5.2 Waste Processing Impacts

Section 5.2 presents a discussion of potential environmental impacts from retrieving, analyzing, treating, and preparing mixed transuranic waste/SBW and mixed HLW for disposal. These are relatively short-term actions because DOE has committed to preparing all of the calcined waste by a target date of December 31, 2035 ***so that it can be shipped to a storage or disposal facility outside of Idaho.*** After 2035, ***if a storage or disposal facility outside of Idaho is not available,*** storage of road-ready waste forms ***at the INEEL*** would ***generate*** impacts ***which are presented*** on an ***annualized*** basis. ***Altogether there are six*** waste processing alternatives, ***which are*** described in detail in Section 3.1 ***and*** evaluated ***for impacts in this section:*** the No Action Alternative, the Continued Current Operations Alternative, the Separations Alternative, the Non-Separations Alternative, the Minimum INEEL Processing Alternative***, and the State of Idaho's Preferred Alternative, Direct Vitrification. As described in Section 3.1.6, the Direct Vitrification Alternative includes two options: Vitrification without Calcine Separations and Vitrification with Calcine Separations.***

Potential impacts are presented by work phase, with the discussion of construction impacts preceding the discussion of operational impacts. Construction impacts would be those associated with (1) development of new waste processing facilities and (2) modification, refurbishment, or expansion of existing waste processing facilities. A representative construction impact would be noise-related disturbance to wildlife. Operational impacts would be those associated with the actual processing of mixed HLW and mixed transuranic waste/SBW within the various facilities. A representative operational impact would be air concentrations of hazardous substances from facility emissions.

Section 5.2 presents impacts of treating newly generated liquid waste as mixed transuranic waste/SBW under all waste processing alternatives. However, DOE may decide to treat this waste separately from the mixed transuranic waste/SBW after 2005. The EIS also presents the impacts for a remote-handled grout facility (see Project P2001 in Appendix C.6) that could be used to treat the liquid waste generated after 2005. This project could be included as part of any of the waste processing alternatives. The treated waste would be packaged and disposed of on- or off-site as low-level waste or disposed of at the Waste Isolation Pilot Plant as transuranic waste, depending on its characteristics. For purposes of assessing transportation and waste management impacts, DOE assumed that the grouted waste would be characterized as remote-handled transuranic waste and transported to the Waste Isolation Pilot Plant for disposal. These transportation and waste management impacts are presented in Sections 5.2.9 and 5.2.13.

Because two of the alternatives, the Separations Alternative and the Minimum INEEL Processing Alternative, could require construction of an onsite disposal facility for the low-level waste fraction, the potential impacts of building and operating this facility and transporting wastes to it for disposal are discussed in Section 5.2. Section 5.3 presents potential post-closure impacts from disposal of the low-level waste fraction in this new facility.

Section 5.2 summarizes the potential environmental impacts of treating INEEL's mixed HLW at the Hanford Site under the Minimum INEEL Processing Alternative. The incremental Hanford Site impacts for treatment of the INEEL mixed HLW were obtained by scaling impacts for similar activities presented in the Tank Waste Remediation System EIS. The "at Hanford" impacts are not directly comparable to those reported for the waste processing activities at INEEL because the impacts would affect different environments and populations and because of differences in the scope of the analyses in the Tank Waste Remediation System EIS and this EIS.

A more detailed analysis of ***potential "at Hanford"*** impacts, along with a description of the Hanford Site Affected Environment, may be found in Appendix C.8. Decontamination and decommissioning activities at the Hanford Site would be carried out in accordance with site-specific plans and waste accords (e.g., Tri-Party Agreement) and are not discussed in this EIS.

Tables in Appendix C.6 list projects to be implemented under each waste processing alternative. Appendix C.6 also contains project summaries and project data sheets, which are the primary sources of information for the impact analysis. Appendix C.10 presents a compilation of environmental consequence data for each ***resource area*** by alternative, identifying acres disturbed, resources used (energy, services, and so forth), personnel required, and other important attributes. These attributes were used to determine the potential impacts of each alternative as discussed in this chapter.

Some waste processing alternatives would generate service waste water. DOE currently discharges this service waste water to existing percolation ponds, but has made a decision to move the discharge of the existing service waste water to replacement ponds by December 31, 2003, as identified in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Record of Decision for Waste Area Group 3 (the Idaho Nuclear Technology and Engineering Center (INTEC)). The service waste water discharges will need to meet the requirements established by the Waste Water Land Application Permit issued by the State of Idaho as well as DOE Order 5400.5, "Radiation Protection of the Public and the Environment."

If the waste processing alternatives generate a significant quantity of additional service waste water, DOE may have to modify its service waste water system such as by adding pretreatment to reduce the volume or by further recycling. Since DOE has not made a selection of a waste processing alternative, the waste water system's impacts are not included as part of the waste processing alternative impact analysis. Once an alternative is identified, the service waste water requirements will be estimated, the waste water system options will be considered, and the impacts will be assessed against the impacts analyzed in the CERCLA Waste Area Group 3 Remedial Investigation/Baseline Risk Assessment/Feasibility Study. Depending on the results, an additional assessment may be performed under the National Environmental Policy Act, as appropriate.

The structure of Section 5.2 closely parallels that of Chapter 4, Affected Environment. Thirteen sections of Chapter 4 have corresponding sections in Section 5.2. The sections discuss methodology and present the potential impacts of each waste processing alternative evaluated. In addition, for five key ***resource areas*** more details on methodology are provided in Appendix C. These ***resource areas*** are Socioeconomics (Appendix C.1), Air Resources (Appendix C.2), Health and Safety (Appendix C.3), Facility Accidents (Appendix C.4), and Transportation (Appendix C.5).

5.2.1 LAND USE

This section presents potential land use impacts from implementing the waste processing alternatives described in Chapter 3. Potential impacts were assessed by reviewing project plans for the ***six*** alternatives to determine if (1) project activities are likely to produce land use changes on the INEEL or surrounding region and (2) project plans conform to existing DOE land use plans and policies. Because one of the alternatives (Minimum INEEL Processing) would involve shipment of INEEL's mixed HLW to the Hanford Site for treatment, possible land use changes at the Hanford Site were also evaluated (see Appendix C.8). Unless otherwise noted, the discussion of impacts presented in this section applies specifically to the INEEL.

Most of the activities associated with waste management would take place inside the secure perimeter fence at INTEC, an area that has been dedicated to industrial use for more than 40 years. Because proposed activities would be conducted within or immediately adjacent to INTEC, land use on government-owned and privately-owned lands surrounding the INEEL (see Section 4.2.2) would not be affected. Construction activities (e.g., development or expansion of facilities) have the greatest potential for affecting land use. Because none of the anticipated operational impacts (e.g., emissions from waste processing facilities) are expected to affect land use, no operational impacts are discussed in this section. Table 5.2-1 compares new facility and land requirements for the ***twelve*** options under

Table 5.2-1. New facilities and land requirements by waste processing alternative.[a]

Waste Processing Alternative	New INTEC facilities	New INEEL facilities outside of INTEC	Open land converted to industrial use (acres)
No Action Alternative	Calcine Retrieval and Transport System (bin set 1 only)	None	None
Continued Current Operations Alternative	Calcine Retrieval and Transport System (bin set 1 only), Newly Generated Liquid Waste Treatment Facility	None	None
Separations Alternative			
Full Separations Option	Calcine Retrieval and Transport System, Waste Separations Facility, Vitrification Plant, Class A Grout Plant, Vitrified Product Interim Storage Facility, New Analytical Laboratory, Waste Treatment Pilot Plant	Low-Activity Waste Disposal Facility[b]	22
Planning Basis Option	Calcine Retrieval and Transport System, Waste Separations Facility, Vitrification Plant, Class A Grout Plant, Vitrified Product Interim Storage Facility, Newly Generated Liquid Waste Treatment Facility, New Analytical Laboratory, Waste Treatment Pilot Plant	None	None
Transuranic Separations Option	Calcine Retrieval and Transport System, Transuranic Separations Facility, Class C Grout Plant, New Analytical Laboratory, Waste Treatment Pilot Plant	Low-Activity Waste Disposal Facility[b]	22
Non-Separations Alternative			
Hot Isostatic Pressed Waste Option	Calcine Retrieval and Transport System, Hot Isostatic Press Facility, HLW Interim Storage Facility, Newly Generated Liquid Waste Treatment Facility, New Analytical Laboratory, Waste Treatment Pilot Plant	None	None
Direct Cement Waste Option	Calcine Retrieval and Transport System, Direct Cement Facility, HLW Interim Storage Facility, Newly Generated Liquid Waste Treatment Facility, New Analytical Laboratory, Waste Treatment Pilot Plant	None	None
Early Vitrification Option	Calcine Retrieval and Transport System, Early Vitrification Facility, HLW Interim Storage Facility, New Analytical Laboratory, Waste Treatment Pilot Plant	None	None
Steam Reforming Option	***New Storage Tanks, Calcine Retrieval and Transport System, Calcine and Steam-Reformed Product Packaging Facility, Newly Generated Liquid Waste Treatment Facility, Steam Reforming Facility***	***None***	***None***
Minimum INEEL Processing Alternative			
At INEEL	Calcine Retrieval and Transport System, Calcine Packaging Facility, SBW and Newly Generated Liquid Waste Treatment Facility, Vitrified Product Interim Storage Facility, New Analytical Laboratory, Waste Treatment Pilot Plant	Low-Activity Waste Disposal Facility[b]	22
At Hanford[c]	Canister Storage Buildings[d], Calcine Dissolution Facility	NA[e]	52
Direct Vitrification Alternative			
Vitrification without Calcine Separations Option	***Calcine Retrieval and Transport System, Vitrification Facility, Interim Storage Facility, Waste Treatment Pilot Plant, New Analytical Laboratory, New Storage Tanks***	***None***	***None***
Vitrification with Calcine Separations Option	***Calcine Retrieval and Transport System, Waste Separations Facility, Vitrification Facility, Grout Plant, Interim Storage Facility, Waste Treatment Pilot Plant, New Analytical Laboratory, New Storage Tanks***	***None***	***None***

a. Source: Project Data Sheets in Appendix C.6.

b. Applicable to disposal of low-activity waste in a new INEEL disposal facility.

c. Source: Appendix C.8 of this EIS.

d. Applicable to the Interim Storage Shipping Scenario only.

e. NA = not applicable. For the onsite disposal facility only.

the ***six*** proposed waste processing alternatives. All activities would be consistent with DOE policy on land use and facility planning (DOE 1996a) and existing INEEL land use plans (DOE 1997).

5.2.1.1 No Action

Under this alternative, the New Waste Calcining Facility calciner would ***remain*** in standby ***(standby began May 2000)***. Remaining mixed transuranic waste/SBW would be left in the Tank Farm. Maintenance essential for the protection of workers and the environment would continue, but there would be no major facility upgrades. A new Calcine Retrieval and Transport System would be required to retrieve calcine from bin set 1 and transport it to bin set 6 or 7; otherwise, there would be no change in land use within INTEC and no overall change in land use on INEEL.

5.2.1.2 Continued Current Operations Alternative

As described in Section 3.1.2, ***under*** this alternative the New Waste Calcining Facility calciner ***would remain*** in standby ***(standby began May 2000)*** until upgrades are completed to put the facility in compliance with Maximum Achievable Control Technology requirements. Any remaining mixed transuranic waste/SBW would be left in the Tank Farm until 2011, when the New Waste Calcining Facility would resume operation. Other than a Newly Generated Liquid Waste Treatment Facility and a Calcine Retrieval and Transport System, no new facilities would be required. There would be no other change in land use within the INTEC and no overall change in land use on the INEEL.

5.2.1.3 Separations Alternative

Full Separations Option - Under this option, a number of new waste management and support facilities would be built within the developed portion of INTEC, including a Waste Separations Facility, Vitrification Plant, Class A Grout Plant, Vitrified Product Interim Storage Facility, and New Analytical Laboratory. DOE is evaluating three methods for disposing of the low-level waste fraction (Class A type grout) produced by processing mixed HLW and mixed transuranic waste/SBW: (1) offsite disposal, (2) onsite disposal in the Tank Farm and bin sets, and (3) disposal in a new near-surface land disposal facility (see Section 3.1.3). If DOE chooses to dispose of the low-level waste fraction onsite in a land disposal facility, a new Low-Activity Waste Disposal Facility would be built approximately 2,000 feet east of the INTEC Coal-Fired Steam Generating Facility, which is outside the existing security perimeter fence. Appendix A discusses the process DOE used to select this site.

The total area of the Low-Activity Waste Disposal Facility, support facilities (e.g., guardhouse), and open buffer zone would be 22 acres; the disposal facility itself would be a 367-foot by 379-foot reinforced concrete structure with a maximum capacity of 34,800 cubic meters (Kiser et al. 1998). Once filled to capacity, the Low-Activity Waste Disposal Facility would be equipped with an engineered cap sloping from centerline to ground level with a four percent grade (Kiser et al. 1998). If a soil cap is used it would be revegetated with selected native plants to prevent erosion, improve the appearance of the closed facility, and blend in with surrounding vegetation.

This option would be consistent with current and planned uses of INTEC outlined in the *INEEL Comprehensive Facility and Land Use Plan* (DOE 1997). Implementing this option would not affect overall INEEL land use or land use on surrounding areas.

Planning Basis Option - This option is similar to the Full Separations Option, but differs in the way that mixed transuranic waste/SBW would be managed (see Chapter 3) and in the way that the low-level waste fraction (produced by processing mixed HLW and mixed transuranic waste/SBW) would be disposed of. Under the Planning Basis Option, mixed transuranic waste/SBW would be calcined in the New Waste Calcining Facility prior to dissolution and chemical separation rather than being separated directly into mixed high- and low-level waste fractions. Although the timing of processing would be different, the same new waste processing facilities would be required under this option as under the Full Separations Option. Under this

option, the low-level waste Class A type grout fraction would be disposed of offsite at a commercial radioactive waste disposal facility. This option would be consistent with current and planned uses of INTEC outlined in the *Comprehensive Facility and Land Use Plan* (DOE 1997). Implementing this option would not affect overall INEEL land use or land use on surrounding areas.

Transuranic Separations Option - Under this option, a number of new facilities would be built within the developed portion of INTEC, including a Transuranic Separations Facility, Class C Grout Plant, and New Analytical Laboratory. As with the Full Separations Option, a new Low-Activity Waste Disposal Facility would be built if DOE chooses to dispose of the low-level waste fraction onsite in a near-surface land disposal facility, ***which is discussed in detail earlier in this section.*** Implementing this option would not affect overall INEEL land use or land use on surrounding areas.

5.2.1.4 Non-Separations Alternative

If DOE selects one of the ***four*** options under the Non-Separations Alternative, a number of new facilities would be built within the developed portion of INTEC including an immobilization ***facility*** (Hot Isostatic Press, ***Direct*** Cement, Early Vitrification, or ***Steam Reforming***), and a Newly Generated Liquid Waste ***Treatment*** Facility. Development of these new facilities would be consistent with current and planned uses of INTEC outlined in the *INEEL Comprehensive Facility and Land Use Plan* (DOE 1997). No new construction would occur outside of the INTEC security perimeter fence, so there would be no overall change in land use on the INEEL.

5.2.1.5 Minimum INEEL Processing Alternative

This alternative would involve the shipment of calcined HLW to the Hanford Site, where it would be separated into high- and low-level ***waste*** fractions and vitrified (see ***Section 3.1.5***). The vitrified wastes would then be returned to INEEL where the vitrified high-level waste fraction would be placed in storage and the vitrified low-level waste fraction would either be shipped to an offsite disposal facility or placed in a new Low-Activity Waste Disposal Facility east of INTEC. A number of new facilities would be built at INEEL in support of this alternative (see Table 5.2-1) including the Low-Activity Waste Disposal Facility, which is discussed in detail in Section 5.2.1.3. Development of these new facilities would be consistent with current and planned uses of INTEC outlined in the *INEEL Comprehensive Facility and Land Use Plan* (DOE 1997). The Low-Activity Waste Disposal Facility would require 22 acres of previously undisturbed land. Two new waste management facilities (Canister Storage Buildings and Calcine Dissolution Facility) would be built at Hanford under the Interim Storage Scenario. These new facilities would be built in an undisturbed 52-acre area within the 200-East Area at the Hanford Site. The development of these two new Hanford facilities would be consistent with Hanford Site land use plans (DOE 1996b). See Appendix C.8 for a more detailed analysis of at-Hanford impacts.

5.2.1.6 Direct Vitrification Alternative

Vitrification without Calcine Separations Option - ***Under this option, a number of new waste management and support facilities would be built within the developed portion of INTEC, including a Calcine Retrieval and Transport System, Vitrification Facility, Interim Storage Facility, Waste Treatment Pilot Plant, New Storage Tanks, and New Analytical Laboratory. No new construction would occur outside the INTEC security perimeter fence, so there would be no overall change in land use on the INEEL. This option would be consistent with current and planned uses of INTEC outlined in the INEEL Comprehensive Facility and Land Use Plan (DOE 1997).***

Vitrification with Calcine Separations Option - ***Under this option, a number of new waste management and support facilities would be built within the developed portion of INTEC, including a Calcine Retrieval and Transport System, Waste Separations Facility, Vitrification Facility, Grout Plant (mixed low-level waste fraction), Interim Storage Facility, Waste Treatment Pilot Plant, New Storage Tanks, and New Analytical Laboratory. This option is con-***

sistent with current and planned uses of INTEC outlined in the INEEL Comprehensive Facility and Land Use Plan (DOE 1997). Implementing this option would not affect overall INEEL land use or land use on surrounding areas.

5.2.2 SOCIOECONOMICS

This section presents the potential effects of implementing the waste processing alternatives described in Chapter 3 on the socioeconomic factors of the INEEL region of influence as defined in Section 4.3, Socioeconomics. Changes to INEEL-related expenditures and workforce levels have the potential to generate economic impacts that may affect local employment, population, and community services. These potential impacts should be positive in that they would contribute to stabilization of the INEEL workforce and thus the regional economy. Since 1991, INEEL employment levels have declined about 35 percent to approximately 8,100 jobs. Long-range employment forecasts are not available for INEEL missions but indications based on budget forecasts suggest workforce levels have stabilized at current levels and will not fluctuate more than $\pm$ 5 percent (McCammon 1999). Currently about 1,100 of these workers are associated with INTEC (Beck 1998). DOE assumes that these workers are the basis for the HLW workforce. Since comprehensive staffing plans determining the number of employees that would be retrained and reassigned, if necessary, to support the HLW mission have not yet been prepared, it is assumed all 1,100 would be potentially available for HLW work.

Figure 5.2-1 shows projected total direct waste processing job requirements by alternative and option. The projected employment levels include a total of both construction and operations employment in a given year. Workforce levels marginally exceed the baseline for the Planning Basis Option during the operational phase.

Following a short discussion on methodology, potential impacts for both the construction and operational phases are discussed in terms of employment and earnings, population and housing, community services, and public finance. Facility disposition is discussed in Section 5.3.2.

5.2.2.1 Methodology

Socioeconomic impacts are addressed in terms of both direct and indirect jobs. Direct jobs are the employment levels directly expected to take place under each alternative and include both construction and operations phases. This may also include existing INEEL employees doing work that will transition to a waste processing alternative, especially in operations where existing employees would be expected to be retrained and reassigned, whenever possible. In some cases, the skill mix and the number of personnel available may dictate a reduction in force. The number of workers affected will depend on the alternatives selected and the timing. History has shown that such reductions are generally small. Indirect jobs can result from spending by INEEL employees which in turn generates non-INEEL jobs. The total economic impact to the region of influence is the sum of direct and indirect impacts.

The direct jobs for each option estimated in the socioeconomic analysis are based on the project data provided in Appendix C.6, Project Summaries, for all projects that make up the option. Total employment and earnings impacts were estimated using Regional Input-Output Modeling System (RIMS) multipliers developed specifically for the INEEL region of influence by the U.S. Bureau of Economic Analysis. A discussion of the methodology can be found in Appendix C.1, Socioeconomics.

The conditions described for the affected environment region of influence provide the basis for determining the potential impacts of each alternative. Projected baseline employment and population represent socioeconomic conditions that are likely to exist in the region of influence through 2035, which is the latest information available. Long term baseline projections that would serve as a comparison to long term HLW operations would be too speculative to be meaningful. Every alternative is expected to result in short-term employment for the construction of new facilities and longer-term employment for the implementation of the waste processing alternatives.

Since the publication of the Draft EIS, Census 2000 and related data have been incorporated into the socioeconomic analyses. Population