5.2.12 UTILITIES AND ENERGY

This section presents the potential impacts on the projected demand for electricity, process and potable water, fossil fuels, and wastewater treatment from implementing the proposed waste processing alternatives. The analysis includes potential impacts associated with increased demand and usage during construction and operation. The data represent the bounding (or highest potential impact) case for each alternative or option; the data have been totaled for all projects supporting the option and do not take into account the fact that all facilities may not be operating simultaneously. Because one of the alternatives (Minimum INEEL Processing) involves shipment of mixed HLW to the Hanford Site for treatment, possible changes in utility and energy use at Hanford were also evaluated (see Appendix C.8).

5.2.12.1 Construction Impacts

There would be a small amount of construction under the No Action Alternative. It would be necessary to build a Calcine Retrieval and Transport System to retrieve calcine from bin set 1 and transport it to another existing bin set. Implementation of the other waste management alternatives would require DOE to construct new waste management and support facilities as described in Chapter 3. New facilities (additional Canister Storage Buildings and a Calcine Dissolution Facility) would be built within the 200-East Area at the Hanford Site under the Minimum INEEL Processing Alternative (Interim Storage Scenario). Appendix C.8 examines the impacts to utility and energy usage for the Hanford Site.

Construction activities would result in increased power and water consumption and wastewater generation. Water usage would include potable water for workers and process water for dust control and other construction-related activities. Domestic and process water would be supplied from existing wells. The use of heavy equipment (e.g., bulldozers, earth movers, dump trucks, compactors) and portable generators during construction would result in the consumption of fossil (diesel) fuel. Table 5.2-2***8*** presents projected utility and energy usage for each alternative. The existing INTEC capacity would adequately support any of the alternatives.

As discussed in Section 3.1.5 under the Minimum INEEL Processing Alternative, DOE would retrieve and transport calcine to a packaging facility, where it would be placed into shipping containers. The containers would then be shipped to DOE's Hanford Site where the HLW would be separated into mixed high- and low-level waste fractions. Each fraction would be vitrified. The vitrified high- and low-level waste fractions would be returned to INEEL. There are two scenarios for shipping INEEL's calcine to the Hanford Site, the Interim Storage Shipping Scenario and the Just-in-Time Shipping Scenario. The data in Table 5.2-2***8*** for the Minimum INEEL Processing Alternative (at INEEL) includes the construction impacts to resources from the Interim Storage Shipping Scenario which is considered the base case in this EIS.

5.2.12.2 Operational Impacts

DOE analyzed the utility and energy requirements for operation of the facilities, projects, and components associated with each of the ***twelve*** options under the ***six*** alternatives discussed in the EIS for the period 2000 through 2035. DOE evaluated the impacts associated with each option relative to existing or historic INEEL capacity and usage.

Operation of INEEL waste processing facilities under any alternative would result in water usage and wastewater generation. Water usage would include potable water for workers and process water for operation of facilities. Domestic and process water would be supplied from existing INTEC wells. Wastewater would be treated at new or existing INEEL facilities. The existing percolation ponds (or their replacements) are capable of handling the service wastewater for all waste processing alternatives.

The existing percolation ponds will be replaced on a like-for-like basis and will be placed approximately 10,200 feet from the southwest corner of INTEC. The environmental impacts for the replacement percolation ponds are discussed in the Waste Area Group 3 CERCLA

Table 5.2-28. Utility and energy requirements for construction by waste processing alternative.[a]

Waste Processing Alternative	Annual electricity usage (megawatt-hours per year)	Annual fossil fuel use (million gallons per year)	Annual potable water use (million gallons per year)	Annual non-potable water use (million gallons per year)	Annual sanitary wastewater discharges (million gallons per year)
INTEC Baseline (1996 usage)	8.8×10^4	0.98	55	400	55
No Action Alternative	180	6.6×10^{-3}	0.12	0.041	0.12
Continued Current Operations Alternative	3.4×10^3	0.036	0.77	0.11	0.77
Separations Alternative					
Full Separations Option	3.3×10^3	0.43	6.6	0.38	6.6
Planning Basis Option	6.5×10^3	0.41	6.8	0.41	6.8
Transuranic Separations Option	2.9×10^3	0.45	4.7	0.27	4.7
Non-Separations Alternative					
Hot Isostatic Pressed Waste Option	4.0×10^3	0.35	3.0	0.28	3.0
Direct Cement Waste Option	4.0×10^3	0.39	3.2	0.46	3.2
Early Vitrification Option	900	0.30	2.5	0.30	2.5
Steam Reforming Option	3.1×10^3	***0.26***	***4.1***	***0.15***	***4.1***
Minimum INEEL Processing Alternative					
At INEEL	1.1×10^3	0.23	2.9	0.29	2.9
At Hanford Site[b]	2.9×10^3	0.092	1.8	0.040	1.8
Direct Vitrification Alternative					
Vitrification without Calcine Separations Option	1.1×10^3	***0.67***	***2.4***	***0.31***	***2.4***
Vitrification with Calcine Separations Option	3.5×10^3	***0.81***	***4.7***	***0.31***	***4.7***

a. INTEC baseline data from LMITCO (1998); remainder of data from the project data sheets identified in Appendix C.6. Values represent incremental increases from the baseline quantities.

b. Data from Project Data Sheets contained in Appendix C.8.

Record of Decision (DOE/ID-10660). Following the selection of the preferred alternative for waste processing, the requirements for the service wastewater system would be determined. Depending on system requirements, service wastewater system alternatives would be analyzed and a determination to provide supplemental NEPA documentation would be made.

The use of steam generators and backup electrical power generators during operations would consume diesel fuel. Table 5.2-2***9*** presents the operational utility and energy requirements for each alternative or option. ***The number of years of operations varies by individual project comprising the alternatives and options. The values presented in Table 5.2-29 are a summation of the individual project values. The calculation is conservative (i.e., it presents a peak consumption of utilities assuming that all projects comprising an alternative or option occur at the same time).*** The existing INTEC infrastructure would be adequate to support these demands. Utility and energy requirements for operation of facilities at the Hanford Site under the Minimum INEEL Processing Alternative are discussed in Appendix C.8.

There are three methods for disposal of the grouted low-level waste fraction under the Separations Alternative. These methods include (1) disposal in an onsite INEEL disposal facility; (2) disposal in an offsite disposal facility; and (3) disposal in two INEEL facilities, the Tank Farm and the bin sets, after they are closed. The data presented in Table 5.2-2***9*** for the Full Separations and Transuranic Separations Options are for disposal of grout in an onsite INEEL disposal facility, which is considered the base case for this EIS. Resource consumption under other disposal methods is similar (for most resources) to the onsite disposal method.

The waste processing alternatives include projects that would provide interim HLW storage, packaging, and loading. The No Action and Continued Current Operations Alternatives would be similar due to continuing waste generation as a result of long-term storage and monitoring of the calcine in the bin sets. Depending on the alternative, the duration of these activities is shown extending beyond the year 2035. Annual utility and energy requirements during this interim storage period is shown in Table 5.2-***30***. ***The Transuranic Separations and Steam Reforming Options are not listed in this table because there would be no interim storage of final waste forms produced under these options.***

Table 5.2-29. Utility and energy requirements for operations by waste processing alternative.[a]

Waste Processing Alternative	Annual electricity usage (megawatt-hours per year)	Annual fossil fuel use (million gallons per year)	Annual potable water use (million gallons per year)	Annual non-potable water use (million gallons per year)	Annual sanitary wastewater discharges (million gallons per year)
INTEC Baseline (1996 usage)	8.8×10^4	0.10	55	400	55
No Action Alternative	1.2×10^4	0.64	1.4	14	1.4
Continued Current Operations Alternative	1.8×10^4	1.9	2.7	62	2.7
Separations Alternative					
Full Separations Option	4.0×10^4	4.5	4.0	5.0	4.0
Planning Basis Option	5.0×10^4	6.3	5.8	69	5.8
Transuranic Separations Option	2.9×10^4	2.2	2.8	53	2.8
Non-Separations Alternative					
Hot Isostatic Pressed Waste Option	3.3×10^4	2.8	3.8	89	3.8
Direct Cement Waste Option	2.8×10^4	2.5	4.8	62	4.8
Early Vitrification Option	3.9×10^4	1.1	2.9	6.3	2.9
Steam Reforming Option	***2.4×10^4***	***0.40***	***2.0***	***6.1***	***2.0***
Minimum INEEL Processing Alternative					
At INEEL	2.5×10^4	0.49	2.8	6.3	2.8
At Hanford Site[b]	6.6×10^5	1.3	4.8	500	4.8
Direct Vitrification Alternative					
Vitrification without Calcine Separations Option	***3.9×10^4***	***1.3***	***2.9***	***6.3***	***2.9***
Vitrification with Calcine Separations Option	***5.2×10^4***	***5.0***	***4.4***	***11***	***4.4***

a. INTEC baseline data from LMITCO (1998); remainder of data from the project data sheets identified in Appendix C.6 (Project Summaries). Values represent incremental increases from the baseline quantities.

b. Data from Project Data Sheets contained in Appendix C.8.

Table 5.2-*30*. Annual utility and energy requirements from interim storage operations after the year 2035.

Waste Processing Alternative	Annual electricity usage (megawatt-hours per year)	Annual fossil fuel use (million gallons per year)	Annual potable water usage (million gallons per year)	Annual non-potable water usage (million gallons per year)	Annual sanitary wastewater discharges (million gallons per year)
Separations Alternative					
Full Separations Option	290	None	0.059	None	0.059
Planning Basis Option	290	None	0.059	None	0.059
Non-Separations Alternative					
Hot Isostatic Pressed Waste Option	4.4×10^3	None	0.059	None	0.059
Direct Cement Waste Option	4.6×10^3	None	0.059	None	0.059
Early Vitrification Option	4.4×10^3	None	0.059	None	0.059
Minimum INEEL Processing Alternative	290	None	0.059	None	0.059
***Direct Vitrification Alternative*[a]**					
Vitrification without Calcine Separations Option	***4.4×10^3***	***None***	***0.059***	***None***	***0.059***
Vitrification with Calcine Separations Option	***290***	***None***	***0.059***	***None***	***0.059***

a. Impacts were estimated assuming that the vitrified SBW would be managed as HLW and placed in interim storage pending disposal in a geologic repository. If DOE determines through the waste incidental to reprocessing process that the SBW can be managed as mixed transuranic waste, interim storage of vitrified SBW would not be required and the impacts would be reduced from those reported above.