5.2.7 WATER RESOURCES

This section presents potential water resource impacts from implementing the proposed waste processing alternatives described in Chapter 3. Section 5.2.14 discusses potential impacts to INEEL water resources from accidents or unusual natural phenomena such as earthquakes. Appendix C.9 discusses potential long-term impacts to INEEL water resources from facility closure.

Because the Minimum INEEL Processing ***Alternative*** would involve shipment of mixed HLW to the Hanford Site for treatment, possible impacts to water resources at Hanford were also evaluated (see Appendix C.8). Unless otherwise noted, however, the discussion of impacts presented in this section applies specifically to INEEL.

5.2.7.1 Methodology

DOE assessed potential impacts by reviewing project plans for the ***six*** proposed alternatives to determine (1) water use by alternative, (2) liquid effluents that could affect local water resources, and (3) the potential for impacts from flooding. Each alternative was then evaluated with respect to its impacts on surface and subsurface water quality and water use. Previous groundwater computer modeling of the vadose zone and saturated contaminant transport shows that existing plumes would not greatly affect the regional groundwater quality because contaminants would not migrate offsite in concentrations above the EPA drinking water standards (DOE 1995). A more recent study (Rodriguez et al. 1997) predicts that without remediation, chromium, mercury, tritium, iodine-129, neptunium-237, and strontium-90 would reach or exceed EPA drinking water standards in the aquifer beneath the INEEL before the year 2095. Iodine-129 was predicted to migrate to the southern border of the INEEL at the concentration of the drinking water standard (1 picocurie per liter). Section 5.4, Cumulative Impacts, discusses potential impacts of these contaminants.

The primary assumption for evaluating consequences to water resources for each alternative was that there would be no future routine discharge of radioactive liquid effluents that would result in offsite radiation doses. Activities proposed for each alternative have been analyzed to identify potential waste streams and water use (see Sections 5.2.12 and 5.2.13). There are no radioactive discharges directly into the Snake River Plain Aquifer from existing operations. Routine deep well injection of radioactive waste at INTEC was discontinued in 1984. The well was permanently closed and sealed in accordance with Idaho Department of Water Resources regulations in 1989. The sewage treatment plant accepts sanitary wastes from INTEC facilities. Liquid effluent discharges from INTEC facilities to the percolation ponds and sewage treatment plant are monitored for compliance with the conditions of their respective wastewater and land application permits (see Section 4.8). It is not known what contaminants may be present in the process effluent; however, it is assumed that under normal operating conditions the radioac-

tive and chemical discharges would not result in off-INTEC impacts and ***would be*** subject to permitting requirements.

5.2.7.2 Construction Impacts

Potential construction impacts evaluated for water resources include water use and impacts to surface water quality from stormwater runoff. Estimated water use during construction by alternative is presented in Table 5.2-28 of Section 5.2.12. Options under the Separations Alternative have the highest water use, followed by ***the Direct Vitrification Alternative,*** the Non-Separations Alternative, the Minimum INEEL Processing Alternative, the Continued Current Operations Alternative, and the No Action Alternative with the lowest water use. ***During fiscal year 2000,*** INEEL activities ***withdrew about 1.1*** billion gallons of water from the Snake River Plain Aquifer (***Fossum 2002***), most of which ***was*** returned. Total use of groundwater from the Snake River Plain Aquifer for all uses (agricultural irrigation, domestic water use, etc.) averages 470 billion gallons each year (DOE 1995). INEEL activities represent 0.4 percent of the total withdrawal from the aquifer. Water use during construction for any alternative represents a minor increase in water withdrawal over current use. ***Total INEEL water use would be well below the consumptive use water rights of 11.4 billion gallons per year (Teel 1993).***

Construction activities at INEEL are managed in accordance with the *INEEL Storm Water Pollution Prevention Plan for Construction Activities* (DOE 1998a). This plan requires the use of best management practices to minimize stormwater runoff and the potential pollution of surface waters. The *INEEL Storm Water Pollution Prevention Plan for Industrial Activities* (DOE 1998b) requires monitoring at INEEL facilities. Stormwater monitoring at INTEC is discussed in Section 4.8.1.4. Stormwater measurements above benchmark levels established in the *LMITCO Storm Water Monitoring Program Plan* (LMITCO 1998) must be investigated and corrected. A temporary increase in sediment loads in stormwater runoff may be expected during construction. Because options under the Separations Alternative have the most construction activities, the highest potential for stormwater pollution is associated with this alternative. This alternative is followed in order of decreasing potential impact by the Non-Separations Alternative, the Minimum INEEL Processing Alternative, the Continued Current Operations Alternative, and the No Action Alternative. However, in every case, because of the construction best management practices, low annual rainfall, small quantities of runoff, and flat ground slopes, DOE expects impact to surface water to be minimal.

As described in Section 4.8***.1.2***, INTEC stormwater runoff is prevented from reaching the Big Lost River by drainage ditches and berms that divert runoff to a borrow pit and depressions scattered around the INTEC area. Water collects in these depressions and infiltrates the ground surface, providing recharge to the aquifer.

5.2.7.3 Operational Impacts

Potential operational impacts evaluated for water resources include water use, impacts to surface water quality from stormwater runoff, and the potential for flooding. As previously discussed, it is assumed there would be no future routine discharge of radioactive liquid effluents that would result in offsite radioactive doses. Under normal operating conditions for all alternatives, there would be no radioactive ***or*** chemical discharges to the soil or directly to the aquifer that would result in offsite impacts. Potential releases from accidents are evaluated in Section 5.2.14.

Water use by alternative is summarized in Table 5.2-29 (Section 5.2.12). As with construction, the increased operational water use would represent a very small increase over the annual water withdrawal of ***1.1*** billion gallons at the INEEL and 470 billion gallons for the entire Snake River Plain Aquifer. The highest operational water use is expected under the Hot Isostatic Pressed Waste Option.

Stormwater runoff from INTEC is monitored in accordance with the *INEEL Storm Water Pollution Prevention Plan for Industrial Activities* (DOE 1998b). This plan includes provisions for spill control and cleanup, facility inspections to identify and correct potential sources of stormwater pollution, and best man-

agement practices at each facility to minimize the potential for polluting stormwater. Stormwater measurements above benchmark levels established in the *LMITCO Storm Water Monitoring Program Plan* (LMITCO 1998) must be investigated and corrected. Based on best management practices, monitoring requirements, and historical measurements of contaminants in INTEC stormwater runoff (Section 4.8), operational impacts to surface water are expected to be minimal under every alternative.

As discussed in Section 4.8***.1.3***, flood studies prepared by the U.S. Geological Survey and Bureau of Reclamation conclude that some inundation at INTEC could occur for a 100-year return period flood. For the two independent 100-year flood studies, the results differ ***by more than*** a factor of two ***in estimated flow rates.*** If, as a result of this EIS, DOE decides to build facilities within the flood plain at INTEC, then some form of mitigation ***could*** be necessary to assure that INTEC facilities would not be impacted by localized flooding. A Mitigation Action Plan would be prepared, if necessary, ***pending results of ongoing flood studies.*** However, before such facilities are constructed, future evaluations and comparative analyses regarding the extent of the 100-year flood at INTEC ***will*** be conducted and used by DOE to determine a more accurate ***evaluation of*** potential inundation.

In a previous study (Koslow and Van Haaften 1986), a probable maximum flood combined with an overtopping failure of Mackay Dam resulted in a larger flood than was presented in the ***U.S. Geological Survey study*** (Berenbrock and Kjelstrom 1998) for a 100-year event. The peak water velocity in the INTEC vicinity was estimated at 2.7 feet per second, which would produce minimal erosion. However, as noted in Appendix C.4, the probable maximum flood could affect bin set 1, causing the bin set to lose its integrity. This is a ***conservative*** design basis bounding event and is discussed in Appendix C.4. ***On January 18, 2001, DOE issued a floodplain determination, an estimate of the 100-year flood elevation, for Resource Conservation and Recovery Act (RCRA) permitting purposes at INTEC (Guymon 2001). The determination is based on Koslow and Van Haaften (1986), as is the probable maximum flood described above. The RCRA determination, however, is based on a 100-year flow scenario which involves the overtopping failure of Mackay Dam resulting in a flood elevation of 4,916 feet, whereas the maximum probable flow estimate results in a flood elevation of 4,917 feet at INTEC. Although this is an extremely conservative assumption, exceeding the requirements for a 10 CFR 1022 floodplain determination, the 4,916 feet elevation is consistent with the safety authorization basis for facilities at INTEC.***

5.2.8 ECOLOGICAL RESOURCES

5.2.8.1 Methodology

This section presents the potential impacts on ecological resources from implementing the proposed waste processing alternatives described in Chapter 3. Potential impacts were qualitatively assessed by reviewing project plans for the ***six*** proposed alternatives to determine if: (1) project activities are likely to produce changes in ecological resources and (2) project plans conform to existing major laws, regulations, and DOE Orders related to protection of ecological resources (e.g., protected species, wetlands). Because the Minimum INEEL Processing ***Alternative*** would involve shipment of mixed HLW to the Hanford Site for treatment, possible impacts to Hanford's ecological resources were also evaluated (see Appendix C.8 for a detailed discussion of at-Hanford impacts). Unless otherwise noted, however, the discussion of impacts in this section applies specifically to the INEEL.

Most of the activities associated with HLW management would take place inside the perimeter fence at INTEC, an area that has been dedicated to industrial use for more than 40 years. Potentially-affected areas (sites and facilities to be used or constructed and surrounding habitat where effluents, emissions, light, or noise may be present) were identified in Chapter 3, Alternatives. Ecological resources of the INEEL are discussed in Section 4.9. The assessment of potential effects is based upon an evaluation of the location, scope, and intensity of construction and waste processing activities in relation to ecological resources. In addition, the potential effects associated with the No Action Alternative serve as a basis of comparison for the other alternatives.