

H.2.2 Radiological Impacts

The risk to the affected population is a measure of the radiological risk posed to society as a whole by the alternative being considered. As such, the impact on the affected population is used as the primary means of comparing various alternatives. For each alternative, radiological risks (risks that result from the radioactive nature of the materials) of transportation were assessed for both incident-free (normal) and accident conditions. The radiological risk associated with incident-free transportation conditions would result from the potential exposure of people to external radiation in the vicinity of a shipment. The radiological risk from transportation accidents would come from the potential release and dispersal of radioactive material into the environment during an accident and the subsequent exposure of members of the public.

All radiological impacts are calculated in terms of the committed dose received by the exposed populations and its associated health effects. The calculated radiation dose is the total effective dose equivalent (10 CFR 20), the sum of the effective dose equivalent from external radiation exposure and the 50-year committed effective dose equivalent from internal radiation exposure. Radiation doses are presented in units of roentgen equivalent man (rem) for individuals and person-rem for collective populations. The impacts are further expressed as health risks in terms of latent cancer fatalities (LCFs) in exposed populations using the dose-to-risk conversion factors recommended by the U.S. Department of Energy's Office of National Environmental Policy Act Policy and Compliance, which are based on Interagency Steering Committee on Radiation Safety guidance (DOE 2003).

H.2.3 Nonradiological Impacts

In addition to the radiological risks posed by transportation activities, nonradiological, vehicle-related risks (risks unrelated to radioactive cargo) are assessed for the same transportation routes. Nonradiological transportation risks, which would be incurred for similar shipments of any commodity, are assessed for both incident-free and accident conditions. The nonradiological accident risk refers to the potential occurrence of transportation accidents resulting in fatalities unrelated to the shipment of cargo. Nonradiological risks are presented in terms of estimated fatalities.

Nonradiological risks during incident-free transportation conditions could be caused by potential exposure to increased vehicle exhaust emissions. As explained in Section H.5.2, these emission impacts were not considered.

H.2.4 Transportation Modes

All shipments were assumed to use either dedicated truck or rail transportation modes.

H.2.5 Receptors

Transportation-related risks were calculated and are presented separately for workers and members of the general public. The workers considered were truck and rail crewmembers involved in transportation and inspection of the packages. The general public included all persons who could be exposed to a shipment while it is either moving or stopped during transit. Potential risks were estimated for the affected populations and for a hypothetical maximally exposed individual (MEI). For incident-free operation, the affected population included individuals living within 800 meters (0.5 miles) of each side of the road or rail, and the MEI was a resident living near the highway or railroad who would be exposed to all shipments transported by road or rail. For accident conditions, the affected population included individuals residing within 80 kilometers (50 miles) of the accident, and the MEI was an individual located 100 meters (330 feet) directly downwind from the accident.

