ecological receptors represents the critical pathway that limits the projected exit level for management of a waste stream outside of the Subtitle C hazardous waste program. These ecological receptors serve as the basis for the proposed exit levels for 18 constituents, including 6 metals. To the extent that contaminants from these waste streams reach off site areas, the Agency based its proposal on modeling the ecological receptors on a neighboring land area of 500 acres or an adjacent stream (with a total length of 12 miles). This approach as currently modeled, may only serve as an indicator of a potential nearby threat to ecological receptors (e.g., the soil fauna and plant life), rather than serving as a measure or indicator of a broader threat to the environment. The Agency solicits comment on the appropriateness and relevance of these receptors as the basis for exit levels under the HWIR program.

3. Sources of Data

a. Human

The two primary sources used to identify human health benchmarks were the Integrated Risk Information System (IRIS) and the Health Effects Assessment Summary Tables (HEAST). Both of these sources were developed and are maintained by the USEPA. For a few constituents, other Agency sources such as Carcinogen Assessment Group (CAG) profiles, Health Effect Assessments (HEAs), and Health Assessment Documents (HADs) were used to fill data gaps.

IRIS is the Agency's official repository of Agency-wide consensus chronic human health risk information. IRIS evaluation are conducted by the Agency's Work Group review process that leads to internal Agency scientific consensus regarding risk assessment information on a chemical. This information is recorded on IRIS and is considered to be ''Work Group Verified.''

The HEAST is prepared by EPA's Office of Research and Development. They contain risk assessment information on chemicals that have undergone a more limited review and have the concurrence of individual Agency program offices; each is supported by an Agency reference. The information has not, however, had enough review to be recognized as Agency-wide consensus information.

b. Ecological

A thorough literature review was conducted to identify toxicological data from laboratory and field studies for each of the constituents of ecological concern. The review included secondary sources such as the Synoptic Review Series published by the U.S. Fish and Wildlife Service, the Ambient Water Quality Criteria documents, and other Federal compendia of toxicity data (e.g. HEAs, the Derivation of Proposed Human Health and Wildlife Bioaccumulation Factors for the Great Lakes Initiative, Agency for Toxic Substances and Disease Registry documents, PHYTOTOX, GRIN, TERRETOX, and AQUIRE). Toxicity data on soil organisms were obtained for several constituents from van de Meent et al. (1990). In addition to AQUIRE, the other primary data source for toxicity data on aquatic plants were the Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota:1994 Revision (Suter and Mabrey, 1994). On-line literature searches were conducted to identify primary sources of toxicity data on constituents lacking sufficient data in the secondary sources. Additional studies were identified in conventional literature reviews.

E. Risk Assessment

1. The Non-groundwater Risk Assessment

a. Introduction

The risk assessment underlying today's proposed rule is based upon a comprehensive approach to evaluating the movement of many different waste constituents from their waste management units, through different routes of exposure or pathways, to the points where human and ecological receptors are potentially exposed to these constituents. This risk assessment is being used in today's proposed rule to determine which listed hazardous wastes can be defined as ''low-risk'' wastes, able to exit the Subtitle C system and be managed in non-Subtitle C units. The previous approach taken in the May 20, 1992, proposed HWIR rule also addressed the risks associated with the management of wastes containing hazardous constituents with very diverse physical and chemical properties; however, only groundwater ingestion exposures from landfill units were evaluated. That approach led to a concern by the Agency, as well as commenters on the proposed rule, that leachate from landfills contaminating groundwater and subsequent consumption of the contaminated groundwater by humans may not be the only exposure pathway important to evaluate. Although the ingestion of contaminated groundwater pathway may be appropriate to propose exit levels for some wastes and constituents, it may be under-protective for others, depending on the physical and chemical properties of each waste constituent. (For example, some constituents have a high potential to bioaccumulate or bioconcentrate in living organisms. Pathways in which these constituents come in contact with fish, grazing livestock, wildlife, or edible plants would be important to evaluate.) In addition, over the past 14 years of implementing the RCRA program, the Agency has learned more about potential routes of release to the environment from various management practices.

Therefore, for today's proposal the Agency undertook an extensive risk assessment that examines numerous exposure pathways, rather than just the groundwater ingestion pathway. In selecting the exposure pathways, previous rulemakings were used as a guide, as well as other special studies by the Agency that implement analyses examining numerous pathways. (Tables A–1 and A–2 contain the human and ecological pathways, respectively, evaluated in the assessment, and are presented in appendix A to today's preamble.) With regard to waste management units considered in the assessment, it is important to note that because today's proposal establishes criteria for waste to exit the Subtitle C system, the assessment evaluated exposures associated with managing wastes in non-Subtitle C units. The human and ecological receptors considered in the assessment were selected to represent a range of behaviors, activities, dietary habits, and trophic levels that influence exposure levels.

The risk assessment supporting this proposal is currently undergoing review by the Science Advisory Board and EPA's Office of Research and Development. As a result of these reviews, and of comments received during the public comment period, it is likely that EPA would make changes to the risk assessment or other parts of the rule. Topics on which the Agency has received informal comment include the use of ecological benchmarks for regulation and the overland transport of waste constituents. The Agency, to the extent consistent with the schedule negotiated in the consent decree for this rulemaking, would publish a supplemental notice proposing any significant changes before finalizing the rule.

b. How the Assessment is Structured

The non-groundwater assessment acknowledges that not all human and ecological pathways arise from each