b. ''Minimize Threat'' requirement of Section 3004(m)

EPA continues to believe that the minimize threat language of section 3004(m) does not require the elimination of every conceivable threat posed by land disposal of a hazardous waste. The legislative history of LDR indicates that Congress did not intend to require wastes to undergo repetitive or ultimate levels of treatment. Rather, Congress wanted to require use of effective, but widely available treatment technologies. See 130 Cong. Rec. S 9178 (daily ed. July 25, 1984) (statement of Senator Chafee introducing the amendment that became section 3004(m).)). Requiring elimination of all conceivable threats would almost certainly require use of the most effective treatment methods available, and this appears to conflict with Congresses' treatment goals. Moreover, although the DC Circuit has cited the dictionary definition of ''minimize'' to uphold technology-based treatment standards below EPA standards such as MCLs and TC levels, EPA does not believe that the court meant that EPA literally must reduce threats to the maximum extent possible. (See *Hazardous Waste Treatment Council III*, 886 F.2d at 361; *Chemical Waste Management II*, 976 F 2d. at 14.) EPA notes that the court indicated that risk-based treatment standards would satisfy section 30004(m). *Hazardous Waste Treatment Council III*, 866 F.2d at 364–65. Further, in his concurring opinion, Judge Silberman stated that Congress would allow EPA to exercise reasonable amounts of discretion in determining the level of risk reduction needed to meet the minimize threat requirement. Id. at 372.

The Agency believes that today's exit concentrations can serve as risk-based land disposal restriction levels for several reasons. First, the risk assessment, described in Section IV of today's proposal, significantly expands beyond the scope of past Agency risk assessment for wastes and waste constituents. Where adequate data are available, the analysis can evaluate the potential for waste constituent migration through almost all significant environmental fate and transport pathways leading to exposure for human and ecological receptors. As explained in more detail below, the Agency is also relying on reasonable conservative risk targets for both humans and ecological receptors in developing this risk assessment. The Agency believes that the proposed exit levels represent levels below which further treatment would not be needed to minimize threats to human health and the environment.

c. Scope of Risk Assessment

The broad scope of the risk analysis is a critical factor in the Agency's conclusion that proposed exit levels minimize both short term and long-term threats to human health and the environment, for those constituents where data are relatively complete.

The risk analysis evaluates all of the most common non-Subtitle C disposal options available to waste generators and treaters. These include disposal in landfills/monofills and by land farming, and management in surface impoundments, tanks and waste piles. The risk analysis assumes no minimum level of regulation of these facilities, and relies on available data to characterize them. As described in detail in Section IV and in the risk analysis report (EPA 1995), EPA modeled each disposal alternative using median values for most inputs, and high-end or conservative values for the two fate and transport and two exposure parameters for which the modeling outcome is most sensitive. The Agency believes that the modeling will also protect against exposures from similar disposal alternatives not specifically modeled.

The risk analysis evaluates the movement of waste constituents from each of these disposal options through numerous environmental fate and transport pathways. These include pathways involving volatiles and respirable (PM10) particulates, particulate deposition on soil and plant surfaces, vapor phase diffusion into surface water and plants, and surface run-off and soil erosion. Many of these pathways can result in waste constituent movement through the food-chains. Therefore, human exposures resulting from these fate and transport pathways include inhalation, soil or groundwater ingestion, and dermal contact, as well as exposure through consumption of contaminated foods such as fish, beef or vegetables.

EPA screened all multipathway constituents for potential to pose threats to ecological receptors. For 45 constituents, EPA quantitatively assessed likely risk to selected ecological receptors. Risks to both fresh water aquatic and terrestrial organisms were evaluated, representing different trophic levels and feeding habits of the ecosystem. Fish, daphnids, and benthic organisms, mammals, birds, plants, and soil organisms (nematodes, insects, etc.) were evaluated. The sustainability of the ecosystem and reproducing populations within the aquatic and terrestrial ecosystems was selected as an assessment endpoint, as described in Section IV of this Notice and in detail in Chapter 3 of the risk analysis support document (EPA 1995).

In addition, as part of this overall risk assessment effort, the Agency has reviewed and reevaluated its modeling of waste and waste constituent movement through groundwater. As described in Section IV above, this responds to comments by interested parties on the original HWIR proposal, as well as incorporates additional data submitted to the Agency (API data base), and updated modeling of leaching from wastes (new HELP model; get Cite).

In evaluating groundwater, the Agency examined both wells located on the landfill edge and closest wells anywhere down-gradient. Also, both finite source type and infinite-source type constituents (which behave as though there is an infinite supply of the constituent in the landfill, and will continue to leach forever) were evaluated. For finite source type constituents, the available constituent was not apportioned over the groundwater and other pathways, i.e., groundwater was modeled separately. Adsorption to soil and degradation of waste constituents (but not biodegradation) is modeled, and the toxicity of constituent daughter products (either more or less toxic than the parent compounds) is included. (There is a biodegradation module to the model; however, data to run that module for national conditions are not adequate at this time, although data were available for some sites. The Agency will continue to evaluate biodegradation data as they become available, and assess in the future whether national biodegradation estimates can be defensibly made). Leaching and groundwater migration from disposal in unregulated industrial landfills, surface impoundments, and waste piles have been modeled.

In evaluating the results of this series of groundwater modeling exercises, the Agency selected the approximate 90th percentile from a distribution of wells closest to modelled sites. This means that there is about a 90% probability that the drinking water well closest to the landfill would be protected at the target concentration (MCL or HBN). All wells more distant would be protected to a greater extent.

As described in section VI.E. above, the Agency then reviewed the risk assessment for groundwater and the pathways for each constituent, and selected as the exit level the concentration, back-calculated to the waste, from the most limiting (or highest risk) pathway. By using the most