

PROTOCOL

Human Health Receptors and Scenarios

Introduction

This protocol has been developed in order to support the Savannah River Site environmental remediation program. It provides details on the standard receptors and scenarios used for human health risk evaluation. The protocol instructions are based on the latest available USEPA guidance and agreement from the staff of USEPA, SCDHEC, and USDOE as members of the Risk Assessment Design Team (RADT).

The receptor scenarios defined in this protocol are consistent with the standard scenarios described by USEPA, with the exception of the exposure pathways for concrete as described below. More detailed information can be found at the USEPA Region 09 website: www.epa.gov/region09/waste/sfund/prg/index.htm or the USEPA PRG Radcalculator website: <http://epa-prgs.ornl.gov/radionuclides/>.

Pathways for receptor exposure to potentially contaminated concrete media are not described in USEPA guidance documents. Pathways identified for future industrial worker exposure to concrete is based on agreements from the Risk Assessment Design Team. Because exposure to concrete would likely occur in an industrial setting, the Risk Assessment Design Team agreed that an exposure pathway for a residential scenario did not need to be evaluated.

A quantitative evaluation will be performed for the following on-unit hypothetical exposure scenarios:

- Future Industrial Worker
- Future Resident

Evaluation of other human receptors such as trespassers, recreational users or site-specific workers, may be appropriate in addition to the standard receptors presented above. Evaluation of additional receptors will be assessed on a case-by-case basis and approved by the project core team. This protocol provides brief descriptions of the standard human health receptor scenarios. Specific values for exposure parameters can be found in the Human Health Exposure Parameter-RME Protocol.

Details

Future Industrial Worker Exposure Scenario

The future industrial worker exposure scenario is a standard USEPA scenario, which addresses long-term risks to workers who are exposed to unit contaminants while working within an industrial setting. The future industrial worker is an adult who hypothetically works on-unit in an outdoor industrial setting for the majority of his time. The primary exposure pathways for evaluation relative to the future industrial worker include:

- Exposure to contaminated soils (incidental ingestion, dermal contact, inhalation of windblown dust, inhalation of volatile constituents, and external exposure from radionuclides).
- Exposure to contaminated concrete via incidental ingestion, dermal contact, and external exposure from radionuclides.
- Exposure to groundwater through ingestion of drinking water from contaminated sources

Future Resident Exposure Scenario

The future resident exposure scenario evaluates long term risks to individuals expected to have unrestricted use of the unit. It assumes that residents hypothetically live on the unit and are exposed chronically, both indoors and outdoors, to unit contaminants. The future resident includes adults and children who will be exposed to all of the contaminated media.

The primary exposure routes utilized for evaluation relative to the hypothetical on-unit resident (adult and child) include:

- Exposure to contaminated soils (incidental ingestion, inhalation of windblown dust and possibly volatile constituents, dermal contact, and external exposure from radionuclides);
- Exposure to groundwater (ingestion, dermal contact, and possibly inhalation of volatile contaminants);
- Exposure to contaminated sediments and surface water, if present (recreational use scenario – ingestion, external exposure, and dermal contact).

The RADT has agreed that there is no need to calculate concrete PRGs for this scenario. It is acknowledged that the areas for Area Completion will maintain some level of Institutional Controls to restrict residential land use. However, if the Core Team determines that the residential scenario is warranted, this scenario can be added. In addition, waste units that may not be part of an Area Completion project typically require a residential evaluation if a No Action is warranted (i.e., no Institutional Controls).