

Overview of the Pesticide Active Ingredient MACT Standard

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ABSTRACT

Pursuant to section 112(d) of the Clean Air Act as amended in 1990, the U.S. Environmental Protection Agency's (EPA's) Office of Air Quality Planning and Standards developed National Emission Standards for Hazardous Air Pollutants (NESHAP) for Pesticide Active Ingredient (PAI) Production. The standards will reduce emissions of numerous organic compounds, HCl, chlorine, and particulate matter HAP from existing and new facilities that manufacture pesticide active ingredients that are used in insecticides, herbicides, and fungicides. The EPA proposed standards in the Federal Register on November 10, 1997. Following proposal, EPA received 27 comment letters. The EPA has considered the comments and made changes to the proposed standards where determined to be appropriate. Promulgation of the standards is scheduled for the second quarter of 1999. This paper summarizes the final NESHAP requirements including applicability; emission standards for process vents, storage vessels, equipment leaks, and wastewater; compliance testing and monitoring requirements; alternative emission averaging and pollution prevention provisions; and reporting and recordkeeping requirements. This paper also highlights significant changes since proposal. [Note: this paper summarizes the regulation as it was submitted for review to the Office of Management and Budget. Additional changes may be incorporated before the final rule is promulgated.]. **[UPDATE: No changes were made by OMB, this paper represents the final rule]**

INTRODUCTION

The EPA proposed NESHAP for the PAI source category on November 10, 1997, and will soon promulgate the standards for this source category. The standards will be codified as a new subpart MMM in 40 CFR part 63. The source category includes production of all PAI's that are used in the production of insecticide, herbicide, and fungicide end-use pesticide products. As with other NESHAP for source categories that consist of the production of different types of organic chemicals, the PAI production NESHAP includes many provisions that are similar to the hazardous organic NESHAP (HON). In addition, because many PAI processes are batch processes, the PAI NESHAP also includes provisions that were first developed for the pharmaceuticals NESHAP and the polymers and resins NESHAP. The primary hazardous air pollutants (HAP) emitted by the PAI industry include toluene, methanol, methyl chloride, and hydrogen chloride (HCl); however, the final rule is not limited to

control of these compounds. As of 1991, EPA estimates that more than 250 companies and more than 300 facilities were producing PAI's; approximately 80 facilities were estimated to be major sources that are subject to the rule. This paper reviews the applicability for the PAI NESHAP; summarizes the standards, initial compliance provisions, monitoring requirements, and the recordkeeping and reporting requirements; and highlights some of the changes made since proposal.

APPLICABILITY

The affected source subject to the PAI production NESHAP is all of the PAI manufacturing process units (PAI process units) that process, use, or produce HAP, and are located at a plant site that is a major source for HAP emissions. Also included in the affected source are waste management units, heat exchange systems, and cooling towers that are associated with the PAI process units. Figure 1 is a flow chart of the applicability determination procedures.

To fully understand what is included in the affected source, several terms must be defined. A process unit consists of the processing equipment, associated storage vessels, and connected piping and related components that are assembled to manufacture an intended product. A PAI process unit is used to produce a material that is primarily used as a PAI or any material that is an integral intermediate. A PAI is any material that: (1) is an active ingredient within the meaning of FIFRA section 2(a); (2) is used to produce an insecticide, herbicide, or fungicide end use pesticide product; (3) consists of one or more organic compounds; and (4) must be labeled in accordance with 40 CFR part 156 for transfer, sale, or distribution (i.e., as required under FIFRA). An integral intermediate is any intermediate that is primarily used in the onsite production of any PAI(s) and that is not stored before being used in the production of the PAI(s) (or another integral intermediate). An intermediate is any organic compound that is produced by chemical reaction and that is further processed or modified in one or more additional chemical reaction steps to produce another intermediate of a PAI. A material is primarily used as a PAI or integral intermediate if more than 50 percent of the annual production is to be used for the intended purpose.

As noted above, each process unit applies to the production of only a single intended product (or simultaneous production of coproducts). However, many facilities use some or all of the same equipment to produce different PAI's, or even other types of products, at different times during the year. For example, different products may be produced by simply alternating raw materials or changing an operating condition, or some of the equipment may also be reconfigured. The final rule allows the owner or operator to identify such groups of shared equipment (called "process unit groups"). If the primary product of the group is a PAI, the owner or operator must comply with the PAI final rule while producing a PAI. Typically, if the primary product of the group is not a PAI, the owner or operator may comply with either the PAI final rule or the rule that applies to the primary product while producing a PAI. An exception to this situation is that an owner or operator must comply with the pharmaceuticals standard while producing a pharmaceutical product; thus, the final rule allows an owner or operator to comply with the pharmaceuticals standard while producing a PAI if any of the process units in the group is used to produce a pharmaceutical product. The primary product is the product that

is projected to be produced for the greatest amount of operating time over the 5 year period following the compliance date.

The final rule applies to both chemical synthesis processes and processes where a PAI is extracted from a carrier material. Extraction steps are not considered separate processes that produce intermediates. Therefore, a series of extraction steps to isolate a PAI from a naturally-occurring material is considered to be a single PAI process.

New source standards apply to any affected source as described above for which construction or reconstruction commences after November 10, 1997. In addition, new source standards apply to any single PAI process unit that is not part of a process unit group, for which construction commences after November 10, 1997, and that has the potential to emit 10 tons/yr of any one HAP or 25 tons/yr of combined HAP.

STANDARDS

Emission points from the affected source for which standards were developed include process vents, storage vessels, wastewater systems, equipment leaks, and heat exchange systems. Within the process vents category, standards were developed for organic HAP and the combination of HCl and chlorine (HCl/Cl₂). In addition, particulate matter standards were developed for bag dumps and product dryers if the particulate emissions are also HAP compounds. Standards for storage vessels, wastewater systems, equipment leaks, and heat exchange systems are for organic HAP compounds. The final rule also includes emissions averaging provisions and an alternative pollution prevention standard. Table 1 summarizes the standards for process vents, and Table 2 summarizes the standards for all of the other emission points.

Process Vents

Except for certain situations, the final rule requires existing sources to reduce total organic HAP emissions by 90 percent from the sum of all process vents within a process if the uncontrolled organic HAP emissions from the process exceed 0.15 Mg/yr. Similarly, HCl/Cl₂ emissions must be reduced by 94 percent from the sum of all process vents within the process if the uncontrolled HCl/Cl₂ emissions from the process exceed 6.8 Mg/yr. Particulate matter emissions from bag dumps and product dryers must not exceed a concentration of 0.01 gr/dscf if the bag dump is used to introduce a solid material that is also a HAP, or if the product dryer is used to dry a solid material that is also a HAP.

One exception to the 90 percent reduction requirement for organic HAP emissions is that certain individual vents (or manifolded vents) with uncontrolled organic HAP emissions that exceed 22.7 Mg/yr and have relatively low flow rates must reduce organic HAP emissions by 98 percent. The flow rate cutoff is determined on a case-by-case basis using an equation in the rule. However, if the emissions control for such a vent exceeds 90 percent on or before November 10, 1997, the final rule requires only that the vent continue to be controlled to this same level. Alternatives to the 90 percent reduction requirement are that individual vents (or all vents within a process) may be controlled to outlet concentrations less than or equal to 20 ppmv as TOC, by a flare that meets the requirements of the

General Provisions, or by boilers or process heaters with certain design or operation characteristics. However, the collective organic HAP emissions from any vents within a process that are not controlled to 98 percent or by one of the alternatives must still be controlled by 90 percent. Similarly, an alternative to the 94 percent reduction for HCl/Cl₂ emissions is to control the emissions to outlet concentrations less than or equal to 20 ppmv.

The standards for new sources are similar to those for existing sources except that organic HAP emissions must be reduced by 98 percent from the sum of all process vents within a process, and HCl/Cl₂ emissions must be reduced by 99 percent if the uncontrolled emissions exceed 191 Mg/yr and by 94 percent if the uncontrolled emissions are between 6.8 and 191 Mg/yr.

Storage Vessels

The standards for storage vessels require control of storage vessels that exceed applicability cutoffs based on the capacity of the vessels and the maximum true vapor pressure of the material stored in the tank. For both new and existing sources, control is required for storage vessels with a capacity of greater than or equal to 75 m³ storing a material with a maximum true vapor pressure greater than or equal to 3.45 kPa. Control is also required for storage vessels at new sources with a capacity between 38 m³ and 75 m³ if the maximum true vapor pressure of the stored material is greater than or equal to 16.5 kPa. Control requirements consist of either a floating roof or a closed vent system routing emissions to a control device that: (1) reduces organic HAP emissions by at least 95 percent, (2) reduces emissions to outlet concentrations of 20 ppmv or less as TOC, (3) is a flare that meets the requirements in the General Provisions, or (4) is a boiler or process heater that meets certain design or operation characteristics. The final rule also specifies that an owner or operator is exempt from the standards during periods of routine maintenance of the control device up to 240 hr/yr.

Wastewater Systems

Generally, the standards for wastewater systems are the same as those in the HON (subpart G). For example, the standards apply only to the 76 HAP listed in Table 9 of Subpart G, control/treatment is required for process wastewater streams that exceed the same flow rate and concentration applicability cutoffs as in the HON, and the control/treatment options are the same as in the HON. The primary difference is that the final rule also requires the same control/treatment of maintenance wastewater streams that contain at least 5.3 Mg of HAP per discharge event. In addition, a new source is limited to only two treatment options if the total load of "Table 9" compounds in the sum of all process wastewater from PAI process units that are part of the new affected source exceeds 2,100 Mg/yr. These options are treatment in any unit that reduces the mass flow rate of all "Table 9" compounds by 99 percent or more, or treatment in a unit that is permitted under RCRA.

Equipment Leaks

The standards for equipment leaks are comparable to the provisions in the proposed consolidated air rule (CAR) (63 FR 57748). The provisions in the CAR are similar to the leak detection and repair provisions (LDAR) in subpart H of the HON, except that the CAR extends certain monitoring intervals

and reduces recordkeeping requirements on components that are not found to be leaking. The final rule differs from the CAR in that it extends the monitoring intervals for pumps and agitators from monthly to quarterly, and it does not include the quality improvement program provisions for pumps or valves. The final rule also allows the alternative means of emission limitation by pressure testing to apply to all processes, not just batch processes.

Heat Exchange Systems

The final rule cross-references the heat exchange provisions in subpart F of the HON. Typically, the owner or operator is required to monitor each heat exchange system that is used to cool process equipment in a PAI process unit. The owner or operator may monitor for one or more organic HAP or other representative substances that would indicate the presence of a leak, or the owner or operator may monitor for a surrogate indicator of leaks such as conductivity. Whenever a leak is detected, it must be repaired as soon as practical.

Emissions Averaging

The final rule includes emissions averaging provisions that are essentially identical to the emissions averaging provisions in the HON. Except as noted below, the emissions averaging provisions may be used to comply with the standards for process vents, storage vessels, and wastewater systems. The owner or operator must calculate debits and credits for actual control levels relative to the required percent reductions. Credits, after discounting by 10 percent, must offset the debits.

Several types of emission points may not be used in emissions averaging. For example, credits are not allowed for controls installed on or before November 15, 1990, or for emission points controlled to comply with a State rule or other Federal rules. In addition, emission points controlled to an outlet concentration (e.g., 20 ppmv) may not be used in emissions averaging. Finally, emission points controlled with specific types of equipment (e.g., floating roofs on storage vessels, a flare for process vents, or the design steam stripper for wastewater) may not be used in emissions averaging unless a nominal efficiency is assigned to the control device according to procedures in the HON.

Pollution Prevention Alternative Standard

As an alternative to all of the conventional standards described above, the final rule includes a pollution prevention alternative standard that was first used in the pharmaceuticals NESHAP. The pollution prevention alternative consists of two options that are both based on demonstrating a reduction in the consumption of HAP (e.g., raw materials or solvent) per unit of output (i.e., production-indexed consumption rates). Consumption is defined as the makeup quantity of HAP entering a process that is not used as reactant. The quantity of material used as reactant is the theoretical amount needed assuming 100 percent stoichiometric conversion, and makeup is the net amount of material that must be added to the process to replenish losses. The pollution prevention alternative may be used if HAP are generated in the process, but generated HAP that differs from consumed HAP must be controlled in the

conventional ways. For example, the pollution prevention alternative cannot be used as an alternative to the standards for particulate matter emissions from product dryers.

Under the first option, an owner or operator must reduce the HAP consumption rate by 85 percent relative to a 3-year average baseline established no earlier than the 1987 through 1989 calendar years. Under the second option, the owner or operator may combine reductions in consumption with emissions reduction. The HAP consumption must be reduced by at least 50 percent relative to the baseline, and emissions must be reduced by an amount that when added to the reduction in consumption would be equivalent to an 85 percent reduction in consumption. This option also requires the owner or operator to demonstrate that the emission reductions are independent of the consumption reductions (i.e., the emissions either must be destroyed or collected for use in such a way that they are not also counted as reductions in consumption). In addition, under both options, an owner or operator may substitute VOC for the HAP only if the HAP is also a VOC, and the mass of substituted VOC is less than or equal to the mass of HAP reduced.

COMPLIANCE PROVISIONS

Process Vents

Typically, the final rule requires the owner or operator to determine uncontrolled emissions per batch from each unit operation within a process (or the emissions per hour for continuous processes) as part of all initial compliance demonstrations for process vents. Additional requirements vary depending on the uncontrolled emissions rate, the type of control device, and the format of the standard with which the owner or operator complies. For example, to demonstrate initial compliance with the uncontrolled annual emissions cutoffs of 0.15 Mg/yr of organic HAP and 6.8 Mg/yr of HCl/Cl₂, the owner or operator must sum the emissions from each unit operation and multiply by the projected number of batches per year (or operating hours per year for continuous processes). To comply with the percent reduction standards for organic HAP and HCl/Cl₂, the owner or operator must determine the efficiency of the control device(s), calculate the controlled emissions, and determine the overall percentage reduction for the process. To comply with the outlet concentration limits, the owner or operator must conduct an initial test using the applicable test method(s). If a flare is used to control emissions, the owner or operator must demonstrate that the flare satisfies the provisions in section 63.11(b) of the General Provisions for 40 CFR part 63. To comply with the outlet particulate matter concentration limits for bag dumps and product dryers, the owner or operator must conduct a performance test using Method 5. Several of these requirements are described in more detail below, and are graphically presented in Figure 2.

Determining Uncontrolled Emissions

The final rule provides procedures (i.e., equations) to calculate uncontrolled emissions from seven types of batch emission episodes. These emission episodes are filling a vessel, purging, heating, depressurization, vacuum systems, gas evolution, and air drying. The equations assume the ideal gas law is applicable, and they require the owner or operator to first estimate the HAP partial pressure

using Raoult's law, Henry's law, or other applicable methods. If emissions are due to emission episodes other than one of the seven types described above, the owner or operator must conduct an engineering assessment to estimate the emissions. The engineering assessment may be based on test data; bench-scale or pilot scale test data; a limiting parameter such as maximum flow rate that is specified or implied in a permit; or a design analysis based on accepted chemical engineering principles, measurable process parameters, or physical or chemical laws or properties. In addition, for any of the seven types of emission episodes described above, the owner or operator may request approval to determine uncontrolled HAP emissions based on an engineering assessment. One situation where the request would be approved is if test data show a greater than 20 percent discrepancy between the test value and the estimated value.

Complying With The Percent Reduction Requirements

Control efficiencies and controlled emissions are estimated in a variety of ways, depending on the type of control or the amount of uncontrolled emissions sent to the control device. If the control device is a condenser, the final rule specifies that the controlled emissions be calculated using equations similar to those discussed above for calculating uncontrolled emissions, except that the partial pressures and temperatures are based on the condenser conditions.

If the inlet HAP load to a control device other than a condenser exceeds 9.1 Mg/yr, the final rule requires that the efficiency of the control device be determined by conducting a performance test. At a minimum, the performance test must be conducted under the most challenging conditions that the control device will handle (when being used to comply with this standard); the owner or operator may elect to conduct additional performance tests under other conditions for the purpose of establishing multiple monitoring parameter levels. The most challenging conditions may be based on emissions from actual operation, or they may be based on simulated conditions. An emissions profile must be developed to document the most challenging conditions.

If the owner or operator elects to test under actual conditions, the emission profile must consider all emission episodes that could vent to the control device as well as expected variations in production scheduling. If the most challenging conditions occur under the maximum HAP load, the test must be conducted over either (1) the period in which the inlet to the control device will contain at least 50 percent of the maximum HAP load that may be vented to the control device over any 8-hour period or (2) the 1-hour period in which the inlet to the control device will contain the highest hourly HAP loading. Alternatively, if the most challenging conditions based on actual operation occur under conditions other than the maximum HAP load, the owner or operator must determine and test over the 1-hour period that includes those conditions. Examples of such conditions include periods when the emission stream contains the maximum combined VOC and HAP load, contains HAP constituents that approach the limits of solubility for scrubbing media, or that contain HAP constituents that approach the limits of adsorptivity for carbon adsorption systems.

If the owner or operator elects to simulate the most challenging conditions for testing, one approach is to consider equipment design features that limit the maximum hourly emissions that can be routed to the control device. For example, a fan may limit the flowrate, and LEL settings may limit the concentration

before opening a safety bypass. Another approach is to evaluate all of the individual emission episodes that vent to the control device and simulate conditions that would result in emissions that exceed the emissions that would be expected under actual operation. For example, the emission episode with the highest emission rate could be simulated for the entire test period. The simulation also could be based on the use of a compound more volatile than compounds actually used in the process.

If the inlet HAP load to a control device other than a condenser is less than 9.1 Mg/yr, the final rule requires the owner or operator to demonstrate the efficiency of the control device based on either a performance test as described above for “large” control devices or a design evaluation. A design evaluation must address the composition and HAP concentration of the vent stream entering the control device. It also must address other critical vent stream characteristics and control device operating parameters, which vary depending on the type of control device that is used. Just as for large control devices, the performance test or design evaluation must demonstrate the control efficiency under actual or simulated conditions that meet or exceed the most challenging conditions that the control device will encounter when being used to comply with this standard.

Compliance With Outlet Concentration Limits

The procedure to demonstrate initial compliance with the outlet concentration limits instead of the percent reduction requirements varies depending on whether the owner or operator will demonstrate ongoing compliance by monitoring emissions concentration using CEMS or by monitoring equipment operating parameters. If the owner or operator intends to monitor the outlet concentration using a continuous emission monitor, initial compliance consists of demonstrating compliance with these continuous monitoring provisions on the initial compliance date; the owner or operator may also need to use Method 18 to determine the predominant organic HAP if a TOC monitor is to be calibrated on the predominant HAP. If the owner or operator intends to monitor control device operating parameters, initial compliance is demonstrated by conducting performance tests using applicable test methods such as Method 18, Method 25A, and/or Method 26. These compliance tests must be conducted under the most challenging conditions for the control device, determined in the same manner as described above for demonstrating compliance with the percent reduction requirements.

Compliance Using A Flare

When a flare is used to comply with the standards, the initial compliance determination consists of a visible emissions determination using Method 22 of 40 CFR part 60, appendix A, and determinations of both the net heating value of the gas being combusted and the exit velocity in accordance with the requirements in sections 63.11(b)(6) through (8) of 40 CFR part 63. The net heating value and exit velocity are to be determined under the most challenging conditions.

Storage Vessels

The compliance procedures vary depending on whether the owner or operator is complying with the equipment standard (floating roof), the percent reduction requirement, an outlet concentration limit, or by using a flare. If a storage vessel is equipped with a floating roof, it must be designed and operated as specified in sections 63.119(b), (c), or (d) of subpart G of the HON, and initial compliance with

these requirements is demonstrated by following the initial inspection and repair requirements in sections 63.120(a), (b), or (c) of subpart G.

If emissions from a storage vessel are controlled using a closed vent system and a control device, the owner or operator demonstrates initial compliance with the percent reduction requirement either by conducting a performance test or preparing a design evaluation. The efficiency of the control device must be demonstrated at the reasonably expected maximum filling rate. A performance test at these conditions is not required if a performance test was conducted on the same control device to demonstrate compliance with the process vent standards; the same efficiency may be used in the compliance demonstration for the storage vessel.

If emissions from a storage vessel are controlled using a closed vent system and a control device, the owner or operator demonstrates initial compliance with the outlet concentration limits following the same procedures described above for process vents that are controlled to outlet concentration limits. Similarly, if the control device is a flare, the owner or operator demonstrates initial compliance following the procedures described above for process vents that are controlled using a flare.

Wastewater Systems

Initial compliance with the wastewater standards is demonstrated by complying with the applicable provisions in section 63.145 of subpart G of the HON, except that the owner or operator need not comply with the requirement to determine visible emissions that is specified in section 63.145(j)(1), and references to “Table 8” compounds are not applicable for this standard.

MONITORING AND INSPECTIONS

To demonstrate ongoing compliance with the standards, the final rule requires various types of monitoring and inspections, depending on the technique used to reduce emissions.

Add-on Control Devices for Organic HAP and HCl/Cl₂ Emissions

If the inlet stream to the control device contains total HAP emissions of at least 0.91 Mg/yr, the owner or operator is required to conduct continuous monitoring (i.e., readings at least once every 15 minutes) while the control device is being used to comply with the standards. The parameter(s) to monitor are specified in the rule for common types of control devices, although the owner or operator may request approval to monitor other parameters. Similarly, the owner or operator must propose parameters to monitor for other types of control devices. The levels to which the readings are compared are established during the initial compliance demonstrations.

Different monitoring levels may be established for different periods during the process. If a performance test is required to demonstrate initial compliance at the most challenging conditions faced by the control device, one monitoring level would be set at these conditions. Additional levels may be established by supplementing the performance test results with engineering assessments and manufacturer’s recommendations; additional performance testing is not required to set these levels. However, the owner or operator must provide rationale for the specific level and why it indicates

proper operation of the control device, and determination of levels using these procedures are subject to review and approval by the Administrator. When multiple levels are monitored, the owner or operator must document the beginning and end points in the daily schedule during which the new level is in effect. In addition, at least one reading must be taken at each new level, even if the duration is less than 15 minutes.

The individual readings must be averaged over either an operating day or an operating block. The operating day may be any continuous 24-hour period, and the operating block, which is only applicable for batch processes, may be any period of time that is, at a maximum, equal to the length of time from the beginning to end of a batch process. Readings taken during periods of no flow to the control device are to be excluded from the averages.

Exceedances occur if an averaged value is outside of the established limit, or an operating requirement (like the presence of pilot flames for a flare) is not met. Excursions occur if insufficient data are collected during 25 percent or more of the operating hours during the operating day or operating block. Most exceedances and excursions are violations of an operating limit. Exceedances or excursions of a condenser temperature limit or of an outlet concentration limit, however, are violations of the emission standard.

If the inlet stream to the control device contains total HAP emissions less than 0.91 Mg/yr, the owner or operator must conduct periodic verification that the device is operating properly. This verification must include, but not be limited to, a daily demonstration that the unit is working as designed. The owner or operator must propose a demonstration procedure for approval by the implementing agency. One option is to take daily readings of the same parameters that must be monitored continuously for the larger control devices.

Fabric Filters

For fabric filters used to control product dryers and bag dumps that are subject to the standards, the owner or operator must install, calibrate, maintain, and continuously operate a bag leak detection system. The system must be equipped with an alarm. If the alarm is triggered, the owner or operator must record the time of the alarm, initiate procedures to identify the cause of the alarm, and take corrective action. The possible corrective actions are to be specified in a corrective action plan.

Emission Limits for Process Vents

As noted above, the owner or operator must calculate the uncontrolled emissions from each unit operation within a process and sum the emissions per batch as part of the initial compliance procedures. To show ongoing compliance, the owner or operator also must maintain records of the number of batches produced and calculate daily a 365-day rolling summation of uncontrolled emissions. Each day that the summation for a process exceeds 0.15 Mg/yr for organic HAP emissions or 6.8 Mg/yr for HCl/Cl₂ emissions is considered a violation of the emission limit.

Floating Roofs for Storage Vessels

To show ongoing compliance with the requirements for floating roofs in sections 63.119(b), (c), or (d) of subpart G of the HON, the owner or operator must comply with the applicable periodic inspection and repair requirements in sections 63.120(a), (b), or (c) of subpart G.

Pollution Prevention

To show ongoing compliance with the pollution prevention alternative standard, the owner or operator must calculate annual rolling averages of the production-indexed HAP and VOC consumption rates. For continuous processes, the rates must be calculated every 30 days. For batch processes, the rates must be calculated every 10 batches (or more frequently if less than 10 batches are produced in a 12-month period). Each rolling average that exceeds the target value is considered a violation of the emission limit.

RECORDKEEPING AND REPORTING

For the most part, recordkeeping and reporting requirements are consistent with the requirements in the General Provisions of subpart A of 40 CFR part 63 and with the requirements in various recent NESHAP. Perhaps the most significant difference is the final rule requires the owner or operator to submit a Precompliance Plan under certain situations. The Precompliance Plan must be submitted at least 6 months before the compliance date. Information that must be included in the Precompliance Plan includes: (1) data and rationale used to support an engineering assessment, (2) descriptions of the periodic verification procedures to demonstrate that small control devices are working as designed, (3) the pollution prevention demonstration summary, (4) descriptions of the test conditions and analyses to develop monitoring parameter levels for conditions other than the most challenging conditions, and (5) the corrective action plan for fabric filters. The owner or operator could also use the Precompliance Plan to request approval to use alternative monitoring parameters. In addition to the typical records, the final rule also requires the owner or operator to keep records that describe the most challenging conditions for control devices and how they were developed.

CHANGES SINCE PROPOSAL

In response to the public comments as well as additional internal evaluation, EPA made a number of changes throughout the regulation between proposal and promulgation. The changes clarify EPA's intent, address inconsistencies, and reflect the use of new information in some analyses. The most substantive changes were made to the applicability, storage vessel standards, pollution prevention standards, and the testing provisions to demonstrate initial compliance with the process vent standards. Some of these changes are summarized below.

Applicability

The scope of the source category was narrowed to include only the production of organic PAI's; production of inorganic compounds was excluded. In addition, the final rule specifies that the primary use of a compound must be as a PAI, and the process must process, use, or produce HAP. The use of process unit groups for determining applicability when the same equipment is used to produce more than one product is also a new approach included in the final rule. The proposed rule stated that the

provisions of the rule would apply during startup and shutdown of batch processes. For the final rule this provision was revised to apply only to routine startups and shutdown between batches; the startup, shutdown, and malfunction requirements in the General Provisions apply during initial startup and startup after extended downtime. Finally, the proposed rule specified that “additions” to an existing plant that meet certain criteria would be subject to the new source standards. The final rule clarifies that the new source standards apply to an entire affected source or to any individual process unit that meets certain criteria.

Standards

For storage vessels, the applicability cutoff for the MACT floor was changed from an annual emission rate format to a vapor pressure format. This change makes the format more consistent with storage vessel standards in other regulations. As a result of this change in approach as well as some corrections in the database of storage vessels, size cutoffs and control levels for the standard also changed as described above. The wastewater standards were changed to exclude maintenance wastewater streams with low emissions potential. The process vent standards for HCl/Cl₂ at new sources was reduced from 99.9 to 99 percent, and an HCl/Cl₂ standard based on an outlet concentration limit of 20 ppmv was added for both new and existing sources. Equipment leak standards were revised to be consistent with the proposed CAR instead of subpart H of the HON. Finally, an outlet concentration limit standard for which monitoring must be conducted using continuous emissions monitors was added for process vents and storage vessels. As noted above, exceedances under this standard result in only a single violation for a given control device, whereas an exceedance under the regular standards results in separate violations for each process unit that is connected to the control device.

Pollution Prevention

To demonstrate compliance with the pollution prevention standard, EPA included additional reporting requirements in the final rule. Specifically, the final rule requires sources to submit a Demonstration Summary in the precompliance plan that describes how the pollution prevention alternative will be applied at the facility, and what tracking mechanisms (e.g., to measure and record HAP consumption and production) will be used to demonstrate compliance. The proposed rule would have limited pollution prevention credits under the second option described above to only 50 percent; the final rule allows credit for the actual pollution prevention reduction between 50 and 85 percent. In addition, a provision was added to the final rule to prevent the substitution of VOC solvents for non-VOC HAP solvents. The final rule also was revised to allow generated HAP to be included in the pollution prevention analysis, provided the generated HAP is identical to HAP that are added to the process.

Testing for Initial Compliance Demonstrations

A number of changes were made to the testing provisions to clarify intent and to improve flexibility. The option to test under “representative” conditions as that term was applied to the most challenging conditions was deleted from the final rule. The option to demonstrate compliance for condensers based on test results was eliminated in favor of analyses to determine the temperature needed to achieve the required reduction and then monitoring to maintain the temperature below that level. The definition of

the most challenging conditions was expanded to include conditions other than the maximum HAP load. The procedures for developing an emissions profile were expanded to include equipment limitations as an alternative to actual emissions.

Table 1. Process vent standards.^a

Type of source	Emission point(s)	Applicability cutoff	Type of emission to control	Control options
Existing	Individual process vent emission points (single vent or manifolded vent)	Use applicability cutoff equation in the rule	organic HAP	<ol style="list-style-type: none"> 1. Reduce by 98%, or 2. Reduce to #20 ppmv TOC, or 3. Use any of the control devices in footnote b, or 4. Reduce by 90% if control is \$90% on Nov. 10, 1997.
Existing	The combination of process vents in a process, excluding those subject to above requirements	Total uncontrolled organic HAP emissions from all process vents within the process exceed 0.15 Mg/yr; and	organic HAP	<ol style="list-style-type: none"> 1. Reduce by 90% overall, or 2. Emissions from individual vents may be reduced to #20 ppmv as TOC or controlled using any of the control devices in footnote b; any remaining vents within a process must be reduced by 90% overall.
		Total uncontrolled HCl/Cl ₂ emissions from all process vents within the process exceed 6.8 Mg/yr	HCl/Cl ₂	<ol style="list-style-type: none"> 1. Reduce by 94% overall, or 2. Reduce to #20 ppmv as HCl/Cl₂
New	The combination of process vents in a process (no requirements for certain individual vents as for existing sources)	Uncontrolled organic HAP emissions from all process vents within the process exceed 0.15 Mg/yr; and	organic HAP	<ol style="list-style-type: none"> 1. Reduce by 98% overall, or 2. Reduce to #20 ppmv as TOC, or 3. Use any of the control devices in footnote b.
		Either total uncontrolled HCl/Cl ₂ emissions from all process vents within the process are >6.8 Mg/yr and <141 Mg/yr; or	HCl/Cl ₂	<ol style="list-style-type: none"> 1. Reduce by 94% overall, or 2. Reduce to #20 ppmv as HCl/Cl₂.
		Total uncontrolled HCl/Cl ₂ emissions from all process vents within the process are \$191 Mg/yr	HCl/Cl ₂	<ol style="list-style-type: none"> 1. Reduce by 99% overall, or 2. Reduce to #20 ppmv as HCl/Cl₂.

^aProcess vents controlled with a RCRA permitted unit are exempt from the provisions of the rule.

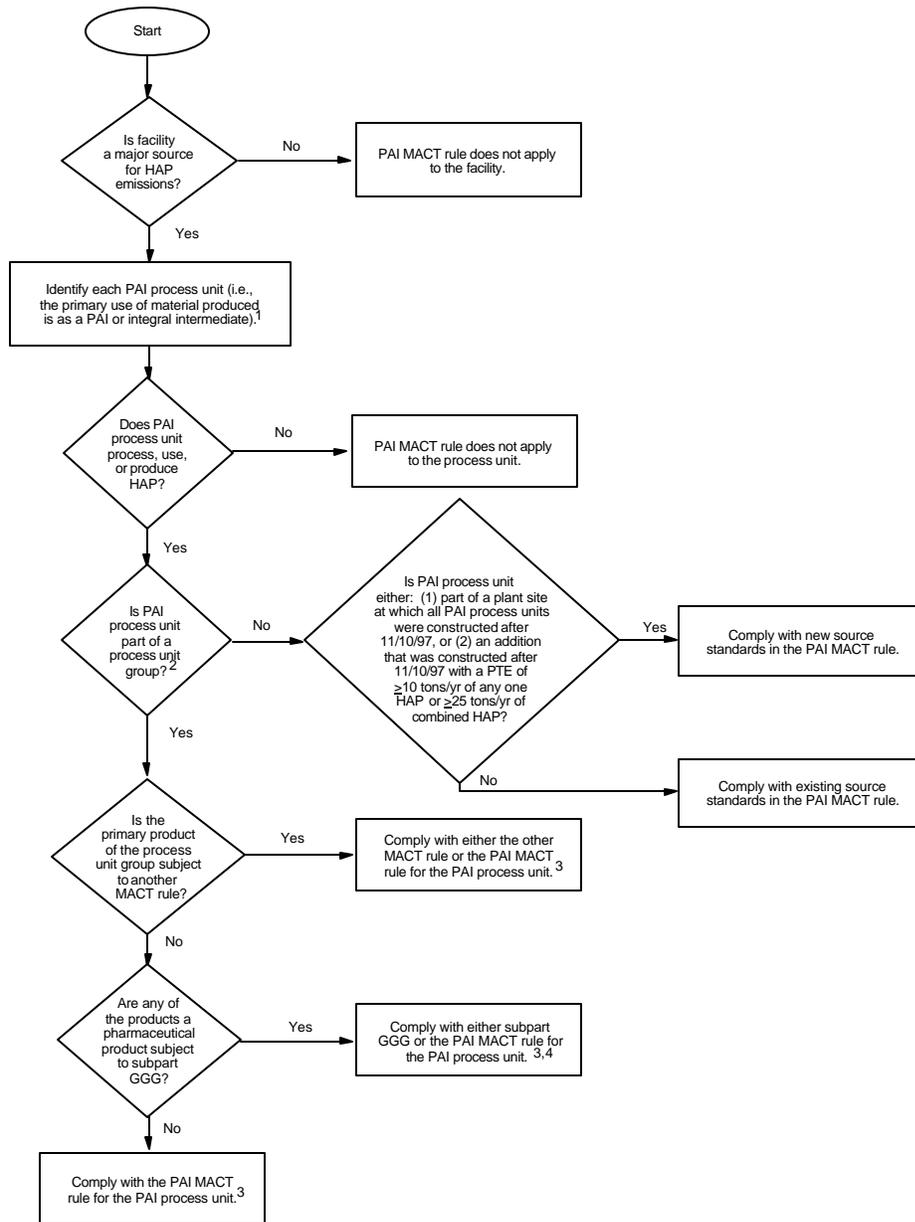
^bIndividual vents controlled with a flare, process heater, or boiler meeting certain conditions are considered to be in compliance.

Table 2. Standards for all emission points except process vents

Emission source	Applicability	Requirement
Storage vessels	Existing: \$75 m ³ capacity and vapor pressure \$3.45 kPa	Install a floating roof, reduce HAP by 95% per vessel, or control to outlet concentration of #20 ppmv TOC
	New: (a) \$38 m ³ capacity and vapor pressure \$16.5 kPa and (b) \$75 m ³ capacity and vapor pressure \$3.45 kPa	Same as for existing sources
Wastewater ^a	Existing: Process wastewater with (a) \$10,000 ppmw Table 9 compounds at any flowrate or (b) \$1,000 ppmw Table 9 compounds at \$10 L/min. Maintenance wastewater with HAP load \$5.3 Mg per discharge event	Reduce concentration of total Table 9 compounds to <50 ppmw (or other options)
	New: Same criteria as for existing sources Total HAP load in wastewater streams from PAI process units \$2,100 Mg/yr	Reduce concentration of total Table 9 compounds to <50 ppmw (or other options) 99% reduction of Table 9 compounds from all streams or treatment in RCRA unit.
Equipment leaks	Subpart H of 40 CFR part 63	Subpart H of 40 CFR part 63 with minor changes, including monitoring frequencies consistent with the proposed CAR
Product dryers and bag dumps	Dryers used to dry PAI that also is a HAP, and bag dumps used to introduce feedstock that is a solid and a HAP	Particulate matter concentration not to exceed 0.01 gr/dscf
Heat exchange systems	Each heat exchange system used to cool process equipment in PAI manufacturing operations	Monitoring and leak repair program as in HON

^aTable 9 is listed in the appendix to subpart G of 40 CFR part 63.

Figure 1. Applicability flowchart.



¹ A PAI is an active ingredient as defined in FIFRA and is used to produce an insecticide, herbicide, or fungicide pesticide end-use product. Note that the owner or operator may designate the production of some intermediates that are not integral intermediates as PAI process units.

² A PAI process unit group is a group of process units that manufacture PAI's and products other than PAI's by alternating raw materials or operating conditions, or by reconfiguring process equipment.

³ Comply with new source standards if the process unit group is part of a plant site at which all PAI process units (and any associated process unit groups) were constructed after November 10, 1997. Otherwise, comply with existing source standards.

⁴ Some provisions in subpart GGG are not allowed for PAI process units.

Figure 2. Flow chart of initial compliance requirements for process vents.

