

Appendices IX and X will be published in the **Federal Register** in the near future. Appendix IX is Methods Manual for Compliance with BIF Regulations, U.S. EPA, December 1990, available from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161, (703) 487–4600, document number PB91–120–006. Appendix X is Guideline on Air Quality Models (Revised) (1986), U.S. EPA, including Supplement A (1987), available from NTIS, 5285 Port Royal Road, Springfield, VA 22161, document numbers PB86–245–248 (Guideline) and PB88–150–958 (Supplement A).

PART 270—EPA ADMINISTERED PERMIT PROGRAMS: THE HAZARDOUS WASTE PERMIT PROGRAM.

VI. In part 270:

1. The authority citation for part 270 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912, 6924, 6925, 6927, 6939, and 6974.

2. Part 270 is amended by adding § 270.22 to read as follows:

§ 270.22 Specific Part B information requirements for boilers and industrial furnaces burning hazardous waste.

(a) *Trial burns*—(1) *General.* Except as provided below, owners and operators that are subject to the standards to control organic emissions provided by § 266.104 of this chapter, standards to control particulate matter provided by § 266.105 of this chapter, standards to control metals emissions provided by § 266.106 of this chapter, or standards to control hydrogen chloride or chlorine gas emissions provided by § 266.107 of this chapter must conduct a trial burn to demonstrate conformance with those standards and must submit a trial burn plan or the results of a trial burn, including all required determinations, in accordance with § 270.66.

(i) A trial burn to demonstrate conformance with a particular emission standard may be waived under provisions of §§ 266.104 through 266.107 of this chapter and paragraphs (a)(2) through (a)(5) of this section; and

(ii) The owner or operator may submit data in lieu of a trial burn, as prescribed in paragraph (a)(6) of this section.

(2) *Waiver of trial burn for DRE*—(i) *Boilers operated under special operating requirements.* When seeking to be permitted under §§ 266.104(a)(4) and 266.110 of this chapter that automatically waive the DRE trial burn, the owner or operator of a boiler must submit documentation that the boiler operates under the special operating requirements provided by § 266.110 of this chapter.

(ii) *Boilers and industrial furnaces burning low risk waste.* When seeking to be permitted under the provisions for low risk waste provided by §§ 266.104(a)(5) and 266.109(a) of this chapter that waive the DRE trial burn, the owner or operator must submit:

(A) Documentation that the device is operated in conformance with the requirements of § 266.109(a)(1) of this chapter.

(B) Results of analyses of each waste to be burned, documenting the concentrations of nonmetal compounds listed in appendix VIII of part 261 of this chapter, except for those constituents that would reasonably not be expected to be in the waste. The constituents excluded from analysis must be identified and the basis for their exclusion explained. The analysis must rely on analytical techniques specified in Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods (incorporated by reference, see § 260.11).

(C) Documentation of hazardous waste firing rates and calculations of reasonable, worst-case emission rates of each constituent identified in paragraph (a)(1)(ii)(B) of this section using procedures provided by § 266.109(a)(2)(ii) of this chapter.

(D) Results of emissions dispersion modeling for emissions identified in paragraphs (a)(2)(ii)(C) of this section using modeling procedures prescribed by § 266.106(h) of this chapter. The Director will review the emission modeling conducted by the applicant to determine conformance with these procedures. The Director will either approve the modeling or determine that alternate or supplementary modeling is appropriate.

(E) Documentation that the maximum annual average ground level concentration of each constituent identified in paragraph (a)(2)(ii)(B) of this section quantified in conformance with paragraph (a)(2)(ii)(D) of this section does not exceed the allowable ambient level established in appendices IV or V of part 266. The acceptable ambient concentration for emitted constituents for which a specific Reference Air Concentration has not been established in appendix IV or Risk-Specific Dose has not been established in appendix V is 0.1 micrograms per cubic meter, as noted in the footnote to appendix IV.

(3) *Waiver of trial burn for metals.* When seeking to be permitted under the Tier I (or adjusted Tier I) metals feed rate screening limits provided by § 266.106 (b) and (e) of this chapter that control metals emissions without requiring a trial burn, the owner or operator must submit:

(i) Documentation of the feed rate of hazardous waste, other fuels, and industrial furnace feed stocks;

(ii) Documentation of the concentration of each metal controlled by § 266.106 (b) or (e) of this chapter in the hazardous waste, other fuels, and industrial furnace feedstocks, and calculations of the total feed rate of each metal;

(iii) Documentation of how the applicant will ensure that the Tier I feed rate screening limits provided by § 266.106 (b) or (e) of this chapter will not be exceeded during the averaging period provided by that paragraph;

(iv) Documentation to support the determination of the terrain-adjusted effective stack height, good engineering practice stack height, terrain type, and land use as provided by § 266.106 (b)(3) through (b)(5) of this chapter;

(v) Documentation of compliance with the provisions of § 266.106(b)(6), if applicable, for facilities with multiple stacks;

(vi) Documentation that the facility does not fail the criteria provided by § 266.106(b)(7) for eligibility to comply with the screening limits; and

(vii) Proposed sampling and metals analysis plan for the hazardous waste, other fuels, and industrial furnace feed stocks.

(4) *Waiver of trial burn for particulate matter.* When seeking to be permitted under the low risk waste provisions of § 266.109(b) which waives the particulate standard (and trial burn to

demonstrate conformance with the particulate standard), applicants must submit documentation supporting conformance with paragraphs (a)(2)(ii) and (a)(3) of this section.

(5) *Waiver of trial burn for HCl and Cl_2.* When seeking to be permitted under the Tier I (or adjusted Tier I) feed rate screening limits for total chloride and chlorine provided by § 266.107 (b)(1) and (e) of this chapter that control emissions of hydrogen chloride (HCl) and chlorine gas (Cl_2) without requiring a trial burn, the owner or operator must submit:

(i) Documentation of the feed rate of hazardous waste, other fuels, and industrial furnace feed stocks;

(ii) Documentation of the levels of total chloride and chlorine in the hazardous waste, other fuels, and industrial furnace feedstocks, and calculations of the total feed rate of total chloride and chlorine;

(iii) Documentation of how the applicant will ensure that the Tier I (or adjusted Tier I) feed rate screening limits provided by § 266.107 (b)(1) or (e) of this chapter will not be exceeded during the averaging period provided by that paragraph;

(vi) Documentation to support the determination of the terrain-adjusted effective stack height, good engineering practice stack height, terrain type, and land use as provided by § 266.107(b)(3) of this chapter;

(v) Documentation of compliance with the provisions of § 266.107(b)(4), if applicable, for facilities with multiple stacks;

(vi) Documentation that the facility does not fail the criteria provided by § 266.107(b)(3) for eligibility to comply with the screening limits; and

(vii) Proposed sampling and analysis plan for total chloride and chlorine for the hazardous waste, other fuels, and industrial furnace feestocks.

(6) *Data in lieu of trail burn.* The owner or operator may seek an exemption from the trial burn requirements to demonstrate conformance with §§ 266.104 through 266.107 of this chapter and § 270.66 by providing the information required by § 270.66 from previous compliance testing of the device in conformance with § 266.103 of this chapter, or from compliance testing or trial or operational burns of similar boilers or industrial furnaces burning similar hazardous wastes under similar conditions. If data from a similar device is used to support a trial burn waiver, the design and operating information required by § 270.66 must be provided for both the similar device and the device to which the data is to be applied, and a comparison of the design and operating information must be provided. The Director shall approve a permit application without a trial burn if he finds that the hazardous wastes are sufficiently similar, the devices are sufficiently similar, the operating conditions are sufficiently similar, and the data from from other compliance tests, trial burns, or operational burns are adequate to specify (under § 266.102 of this chapter) operating conditions that will ensure conformance with § 266.102(c) of this chapter. In addition, the following information shall be submitted:

(i) For a waiver from any trial burn:

(A) A description and analysis of the hazardous waste to be burned compared with the hazardous waste for which data from compliance testing, or operational or trial burns are provided to support the contention that a trial burn is not needed;

(B) The design and operating conditions of the boiler or industrial furnace to be used, compared with that for which comparative burn data are available; and

(C) Such supplemental information as the Director finds necessary to achieve the purposes of this paragraph.

(ii) For a waiver of the DRE trial burn, the basis for selection of POHCs used in the other trial or operational burns which demonstrate compliance with the DRE performance standard in § 266.104(a) of this chapter. This analysis should specify the constituents in appendix VIII, part 261 of this chapter, that the applicant has identified in the hazardous waste for which a permit is sought, and any differences from the POHCs in the hazardous waste for which burn data are provided.

(b) *Alternative HC limit for industrial furnaces with organic matter in raw materials.* Owners and operators of industrial furnaces requesting an alternative HC limit under § 266.104(f) of this chapter shall submit the following information at a minimum:

(1) Documentation that the furnace is designed and operated to minimze HC emissions from fuels and raw materials;

(2) Documentation of the proposed baseline flue gas HC (and CO) concentration, including data on HC (and CO) levels during tests when the facility produced normal products under normal operating conditions from normal raw materials while burning normal fuels and when not burning hazardous waste;

(3) Test burn protocol to confirm the baseline HC (and CO) level including information on the type and flow rate of all feedstreams, point of introduction of all feedstreams, total organic carbon content (or other appropriate measure of organic content) of all nonfuel feedstreams, and operating conditions that affect combustion of fuel(s) and destruction of hydrocarbon emissions from nonfuel sources;

(4) Trial burn plan to:

(i) Demonstrate that flue gas HC (and CO) concentrations when burning hazardous waste do not exceed the baseline HC (and CO) level; and

(ii) Identify the types and concentrations of organic compounds listed in appendix VIII, part 261 of this chapter, that are emitted when burning hazardous waste in conformance with procedures prescribed by the Director;

(5) Implementation plan to monitor over time changes in the operation of the facility that could reduce the baseline HC level and procedures to periodically confirm the baseline HC level; and

(6) Such other information as the Director finds necessary to achieve the purposes of this paragraph.

(c) *Alternative metals implementation approach.* When seeking to be permitted under an alternative metals implementation approach under § 266.106(f) of this chapter, the owner or operator must submit documentation specifying how the approach ensures compliance with the metals emissions standards of § 266.106(c) or (d) and how the approach can be effectively implemented and monitored. Further, the owner or operator shall provide such other information that the Director finds necessary to achieve the purposes of this paragraph.

(d) *Automatic waste feed cutoff system.* Owners and operators shall submit information describing the automatic waste feed cutoff system, including any pre-alarm systems that may be used.

(e) *Direct transfer.* Owners and operators that use direct transfer operations to feed hazardous waste from transport vehicles (containers, as defined in § 266.111 of this chapter) directly to the boiler or industrial furnace shall submit information supporting conformance with the standards for direct transfer provided by § 266.111 of this chapter.

(f) *Residues.* Owners and operators that claim that their residues are excluded from regulation under the provisions of § 266.112 of this chapter must submit information adequate to demonstrate conformance with those provisions.

(Approved by the Office of Management and Budget under control number 2050-0073)

3. In § 270.42, paragraph (g) is revised to read as follows:

§ 270.42 Permit modification at the request of the permittee.

* * * * *

(g) *Newly regulated wastes and units.* (1) The permittee is authorized to continue to manage wates listed or identified as hazardous under part 261 of this chapter, or to continue to manage hazardous waste in units newly regulated as hazardous waste management units, if:

(i) The unit was in existence as a hazardous waste facility with respect to the newly listed or characterized waste or newly regulated waste management unit on the effetive date of the final rule listing or identifying the waste, or regulating the unit;

(ii) The permittee submits a Class 1 modification request on or before the date on which the waste or unit becomes subject to the new requirements;

(iii) The permittee is in compliance with the applicable standards of 40 CFR parts 265 and 266 of this chapter;

(iv) In the case of Classes 2 and 3 modifications, the permittee also submits a complete modification request within 180 days of the effective date of the rule listing or identifying the waste, or subjecting the unit to RCRA Subtitle C management standards;

(v) In the case of land disposal units, the permittee certifies that each such unit is in compliance with all applicable requirements of part 265 of this chapter for groundwater monitoring and financial responsibility on the date 12 months after the effective date of the rule identifying or listing the waste as hazardous, or regulating the unit as a hazardous waste management unit. If the owner or operator fails to certify compliance with all these requirements, he or she will lose authority to operate under this section.

(2) New wastes or units added to a facility's permit under this subsection do not constitute expansions for the purpose of the 25 percent capacity expansion limit for Class 2 modifications.

* * * * *

4. In § 270.42, Appendix I is amended by revising the heading of L and items 1, 4, 5a, 6, 7b, and 8 to read as follows:

Appendix I to Section 270.42—Classification of Permit Modifications

Modifications	Class
* * * * * * *	
L. Incinerators, Boilers, and Industrial Furnaces:	
1. Changes to increase by more than 25% any of the following limits authorized in the permit: A thermal feed rate limit, a feedstream feed rate limit, a chlorine/chloride feed rate limit, a metal feed rate limit, or an ash feed rate limit. The Director will require a new trial burn to substantiate compliance with the regulatory performance standards unless this demonstration can be made through other means	3
2. Changes to increase by up to 25% any of the following limits authorized in the permit: A thermal feed rate limit, a feedstream feed rate limit, a chlorine/chloride feed rate limit, a metal feed rate limit, or an ash feed rate limit. The Director will require a new trial burn to substantiate compliance with the regulatory performance standards unless this demonstration can be made through other means	2
3. Modification of an incinerator, boiler, or industrial furnace unit by changing the internal size or geometry of the primary or secondary combustion units, by adding a primary or secondary combustion unit, by substantially changing the design of any component used to remove HCl/Cl_2, metals, or particulate from the combustion gases, or by changing other features of the incinerator, boiler, or industrial furnace that could affect its capability to meet the regulatory performance standards. The Director will require a new trial burn to substantiate compliance with the regulatory performance standards unless this demonstration can be made through other means	3
4. Modification of an incinerator, boiler, or industrial furnace unit in a manner that would not likely affect the capability of the unit to meet the regulatory performance standards but which would change the operating conditions or monitoring requirements specified in the permit. The Director may require a new trial burn to demonstrate compliance with the regulatory performance standards	2
5. Operating requirements.	
a. Modification of the limits specified in the permit for minimum or maximum combustion gas temperature, minimum combustion gas residence time, oxygen concentration in the secondary combustion chamber, flue gas carbon monoxide and hydrocarbon concentration, maximum temperature at the inlet to the particulate matter emission control system, or operating parameters for the air pollution control system. The Director will require a new trial burn to substantiate compliance with the regulatory performance standards unless this demonstration can be made through other means	3
* * * * * * *	
6. Burning different wastes:	
a. If the waste contains a POHC that is more difficult to burn than authorized by the permit or if burning of the waste requires compliance with different regulatory performance standards than specified in the permit. The Director will require a new trial burn to substantiate compliance with the regulatory performance standards unless this demonstration can be made through other means	3
b. If the waste does not contain a POHC that is more difficult to burn than authorized by the permit and if burning of the waste does not require compliance with different regulatory performance standards than specified in the permit	2
NOTE: See § 270.42(g) for modification procedures to be used for the management of newly listed or identified wastes	
7. Shakedown and trial burn:	
* * * * * * *	
b. Authorization of up to an additional 720 hours of waste burning during the shakedown period for determining operational readiness after construction, with the prior approval of the Director	[1]1
* * * * * * *	
8. Substitution of an alternative type of nonhazardous waste fuel that is not specified in the permit	1

[1] Class 1 modifications requiring prior Agency approval.

5. Part 270 is amended by adding § 270.66 to read as follows:

§ 270.66 Permits for boilers and industrial furnaces burning hazardous waste.

(a) *General.* Owners and operators of new boilers and industrial furnaces (those not operating under the interim status standards of § 266.103 of this chapter) are subject to paragraphs (b) through (f) of this section. Boilers and industrial furnaces operating under the interim status standards of § 266.103 of this chapter are subject to paragraph (g) of this section.

(b) *Permit operating periods for new boilers and industrial furnaces.* A permit for a new boiler or industrial furnace shall specify appropriate conditions for the following operating periods:

(1) *Pretrial burn period.* For the period beginning with initial introduction of hazardous waste and ending with initiation of the trial burn, and only for the minimum time required to bring the boiler or industrial furnace to a point of operation readiness to conduct a trial burn, not to exceed 720 hours operating time when burning hazardous waste, the Director must establish in the Pretrial Burn Period of the permit conditions, including but not limited to, allowable hazardous waste feed rates and operating conditions. The Director may extend the duration of this operational period once, for up to 720 additional hours, at the request of the applicant when good cause is shown. The permit

may be modified to reflect the extension according to § 270.42.

(i) Applicants must submit a statement, with part B of the permit application, that suggests the conditions necessary to operate in compliance with the standards of §§ 266.104 through 266.107 of this chapter during this period. This statement should include, at a minimum, restrictions on the applicable operating requirements identified in § 266.102(e) of this chapter.

(ii) The Director will review this statement and any other relevant information submitted with part B of the permit application and specify requirements for this period sufficient to meet the performance standards of §§ 266.104 through 266.107 of this chapter based on his/her engineering judgment.

(2) *Trial burn period.* For the duration of the trial burn, the Director must establish conditions in the permit for the purposes of determining feasibility of compliance with the performance standards of §§ 266.104 through 266.107 of this chapter and determining adequate operating conditions under § 266.102(e) of this chapter. Applicants must propose a trial burn plan, prepared under paragraph (c) of this section, to be submitted with part B of the permit application.

(3) *Post-trial burn period.* (i) For the period immediately following completion of the trial burn, and only for the minimum period sufficient to allow sample analysis, data computation, and submission of the trial burn results by the applicant, and review of the trial burn results and modification of the facility permit by the Director to reflect the trial burn results, the Director will establish the operating requirements most likely to ensure compliance with the performance standards of §§ 266.104 through 266.107 of this chapter based on his engineering judgment.

(ii) Applicants must submit a statement, with part B of the application, that identifies the conditions necessary to operate during this period in compliance with the performance standards of §§ 266.104 through 266.107 of this chapter. This statement should include, at a minimum, restrictions on the operating requirements provided by § 266.102(e) of this chapter.

(iii) The Director will review this statement and any other relevant information submitted with part B of the permit application and specify requirements for this period sufficient to meet the performance standards of §§ 266.104 through 266.107 of this chapter based on his/her engineering judgment.

(4) *Final permit period.* For the final period of operation, the Director will develop operating requirements in conformance with § 266.102(e) of this chapter that reflect conditions in the trial burn plan and are likely to ensure compliance with the performance standards of §§ 266.104 through 107 of this chapter. Based on the trial burn results, the Director shall make any necessary modifications to the operating requirements to ensure compliance with the performance standards. The permit modification shall proceed according to § 270.42.

(c) *Requirements for trial burn plans.* The trial burn plan must include the following information. The Director, in reviewing the trial burn plan, shall evaluate the sufficiency of the information provided and may require the applicant to supplement this information, if necessary, to achieve the purposes of this paragraph:

(1) An analysis of each feed stream, including hazardous waste, other fuels, and industrial furnace feed stocks, as fired, that includes:

(i) Heating value, levels of antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, silver, thallium, total chlorine/chloride, and ash;

(ii) Viscosity or description of the physical form of the feed stream;

(2) An analysis of each hazardous waste, as fired, including:

(i) An identification of any hazardous organic constituents listed in appendix VIII, part 261, of this chapter that are present in the feed stream, except that the applicant need not analyze for constituents listed in appendix VIII that would reasonably not be expected to be found in the hazardous waste. The constituents excluded from analysis must be identified and the basis for this exclusion explained. The analysis must be conducted in accordance with analytical techniques specified in Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods (incorporated by reference, see § 270.6), or their equivalent.

(ii) An approximate quantification of the hazardous constituents identified in the hazardous waste, within the precision produced by the analytical methods specified in Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods (incorporated by reference, see § 270.6), or other equivalent.

(iii) A description of blending procedures, if applicable, prior to firing the hazardous waste, including a detailed analysis of the hazardous waste prior to blending, an analysis of the material with which the hazardous waste is blended, and blending ratios.

(3) A detailed engineering description of the boiler or industrial furnace, including:

(i) Manufacturer's name and model number of the boiler or industrial furnace;

(ii) Type of boiler or industrial furnace;

(iii) Maximum design capacity in appropriate units;

(iv) Description of the feed system for the hazardous waste, and, as appropriate, other fuels and industrial furnace feedstocks;

(v) Capacity of hazardous waste feed system;

(vi) Description of automatic hazardous waste feed cutoff system(s); and

(vii) Description of any pollution control system; and

(viii) Description of stack gas monitoring and any pollution control monitoring systems.

(4) A detailed description of sampling and monitoring procedures including sampling and monitoring locations in the system, the equipment to be used, sampling and monitoring frequency, and planned analytical procedures for sample analysis.

(5) A detailed test schedule for each hazardous waste for which the trial burn is planned, including date(s), duration, quantity of hazardous waste to be burned, and other factors relevant to the Director's decision under paragraph (b)(2) of this section.

(6) A detailed test protocol, including, for each hazardous waste identified, the ranges of hazardous waste feed rate, and, as appropriate, the feed rates of other fuels and industrial furnace feedstocks, and any other relevant parameters that may affect the ability of the boiler or industrial furnace to meet the performance standards in §§ 266.104 through 266.107 of this chapter.

(7) A description of, and planned operating conditions for, any emission control equipment that will be used.

(8) Procedures for rapidly stopping the hazardous waste feed and controlling emissions in the event of an equipment malfunction.

(9) Such other information as the Director reasonably finds necessary to determine whether to approve the trial burn plan in light of the purposes of this paragraph and the criteria in paragraph (b)(2) of this section.

(d) *Trial burn procedures.* (1) A trial burn must be conducted to demonstrate conformance with the standards of §§ 266.104 through 266.107 of this

chapter under an approved trial burn plan.

(2) The Director shall approve a trial burn plan if he/she finds that:

(i) The trial burn is likely to determine whether the boiler or industrial furnace can meet the performance standards of §§ 266.104 through 266.107 of this chapter;

(ii) The trial burn itself will not present an imminent hazard to human health and the environment;

(iii) The trial burn will help the Director to determine operating requirements to be specified under § 266.102(e) of this chapter; and

(iv) The information sought in the trial burn cannot reasonably be developed through other means.

(3) The applicant must submit to the Director a certification that the trial burn has been carried out in accordance with the approved trial burn plan, and must submit the results of all the determinations required in paragraph (c) of this section. This submission shall be made within 90 days of completion of the trial burn, or later if approved by the Director.

(4) All data collected during any trial burn must be submitted to the Director following completion of the trial burn.

(5) All submissions required by this paragraph must be certified on behalf of the applicant by the signature of a person authorized to sign a permit application or a report under § 270.11.

(e) *Special procedures for DRE trial burns.* When a DRE trial burn is required under § 266.104(a) of this chapter, the Director will specify (based on the hazardous waste analysis data and other information in the trial burn plan) as trial Principal Organic Hazardous Constituents (POHCs) those compounds for which destruction and removal efficiencies must be calculated during the trial burn. These trial POHCs will be specified by the Director based on information including his/her estimate of the difficulty of destroying the constituents identified in the hazardous waste analysis, their concentrations or mass in the hazardous waste feed, and, for hazardous waste containing or derived from wastes listed in part 261, subpart D of this chapter, the hazardous waste organic constituent(s) identified in Appendix VII of that part as the basis for listing.

(f) *Determinations based on trial burn.* During each approved trial burn (or as soon after the burn as is practicable), the applicant must make the following determinations:

(1) A quantitative analysis of the levels of antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, thallium, silver, and chlorine/chloride, in the feed streams (hazardous waste, other fuels, and industrial furnace feedstocks);

(2) When a DRE trial burn is required under § 266.104(a) of this chapter:

(i) A quantitative analysis of the trial POHCs in the hazardous waste feed;

(ii) A quantitative analysis of the stack gas for the concentration and mass emissions of the trial POHCs; and

(iii) A computation of destruction and removal efficiency (DRE), in accordance with the DRE formula specified in § 266.104(a) of this chapter;

(3) When a trial burn for chlorinated dioxins and furans is required under § 266.104(e) of this chapter, a quantitative analysis of the stack gas for the concentration and mass emission rate of the 2,3,7,8-chlorinated tetra-octa congeners of chlorinated dibenzo-p-dioxins and furans, and a computation showing conformance with the emission standard.

(4) When a trial burn for particulate matter, metals, or HCl/Cl_2 is required under §§ 266.105, 266.106 (c) or (d), or 266.107 (b)(2) or (c) of this chapter, a quantitative analysis of the stack gas for the concentrations and mass emissions of particulate matter, metals, or hydrogen chloride (HCl) and chlorine (Cl_2), and computations showing conformance with the applicable emission performance standards;

(5) When a trial burn for DRE, metals, or HCl/Cl_2 is required under §§ 266.104(a), 266.106 (c) or (d), or 266.107 (b)(2) or (c) of this chapter, a quantitative analysis of the scrubber water (if any), ash residues, other residues, and products for the purpose of estimating the fate of the trial POHCs, metals, and chlorine/chloride;

(6) An identification of sources of fugitive emissions and their means of control;

(7) A continuous measurement of carbon monoxide (CO), oxygen, and where required, hydrocarbons (HC), in the stack gas; and

(8) Such other information as the Director may specify as necessary to ensure that the trial burn will determine compliance with the performance standards is §§ 266.104 through 266.107 of this chapter and to establish the operating conditions required by § 266.102(e) of this chapter as necessary to meet those performance standards.

(g) *Interim status boilers and industrial furnaces.* For the purpose of determining feasibility of compliance with the performance standards of §§ 266.104 through 266.107 of this chapter and of determining adequate operating conditions under § 266.103 of this chapter, applicants owning or operating existing boilers or industrial furnaces operated under the interim status standards of § 266.103 must either prepare and submit a trial burn plan and perform a trial burn in accordance with the requirements of this section or submit other information as specified in § 270.22(a)(6). Applicants who submit a trial burn plan and receive approval before submission of the part B permit application must complete the trial burn and submit the results specified in paragraph (f) of this section with the part B permit application. If completion of this process conflicts with the date set for submission of the part B application, the applicant must contact the Director to establish a later date for submission of the part B application or the trial burn results. If the applicant submits a trial burn plan with part B of the permit application, the trial burn must be conducted and the results submitted within a time period prior to permit issuance to be specified by the Director.

(Approved by the Office of Management and Budget under control number 2050–0073)

6. § 270.72 is amended by adding paragraphs (a)(6) and (b)(7) to read as follows:

§ 270.72 Changes during interim status.

(a) * * *

(6) Addition of newly regulated units for the treatment, storage, or disposal of hazardous waste if the owner or operator submits a revised part A permit application on or before the date on which the unit becomes subject to the new requirements.

(b) * * *

(7) Addition of newly regulated units under paragraph (a)(6) of this section.

7. § 270.73 is amended by revising paragraphs (f) and (g) to read as follows:

§ 270.73 Termination of interim status.

* * * * *

(f) For owners and operators of each incinerator facility which as achieved interim status prior to November 8, 1984, interim status terminates on November 8, 1989, unless the owner or operator of the facility submits a part B application for a RCRA permit for an incinerator facility by November 8, 1986.

(g) For owners or operators of any facility (other than a land disposal or an incinerator facility) which as achieved interim status prior to November 8, 1984, interim status terminates on November 8, 1992, unless the owner or operator of the facility submits a part B application for a RCRA permit for the facility by November 8, 1988.

PART 271—REQUIREMENTS FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS

VII. In part 271:

1. The authority citation for part 271 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), and 6926.

2. Section 271.1(j) is amended by adding the following entry to Table 1 in chronological order by date of promulgation in the Federal Register:

§ 271.1 Purpose and scope.

* * * * *

(j) * * *

TABLE 1.—REGULATIONS IMPLEMENTING THE HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984

Promulgation date	Title of regulation	Federal Register reference	Effective date
December 31, 1990	Burning of Hazardous Waste in Boilers and Industrial Furnaces	[insert FR page numbers].	August 21, 1991.

[FR Doc. 91-2667 Filed 2-20-91; 8:45 am]
BILLING CODE 6560-50-M

federal register

Thursday
February 21, 1991

Part IV

Securities and Exchange Commission

17 CFR Parts 229, 240, et al.

Ownership Reports and Trading By Officers, Directors, and Principal Security Holders; Final Rule

SECURITIES AND EXCHANGE COMMISSION

17 CFR Parts 229, 240, 249, 270, and 274

[Release Nos. 34-28869; 35-25254; IC-17991; File No. S7-3-91]

RIN 3235-AB14

Ownership Reports and Trading By Officers, Directors and Principal Security Holders

AGENCY: Securities and Exchange Commission.

ACTION: Final rules and solicitation of comments.

SUMMARY: The Commission today is adopting amendments to its rules and forms, as well as related disclosure requirements for issuers, regarding the filing of ownership reports by officers, directors, and principal security holders, and the exemption of certain transactions by those persons from the short-swing profit recovery provisions of section 16 of the Securities Exchange Act of 1934 and related provisions of the Investment Company Act of 1940 and the Public Utility Holding Company Act of 1935. The amendments are intended to achieve greater clarity, enhance consistency with the statutory purpose, and improve compliance with the reporting provisions of the rules. The Commission also is soliciting further public comments on the addition of an exit box to Forms 4 and 5.

EFFECTIVE DATE: These amendments are effective May 1, 1991; however, special phase-in provisions are contained in Section VII of this release.

Comment date: Comment letters on the exit box on Forms 4 and 5 should be received on or before March 31, 1991.

ADDRESSES: Comments should be submitted in triplicate to Jonathan G. Katz, Secretary, Securities and Exchange Commission, 450 Fifth St., NW., Washington, DC 20549. Comments should refer to File No. S7-3-91. All comments received will be available for public inspection and copying in the Commission's Public Reference Room at the same address.

FOR FURTHER INFORMATION CONTACT: Brian J. Lane, Richard P. Konrath, Mark W. Green, or Emanuel D. Strauss, (202) 272-2573, Division of Corporation Finance; Dorothy Donohue (202) 272-2030, Division of Investment Management; or Joanne Rutkowski (202) 504-2267 with respect to the Public Utility Holding Company Act.

SUPPLEMENTARY INFORMATION: The Commission today announced the adoption of revisions to its rules promulgated under section 16 [1] of the Securities Exchange Act of 1934 ("Exchange Act").[2] Every rule under section 16 has been amended, deleted, or reorganized except for Rule 16e-1,[3] and several new Section 16 rules have been added. Further, Exchange Act Rule 12h-2 [4] has been deleted as obsolete and Rule 30f-1 [5] under the Investment Company Act of 1940 ("Investment Company Act") [6] has been amended.

In addition, new Item 405 of Regulation S-K [7] and new Form 5 have been adopted, as have changes to Schedule 14A [8] and Forms 10-K,[9] 3,[10] 4 [11] and N-SAR.[12]

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I. Executive Summary

The beneficial ownership reporting and short-swing profit recovery provisions of section 16 of the Exchange Act apply to every person who is directly or indirectly the beneficial owner of more than ten percent of any class of equity securities that is registered pursuant to section 12 of the Exchange Act ("ten percent holders"),[13]

[1] 15 U.S.C. 78p (1988).
[2] 15 U.S.C. 78a *et seq.* (1988).
[3] 17 CFR 240.16e-1.
[4] 17 CFR 240.12h-2.
[5] 17 CFR 270.30f-1.
[6] 15 U.S.C. 80a-1 *et seq.* (1988).
[7] 17 CFR 229.10—229.802.
[8] 17 CFR 240.14a-101.
[9] 17 CFR 249.310.
[10] 17 CFR 249.103.
[11] 17 CFR 249.104.
[12] 17 CFR 274.101.
[13] 15 U.S.C. 78/ (1988). When referring to an issuer with securities registered under section 12, this release includes securities of closed-end investment companies subject to section 30(f) of the Investment Company Act (15 U.S.C. 80a-29(f) (1988)) and public utility holding companies subject to Section 17 of the Public Utility Holding Company Act of 1935 (15 U.S.C. 79q (1988)). The insiders of a closed-end investment company also include the adviser and any affiliated person of the adviser. Section 2(a)(3) of the Investment Company Act (15 U.S.C. 80a-2(a)(3) (1988)).

and to every director and officer of an issuer with a class of equity securities so registered.[14] Section 16 of the Exchange Act was designed to provide the public with information on securities transactions and holdings of corporate insiders and to deter insiders from speculative short-swing trading in their corporations' securities and from engaging in transactions in their corporations' securities while in possession of material, non-public information. Section 16 is but one weapon against insider trading. Unlike other provisions applicable to insider trading, such as sections 10(b),[15] 14(e)[16] and 21A[17] of the Exchange Act, section 16 is a strict liability provision under which an insider's short-swing profits can be recovered regardless of whether the insider actually was in possession of material, non-public information.

In response to developments in the trading of derivative securities, the growth of complex and diverse employee benefit plans, and substantial filing delinquencies, the Commission undertook a comprehensive review of the rules and forms under section 16. Noting that the regulatory framework had resulted in interpretive uncertainty, substantial litigation, and, in some instances, unnecessary regulatory burdens, the Commission proposed to revise the rules to achieve greater clarity, rescind unnecessary requirements, streamline mandated procedures, increase compliance with the reporting provisions of the rules, and enhance consistency with the statutory purposes of section 16.

The Commission initially proposed comprehensive revisions to the rules promulgated pursuant to section 16 in December 1988; 271 comment letters were received.[18] In response to comments, the Commission revised the proposed amendments and republished the rules for comment in August 1989; 211 comment letters were submitted in response to the reproposal.[19] For the reasons provided in the Proposing and Reproposing Releases, and as further explained in this release, the Commission today is adopting the proposed regulatory scheme, with a number of modifications in response to comments made on the reproposal.

Rule 16b–3, the employee benefit plan rule, has been modified in several respects from that reproposed. The shareholder approval condition to the exemption, applicable to issuer grant plans and other plans unable to satisfy the conditions of former Rule 16a–8,[20] has been retained. The reproposed extension of the required period of disinterested status for plan administrators to one year following the administration of a plan has not been adopted. In response to comments, Rule 16b–3 has been reorganized to clarify the application of the regulatory framework to transactions under broad-based, non-discriminatory plans and the availability of the intra-plan transaction exemption for elections and transactions within a participant-directed plan. The revisions are intended to facilitate compliance with Rule 16b–3 by section 401(k) plans[21] and other similar broad-based participant-directed plans.

In addition to the revisions addressing employee benefit plans, revisions have been made to modify the reproposed conditions under which a trust becomes subject to section 16 where it has an insider trustee; specify the extent of insiders' obligations to disclose on the first Form 5 unreported transactions and holdings that should have been reported prior to the effective date of the rules; delete the former exemption for surrenders of options in a merger as unnecessary; provide a reporting as well as a short-swing profit exemption for non-events such as pro rata stock splits, stock dividends, and similar grants; add an exit box to Forms 4 and 5; add a provision deeming a Form 3, 4 or 5 timely filed if delivered to a third party business that guarantees delivery to the Commission no later than the due date; and clarify the application of the rules to specific situations.[22] Comment is solicited on the exit box, as discussed in section II.C.2 below.

II. Section 16(a) Reporting

A. Who Must Report

1. Officers and Directors

The definition of "officer" has been adopted without substantive change from the reproposal. It is modeled after the definition of "executive officer" used elsewhere in the Exchange Act rules,[23] but also specifically includes principal financial officers and principal accounting officers (or controllers where there is no principal accounting officer), as well as officers of a parent having policy-making functions with respect to the issuer.[24] Thus, persons having policy-making duties, as specified under Rule 3b–7, will be deemed officers for purposes of section 16.[25] A person's title alone should not determine whether that person is subject to section 16; the proper focus should be on whether a person is "a corporate employee performing important executive duties of such character that he would be likely, in discharging these duties, to obtain confidential information about the company's affairs that would aid him if he engaged in personal market transactions."[26] If title were determinative, persons with executive functions could avoid responsibility by forgoing title; moreover, persons with officer titles but no significant managerial or policy-making duties would be subject to the draconian

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[14] Officers, directors, and ten percent holders are referred to throughout this release as "insiders." The term also includes an officer or director who has terminated officer or director status but continues to be subject to reporting under section 16 for six months following his or her last transaction as an officer or director, including the Form 5 filing requirement.

[15] 15 U.S.C. 78j(b) (1988).

[16] 15 U.S.C. 78n(e) (1988).

[17] 15 U.S.C. 78u(a)(1) (1988).

[18] Release No. 34–26333 (December 2, 1988) (53 FR 49997) ("Proposing Release"). The comment letters and a staff summary of the letters may be inspected and copied at the Commission's Public Reference Room (File No. S7–26–88).

[19] Release No. 34–27146 (August 18, 1989) (54 FR 35667) ("Reproposing Release"). The comment letters and a staff summary of the letters may be inspected and copied at the Commission's Public Reference Room (File No. S7–23–89).

[20] 17 CFR 240.16a–8.

[21] I.R.C. 401(k) (26 U.S.C. 401(k) (1988)).

[22] Section VIII, *infra*, contains charts summarizing the changes from the former rules, as well as a chart summarizing changes in staff interpretations enumerated in the section 16 question-and-answer interpretive release, Exchange Act Release No. 18114 (September 24, 1981) (46 FR 48147) ("Release No. 34–18114").

[23] Rule 3b–7 (17 CFR 240.3b–7). The term includes presidents, vice-presidents in charge of a principal business unit, division or function, other persons who perform similar policy-making functions, and executive officers of subsidiaries who perform policy-making functions for the registrant. A technical change is being made to this rule to correct a typographical error.

[24] Rule 16a–1(f). A note has been added to the rule that makes it clear that those persons identified by an issuer as meeting the policy-making definition pursuant to Item 401(b) of Regulation S–K (17 CFR 229.401) (based on the Rule 3b–7 definition) will be presumed to be those persons who, together with the other persons specified in Rule 16a–1(f), are subject to section 16, and the note makes it clear that the term "policy-making function" does not include functions that are not significant. The rule as adopted also clarifies that when an issuer with equity securities registered under section 12 is structured as a trust, employees of the trustee performing policy-making functions with respect to the trust are deemed officers of the trust.

[25] *See C.R.A. Realty Corp.* v. *Crotty*, 878 F.2d 562 (2d Cir. 1989); *Colby* v. *Klune*, 178 F.2d 872 (2d Cir. 1949); *see also Merrill Lynch, Pierce Fenner & Smith, Inc.* v. *Livingston*, 566 F.2d 1119 (9th Cir. 1978); *Pier I Imports of Georgia, Inc.* v. *Wilson*, 529 F. Supp. 239 (N.D. Tex. 1981); *but see National Medical Enterprises, Inc.* v. *Small*, 680 F.2d 83 (9th Cir. 1982).

[26] *Colby* v. *Klune, supra* 178 F.2d at 873, *as quoted in C.R.A. Realty Corp.* v. *Crotty, supra*, 878 F.2d at 566.

liability of section 16(b). Similarly, in determining whether an advisory, emeritus or honorary director is a director for section 16 purposes, the person's title is not determinative and no change in current staff interpretation is being made.[27]

2. Transactions While not an Officer or Director

Rule 16a-2(a) is adopted substantially as reproposed. Thus, a person will not be required to disclose transactions or be subject to section 16(b) short-swing profit liability for transactions that occurred within six months prior to the date the individual first became an officer or director, except that an officer or director who becomes subject to section 16 as a result of the issuer's registration of a class of equity securities pursuant to section 12 of the Exchange Act will be subject to section 16 with respect to transactions conducted during the six months prior to the first transaction requiring a Form 4 filing.[28]

In contrast, consistent with the prior rules,[29] transactions by officers and directors after termination of employment with an issuer are not necessarily exempt from section 16. In response to commenters' concerns, the rule makes it clear that, as is currently the case, an insider continues to be subject to section 16 for up to six months following termination. However, a transaction occurring after a person has terminated insider status must be reported only if it occurs within six months of a transaction that took place while the person was an officer or director.[30] As a result, a person is required to file on Form 4 to report non-exempt transactions within six months of the last transaction while the person was an officer or director subject to Section 16. In addition, the person is required to file on Form 5 to report transactions on a deferred basis for that portion of the issuer's fiscal year during which the person was an officer or director subject to section 16, and also is required to report exempt transactions occurring within six months of the last transaction while the person was an officer or director subject to section 16.

For example, if an insider executes a transaction on April 28 and terminates officer or director status on April 30, any transaction executed on or before October 28 must be reported, since it occurred within six months following the last transaction prior to termination of officer or director status. If, in this example, the insider filed a Form 5 in June to report exempt acquisitions and dispositions in an employee benefit plan, and in September exercised an option previously granted and reported on a Form 5, the insider must file another Form 5 (or an optional Form 4) to report the exercise, since it occurred within six months following the last transaction prior to termination of officer or director status. In addition, the insider should indicate on the Form 4 or 5 reporting the exercise that insider status has terminated.[31] Where all prior transactions, including transactions otherwise reportable on Form 5, have been reported, and the insider has not had any transactions, including transactions exempt from Section 16(b), in the six months prior to termination, there is no Form 5 filing obligation or other post-termination reporting obligation. In this case, the insider may wish to furnish the issuer with a written representation that no further report on Form 5 is required.

3. Ten Percent Holder

Section 16, as applied to ten percent holders, is intended to reach those persons who can be presumed to have access to inside information because they can influence or control the issuer as a result of their equity ownership. Section 13(d) of the Exchange Act[32] specifically addresses such relationships. As proposed, the rules adopted today[33] define ten percent holders under section 16 as persons deemed ten percent holders under section 13(d) of the Exchange Act and the rules thereunder. The section 13(d) analysis, such as the exclusion of non-voting securities[34] and counting only those derivative securities exercisable or convertible within 60 days,[35] are imported into the ten percent holder determination for section 16 purposes.[36] The section 13(d) definition of beneficial ownership is used only to determine status as a ten percent holder; once status is determined, the reporting and short-swing profit provisions of section 16 apply only to those securities in which the insider has a pecuniary interest.[37]

Under the rule, adopted as reproposed, shares held by institutions eligible to file beneficial ownership reports on Schedule 13G[38] that are held for clients in a fiduciary capacity in the ordinary course of business are not counted for purposes of determining ten percent holder status ("13G exemption").[39] This is a limited

[27] As stated in the Proposing Release, the legal doctrine concerning "deputized" directors is not affected by the rules adopted today and will be left to case law. *See, e.g., Blau* v. *Lehman*, 368 U.S. 403 (1962); *Feder* v. *Martin Marietta*, 406 F.2d 260 (2d Cir. 1969).

[28] For example, a director of a private company purchases common stock in the company on January 1 and March 1. The company registers a class of equity securities under section 12 effective May 1. The director then sells the stock on August 1. The sale is required to be reported on Form 4, triggering the requirement to report any transactions conducted within six months of the first transaction requiring a filing. The purchase made on March 1 would be disclosed because it was conducted within six months of the sale, but the purchase made on January 1 need not be disclosed because it occurred more than six months prior to the sale. In addition, the March 1 purchase could be matched with the August 1 sale for short-swing profit recovery purposes, absent an exemption from section 16(b).

[29] Former Rule 16a-1(e) (17 CFR 240.16a-1(e)); Release 34-18114 Q.35.

[30] Rule 16a-2(b). Transactions occurring after a reduction in beneficial ownership of an issuer's securities to ten percent or less would not be a reportable event, if the person is not also an officer or director, since section 16(b) explicitly provides that short-swing transactions can occur only if there is both a sale and purchase within six months while the person beneficially owned more than ten percent of the issuer. *Foremost-McKesson, Inc.* v. *Provident Securities Co.*, 423 U.S. 232 (1976); *see also* Rule 16a-2(c).

[31] Both Form 4 and Form 5 have an exit box on the face of the Form that should be checked. *See* II.C.2, *infra*. If the exit box is checked to reflect termination of insider status and a subsequent transaction necessitates another filing, the exit box should also be checked on the subsequent filing.

[32] 15 U.S.C. 78m(d) (1988).

[33] Rule 16a-1(a)(1). For a discussion of the application of Section 16 to section 13(d) groups, *see* Section II.B.3, *infra*.

[34] Rule 13d-1(d) (17 CFR 240.13d-1(d)).

[35] Rule 13d-3(d)(1) (17 CFR 240.13d-3(d)(1)).

[36] With respect to derivative securities, Rule 16a-4(a) states that derivative securities are deemed to be the same class of equity securities as the underlying securities. This essentially codifies the holding in *Chemical Fund* v. *Xerox Corp.*, 377 F.2d 107 (2d Cir. 1967). Accordingly, a holder of section 12 debt convertible into Section 12 common stock would not consider the debt itself in the ten percent owner calculation, but rather would consider only the common stock into which the debt was convertible within 60 days.

In contrast to convertible debt, a security that is an equity security in its own right, as well as on account of a conversion feature, would require a double calculation. For example, if a class of voting preferred stock registered under section 12 is convertible into section 12 common stock, the beneficial owner of the preferred stock is deemed the owner of both the preferred stock and the underlying common stock. Accordingly, the ten percent holder calculation must be performed with respect to the preferred stock and the common stock separately. If the convertible preferred stock is non-voting, the preferred stock is not considered a separate class of equity for purposes of the ten percent holder calculation, because Rule 13d-3(d)(1) excludes non-voting securities; therefore, the beneficial owner of the non-voting preferred stock, like a holder of convertible debt, performs the ten percent holder calculation only with respect to the underlying common stock.

[37] Rule 16a-1(a)(2).

[38] 17 CFR 240.13d-102. In order to qualify to use Schedule 13G, the institution must acquire or hold securities of the issuer in the ordinary course of business without the purpose or effect of influencing or changing control. Rule 13d-1(b)(1)(i) (17 CFR 240.13d-1(b)(1)(i)).

[39] Rule 16a-1(a)(1). The rule is modeled after Rule 13d-1(b)(1)(ii) (17 CFR 240.13d-1(b)(1)(ii)).

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departure from the approach under section 13(d). Securities not held in a fiduciary capacity, however, must be counted in determining whether the 13G institution is a ten percent holder. Questions have been raised as to the applicability of the 13G exemption to employee benefit plans and pension funds subject to the Employee Retirement Income Security Act of 1974 ("ERISA").[40] Consistent with current staff interpretation of Section 13(d),[41] a plan will not be deemed the beneficial owner of shares allocated to plan participants over which participants have voting power.[42]

B. What Is Reported—Transactions in Securities in Which Insider has Pecuniary Interest

1. Pecuniary Interest

Section 16(a) reporting obligations and section 16(b) short-swing profit recovery cover only those securities in which insiders have or share a direct or indirect pecuniary interest.[43] The definition of pecuniary interest is adopted as reproposed, with the following modifications to the application of the indirect pecuniary interest standard.

a. *Partnership Holdings.* Under the partnership attribution rule, adopted as reproposed, the beneficial ownership of portfolio securities [44] owned by a general or limited partnership is attributed to the general partners in proportion to the greater of their capital account or interest in the profit of the partnership at the time of the transaction.[45] In the event of a short-swing transaction, a general partner's share of the partnership's capital account or profits is determined by the partnership agreement in effect at the time of the transaction and the partnership's most recent financial statements.

b. *Fee Arrangements.* In the Reproposing Release, the Commission proposed that investment adviser or trustee fee arrangements based on the performance of the portfolio would create a pecuniary interest in the portfolio, except where the fee was calculated on an annual or longer basis and the securities of the issuer did not comprise more than ten percent of the portfolio.[46] Commenters expressed concern that the rule inadvertently implied that fees based upon the amount of assets managed would create a pecuniary interest and that advisers and trustees could not be paid until the end of the year. The rules adopted today clarify that asset-based fees do not create a pecuniary interest in the securities managed and that advisers or trustees may be paid more than once during the year, as long as the fee is related to performance for a year or more.

c. *Corporate Holdings.* A non-exclusive safe harbor governing beneficial ownership of portfolio securities held by a corporation or similar entity [47] has been adopted. The rule adopted today [48] provides a safe harbor from attribution of corporate holdings for shareholders who are not controlling shareholders [49] of the corporation and do not have or share investment control over the corporation's portfolio securities. Unlike the reproposal, the safe harbor does not extend to controlling shareholders and, therefore, the rule does not distinguish between public and nonpublic corporations.

2. Broad-based Stock Indices and Baskets

A new provision has been added to make it clear that beneficial ownership of a broad-based, publicly traded market basket or index security or future does not create a beneficial ownership interest in the component stocks.[50] This provision clarifies that in such a case, the pecuniary interest in one component stock is too remote for the stock to be considered beneficially owned.[51]

3. Section 13(d) Groups

Questions have been raised concerning the application of the reporting and short-swing profit recovery provisions of section 16 to section 13(d) groups.[52] In applying the rules adopted today, only those securities in which a member of a group has a direct or indirect pecuniary interest would be reported and subject to short-swing profit recovery.[53] Thus, while securities holdings of group members may subject the group members to section 16, if the group member does not have or share a pecuniary interest in securities held by other group members, the transactions of the other group members do not create section 16 obligations for that member.[54]

Institutions eligible to use the 13G exemption include specified broker-dealers, banks, insurance companies, investment companies, investment advisers, employee benefit plans, holding companies, and groups consisting of these exempt institutions. Whereas the reproposed rule made reference to Rule 13d-1 (17 CFR 240.13d-1), the rule as adopted enumerates the eligible institutions. It is noted that although securities in life insurance company separate accounts are deemed assets of the insurance company under state law, these assets are held for the exclusive benefit of customer annuitants in a manner comparable to other fiduciary institutions referenced in the rule. Thus, for purposes of section 16, insurance accounts held for the exclusive benefit of customers may be treated, where appropriate, as fiduciary accounts and excluded from the determination as to whether the insurance company is a ten percent holder for purposes of section 16.

[40] Public Law No. 93-406, 88 Stat. 829 (29 U.S.C. 1001 *et seq.* (1988)).

[41] *See Rio Grande Industries, Inc.* (April 5, 1989).

[42] Rule 16a-1(a)(1). A plan trustee's residual or overriding voting or investment control, pursuant to its legally imposed fiduciary duty to act in the best interests of the plan trust beneficiaries under Title I of ERISA, does not create a beneficial ownership interest under Rule 16a-1(a)(1) in securities that are allocated to plan participants having voting power. In addition, a plan trustee does not become a beneficial owner under Rule 16a-1(a)(1) where the trustee gains limited voting authority, such as in circumstances where a plan participant does not give the trustee voting instructions and the trustee must exercise voting power on behalf of the participant. *Compare Rio Grande Industries, Inc., supra* n. 41. Note that while the plan itself has beneficial ownership of unallocated shares over which the trustee has voting or investment power, employee benefit plan trustees that are institutions enumerated in the rule typically would not have beneficial ownership of those shares because they are held in a fiduciary account in the ordinary course of business. For a discussion of trusts, *see* Section II.B.4, *infra.*

[43] Rule 16a-1(a)(2). Rule 16a-8 addresses trust beneficial ownership. Rule 16a-1(a)(4) permits a disclaimer of beneficial ownership to accompany any reported transaction or holding, even where beneficial ownership is deemed to exist under the rules.

[44] The definition of "portfolio securities" has been moved to Rule 16a-1(g).

[45] Rule 16a-1(a)(2)(ii)(B).

[46] Rule 16a-1(a)(2)(ii)(C).

[47] For example, business trusts are treated as corporations for purposes of section 16.

[48] Rule 16a-1(a)(2)(iii).

[49] The reference to "controlling shareholder" applies to shareholders that have the power to exercise control over the corporation by virtue of their securities holdings.

[50] Rule 16a-1(a)(5)(iii).

[51] Broad-based stock indices and baskets also are excluded from the definition of "derivative security." *See* Rule 16a-1(c)(4) and section III.B, *infra.* In essence, broad-based indices and baskets are outside the purview of section 16, both with respect to the indices or baskets and their component securities.

[52] *See* Exchange Act section 13(d)(3) (15 U.S.C. 78m(d)(3) (1988)); Rule 13d-5 (17 CFR 240.13d-5).

[53] Where a member of the group has the ability, through any contract, arrangement, understanding or relationship, to receive a portion of the profits from transactions in any other group member's securities, the member has a pecuniary interest in the securities. In this event, the group member is required to report all holdings and transactions in equity securities to which the arrangement or understanding relates, as well as any other equity securities in which the member has a pecuniary interest, and is subject to short-swing recovery from resulting transactions.

[54] In contrast to section 13(d), which requires a group filing, the group itself would not be a separate person for section 16 purposes. However, for purposes of determining status as a ten percent holder under Section 16, the securities beneficially owned by the group must be included in the calculation by each individual member of the group.

4. Trusts and Trustees

The trust rule adopted today addresses the application of section 16 to trust holdings and transactions substantially as reproposed.[55] There are two changes from the reproposal, discussed below, which limit the circumstances under which a trust becomes subject to section 16 as a result of having an insider trustee.

In addition, the rule has been reorganized for clarity.[56] The first part of the rule addresses circumstances under which a trust, trustee, beneficiary or settlor becomes subject to section 16,[57] while the second part addresses the reporting and short-swing profit obligations of such parties once they are subject to section 16.[58] The first part of the rule is based on the section 13(d) concepts used for determining ten percent holder status generally,[59] while the second part is based on the pecuniary interest concepts used for determining reporting and short-swing profit obligations generally.[60]

a. *Status Under Section 16.* As in the reproposed rules and under current law, the Rule provides that a trust is subject to section 16 if it holds more than ten percent of a class of equity securities of an issuer registered pursuant to section 12. Under the new rule, ten percent ownership by a trust is determined in accordance with the general beneficial ownership rule, Rule 16a-1(a)(1).[61] Employee benefit plan trusts subject to ERISA thus will exclude from the ten percent calculation securities that are allocated to participants with voting control, a result that carries out the purposes of section 16 without unduly interfering with the day-to-day operation of pension and employee benefit plans.[62]

As proposed, a trust also would have become subject to section 16 if the trustee was an insider and had investment control over the trust's portfolio securities. The rule, as adopted, subjects the trust to section 16 only if an insider trustee has or shares investment control and the trustee, or a member of the trustee's immediate family, has a pecuniary interest in the issuer's securities held by the trust.[63] This modification recognizes that the potential for abuse is remote where the trustee has little incentive to abuse inside information. Further, the rule has been modified to state that if a trustee is an institution eligible to file a Schedule 13G, the trustee's insider status does not subject that trust to section 16.[64] Additionally, the service of an officer or director as a trustee of the issuer's employee benefit plan does not in itself subject the plan to section 16, even if the officer or director is a plan participant.[65]

The former rule provided that where the trust was a ten percent holder, each trustee also became subject to section 16. The result is similar under the rule as adopted;[66] whether a trustee is deemed to be the beneficial owner of securities held by the trust for status purposes is governed by the general beneficial ownership rule, Rule 16a-1(a)(1), which focuses on a section 13(d) analysis.[67] Thus, a trustee having or sharing voting or investment control over securities held by a trust would include these securities in the trustee's own ten percent holder calculation.[68] Professional institutional trustees, however, are likely to be able to avail themselves of the 13G exemption provided by Rule 16a-1(a)(1).

The Rule 16a-1(a)(1) analysis also is applicable to beneficiaries or settlors. Under most circumstances such parties are not expected to have either the requisite voting or investment control over the securities, and thus could exclude the securities from the ten percent holder calculation. Where, however, a settlor has the power to revoke the trust without the consent of another person, the settlor will be deemed a beneficial owner of securities held by the trust for determining status as a ten percent holder.[69]

b. *Reporting and Short-Swing Profit Obligations.* The rule separately addresses reporting obligations, and the corollary application of short-swing profit recovery provisions, of trusts, trustees, beneficiaries and settlors.[70] Trust holdings and transactions normally are reported only by the trustee on behalf of the trust,[71] and generally would not be matched for section 16(b) purposes with non-trust transactions of the trustee, beneficiaries and settlors. Four exceptions to this provision are specified in the rule.

First, just as employee benefit plan securities allocated to employees with voting control are excluded from the trust's ten percent holder calculation, securities held by or transactions conducted in an employee benefit plan are excluded from the trust's reporting obligations if the trustee does not exercise investment control with respect to such holdings or transactions.[72] These transactions instead must be reported by employee participants who are subject to section 16. The allocation of securities owned by a trust to a participant account is not a trust transaction subject to section 16, and need not be reported by the trust, but is an acquisition reportable by the insider-participant.

Second, an insider trustee with a pecuniary interest in any holding or transaction of the trust[73] must report such holding or transaction on the trustee's individual form, as well as on the separate form filed on behalf of the trust.[74] Trust transactions in which the insider trustee has a pecuniary interest can be matched with personal transactions of the trustee, as well as other trust transactions. The rule sets forth two non-exclusive situations where the trustee is deemed to have a pecuniary interest: The trustee or an immediate family member is a beneficiary of the trust,[75] or a

[55] Rule 16a-8.

[56] For ease of reference, reproposed Rule 16a-1(a)(5)(i), addressing trust remainder interests, has been redesignated Rule 16a-8(c).

[57] Rule 16a-8(a).

[58] Rule 16a-8(b).

[59] Rule 16a-1(a)(1).

[60] Rule 16a-1(a)(2).

[61] Rule 16a-8(a)(1)(i).

[62] *See* section II.A.3, *supra*.

[63] Rule 16a-8(a)(1)(ii).

[64] Rule 16a-8(a)(1)(ii)(A).

[65] Rule 16a-8(a)(1)(ii)(B). This was added in response to commenter concern that officers acting as trustees for plans of the issuer would subject the plan trust to section 16. For an explanation of the rules concerning employee benefit plans, including plans structured in trust form, *see* section IV, *infra*.

[66] Where a trust is subject to section 16 because an insider trustee has a pecuniary interest in a portion of the trust corpus, other trustees of the trust who are not insiders will not thereby become subject to section 16.

[67] Rule 16a-8(a)(2)(i).

[68] Generally, in determining whether a trustee in his or her individual capacity is a ten percent holder, equity securities individually held over which the trustee has or shares voting or investment control and equity securities of the same class held in one or more trusts (and deemed beneficially owned by the trustee under a section 13(d) analysis) would be aggregated.

[69] Rule 16a-8(a)(2)(ii).

[70] The person required to report a transaction under section 16(a) also is subject to the provisions of sections 16(b) and 16(c). Rule 16a-8(d).

[71] Rule 16a-8(b).

[72] Rule 16a-8(b)(1). Thus, transactions in a typical participant-directed plan would be reported by the employee-participants, not the trust. When a trust does have to file reports with respect to an employee benefit plan, the reporting ordinarily will be on an annual basis since transactions exempt pursuant to Rule 16b-3 are reportable on Form 5. *See* Rule 16a-3(g)(3) and the discussion of employee benefit plans in Part IV, *infra*.

[73] Pecuniary interest includes an interest in the income or the corpus of the trust.

[74] Rule 16a-8(b)(2). In such circumstances, both the trustee and the trust are deemed beneficial owners; however, any short-swing profits would be recoverable only once, as specified in Rule 16a-1(a)(3).

[75] Rule 16a-8(b)(2)(ii). As adopted, the rule clarifies that the trustee has a pecuniary interest in

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performance fee is received that does not satisfy the proviso of Rule 16a-1(a)(2)(ii)(C).[76]

Third, the rule addresses insider beneficiaries specifically, recognizing, as did the former rule, that it is inappropriate to require beneficiaries to incur reporting and short-swing profit obligations for transactions beyond their control. Accordingly, although beneficiaries have a pecuniary interest in trust securities to the extent of their pro rata interest in the trust,[77] they ordinarily would not report trust holdings or transactions. In the usual situation where the trustee makes the investment decisions without the prior approval of or consultation with the beneficiary, only the trust reports the transaction, and the transaction is matchable only with other trust transactions.[78] Where the insider beneficiary has investment control over the transaction and the trustee executes the transaction as directed, the beneficiary rather than the trust reports the transaction, which is matchable with other transactions of the beneficiary.[79] Where investment control is shared, including consultation between the trustee and beneficiary, both the trust and the beneficiary must report the transaction and are responsible for any resulting short-swing profits.[80]

Finally, the rule addresses reporting by insider settlors.[81] Just as a settlor who reserves the right to revoke the trust without the consent of another person is deemed to beneficially own the issuer's securities held by the trust for purposes of determining ten percent ownership status, such a settlor also is viewed as having a pecuniary interest in the securities, and is responsible for reporting and short-swing profit recovery. However, if such a settlor neither has nor shares investment control, it would be inappropriate to require reporting or profit recovery. In this event, the trust rather than the settlor is responsible for reporting and the trust transactions are not matchable against the settlor's transactions, just as for a beneficiary having no investment control.

C. How and When to Report

1. Timing of Reports

As reproposed, option exercises and conversions of derivative securities must be reported on the earlier of the next Form 4 otherwise required or on Form 5.[82] In addition, commenters suggested that reporting earlier on a voluntary basis would facilitate report preparation and section 16(a) compliance. At their suggestion, the rules, as adopted, have been amended to state explicitly that insiders may report exercises and conversions, as well as any other transactions, on a date earlier than that which is required by the rules.[83]

The rules adopted today provide that for purposes of section 16 a form will be deemed timely filed if it is delivered to a third party business, including the postal service, in sufficient time for it to guarantee delivery of the filing to the Commission no later than the specified due date.[84] Accordingly, the insider will not be deemed delinquent on account of the third party's breach of its guarantee. For example, many mail services currently guarantee overnight delivery or delivery within a specified time. An insider required to file a Form 4 with the Commission by the tenth of the month will be deemed to have timely filed the Form 4 if the insider delivers the Form to a mail service guaranteeing delivery to the Commission by the due date. This provision recognizes the large number of individuals that are subject to the reporting requirements of section 16(a), as well as the expectation that forms mailed or delivered by guaranteed delivery services will be filed with the Commission by the specified due date.[85] Insiders must retain a receipt or other writing from the third party evidencing timely receipt by the third party for filing with the Commission by the required date in order to rely on this provision.

2. Revisions to Forms 3, 4, and 5

The annual Form 5 filing requirements have been adopted substantially as proposed, with revisions to facilitate the reporting of securities held in employee benefit plans. A Form 5 must be filed within 45 days of the issuer's fiscal year end by every person who was an insider at any time during the fiscal year to report any securities transactions during that period that have not been reported previously on a Form 4, either because of deferred reporting or failure to file required reports.[86] A Form 5 is not required from an insider with no reportable transactions.

In response to comments that information concerning transactions in employee benefit plans and dividend reinvestment plans ("DRIPs") may not be available from plan administrators to permit timely reporting on Form 5, as well as concern that the information required would be voluminous and not meaningful, two changes to the reporting requirements have been made.[87] First, insiders are permitted to report exempt acquisitions in thrift and stock purchase plans [88] and DRIPs [89] on an aggregate basis, rather than transaction by transaction. Reportable dispositions may not be aggregated. Second, insiders must report plan transactions on the Form 5 as of the most recent date for which such data is reasonably available to the reporting person.[90] Plan information for the fiscal year not reported on the Form 5 filed for that year would be reportable on the Form 5 for the next fiscal year (or may be filed on a Form 4 or an amended Form 5 promptly after becoming available).

Commenters were concerned that the Form 5 requirement to report any unreported transactions, including those made prior to the adoption of Form 5, would place insiders at risk of committing reporting violations by failing to report earlier transactions that they in good faith did not recollect. In response to these concerns, the rule adopted today requires an insider, in completing the first Form 5 or making the first written representation that no Form 5 is required, to report transactions not previously reported for each of the issuer's two past fiscal years, rather than for an indefinite period. For calendar year companies this will mean that the Form 5 will

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the proportionate holdings of the family member, rather than all holdings of the trust.

[76] Rule 16a-8(b)(2)(i). For a discussion of performance fees, *see* Section II.B.1.b, *supra*.

[77] Rule 16a-8(b)(3)(iii).

[78] This is consistent with former Rule 16a-8(b) (17 CFR 240.16a-8(b)).

[79] Rule 16a-8(b)(3)(ii).

[80] Rule 16a-8(b)(3)(i). Under former Rule 16a-8(d) (17 CFR 240.16a-8(d)), the trustee was permitted to file a single report on behalf of all beneficiaries. However, as proposed, this provision has been deleted; under the new regulatory framework the person who has the pecuniary interest must report. *See* Rule 16a-1(a)(3).

[81] Rule 16a-8(b)(4).

[82] Rule 16a-4. *See* Section III.D, *infra*, for a discussion of exercises and conversions.

[83] Rules 16a-3(a) and 16a-3(g)(3) permit the early reporting of transactions on Form 4.

[84] Rule 16a-3(h).

[85] The Commission's position regarding the timely filing of forms required by section 16 and the rules thereunder does not apply to filings required under other provisions of the federal securities laws. *See, e.g.*, Exchange Act Rule 0-3 (17 CFR 240.0-3).

[86] Rule 16a-3(f)(1).

[87] Instruction 4(a)(ii) of Form 5.

[88] For a discussion of the exemption from liability for transactions in ongoing stock acquisition plans, *see* section IV.D, *infra*.

[89] Consistent with current interpretation, only the reinvestment of dividends or interest is exempt, not additional securities acquired through voluntary cash contributions under such plans. *See* Release No. 34-18114, Q. 78. Any such additional purchases thus must be reported on Form 4 and may not be aggregated.

[90] The Form must specify the period for which plan information is disclosed.

include transactions in 1990 and 1991. As another example, an insider of a company with a June 30 fiscal year end would include transactions for the year ending June 30, 1990, and 1991. The rule also provides that the insider need only have a reasonable good faith belief that all transactions in the period prior to the effective date of the rules have been reported or are reported on the Form 5.[91] The limitation of insider review to the prior two fiscal years is not an amnesty for earlier violations of section 16(a). Likewise, late disclosure of any transactions, on any form, does not cure the original violation.

In subsequent years, Form 5 will relate only to transactions during the most recent fiscal year and DRIP and employee benefit plan transactions from the prior fiscal year for which information was not available at the time of the prior report and not previously reported. Insiders will be responsible for determining whether all required reports and transactions during such periods have been reported.[92]

In response to commenters' concerns, Forms 3, 4, and 5 and related instructions have been revised to simplify the forms and facilitate completion and reporting.[93] General revisions include reformatting the forms (*i.e.*, combining columns and eliminating others as unnecessary) to create additional space for reporting transactions, and changing transaction codes to specify in greater detail the types of transactions reported. Minor changes also have been made to form instructions to clarify reporting obligations.

At the suggestion of commenters, boxes have been added to Forms 4 and 5 that insiders must check to indicate termination of insider status. Completing these boxes will facilitate Commission and investor monitoring of insider reports. Comment is solicited on the usefulness of this approach.

Forms 4 and 5 also have been amended to contain, next to the exit box, a reminder that subsequent reports may be required to be filed by persons who were insiders at any time during the issuer's fiscal year. Of course, as discussed above,[94] even after a person ceases to be an officer or director, the person may have subsequent filing obligations (*i.e.*, a Form 4 for post-termination transactions or a Form 5 at the end of the year to reflect option exercises, employee benefit plan transactions, other transactions exempt from section 16(b), small acquisitions or other previously unreported transactions).[95] Insiders who wish to file reports of exempt transactions early, at the time of their ceasing to be officers or directors subject to Section 16, may do so on either a Form 4 or Form 5.

III. Derivative Securities

A. Conceptual Framework

Given the uncertainty surrounding the application of section 16 to derivative securities under the former rules and existing case law, the Commission is adopting a comprehensive regulatory framework, in order to effect the purposes of section 16 and to address the proliferation of derivative securities and the popularity of exchange-traded options. This framework recognizes that holding derivative securities is functionally equivalent to holding the underlying equity securities for purposes of section 16, since the value of the derivative securities is a function of or related to the value of the underlying equity security. Consequently, both types of securities can be used to engage in the kind of short-swing profit taking that Congress sought to prevent.[96]

Section 16 was enacted by Congress to provide a prophylactic measure against insider trading by allowing the corporation to recapture the profit derived by one of its insiders who engages in two transactions in the company's equity securities within a six-month period of time. Just as an insider's opportunity to profit commences when he purchases or sells the issuer's common stock, so too the opportunity to profit commences when the insider engages in transactions in options or other derivative securities that provide an opportunity to obtain or dispose of the stock at a fixed price.[97] The holder of a call option not only knows that he will be able to obtain the stock, but also knows the price at which it will be obtained. Thus, whether or not the holder chooses to exercise his right to obtain the stock, the extent of his profit is determinable, when compared with a transaction in the underlying equity security or a derivative security related to that underlying equity security.[98]

The functional equivalence of derivative securities and their underlying equity securities for section 16 purposes requires that the acquisition of the derivative security be deemed the significant event, not the exercise. Failure to recognize that derivative securities are functional equivalents of the underlying securities for Section 16 purposes would permit insiders to evade disgorgement of short-swing profits simply by buying call options and selling the underlying stock, or buying underlying stock and buying put options. Potential abuse with derivative securities is demonstrated by the many enforcement actions involving the purchase of derivative securities, rather than common stock, to misuse inside information.[99]

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[91] Rule 16a-3(f)(1). A review of records available without undue burden or expense would be an adequate basis for such belief.

[92] The good faith belief standard is not applicable for transactions subsequent to the effective date. If an insider does not report a Form 4 transaction until a subsequent fiscal year, there would be two violations, a failure to file a timely Form 4 and a failure to report the transaction on Form 5; there would not be an additional violation each subsequent year.

[93] As a matter of policy, the Commission will accept computer generated Forms 3, 4, or 5 if the computer generated facsimile is identical in format and is limited to 8½" x 11" paper. These forms must be signed manually.

[94] *See* section II.A.2, *supra*.

[95] In addition, ten percent holders while not subject to section 16 after termination of status, may have a Form 5 filing obligation as to unreported transactions that occurred during the period the person was a ten percent holder.

[96] For a discussion of option pricing and the relationship between an option's price and the price of the underlying security, *see generally* J. Cox and M. Rubenstein, "Options Markets" (Prentice-Hall Inc. 1985); J. Cox, S. Ross, & M. Rubinstein, "Option Pricing: A Simplified Approach," "Journal of Financial Economics," 229–263 (Sept. 1979); M. Brennan & E. Schwartz, "The Valuation of American Put Options," "Journal of Finance," 449–462 (May 1977); F. Black and M. Scholes, "The Valuation of Option Contracts and a Test of Market Efficiency," "Journal of Financial Economics," 399–418 (May 1972).

[97] The definition of "derivative security" in Rule 16a-1(c) excludes those securities without a fixed exercise price. *See* sections III.B and III.D, *infra*.

[98] For example, if an insider who owns 1000 shares of stock acquires call options giving him the right to obtain 1000 shares of the company's stock at $100 a share, and the stock price rises to $120, the insider knows that he can sell his stock and replace that holding for $20,000 less than the sale price. The insider is at no risk that subsequent events will place that profit in danger, if he sells the stock but chooses not to exercise the call options immediately.

[99] *See, e.g.*, *SEC* v. *Tome*, 833 F.2d 1086 (2d Cir. 1987); *SEC* v. *Foundation Hai*, 736 F. Supp. 465 (S.D.N.Y. 1990); *SEC* v. *Raab*, Litigation Release No. 12709 (Nov. 20, 1990); *SEC* v. *Finacor Anstalt and Certain Purchasers of Call Option Contracts for the Common Stock of Combustion Engineering, Inc.*, Litigation Release No. 12603 (Sept. 6, 1990); *SEC* v. *Bushman*, Litigation Release No. 12594 (Aug. 27, 1990); *SEC* v. *Certain Purchasers*, Litigation Release No. 12542 (July 13, 1990); *SEC* v. *Godfrey*, Litigation Release No. 12420 (March 22, 1990); *SEC* v. *O'Hagan*, Litigation Release No. 12344 (Jan. 10, 1990); *SEC* v. *Musella*, 748 F. Supp. 1028 (S.D.N.Y. 1989); *SEC* v. *Shiffman*, Litigation Release No. 12175 (July 24, 1989); *SEC* v. *Iseppi*, Litigation Release No. 11964 (Jan. 17, 1989), *SEC* v. *Levine*, Litigation Release No. 11095 (May 12, 1986); and *SEC* v. *Reed*, Litigation Release No. 9537 (December 23, 1981). Congressional concern about this problem is further evidenced by the enactment of the Insider Trading Sanctions Act of 1984 amendment to section 20(d) of the Exchange Act. *See* Public Law No. 98–376, 98 Stat. 1264 (1984); 15 U.S.C. 78t(d) (1988).

By equating ownership of the derivative security to ownership of the underlying equity security, opportunities for evasion of Section 16 are minimized. Unlike the results under prior Commission rules and case law, under the rules adopted today, transactions in the derivative securities are matchable against transactions in the underlying securities and against each other; short-swing profits obtained through use of derivative securities are recoverable.[100] The rules correspondingly recognize that, for purposes of the abuse addressed by section 16, the exercise of a derivative security, much like the conversion of a convertible security, essentially changes the form of beneficial ownership from indirect to direct.[101] Since the exercise represents neither the acquisition nor the disposition of a right affording the opportunity to profit, it should not be an event that is matched against another transaction in the equity securities for purposes of section 16(b) short-swing profit recovery.

The profit that can be realized on short-swing transactions, whether accomplished through derivative securities, the underlying equity security or a combination of both, depends upon the price of the underlying security. While the amount of the profit may vary given factors such as the time value of money and volatility of the underlying stock evidenced in the option premium, the exercise does not change the opportunity to realize a profit. As the price of the underlying common stock increases, so does the value of a call option [102] or similar derivative security with a fixed exercise or conversion price related to the common stock.[103]

When an insider acquires a typical call option, the insider acquires the right to receive the underlying equity security at a fixed price for a fixed duration.[104] When the price of the underlying equity security exceeds sufficiently the price at which the derivative security can be exercised, the profit can be locked in as there is no uncertainty about the insider's ability to realize the profit, whether by selling the derivative security, selling the underlying securities received upon exercise, or selling other holdings of the underlying securities or other derivative securities related to the underlying security.[105] In each case the insider locks in the ability to profit by transactions in derivative securities, but under the former rules the insider could evade disgorgement of the short-swing profit earned by timing the exercise of the call option to occur more than six months after the sale of the underlying security. Some courts have recognized a potential for abuse and have matched a transaction in a derivative security with an offsetting transaction in the underlying security,[106] but many courts have not.[107]

The following scenarios, while not exhaustive of all possible combinations of transactions involving derivative securities and the underlying equity security, use actual prices on the specified dates and illustrate an insider's profit potential from short-swing transactions involving derivative securities and the underlying equity securities. The amount of profit differs primarily due to the diminishing value of an option as it approaches expiration and the fact that some of the value of the option premium (or market price) is lost upon exercise.[108]

(1) *Purchase Stock—Sell Stock.* If an insider of IBM purchased 1,000 shares of IBM common stock on February 23, 1990 ($102⅝ per share NYSE), he would have paid $102,625. If the insider sold the 1,000 shares on April 16, 1990, for $110,750 ($110¾ per share NYSE), a profit of $8,125 would have been made.[109]

(2) *Purchase Option—Exercise Option—Sell Stock.* Similarly, the same insider could have bought ten IBM call option contracts (covering 1,000 IBM common shares) on February 23, 1990, for $9,875 ($9 ⅞ per share), exercisable on or before October 19, 1990, at $100 per share. If on April 16, 1990, the insider exercised the option and purchased the stock for $100,000 and sold the stock for $110,750 ($110¾ per share), the profit would be $875.[110]

(3) *Purchase Option—Sell Stock.* If the insider purchased the same ten IBM call option contracts (covering 1,000 IBM common shares) on February 23, 1990, for $9,875 ($9⅞ per share), exercisable on or before October 19, 1990, but, instead of exercising the option and selling the underlying stock, he sold 1,000 shares of IBM common stock otherwise held on April 16, 1990, for $110,750 ($110¾ per share), the insider would lock in the ability to earn a profit of $875.[111]

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[100] Rule 16a-4(a) and Rule 16b-6(a).

[101] *See, e.g., Petteys* v. *Butler*, 367 F.2d 528 (9th Cir. 1966), *cert. denied*, 385 U.S. 1006 (1967); *Blau* v. *Lamb*, 363 F.2d 507 (2d Cir. 1966), *cert. denied*, 385 U.S. 1002 (1967); *Blau* v. *Max Factor & Co.*, 342 F.2d 304 (9th Cir.), *cert. denied*, 382 U.S. 892 (1965).

[102] A long call option position or a short put option position can benefit as the value of the underlying stock increases, although the profit potential varies between the two. These positions are termed "call equivalent positions." Likewise, a short call or a long put position are termed "put equivalent positions."

[103] For example, on April 2, 1990, Global Marine common stock closed on the New York Stock Exchange ("NYSE") at $4 ⅝ while its warrants (a right to purchase one common share at $3 expiring in 1996) closed at $2 ¾. On October 1, 1990, the stock closed at $5⅝ 3/8 and the warrants closed at $3⅛. Both the stock and the warrant had increased in value by 75 cents.

[104] Although the timing of the exercise of European style options is fixed in advance, the opportunity to profit from acquiring stock at a fixed price is the same.

[105] Likewise, an insider can lock in profit from the appreciation in value of an equity security by purchasing a put option.

[106] *See Gund* v. *First Florida Banks, Inc.*, 726 F.2d 682 (11th Cir. 1984); *Bershad* v. *McDonough*, 428 F.2d 693 (7th Cir. 1970), *cert. denied*, 400 U.S. 992 (1971); *T-Bar Inc.* v. *Chatterjee*, 693 F. Supp. 1 (S.D.N.Y. 1988).

[107] *See, e.g., Colan* v. *Monumental Corp.*, 713 F.2d 330 (7th Cir. 1983); *Morales* v. *Mapco*, 541 F.2d 233 (10th Cir. 1976); *Silverman* v. *Landa*, 306 F.2d 422 (2d Cir. 1962); *Blau* v. *Ogsbury*, 210 F.2d 426 (2d Cir. 1954).

[108] For example, assume that at the close of trading on March 20, 1990, a person purchased a May IBM call option covering 100 shares of IBM stock with an exercise price of $100, at $1000 ($10 per share) when the underlying IBM stock's price was $108. On May 1, 1990, IBM's stock price was again $108 per share, yet the May IBM call option's closing price was $8⅛ per share. The decrease in value resulted primarily from the fact that the option was closer to its expiration on May 18. In both examples the "intrinsic value" (inherent profit on the underlying stock as of that date) of the option was $8, since the option could be exercised at $100 and the stock was trading at $108. The remainder of the option price ($2 extra on March 20, but only ⅛ on May 1st) reflects the time value remaining until expiration, the volatility of the underlying stock and other factors, such as interest rates, that affect the market value of an option. *See generally* R.A. Brealey & S.C. Meyers, "Principles of Corporation Finance" 484, Table 20-2 (3d ed. 1988).

If the holder of the call option immediately exercised the option on March 20 or exercised on May 1, he would have received the underlying stock priced at $108 for $100 per share, providing a possible $8 per share profit (the "intrinsic value" of the option). It should be noted that by exercising the option the holder would have lost any option premium above the intrinsic value ($2 on March 20 or ⅛ on May 1). Thus, it is less likely that option holders will exercise the option and lose the option premium since it is more profitable to sell the option. *See generally* "Characteristics and Risks of Standardized Options" 26-31 (Options Clearing Corp. 1987). Where employee stock options are non-transferable, there is no premium to lose through exercise.

[109] The examples do not take into account transaction costs such as brokerage commissions and other costs.

[110] The profit was $7,250 less than the first example and $2,875 less than the fourth example where the insider simply sold his options rather than exercise them. This differential results from the loss of the option time value premium when exercised. The intrinsic value of the option when exercised was $10¾ ($110¾ minus $100 exercise price), and the remaining 2⅞ of the $13⅝ premium received in example 4 represented time value, which is lost when an option is exercised.

[111] This assumes the insider later replaces the 1,000 shares sold through the exercise of the call options. The profit was $7,250 less than the profit in the first example and the same as the second example. By selling the option rather than exercising it, the insider would retain the full value of the option premium. (See Example 4.)

(4) *Purchase Option—Sell Option.* Suppose the same insider purchased ten IBM call option contracts (covering 1,000 IBM shares) on February 23, 1990 for $9,875 ($9⅞ per share) exercisable at $100 before October 19. On April 16, 1990, the insider sold the call options for $13,625 ($13⅝ per share). The profit would have been $3,750.[112]

(5) *Purchase Stock—Purchase Put Option.* The same insider also could have bought 1,000 shares of IBM stock on February 23, 1990, for $102,625, and on April 16, 1990, bought ten put option contracts (covering 1,000 IBM shares) expiring October 19 with an exercise price of $115, at a price of $7½ per share, or $7,500. By purchasing the put options, the insider locked in the ability to earn a profit of $4,875, when the insider could receive $115,000 for the 1,000 shares under the put options.[113]

In each of the five examples there was an acquisition of a beneficial ownership interest in an equity security of IBM followed by a disposition in less than six months, and in each case, the insider profited in a short-swing manner. Under the former rules, the profit would have been recoverable from the insider in examples 1 and 2. However, the outcome was uncertain for examples 3, 4 and 5. The Commission's rules did not specifically address the situations presented in those examples and many courts have had difficulty in concluding that transactions in derivative securities and transactions in underlying securities should be matched to permit short-swing profit recovery. Moreover, the courts have not determined whether section 16 applies to standardized options under the former rules.[114]

Given the growth of trading in derivative securities, increased sophistication in trading practices involving derivative securities, and continued Commission experience with derivative securities and practices, the rules adopted today eliminate this disparity in treatment, which is neither analytically warranted nor consistent with the purposes of section 16. Derivative securities are susceptible to the type of abuse that section 16 seeks to eliminate, and should be subject to the short-swing recovery provisions of section 16 to carry out the purpose of the statute.

The former Commission section 16 rules and case law, by failing to recognize the functional equivalence of derivative securities and the underlying equity securities, and by therefore focusing on the exercise, rather than the acquisition, of the derivative security, have left open a significant potential for short-swing abuse in trading derivative securities, while permitting recovery in situations that represent long-term investments. For example, an insider with knowledge of a positive material development, to be announced shortly, determines that while he wants to retain his existing equity position, he wants to take advantage of the information, so he purchases issuer warrants. After the public announcement and rise in stock price the insider sells his common stock, obtaining a short-swing profit, knowing that he can replace the shares at a predetermined price since he holds the warrants. Under the former rules, he could simply wait six months and a day to exercise the warrants so the profit would not be subject to section 16(b) and not recoverable by the company. Ironically, however, an insider who purchased a warrant for investment purposes, exercised the warrant after a year and sold the underlying stock five months later—17 months after the purchase of the warrant, far beyond the six month period the statute defines as short-swing—would be subject to short-swing profit recovery.[115]

Given the short-swing profit potential presented by transactions in derivative securities, the Commission has amended the rules to make it clear that ownership of derivative securities constitutes beneficial ownership of the underlying equity securities for purposes of section 16. Therefore, transactions in options, convertible securities, warrants and similar derivative securities will be matchable with transactions in other derivative securities and in the underlying equity, and the profits recoverable by the corporation.

In realigning the section 16(b) focus from the exercise of the derivative securities to the acquisition of the derivative securities, the new regulatory framework not only reverses the Commission's own regulatory approach but also differs from a line of cases that, in the absence of rules to the contrary, have held that the exercise of the option (rather than its acquisition) is the section 16(b) purchase of an equity security.[116] These cases have held that an acquisition of a right is not a purchase of an equity security unless accompanied by an irrevocable liability to pay for the stock, or other indicia of beneficial ownership. A few courts have found a purchase of an equity security to occur at the acquisition of the derivative security,[117] but usually the purchase has been found to occur at exercise. As the most recent judicial decision to address the operation of derivative securities stated:

> This judicial rule (treating exercise as a purchase under section 16(b)) cannot withstand careful analysis. A person who acquires a call option acquires the right to purchase the underlying stock at a given price. If the price of the stock subsequently rises and the person exercises the option and then sells the stock, the "profit" he earns represents the 'swing' in the price, not between the date of exercise of the option and later sale of the stock, but rather between the time he originally purchases the option and the time he sells the stock * * *. The courts have strayed because they have viewed the intervening event—the exercise of the option for stock—as an independent purchase. This is incorrect. Because the option holder already owns the right to purchase the stock at a fixed price, his decision to actually exercise the option does not provide him the ability to earn insider profits and thus does not constitute a section 16(b) "purchase".[118]

[112] While the profit was less than the first example, the amount invested in Example 4 was less than one-tenth the amount invested in the first example. If the insider had invested $98,750 of the amount he invested in the first example, in options instead of stock, he would have made $37,500 profit, compared with the $8,125 profit in the first example, due to the leverage afforded by options.

[113] The profit is $3,250 less than the profit in the first example because the insider paid a premium of $3¼ over the intrinsic value of the put option. Since the stock was priced at $110¾, a right to sell the stock at $115 was worth $4¼ ($115 minus $110¾). However, the insider had to pay $7½ to buy the put option since the option did not expire until October.

[114] In examples 3 and 5 it is assumed that the insider, seeking to escape short-swing profit recovery under the former rules, would wait at least six months after the potential matching transaction to exercise the option acquired. Since the courts have been reluctant to match transactions in two different types of securities, except in the cases cited in n. 106 *supra*, it is questionable whether the courts would have found liability in examples 3 or 5. Only one case has involved a put option. *See Silverman* v. *Landa*, 306 F. 2d 422 (2d Cir. 1962) (no liability found where an insider sold both a call and put option within six months). In addition, the judicial outcomes in examples 3, 4, or 5 would have been uncertain, since no court has specifically ruled on the treatment of third party-issued options under section 16. One judicial decision addressed the matter and remanded the issue to the district court for its consideration. *See Miller* v. *General Outdoor Advertising Co.*, 337 F. 2d 944 (2d Cir. 1964). Although the issue was never determined, the Second Circuit indicated that the decision should be based upon whether transactions "were susceptible to the type of speculation the section seeks to eliminate." *Id.* at 948. *See also* section III.B, *infra*.

[115] In fact, former Rule 16b-6(b) (17 CFR 240.16b-6(b)) recognized the inconsistency of the prior treatment of derivative securities by limiting the amount of profit recoverable from options held longer than six months.

[116] *See, e.g., Colan* v. *Monumental Corp., supra*, 713 F.2d 330; *Morales* v. *Mapco, supra*, 541 F.2d 233; *Silverman* v. *Landa, supra*, 306 F.2d 422.

[117] *See, e.g., Bershad* v. *McDonough, supra*, 428 F.2d 693; Newmark v. *RKO General, Inc.*, 425 F.2d 348 (2d Cir.), *cert. denied* 400 U.S. 854 (1970).

[118] *Seinfeld* v. *Hospital Corp. of America*, 685 F. Supp. 1057, 1066 (N.D. Ill. 1988) (dictum)

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The conceptual framework for derivative securities adopted today does not distinguish between standardized options and other options, such as those granted under employee benefit plans. Some have argued that employee stock options should be treated differently from other options, because employees do not pay cash for the options and, therefore, the exercise rather than the grant should be treated as the purchase. Under section 16, the Commission historically has recognized that a purchase takes place at the time of the grant of employee options or bonus stock and that the consideration for the bonus stock and options is the employee's services.[119] Just as with standardized options, the employee option requires further payment at the time of exercise, but the short-swing profit opportunity is set at the time of grant, just as it is with the acquisition of a standardized option. Indeed, not to treat the employee option or bonus stock grant as a purchase for section 16 purposes would be to provide a significant opportunity for the short-swing transactions Congress wished to eliminate. For example, an insider could sell employer stock in advance of bad news, and obtain a specially-authorized stock option grant at market after the price drop, without the concern that profit could be recoverable under section 16.

Nor do employee options justify different treatment because, unlike standardized options, they are non-transferable. Their non-transferability does not impair the short-swing profit opportunity provided by the right to acquire stock at a fixed price. The restriction on transferability, a Commission-imposed requirement for an exemption under Rule 16b–3 initially derived from the Internal Revenue Code as a reflection of prior business practice and designed to provide a further safeguard against abuse, should not operate to remove option grants from the scope of section 16.

Under the rules adopted today, acquisitions of call options from an issuer or third party are deemed purchases for purposes of section 16 and are matchable with sales of the underlying stock or sales of another call equivalent derivative security relating to the same equity security. The exercise of the option, which does not create a new opportunity for profit, is exempt unless the option is out-of-the-money.[120] Generally, there appears to be little economic justification for an insider to exercise an out-of-the-money option. While it may be possible to view exercises of out-of-the-money options as a similar change from indirect to direct ownership, the rules do not provide such treatment given concerns as to the reasons that an insider would exercise such an option. At-the-money options are treated as in-the-money options under the new rules.

The sale of the stock underlying an option is not exempt and therefore is matchable with a purchase of the same equity security or any call derivative security relating to the same equity security within six months. Thus, to avoid short-swing profit recovery, a grant of an employee stock option by an issuer, absent an exemption, must occur at least six months before or after a sale of the equity security or any derivative security relating to the equity security. While many employee stock option grants may be exempt under Rule 16b–3, that exemption reflects the safeguards imposed on the transaction and not a determination that an option grant is not within the purview of section 16.[121]

Some commenters have questioned the appropriateness of the Commission's exempting the exercise of derivative securities in light of the United States Court of Appeals for the Second Circuit decision in *Greene* v. *Dietz*.[122] In that case, the majority of a panel of the Second Circuit criticized a Commission rule that exempted the exercise of employee benefit plan stock options. One district court, in *Perlman* v. *Timberlake*, subsequently found the rule invalid, although another district court, in *Perlitz* v. *Continental Oil*, upheld the rule.[123] The Commission filed an amicus brief for rehearing in *Greene*, and an amicus brief before the court in *Perlman*, both of which were before the court in *Perlitz*.[124] These briefs set forth the Commission's view that the rule was a proper exercise of its authority.[125]

Moreover, there are significant differences between the rules adopted today and the rule challenged in these cases. For example, in contrast to the rules adopted today, the exemption for the exercise considered in *Greene* was not a corollary of a regulatory scheme that defined derivative securities as holdings of the underlying securities and specifically subjected transactions in derivative securities to section 16(b), as transactions matchable against transactions in the underlying equity. The rule scrutinized in 1957 was adopted without the concomitant application of short-swing liabilities to derivative securities transactions.[126] Now, after 30 years of study and experience with trading in derivative securities, the Commission's rules today recognize what they did not then,[127] that derivative securities are functionally equivalent to underlying equity securities for purposes of section 16.[128]

B. Definitions of Equity Securities of An Issuer and Derivative Security

The definition of equity securities of an issuer has been adopted as proposed.[129] The rule provides that

(Acquisition of a "lock-up" option was the purchase, rather than the implied exercise accompanying the disposal of the option).

[119] In the Reproposing Release, the Commission noted commenter concern about the absence of an across-the-board exemption for issuer grants and expressed its unwillingness to grant such an exemption. However, it requested comment "as to examples of non-compensatory issuer option grants given without consideration or value." 54 FR at 35675. No examples of such option grants were provided by commenters in response to that request.

[120] When the exercise price for a call derivative security is less than the current market price of the underlying security, the derivative security is "in-the-money." If the exercise price and market price are the same, the call derivative security is "at-the-money." If the exercise price is greater than the market price, the call derivative security is "out-of-the-money." *See also* n.150 and surrounding text, *infra*.

[121] *See* discussion of Rule 16b–3 in section IV, *infra*.

[122] 247 F.2d 689 (2d Cir. 1957).

[123] *Perlman* v. *Timberlake*, 172 F. Supp. 246 (S.D.N.Y. 1959); *but see Perlitz* v. *Continental Oil*, 176 F. Supp. 219 (S.D. Tex. 1959) (upholding the Rule invalidated in *Perlman*).

[124] Memorandum of the Securities and Exchange Commission Amicus Curiae, *Greene* v. *Dietz*, 247 F.2d 689 (2d Cir. 1957); Memorandum of Securities and Exchange Commission Amicus Curiae, *Perlman* v. *Timberlake*, 172 F. Supp. 246 (S.D.N.Y. 1959). *See Perlitz* v. *Continental Oil*, 176 F. Supp. 219, 22 (S.D. Tex 1959).

[125] Recent Supreme Court decisions have emphasized the deference to be accorded agency rules. *See, e.g., Chevron U.S.A. Inc.* v. *Natural Resources Defense Council, Inc.*, 467 U.S. 837 (1984).

[126] Moreover, unlike the former rule, the rules adopted today require a minimum period of six months between a grant to an insider and a sale of the underlying equity security. The six month holding period is also applicable to grants of bonus stock, whereas the former rules permitted immediate sale of bonus stock granted under a Rule 16b–3 plan. See section IV.C, infra.

[127] The Commission argued in *Perlman* that since the exercise price was fixed at grant and the option was not exercisable for one year, the profit was necessarily long-term. 172 F. Supp. at 255.

[128] *See Report of the Presidential Task Force on Market Mechanisms* 55 (Jan. 1988) ("From an economic viewpoint, what have been traditionally seen as separate markets—the markets for stocks, stock index futures, and stock options—are in fact one market."); *see also* "Report of the Special Study of the Options Markets", United States Securities and Exchange Commission 82 (1978) ("Options can be used as a substitute for short-term stock trading * * *").

[129] Rule 16a–1(d).

derivative securities written by third parties, so long as they relate to and derive their value from the equity securities of the issuer, are within the definition as functionally equivalent instruments representing beneficial ownership of the underlying securities. To do otherwise would be to countenance the evasion of section 16(b) liabilities through the trading of standardized or third party options or other rights issued by a third party relating to equity securities of the issuer.

While a few commenters expressed a contrary view, the application of section 16(b) to third-party derivative securities is consistent with both the statutory purposes of section 16(b) and its language. Defining an equity security of the issuer to include derivative securities written by third parties is consistent with the language of the statute, both because those securities represent beneficial ownership of the underlying equity and because they are securities relating to that issuer.[130] The Supreme Court stated in *Reliance Electric Co.* v. *Emerson Electric Co.*,[131] "where alternative constructions of the terms of section 16(b) are possible, those terms are to be given the construction that best serves the congressional purpose of curbing short-swing speculation by corporate insiders." [132] The prophylactic purpose of section 16(b) would be vitiated by the reading suggested by commenters who took issue with the approach of the proposed rules.

Derivative securities are defined in the rules to include options and convertible securities, and similar rights whose value depends upon the value of the issuer's equity securities.[133] The definition has been clarified to exclude securities without a fixed exercise price.[134] Rights without a fixed exercise price do not provide an insider the same kind of opportunity for short-swing profit since the purchase price is not known in advance. The opportunity to lock in a profit begins when the exercise price is fixed; at that time, the right becomes a derivative security subject to section 16.

The rules [135] specifically exempt from the definition of derivative security: (1) A pledgee's interest in pledged securities, (2) the obligation to receive or surrender securities in a merger, (3) cash-only securities, such as phantom stock, awarded under an employee benefit plan satisfying the provisions of Rule 16b–3(c) or with a fixed date of redemption beyond six months from the date of acquisition,[136] (4) interests in broad-based index options, futures, and baskets, (5) employee benefit plan interests or plan rights of participation, and (6) rights with an exercise or conversion privilege at a price that is not fixed.[137] The first three exclusions from the definition are adopted as proposed. The fourth exclusion from the definition, relating to broad-based index options and futures, has been expanded to include broad-based publicly traded market baskets of underlying equity securities, provided the basket has been approved for trading by the appropriate federal governmental authority.[138] The fifth exclusion has been added to clarify that employee benefit plan interests, or rights to participate in an employee plan, are not derivative securities.[139] The sixth exclusion, as discussed above, makes it clear that a derivative security must have a fixed exercise price.

C. Call and Put Equivalent Positions

Under the rules, transactions in derivative securities are matchable; the rules use the terms "call equivalent position" and "put equivalent position" to define those transactions that may be viewed as purchases and sales, respectively, and therefore matchable. The definitions of "call equivalent position" [140] and "put equivalent position" [141] are adopted as proposed. Derivative securities have either a "call" feature, permitting the owner to acquire securities upon exercise, or a "put" feature, permitting the owner to dispose of securities upon exercise.

A person owning a call option or writing a put option [142] would benefit from an increase in the value of the underlying security, while a person owning a put option or writing a call option would benefit from a decrease in the value of the underlying security.

D. Acquisition of Derivative Securities

When an insider purchases a derivative security in the open market or in a negotiated transaction, or is granted a derivative security by the issuer, the opportunity to realize the short-swing profit begins. Thus the acquisition of a derivative security is a reportable event, whether or not the derivative security is presently exercisable.[143] Acquisitions of call derivative securities are matchable with any disposition of the related underlying security (or other call equivalent position related to the same class of underlying security) for purposes of short-swing profit recovery.[144] Likewise, acquisitions of put equivalent positions are matchable with any acquisition of the related underlying security (or any disposition of a put equivalent position related to the same class of underlying security).

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[130] Referring to the phrase "equity security of such issuer" in section 16, one commenter noted: "Since the word 'of' is part of the everyday language of men, resort should (be made) in the first instance to its significance in common usage. Defining the word 'of' to mean 'indicating the possessive relationship, otherwise expressed by the possessive case; belonging or pertaining to' not only eliminates the necessity for reading a basic English preposition as a legal term of art, but is altogether a more satisfactory means of effectuating the statutory purpose. The reading 'equity security *issued* by such issuer' looks only to the formalities attendant upon creation of the instrument, and in so doing eliminates from the scope of section 16(b) a whole class of instruments whose economic significance in the present day market is considerable. The reading 'equity security *pertaining to* such issuer' or even 'equity security *representing an interest in* such issuer,' on the other hand, looks to the nature of the legal relations evidenced by the instrument rather than to the technicalities attendant upon its creation, and in so doing comprehends the whole class of instruments subject to speculative abuse without requiring any artificial stretching of ordinary language." Michaely & Lee, *Put and Call Options under Section 16 of the Securities and Exchange Act of 1934*, 40 Notre Dame L. Rev. 239, 248 (1965) (footnotes omitted); *see* The Oxford English Dictionary 716 (2d ed. 1989) ("of" also means "relating to").

[131] 404 U.S. 418 (1972).

[132] *Id.* at 425; *see also Mendell* v. *Gollust*, 909 F.2d 724, 728 (2d Cir. 1990), *cert. granted*, 59 U.S.L.W 3460 (U.S. Jan. 7, 1991) (No. 90–659).

[133] Rule 16a–1(c). Included are novel securities, such as primes and scores, that provide an opportunity to profit from a price change in an underlying equity security.

[134] Rule 16a–1(c)(6). *See also* section III.D, *infra*. A convertible security with a fixed conversion privilege is deemed to have a fixed exercise price. A derivative security having a series of preset prices, or having a price that is adjusted to reflect pre-specified events such as a stock split, is considered fixed for purposes of the Rule. The adjustments for pre-specified events do not constitute acquisitions of additional equity securities.

[135] Rule 16a–1(c) (1)–(6).

[136] Rule 16a–1(c)(3). The rule adopted today codifies that death, disability, or termination of employment are deemed fixed dates of redemption, whether or not they occur within six months. In addition, a series of fixed dates of partial redemptions satisfies the requirement.

[137] These instruments exempted from the definition of derivative security would not be subject to the section 16 reporting or short-swing liability provisions.

[138] Rule 16a–1(c)(4). The treatment is the same as for broad-based baskets in determining beneficial ownership under section 16. *See* section II.B.2, *supra*. If a component security is traded independent of the basket, that transaction is subject to section 16.

[139] Rule 16a–1(c)(5). This excludes only rights to participate in a plan, not rights, options, or other derivative securities awarded under a plan.

[140] Rule 16a–1(b).

[141] Rule 16a–1(h).

[142] By "writing" an option, the writer, in return for a fee or premium, promises to buy or sell securities when the holder chooses to exercise the option.

[143] Rule 16a–4(a).

[144] Rule 16b–6(a). Acquisitions of put derivative securities mirror the acquisition of call derivative securities. Instead of a "purchase" occurring at acquisition, a "sale" occurs.

As noted above, a right to acquire an equity security with an exercise price that is not fixed is not deemed to be an equity security or derivative security subject to section 16.[145] The rules adopted today clarify that a right with a floating exercise price is not required to be reported and will not be deemed to be acquired or purchased, for section 16 purposes, until the purchase price of the underlying securities becomes fixed or established, which commonly occurs at exercise.[146] Thus, a right to purchase an equity security is deemed acquired as of the date the exercise or conversion price becomes fixed, and the acquisition, absent an exemption, would be matchable for section 16(b) purposes with a disposition within six months of the fixing of the price. For example, the acquisition of an option having an exercise price equal to 90 percent of the market price as of the date of exercise would be deemed to be a purchase of the underlying stock as of the date of exercise.[147] The receipt of such an option to purchase shares at a discount from the floating market price does not provide the same kind of opportunity for short-swing profit as a right with a fixed exercise price because the value relationship between the floating option and the underlying stock is a function of the issuer discount or subsidy, rather than capital appreciation.[148]

In the case of an option with a floating price that will become fixed as of an event or a specified date prior to exercise, the right is deemed to become a derivative security upon the fixing of the price, and is reportable as the acquisition of a derivative security. The rules have been modified to provide that if the timing of the event fixing the price is outside the control and knowledge of the holder, then the acquisition would be reportable on Form 4 as of the date of the event fixing the price, but would be exempt from section 16(b) matching with sales occurring before the fixing of the exercise price, but will not be exempt from section 16(b) matching with sales occurring thereafter.[149] Given the holder's lack of control over the timing of the fixing of the acquisition price, it would not be appropriate to put all sales at risk for the entire period, however long, prior to fixing of the price.

The exemption from section 16(b) for exercises of options does not apply to the exercise of out-of-the-money options, as discussed above, because there generally is no rational economic reason for such exercises. In response to commenters, however, the rule provides an exemption for out-of-the-money exercises necessary to satisfy the serial exercise requirement of the Internal Revenue Code, which requires insiders to exercise incentive stock options in the chronological order in which they were granted, even if they are out-of-the-money.[150]

E. Disposition of Derivative Securities

Dispositions of derivative securities are reportable events representing changes in beneficial ownership of the underlying securities, as well as in the derivative securities themselves, and are therefore subject to the short-swing profit recovery provisions of section 16(b). Dispositions of call derivative securities are matchable with any acquisition of related underlying securities (or other call equivalent position related to the same class of underlying securities). Likewise, dispositions of put equivalent positions are matchable with any disposition of related underlying securities (or call equivalent positions related to the same class of underlying securities). However, as under the former rules, the disposition of derivative securities in connection with an exercise or conversion is exempt from section 16(b), because it represents only a change in the form of beneficial ownership.[151]

1. Expiration of Derivative Securities

Rule 16b–6(d) exempts from section 16(b) the expiration or cancellation without value of a long derivative security. The Rule has been revised to make it clear that the expiration of short derivative securities positions may yield a profit which is subject to recovery under section 16(b).[152]

2. Options in a Merger

The exemption for option exercises as a result of a merger, contained in former Rule 16b–6(c), has been deleted as no longer necessary. The former rule was promulgated in response to concern that profit recovery under such circumstances would negate the accrued value of long-term options. An insider would be required to exercise the option, which was deemed a purchase under the former scheme, before surrendering the underlying securities into the merger. Without an exemption, the combination of the exercise and the surrender of the underlying securities would result automatically in a short-swing transaction subject to section 16(b). Under the rules adopted today, the exercise of the option is exempt if it is not out-of-the-money.[153] If the option was held six months before the merger, there would be no short-swing transaction for purposes of Section 16(b), assuming no matching purchase within six months.[154]

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[145] *See* section III.B, *supra*.

[146] Some issuers may grant options with an exercise price that is discounted from market price. The discount represents an issuer subsidy or matching contribution typically intended to act as an incentive for employees to purchase equity securities of the issuer. As a matter of policy, this matching contribution is not recoverable under section 16(b). A similar distinction is found in the Internal Revenue Code for options awarded under section 423 (26 U.S.C. 423 (1988)). For these statutory options, the discount is treated for tax purposes as issuer compensation and taxed as ordinary income, while the remainder of the profit derived from an increase in the value of the underlying stock is taxed as capital gains. *See* section 423(c) (26 U.S.C. 423(c) (1988)).

[147] Some stock purchase plans, such as plans satisfying section 423 of the Internal Revenue Code offer an ongoing right to purchase stock at the current market price or a discount from market such as 85 percent of market price. The rights or "options" tend to have a duration of six months or a year and operate through payroll deduction mechanisms. Although these plans offer a right to purchase underlying stock, the purchase price of the underlying security often is not fixed and therefore those rights without a fixed exercise price will not be treated as derivative securities until the purchase price is established, which occurs usually at exercise of the right. As such, only stock purchases will be reported, rather than the award of the right to participate. *See* section IV.C, *infra*.

[148] While an option to purchase stock at 90 percent of market value, for example, is more valuable as the price of the stock increases, the profit opportunity is different from a fixed price option. Therefore, for policy reasons floating price derivative securities have been treated differently. Assume Insider A is granted a fixed price option to purchase stock at the current market price of $100 per share. Insider B is granted a floating price option to purchase company stock at 90 percent of market value, $90 per share at the then current price. The initial value of Insider B's discount is $10 per share. If both insiders came into possession of inside information indicating that the stock price would rise to $150, Insider A would not need to do anything to benefit from the $50 price rise. Insider B, however, must exercise the option before the announcement of the inside information to profit a like amount. If Insider B did not exercise the option until the price had risen to $150, he would have to pay $135 a share, saving $15 per share (an increase of only $5 from the original discount of $10), while Insider A could profit $50 per share, even though he did not exercise his option prior to the announcement. As the example illustrates, the primary potential for abuse arises at the time of exercise for a floating price derivative security because only at exercise is the price fixed and, therefore, the extent of the profit opportunity defined. By treating the exercise of the floating price derivative security as the "acquisition" of the underlying security, the rules mitigate the incentives for insiders to abuse their informational advantage.

[149] Rule 16b–6(a).

[150] Rule 16b–6(b); I.R.C. 422(b)(7) (26 U.S.C. 422(b)(7) (1988)). This rule was deleted in 1986 with respect to options awarded after January 1, 1987.

[151] Rule 16b–6(b). Although the derivative security is surrendered, this is simply a procedural step necessary to receive the underlying securities. There is no change in profit potential, as the profit potential relates to the underlying securities.

[152] Rule 16b–6(d).

[153] Rule 16b–6(b).

[154] Former Rule 16b–6(c) provided an express exemption for dispositions of securities underlying

Continued

3. Determination of Profit

The profit calculation standard for transactions in derivative securities is adopted as reproposed.[155] The Rule provides guidance to the courts and issuers seeking settlements with insiders, but permits consideration of other equitable factors in determining profits. If the same security is purchased and sold, the recovery would be the profit received. For transactions involving different types of equity securities, under the standard adopted today, the maximum short-swing profit recovery is the difference in market value of the underlying security between the date of purchase and the date of sale. If an insider can demonstrate that the amount of profit was less, then a court can order a lesser recovery.[156]

IV. Employee Benefit Plan Transactions

The substantive revisions to Rule 16b-3 [157] have been adopted substantially as reproposed, except that the shareholder approval requirement and the one year period of non-participation for disinterested administrators of the former rules have been retained. In addition, the Rule has been reorganized to clarify its application to acquisitions under grant plans and to employee-directed transactions under 401(k) and other thrift and similar plans.

Employee benefit plans, the subject of Rule 16b-3, have been a traditional vehicle through which employers have compensated and provided incentives to their employees. Since many plans provide for grants or awards at least every 12 months, if there were no acquisition exemption, any sale of any equity security by participating officers or directors would necessarily occur within six months before or after an acquisition, and therefore result in short-swing liability. Rule 16b-3 is intended to provide relief from this frustration of the legitimate use of employee benefit plans as a method of executive compensation, where the nature of the transaction and the safeguards imposed by the rule minimize the potential for abuse.[158] Recognizing the interests of companies in providing employee benefit plans for their officers and directors, the Commission historically has sought to establish "conditions * * * designed to preclude the unfair use of information which may have been obtained by an officer or director by reason of his relationship to the issuer" in order "to delineate situations in which (an employee benefit plan) transaction (is) not comprehended within the purpose of section 16(b)." [159]

The Rule as adopted divides plan transactions into two principal categories—grant and award transactions and participant-directed transactions.[160] Two conditions apply across-the-board to all plan transactions involving employer securities.[161] First, the transaction must be pursuant to a written plan. Second, the plan or a written agreement must require derivative securities to be non-transferable, with limited exceptions discussed below.

As proposed, the rule would have deleted the requirement that employee benefit plans and material plan amendments be approved by shareholders as a condition to exemption. The Rule as adopted retains the requirement for those employee benefit plans of the types subject to the shareholder approval requirement under the former Rule.[162] Thus, shareholder approval continues to apply to most grant and award plans and, as more fully discussed below, to participant-directed plans that would not have been eligible for exemption under former Rule 16a-8.

Additional conditions, which must be met for the transaction to qualify for exemption from section 16(b), vary depending on whether the transaction is a grant or award of securities (such as options or bonus stock) to the insider, or an insider-directed transaction, which commonly occurs in thrift or similar plans through payroll deduction.

To be exempt, in addition to satisfying the general conditions for exemption and the shareholder approval requirement, grants or awards of securities to insiders must be made pursuant to a plan in which either a disinterested committee of directors makes all substantive decisions regarding timing, eligibility, pricing and amount of awards, or an automatic formula specifies those terms.[163] These conditions are designed to preclude the insider from influencing the time, terms or amount of the grant of securities, so as to take advantage of inside information. In addition, all grants or awards now are subject to a six month holding period from the time of the grant by the company. Thus, for example, an insider cannot sell bonus stock within six months of its grant, or sell securities received upon exercise of an option within six months of the option grant, without losing the exemption for the acquisition and becoming subject to the short-swing profit recovery provisions of section 16(b).[164]

The conditions applicable to transactions in plans that permit participants to make investment elections, such as thrift or savings plans [165] ("participant-directed transactions"), primarily entail restrictions upon the timing of elections to acquire or dispose of equity securities held in the participant's plan account.[166] These restrictions are designed to assure that the transaction is part of a plan that permits only ongoing or other routine transactions, where the opportunity for abuse is limited because elections are not changed on a short-term basis.

Rule 16b-3, as adopted, continues to provide an exemption for cash settlements of stock appreciation rights ("SARs") satisfying the conditions of the former rule, including the requirements of shareholder approval and disinterested administration, and that elections generally be made in specified quarterly window periods.[167]

options pursuant to a merger where the options were held for six months, as well as an implied exemption for the exercise in certain cases. While the rules adopted today would not provide an exemption for the disposition of the underlying securities, the exemption adopted for exercises should protect long-term accretion in the value of options from short-swing profit recovery as a result of a merger by providing an exemption for the acquisition of the underlying stock.

[155] Rule 16b-6(c).

[156] For example, the insider could demonstrate that part of the "profit" represented issuer matching contributions or subsidies that should not be recoverable.

[157] 17 CFR 240.16b-3, originally adopted in 1935.

[158] *See, e.g.*, Exchange Act Release No. 13097 (Dec. 22, 1976) (42 FR 754).

[159] Exchange Act Release No. 12374, 9 SEC Dock. 487, 488-489 (April 23, 1976) (41 FR 19983).

[160] The revisions make it clear that, as intended, the conditions of the rule need be satisfied only with respect to participation by insiders subject to section 16 and not other employee plan participants. Of course, plans with no insider participants need not comply with Rule 16b-3.

[161] Rule 16b-3(a).

[162] Rule 16b-3(b).

[163] Rule 16b-3(c).

[164] Securities other than those granted may be sold within the six months after an exempt grant. If the grant loses its exemption because of the sale of the bonus stock or the option stock within six months, the sales of other stock may be matchable with the grant. In these cases, the insider must report the original grant on a Form 4 as if the grant had occurred during the month the exemption was lost, unless the grant had been reported earlier. If the Form 4 is filed within ten days of the end of the month in which the exemption was lost, the transaction will not be deemed reported late under section 16(a). Therefore, insiders are encouraged to provide an explanation as to why the grant is being reported on a Form 4.

[165] These plans generally include section 401(k) plans. I.R.C. 401(k).

[166] Rule 16b-3(d).

[167] Rule 16b-3(e).

Consistent with the former rule, the rule also requires a six month holding period. Further, the exemptions for specified dispositions of plan securities to the issuer, such as cancellations and redemptions, are retained substantially as provided in the former and proposed rules, along with an exemption for dispositions pursuant to qualified domestic relations orders.[168] Finally, consistent with the former rules, the Rule has been revised from the reproposal to exempt all distributions to the participants from a Rule 16b-3 plan.[169]

The restructured rule is discussed in more detail below.[170]

A. General Exemptive Conditions of Rule 16b-3

Rule 16b-3 as adopted today establishes two general conditions, a shareholder approval condition, and additional transaction-specific conditions necessary for a transaction pursuant to an employee benefit plan to be exempt from section 16(b).[171] The rule requires that transactions be pursuant to a written plan specifying the basis for determining eligibility and either the price and amount of securities to be awarded or the method by which the price and amount are to be determined.[172] The plan or a written agreement also must provide that derivative securities are not transferable other than by will or the laws of descent and distribution.[173] This latter condition is similar to the condition imposed on incentive stock options under the Internal Revenue Code [174] and has been a condition of the Rule 16b-3 exemption since 1952.[175] At the suggestion of commenters, the rule adopted today also permits transfers pursuant to qualified domestic relations orders.[176]

B. Shareholder Approval

Upon reconsideration, the Commission has determined to retain the former shareholder approval condition in Rule 16b-3. This requirement was proposed to be deleted in favor of other safeguards against section 16(b) abuse, but concerned shareholders, commenting on the proposals, urged that shareholders have an interest in not only the level of compensation, but that compensation be designed to enhance the longer term horizons of management.[177] The adopted requirement parallels the former requirement, and thus plans that were not subject to the shareholder approval requirement under the former rules are not subject to shareholder approval under the new rules. There are two types of such plans, both established as trusts. First, plan trusts containing issuer securities where less than 20 percent of the securities are held by insiders are excluded.[178] Second, pension and retirement plan trusts that have broad-based employee participation are excluded.[179] The overall effect of these two exemptions is to carry forward the current scope of the shareholder approval requirement; most grant and award plans will be subject to the shareholder approval requirement, and many participant-directed plans will qualify for exemption from the requirement because of the manner in which they are structured.

C. Grant or Award Transactions

1. Disinterested Director Provision or Formula

In addition to meeting the general exemptive conditions of Rule 16b-3 and the shareholder approval requirement, grants and awards of equity securities under an employee benefit plan must be made by a committee of two or more disinterested directors [180] or pursuant to a specific formula.[181] As under the reproposal, the disinterested administration requirement has been strengthened by requiring that award decisions be made by directors, who have fiduciary responsibilities to the company and shareholders. Upon reconsideration, the reproposal to extend the prohibition against administrators participating in any plan of the issuer to one year following such service is not deemed necessary and has not been adopted. Instead, the former requirement prohibiting participation for one year prior to serving as an administrator is retained. The Rule adopted today provides that it is a director's actual participation in a plan, rather than the eligibility of a director to participate, that affects his or her disinterested status.[182]

Where an insider participating in an employee stock bonus or option plan can exercise discretion in determining either the amount of securities that may be acquired or other material terms of awards to the insider, the award is treated as a volitional acquisition, just like an open market purchase. If such an acquisition is preceded or followed by a matchable sale of a security within the statutory six-month period, any short-swing profit is recoverable. The disinterested administration requirement of Rule 16b-3 is designed to prevent insiders from having, directly or indirectly, any control over the terms of their own awards, and therefore removes the ability of the insiders to time their acquisitions under the plan to take advantage of inside information. It also provides assurance that plan administrators cannot be influenced by their own expectation of awards in plans of the issuer and accordingly shields them from any potential pressure from insiders to act in a less than independent fashion.

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[168] Rule 16b-3(f). The rule has been reorganized to specify all exempt plan dispositions in one paragraph.

[169] Rule 16b-3(g).

[170] Issuers and plan participants may continue to rely upon prior interpretive letters with respect to grants and transactions in existing rule 16b-3 plans until the Rules adopted today apply. *See* section VII.C, *infra*. When the issuer becomes subject to new Rule 16b-3, interpretive letters inconsistent with new Rule 16b-3 may not be relied upon for subsequent transactions under such plans.

[171] Transactions exempt under Rule 16b-3 will be reported on Form 5 (or, at the option of the reporting person, on a Form 4 filed before the due date of Form 5). *See* section II.C, *supra*.

[172] Rule 16b-3(a)(1).

[173] Rule 16b-3(a)(2). The Rule makes it clear that, in accordance with current interpretation, a written beneficiary designation is not a transfer. *See H.F. Ahmanson & Co.* (August 28, 1989).

[174] I.R.C. 422A.

[175] *See* Exchange Act Release No. 4754 (Sept. 24, 1952) (17 FR 8901).

[176] I.R.C. 401(a)(13) (26 U.S.C. 401(a)(13) (1988)) prohibits assignment or alienation of qualified trust interests, but provides an exception for transfers pursuant to qualified domestic relations orders. *See* I.R.C. 414(p) (26 U.S.C. 414(p) (1988)). Commenters suggested a similar exception for Rule 16b-3(a)(2). These transfers would be an exception to the Rule 16b-3 restrictions on transferability of derivative securities, even if the plan is not subject to section 401(a)(13), and an exemption from section 16(b) is provided for such transactions pursuant to Rule 16b-3(e)(3). *See Abbe* v. *Goss*, 411 F. Supp. 923 (S.D.N.Y. 1975) (court found an exemption for an acquisition pursuant to a divorce decree).

[177] It should be noted that companies may be required to seek shareholder approval for their benefit plans pursuant to state law or the rules of self-regulatory organizations. *See, e.g.*, N.Y. Bus. Corp. Law section 505(d); NYSE Company Manual section 312.

[178] These plans were exempt under former Rule 16a-8(b) (17 CFR 240.16a-8(b)). The phrase used in that rule, "consists of equity securities with respect to which reports would otherwise be required" has been replaced with "consists of equity securities held by persons subject to section 16(a) of the Act," which comports with the manner in which the former Rule was interpreted.

[179] These plans were exempt under former Rule 16a-8(g)(3) (17 CFR 240.16a-8(g)(3)). The phrase used in that Rule, "whose employees generally are the beneficiaries of the plan," has been replaced with "providing for broad-based employee participation," which comports with the manner in which the former rule was interpreted and is the same phrase used in Rule 16b-3(d)(2)(i)(A), discussed *infra*.

[180] Grants and awards also may be made by the entire Board of Directors, if all the members are disinterested persons.

[181] Rule 16b-3(c).

[182] Rule 16b-3(c). For greater clarity, the definition of "disinterested person" has been combined with the disinterested administration requirement.

As under former Rule 16b–3, where a grant of bonus stock or the award of derivative securities meets the conditions of the new Rule, and thus is not within the control of the insider, that non-volitional transaction is an exempt purchase. Since the substantive decisions concerning the grant are made by disinterested administrators, the grant transaction is not one that the insider can cause in order to take advantage of inside information unfairly to effect a short-swing transaction. Awards of derivative securities meeting the Rule 16b–3 conditions are subject to the same conditions for exemption as grants of bonus stock, since the new rules treat derivative securities as a form of beneficial ownership of the underlying equity securities.[183]

In response to comments, the disinterested administration requirement specifies several exceptions consistent with current staff interpretation. The Rule makes it clear that a director's disinterested status is not affected by participation in either a formula plan, automatic in operation,[184] or a broad-based participant-directed plan such as an employee thrift plan.[185] The Rule specifically provides that a director may choose between cash or an equivalent amount of issuer equity securities in lieu of the director's annual retainer fee or meeting fee without affecting the director's disinterested status.[186] Finally, as provided under former Rule 16b–3, a director of the issuer is disinterested for purposes of administering plans that are not open to directors.[187]

The rule provides that a formula may be used as an alternative to disinterested administration, or it may be used in tandem with decisions made by disinterested administrators.[188] Such formulas serve as a substitute for the disinterested administration requirement by automatically establishing the terms of awards. As with the disinterested administration condition, the rule as adopted strengthens the safeguards associated with use of a formula by requiring greater specificity concerning award terms than is currently required. The amount, price and timing of awards to individuals or classes of employees must be set forth in the plan or automatically determined by the formula.

2. Six Month Holding Period

The rule, adopted as reproposed, also conditions the exemption for grants or awards of bonus stock and derivative securities under an employee benefit plan on a six month holding period. If an insider fails to adhere to this condition, and sells the securities within the six month period, the Rule 16b–3 exemption for the grant or award of the stock or derivative security is lost and the sale is matchable with the grant or award transaction, or other non-exempt acquisitions, for purposes of section 16(b) short-swing profit recovery. The six month holding period provides an additional safeguard against short-swing transactions.

A total of six months must elapse between the grant of the derivative securities and the sale of the securities underlying those derivative securities; the timing of the exercise does not affect the six month period. Of course, if the exercise occurs when the option is out-of-the-money, the exercise would not be exempt, and would be matchable with any sales of equity securities within six months before or after the exercise. The out-of-the-money exercise will not affect the exempt status of the grant.

3. Treatment of Restricted Stock and Discount Stock

Under the new Rule, the date of a grant or award is the date of acquisition; if the acquisition is exempt pursuant to Rule 16b–3, it would be reported on a deferred basis on Form 5, or may be reported earlier on Form 4. Consistent with prior interpretation, the acquisition of restricted stock containing vesting or forfeiture provisions likewise is deemed to occur as of the date of grant even if not vested or subject to risk of forfeiture.[189] If the stock is forfeited, the forfeiture would be reported on Form 5 (or earlier, on Form 4, at the option of the insider) as a cancellation without value received. The vesting of the stock or the lapse of a forfeiture provision is not a reportable event for purposes of section 16.[190]

Interpretive questions have been raised concerning the treatment of discount or "cheap" stock grants.[191] Cheap stock is treated the same as any other right to purchase equity securities. Therefore, awards with a fixed exercise price, such as par value, will be treated as the award of a derivative security.[192] However, grants or awards of cheap stock or rights having a floating exercise price at a discount, such as a price related to a percentage of market value of the underlying equity security on the date of exercise, are deemed to involve acquisitions of neither derivative securities nor equity securities.[193] Thus, a grant of these rights is not a section 16 event. Commenters, however, were uncertain about the application of the new rules to the exercise of such rights. The rule, as adopted, clarifies that an insider is deemed to acquire the underlying equity securities, for purposes of Section 16(b), when the exercise price of an option or right with a floating exercise price is fixed.[194] In the case of cheap stock with a floating price, or other rights with a floating price, this usually occurs at exercise. Thus, the six month holding period begins at exercise. If the grant of the right satisfied the conditions of the grant or award exemption of the Rule, the acquisition of the underlying equity securities would be treated as an award of an equity security at the time of exercise and would be exempt from section 16(b), subject to satisfaction of the holding period.

D. Participant-Directed Transactions

The Rule as reproposed provided four exemptions for transactions in participant-directed plans. These exemptions have been restructured for clarity and modified to address commenters' concerns that a literal reading of the conditions as reproposed would render the exemptions unavailable to 401(k) plans and other similar stock purchase plans. In particular, commenters were concerned that the reproposed requirement that the plan be a retirement or pension plan could be read to preclude thrift plans from qualifying because they provide for in-service withdrawals. Concern was also raised that the reproposed requirement that the plan be open to all employees was too restrictive, because there may be separate classes of

[183] See section III.A, *supra*.

[184] Rule 16b–3(c)(2)(i)(A).

[185] Rule 16b–3(c)(2)(i)(B).

[186] Rule 16b–3(c)(2)(i)(C). The rules adopted today do not distinguish between the director's ability to choose between stock, options, or cash for purposes of determining disinterested status. Thus, staff interpretive letters such as *SPS Technologies, Inc.* (June 1, 1988) no longer will apply.

[187] Rule 16b–3(c)(2)(i)(D).

[188] Rule 16b–3(c)(2).

[189] *See, e.g., UJB Financial Corp.* (Jan. 30, 1990).

[190] A note has been added to the Rule to reflect this position.

[191] "Cheap" stock is a right to purchase stock at a deep discount.

[192] Because the exercise is exempt under Rule 16b–6(b), there is no longer a need for separate interpretive relief for cheap stock. *See* Release No. 34–18114 Q.68(e).

[193] Rule 16a–1(c)(6). *See* sections III.A and III.D, *supra*, for a discussion of rights with a floating exercise price. Section IV.D, *infra*, addresses rights with floating exercise prices granted in the context of a participant-directed plan.

[194] Rule 16b–3(c)(3).

employees who do not participate in thrift plans, such as union employees who may receive different pension benefits pursuant to a collective bargaining agreement. The Commission did not intend to change the current exempt status of transactions in 401(k) plans or other broad-based thrift plans under Rule 16b–3, and has modified the rule to avoid such a result.

As adopted, the rule exempts specified transactions within any participant-directed plan of an issuer,[195] where the plan satisfies the general exemptive conditions of the Rule and has been approved by shareholders, where required, and the participant-directed transaction satisfies one of four additional sets of conditions of the rule discussed below. Shareholder approval is retained as a condition for those participant-directed plans that were subject to the condition under former Rule 16b–3 because they could not satisfy the conditions of former Rule 16a–8. Those plans would include director plans where the insider can choose periodically between cash and securities in lieu of an annual retainer.

The first two exemptions are available for transactions in any participant-directed plan.[196] If either condition is met and the plan qualifies under Rule 16b–3, the transaction is exempt. First, transactions in such a plan are exempt when the participant's election is made at least six months in advance of its effective date, *i.e.*, six months prior to any purchase of the securities under the plan.[197] Second, an exemption is provided for transactions conducted by terminated, retired, or disabled employees, or on behalf of deceased employees, to settle their plan accounts, because the timing of these events is not likely to present the opportunities for abuse that section 16 addresses.[198] This exemption, as adopted, differs from the reproposal by the inclusion of a death and retirement provision, and by providing that the exempt transaction can occur on the date of termination or retirement rather than being deferred for six months after election.

In contrast to the first two exemptions, the third and fourth exemptions are available only for participant-directed transactions relating to a thrift, pension, retirement, or other ongoing stock purchase plan.[199] These exemptions are provided for transactions undertaken as a result of an election to participate or to change participation levels and for intra-plan transfers.

The third exemption provides that the initial and periodic purchase transactions resulting from an election to participate or an election to change levels of participation [200] under a plan satisfying general exemptive conditions of the rule and the shareholder approval condition (where applicable) are exempt if four safeguards are met to assure that plan transactions are ongoing and routine.

First, the plan must be broad-based and not discriminate in favor of highly compensated employees.[201] This limits the exemption to routine plans where wide participation and equal treatment of all participating employees limits insiders' opportunities to engage in short-swing speculation.

Second, purchases under the plan within six months before an insider participant's withdrawal of plan securities (other than pursuant to a qualified domestic relations order, or at death, retirement, disability or termination) will lose their exempt status unless: (i) Following withdrawal, the insider ceases purchases of securities under the plan for six months, or (ii) the securities so distributed are held by the participant for six months before disposition.[202] This safeguard imposes a penalty on early withdrawal by insider participants to discourage non-periodic transactions generating short-swing profit and serves to encourage long-term investment strategies.[203]

Third, similar to the second safeguard, insider participants electing to cease participation in a plan may not renew participation for six months.[204] This penalty is likewise intended to discourage insiders from using a plan to make purchases on a one-shot or episodic, rather than on an ongoing, routine, basis.

The fourth safeguard is applicable to stock purchase plans, such as section 423 plans,[205] where the rights have floating exercise prices and there is no obligation to purchase the stock until the date of exercise or purchase. For such plans, the underlying securities must be held six months from the date the exercise or purchase price is determined.[206] Since rights to purchase stock at a price that floats with the market price provide different opportunities for abuse, the six month holding period requirement commencing at the date the price is fixed prevents insiders from profiting in a short-swing manner by selling the underlying stock

[195] Rule 16b–3(d). The exemption does not apply to transactions in self-directed individual retirement accounts.

[196] Rule 16b–3(d)(1).

[197] Rule 16b–3(d)(1)(i). For example, insiders could elect to receive options or other securities in lieu of their annual retainer fee. As long as the election occurred at least six months prior to the implementation of the election, and was irrevocable, the acquisition would be exempt from section 16(b).

[198] Rule 16b–3(d)(1)(ii).

[199] Rule 16b–3(d)(2). These exemptions are not available for participant-directed plans that are not ongoing in nature; for example, certain deferred compensation plans and director-only plans permit a choice between securities and cash on a one-time rather than a periodic basis. Such plans should instead look to the exemption in Rule 16b–3(d)(1)(i).

[200] A note to the rule clarifies the application of section 16 to investment elections and the resulting transactions. The elections are not subject to section 16 and therefore would not be reported. If not exempt from section 16(b), the transactions resulting from the election would be reportable on Form 4; otherwise they would be reportable voluntarily on Form 4 or as required on Form 5.

[201] Rule 16b–3(d)(2)(i)(A). The broad-based and anti-discrimination conditions replace the reproposed requirement that the plan be open to all employees. A plan satisfying the conditions of I.R.C. 410(b) (26 U.S.C. 410(b) (1988)) would satisfy the requirement for broad-based employee participation. The plan cannot be a "top hat" plan or limited to insiders, but must include other classes of employees. The anti-discrimination requirement is similar to I.R.C. 401(a)(4) (26 U.S.C. 401(a)(4) (1988)), and a plan satisfying I.R.C. 401(a)(4) will satisfy this condition. It is not deemed discriminatory to base contributions or benefits on a percentage of salary.

[202] Rule 16b–3(d)(2)(i)(B).

[203] The reproposals would have required that in-service withdrawals be accompanied by "significant penalties," without further specification. Because of commenters' concerns as to what would constitute an adequate penalty, the rule, as adopted, provides two alternative penalties to accommodate different types of plans. For example, since many stock purchase plans are not retirement plans, the securities often are distributed automatically on a periodic basis. For these plans, it may be more appropriate and practical to permit participants to elect a six month holding period. On the other hand, in the case of thrift plans, distributions often are made as a result of an economic hardship, and a six month holding period requirement could defeat the purpose of the withdrawal, but the six month ban from participation serves as an alternate safeguard.

The rule as adopted also exempts extraordinary distributions of all of the issuer's securities held by the plan to participants, so that distributions resulting from cessation of the plan or transfer of plan assets will not be subject to the same restrictions as routine withdrawals.

[204] Rule 16b–3(d)(2)(i)(C). The decision to cease participation or decrease participation is neither a purchase nor sale that requires an exemption from section 16, but the restrictions upon such decisions are a condition to exemption for the ongoing purchases.

[205] I.R.C. 423.

[206] Rule 16b–3(d)(2)(i)(D). Unlike thrift plans, participants in section 423 plans generally do not purchase securities until the end of an "option period" of six months to a year, often at a discount such as 85 percent of market value. Participants commonly have the ability, until the last day of the option period, to change their election to participate in the plan and receive a refund of all monies withheld. If the plan, however, establishes a fixed purchase price, rather than a floating price, or does not permit the participant to cancel plan purchases retroactively, the six month holding period requirement is inapplicable.

received from such rights within six months.

The fourth and final participant-directed plan exemption covers acquisitions of employee securities or dispositions of such securities in connection with transfers among funds within a thrift plan, where the intra-plan transactions occur during a quarterly ten-day window period beginning on the third day after release of the issuer's quarterly financial information, if the insider has not within the prior six months made an election to effect an intra-plan transaction involving the issuer's securities.[207] Thus, an insider could make an intra-plan transfer during one of four window periods as long as there is only one election per six month period, or two window periods in a year. These window periods coincide with the release of the issuer's quarterly financial reports, which serves as a safeguard against the insider having material information that the public does not have. The six month period is designed to prevent an insider from electing to purchase issuer securities by participating in an employer securities fund and then electing to sell such securities by transferring out of the fund within six months, or vice versa.

E. Stock Appreciation Rights

SARs that may be settled only for cash, where either the award satisfied the conditions of Rule 16b–3(c) or the cash-only SAR may be redeemed or exercised only upon a fixed date of redemption at least six months after award, or upon death, retirement, disability or termination of employment, are not deemed to be derivative securities and are exempt from section 16.[208] In contrast, SARs settled for stock are derivative securities and are accorded the same treatment as options.[209] SARs that can be settled in either cash or stock, but are settled in cash, are treated as an exercise of an option (generally an exempt transaction) and the simultaneous sale of the underlying stock.[210] If the cash settlement satisfies the conditions of the safe harbor, the sale upon the receipt of cash is exempt from section 16(b). The rule continues to impose conditions of shareholder approval, issuer information availability, disinterested administration, exercise of the SAR only during a window period except in specified situations,[211] and a six month holding period from the acquisition of the right to the date of the cash settlement.[212]

Apart from traditional SARs, other securities or rights related to the securities have been deemed SARs under current staff interpretation where there is a right to receive cash in return for the surrender of the right or securities. For example, the right to surrender securities to satisfy tax withholding consequences of an option exercise is deemed an SAR equivalent.[213] A right that, by its terms, affords an opportunity to receive cash related to an appreciation in the value of the underlying equity securities will be treated as an SAR, but other derivative securities or underlying equity securities that do not have a cash component will not be so treated. The ability to receive cash in certain circumstances, such as a change of control, creates a cash component similar to a grant of an SAR. The addition of a cash component must satisfy the conditions of Rule 16b–3 for exemption.[214]

F. Cancellations, Expirations, Surrenders, and Qualified Domestic Relations Orders

Historically, Rule 16b–3 has provided an exemption for specified dispositions of plan securities, including cancellations and expirations. The proposals provided similar exemptions. The reproposals added a condition for exemption that the cancellation, expiration, or surrender must not be accompanied by the receipt of consideration. Concern was expressed that a cancellation of an option accompanied by a grant of a new option would not be exempt. As a result, the Rule adopted today provides a specific exemption for cancellations attendant on grants of replacement options.[215] Additionally, an exemption for a disposition of plan securities pursuant to a qualified domestic relation order has been added.[216]

G. Distributions From a Plan

The rule adopted today makes it clear that the exemption for distributions applies to participant-directed plans as well as distributions from grant or award plans if the conditions of the rule are satisfied.[217] Since securities are deemed purchased when acquired under the plan, distributions from a plan simply represent a change from indirect to direct ownership. Thus, it is appropriate to apply the exemption to distributions from either type of plan.[218] The exemption applies only to distributions of equity securities, not cash payments in lieu of the equity security. If, for example, the insider surrenders 500 shares of stock in his or her account to the issuer for cash, the receipt of cash would be deemed a sale of the 500 shares for purposes of section 16.[219]

V. Other Rules

A. Pro Rata Rights, Stock Splits and Stock Dividends

In response to comment received, the reproposed rule exempting the pro rata

[207] Rule 16b–3(d)(2)(ii); *see also* Rule 16b–3(e)(3). Although this exemption imports the window period requirements of the SAR exemption, participant-directed intra-plan transactions present different opportunities for abuse and, therefore, the staff interpretations concerning a change of control exemption from the window period requirement of the SAR safe harbor do not necessarily apply.

[208] Rule 16a–1(c)(3). Since traditional phantom stock is settled solely in cash, and has a long term fixed date of redemption, such phantom stock is not a derivative security and is outside the scope of section 16, and consequently is not required to be reported. *See* section III.B, *supra*.

[209] Just as with other derivative securities, any SAR that may be settled for stock, or cash and stock, would be reported at grant and eligible for the exercise exemption of Rule 16b–6(b).

[210] Likewise, an SAR granted in tandem with a stock option, such that the exercise of one automatically cancels the other, will be treated the same as an SAR that can be settled either in cash or stock. The fact that the SAR granted in tandem with a stock option can be settled only in cash and otherwise could satisfy the exclusion of Rule 16a–1(c)(3) if it were granted alone does not change the analysis.

[211] The election to exercise the SAR for cash, or to withhold shares underlying an option to satisfy tax withholding requirements, must be made during this quarterly window period, or the election may be made in advance but take effect as of the next window period.

[212] Rule 16b–3(e). One of the conditions of the safe harbor is that the issuer releases information on a regular basis. Rule 16b–3(e)(1)(ii) has been modified to make it clear that a press release is sufficient, whether or not it results in actual publication.

[213] *Id.* An exercise of an option can be a taxable event under the Internal Revenue Code. Many plans permit option holders to surrender some of the stock that would be received upon exercise to satisfy the withholding tax requirement. This choice is similar to a cash settlement feature of an SAR and has been treated as such. *See, e.g., Morgan Stanley Group, Inc.* (June 22, 1990). This interpretation has been codified in the rule.

[214] Staff interpretive letters issued under the former rules inconsistent with this position may not be relied upon for transactions occurring after the effective date of the new rules. *See, e.g., Warner-Lambert Co.* (Feb. 6, 1990) (cash component added to restricted stock immediately prior to change of control treated as an SAR without new six month holding period requirement).

[215] Rule 16b–3(f)(1). Cancellations without value received are no longer addressed in Rule 16b–3 because they are exempt under the general derivative securities rule, Rule 16b–6(d).

[216] Rule 16b–3(f)(3).

[217] Rule 16b–3(g).

[218] The reproposed requirement that past acquisitions be reported prior to or contemporaneously with the distribution has been deleted as unnecessary.

[219] Cash distributions from a plan fund or account unrelated to equity securities of the issuer are not subject to section 16. Thus, if an insider withdraws cash from his or her interest in the plan's money market fund, this event would be neither a purchase nor a sale for purposes of section 16.

grant of subscription rights has been modified to include an exemption for the acquisition of pro rata grants of rights to all holders of a class of equity securities registered under section 12 of the Exchange Act.[220] As commenters pointed out, there is no reason under section 16 to distinguish subscription rights from other rights, such as a repurchase right or "poison pill," that are awarded pro rata to all holders of the underlying equity security registered under section 12, since the opportunity for the abuse addressed by section 16 is limited where all shareholders are treated equally. When subscription or similar rights are exercised, the transaction is treated as the exercise of a derivative security and is reported accordingly.[221]

The rules as proposed would have exempted stock splits and stock dividends from section 16(b) but would have required the transaction to be reported on Form 5. The Commission has concluded that neither section 16 reporting nor short-swing liability should apply to stock splits, stock dividends, or grants of rights where the grants are provided pro rata to all security holders, as these are non-discretionary transactions, and do not present the opportunity for abuse intended to be addressed by section 16. Information regarding stock splits and stock dividends is readily available to the public through issuer press releases and periodic Commission filings. Accordingly, the exemption provides both a reporting and short-swing profit recovery exemption for pro rata awards such as subscription rights or shareholder rights, as well as changes in the number of equity securities owned pursuant to pro rata stock splits and stock dividends. Should the holdings of an insider change as a result of such events, the insider may note the reason for the change in the space provided on the Form 4 or Form 5.[222]

B. Canadian Issuers

The reproposals contained an exemption for reporting persons of Canadian issuers. The Commission has determined not to adopt the exemption at this time. The matter will be considered in connection with the Commission's proposed multijurisdictional disclosure system.[223]

C. Owner of Any Security of the Issuer

The Commission continues to believe that a shareholder does not lose standing to sue under section 16(b) by virtue of the fact that, as a result of a business combination transaction, the shareholder is divested of ownership of shares in the company in whose securities the short-swing profits are alleged to have been made.[224] However, in light of the fact that the Supreme Court has granted certiorari in the case of *Mendell* v. *Gollust*, the Commission has determined not to adopt the proposed definition of "owner of any security of the issuer" [225] at this time.

D. Section 16(d)—Market Makers

The Commission also has determined not to adopt proposed Rule 16d–1 at this time. Prior interpretations and no-action letters under section 16(d) remain in effect.

In addition, questions have been raised concerning the applicability of section 16(d) to transactions on a national securities exchange that are incident to over-the-counter market making activities. Persons making a market on a national securities exchange are not eligible for the section 16(d) exemption. However, section 16(d) has been interpreted by the staff to exempt purchases and sales of closed-end fund shares by an affiliated market maker for its trading account even though the shares may be purchased on a national securities exchange, if the transactions occur in the ordinary course of business for the purpose of maintaining a foreign over-the-counter market for the securities and the purchases and sales are in response to actual or anticipated demand of its customers in the foreign market.[226] This interpretation is extended to transactions, even those made on a national securities exchange, that are incident to the establishment or maintenance of a domestic or foreign over-the-counter market, provided that the transactions are in the ordinary course of the dealer's business in providing liquidity in the over-the-counter market and the securities purchased on a national securities exchange are held in the dealer's trading account to be used solely for providing liquidity and not for investment.

VI. Compliance With Section 16(a)

A. Delinquent Reporting Under Section 16(a)

Compliance with section 16(a) continues to be a problem,[227] despite publicly expressed Commission concern, continued enforcement actions against delinquent filers, and recent legislation that permits the Commission to seek fines for section 16(a) violations.[228] Although the percentage of delinquencies has decreased in the past two years, it continues to be unacceptably high.

B. Item 405 of Regulation S–K

To address the non-compliance problem, Item 405 of Regulation S–K adopted today requires a registrant [229] to disclose in proxy and information statements, Form 10–K reports, and Form N–SAR reports information regarding delinquent section 16 filings by insiders.[230] A registrant must identify by name its insiders who, during the fiscal year, reported transactions late or failed to file required reports, and must disclose the number of delinquent filings and

[220] Rule 16a–9. This rule replaces proposed Rules 16b–2 and 16b–10.

[221] With the deletion of the separate Rule 16b–2 exemption for subscription rights, reproposed Rule 16b–9 has been renumbered Rule 16b–2.

[222] The same is true if the exercise price or amount of shares underlying a derivative security are changed as a result of a stock split or stock dividend.

[223] *See* Release No. 33–6879 (Oct. 22, 1990) [55 FR 46288].

[224] *See* Brief for the Securities and Exchange Commission, *Amicus Curiae*, *Mendell* v. *Gollust*, 909 F.2d 724 (2d Cir. 1990), *cert granted*, 59 U.S.L.W. 3460 (U.S. Jan. 7, 1991) (No. 90–659).

[225] Proposed Rule 16a–1(h), reproposed Rule 16a–1(g).

[226] *See Nomura Securities Co., Ltd.* (November 1, 1990). In *C.R.A. Realty* v. *Tri-South Investments*, 738 F.2d 73 (2d Cir. 1984), the court held that transactions in the underlying common stock, which was listed on a national securities exchange, were exempt under section 16(d) where the transactions were incidental to the maintenance of an over-the-counter market in debentures convertible into the common stock. In this case, the convertible debentures were traded over-the-counter while the underlying common stock was listed on a national securities exchange.

[227] During calendar year 1988, approximately 37 percent of reportable market transactions were filed more than three days late. For calendar year 1989 the delinquency rate was 36 percent. For the first ten months of calendar year 1990, the rate was 21 percent. These figures do not take into account required Forms 3 and 4 that never have been filed. *See also* section VIII.A of both the Proposing and Reproposing Releases.

[228] "Securities Enforcement Remedies and Penny Stock Reform Act of 1990," S. 647, Public Law 109–429.

[229] Registrants having a class of equity securities registered pursuant to section 12 of the Exchange Act, closed-end investment companies registered under the Investment Company Act, and holding companies registered under the Public Utility Holding Company Act of 1935 are subject to Item 405.

[230] Item 405(a). Such disclosure will be required in definitive proxy or information statements and will not create a separate obligation to file preliminary proxy or information statements. This disclosure is required in part III of Form 10–K, or may be incorporated by reference from the definitive proxy or information statement as required by Form 10–K.

transactions for each such insider. It is not necessary to disclose the details of the late reported transactions. Upon further consideration, the Commission has determined not to adopt the proposal to require registrants to disclose their procedures to assist insiders with their section 16(a) compliance, since such a requirement would not likely result in disclosure useful to shareholders.

Item 405 requires a registrant to disclose any known late filing or failure by an insider to file a report required by section 16(a).[231] As stated in the proposing releases, a registrant will not be liable for incorrect disclosures pursuant to Item 405 if the information reported is consistent with the information disclosed on the Forms 3, 4 and 5 or amendments sent to the registrant by the insider pursuant to Rule 16a-3(e). A registrant does not have an obligation under Item 405 to research or make inquiry regarding delinquent section 16(a) filings. Any form received by the registrant within three calendar days of the required filing date may be presumed to have been filed with the Commission on a timely basis.[232] An issuer may rely on a written representation from the insider that no Form 5 filing is required.[233] The Item has been revised to make it clear that, while the registrant must retain the written representation for two years, failure to do so does not violate the Commission rules, but simply removes the safe harbor protection for responsibility for incorrect disclosure.

If a particular transaction or holding has not been reported, the insider should amend the original filing or make a new filing to report the transaction.[234] The transaction reported in an untimely manner would be disclosed pursuant to Item 405 for the fiscal year in which the report was filed, even if the transaction related to and should have been reported in a prior fiscal year.[235]

Delinquent filings reported prior to the effective date of the new rules are not required to be disclosed pursuant to Item 405. Although not disclosed in the proxy statement, such delinquencies nonetheless are violations of section 16(a). On or after the effective date of the new rules, if a registrant receives a Form 3, 4, or 5 during the fiscal year reporting holdings or transactions that were required to have been reported at an earlier date, disclosure of delinquent filers under Item 405 would be required.

To assist the Commission and shareholders in identifying those registrants disclosing delinquent filings or transactions by insiders, the cover page of Form 10-K has been amended. Registrants will check the designated space on the cover page if disclosure of delinquent filers pursuant to Item 405 is not contained in the Form and will not be contained in the proxy or information statement incorporated by reference. If at the time of filing the Form 10-K the registrant does not yet know whether such disclosure will be contained in the proxy or information statement or the Form 10-K amendment containing the part III information, the box should not be checked. If the box is not checked, this will not be taken as a statement that there will be Item 405 disclosure of delinquent filers, but rather that the registrant may not have the requisite knowledge at the time the Form 10-K is filed.[236]

VII. Transition to New System

A. General Application

All of the rules adopted today, except for Rule 16b-3, Item 405 of Regulation S-K, and, in certain cases, Rule 16b-6(b) become effective May 1, 1991 ("effective date"). As discussed below, a phase-in period until September 1, 1992 is provided for employee benefit plans. Disclosure of delinquent filers under Item 405 will be required for registrants whose fiscal year ends on or after November 1, 1991. In general, the Rule 16b-6(b) exemption for specified option exercises is effective May 1, 1991, subject to a six month holding period requirement as discussed below.

There is no "grandfathering" of the former rules. Thus, no benefit plan or reporting person will be entitled to rely on the former rules once the new rules are phased in, except as to reporting and transactions conducted prior to the effective date of the new rules. Staff interpretations inconsistent with the new rules may not be relied upon for transactions occurring after the effective date of the rules and the related phase-in schedule.

The new rules affect the application of section 16 to various persons. Those subject to section 16 under the new rules will be required to file a Form 3 by the later of May 1, 1991, or 10 days after becoming an officer, director or ten percent holder, if they have not already filed one under the former rules. Transactions made prior to the effective date by persons becoming insiders solely as a result of the new rules would not be reportable, or subject to short-swing profit recovery. Persons ceasing to be insiders as a result of the new rules should file a Form 4 by May 1, 1991 (or, in the case of transactions conducted in April 1991, by May 10, 1991) disclosing all reportable transactions prior to the effective date that have not yet been reported.[237] Unlike other situations where insider status is terminated,[238] those persons ceasing to be insiders by operation of the rules adopted today will have no post-termination reporting obligations.

Transactions required to be reported under the new rules, but not under the former rules, would be reportable as of the effective date of the rules.[239] Thus, all transactions conducted on or after May 1, 1991, would be reportable unless exempt from reporting under the new rules.

Transactions occurring prior to the effective date that were exempt under the former rules would continue to be exempt from the short-swing profit recovery provisions of section 16(b), even if such transaction would not be exempt if made under the new rules. However, transactions not exempt from section 16(b) under the former rules that are conducted prior to the effective date would continue to be matchable with non-exempt transactions conducted after the effective date for short-swing profit recovery purposes.

The new Forms 3, 4, and 5 should be used for any filings after May 1, 1991.[240] Form 5 must be filed within 45 days after the registrant's fiscal year-end following the effective date of the new rules, even where the year-end occurs a short time after the effective date, to reflect (1) transactions exempt from section 16(b) that took place on or after May 1, 1991 not previously reported, and (2) holdings and transactions, whether or not before the effective date, that were required to be reported on a Form

[231] A known failure to file would include, but not be limited to, a failure to file a Form 3, which is required of all insiders, and a failure to file a Form 5 in the absence of a written representation by the insider that no such filing is required.

[232] Item 405(b)(1).

[233] Item 405(b)(2).

[234] For a discussion of the insider's duty to review past transactions to ascertain whether all required reports have been filed, *see* section II.C.2, *supra*.

[235] *See* Note to Item 405(a).

[236] *See* the Instruction to Item 10 of Form 10-K.

[237] The insider should use the old forms to report these transactions and is encouraged to note on the Form 4 that this is expected to be the final filing. For a discussion of the insider's duty to disclose unreported transactions, *see* section II.C.2, *supra*.

[238] *See* section II.A.2, *supra*.

[239] For example, option grants pursuant to Rule 16b-3 and dividend reinvestment plan transactions were not required to be reported under the former rules, but must be reported on Form 5 under the new rules.

[240] Copies of new forms can be requested from the Commission's publications unit at (202) 272-7460 or (202) 272-7461.

3 or 4, but were not so reported by the due date of the Form 5.

B. Derivative Securities

Derivative securities not previously reported that were acquired under the former rules should be reported on the first form otherwise required to be filed after May 1. Holdings of derivative securities should be reported regardless of whether they are presently exercisable or vested.[241]

The new exemption for exercises on or after May 1 of options that are not out-of-the-money [242] will apply to options acquired under the former rules in the following manner. For options acquired under a Rule 16b–3 plan, the exemption is available if at least six months elapses between the acquisition of the option and the disposition of the underlying securities. For other derivative securities, the derivative security must be held six months from the date of acquisition and may not be exercised during this time. If the insider does not comply with the six month holding period requirement, the newly adopted exemption for the exercise would not be available.

Staff interpretation under the former rules will continue to apply to cash-only instruments (*e.g.*, phantom stock or performance units) awarded prior to May 1, 1991. On or after that date, an award of a cash-only instrument will not be deemed a derivative security under Rule 16a–1(c) if the instrument has a fixed date of redemption or its grant complies with the disinterested administration requirement of either former or adopted Rule 16b–3.[243]

C. Employee Benefit Plans

While the new reporting rules under section 16(a) concerning employee benefit plan transactions become effective on May 1, 1991 with the other rules adopted today, the substantive conditions of new Rule 16b–3 need not be phased in until September 1, 1992. Until this date, registrants may elect to rely on the section 16(b) exemptions contained in former Rules 16a–8(b), 16a–8(g)(3), and 16b–3, and the staff interpretations thereunder, not otherwise vacated by the staff, or they may conform their plans to new Rule 16b–3. The delayed phase-in period is to provide ample time for registrants to review the rule changes and amend their plans accordingly.[244] If registrants delay phase-in of new Rule 16b–3, they must continue to comply with the former rules.

During the phase-in period, registrants may not elect to comply with selected provisions of either the former or new rules. When a registrant chooses to adopt a plan that complies with the new rules or convert one of its plans to the new rules, all plans must be converted. This will provide consistency of application of the new rules to insiders of the registrant. The former rules may not continue to be relied on by registrants and insiders beyond September 1, 1992.

Transactions under Rule 16b–3 must be reported as provided by the new rules during the phase-in period. Many insiders participating in employee plans established in trust form, such as ERISA plans, relied upon former Rule 16a–8 for both a reporting and liability exemption for intra-trust transactions. Insiders may continue to rely upon the former rule during the phase-in period for purposes of section 16(b), but they will lose the reporting exemption on May 1, 1991 since only the substantive requirements for the exemption from section 16(b) are to be phased in. Therefore, these transactions, although exempt from section 16(b), would be required to be reported on Form 5 with other exempt transactions.

D. Item 405 Disclosure of Delinquent Reporting Persons

The Commission has determined to permit registrants to delay Item 405 disclosure if the fiscal year ends before November 1, 1991. These registrants would include the required disclosure for the partial year with the Item 405 disclosure for the next fiscal year. As a result, some registrants may have up to 18 months of disclosure under Item 405 in their 1992 filing. Late reports filed with the Commission before May 1, 1991 are not included in the issuer's Item 405 disclosure obligation. In contrast, late reports filed on or after that date are included and must be disclosed by the issuer, whether or not the transactions to which the reports relate occurred in an earlier fiscal year. Accordingly, insiders filing reports late or reporting late transactions on or after May 1, 1991 will be identified in the proxy statement, information statement, Form 10–K, or Form N–SAR pursuant to Item 405 of Regulation S–K, for fiscal years ending on or after November 1, 1991.

VIII. Charts Comparing Former and New Rules and Interpretations

A. The following chart lists the former rules and how they will change under the new regulatory scheme.

Former rule	New rule	Substantive changes
12h–2	None	Deleted because it related to transactions occurring prior to November 1, 1967.
16a–1(a)	16a–3(a)	Added a Form 5 requirement.
16a–1(b)	16a–3(b)	No change.
16a–1(c)	16a–3(c)	No change.
16a–1(d)	16a–2(a)	Only persons who become subject to section 16 by the issuer's registration under section 12 will have pre-insider transactions subject to section 16.
16a–1(e)	16a–2(b)	No change.
16a–2(a)	16a–1(a)(1)	For purposes of determining status as a ten percent holder, the rules use a 13(d) analysis. Exceptions are provided for customer accounts of institutions eligible to file a Schedule 13G.
16a–2(b)	None	Deleted since it is not relevant whether a derivative security is presently exercisable.
16a–3	16a–1(a)(4)	No change.
16a–4	16a–2(d)	After the 12-month grace period for fiduciaries an estate or trust additionally is subject to section 16 if the trustee is an insider with a pecuniary interest in the trust corpus. Paragraphs (c) and (d) have been deleted. Since the issuer is not subject to section 16, (c) is unnecessary. Paragraph (d) was a typographical error.
16a–5	16a–5	No change.

[241] Former Rule 16a–6(a) (17 CFR 240.16a–6(a)) provided that options were not reportable until they became exercisable. This exemption has been deleted.

[242] Rule 16b–6(b).

[243] The 16 month phase-in period for employee benefit plans discussed in section C below will apply to plans awarding cash-only derivative securities, except that a decision to use the adopted rule for cash-only derivative securities will not trigger a requirement to conform all other plans of the issuer.

[244] Plan amendments designed to conform with the rules adopted today are not deemed material and need not satisfy the shareholder approval requirement of Rule 16b–3. It should be noted that the staff of the Division of Corporation Finance intends to issue shortly an interpretive release regarding the shareholder approval requirement. Further, where a plan amendment is submitted for shareholder approval, whether or not such amendment is for the purpose of conforming a plan to the new rules, the proposal will no longer trigger a requirement to file the proxy or information statement in preliminary form.

Former rule	New rule	Substantive changes
16a-6	16a-1(c), 16a-4	Deleted and replaced by general rules regarding derivative securities.
16a-7	16a-3(d)	No change.
16a-8	16a-1(a)(2), 16a-1(a)(5), 16a-8.	1. Insider trustee with pecuniary interest and investment control subjects trust to section 16. 2. Beneficiary or settlor directed transactions are not attributed to trust. 3. Deletion of 20 percent trust exemption of former Rule 16a-8(b) (but see new Rule 16b-3(d)). 4. Trustee no longer may report in place of the beneficiaries. 5. Remainder interests are excluded only where remainder holders do not exercise investment control. 6. Deletion of exclusion for pension or retirement plans (but see new Rule 16b-3(d)(2)) and business trusts with over 25 beneficiaries. 7. Definition of "immediate family" expanded to include grandchildren, grandparents, siblings, in-laws, and adoptive relationships. Moved to Rule 16a-1(e).
16a-9	16a-6, 16b-5	Bona fide gifts exempt from section 16(b), as well as transfers pursuant to the laws of descent.
16a-10	16a-10	No change.
16a-11	16b-2	Exemption from section 16(b) only.
16b-1	16b-1(a)	Expanded exemption for investment companies transactions exempted by rule under section 17(a) of the Investment Company Act.
16b-2	16a-7	Distributions and related transactions are not reported and equal participation requirement deleted.
16b-3	16b-3	1. The disinterested administration requirement has been modified by requiring a committee of two or more disinterested directors to make grants and awards. The alternative to disinterested administration for automatic plans has been strengthened to permit no discretion by interested persons. 2. Deletion of paragraph (c) plan limitations. 3. Addition of transferability restriction exception for qualified domestic relations. 4. Deletion of the definition of "exercise of an option." 5. Six-month holding period for many transactions. 6. Specific exemption for participant-directed transactions. 7. Exemption for distributions from a plan.
16b-4	16b-1(b)	No change.
16b-5	16b-4	No change.
16b-6	None	
16b-7	16b-7	No change.
16b-8	16b-8	No change.
16b-9	16b-6(b)	Conversions exempt from section 16(b) without need to satisfy the conditions of Rule 16b-9.
16b-10	16b-1(c)	No change.
16b-11	16a-9	Exemption for acquisition rather than disposition of subscription rights and other pro rata rights. Exemption from reporting as well. Exemption for stock splits and dividends added.
16c-1	16c-1	No change.
16c-2	16c-2	Deletion of the equal participation requirement.
16c-3	16c-3	No change.
16e-1	16e-1	No change.
30f-1 (Investment company act).	30f-1	No change.

B.The following chart lists the new rules, the former rule from which the new rule is derived, and a summary of the new rule's content.

New rule	Former rule	Summary of new rule
16a-1(a)	16a-2, 16a-3 16a-8(f), (g).	Beneficial ownership, Two tier analysis of ownership. Section 13(d) determines 10% holder. For other purposes, pecuniary interest determines ownership. Indirect pecuniary interests and exclusions from beneficial ownership identified.
16a-1(b)	None	Definition of call equivalent position as one that benefits from an increase in value of underlying security.
16a-1(c)	None	Definition of derivative securities. Excludes pledges, pro rata merger rights, specified cash-only securities (phantom stock), broad-based products, and interests in employee benefit plans.
16a-1(d)	None	Definition of equity security of such issuer. Includes any right related to equity security of the issuer.
16a-1(e)	16a-8(e)	Definition of immediate family. 16a-1(f) None Definition of officer to include policy-making executives and principal financial and accounting officers of the issuer.
16a-1(g)	None	Definition of portfolio security.
16a-1(h)	None	Definition of put equivalent position as one that benefits from a decrease in value of underlying security.
16a-2(a)	16a-1(d)	Transactions by officers and directors before issuer registers under section 12 are subject to section 16.
16a-2(b)	16a-1(e)	Transactions by officers and directors are subject to section 16 after termination of insider status.
16a-2(c)	None	Transaction creating status as a ten percent holder is exempt from section 16.
16a-2(d)	16a-4	Transactions by certain fiduciaries exempt for 12 months.
16a-3(a)	16a-1(a)	General filing requirement.
16a-3(b)	16a-1(b)	Additional Form 3 is not required under certain circumstances.
16a-3(c)	16a-1(c)	Copies of forms filed with one exchange.
16a-3(d)	16a-7	One filing satisfies Exchange Act, ICA, and PUHCA.
16a-3(e)	None	Copies of all filings must be delivered to issuer.
16a-3(f)	None	Form 5 must be filed within 45 days after end of issuer's fiscal year unless no transactions conducted and reporting is current.
16a-3(g)	None	Specifies the transactions that may be reported on Form 5.
16a-3(h)	None	Date on which a Form 3, 4, or 5 is deemed filed.
16a-4	16a-2(b)	Derivative and underlying securities are the same class of securities. Specifies reporting of exercises and conversions.
16a-5	16a-5	Exemption for odd-lot dealers.
16a-6	16a-9(a)	Deferred reporting for small purchases. Separate exemption for gifts contained in Rule 16b-5.
16a-7	16b-2	Distribution related transactions are not reported.
16a-8	16a-8	Trusts.
16a-9	16b-11	Exemption for stock splits, dividends, and grants of pro rata rights.
16a-10	16a-10	An exemption from section 16(a) serves as an exemption from section 16(b).
16b-1(a)	16b-1	Investment companies.

New rule	Former rule	Summary of new rule
16b-1(b)	16b-4	Public utility holding companies.
16b-1(c)	16b-10	Railroad mergers.
16b-2	16a-11	Dividend reinvestment plans.
16b-3	16b-3	Employee benefit plans.
16b-3(a)	16b-3(d)(1)	General plan requirements for exemption.
16b-3(b)	16b-3(a)	Shareholder approval requirement.
16b-3(c)	16b-3(b), 16b-3(d)(3).	Grant and award transactions. Additional conditions for exemption.
16b-(d)	None	Participant-directed transactions. Additional conditions for exemption.
16b-3(e)	16b-3(e)	SAR cash settlement conditions for exemption.
16b-3(f)	16b-3	Exemption for cancellations, expiration, surrenders and qualified domestic relations orders.
16b-3(g)	None	Exemption for plan distributions.
16b-4	16b-5	Exemptions for redemptions of securities of a holding company in return for distribution of securities held.
16b-5	16a-9(b)	Exemption for bona-fide gifts and transactions resulting from the laws of descent and distribution.
16b-6	None	Derivative securities.
16b-6(a)	None	Transactions in derivative securities equivalent to transactions in the underlying securities.
16b-6(b)	16b-9	Exemption for exercises and conversions.
16b-6(c)	None	Formula for determining short-swing profit.
16b-6(d)	None	Expirations.
16b-7	16b-7	Non-substantive mergers or consolidations.
16b-8	16b-8	Voting trusts.
16c-1	16c-1	Exemption for broker transactions.
16c-2	16c-2	Exemption for when-issued securities dispositions.
16c-4	None	Exemption for "net long" derivative security position.
16e-1	16e-1	Arbitrage transactions.
30f-1	30f-1	Applicability of section 16 to investment companies.
Item 405 of Regulation S-K.	None	Requirement to disclose delinquent reporting persons.

C. The following chart notes the effect of the new rules upon the Division of Corporation Finance's interpretations under Release 34-18114 (Sept. 24, 1981) (46 FR 48147). Listed below are the questions where the answers have been modified substantively by the new rules. Answers not listed here remain the same under the new rules.

Question No.	Effect of the new rules
1(a)	These persons are officers if they perform policymaking functions that are not insignificant.
1(b)	If officers of a subsidiary have a policymaking function for the issuer they would be considered officers of the issuer.
5	There is now a two-tier analysis of beneficial ownership under Rule 16a-1(a); one for purposes of determining whether a person is a ten percent holder subject to section 16 and the other, involving pecuniary interests, which is otherwise applicable to transactions and securities reported. Mr. Smith would report the foundation's holdings only if he had a pecuniary interest (which is unlikely in this case). In addition, if Mr. Smith shared or exercised investment control and he or a member of his immediate family had a pecuniary interest, pursuant to Rule 16a-8(a)(1)(ii) the charitable trust would itself become an insider because Mr. Smith is an insider trustee.
9	The analysis is now the same for public and nonpublic companies pursuant to the new safe harbor provided in Rule 16a-1(a)(2)(iii).
10	Footnote 25 would change. If the person with the power to revoke is the settlor, whoever has investment control reports. Rule 16a-8(b)(4).
17	Stock dividends are no longer reportable events, pursuant to Rule 16a-9.
22	Rule 16a-1(c)(3) addresses cash-only SARs. Where the timing of exercise of a cash-only SAR is within the control of the holder and the award of the SAR does not comply with Rule 16b-3, the SAR may be a derivative security subject to section 16. The grant of an SAR not exempt under Rule 16a-1(c)(3) is deemed a purchase. The exercise of the SAR for stock is treated as a stock option. The receipt of cash is treated as a sale.
23	Last sentence is true no longer. A holder of convertible securities would not become a ten percent holder unless he or she would beneficially own over ten percent of the underlying equity securities if converted.
33	Only persons who are already officers or directors and become subject to section 16 solely as a result of the issuer's registration of equity securities under section 12 are required to report transactions that may have occurred prior to becoming subject to section 16. (See Question 34.)
37-40	To determine what constitutes 10% of a class of equity securities, the rules under section 13(d) would apply. A class of section 12 voting preferred stock is deemed a separate class of equity securities.
43	Although former Rule 16a-4(c) has been deleted, transactions by the issuer are not subject to section 16 since the issuer is the beneficiary of the short-swing profit provision. Thus, no exemption is necessary.
47	The SAR and option are reportable, even if not presently exercisable. Transactions exempted under Rule 16b-3 are reportable on Form 5. Of course, if a derivative security is not exercisable within 60 days, the securities underlying such derivative security are not beneficially owned for purposes of determining 10% beneficial owner status under Rules 16a-1(a)(1) and 13d-3.
48	The acquisition of the right is reported at grant.
49	The answer remains the same except that the transactions could be reported on Form 5, if exempt under Rule 16b-3.
52	The exercise of the option would be reported no later than the first Form 4 or next Form 5 required to be filed.
53	Answer remains the same, except an option awarded under Rule 16b-3 would be reported on Form 5, rather than not being reported.
54	Answer remains the same although former Rule 16a-6 was deleted. Standardized options are required to be reported under Rule 16a-4.
55	The acquisition of the performance units must be reported unless it is not deemed a derivative security because of its cash-only nature under Rule 16a-1(c)(3).
57	Answer remains the same although definition has changed, by adding persons such as grandparents and grandchildren. *See* Rule 16a-1(e).
58	The officer has a pecuniary interest in the trust.
59	The power to remove the trustee without the approval of the beneficiaries is not the power to revoke the trust, so the settlor is not the beneficial owner.
60-61	The 20 percent exemption of former Rule16a-8(b) has been deleted. However, intra-plan transactions may be exempt under Rule 16b-3(d).
62-63	Distributions of securities from any benefit plans are exempt pursuant to Rule 16b-3(g).
64	Since a distribution is exempt from section 16(b), it is reportable on Form 5.
65	If the insider trustee, or a member of the trustee's immediate family, has a pecuniary interest in the trust corpus, the trust becomes subject to section 16. *See* Rule 16a-8(a)(1)(ii).

Question No.	Effect of the new rules
66–68	Former Rule 16a–8(d) has been deleted. Each beneficiary must report individually his or her beneficial ownership, subject to Rule 16a–8(b).
69–71	Former Rule 16a–8(g)(3) has been deleted in favor of Rule 16b–3(d). The answer remains the same although the analysis changes.
72	Former Rule 16a–8(g)(4) has been deleted. Business trusts are treated as corporations.
73, 75	Substitute $10,000 for $3,000. Gift transactions are exempted separately.
74	Bona fide gifts are exempt under Rule 16b–5.
77	DRIP acquisitions are exempt pursuant to Rule 16b–2 and are reported on Form 5.
84	The "equal participation requirement" of the Rule has been deleted.
86	There are three provisions, rather than one, in Rule 16b–3 that exempt specified dispositions. See Rule 16b–3(f).
87	Vacated. The acquisition of underlying securities upon the exercise of an option generally is exempt under Rule 16b–6(b).
88 (a)	Performance share plans are treated as stock appreciation rights. If they satisfy the conditions of Rule 16a–1(c)(3), they are not deemed derivative securities.
	(b) The SAR is treated as a stock option and the exercise is exempt under Rule 16b–6(b).
	(c) The "options" received in this plan (a section 423 plan) are not derivative securities because the acquisition price is floating.
	(d) Restricted stock is not a derivative security because it is not exercisable or convertible into other securities. Vesting periods do not change the analysis.
	(e) If the exercise price is fixed, such as par value, the right is a derivative security. The exercise of the right is exempt under Rule 16b–6(b). If the exercise price is floating, such as ten percent of market value, the right is not treated as a derivative security until the price is determined, usually at exercise.
89	The right to defer receipt of cash or securities does not create a derivative security where the holder does not have a choice between cash or securities. Even though receipt of the securities are deferred, they are deemed acquired under section 16 when they are awarded.
90	Situations (a) and (b) do not create a derivative security. Situation (c) is a transaction subject to section 16(b), unless exempt under Rule 16b–3(d)(1)(ii).
91	Option exercises are exempt. The shares received from the exercise may be sold, but are matchable with purchases made within six months of the sale.
92	The interpretation was reversed by staff letters to *Nixon, Hargrave, Devans & Doyle* (Jan. 7, 1982) and *Debevoise & Plimpton* (Jan. 7, 1982). The interpretations set forth in the cited letters would not be changed.
103	The illustrated plan does not satisfy the disinterested administration requirement; however, it may be exempt under Rule 16b–3(d).
104	The transaction must comply with Rule 16b–3(d) to be exempt since plan participants may exercise investment discretion.
106(c)	If the grant of options is subject to discretion of a third party, the recipient is not disinterested. Illustration (2) changes because disinterested status is contingent on participation, rather than eligibility to participate.
107	Either the plan must be administered by a committee where all committee members are disinterested or awards are made automatically under a formula, or a combination of both.
109	Former Rule 16b–3(c) has been deleted.
110	A one person plan is eligible for exemption.
112	Each example meets the requirement of Rule 16b–3(a)(1).
113	Options may be transferred pursuant to a qualified domestic relations order.
114	Exercises of SARs for stock are exempt pursuant to Rule 16b–6(b).
115(e)	A cancellation of stock options for cash does not necessarily equate to a SAR. A cancellation for cash generally equates to a sale of the security cancelled. If the option has no cash component and one is added it is deemed a grant of an SAR, requiring a new six month holding period for exemption.
118	The letters permitting "tacking" of the six month period, and thereby modifying this interpretation (and the interpretation under Q. 115 above), should not be relied upon for future transactions. *See, e.g., Gannett Co., Inc.* (Nov. 3, 1989); *Firstar Corp.* (June 23, 1989).
122	Only two disinterested administrators are required under the new rules.
123(b)	The rule is not satisfied because insiders effectively can choose between cash and stock by determining the date of exercise.
129	Limited rights with a cash component are treated the same as SARs.
130	Securities with a cash component may be cash settled outside of the window period in connection with a change of control situation if the following conditions are met: (1) The ability to cash settle the SAR in such situations is provided in the plan; (2) the SAR so settled must be held (and subject to market price fluctuations) at least six months from the date of grant of the right to cash settle; and (3) the change in control is subject to shareholder approval by non-insider shareholders. The third condition insures that the change in control is outside of the control of the insiders. For tender offers, the change of control is deemed to occur at consummation, rather than at announcement. Letters inconsistent with this interpretation may not be relied upon for future transactions. *See, e.g., Lyphomed, Inc.* (Nov. 29, 1989); *Hilton Hotels Corp.* (Nov. 21, 1989); *West Point-Pepperell, Inc.* (avail. Oct. 28, 1987).
135–136	Exercises are exempt generally pursuant to Rule 16b–6(b).
137–141	Rule 16b–6(c) has been deleted as no longer necessary.
146–149	Conversions are exempt pursuant to Rule 16b–6.
151	Grants of subscription rights are exempt pursuant to Rule 16a–9.

IX. Cost-Benefit Analysis

It appears to the Commission that, while some additional costs to issuers and insiders may result from the comprehensive restructuring of the rules under section 16, such costs will be outweighed by the savings to insiders with respect to deferred reporting for exempt transactions and increased compliance with section 16(a) as a result of Item 405, which will benefit issuers, shareholders, and investors.

X. Availability of Final Regulatory Flexibility Analysis

In accordance with the Regulatory Flexibility Act, 5 U.S.C. 604, the Commission has prepared a Final Regulatory Flexibility Analysis with regard to proposed amendments to Rules 16a–1, 16a–2, 16a–3, 16a–4, 16a–5, 16a–6, 16a–7, 16a–8, 16a–9, 16a–10, 16a–11, 16b–1, 16b–2, 16b–3, 16b–4, 16b–5, 16b–6, 16b–7, 16b–8, 16b–9, 16b–10, 16b–11, 16c–1, 16c–2, 16c–3, Schedule 14A, Forms 10–K, 3, and 4, the addition of a new Form 5, Rule 16c–4, and the deletion of Rule 12h–2 under the Exchange Act, as well as the addition of a new Item 405 to Regulation S–K. Also a subject of this analysis is a proposed amendment to Rule 30f–1 and Form N–SAR under the Investment Company Act of 1940. A corresponding Initial Regulatory Flexibility Analysis was prepared and a summary of that analysis was included in the proposing release. A summary of the revised corresponding Initial Regulatory Flexibility Analysis was included in the reproposing release. Members of the public who wish to obtain a copy of the Final Regulatory Flexibility Analysis should contact Brian J. Lane or Richard P. Konrath, Office of Disclosure Policy, Division of Corporation Finance, Securities and Exchange Commission, 450 Fifth Street, NW., Washington, DC 20549.

XI. Request for Comment

Any interested person wishing to submit written comments on the exit box requirement on Form 4 and Form 5 are requested to do so by March 31,

1991. Comments on this inquiry will be considered by the Commission in complying with its responsibilities under section 23(a) of the Exchange Act.[245]

XII. Statutory Basis

The amendments to the proxy rules, Form 10–K, Regulation S–K, and the section 16 rules are being adopted by the Commission pursuant to Exchange Act sections 3(a)(11),[246] 3(a)(12),[247] 3(b),[248] 9(b),[249] 10(a),[250] 12(h),[251] 13(a),[252] 14,[253] 16, and 23(a). The amendments to Form N–SAR and Rule 30f–1 are being adopted pursuant to Investment Company Act sections 30 [254] and 38.[255] As the section 16 rules relate to the Investment Company Act and the Public Utility Holding Company Act they also are adopted pursuant to Investment Company Act sections 30 and 38, and Public Utility Holding Company Act Sections 17 [256] and 20,[257] respectively.

List of Subjects in 17 CFR Parts 229, 240, 249, 270, and 274

Reporting, recordkeeping requirements, and securities.

XIII. Text of New Rules

In accordance with the foregoing, title 17, chapter II of the Code of Federal Regulations is amended as follows:

PART 229—STANDARD INSTRUCTIONS FOR FILING FORMS UNDER SECURITIES ACT OF 1933, SECURITIES EXCHANGE ACT OF 1934, AND ENERGY POLICY AND CONSERVATION ACT OF 1975—REGULATION S–K

1. The authority citation for part 229 is revised to read as follows:

Authority: 15 U.S.C. 77f, 77g, 77h, 77j, 77s, 77aa(25), 77aa(26), 77ddd, 77eee, 77ggg, 77hhh, 77iii, 77nnn, 77sss, 78c, 78i, 78j, 78*l*, 78m, 78n, 78o, 78p, 78w, 80a–8, 80a–29, 80a–30 and 80a–37, unless otherwise noted.

2. New § 229.405 is added to subpart 229.400 to read as follows:

§ 229.405 (Item 405) Compliance with section 16(a) of the Exchange Act.

Every registrant having a class of equity securities registered pursuant to section 12 of the Exchange Act (15 U.S.C. 78*l*), every closed-end investment company registered under the Investment Company Act of 1940 (15 U.S.C. 80a–1 et seq.), and every holding company registered pursuant to the Public Utility Holding Company Act of 1935 (15 U.S.C. 79a et seq.) shall:

(a) Based solely upon a review of Forms 3 (§ 249.103) and 4 (§ 249.104) and amendments thereto furnished to the registrant pursuant to § 240.16a–3(e) during its most recent fiscal year and Forms 5 and amendments thereto (§ 249.105) furnished to the registrant with respect to its most recent fiscal year, and any written representation referred to in paragraph (b)(2)(i) of this Item.

(1) Identify each person who, at any time during the fiscal year, was a director, officer, beneficial owner of more than ten percent of any class of equity securities of the registrant registered pursuant to section 12 of the Exchange Act, or any other person subject to section 16 of the Exchange Act with respect to the registrant because of the requirements of section 30 of the Investment Company Act or section 17 of the Public Utility Holding Company Act ("reporting person") that failed to file on a timely basis, as disclosed in the above Forms, reports required by section 16(a) of the Exchange Act during the most recent fiscal year or prior fiscal years.

(2) For each such person, set forth the number of late reports, the number of transactions that were not reported on a timely basis, and any known failure to file a required Form.

Note: The disclosure requirement is based on a review of the forms submitted to the registrant during and with respect to its most recent fiscal year, as specified above. Accordingly, a failure to file timely need only be disclosed once. For example, if in the most recently concluded fiscal year a reporting person filed a Form 4 disclosing a transaction that took place in the prior fiscal year, and should have been reported in that year, the registrant should disclose that late filing and transaction pursuant to this Item 405 with respect to the most recently concluded fiscal year, but not in material filed with respect to subsequent years.

(b) With respect to the disclosure required by paragraph (a) of this Item:

(1) A form received by the registrant within three calendar days of the required filing date may be presumed to have been filed with the Commission by the required filing date.

(2) If the registrant (i) receives a written representation from the reporting person that no Form 5 is required; and (ii) maintains the representation for two years, making a copy available to the Commission or its staff upon request, the registrant need not identify such reporting person pursuant to paragraph (a) of this Item as having failed to file a Form 5 with respect to that fiscal year.

PART 240—GENERAL RULES AND REGULATIONS, SECURITIES EXCHANGE ACT OF 1934

3. The authority citation for Part 240 is revised to read as follows:

Authority: 15 U.S.C. 77c, 77d, 77s, 78c, 78d, 78i, 78j, 78*l*, 78m, 78n, 78o, 78p, 78s, 78w, 78x, 79q, 79t, 80a–29, 80a–37, unless otherwise noted.

4. The authority citations following §§ 240.16a–1 through 240.16a–10 are removed.

5. By amending § 240.3b–7 by revising the following phrases in the fifth and sixth lines to read as follows:

§ 240.3b–7 Definition of "executive officer."

* * * principal business unit, division or function (such as sales, administration, or finance), * * *

§ 240.12h–2 [Removed]

6. Section 240.12h–2 is removed.

7. By revising Item 7(b) of § 240.14a–101 to read as follows:

§ 240.14a–101 Schedule 14A. Information required in proxy statement.

* * * * *

Item 7. Directors and executive officers.

* * * * *

(b) The information required by Items 401, 404 (a) and (c), and 405 of Regulation S–K (§ 229.401, § 229.404 and § 229.405 of this chapter).

* * * * *

8. Sections 240.16a–1 through 16a–10 are revised, and the undesignated center heading preceding them is revised, as follows, and § 240.16a–11 is removed:

Reports of Directors, Officers, and Principal Shareholders

§ 240.16a–1 Definition of Terms.

Terms defined in this rule shall apply solely to section 16 of the Act and the rules thereunder. These terms shall not be limited to section 16(a) of the Act but also shall apply to all other subsections under section 16 of the Act.

(a) The term *beneficial owner* shall have the following applications:

(1) Solely for purposes of determining whether a person is a beneficial owner

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[245] 15 U.S.C. 78w(a) (1988).
[246] 15 U.S.C. 78c(a)(11) (1988).
[247] 15 U.S.C. 78c(a)(12) (1988).
[248] 15 U.S.C. 78c(b) (1988).
[249] 15 U.S.C. 78i(b) (1988).
[250] 15 U.S.C. 78j(a) (1988).
[251] 15 U.S.C. 78l(h) (1988).
[252] 15 U.S.C. 78m(a) (1988).
[253] 15 U.S.C. 78n (1988).
[254] 15 U.S.C. 80a–29 (1988).
[255] 15 U.S.C. 80a–37 (1988).
[256] 15 U.S.C. 79q (1988).
[257] 15 U.S.C. 79t (1988).

of more than ten percent of any class of equity securities registered pursuant to section 12 of the Act, the term "beneficial owner" shall mean any person who is deemed a beneficial owner pursuant to section 13(d) of the Act and the rules thereunder; *provided, however*, that the following institutions or persons shall not be deemed the beneficial owner of securities of such class held for the benefit of third parties or in customer or fiduciary accounts in the ordinary course of business (or in the case of an employee benefit plan specified in paragraph (a)(1)(vi) of this section, of securities of such class allocated to plan participants where participants have voting power) as long as such shares are acquired by such institutions or persons without the purpose or effect of changing or influencing control of the issuer or engaging in any arrangement subject to Rule 13d-3(b) (§ 240.13d-3(b)):

(i) A broker or dealer registered under Section 15 of the Act;

(ii) A bank as defined in section 3(a)(6) of the Act;

(iii) An insurance company as defined in section 3(a)(19) of the Act;

(iv) An investment company registered under section 8 of the Investment Company Act of 1940 (15 U.S.C. 80a-8);

(v) An investment adviser registered under section 203 of the Investment Advisers Act of 1940 (15 U.S.C. 80b-3);

(vi) An employee benefit plan or a pension fund which is subject to the provisions of the Employee Retirement Income Security Act of 1974, as amended, 29 U.S.C. 1001 *et seq.* ("Employee Retirement Income Security Act"), or an endowment fund;

(vii) A parent holding company, provided the aggregate amount held directly by the parent, and directly and indirectly by its subsidiaries that are not persons specified in § 240.16a-1(a)(1) (i) through (vi), does not exceed one percent of the securities of the subject class; and

(viii) A group, provided that all the members are persons specified in § 240.16a-1(a)(1) (i) through (vii).

Note to paragraph (a). Pursuant to this section, a person deemed a beneficial owner of more than ten percent of any class of equity securities registered under section 12 of the Act would file a Form 3 (§ 249.103), but the securities holdings disclosed on Form 3, and changes in beneficial ownership reported on subsequent Forms 4 (§ 249.104) or 5 (§ 249.105), would be determined by the definition of "beneficial owner" in paragraph (a)(2) of this section.

(2) Other than for purposes of determining whether a person is a beneficial owner of more than ten percent of any class of equity securities registered under Section 12 of the Act, the term *beneficial owner* shall mean any person who, directly or indirectly, through any contract, arrangement, understanding, relationship or otherwise, has or shares a direct or indirect pecuniary interest in the equity securities, subject to the following:

(i) The term *pecuniary interest* in any class of equity securities shall mean the opportunity, directly or indirectly, to profit or share in any profit derived from a transaction in the subject securities.

(ii) The term *indirect pecuniary interest* in any class of equity securities shall include, but not be limited to:

(A) Securities held by members of a person's immediate family sharing the same household;

(B) A general partner's proportionate interest in the portfolio securities held by a general or limited partnership. The general partner's proportionate interest, as evidenced by the partnership agreement in effect at the time of the transaction and the partnership's most recent financial statements, shall be the greater of:

(*1*) The general partner's share of the partnership's profits, including profits attributed to any limited partnership interests held by the general partner and any other interests in profits that arise from the purchase and sale of the partnership's portfolio securities; or

(*2*) The general partner's share of the partnership capital account, including the share attributable to any limited partnership interest held by the general partner.

(C) A performance-related fee, other than an asset-based fee, received by any broker, dealer, bank, insurance company, investment company, investment adviser, investment manager, trustee or person or entity performing a similar function; *provided, however*, that no pecuniary interest shall be present where:

(*1*) The performance-related fee, regardless of when payable, is calculated based upon net capital gains and/or net capital appreciation generated from the portfolio or from the fiduciary's overall performance over a period of one year or more; and

(*2*) Equity securities of the issuer do not account for more than ten percent of the market value of the portfolio. A right to a nonperformance-related fee alone shall not represent a pecuniary interest in the securities;

(D) A person's right to dividends that is separated or separable from the underlying securities. Otherwise, a right to dividends alone shall not represent a pecuniary interest in the securities;

(E) A person's interest in securities held by a trust, as specified in § 240.16a-8(b); and

(F) A person's right to acquire equity securities through the exercise or conversion of any derivative security, whether or not presently exercisable.

(iii) A shareholder shall not be deemed to have a pecuniary interest in the portfolio securities held by a corporation or similar entity in which the person owns securities if the shareholder is not a controlling shareholder of the entity and does not have or share investment control over the entity's portfolio.

(3) Where more than one person subject to section 16 is deemed to be a beneficial owner of the same equity securities, all such persons must report as beneficial owners of the securities. In such cases, the amount of short-swing profit recoverable shall not be increased above the amount recoverable if there were only one beneficial owner.

(4) Any person filing a statement pursuant to section 16(a) of the Act may state that the filing shall not be deemed an admission that such person is, for purposes of section 16 of the Act or otherwise, the beneficial owner of any equity securities covered by the statement.

(5) The following interests are deemed not to confer beneficial ownership for purposes of section 16 of the Act:

(i) Interests in portfolio securities held by any holding company registered under the Public Utility Holding Company Act of 1935 (15 U.S.C. 79a *et seq.*);

(ii) Interests in portfolio securities held by any investment company registered under the Investment Company Act of 1940 (15 U.S.C. 80a-1 *et seq.*); and

(iii) Interests in securities comprising part of a broad-based, publicly traded market basket or index of stocks, approved for trading by the appropriate federal governmental authority.

(b) The term *call equivalent position* shall mean a derivative security position that increases in value as the value of the underlying equity increases, including, but not limited to, a long convertible security, a long call option, and a short put option position.

(c) The term *derivative securities* shall mean any option, warrant, convertible security, stock appreciation right, or similar right with an exercise or conversion privilege at a price related to an equity security, or similar securities with a value derived from the value of an equity security, but shall not include:

(1) Rights of a pledgee of securities to sell the pledged securities,

(2) Rights of all holders of a class of securities of an issuer to receive securities pro rata, or obligations to dispose of securities, as a result of a merger, exchange offer, or consolidation involving the issuer of the securities;

(3) Securities that may be redeemed or exercised only for cash and do not permit the receipt of equity securities in lieu of cash, if the securities either:

(i) Are awarded pursuant to an employee benefit plan satisfying the provisions of § 240.16b–3(c); or

(ii) May be redeemed or exercised only upon a fixed date or dates at least six months after award, or upon death, retirement, disability or termination of employment;

(4) Interests in broad-based index options, broad-based index futures, and broad-based publicly traded market baskets of stocks approved for trading by the appropriate federal governmental authority;

(5) Interests or rights to participate in employee benefit plans of the issuer; or

(6) Rights with an exercise or conversion privilege at a price that is not fixed.

(d) The term *equity security of such issuer* shall mean any equity security or derivative security relating to an issuer, whether or not issued by that issuer.

(e) The term *immediate family* shall mean any child, stepchild, grandchild, parent, stepparent, grandparent, spouse, sibling, mother-in-law, father-in-law, son-in-law, daughter-in-law, brother-in-law, or sister-in-law, and shall include adoptive relationships.

(f) The term *officer* shall mean an issuer's president, principal financial officer, or principal accounting officer (or, if there is no such accounting officer, the controller), any vice-president of the issuer in charge of a principal business unit, division or function (such as sales, administration or finance), any other officer who performs a policy-making function, or any other person who performs similar policy-making functions for the issuer. Officers of the issuer's parent(s) or subsidiaries shall be deemed officers of the issuer if they perform such policy-making functions for the issuer. In addition, when the issuer is a limited partnership, officers or employees of the general partner(s) who perform policy-making functions for the limited partnership are deemed officers of the limited partnership. When the issuer is a trust, officers or employees of the trustee(s) who perform policy-making functions for the trust are deemed officers of the trust.

Note: "Policy-making function" is not intended to include policy-making functions that are not significant. If pursuant to Item 401(b) of Regulation S–K (§ 229.401(b)) the issuer identifies a person as an "executive officer," it is presumed that the Board of Directors has made that judgment and that the persons so identified are the officers for purposes of Section 16 of the Act, as are such other persons enumerated in this paragraph (f) but not in Item 401(b).

(g) The term *portfolio securities* shall mean all securities owned by an entity, other than securities issued by the entity.

(h) The term *put equivalent position* shall mean a derivative security position that increases in value as the value of the underlying equity decreases, including, but not limited to, a long put option and a short call option position.

§ 240.16a–2 Persons and transactions subject to section 16.

Any person who is the beneficial owner, directly or indirectly, of more than ten percent of any class of equity securities ("ten percent beneficial owner") registered pursuant to section 12 of the Act, any director or officer of the issuer of such securities, and any person specified in section 17(a) of the Public Utility Holding Company Act of 1935 or section 30(f) of the Investment Company Act of 1940, including any person specified in § 240.16a–8, shall be subject to the provisions of section 16 of the Act. The rules under section 16 of the Act apply to any class of equity securities of an issuer whether or not registered under section 12 of the Act. The rules under section 16 of the Act also apply to non-equity securities as provided by the Public Utility Holding Company Act of 1935 and the Investment Company Act of 1940. With respect to transactions by persons subject to section 16 of the Act:

(a) A transaction(s) carried out by a director or officer in the six months prior to the director or officer becoming subject to section 16 of the Act shall be subject to section 16 of the Act and reported on the first required Form 4 only if the transaction(s) occurred within six months of the transaction giving rise to the Form 4 filing obligation and the director or officer became subject to section 16 of the Act solely as a result of the issuer registering a class of equity securities pursuant to section 12 of the Act.

(b) A transaction(s) following the cessation of director or officer status shall be subject to section 16 of the Act only if executed within six months of a transaction that occurred while that person was a director or officer.

(c) The transaction that results in a person becoming a ten percent beneficial owner is not subject to section 16 of the Act unless the person otherwise is subject to section 16 of the Act. A ten percent beneficial owner not otherwise subject to section 16 of the Act must report only those transactions conducted while the beneficial owner of more than ten percent of a class of equity securities of the issuer registered pursuant to section 12 of the Act.

(d)(1) Transactions by a person or entity shall be exempt from the provisions of section 16 of the Act for the 12 months following appointment and qualification, to the extent such person or entity is acting as:

(i) Executor or administrator of the estate of a decedent;

(ii) Guardian or member of a committee for an incompetent;

(iii) Receiver, trustee in bankruptcy, assignee for the benefit of creditors, conservator, liquidating agent, or other similar person duly authorized by law to administer the estate or assets of another person; or

(iv) Fiduciary in a similar capacity.

(2) Transactions by such person or entity acting in a capacity specified in paragraph (d)(1) of this section after the period specified in that paragraph shall be subject to section 16 of the Act only where the estate, trust or other entity is a beneficial owner of more than ten percent of any class of equity security registered pursuant to section 12 of the Act, or the fiduciary is a person described in § 240.16a–8(a)(1)(ii).

§ 240.16a–3 Reporting transactions and holdings.

(a) Initial statements of beneficial ownership of equity securities required by section 16(a) of the Act shall be filed on Form 3. Statements of changes in beneficial ownership required by that section shall be filed on Form 4. Annual statements shall be filed on Form 5. At the election of the reporting person, any transaction required to be reported on Form 5 may be reported on an earlier filed Form 4. All such statements shall be prepared and filed in accordance with the requirements of the applicable form.

(b) A person filing statements pursuant to section 16(a) of the Act with respect to any class of equity securities registered pursuant to section 12 of the Act need not file an additional statement on Form 3:

(1) When an additional class of equity securities of the same issuer becomes registered pursuant to section 12 of the Act; or

(2) When such person assumes a different or an additional relationship to the same issuer (for example, when an officer becomes a director).

(c) Any issuer that has equity securities listed on more than one

national securities exchange may designate one exchange as the only exchange with which reports pursuant to section 16(a) of the Act need be filed. Such designation shall be made in writing and shall be filed with the Commission and with each national securities exchange on which any equity security of the issuer is listed at the time of such election. The reporting person's obligation to file reports with each national securities exchange on which any equity security of the issuer is listed shall be satisfied by filing with the exchange so designated.

(d) Any person required to file a statement with respect to securities of a single issuer under both section 16(a) of the Act and either section 17(a) of the Public Utility Holding Company Act of 1935 or section 30(f) of the Investment Company Act of 1940 may file a single statement containing the required information, which will be deemed to be filed under both Acts.

(e) Any person required to file a statement under section 16(a) of the Act shall, not later than the time the statement is transmitted for filing with the Commission, send or deliver a duplicate to the person designated by the issuer to receive such statements, or, in the absence of such a designation, to the issuer's corporate secretary or person performing equivalent functions.

(f)(1) A Form 5 shall be filed by every person who at any time during the issuer's fiscal year was subject to section 16 of the Act with respect to such issuer, except as provided in paragraph (f)(2) of this section. The Form shall be filed within 45 days after the issuer's fiscal year end, and shall disclose the following holdings and transactions not reported previously on Forms 3, 4 or 5:

(i) All transactions during the most recent fiscal year that were either exempt from section 16(b) of the Act or constituted small acquisitions pursuant to § 240.16a-6(a);

(ii) All holdings and transactions that should have been reported during the most recent fiscal year, but were not; and

(iii) With respect to the first Form 5 requirement for a reporting person, all holdings and transactions that should have been reported in each of the issuer's last two fiscal years but were not, based on the reporting person's reasonable belief in good faith in the completeness and accuracy of the information.

(2) Notwithstanding the above, no Form 5 shall be required where all transactions otherwise required to be reported on the Form 5 have been reported before the due date of the Form 5.

Note: Persons no longer subject to section 16 of the Act, but who were subject to the Section at any time during the issuer's fiscal year, must file a Form 5 unless paragraph (f)(2) is satisfied. *See also* § 240.16a-2(b) regarding the reporting obligations of persons ceasing to be officers or directors.

(g) All transactions shall be reported on Form 4, except as follows:

(1) Small acquisitions as specified in § 240.16a-6(a) shall be reported in the manner specified by that section;

(2) Exercises and conversions of derivative securities exempted pursuant to § 240.16b-6(b) shall be reported in the manner specified by § 240.16a-4; and

(3) Transactions that are exempted by operation of any rule pursuant to section 16(b) of the Act, other than exercises and conversions of derivative securities exempted pursuant to § 240.16b-6(b), shall be reported on either Form 5, or, at the option of the reporting person, Form 4, but in no event later than the due date of the Form 5 with respect to the fiscal year in which the transaction occurred.

(h) The date of filing with the Commission shall be the date of receipt by the Commission; *Provided, however,* That a Form 3, 4, or 5 shall be deemed to have been timely filed if the filing person establishes that the Form had been transmitted timely to a third party company or governmental entity providing delivery services in the ordinary course of business, which guaranteed delivery of the filing to the Commission no later than the required filing date.

§ 240.16a-4 Derivative securities.

(a) For purposes of section 16 of the Act, both derivative securities and the underlying securities to which they relate shall be deemed to be the same class of equity securities, *except that* the acquisition or disposition of any derivative security shall be separately reported.

(b) The exercise or conversion of a call equivalent position shall be reported no later than the next Form 4 otherwise required or the Form 5 filed with respect to the fiscal year in which the transaction occurred, whichever is earlier, and shall be treated for reporting purposes as:

(1) A purchase of the underlying security; and

(2) A closing of the derivative security position.

(c) The exercise of a put equivalent position shall be reported no later than the next Form 4 otherwise required or the Form 5 filed with respect to the fiscal year in which the transaction occurred, whichever is earlier, and shall be treated for reporting purposes as:

(1) A sale of the underlying security; and

(2) A closing of the derivative security position.

(d) If the next Form 4 otherwise required or the Form 5 is due within fewer than ten days after an exercise or conversion, the exercise or conversion may be reported on the next required report.

Note: Under § 240.16b-6(b), a purchase or sale resulting from an exercise or conversion of a derivative security generally is exempt from section 16(b) of the Act.

§ 240.16a-5 Odd-lot dealers.

Transactions by an odd-lot dealer (a) in odd-lots as reasonably necessary to carry on odd-lot transactions, or (b) in round lots to offset odd-lot transactions previously or simultaneously executed or reasonably anticipated in the usual course of business, shall be exempt from the provisions of section 16(a) of the Act with respect to participation by such odd-lot dealer in such transaction.

§ 240.16a-6 Small acquisitions.

(a) Any acquisition of an equity security not exceeding $10,000 in market value, or of the right to acquire such securities, shall be reported no later than the next Form 4 otherwise required or the Form 5 filed with respect to the fiscal year in which the transaction occurred, whichever is earlier, subject to the following conditions:

(1) Total acquisitions of securities of the same class (including securities underlying derivative securities) within the prior six months do not exceed $10,000 in market value; and

(2) The person making the acquisition does not within six months thereafter make any disposition, other than by a transaction exempt from section 16(b) of the Act.

(b) Should an acquisition no longer qualify for the reporting deferral in paragraph (a) of this section, all such acquisitions that have not yet been reported shall be reported on a Form 4 within ten days after the close of the calendar month in which the conditions of paragraph (a) of this section are no longer met.

(c) If the next Form 4 otherwise required or the Form 5 is due within fewer than ten days after an acquisition subject to the section, the acquisition may be reported on the next required report.

§ 240.16a-7 Transactions effected in connection with a distribution.

(a) Any purchase and sale, or sale and purchase, of a security that is made in connection with the distribution of a substantial block of securities shall be exempt from the provisions of section 16(a) of the Act, to the extent specified in this rule, subject to the following conditions:

(1) The person effecting the transaction is engaged in the business of distributing securities and is participating in good faith, in the ordinary course of such business, in the distribution of such block of securities; and

(2) The security involved in the transaction is:

(i) Part of such block of securities and is acquired by the person effecting the transaction, with a view to distribution thereof, from the issuer or other person on whose behalf such securities are being distributed or from a person who is participating in good faith in the distribution of such block of securities; or

(ii) A security purchased in good faith by or for the account of the person effecting the transaction for the purpose of stabilizing the market price of securities of the class being distributed or to cover an over-allotment or other short position created in connection with such distribution.

(b) Each person participating in the transaction must qualify on an individual basis for an exemption pursuant to this section.

§ 240.16a-8 Trusts.

(a) *Persons subject to section 16.—(1) Trusts.* A trust shall be subject to section 16 of the Act with respect to securities of the issuer if:

(i) The trust is a beneficial owner, pursuant to § 240.16a-1(a)(1), of more than ten percent of any class of equity securities of the issuer registered pursuant to section 12 of the Act ("ten percent beneficial owner"); or

(ii) The trustee otherwise is subject to section 16 of the Act and exercises or shares investment control over the issuer's securities held by the trust, and either the trustee or a member of the trustee's immediate family has a pecuniary interest in the issuer's securities held by the trust, except where the trustee is:

(A) An entity or person that in the ordinary course of business acts as trustee, and is specified in § 240.16a-1(a)(1) (i) through (viii); or

(B) An officer or director of the issuer serving as trustee for the issuer's employee benefit plan trust.

(2) *Trustees, beneficiaries, and settlors.* In determining whether a trustee, beneficiary, or settlor is a ten percent beneficial owner with respect to the issuer:

(i) Such persons shall be deemed the beneficial owner of the issuer's securities held by the trust, to the extent specified by § 240.16a-1(a)(1); and

(ii) Settlors shall be deemed the beneficial owner of the issuer's securities held by the trust where they have the power to revoke the trust without the consent of another person.

(b) *Trust holdings and transactions.* If the trust is subject to section 16 of the Act, all holdings and transactions in the issuer's securities held by the trust shall be reported by the trustee on behalf of the trust, and need not be reported by other parties, except as follows:

(1) *Trusts.* The trust need not report holdings and transactions in the issuer's securities held by the trust in an employee benefit plan subject to the Employee Retirement Income Security Act over which no trustee exercises investment control.

(2) *Trustees.* If, as provided by § 240.16a-1(a)(2), a trustee subject to section 16 of the Act has a pecuniary interest in any holding or transaction in the issuer's securities held by the trust, such holding or transaction shall be attributed to the trustee and shall be reported by the trustee in the trustee's individual capacity, as well as on behalf of the trust. With respect to performance fees and holdings of the trustee's immediate family, trustees shall be deemed to have a pecuniary interest in the trust holdings and transactions in the following circumstances:

(i) A performance fee is received that does not meet the proviso of § 240.16a-1(a)(2)(ii)(C); or

(ii) At least one beneficiary of the trust is a member of the trustee's immediate family. The pecuniary interest of the immediate family member(s) shall be attributed to and reported by the trustee.

(3) *Beneficiaries.* A beneficiary subject to section 16 of the Act shall have or share reporting obligations with respect to transactions in the issuer's securities held by the trust, if the beneficiary is a beneficial owner of the securities pursuant to § 240.16a-1(a)(2), as follows:

(i) If a beneficiary shares investment control with the trustee with respect to a trust transaction, the transaction shall be attributed to and reported by both the beneficiary and the trust;

(ii) If a beneficiary has investment control with respect to a trust transaction without consultation with the trustee, the transaction shall be attributed to and reported by the beneficiary only; and

(iii) In making a determination as to whether a beneficiary is the beneficial owner of the securities pursuant to § 240.16a-1(a)(2), beneficiaries shall be deemed to have a pecuniary interest in the issuer's securities held by the trust to the extent of their pro rata interest in the trust where the trustee does not exercise exclusive investment control.

(4) *Settlors.* If a settlor subject to section 16 of the Act reserves the right to revoke the trust without the consent of another person, the trust holdings and transactions shall be attributed to and reported by the settlor instead of the trust; *Provided, however,* That if the settlor does not exercise or share investment control over the issuer's securities held by the trust, the trust holdings and transactions shall be attributed to and reported by the trust instead of the settlor.

(c) *Remainder interests.* Remainder interests in a trust are deemed not to confer beneficial ownership for purposes of section 16 of the Act, provided that the persons with the remainder interests have no power, directly or indirectly, to exercise or share investment control over the trust.

(d) A trust, trustee, beneficiary or settlor becoming subject to section 16(a) of the Act pursuant to this rule also shall be subject to sections 16(b) and 16(c) of the Act.

§ 240.16a-9 Stock splits, stock dividends, and pro rata rights.

The following shall be exempt from section 16 of the Act:

(a) The increase or decrease in the number of securities held as a result of a stock split or stock dividend applying equally to all securities of that class; and

(b) The acquisition of rights, such as shareholder or pre-emptive rights, pursuant to a pro rata grant to all holders of the same class of equity securities registered under section 12 of the Act.

Note: The exercise or sale of a pro rata right shall be reported pursuant to § 240.16a-4 and the exercise shall be eligible for exemption from section 16(b) of the Act pursuant to § 240.16b-6(b).

§ 240.16a-10 Exemptions under section 16(a).

Except as provided in § 240.16a-6, any transaction exempted from the requirements of section 16(a) of the Act, insofar as it is otherwise subject to the provisions of section 16(b), shall be likewise exempt from section 16(b) of the Act.

9. Sections 240.16b–1 through 16b–8 are revised, §§ 240.16b–9 through 16b–11 are removed and the center heading is republished as follows:

Exemption of Certain Transactions From Section 16(b)

§ 240.16b–1 Transactions approved by a regulatory authority.

(a) Any purchase and sale, or sale and purchase, of a security shall be exempt from section 16(b) of the Act, if the transaction is effected by an investment company registered under the Investment Company Act of 1940 (15 U.S.C. 80a–1 *et seq.*) and both the purchase and sale of such security have been exempted from the provisions of section 17(a) (15 U.S.C. 80a–17(a)) of the Investment Company Act of 1940, by rule or order of the Commission.

(b) Any purchase and sale, or sale and purchase, of a security shall be exempt from the provisions of section 16(b) of the Act if:

(1) The person effecting the transaction is either a holding company registered under the Public Utility Holding Company Act of 1935 (15 U.S.C. 79a *et seq.*) or a subsidiary thereof; and

(2) Both the purchase and the sale of the security have been approved or permitted by the Commission pursuant to the applicable provisions of that Act and the rules and regulations thereunder.

(c) Any acquisition of securities made in exchange for other securities shall be exempt from the provisions of section 16(b) of the Act if:

(1) The securities are acquired from the issuer;

(2) The person acquiring the securities is subject to one or more of the provisions of part I of the Interstate Commerce Act;

(3) (i) The person acquiring the securities is subject to an order of, or has accepted a condition imposed by, the Interstate Commerce Commission in connection with an approval of a unification, merger or acquisition of control pursuant to 49 U.S.C. 11343–11347, requiring such person to dispose of all securities of the same class as those exchanged for the securities acquired; and

(ii) The issuance of the securities acquired by such person has been approved by the Interstate Commerce Commission pursuant to 49 U.S.C. 11301; and

(4) (i) The person acquiring voting equity securities has transferred all voting rights on an unrestricted basis to one or more banks or trust companies; and

(ii) Such transfer remains in effect until such securities are disposed of by such person.

§ 240.16b–2 Dividend or interest reinvestment plans.

Any acquisition of securities resulting from the reinvestment of dividends or interest on securities of the same issuer shall be exempt from section 16(b) of the Act if made pursuant to a plan, available on the same terms to all holders of that class of securities, providing for the regular reinvestment of dividends or interest.

§ 240.16b–3 Employee benefit plan transactions.

(a) *Plan Conditions.* A transaction by an officer or director shall be exempt from section 16(b) of the Act if it is pursuant to an employee benefit plan that satisfies the following two conditions and the condition of paragraph (b) of this section, if applicable; and the transaction satisfies one of the transaction exemptions of paragraphs (c), (d), (e), (f), or (g) of this section.

(1) *Written plan.* The plan shall set forth in writing the means or basis for determining eligibility to participate, as it relates to officers and directors, and either the price at which the securities may be offered and the amount of securities to be awarded or the method by which the price and the amount of the award are to be determined; and

(2) *Transferability restriction.* Either the plan or an agreement in writing signed by the officer or director participating in the plan shall provide that a derivative security issued under the employee benefit plan is not transferable by the participant other than by will or the laws of descent and distribution or pursuant to a qualified domestic relations order as defined by the Internal Revenue Code of 1986, as amended, 26 U.S.C. 1 *et seq.* ("Internal Revenue Code") or title I of the Employee Retirement Income Security Act, or the rules thereunder. The designation of a beneficiary by an officer or director does not constitute a transfer.

(b) *Approval by security holders.* The plan, other than a plan specified in paragraph (b)(3) of this section, has been approved, directly or indirectly,

(1) By the affirmative votes of the holders of a majority of the securities of the issuer present, or represented, and entitled to vote at a meeting duly held in accordance with the applicable laws of the state or other jurisdiction in which the issuer was incorporated, or

(2) By the written consent of the holders of a majority of the securities of the issuer entitled to vote: *Provided, however,* That if such vote or written consent was not solicited substantially in accordance with the rules and regulations, if any, in effect under section 14(a) of the Act at the time of such vote or written consent, the issuer shall furnish in writing to the holders of record of the securities entitled to vote for the plan substantially the same information concerning the plan which would be required by the rules and regulations in effect under section 14(a) of the Act at the time such information is furnished, if proxies to be voted with respect to the approval or disapproval of the plan were then being solicited, on or prior to the date of the first annual meeting of security holders held subsequent to the later of

(i) The first registration of an equity security under section 12 of the Act or

(ii) The acquisition of an equity security for which exemption is claimed.

Such written information may be furnished by mail to the last known address of the security holders of record within 30 days prior to the date of mailing. Four copies of such written information shall be filed with, or mailed for filing to, the Commission not later than the date on which it is first sent or given to security holders of the issuer. For the purposes of this paragraph, the term "issuer" includes a predecessor corporation if the plan or obligations to participate thereunder were assumed by the issuer in connection with the succession. In addition, any amendment to the plan shall be similarly approved if the amendment would:

(A) Materially increase the benefits accruing to participants under the plan;

(B) Materially increase the number of securities which may be issued under the plan; or

(C) Materially modify the requirements as to eligibility for participation in the plan.

(3) A plan, established and operated as a trust, satisfying one of the following conditions below need not satisfy paragraph (b) of this section.

(i) Less than 20 percent in market value of the securities having a readily ascertainable market value held by such trust, determined as of the end of the preceding fiscal year of the trust, consists of equity securities held by persons subject to section 16(a) of the Act; or

(ii) The plan is a pension or retirement plan holding securities of the issuer, providing for broad-based employee participation.

(c) *Grant and award transactions.* The grant or award of an equity security,

including a derivative security, shall be exempt from section 16(b) of the Act if the plan satisfies the conditions of paragraph (a) and paragraph (b) of this section, if applicable, and the following conditions are met:

(1) *Six month holding period.* The equity security is held for six months from the date of grant or, in the case of a derivative security, at least six months elapse from the date of acquisition of the derivative security to the date of disposition of the derivative security (other than upon exercise or conversion) or its underlying equity security;

(2) *Plan administration.* The plan is administered in the manner specified in either paragraph (c)(2) (i) or (ii) of this section: *Provided, however,* That compliance with this paragraph (c)(2) is not required with respect to a grant or award of an equity security prior to the date the issuer first registers the class of equity security under section 12 of the Act:

(i) *Disinterested administration.* The grant or award is made pursuant to an employee benefit plan in which selection of officers and directors for participation and decisions concerning the timing, pricing, and amount of a grant or award, if not determined under a formula meeting the conditions in paragraph (c)(2)(ii) of this section, are made solely by the board of directors, if each member is a disinterested person, or a committee of two or more directors, each of whom is a disinterested person, *i.e.*, a director who is not, during the one year prior to service as an administrator of a plan, granted or awarded equity securities pursuant to the plan or any other plan of the issuer or any of its affiliates, except that:

(A) Participation in a formula plan meeting the conditions in paragraph (c)(2)(ii) of this section shall not disqualify a director from being a disinterested person;

(B) Participation in an ongoing securities acquisition plan meeting the conditions in paragraph (d)(2)(i) of this section shall not disqualify a director from being a disinterested person;

(C) An election to receive an annual retainer fee in either cash or an equivalent amount of securities, or partly in cash and partly in securities, shall not disqualify a director from being a disinterested person; and

(D) Participation in a plan shall not disqualify a director from being a disinterested person for the purpose of administering another plan that does not permit participation by directors.

(ii) *Formula awards.* The grant or award is made pursuant to a plan that by its terms:

(A) Permits officers and/or directors to receive awards; either states the amount and price of securities to be awarded to designated officers and directors or categories of officers and directors, though not necessarily to others who may participate in the plan, and specifies the timing of awards to officers and directors; or sets forth a formula that determines the amount, price and timing, using objective criteria such as earnings of the issuer, value of the securities, years of service, job classification, and compensation levels; and

(B) Provides that these plan provisions shall not be amended more than once every six months, other than to comport with changes in the Internal Revenue Code, the Employee Retirement Income Security Act, or the rules thereunder.

(3) *Rights without a fixed price.* Rights granted or awarded with an exercise price that is not fixed at the time of grant or award shall not be deemed acquired until the price is fixed, and the six month holding period of § 240.16b–3(c)(1) shall not commence until such time.

(d) *Participant-directed transactions.* A participant-directed transaction and any related employer matching contribution shall be exempt from section 16(b) of the Act, if the plan satisfies the conditions of paragraph (a) and paragraph (b) of this § 240.16b–3, if applicable, and the transaction satisfies the conditions of either paragraph (d) (1) or (2) of this § 240.16b–3.

(1) A transaction in any participant-directed plan of the issuer meets the requirements of either paragraph (d)(1) (i) or (ii) of this section:

(i) The transaction is pursuant to an irrevocable election made by the participant at least six months in advance of the effective date of the transaction; or

(ii) The transaction is pursuant to an election to receive either securities or cash, or a combination of securities and cash, or to defer a distribution of securities or cash in whole or in part, incident to death, retirement, disability, or termination of employment; or

(2) A transaction in a thrift, stock purchase, or similar ongoing securities acquisition plan meets the requirements of either paragraph (d)(2) (i) or (ii) of this section:

(i) For initial or periodic transactions resulting from an election to participate or change levels of participation with respect to securities of the issuer:

(A) The plan provides for broad-based employee participation and the terms of the plan do not discriminate in favor of highly compensated employees;

(B) Officer or director participants making withdrawals must cease further purchases in the plan for six months, or the securities so distributed must be held by the participant six months prior to disposition: *Provided, however,* That extraordinary distributions of all of the issuer's securities held by the plan and distributions in connection with death, retirement, disability, termination of employment, or a qualified domestic relations order as defined by the Internal Revenue Code or title I of the Employee Retirement Income Security Act, or the rules thereunder, are not subject to this requirement;

(C) Officer or director participants who cease participation in the plan may not participate again for at least six months; and

(D) For stock purchase plans under section 423 of the Internal Revenue Code or similar plans, where the purchase price of the stock is not fixed and the participant is not obligated to purchase the stock until exercise of a right, in addition to the foregoing conditions, the stock acquired is held for six months from the date the stock purchase price is fixed; or

(ii) For intra-plan transfers between an equity securities of the issuer fund and another fund, the transaction is pursuant to an election made on a quarterly date specified in paragraph (e)(3) of this section at least six months after the date of the previous intra-plan transfer election relating to an equity securities of the issuer fund.

(e) *Cash settlements of stock appreciation rights and tax withholding.* A transaction involving the exercise and cancellation of a stock appreciation right (whether or not the transaction also involves the related surrender and cancellation of a stock option), and the receipt of cash in complete or partial settlement of that right, or the cash settlement of an equity security to satisfy the tax withholding consequences of an exercise of a derivative security related to the equity security, which shall be deemed a stock appreciation right, shall be exempt from section 16(b) of the Act if the plan satisfies the conditions of paragraph (a) and paragraph (b) of this § 240.16b–3, if applicable, and the following conditions are met:

(1) *Information about the issuer.* (i) The issuer of the stock appreciation right has been subject to the reporting requirements of section 13(a) of the Act for at least a year prior to the transaction and has filed all reports and statements required to be filed pursuant to that section for that year; and

(ii) The issuer of the stock appreciation right on a regular basis releases for publication quarterly and annual summary statements of sales and earnings. This condition shall be deemed satisfied if the specified financial data (A) appears on a wire service, (B) appears in a financial news service, (C) appears in a newspaper of general circulation, or (D) is otherwise made publicly available, for example, by press releases to a wire service, financial news service, or newspapers of general circulation;

(2) *Administration of the plan.* (i) The plan is administered in the manner specified in paragraph (c)(2) of this section; and

(ii) The board of directors of the issuer or a committee of two or more directors who are disinterested persons as defined in paragraph (c)(2)(i) of this section has sole discretion either (A) to determine the form in which payment of the right will be made (*i.e.*, cash, securities, or any combination thereof) or (B) to approve the election of the participant to receive cash in whole or in part in settlement of the right. Such approval or disapproval may be given at any time after the election to which it relates;

(3) *Timing of the election.* The election by the participant to receive cash in full or partial settlement of the stock appreciation right, as well as the exercise by the participant of the stock appreciation right for cash, is made during the period beginning on the third business day following the date of release of the financial data specified in paragraph (e)(1)(ii) of this section and ending on the twelfth business day following such date. This condition, however, shall not apply to any exercise by the participant of a stock appreciation right for cash where the date of exercise is automatic or fixed in advance under the plan and is outside the control of the participant; and

(4) *Holding period.* The right is held for six months from the date of acquisition to the date of cash settlement.

(f) *Cancellations, expirations, surrenders, and qualified domestic relations orders.* If the plan satisfies the conditions of paragraph (a) and paragraph (b) of this § 240.16b-3, if applicable, the following transactions are exempt from section 16(b) of the Act:

(1) The expiration, cancellation, or surrender to the issuer of a stock option or stock appreciation right in connection with the grant of a replacement option or right;

(2) The surrender or delivery to the issuer of shares of its stock as payment for the exercise of an option, warrant or right with respect to shares of the same class; and

(3) The disposition of plan securities pursuant to a qualified domestic relations order as defined in the Internal Revenue Code or title I of the Employee Retirement Income Security Act, or the rules thereunder.

(g) *Distributions of plan securities.* A distribution to a participant of securities that have been held pursuant to a plan for the benefit of that participant shall be exempt from section 16(b) of the Act if the plan satisfies the conditions of paragraph (a), paragraph (b), if applicable, and either paragraph (c) or (d) of this § 240.16b-3.

Note: The following are not transactions subject to section 16 of the Act and need not be reported: The vesting of the right to receive a security, the lapse of restrictions relating to a security, and the election to participate in a plan, cease participation or change the level of participation. However, transactions resulting from elections to participate or change the level of participation are subject to section 16 of the Act and shall be reported on Form 4 or 5 as appropriate.

§ 240.16b-4 Issuer redemptions.

An acquisition by a person subject to section 16 of the Act of an issuer's equity securities shall be exempt, provided the securities are acquired through an issuer redemption transaction where:

(a) The securities redeemed ("surrendered securities"):

(1) Represent equity securities of an issuer whose assets consist entirely of cash, government securities, and equity securities in the issuer whose equity securities are acquired;

(2) Have a value equivalent to the equity securities acquired in the redemption; and

(3) Confer upon the holder the right to receive the acquired equity securities without the payment of any consideration other than the security redeemed;

(b) The person has not acquired or disposed of any surrendered securities during any six month period before or after the redemption transaction;

(c) The security acquired in the redemption transaction is not a derivative security; and

(d) The issuer of the securities acquired in the redemption has taken appropriate board action to establish the relationship between its equity securities and the surrendered securities and to establish the issuer's right to redeem.

§ 240.16b-5 Bona fide gifts and inheritance.

Both the acquisition and the disposition of equity securities shall be exempt from the operation of section 16(b) of the Act if they are: (a) Bona fide gifts; or (b) transfers of securities by will or the laws of descent and distribution.

§ 240.16b-6 Derivative securities.

(a) The establishment of or increase in a call equivalent position or liquidation of or decrease in a put equivalent position shall be deemed a purchase of the underlying security for purposes of section 16(b) of the Act, and the establishment of or increase in a put equivalent position or liquidation of or decrease in a call equivalent position shall be deemed a sale of the underlying securities for purposes of section 16(b) of the Act: *Provided, however,* That if the increase or decrease occurs as a result of the fixing of the exercise price of a right initially issued without a fixed price, where the date the price is fixed is not known in advance and is outside the control of the recipient, the increase or decrease shall be exempt from section 16(b) of the Act with respect to any offsetting transaction within the six months prior to the date the price is fixed.

(b) The closing of a derivative security position as a result of its exercise or conversion shall be exempt from the operation of section 16(b) of the Act, and the acquisition of underlying securities at a fixed exercise price due to the exercise or conversion of a call equivalent position or the disposition of underlying securities at a fixed exercise price due to the exercise of a put equivalent position shall be exempt from the operation of section 16(b) of the Act: *Provided, however,* That the acquisition of underlying securities from the exercise of an out-of-the-money option, warrant, or right shall not be exempt unless the exercise is necessary to comport with the sequential exercise provisions of the Internal Revenue Code (26 U.S.C. 422A).

(c) In determining the short-swing profit recoverable pursuant to section 16(b) of the Act from transactions involving the purchase and sale or sale and purchase of derivative and other securities, the following rules apply:

(1) Short-swing profits in transactions involving the purchase and sale or sale and purchase of derivative securities that have identical characteristics (*e.g.*, purchases and sales of call options of the same strike price and expiration date, or purchases and sales of the same series of convertible debentures) shall

be measured by the actual prices paid or received in the short-swing transactions.

(2) Short-swing profits in transactions involving the purchase and sale or sale and purchase of derivative securities having different characteristics but related to the same underlying security (*e.g.*, the purchase of a call option and the sale of a convertible debenture) or derivative securities and underlying securities shall not exceed the difference in price of the underlying security on the date of purchase or sale and the date of sale or purchase. Such profits may be measured by calculating the short-swing profits that would have been realized had the subject transactions involved purchases and sales solely of the derivative security that was purchased or solely of the derivative security that was sold, valued as of the time of the matching purchase or sale, and calculated for the lesser of the number of underlying securities actually purchased or sold.

(d) Upon cancellation or expiration of an option within six months of the writing of the option, any profit derived from writing the option shall be recoverable under section 16(b) of the Act. The profit shall not exceed the premium received for writing the option. The disposition or closing of a long derivative security position, as a result of cancellation or expiration, shall be exempt from section 16(b) of the Act where no value is received from the cancellation or expiration.

§ 240.16b-7 Mergers, reclassifications, and consolidations.

(a) The following transactions shall be exempt from the provisions of section 16(b) of the Act:

(1) The acquisition of a security of a company, pursuant to a merger or consolidation, in exchange for a security of a company which, prior to the merger or consolidation, owned 85 percent or more of either

(i) The equity securities of all other companies involved in the merger or consolidation, or in the case of a consolidation, the resulting company; or

(ii) The combined assets of all the companies involved in the merger or consolidation, computed according to their book values prior to the merger or consolidation as determined by reference to their most recent available financial statements for a 12 month period prior to the merger or consolidation, or such shorter time as the company has been in existence.

(2) The disposition of a security, pursuant to a merger or consolidation, of a company which, prior to the merger or consolidation, owned 85 percent or more of either

(i) The equity securities of all other companies involved in the merger or consolidation or, in the case of a consolidation, the resulting company; or

(ii) The combined assets of all the companies undergoing merger or consolidation, computed according to their book values prior to the merger or consolidation as determined by reference to their most recent available financial statements for a 12 month period prior to the merger or consolidation.

(b) A merger within the meaning of this section shall include the sale or purchase of substantially all the assets of one company by another in exchange for equity securities which are then distributed to the security holders of the company that sold its assets.

(c) Notwithstanding the foregoing, if a person subject to section 16 of the Act makes any non-exempt purchase of a security in any company involved in the merger or consolidation and any non-exempt sale of a security in any company involved in the merger or consolidation within any period of less than six months during which the merger or consolidation took place, the exemption provided by this Rule shall be unavailable to the extent of such purchase and sale.

§ 240.16b-8 Voting trusts.

Any acquisition or disposition of an equity security or certificate representing equity securities involved in the deposit or withdrawal from a voting trust or deposit agreement shall be exempt from section 16(b) of the Act if substantially all of the assets held under the voting trust or deposit agreement immediately after the deposit or immediately prior to the withdrawal consisted of equity securities of the same class as the security deposited or withdrawn: *Provided, however,* That this exemption shall not apply if there is a non-exempt purchase or sale of an equity security of the class deposited within six months (including the date of withdrawal or deposit) of a non-exempt sale or purchase, respectively, of any certificate representing such equity security (other than the actual deposit or withdrawal).

10. Sections 240.16c-1 through 240.16c-3 and the undesignated center heading preceding them are revised and § 240.16c-4 is added, as follows:

Exemption of Certain Transactions From Section 16(c)

§ 240.16c-1 Brokers.

Any transaction shall be exempt from section 16(c) of the Act to the extent necessary to render lawful the execution by a broker of an order for an account in which the broker has no direct or indirect interest.

§ 240.16c-2 Transactions effected in connection with a distribution.

Any transaction shall be exempt from section 16(c) of the Act to the extent necessary to render lawful any sale made by or on behalf of a dealer in connection with a distribution of a substantial block of securities, where the sale is represented by an over-allotment in which the dealer is participating as a member of an underwriting group, or the dealer or a person acting on the dealer's behalf intends in good faith to offset such sale with a security to be acquired by or on behalf of the dealer as a participant in an underwriting, selling, or soliciting-dealer group of which the dealer is a member at the time of the sale, whether or not the security to be acquired is subject to a prior offering to existing security holders or some other class of persons.

§ 240.16c-3 Exemption of sales of securities to be acquired.

(a) Whenever any person is entitled, incident to ownership of an issued security and without the payment of consideration, to receive another security "when issued" or "when distributed," the sale of the security to be acquired shall be exempt from the operation of section 16(c) of the Act: *Provided,* That:

(1) The sale is made subject to the same conditions as those attaching to the right of acquisition;

(2) Such person exercises reasonable diligence to deliver such security to the purchaser promptly after the right of acquisition matures; and

(3) Such person reports the sale on the appropriate form for reporting transactions by persons subject to section 16(a) of the Act.

(b) This section shall not exempt transactions involving both a sale of the issued security and a sale of a security "when issued" or "when distributed" if the combined transactions result in a sale of more securities than the aggregate of issued securities owned by the seller plus those to be received for the other security "when issued" or "when distributed."

§ 240.16c-4 Derivative securities.

Establishing or increasing a put equivalent position shall be exempt from section 16(c) of the Act, so long as the amount of securities underlying the put equivalent position does not exceed the amount of underlying securities otherwise owned.

PART 249—FORMS, SECURITIES EXCHANGE ACT OF 1934

11. The authority citation for part 249 continues to read, in part, as follows:

Authority: The Securities Exchange Act of 1934, 15 U.S.C. 78a, *et seq.* * * *

12. By revising § 249.103 (the description of Form 3) as follows:

§ 249.103 Form 3, initial statement of beneficial ownership of securities.

This Form shall be filed pursuant to Rule 16a-3 (§ 240.16a-3 of this chapter) for initial statements of beneficial ownership of securities. The Commission is authorized to solicit the information required by this Form pursuant to sections 16(a) and 23(a) of the Securities Exchange Act of 1934 (17 CFR part 240); sections 17(a) and 20(a) of the Public Utility Holding Company Act of 1935 (17 CFR part 250); and sections 30(f) and 38 of the Investment Company Act of 1940 (17 CFR part 270), and the rules and regulations thereunder. Disclosure of information specified on this Form is mandatory, except for disclosure of IRS or Social Security numbers of the reporting person, which is voluntary. If such numbers are furnished, they will assist the Commission in distinguishing reporting persons with similar names and will facilitate the prompt processing of the Form. The information will be used for the primary purpose of disclosing the holdings of directors, officers and beneficial owners of registered companies. Information disclosed will be a matter of public record and available for inspection by members of the public. The Commission can use the information in investigations or litigation involving the federal securities laws or other civil, criminal, or regulatory statutes or provisions, as well as for referral to other governmental authorities and self-regulatory organizations. Failure to disclose required information may result in civil or criminal action against persons involved for violations of the federal securities laws and rules.

13. By revising § 249.104 (the description of Form 4) as follows:

§ 249.104 Form 4, statement of changes in beneficial ownership of securities.

This Form shall be filed pursuant to Rule 16a-3 (§ 240.16a-3 of this chapter) for statements of changes in beneficial ownership of securities. The Commission is authorized to solicit the information required by this form pursuant to sections 16(a) and 23(a) of the Securities Exchange Act of 1934 (17 CFR part 240); sections 17(a) and 20(a) of the Public Utility Holding Company Act of 1935 (17 CFR part 250); and sections 30(f) and 38 of the Investment Company Act of 1940 (17 CFR part 270), and the rules and regulations thereunder. Disclosure of information specified on this Form is mandatory, except for disclosure of IRS or Social Security numbers of the reporting person, which is voluntary. If such numbers are furnished, they will assist the Commission in distinguishing reporting persons with similar names and will facilitate the prompt processing of the Form. The information will be used for the primary purpose of disclosing the transactions and holdings of directors, officers and beneficial owners of registered companies. Information disclosed will be a matter of public record and available for inspection by members of the public. The Commission can use the information in investigations or litigation involving the federal securities laws or other civil, criminal, or regulatory statutes or provisions, as well as for referral to other governmental authorities and self-regulatory organizations. Failure to disclose required information may result in civil or criminal action against persons involved for violations of the federal securities laws and rules.

14. By adding § 249.105 (the description of Form 5) to subpart B to read as set forth below:

§ 249.105 Form 5, annual statement of beneficial ownership of securities.

This Form shall be filed pursuant to Rule 16a-3 (§ 240.16a-3 of this chapter) for annual statements of beneficial ownership of securities. The Commission is authorized to solicit the information required by this Form pursuant to sections 16(a) and 23(a) of the Securities Exchange Act of 1934 (17 CFR part 240); sections 17(a) and 20(a) of the Public Utility Holding Company Act of 1935 (17 CFR part 250); and sections 30(f) and 38 of the Investment Company Act of 1940 (17 CFR part 270), and the rules and regulations thereunder. Disclosure of information specified on this Form is mandatory, except for disclosure of IRS or Social Security numbers of the reporting person, which is voluntary. If such numbers are furnished, they will assist the Commission in distinguishing reporting persons with similar names and will facilitate the prompt processing of the Form. The information will be used for the primary purpose of disclosing the transactions and holdings of officers, directors and beneficial owners of registered companies. Information disclosed will be a matter of public record and available for inspection by members of the public. The Commission can use the information in investigations or litigation involving the federal securities laws or other civil, criminal, or regulatory statutes or provisions, as well as for referral to other governmental authorities and self-regulatory organizations. Failure to disclose required information may result in civil or criminal action against persons involved for violations of the federal securities laws and rules.

§ 249.310 (Form 10-K) [Amended]

15. By amending Form 10-K (§ 249.310) by adding the following paragraph at the bottom of the cover page, and revising part III Item 10, as follows:

Note: The text of Form 10-K does not and this amendment will not appear in the Code of Federal Regulations.

Form 10-K, annual report pursuant to sections 13 or 15(d) of the Securities Exchange Act of 1934.

* * * * *

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§ 229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in part III of this Form 10-K or any amendment to this Form 10-K. [ ]

* * * * *

Part III

* * * * *

Item 10. Directors and Executive Officers of the Registrant

Furnish the information required by Items 401 and 405 of Regulation S-K. (§ 229.401 and § 229.405 of this chapter).

Instruction

Checking the box provided on the cover page of this Form to indicate that Item 405 disclosure of delinquent Form 3, 4, or 5 filers is not contained herein is intended to facilitate Form processing and review. Failure to provide such indication will not create liability for violation of the federal securities laws. The space should be checked only if there is no disclosure in this Form of reporting person delinquencies in response to Item 405 and the registrant, at the time of filing the Form 10-K, has reviewed the information necessary to ascertain, and has determined that, Item 405 disclosure is not expected to be contained in part III of the Form 10-K or incorporated by reference.

PART 270—RULES AND REGULATIONS, INVESTMENT COMPANY ACT OF 1940

16. The authority citation for part 270 continues to read, in part, as follows:

Authority: Secs. 38, 40, 54 Stat. 841, 842; 15 U.S.C. 80a-37, 80c-89; The Investment

Company Act of 1940, as amended, 15 U.S.C. 80a-1 *et seq.*, unless otherwise noted; * * *

17. Section 270.30f-1 is revised to read as follows:

§ 270.30f-1. Applicability of section 16 of the Exchange Act to section 30(f)

(a) The filing of any statement prescribed under section 16(a) of the Securities Exchange Act of 1934 shall satisfy the corresponding requirements of section 30(f) of the Investment Company Act of 1940.

(b) The rules under section 16 of the Securities Exchange Act of 1934 shall apply to any duty, liability or prohibition imposed with respect to a transaction involving any security of a registered closed-end company under section 30(f) of the Act.

(c) No statements need be filed pursuant to section 30(f) of the Act by an affiliated person of an investment adviser in his or her capacity as such if such person is solely an employee, other than an officer, of such investment adviser.

PART 274—FORMS PRESCRIBED UNDER THE INVESTMENT COMPANY ACT OF 1940

18. The authority citation for part 274 continues to read in part as follows:

Authority: The Investment Company Act of 1940, 15 U.S.C. § 80a-1 *et seq.* * * *

§ 274.101 (Form N-SAR) [Amended]

19. By amending instructions to Form N-SAR (§ 274.101) by redesignating instructions to sub-item 77Q as instructions to sub-item 77Q1, redesignating instructions to sub-item 102P as instructions to sub-item 102P1, and by adding instructions to sub-items 77Q2-3 and 102P2-3 as follows:

Note: The text of Form N-SAR does not, and this amendment will not, appear in the Code of Federal Regulations.

* * * * *

Instructions to Specific Items

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SUB-ITEM 77Q1 Exhibits

* * * * *

SUB-ITEM 77Q2

For closed-end management companies except small business investment companies, furnish the information called for by Item 405 of Regulation S-K (17 CFR 229.405). Notwithstanding requirements in General Instruction A of this Form to file all items except Items 80 through 85 semi-annually, registrants need complete this paragraph of the sub-item only once each year as an annual supplement to the form filed after the end of a registrant's fiscal year.

SUB-ITEM 77Q3

Furnish any other information required to be included as an exhibit pursuant to such rules and regulations as the Commission may prescribe.

* * * * *

SUB-ITEM 102P1 Exhibits

* * * * *

SUB-ITEM 102P2

Furnish the information called for by Item 405 of Regulation S-K (17 CFR 229.405). Notwithstanding requirements in General Instruction A of this Form to file all items except Items 105 through 110 semi-annually, registrants need complete this paragraph of the sub-item only once each year as an annual supplement to the form filed after the end of a registrant's fiscal year.

SUB-ITEM 102P3

Furnish any other information required to be included as an exhibit pursuant to such rules and regulations as the Commission may prescribe.

* * * * *

XIV. Text of New Forms

20. By amending Form 3 (§ 249.103) and Form 4 (§ 249.104) and adding Form 5 (§ 249.105) as set forth below.

Note: The text and instructions of Forms 3, 4 and 5 do not and the amendments will not appear in the Code of Federal Regulations.

OMB Approval

OMB Number: 3235-0104
Expires: February 1, 1994
Estimated average burden hours per response: 0.5

United States Securities and Exchange Commission
Washington, DC 20549

Form 3—Initial Statement of Beneficial Ownership of Securities

The Commission is authorized to solicit the information required by this form pursuant to sections 16(a) and 23(a) of the Securities Exchange Act of 1934; sections 17(a) and 20(a) of the Public Utility Holding Company Act of 1935; and sections 30(f) and 38 of the Investment Company Act of 1940, and the rules and regulations thereunder.

Disclosure of information specified on this form is mandatory, except for disclosure of IRS or Social Security numbers of the reporting person, which is voluntary. If such numbers are furnished, they will assist the Commission in distinguishing reporting persons with similar names and will facilitate the prompt processing of the form. The information will be used for the primary purpose of disclosing the holdings of directors, officers, and beneficial owners of registered companies. Information disclosed will be a matter of public record and available for inspection by members of the public. The Commission can use it in investigations or litigation involving the Federal securities laws or other civil, criminal, or regulatory statutes or provisions, as well as for referral to other governmental authorities and self-regulatory organizations. Failure to disclose required information may result in civil or criminal action against persons involved for violations of the Federal securities laws and rules.

General Instructions

1. Who Must File

(a) This Form must be filed by the following persons ("reporting person"):

(i) Any director or officer of an issuer with a class of equity securities registered pursuant to section 12 of the Securities Exchange Act of 1934 ("Exchange Act");

(Note: Title is not determinative for purposes of determining "officer" status. *See* Rule 16a-1(f) for the definition of "officer");

(ii) Any beneficial owner of greater than 10% of a class of equity securities registered under Section 12 of the Exchange Act, as determined by voting or investment control over the securities pursuant to Rule 16a-1(a)(1) ("ten percent holder");

(iii) Any officer or director of a registered holding company pursuant to section 17(a) of the Public Utility Holding Company Act of 1935;

(iv) Any officer, director, member of an advisory board, investment adviser, affiliated person of an investment adviser, or beneficial owner of more than 10% of any class of outstanding securities (other than short-term paper) of a registered closed-end investment company, under Section 30(f) of the Investment Company Act of 1940; and

(v) Any trust, trustee, beneficiary or settlor required to report pursuant to Rule 16a-8.

(b) If a reporting person is not an officer, director, or 10% holder, the person should check "other" in Item 5 (Relationship of Reporting Person to Issuer) and describe the reason for reporting status in the space provided.

(c) If a person described above does not beneficially own any securities required to be reported (*see* Rule 16a-1 and Instruction 5), the person is required to file this Form and state that no securities are beneficially owned.

2. When Form Must be Filed

(a) This Form must be filed within 10 days after the event in which the person becomes a reporting person (*i.e.*, officer, director, ten percent holder or other person). This Form and any amendment

is deemed filed with the Commission or the Exchange on the date it is received by the Commission or the Exchange respectively. *See*, however, Rule 16a-3(h) regarding delivery to a third party business that guarantees delivery of the filing no later than the specified due date.

(b) A reporting person of an issuer that is registering securities for the first time under section 12 of the Exchange Act must file this Form no later than the effective date of the registration statement.

(c) A separate Form shall be filed to reflect beneficial ownership of securities of each issuer, except that a single statement shall be filed with respect to the securities of a registered public utility holding company and all of its subsidiary companies.

3. Where Form Must be Filed

(a) File three copies of this Form or any amendment, at least one of which is manually signed, with the Securities and Exchange Commission, 450 5th Street, NW., Washington, DC 20549.

(**Note:** Acknowledgment of receipt by the Commission may be obtained by enclosing a self-addressed stamped postcard identifying the Form or amendment filed.)

(b) At the time this Form or any amendment is filed with the Commission, file one copy with each Exchange on which any class of securities of the issuer is registered. If the issuer has designated a single Exchange to receive Section 16 filings, the copy shall be filed with that Exchange only.

(c) Any person required to file this Form or amendment shall, not later than the time the Form is transmitted for filing with the Commission, send or deliver a copy to the person designated by the issuer to receive the copy or, if no person is so designated, the issuer's corporate secretary (or person performing similar functions) in accordance with Rule 16a-3(e).

4. Class of Securities Reported

(a)(i) Persons reporting pursuant to section 16(a) of the Exchange Act shall include information as to their beneficial ownership of any class of equity securities of the issuer, even though one or more of such classes may not be registered pursuant to Section 12 of the Exchange Act.

(ii) Persons reporting pursuant to section 17(a) of the Public Utility Holding Company Act of 1935 shall include information as to their beneficial ownership of any class of securities (equity or debt) of the registered holding company and of all of its subsidiary companies and specify the name of the parent or subsidiary issuing the securities.

(iii) Persons reporting pursuant to section 30(f) of the Investment Company Act of 1940 shall include information as to their beneficial ownership of any class of securities (equity or debt) of the registered closed-end investment company (other than "short-term paper" as defined in section 2(a)(38) of the Investment Company Act).

(b) The title of the security should clearly identify the class, even if the issuer has only one class of securities outstanding; for example, "Common Stock," "Class A Common Stock," "Class B Convertible Preferred Stock," etc.

(c) The amount of securities beneficially owned should state the face amount of debt securities (U.S. Dollars) or the number of equity securities, whichever is appropriate.

5. Holdings Required to be Reported

(a) *General Requirements.* Report holdings of each class of securities of the issuer beneficially owned as of the date of the event requiring the filing of this Form. See Instruction 4 as to securities required to be reported.

(b) *Beneficial Ownership Reported (Pecuniary Interest).* (i) Although, for purposes of determining status as a ten percent holder, a person is deemed to beneficially own securities over which that person has voting or investment control (*see* Rule 16a-1(a)(1)), for reporting purposes, a person is deemed to be the beneficial owner of securities if that person has or shares the opportunity, directly or indirectly, to profit or share in any profit derived from a transaction in the securities ("pecuniary interest"). *See* Rule 16a-1(a)(2). *See also* Rule 16a-8 for application of the beneficial ownership definition to trust holdings and transactions.

(ii) Both direct and indirect beneficial ownership of securities shall be reported. Securities beneficially owned directly are those held in the reporting person's name or in the name of a bank, broker or nominee for the account of the reporting person. In addition, securities held as joint tenants, tenants in common, tenants by the entirety, or as community property are to be reported as held directly. If a person has a pecuniary interest, by reason of any contract, understanding or relationship (including a family relationship or arrangement), in securities held in the name of another person, that person is an indirect beneficial owner of those securities. *See* Rule 16a-1(a)(2)(ii) for certain indirect beneficial ownerships.

(iii) Report securities beneficially owned directly on a separate line from those beneficially owned indirectly. Report different forms of indirect ownership on separate lines. The nature of indirect ownership shall be stated as specifically as possible; for example, "By Self as Trustee for X," "By Spouse," "By X Trust," "By Y Corporation," etc.

(iv) In stating the amount of securities owned indirectly through a partnership, corporation, trust, or other entity, report the number of securities representing the reporting person's proportionate interest in securities beneficially owned by that entity. Alternatively, at the option of the reporting person, the entire amount of the entity's interest may be reported. *See* Rule 16a-1(a)(2)(ii)(B) and Rule 16a-1(a)(2)(iii).

(c) *Non-Derivative and Derivative Securities.* (i) Report non-derivative securities beneficially owned in Table I and derivative securities (*e.g.*, puts, calls, options, warrants, convertible securities, or other rights or obligations to buy or sell securities) beneficially owned in Table II. Derivative securities beneficially owned that are both equity securities and convertible or exchangeable for other equity securities (*e.g.*, convertible preferred securities) should be reported only on Table II.

(ii) The title of a derivative security and the title of the equity security underlying the derivative security should be shown separately in the appropriate columns in Table II. The "puts" and "calls" reported in Table II include, in addition to separate puts and calls, any combination of the two, such as spreads and straddles. In reporting an option in Table II, state whether it represents a right to buy, a right to sell, an obligation to buy, or an obligation to sell the equity securities subject to the option.

(iii) Describe in the appropriate columns in Table II characteristics of derivative securities, including title, exercise or conversion price, date exercisable, expiration date, and the title and amount of securities underlying the derivative security.

(iv) Securities constituting components of a unit shall be reported separately on the applicable table (*e.g.*, if a unit has a non-derivative security component and a derivative security component, the non-derivative security component shall be reported in Table I and the derivative security component shall be reported in Table II). The relationship between individual securities comprising the unit shall be indicated in the space provided for explanation of responses.

6. Additional Information

If space provided in the line items of this Form or space provided for additional comments is insufficient, attach another Form (or copy of the Form) completed as appropriate. Each Form attached as a continuation must include information required in Items 1, 4 and 6 of the Form. The number of pages comprising the report (Form plus attachment) shall be indicated at the bottom of each report page (*e.g.*, 1 of 3, 2 of 3, 3 of 3). If additional information is not reported in this manner, the Commission will assume no additional information was provided.

7. Signature

(a) If the Form is filed for an individual, it shall be signed by that person or specifically on behalf of the individual by a person authorized to sign for the individual. If signed on behalf of the individual by another person, the authority of such person to sign the Form shall be confirmed to the Commission in writing in an attachment to the Form or as soon as practicable in an amendment by the individual for whom the Form is filed, unless such a confirmation still in effect is on file with the Commission. The confirming statement need only indicate that the reporting person authorizes and designates the named person or persons to file the Form on the reporting person's behalf, and state the duration of the authorization.

(b) If the Form is filed for a corporation, partnership, trust, or other entity, the capacity in which the individual signed shall be set forth. (*e.g.*, John Smith, Secretary, on behalf of X Corporation.)

U.S. SECURITIES AND EXCHANGE COMMISSION, WASHINGTON, D.C. 20549

INITIAL STATEMENT OF BENEFICIAL OWNERSHIP

[Filed pursuant to Section 16(a) of the Securities Exchange Act of 1934, Section 17(a) of the Public Utility Holding Company Act of 1935 or Section 30(f) of the Investment Company Act of 1940]

1. Name and Address of Reporting Person

(Last) (First) (Middle)

(Street)

(City) (State) (Zip)

2. Date of Event Requiring Statement (Month/Day/Year)

3. IRS or Social Security Number of Reporting Person (Voluntary)

4. Issuer Name and Ticker or Trading Symbol

5. Relationship of Reporting Person to Issuer (Check all applicable)
___ Director ___ Officer (give title below) ___ 10% Owner ___ Other (specify below)

6. If Amendment, Date of Original (Month/Day/Year)

TABLE I.—NON-DERIVATIVE SECURITIES BENEFICIALLY OWNED

1. Title of Security (Instruction 4)	2. Amount of Securities Beneficially Owned (Instruction 4)	3. Ownership Form: Direct (D) or Indirect (I) (Instruction 5)	4. Nature of Indirect Beneficial Ownership (Instruction 5)

Reminder: Report on a separate line for each class of securities beneficially owned directly or indirectly.
(Print or Type Responses)

TABLE II.—DERIVATIVE SECURITIES BENEFICIALLY OWNED (E.G., PUTS, CALLS, WARRANTS, OPTIONS, CONVERTIBLE SECURITIES)

1. Title of Derivative Security (Instruction 4)	2. Date Exercisable and Expiration Date (Month/Day/Year)		3. Title and Amount of Securities Underlying Derivative Security (Instruction 4)		4. Conversion or Exercise Price of Derivative Security	5. Ownership Form of Derivative Security: Direct (D) or Indirect (I) (Instruction 5)	6. Nature of Indirect Beneficial Ownership (Instruction 5)
	Date Exercisable	Expiration Date	Title	Amount or Number of Shares			

TABLE II.—DERIVATIVE SECURITIES BENEFICIALLY OWNED (E.G., PUTS, CALLS, WARRANTS, OPTIONS, CONVERTIBLE SECURITIES)—Continued

1. Title of Derivative Security (Instruction 4)	2. Date Exercisable and Expiration Date (Month/Day/Year)		3. Title and Amount of Securities Underlying Derivative Security (Instruction 4)		4. Conversion or Exercise Price of Derivative Security	5. Ownership Form of Derivative Security: Direct (D) or Indirect (I) (Instruction 5)	6. Nature of Indirect Beneficial Ownership (Instruction 5)
	Date Exercisable	Expiration Date	Title	Amount or Number of Shares			

Explanation of Responses:
**Signature of Reporting Person _____ Date _____
Note: File three copies of this Form, one of which must be manually signed. If space provided is insufficient. *See* Instruction 6 for procedure.
**Intentional misstatements or omissions of facts constitute Federal Criminal Violations. *See* 18 U.S.C. 1001 and 15 U.S.C. 78ff(a).
Reminder: Report on a separate line for each class of securities beneficially owned directly or indirectly.
(Print or Type Responses)
FORM 3
OMB APPROVAL: OMB Number: 3235-0104, Expires: February 1, 1994, Estimated average burden hours per response: 0.5.

OMB Approval

OMB Number: 3235–0287
Expires: February 1, 1994
Estimated average burden hours per response: 0.5
United States Securities and Exchange Commission
Washington, DC 20549

Form 4—Statement of Changes of Beneficial Ownership of Securities

The Commission is authorized to solicit the information required by this form pursuant to sections 16(a) and 23(a) of the Securities Exchange Act of 1934; sections 17(a) and 20(a) of the Public Utility Holding Company Act of 1935; and sections 30(f) and 38 of the Investment Company Act of 1940, and the rules and regulations thereunder.

Disclosure of information specified on this form is mandatory, except for disclosure of IRS or Social Security numbers of the reporting person, which is voluntary. If such numbers are furnished, they will assist the Commission in distinguishing reporting persons with similar names and will facilitate the prompt processing of the form. The information will be used for the primary purpose of disclosing the transactions and holdings of directors, officers, and beneficial owners of registered companies. Information disclosed will be a matter of public record and available for inspection by members of the public. The Commission can use it in investigations or litigation involving the Federal securities laws or other civil, criminal, or regulatory statutes or provisions, as well as for referral to other governmental authorities and self-regulatory organizations. Failure to disclose required information may result in civil or criminal action against persons involved for violations of the Federal securities laws and rules.

General Instructions

1. When Form Must be Filed

(a) This Form must be filed on or before the tenth day after the end of the month in which a change in beneficial ownership has occurred (the term "beneficial owner" is defined in Rule 16a–1(a)(2) and discussed in Instruction 4). This Form and any amendment is deemed filed with the Commission or the Exchange on the date it is received by the Commission or the Exchange, respectively. *See*, however, Rule 16a–3(h) regarding delivery to a third party business that guarantees delivery of the filing no later than the specified due date.

(b) A reporting person no longer subject to Section 16 of the Securities Exchange Act of 1934 ("Exchange Act") must check the exit box appearing on this Form. However, Form 4 and Form 5 obligations may continue to be applicable. *See* Rules 16a–3(f) and 16a–2(b). Form 5 transactions to date may be included on this Form and subsequent Form 5 transactions may be reported on a later Form 4 or Form 5, provided all transactions are reported by the required date.

(c) A separate Form shall be filed to reflect beneficial ownership of securities of each issuer, except that a single statement shall be filed with respect to the securities of a registered public utility holding company and all of its subsidiary companies.

(d) If a reporting person is not an officer, director, or 10% holder, the person should check "other" in Item 6 (Relationship of Reporting Person to Issuer) and describe the reason for reporting status in the space provided.

2. Where Form Must be Filed

(a) File three copies of this Form or any amendment, at least one of which is manually signed, with the Securities and Exchange Commission, 450 5th Street, NW., Washington, DC, 20549. (*Note*: Acknowledgment of receipt by the Commission may be obtained by enclosing a self-addressed stamped postcard identifying the Form or amendment filed.)

(b) At the time this Form or any amendment is filed with the Commission, file one copy with each Exchange on which any class of securities of the issuer is registered. If the issuer has designated a single Exchange to receive Section 16 filings, the copy shall be filed with that Exchange only.

(c) Any person required to file this Form or amendment shall, not later than the time the Form or amendment is

transmitted for filing with the Commission, send or deliver a copy to the person designated by the issuer to receive the copy or, if no person is so designated, the issuer's corporate secretary (or person performing similar functions) in accordance with Rule 16a-3(e).

3. Class of Securities Reported

(a)(i) Persons reporting pursuant to Section 16(a) of the Exchange Act shall report each transaction resulting in a change in beneficial ownership of any class of equity securities of the issuer and the beneficial ownership at the end of the month of that class of equity securities, even though one or more of such classes may not be registered pursuant to Section 12 of the Exchange Act.

(ii) Persons reporting pursuant to Section 17(a) of the Public Utility Holding Company Act of 1935 shall report each transaction resulting in a change in beneficial ownership of any class of securities (equity or debt) of the registered holding company and of all of its subsidiary companies and the beneficial ownership at the end of the month of that class of securities. Specify the name of the parent or subsidiary issuing the securities.

(iii) Persons reporting pursuant to Section 30(f) of the Investment Company Act of 1940 shall report each transaction resulting in a change in beneficial ownership of any class of securities (equity or debt) of the registered closed-end investment company (other than "short-term paper" as defined in Section 2(a)(38) of the Investment Company Act) and the beneficial ownership at the end of the month of that class of securities.

(b) The title of the security should clearly identify the class, even if the issuer has only one class of securities outstanding; for example, "Common Stock," "Class A Common Stock," "Class B Convertible Preferred Stock," etc.

(c) The amount of securities beneficially owned should state the face amount of debt securities (U.S. Dollars) or the number of equity securities, whichever is appropriate.

4. Transactions and Holdings Required to be Reported

(a) *General Requirements.* (i) Report, in accordance with Rule 16a-3(g), all transactions resulting in a change of beneficial ownership in the issuer's securities, except those transactions reportable on Form 5. Every transaction shall be reported even though acquisitions and dispositions during the month with respect to a class of securities are equal, or the change involves only the nature of ownership, such as a change from indirect ownership through a trust or corporation to direct ownership by the reporting person. Report total beneficial ownership as of the end of the month for each class of securities in which a transaction was reported.

(ii) Each transaction should be reported on a separate line. Transaction codes specified in Instruction 8 should be used to identify the nature of the transaction resulting in an acquisition or disposition of a security.

Note: Transactions reportable on Form 5 may, at the option of the reporting person, be reported on a Form 4 filed before the due date of the Form 5. Exercises or conversions of derivative securities and small acquisitions specified in Rule 16a-6(a) must be reported on the next required Form 4 or Form 5 but may be reported voluntarily on Form 4 at an earlier date. (*See* Instruction 8 for the code for voluntarily reported transactions.)

(b) *Beneficial Ownership Reported (Pecuniary Interest).* (i) Although for purposes of determining status as a ten percent holder, a person is deemed to beneficially own securities over which that person has voting or investment control (*see* Rule 16a-1(a)(1)), for reporting transactions and holdings, a person is deemed to be the beneficial owner of securities if that person has or shares the opportunity, directly or indirectly, to profit or share in any profit derived from a transaction in the securities ("pecuniary interest"). *See* Rule 16a-1(a)(2). *See also* Rule 16a-8 for the application of the beneficial ownership definition to trust holdings and transactions.

(ii) Both direct and indirect beneficial ownership of securities shall be reported. Securities beneficially owned directly are those held in the reporting person's name or in the name of a bank, broker or nominee for the account of the reporting person. In addition, securities held as joint tenants, tenants in common, tenants by the entirety, or as community property are to be reported as held directly. If a person has a pecuniary interest, by reason of any contract, understanding, or relationship (including a family relationship or arrangement), in securities held in the name of another person, that person is an indirect beneficial owner of the securities. *See* Rule 16a-1(a)(2)(ii) for certain indirect beneficial ownerships.

(iii) Report transactions in securities beneficially owned directly on separate lines from those beneficially owned indirectly. Report different forms of indirect ownership on separate lines. The nature of indirect ownership shall be stated as specifically as possible; for example, "By Self as Trustee for X," "By Spouse," "By X Trust," "By Y Corporation," etc.

(iv) In stating the amount of securities acquired, disposed of, or beneficially owned indirectly through a partnership, corporation, trust, or other entity, report the number of securities representing the reporting person's proportionate interest in transactions conducted by that entity or holdings of that entity. Alternatively, at the option of the reporting person, the entire amount of the entity's interest may be reported. *See* Rule 16a-1(a)(2)(ii)(B) and Rule 16a-1(a)(2)(iii).

(c) *Non-Derivative and Derivative Securities.* (i) Report acquisitions or dispositions and holdings of non-derivative securities in Table I. Report acquisitions or dispositions and holdings of derivative securities (*e.g.*, puts, calls, options, warrants, convertible securities, or other rights or obligations to buy or sell securities) in Table II. Report the exercise or conversion of a derivative security in Table II (as a disposition of the derivative security) and report in Table I the holdings of the underlying security. Report acquisitions or dispositions and holdings of derivative securities that are both equity securities and convertible or exchangeable for other equity securities (*e.g.*, convertible preferred securities) only on Table II.

(ii) The title of a derivative security and the title of the equity security underlying the derivative security should be shown separately in the appropriate columns in Table II. The "puts" and "calls" reported in Table II include, in addition to separate puts and calls, any combination of the two, such as spreads and straddles. In reporting an option in Table II, state whether it represents a right to buy, a right to sell, an obligation to buy, or an obligation to sell the equity securities subject to the option.

(iii) Describe in the appropriate columns in Table II characteristics of derivative securities, including title, exercise or conversion price, date exercisable, expiration date, and the title and amount of securities underlying the derivative security. If the transaction reported is a purchase or sale of a derivative security, the purchase or sale price of that derivative security shall be reported in column 8. If the transaction is the exercise or conversion of a derivative security, leave column 8 blank and report the exercise or conversion price of the derivative security in column 2.

(iv) Securities constituting components of a unit shall be reported separately on the applicable table (*e.g.*, if a unit has a non-derivative security component and a derivative security

component, the non-derivative security component shall be reported in Table I and the derivative security component shall be reported in Table II). The relationship between individual securities comprising the unit shall be indicated in the space provided for explanation of responses. When securities are purchased or sold as a unit, state the purchase or sale price per unit and other required information regarding the unit securities.

5. Price of Securities

(a) Prices of securities shall be reported in U.S. dollars on a per share basis, not an aggregate basis, except that the aggregate price of debt shall be stated. Amounts reported shall exclude brokerage commissions and other costs of execution.

(b) If consideration other than cash was paid for the security, describe the consideration, including the value of the consideration, in the space provided for explanation of responses.

6. Additional Information

If space provided in the line items of this Form or space provided for additional comments is insufficient, attach another Form (or copy of the Form) completed as appropriate. Each Form attached as a continuation must include information required in Items 1, 4 and 6 of the Form. The number of pages comprising the report (Form plus attachment) shall be indicated at the bottom of each report page (*e.g.*, 1 of 3, 2 of 3, 3 of 3). If additional information is not reported in this manner, the Commission will assume no additional information was provided.

7. Signature

(a) If the Form is filed for an individual, it shall be signed by that person or specifically on behalf of the individual by a person authorized to sign for the individual. If signed on behalf of the individual by another person, the authority of such person to sign the Form shall be confirmed to the Commission in writing in an attachment to the Form or as soon as practicable in an amendment by the individual for whom the Form is filed, unless such a confirmation still in effect is on file with the Commission. The confirming statement need only indicate that the reporting person authorizes and designates the named person or persons to file the Form on the reporting person's behalf, and state the duration of the authorization.

(b) If the Form is filed for a corporation, partnership, trust, or other entity, the capacity in which the individual signed shall be set forth (e.g., John Smith, Secretary, on behalf of X Corporation).

8. Transaction Codes

Use the codes listed below to indicate in Table I, Column 3 and Table II, Column 4 the character of the transaction reported. Use the code that most appropriately describes the transaction. If the transaction is not specifically listed, use transaction Code "J" and describe the nature of the transaction in the space for explanation of responses. If a transaction is voluntarily reported earlier than required, place "V" in the appropriate column to so indicate; otherwise, the column should be left blank.

General Transaction Codes

P—Open market or private purchase of non-derivative or derivative security

S—Open market or private sale of non-derivative or derivative security

V—Transaction voluntarily reported earlier than required

Employee Benefit Plan Transaction Codes

A—Grant or award transaction pursuant to Rule 16b–3(c)

M—Exercise of in-the-money or at-the-money derivative security acquired pursuant to Rule 16b–3 plan

B—Participant-directed transaction in ongoing acquisition plan pursuant to Rule 16b–3(d)(2) (except for intra-plan transfers specified in Code I)

N—Participant-directed transaction pursuant to Rule 16b–3(d)(1)

F—Payment of option exercise price or tax liability by delivering or withholding securities incident to exercise of a derivative security issued in accordance with Rule 16b–3

I—Intra-plan transfer in accordance with Rule 16b–3(d)(2)(ii) resulting in an acquisition or disposition of issuer securities

T—Acquisition or disposition transaction under an employee benefit plan other than pursuant to Rule 16b–3

Derivative Securities Codes

E—Expiration of short derivative position

H—Expiration (or cancellation) of long derivative position

C—Conversion of derivative security

O—Exercise of out-of the-money derivative security

X—Exercise of in-the-money or at-the-money derivative security

Other Section 16(b) Exempt Transactions and Small Acquisition Codes (except for employee benefit plan codes above)

G—Bona fide gift

R—Acquisition pursuant to reinvestment of dividends or interest (DRIPS)

W—Acquisition or disposition by will or laws of descent and distribution

L—Small acquisition under Rule 16a–6

Z—Deposit into or withdrawal from voting trust

Other Transaction Codes

J—Other acquisition or disposition (describe transaction)

Q—Transfer pursuant to a qualified domestic relations order

U—Disposition pursuant to a tender of shares in a change of control transaction

U.S. SECURITIES AND EXCHANGE COMMISSION, WASHINGTON D.C. 20549

STATEMENT OF CHANGES IN BENEFICIAL OWNERSHIP

[Filed pursuant to Section 16(a) of the Securities Exchange Act of 1934, Section 17(a) of the Public Utility Holding Company Act of 1935 or Section 30(f) of the Investment Company Act of 1940]

1. Name and Address of Reporting Person

(Last) (First) (Middle)

(Street)

(City) (State) (Zip)

2. Issuer Name and Ticker or Trading Symbol

3. IRS or Social Security Number of Reporting Person (Voluntary)

U.S. SECURITIES AND EXCHANGE COMMISSION, WASHINGTON D.C. 20549—Continued

[Filed pursuant to Section 16(a) of the Securities Exchange Act of 1934, Section 17(a) of the Public Utility Holding Company Act of 1935 or Section 30(f) of the Investment Company Act of 1940]

4. Statement for Month/Year

5. If Amendment, Date of Original (Month/Year)

6. Relationship of Reporting Person to Issuer. (Check all applicable)
___Director ___Officer (give title below) ___10% Owner ___Other (specify below)

TABLE I.—NON-DERIVATIVE SECURITIES, ACQUIRED, DISPOSED OF, OR BENEFICIALLY OWNED

1. Title of Security (Instruction 3)	2. Transaction Date (Month/Day/Year)	3. Transaction Code (Instruction 8)		4. Securities Acquired (A) or Disposed of (D) (Instructions 3, 4 and 5)			5. Amount of Securities Beneficially Owned at End of Month (Instructions 3 and 4)	6. Ownership Form: Direct (D) or Indirect (I) (Instruction 4)	7. Nature of Indirect Beneficial Ownership (Instruction 4)
		Code	V	Amount	(A) or (D) or	Price			

TABLE II.—DERIVATIVE SECURITIES ACQUIRED, DISPOSED OF, OR BENEFICIALLY OWNED (E.G. PUTS, CALLS, WARRANTS, OPTIONS, CONVERTIBLE SECURITIES)

1. Title of Derivative Security (Instructions 3)	2. Conversion or Exercise Price of Derivative Security	3. Transaction Date (Month/Day/Year)	4. Transaction Code (Instruction 8)		5. Number of Derivative Securities Acquired (A) or Disposed of (D) (Instructions 3 and 4)		6. Date Exercisable and Expiration Date (Month/Day/Year)		7. Title and Amount of Underlying Securities (Instructions 3 and 4)		8. Price of Derivative Security (Instr. 5)	9. Number of Derivative Securities Beneficially Owned at End of Month (Instruction 4)	10. Ownership Form of Derivative Security: Direct (D) Indirect (I) (Instruction 4)	11. Nature of Indirect Beneficial Ownership (Instruction 4)
			T	V	(A)	(D)	Date Exercisable	Expiration Date	Title	Amount or Number of Shares				

Explanation of Responses:

**Signature of Reporting Person _____ Date _____

Note: File three copies of this Form, one of which must be manually signed. If space provided is insufficient, *See* Instruction 6 for procedure.
** Intentional misstatements or omissions of facts constitute Federal Criminal Violations. *See* 18 U.S.C. 1001 and 15 U.S.C. 78ff(a).
Reminder: Report on a separate line for each class of securities beneficially owned directly or indirectly.

(Print or Type Responses)

Form 4
[ ] Check box is no longer subject to Section 16. Form 4 or Form 5 obligations may continue. *See* Instruction 1(b).

OMB Approval
Expires: Febuary 1, 1994
Estimeted average burden hours per response 0.5

OMB APPROVAL

OMB Number: 3235–0362
Expires: February 1, 1994
Estimated average burden hours per response: 1.0

United States Securities and Exchange Commission
Washington, DC 20549

Form 5—Annual Statement of Beneficial Ownership of Securities

The Commission is authorized to solicit the information required by this form pursuant to sections 16(a) and 23(a) of the Securities Exchange Act of 1934,

sections 17(a) and 20(a) of the Public Utility Holding Company Act of 1935, and sections 30(f) and 38 of the Investment Company Act of 1940, and the rules and regulations thereunder.

Disclosure of information specified on this form is mandatory, except for disclosure of IRS or Social Security numbers of the reporting person, which is voluntary. If such numbers are furnished, they will assist the Commission in distinguishing reporting persons with similar names and will facilitate the prompt processing of the form. The information will be used for the primary purpose of disclosing the transactions and holdings of directors, officers, and beneficial owners of registered companies. Information disclosed will be a matter of public record and available for inspection by members of the public. The Commission can use it in investigations or litigation involving the Federal securities laws or other civil, criminal, or regulatory statutes or provisions, as well as for referral to other governmental authorities and self-regulatory organizations. Failure to disclose required information may result in civil or criminal action against persons involved for violations of the Federal securities laws and rules.

General Instructions

1. When Form Must be Filed

(a) This Form must be filed on or before the 45th day after the end of the issuer's fiscal year in accordance with Rule 16a-3(f). This Form and any amendment is deemed filed with the Commission or the Exchange on the date it is received by the Commission or the Exchange, respectively. *See*, however, Rule 16a-3(h) regarding delivery to a third party business that guarantees delivery of the filing no later than the specified due date.

(b) A reporting person no longer subject to Section 16 of the Securities Exchange Act of 1934 ("Exchange Act") must check the exit box appearing on this Form. Transactions and holdings previously reported are not required to be included on this Form. Form 4 or Form 5 obligations may continue to be applicable. *See* Rules 16a-3(f) and 16a-2(b).

(c) A separate Form shall be filed to reflect beneficial ownership of securities of each issuer, except that a single statement shall be filed with respect to the securities of a registered public utility holding company and all of its subsidiary companies.

(d) If a reporting person is not an officer, director, or 10% holder, the person should check "other" in Item 6 (Relationship of Reporting Person to Issuer) and describe the reason for reporting status in the space provided.

2. Where Form Must be Filed

(a) File three copies of this Form or any amendment, at least one of which is manually signed, with the Securities and Exchange Commission, 450 5th Street, NW., Washington, DC 20549.

(Note: Acknowledgment of receipt by the Commission may be obtained by enclosing a self-addressed stamped postcard identifying the Form or amendment filed.)

(b) At the time this Form or any amendment is filed with the Commission, file one copy with each Exchange on which any class of securities of the issuer is registered. If the issuer has designated a single Exchange to receive Section 16 filings, the copy shall be filed with that Exchange only.

(c) Any person required to file this Form or amendment shall, not later than the time the Form or amendment is transmitted for filing with the Commission, send or deliver a copy to the person designated by the issuer to receive the copy or, if no person is so designated, the issuer's corporate secretary (or person performing similar functions) in accordance with Rule 16a-3(e).

3. Class of Securities Reported

(a)(i) Persons reporting pursuant to section 16(a) of the Exchange Act shall include information as to transactions and holdings required to be reported in any class of equity securities of the issuer and the beneficial ownership at the end of the year of that class of equity securities, even though one or more of such classes may not be registered pursuant to section 12 of the Exchange Act.

(ii) Persons reporting pursuant to section 17(a) of the Public Utility Holding Company Act of 1935 shall include transactions and holdings required to be reported in any class of securities (equity or debt) of the registered holding company and any of its subsidiary companies and the beneficial ownership at the end of the issuer's fiscal year of that class of securities. Specify the name of the parent or subsidiary issuing the securities.

(iii) Persons reporting pursuant to section 30(f) of the Investment Company Act of 1940 shall include transactions and holdings required to be reported in any class of securities (equity or debt) of the registered closed-end investment company (other than "short-term paper" as defined in Section 2(a) (38) of the Act) and the beneficial ownership at the end of the year of that class of securities.

(b) The title of the security should clearly identify the class, even if the issuer has only one class of securities outstanding; for example, "Common Stock," "Class A Common Stock," "Class B Convertible Preferred Stock," etc.

(c) The amount of securities beneficially owned should state the face amount of debt securities (U.S. Dollars) or the number of equity securities, whichever is appropriate.

4. Transactions and Holdings Required To Be Reported

(a) *General Requirements.* (i) Pursuant to Rule 16a-3(f), if not previously reported, the following transactions, and total beneficial ownership as of the end of the issuer's fiscal year (or the earlier date applicable to a person ceasing to be an insider during the fiscal year) for any class of securities for which a transaction is reported, shall be reported:

(A) Any transaction during the issuer's fiscal year that was exempt by operation of any rule under Section 16(b);

(B) Any small acquisition or series of acquisitions in a six month period during the issuer's fiscal year not exceeding $10,000 in market value (*see* Rule 16a-6); and

(C) Any transactions or holdings that should have been reported during the issuer's fiscal year on a Form 3 or Form 4, but were not reported. The first Form 5 filing obligation shall include all holdings and transactions that should have been reported in each of the issuer's last two fiscal years but were not. *See* Instruction 8 for the code to identify delinquent Form 3 holdings or Form 4 transactions reported on this Form 5.

Note: A required Form 3 or Form 4 must be filed within the time specified by the Form. Form 3 holdings or Form 4 transactions reported on Form 5 represent delinquent Form 3 and Form 4 filings.

(ii) Report transactions and holdings in Rule 16b-3(d) ongoing securities acquisition plans as of the most recent date for which the information is reasonably available, specifying the date of the information. Also, report transactions and holdings in ongoing securities acquisition plans for the portion of the prior fiscal year not included on the Form 5 for the prior year, specifying the date of the information, or, alternatively, this information may be included on a Form 4 or an amendment to the Form 5 filed promptly. Plan acquisitions for the

period reported, but not dispositions, may be presented on an aggregate basis for each plan. If reported on an aggregate basis, disclose the range of prices paid.

(iii) Each transaction should be reported on a separate line. Transaction codes specified in Instruction 8 should be used to identify the nature of the transaction resulting in an acquisition or disposition of a security.

(iv) Except for transactions related to Rule 16b–3(d) ongoing acquisition plans noted in (ii) above, every transaction shall be reported even though acquisitions and dispositions with respect to a class of securities are equal, or the change involves only the nature of ownership, such as a change from indirect ownership through a trust or corporation to direct ownership by the reporting person. Report total beneficial ownership as of the end of the issuer's fiscal year for all classes of securities in which a transaction was reported.

(b) *Beneficial Ownership Reported (Pecuniary Interest).* (i) Although, for purposes of determining status as a ten percent holder, a person is deemed to beneficially own securities over which that person has voting or investment control (*see* Rule 16a–1(a)(1)), for reporting transactions and holdings, a person is deemed to be the beneficial owner of securities if that person has or shares the opportunity, directly or indirectly, to profit or share in any profit derived from a transaction in the securities ("pecuniary interest"). *See* Rule 16a–1(a)(2). *See also* Rule 16a–8 for the application of the beneficial ownership definition to trust holdings and transactions.

(ii) Both direct and indirect beneficial ownership of securities shall be reported. Securities beneficially owned directly are those held in the reporting person's name or in the name of a bank, broker or nominee for the account of the reporting person. In addition, securities held as joint tenants, tenants in common, tenants by the entirety, or as community property are to be reported as held directly. If a person has a pecuniary interest, by reason of any contract, understanding, or relationship (including a family relationship or arrangement), in securities held in the name of another person, that person is an indirect beneficial owner of the securities. *See* Rule 16a–1(a)(2)(ii) for certain indirect beneficial ownerships.

(iii) Report transactions in securities beneficially owned directly on separate lines from those beneficially owned indirectly. Report different forms of indirect ownership on separate lines. The nature of indirect ownership shall be stated as specifically as possible; for example, "By Self as Trustee for X," "By Spouse," "By X Trust," "By Y Corporation," etc.

(iv) In stating the amount of securities acquired, disposed of, or beneficially owned indirectly through a partnership, corporation, trust, or other entity, report the number of securities representing the reporting person's proportionate interest in transactions conducted by that entity or holdings of that entity. Alternatively, at the option of the reporting person, the entire amount of the entity's interest may be reported. *See* Rule 16a–1(a)(2)(ii)(B) and Rule 16a–1(a)(2)(iii).

(c) *Non-Derivative and Derivative Securities.* (i) Report acquisitions or dispositions and holdings of non-derivative securities in Table I. Report acquisitions or dispositions and holdings of derivative securities (*e.g.*, puts, calls, options, warrants, convertible securities, or other rights or obligations to buy or sell securities) in Table II. Report the exercise or conversion of a derivative security in Table II (as a disposition of the derivative security) and report in Table I the holdings of the underlying security. Report acquisitions or dispositions and holdings of derivative securities that are both equity securities and convertible or exchangeable for other equity securities (*e.g.*, convertible preferred securities) only on Table II.

(ii) The title of a derivative security and the title of the equity security underlying the derivative security should be shown separately in the appropriate columns in Table II. The "puts" and "calls" reported in Table II include, in addition to separate puts and calls, any combination of the two, such as spreads and straddles. In reporting an option in Table II, state whether it represents a right to buy, a right to sell, an obligation to buy, or an obligation to sell the equity securities subject to the option.

(iii) Describe in the appropriate columns in Table II characteristics of derivative securities, including title, exercise or conversion price, date exercisable, expiration date, and the title and amount of securities underlying the derivative security. If the transaction reported is a purchase or sale of a derivative security, the purchase or sale price of the derivative security shall be reported in column 8. If the transaction is the exercise or conversion of a derivative security, leave column 8 blank and report the exercise or conversion price of the derivative security in column 2.

(iv) Securities constituting components of a unit shall be reported separately on the applicable table (*e.g.*, if a unit has a non-derivative security component and a derivative security component, the non-derivative security component shall be reported in Table I and the derivative security component shall be reported in Table II). The relationship between individual securities comprising the unit shall be indicated in the space provided for explanation of responses. When securities are purchased or sold as a unit, state the purchase or sale price per unit and other required information regarding the unit securities.

5. Price of Securities

(a) Prices of securities shall be reported in U.S. dollars and on a per share basis, not an aggregate basis, except that the aggregate price of debt shall be stated. Amounts reported shall exclude brokerage commissions and other costs of execution.

(b) If consideration other than cash was paid for the security, describe the consideration, including the value of the consideration in the space provided for explanation of responses.

6. Additional Information

If space provided in the line items of this Form or space provided for additional comments is insufficient, attach another Form (or copy of the Form) completed as appropriate. Each Form attached as a continuation must include information required in Items 1, 4 and 6 of the Form. The number of pages comprising the report (Form plus attachment) shall be indicated at the bottom of each report page (*e.g.*, 1 of 3, 2 of 3, 3 of 3). If additional information is not reported in this manner, the Commission will assume no additional information was provided.

7. Signature

(a) If the Form is filed for an individual, it shall be signed by that person or specifically on behalf of the individual by a person authorized to sign for the individual. If signed on behalf of the individual by another person, the authority of such person to sign the Form shall be confirmed to the Commission in writing in an attachment to the Form or as soon as practicable in an amendment by the individual for whom the Form is filed, unless such a confirmation still in effect is on file with the Commission. The confirming statement need only indicate that the reporting person authorizes and designates the named person or persons to file the Form on the reporting person's behalf, and state the duration of the authorization.

(b) If the Form is filed for a corporation, partnership, trust, or other entity, the capacity in which the

individual signed shall be set forth (*e.g.*, John Smith, Secretary, on behalf of X Corporation).

8. Transaction Codes

Use the codes listed below to indicate in Table I, Column 3 and Table II, Column 4 the character of the transaction reported. Use the code that most appropriately describes the transaction. If the transaction is not specifically listed, use transaction Code "J" and describe the nature of the transaction in the space for explanation of responses.

General Transaction Codes

P—Open market or private purchase of non-derivative or derivative security

S—Open market or private sale of non-derivative or derivative security

Employee Benefit Plan Transaction Codes

A—Grant or award transaction pursuant to Rule 16b–3(c)

M—Exercise of in-the-money or at-the-money derivative security acquired pursuant to Rule 16b–3 plan

B—Participant-directed transaction in ongoing acquisition plan pursuant to Rule 16b–3(d)(2) (except for intra-plan transfers specified in Code I)

N—Participant-directed transaction pursuant to Rule 16b–3(d)(1)

F—Payment of option exercise price or tax liability by delivering or withholding securities incident to exercise of a derivative security issued in accordance with Rule 16b–3

I—Intra-plan transfer in accordance with Rule 16b–3(d)(2)(ii) resulting in an acquisition or disposition of issuer securities

T—Acquisition or disposition transaction under an employee benefit plan other than pursuant to Rule 16b–3

Derivative Securities Codes

E—Expiration of short derivative position

H—Expiration (or cancellation) of long derivative position

C—Conversion of derivative security

O—Exercise of out-of the-money derivative security

X—Exercise of in-the-money or at-the-money derivative security

Other Section 16(b) Exempt Transactions and Small Acquisition Codes (except for employee benefit plan codes above)

G—Bona fide gift

R—Acquisition pursuant to reinvestment of dividends or interest (DRIPS)

W—Acquisition or disposition by will or laws of descent and distribution

L—Small acquisition under Rule 16a–6

Z—Deposit into or withdrawal from voting trust

Other Transaction Codes

J—Other acquisition or disposition (describe transaction)

Q—Transfer pursuant to a qualified domestic relations order

U—Disposition pursuant to a tender of shares in a change of control transaction

Form 3 or Form 4 Holdings or Transactions Not Previously Reported

To indicate that a holding should have been reported previously on Form 3, place a "3" in Table I, column 3 or Table II, column 4, as appropriate. Indicate in the space provided for explanation of responses the event triggering the Form 3 filing obligation. To indicate that a transaction should have been reported previously on Form 4, place a "4" next to the transaction code reported in Table I, column 3 or Table II, column 4 (*e.g.*, an open market purchase of a non-derivative security that should have been reported previously on Form 4 should be designated as "P4"). In addition, the appropriate box on the front page of the Form should be checked.

U.S. SECURITIES AND EXCHANGE COMMISSION, WASHINGTON, DC 20549

ANNUAL STATEMENT OF CHANGES IN BENEFICIAL OWNERSHIP

[Filed pursuant to Section 16(a) of the Securities Exchange Act of 1934, Section 17(a) of the Public Utility Holding Company Act of 1935 or Section 30(f) of the Investment Company Act of 1940]

1. Name and Address of Reporting Person

(Last) (First) (Middle)

(Street)

(City) (State) (Zip)

2. Issuer Name and Ticker or Trading Symbol

3. IRS or Social Security Number of Reporting Person (Voluntary)

4. Statement for (Month/Year)

5. If Amendment, Date of Original (Month/Year)

6. Relationship of Reporting Person to Issuer (Check all applicable)

___ Director ___ Officer (give title below) ___ 10% Owner ___ Other (specify below)

TABLE I.—NON-DERIVATIVE SECURITIES, ACQUIRED, DISPOSED OF, OR BENEFICIALLY OWNED

1. Title of Security (Instruction 3)	2. Transaction Date (Month/Day/Year)	3. Transaction Code (Instruction 8)	4. Securities Acquired (A) or Disposed of (D) (Instructions 3, 4, and 5)			5. Amount of Securities Beneficially Owned at End of Issuer's Fiscal Year (Instructions 3 and 4)	6. Ownership Form: Direct (D) or Indirect (I) (Instruction 4)	7. Nature of Indirect Beneficial Ownership (Instruction 4)
			Amount	(A) or (D)	Price			

TABLE II.—DERIVATIVE SECURITIES ACQUIRED, DISPOSED OF, OR BENEFICIALLY OWNED (E.G. PUTS, CALLS, WARRANTS, OPTIONS, CONVERTIBLE SECURITIES)

1. Title of Derivative Security (Instruction 3)	2. Conversion or Exercise Price of Derivative Security	3. Transaction Date (Month/Day/Year)	4. Transaction Code (Instruction 8)	5. Number of Derivative Securities Acquired (A) or Disposed of (D) (Instructions 3 and 4)		6. Date Exercisable and Expiration Date (Month/Day/Year)		7. Title and Amount of Underlying Securities (Instructions 3 and 4)		8. Price of Derivative Security	9. Number of Derivative Securities Beneficially Owned at End of Year (Instruction 4)	10. Ownership Form of Derivative Security: Direct (D) Indirect (I) (Instruction 4)	11. Nature of Indirect Beneficial Ownership (Instruction 4)
				(A)	(D)	Date Exercisable	Expiration Date	Title	Amount or Number of Shares				

Explanation of Responses:

Signature of Reporting Person _____ Date _____

Note: File three copies of this Form, one of which must be manually signed. If space provided is insufficient, *see* Instruction 6 for procedure.

** Intentional misstatements or omissions of facts constitute Federal Criminal Violations. *See* 18 U.S.C. 1001 and 15 U.S.C. 78ff(a).

Reminder: Report on a separate line for each class of securities beneficially owned directly or indirectly.

(Print or Type Responses)

FORM 5

[ ] Check box if no longer subject to Section 16. Form 4 or Form 5 obligations may continue. *See* Instruction 1(b).

[ ] Form 3 holdings reported

[ ] Form 4 transactions reported

OMB APPROVAL

OMB Number: 3235-0362

Expires: February 1, 1994

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By the Commission.

Dated: February 8, 1991.

Margaret H. McFarland,

Deputy Secretary.

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