

target organ or toxic effect for which the HI is calculated is different from the RfC's critical effect, then the RfC for that chemical will be an overestimate, that is, the resultant HI potentially may be overprotective. Conversely, since the calculation of an HI does not account for the fact that the potency of a mixture of HAP can be more potent than the sum of the individual HAP potencies, an HI may potentially be underprotective in some situations.

b. *Options for establishing a hazard index limit.* One consideration in establishing a hazard index limit is whether the analysis considers the total ambient air concentrations of all the emitted HAP to which the public is exposed.⁵ There are at least several options for establishing a hazard index limit for the CAA section 112(d)(4) analysis that reflect, to varying degrees, public exposure.

One option is to allow the hazard index posed by all threshold HAP emitted from sources at the facility to be no greater than one. This approach is protective if no additional threshold HAP exposures would be anticipated from other sources in the vicinity of the facility or through other routes of exposure (e.g., through ingestion).

A second option is to adopt a default percentage approach, whereby the hazard index limit of the HAP emitted by the facility is set at some percentage of one (e.g., 20 percent or 0.2). This approach recognizes the fact that the facility in question is only one of many sources of threshold HAP to which people are typically exposed every day. Because noncancer risk assessment is predicated on total exposure or dose, and because risk assessments focus only on an individual source, establishing a hazard index limit of 0.2 would account for an assumption that 20 percent of an individual's total exposure is from that individual source. For the purposes of this discussion, we will call all sources of HAP, other than the facility in question, background sources. If the facility is allowed to emit HAP such that its own impacts could result in HI values of one, total exposures to threshold HAP in the vicinity of the facility could be substantially greater than one due to background sources, and this would not be protective of public health, since only HI values below one are considered to be without appreciable risk of adverse health effects. Thus, setting the hazard index limit for the facility at some default

percentage of one will provide a buffer which would help to ensure that total exposures to threshold HAP near the facility (i.e., in combination with exposures due to background sources) will generally not exceed one, and can generally be considered to be without appreciable risk of adverse health effects.

The EPA requests comment on using the default percentage approach and on setting the default hazard index limit at 0.2. The EPA is also requesting comment on whether an alternative HI limit, in some multiple of one would be a more appropriate applicability cutoff.

A third option is to use available data (from scientific literature or EPA studies, for example) to determine background concentrations of HAP, possibly on a national or regional basis. These data would be used to estimate the exposures to HAP from non-industrial boiler and process heater sources in the vicinity of an individual facility. For example, the EPA's National-scale Air Toxics Assessment (NATA)⁶ and ATSDR's Toxicological Profiles⁷ contain information about background concentrations of some HAP in the atmosphere and other media. The combined exposures from these sources and from other sources (as determined from the literature or studies) would then not be allowed to exceed a hazard index limit of one. The EPA requests comment on the appropriateness of setting the hazard index limit at one for such an analysis.

A fourth option is to allow facilities to estimate or measure their own facility-specific background HAP concentrations for use in their analysis. With regard to the third and fourth options, the EPA requests comment on how these analyses could be structured. Specifically, EPA requests comment on how the analyses should take into account background exposure levels from air, water, food and soil encountered by the individuals exposed to emissions from industrial boilers and process heaters. In addition, we request comment on how such analyses should account for potential increases in exposures due to the use of new HAP or the increased use of a previously emitted HAP, or the effect of other nearby sources that release HAP.

EPA requests comment on the feasibility and scientific validity of each of these or other approaches. Finally, EPA requests comment on how we should implement the CAA section 112(d)(4) applicability cutoffs, including appropriate mechanisms for applying

cutoffs to individual facilities. For example, would the title V permit process provide an appropriate mechanism?

c. *Tiered analytical approach for predicting exposure.* Establishing that a facility meets the cutoffs established under CAA section 112(d)(4) will necessarily involve combining estimates of pollutant emissions with air dispersion modeling to predict exposures. The EPA envisions that we would promote a tiered analytical approach for these determinations. A tiered analysis involves making successive refinements in modeling methodologies and input data to derive successively less conservative, more realistic estimates of pollutant concentrations in air and estimates of risk.

As a first tier of analysis, EPA could develop a series of simple look-up tables based on the results of air dispersion modeling conducted using conservative input assumptions. By specifying a limited number of input parameters, such as stack height, distance to property line, and emission rate, a facility could use these look-up tables to determine easily whether the emissions from their sources might cause a hazard index limit to be exceeded.

A facility that does not pass this initial conservative screening analysis could implement increasingly more site-specific but more resource-intensive tiers of analysis using EPA-approved modeling procedures, in an attempt to demonstrate that exposure to emissions from the facility does not exceed the hazard index limit. The EPA's guidance could provide the basis for conducting such a tiered analysis.⁸

The EPA requests comment on methods for constructing and implementing a tiered analytical approach for determining applicability of the CAA section 112(d)(4) criterion to specific industrial boiler and process heater sources. It is also possible that ambient monitoring data could be used to supplement or supplant the tiered modeling approach described above. It is envisioned that the appropriate monitoring to support such a determination could be extensive. The EPA requests comment on the appropriate use of monitoring in the determinations described above.

d. *Accounting for dose-response relationships.* In the past, EPA routinely treated carcinogens as nonthreshold pollutants. The EPA recognizes that

⁵ Senate Debate on Conference Report (October 27, 1990), reprinted in "A Legislative History of the Clean Air Act Amendments of 1990," Comm. Print S. Prt. 103-38 (1993) ("Legis. Hist.") at 868.

⁶ See <http://www.epa.gov/ttn/atw/nata>.

⁷ See <http://www.atsdr.cdc.gov/toxpro2.html>.

⁸ "A Tiered Modeling Approach for Assessing the Risks due to Sources of Hazardous Air Pollutants," EPA-450/4-92-001. David E. Guinnup, Office of Air Quality Planning and Standards, USEPA, March 1992.