- Use of regression equations based on Kow to derive biotransfer factors for plants—The biotransfer factors are based upon empirical relationships with Kow defined by studies on relatively few chemicals.
- The lack of accounting for translocation of contaminants within plants—The plant uptake models do not account for translocation of contaminants (should such a translocation occur) from one part of a plant to another. The Agency is considering two models developed by Stephan Trapp, plantx and plantE, and solicits comment on their use.
- Use of regression equations based on Kow to derive biotransfer factors for beef and milk—The biotransfer factors for beef and milk are based upon empirical relationships with Kow defined by studies on relatively few chemicals.

c. Receptors

Both human and ecological receptors are considered in the assessment. The human receptors evaluated were selected to represent a range of behaviors and activities that influence exposure levels. The Agency believes that these represent typical and more exposed types of behaviors and activities that might exist around waste management units or media contaminated by releases from waste management units. Each receptor was evaluated for individual exposure pathways (i.e., exposure to multiple pathways was not included). For ecological receptors, populations or communities were selected for the generic terrestrial and freshwater ecosystems based on behavior patterns such as dietary habits (plant-eater vs. meat-eater) as well as qualities such as significance and representativeness with respect to trophic structure in the ecosystem (bald eagle). The selection of ecological receptors was limited by the level of characterization available such as food intake and body weight. Again, the Agency believes that these represent the types of organisms that might exist around waste management units or media contaminated by releases from waste management units.

(1) Human Receptors and Exposure

Human receptors assessed in the assessment included the following:

- Adult resident living in the vicinity of a management unit—This individual is representative of the general population in the United States and is evaluated independently through the following potential exposure pathways: Inhalation, ingestion of contaminated soil, ingestion of contaminated drinking water, dermal contact with contaminated soil, and dermal contact during bathing. In addition, the analysis evaluates exposures to an adult resident living on-site of a land application unit begining 10 years after closure of the unit.
- Child resident living in the vicinity of a management unit—Children are a special population considered in certain pathways because of their low body weight compared to high intake rates or surface area. A child is evaluated through the following potential exposure pathways: ingestion of contaminated soil, dermal contact with contaminated soil, and dermal contact during bathing.
- Home Gardener—This individual represents a sub-population that supplements their fruit and vegetable consumption with fruits and vegetables they grow on contaminated land.
- Subsistence Fisher—This individual represents a sub-population that subsists on contaminated fish.
- General Fish Consumer—This individual represents a sub-population that consumes contaminated fish and supplements their intake with other non-contaminated foods.
- Subsistence Farmer—This individual represents a sub-population that grows or raises most of their own food on contaminated land. This individual is evaluated independently through the following exposure pathways: beef ingestion, milk ingestion, and fruit and vegetable ingestion.
- On-site Worker—This individual represents the working population that may be found at the waste management units. This individual is evaluated during the active phase of the unit for the following on-site exposures: Inhalation and dermal contact with contaminated soil.

Each of the receptors has been matched with the most relevant exposure routes. Table A–3 in appendix A shows the pathways were modeled for each receptor.

As previously discussed, the assessment begins with a target human toxicity benchmark and exposure assumptions tailored to each receptor, and back-calculates to constituent-specific concentrations in each media. In characterizing the exposure, two exposure parameters are set to high-end values and the rest of the exposure parameters are set to central tendency or default values. The two high-end exposure values were typically exposure duration and a parameter affecting intake of, or exposure to, a contaminant (e.g., fraction contaminated, consumption rate, inhalation rate).

The exposure equations used for back-calculating media concentrations are based on standard risk equations used in most Agency risk assessments. For all inhalation and ingestion pathways, these equations were adapted from Risk Assessment Guidance for Superfund (RAGS): Volume I—Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals) (U.S. EPA, 1991x; hereafter, RAGS Part B) and subsequent modifications. For dermal pathways, which are not covered in RAGS Part B, the equations presented in Dermal Exposure Assessment: Principles and Applications, Interim Report (U.S. EPA 1992x; hereafter, the Dermal document) were used; this document reflects the current techniques for assessing dermal exposure. The Agency requests comment on the data sources and assumptions used in the human exposure portion of the risk assessment, described in detail in Section 5.0 of the Technical Support Document for the Hazardous Waste Identification Rule: Risk Assessment for Human and Ecological Receptors.

The Agency seeks comment on the following types of human exposure that were not examined:

- Ingestion of contaminated water by humans while bathing or swimming—The ingestion rate of water while swimming or bathing is 30 times smaller than the normal consumption rate of water used in the drinking water ingestion pathways; therefore, the drinking water ingestion pathways should be protective of the incidental water ingestion pathways.
- Inhalation of volatiles while bathing—No appropriate, chemical-specific equations could be found to address this pathway.
- Ingestion of airborne particulates—The ingestion rate of soil used in the soil ingestion pathways is many times larger than the ingestion rate from airborne particulates; therefore, the soil ingestion pathways should be protective of the ingestion of airborne particulates. Also, given the way the soil ingestion rates were empirically derived, ingestion of airborne particulates should, in effect, be accounted for in the estimated soil ingestion rates.
- Ingestion of contaminated soil by resident on active site—While the waste management units are active, it is assumed that access is limited to workers.

(2) Ecological Receptors and Exposure

In addition to the human receptors, ecological receptors were evaluated in the assessment. Lacking an Agency precedent for the selection of ecological