

#### 6.4.4 HEALTH AND SAFETY

Airborne contamination is the principal transport pathway through which radioactive materials from the INEEL affect workers and the public. The SNF and INEL EIS evaluated radiation releases and subsequent offsite doses associated with INEEL operations. Doses have always been small and within applicable radiation protection standards. In 1996, for example, the collective radiological dose to the population within 50 miles of the INEEL was 0.24 person-rem. This is representative of the average yearly impacts.

By comparison, the maximum annual collective dose from the waste processing alternatives and treatment options would add *0.11* person-rem to the population living within 50 miles of INEEL. This dose would result from implementation of the Continued Current Operations Alternative, the Planning Basis Option, the Hot Isostatic Pressed Waste Option, or the Direct Cement Waste Option. Other projected releases from new facilities planned at the INEEL would add an additional 0.05 person-rem per year. The most likely outcome is that no latent cancer fatalities would occur as a result of the cumulative radiation dose received by the population from the waste processing alternatives and treatment options evaluated.

DOE believes that institutional controls at the INEEL would prevent public exposure to residual radioactive materials left in place after facilities were closed until at least 2095. Materials left in place could potentially migrate to the aquifer, and public exposure could occur if people use the aquifer for drinking water and other domestic purposes.

The occupational radiation dose received by the entire INEEL workforce would result in about 1 latent cancer fatality during 10 years of operations. This compares to the natural lifetime incidence of fatal cancers in the same population from all causes of about *2,000* over a 10-year period. The greatest increases in collective worker dose, under the Direct Cement Waste Option, would be about *0.43* latent cancer fatality over the life of the project. Public exposure could also result from airborne contaminants due

to soil erosion or inadvertent intrusion into disposal areas.

#### 6.4.5 WASTE AND MATERIALS

Waste produced under the waste processing and facility disposition alternatives analyzed in this EIS would be in addition to existing waste already stored or buried on the INEEL. This existing waste includes (a) approximately 145,000 cubic meters of low-level waste; (b) about 62,000 cubic meters of transuranic waste; and (c) industrial waste previously deposited in the INEEL Landfill Complex (volume unknown).

DOE *estimates that the waste processing and facility disposition alternatives would generate about  $1.0 \times 10^6$  cubic meters of low-level waste and about  $1.1 \times 10^6$  cubic meters of industrial waste.* The actual volumes generated may be smaller than estimated because waste minimization and recycling could reduce the quantity of waste.

### 6.5 Summary Comparison of Alternatives

*The five waste processing alternatives from the Draft EIS are briefly summarized in Figure S-14 along with the new Steam Reforming Option (under the Non-Separations Alternative) and the new Direct Vitrification Alternative (selected by the State of Idaho as its Preferred Alternative for waste processing). A summary of the facility disposition alternatives is provided in Figure S-15. Figures S-14 and S-15 identify those options that DOE prefers along with those not included under DOE's preferred waste processing alternative and the preferred facility disposition alternative. A comparison of impacts for the five key areas of interest (air resources, transportation, waste and materials, health and safety, and accidents) is provided in Table S-2. The table presents analysis results for waste processing alternatives, facility disposition alternatives, and the increment of INEEL cumulative impacts.*

DOE's Preferred Alternative		
NO ACTION ALTERNATIVE	CONTINUED CURRENT OPERATIONS ALTERNATIVE	SEPARATIONS ALTERNATIVE
<p>Required under NEPA as a basis for comparison.</p> <ul style="list-style-type: none"> <li>• Leave mixed transuranic waste/SBW in tanks indefinitely.</li> <li>• Leave mixed HLW calcine in bin sets indefinitely.</li> </ul>	<ul style="list-style-type: none"> <li>• Upgrade and permit calciner.</li> <li>• Calcine the liquid mixed transuranic waste/SBW, add to existing mixed HLW calcine in bin sets.</li> <li>• Remove transuranics from tank heels and newly generated liquid waste and send to the Waste Isolation Pilot Plant (WIPP).</li> <li>• Grout remaining low-level waste (Class A-type) for disposal at INEEL.</li> </ul> <p><i>The following are not included in DOE's Preferred Alternative:</i></p> <ul style="list-style-type: none"> <li>◦ Store calcine in bin sets indefinitely.</li> <li>◦ Grout remaining mixed low-level waste (Class A-type) for disposal at INEEL.</li> </ul>	<p>Different ways to chemically separate waste into fractions that can be disposed of differently depending on the type and level of radioactivity.</p> <p><b>FULL SEPARATIONS OPTION</b></p> <p>The most highly radioactive and long-lived radionuclides removed for disposal in a HLW repository.</p> <ul style="list-style-type: none"> <li>• Separate cesium, strontium, and transuranics from mixed HLW calcine and mixed transuranic waste/SBW &amp; treat (vitrify) for disposal in a HLW repository.</li> <li>• Treat mixed low-level waste (Class A-type) fraction for disposal in an offsite landfill.</li> </ul> <p><i>◦ Treat mixed low-level waste (Class A-type) fraction for disposal in empty tanks, bin sets, or onsite landfill (not a component of DOE's Preferred Alternative).</i></p> <p><b>PLANNING BASIS OPTION</b></p> <p>This option mirrors the previously announced DOE decisions and agreements regarding mixed HLW calcine and the mixed transuranic waste/SBW.</p> <ul style="list-style-type: none"> <li>• Upgrade and permit the calciner</li> <li>• Calcine the liquid mixed transuranic waste/SBW and add to the bin sets.</li> <li>• Proceed as for Full Separations Option above except that the mixed low-level waste fraction would be disposed of at an offsite landfill.</li> <li>• Remove transuranics from tank heels and newly generated liquid waste and send to WIPP.</li> </ul> <p><b>TRANSURANIC SEPARATIONS OPTION</b></p> <p>Does not result in a HLW fraction.</p> <ul style="list-style-type: none"> <li>• Remove transuranics from calcine and mixed transuranic waste/SBW, solidify and send to WIPP.</li> <li>• Grout mixed low-level waste (Class C-type) fraction containing cesium, strontium, and other nuclides for disposal in an offsite landfill.</li> </ul> <p><i>◦ Grout mixed low-level waste (Class C-type) fraction containing cesium, strontium, and other nuclides for disposal in empty tanks, bin sets, or onsite landfill (not a component of DOE's Preferred Alternative).</i></p>

### Waste Processing Alternatives at a Glance

- These alternatives offer DOE different ways to treat mixed HLW currently stored in calcine bin sets and mixed transuranic waste/SBW currently stored in underground tanks so that these wastes can be safely stored and properly disposed of.
- These alternatives differ in the kinds of technology used to treat the waste, specifically, whether the calciner will be upgraded and permitted for treating the liquid mixed transuranic waste/SBW and whether waste will be separated into fractions for different disposal destinations.
- These alternatives also differ in the kind of disposal options available for mixed low-level waste fractions produced as a result of treatment alternatives.
- The timeframe of the waste processing alternatives spans approximately through the year 2035. The year 2035 is the target date in the Settlement Agreement/Consent Order for DOE to have all the calcined mixed HLW ready for shipment to a storage facility or repository outside of Idaho.
- Long-term impacts (beyond 2035) associated with waste processing alternatives that include onsite disposal of low-level waste (Class A-type and Class C-type) are carried over to the facility disposition alternatives, which evaluate impacts associated with the long term closure of HLW facilities at INTEC.
- Projects and facilities are identified individually and can be combined in a building block fashion to develop other waste processing alternatives.

State of Idaho's  
Preferred Alternative

DOE's Preferred Alternative

NON-SEPARATIONS ALTERNATIVE	MINIMUM INEEL PROCESSING ALTERNATIVE	DIRECT VITRIFICATION ALTERNATIVE
<p>Different ways to immobilize the waste through solidification without separating waste fractions by type and level of radioactivity.</p> <p><b>HOT ISOSTATIC PRESSED WASTE OPTION</b> Creates a non-leaching, glass-ceramic waste.</p> <ul style="list-style-type: none"> <li>Upgrade and permit the calciner</li> <li>Calcine the liquid mixed transuranic waste/SBW and add to bin sets.</li> <li>Blend calcine with silica and titanium powder and press into glass ceramic for disposal in HLW repository.</li> <li>Remove transuranics from tank heels and newly generated liquid waste and send to WIPP.</li> </ul> <p><b>DIRECT CEMENT WASTE OPTION</b> Creates a cement-like solid.</p> <ul style="list-style-type: none"> <li>Upgrade and permit the calciner</li> <li>Calcine liquid mixed transuranic waste/SBW and add to bin sets.</li> <li>Blend calcine with slag, caustic soda, and water and cure at elevated temperature and pressure for disposal in a HLW repository.</li> <li>Remove transuranics from tank heels and newly generated liquid waste and send to WIPP.</li> </ul> <p><b>EARLY VITRIFICATION OPTION</b> Creates a non-leaching, glass waste out of mixed transuranic waste/SBW and mixed HLW calcine.</p> <ul style="list-style-type: none"> <li>Blend mixed transuranic waste/SBW and tank heels with glass frit, vitrify, and send to WIPP.</li> <li>Blend mixed HLW calcine with glass frit, and vitrify for disposal in a HLW repository.</li> </ul> <p><b>STEAM REFORMING OPTION</b> Creates a calcine-like waste from mixed transuranic waste/SBW.</p> <ul style="list-style-type: none"> <li>Steam reform mixed transuranic waste/SBW and dispose of the product at WIPP.</li> <li>Grout newly generated liquid waste.</li> <li>Package calcine from the bin sets for shipment to a HLW repository.</li> </ul>	<p>Mixed HLW calcine would be sent to the Hanford Site in Washington State for treatment and mixed transuranic waste/SBW would be treated at INEEL.</p> <ul style="list-style-type: none"> <li>At INEEL, process mixed transuranic waste/SBW and tank heels to remove cesium and grout remainder for shipment to WIPP.</li> </ul> <p><i>The following are not included in DOE's Preferred Alternative:</i></p> <ul style="list-style-type: none"> <li>Place mixed HLW calcine and cesium ion exchange resin (from mixed transuranic waste/SBW treatment) in shipping containers and transport to the Hanford Site.</li> <li>Separate calcine into mixed high-level and mixed low-level waste fractions and treat at Hanford.</li> <li>Return treated mixed HLW and mixed low-level waste fractions to INEEL.</li> <li>Dispose of mixed low-level waste fraction at INEEL or offsite; store HLW fraction for disposal in a HLW repository.</li> </ul>	<p><b>VITRIFICATION WITHOUT CALCINE SEPARATIONS</b> Creates a non-leaching glass waste out of mixed transuranic waste/SBW, tank heels, and mixed HLW calcine.</p> <ul style="list-style-type: none"> <li>Blend mixed transuranic waste/SBW and tank heels with glass frit, vitrify, and send to WIPP or a HLW repository based on the outcome of the waste incidental to reprocessing determination.</li> <li>Blend mixed HLW calcine with glass frit, and vitrify for disposal in a HLW repository.</li> </ul> <p><b>VITRIFICATION WITH CALCINE SEPARATIONS</b> Same information as above with the following additions:</p> <ul style="list-style-type: none"> <li>Separate strontium, cesium, and/or transuranics from mixed HLW calcine and vitrify for disposal in a HLW repository. Type of separations to be determined by further technology development.</li> <li>Grout mixed low-level waste fraction for disposal in an offsite disposal facility. Mixed low-level waste fraction to be disposed of in accordance with Waste Management Programmatic EIS ROD.</li> </ul>

**FIGURE S-14.**  
Waste processing alternatives at a glance.

## Facility Disposition Alternatives at a Glance

- These alternatives offer DOE different ways to address the final risk component of the proposed action and close INEEL facilities used to treat and manage mixed HLW when their missions are completed.
- These alternatives differ in the degree to which the land is considered "cleaned-up" and in the type of use that could be made of the land as a result.
- Two of the alternatives include onsite low-level waste disposal options (Class A- or Class C-type waste) that are part of the waste processing alternatives.
- For purposes of analysis, DOE assumed that the timeframe spans the years 2035 to 2095. During this period, DOE would continue to maintain facilities and store treated waste ready for disposal. Beyond 2095, DOE would no longer maintain facilities or restrict access to the site. Where potential impacts to public health and the environment could occur well beyond 2095, the analysis is extended for 10,000 years.

		Preferred Alternative	
		CLOSURE TO LANDFILL STANDARDS ALTERNATIVE	PERFORMANCE-BASED CLOSURE WITH CLASS A GROUT DISPOSAL
		<p>Facilities closed in accordance with state and Federal requirements for landfills.</p> <ul style="list-style-type: none"> <li>• Stabilize waste residuals in tanks, vaults, and piping with grout.</li> <li>• Build an engineered cap over facilities.</li> <li>• Install groundwater monitoring system.</li> <li>• Provide post-closure monitoring.</li> </ul>	<p>Closure methods similar to the Performance-Based Closure Alternative; however, Class A-type grout from waste processing alternatives would be disposed of in the empty tanks or bin sets.</p>
NO ACTION ALTERNATIVE	CLEAN CLOSURE ALTERNATIVE	PERFORMANCE-BASED CLOSURE ALTERNATIVE	PERFORMANCE-BASED CLOSURE WITH CLASS C GROUT DISPOSAL
<p>Required under NEPA as a basis for comparison.</p> <ul style="list-style-type: none"> <li>• Similar to the No Action Alternative for Waste Processing.</li> <li>• Remove bulk chemicals and de-energize facilities.</li> <li>• Perform surveillance and maintenance until 2095.</li> <li>• Leave existing facilities in place with no further consideration.</li> </ul>	<p>Restore the land to a condition after closure that presents no risk to workers or the public from hazardous or radiological components.</p> <ul style="list-style-type: none"> <li>• Remove or treat all wastes and contaminated items so that radiation is at background level.</li> <li>• If necessary, remove buildings, vaults, and contaminated soil.</li> <li>• Post-closure monitoring may be required.</li> </ul>	<p>Closure methods decided on a case-by-case basis, depending on risk.</p> <ul style="list-style-type: none"> <li>• Raze above-grade facilities and decontaminate below-grade facilities as determined on a case-by-case basis.</li> <li>• Decontaminate remaining facilities so as not to pose an unacceptable risk to workers or the public.</li> <li>• Determine which facilities may require monitoring.</li> <li>• Provide post-closure monitoring as necessary.</li> </ul>	<p>Closure methods similar to the Performance-Based Closure Alternative; however, Class C-type grout from waste processing alternatives would be disposed of in the empty tanks or bin sets.</p>

**FIGURE S-15.**

Facility disposition alternatives at a glance.

No Action Alternative	Continued Current Operations Alternative	Separations Alternative	Non-Separations Alternative	Minimum INEEL Processing Alternative	Direct Vitrification Alternative
<b>Impacts to Air - Waste Processing</b>					
<p>Radiation dose from emissions would be <math>6.0 \times 10^{-4}</math> millirem per year to offsite MEI and <math>7.0 \times 10^{-6}</math> millirem per year to noninvolved worker. Collective population dose to the general public is 0.038 person-rem per year. No criteria pollutant would exceed significance threshold.</p> <p>Maximum offsite impact from carcinogenic toxic pollutant emissions would be approximately 1.2 percent of the applicable standard.</p>	<p>Radiation dose from emissions would be <math>1.7 \times 10^{-3}</math> millirem per year to offsite MEI and <math>1.8 \times 10^{-3}</math> millirem per year to noninvolved worker. Collective population dose to the general public is 0.11 person-rem per year. One criteria pollutant (sulfur dioxide) would exceed significance threshold.</p> <p>Maximum offsite impact from carcinogenic toxic pollutant emissions would be approximately 1.9 percent of the applicable standard.</p>	<p><b>FULL SEPARATIONS OPTION</b></p> <p>Radiation dose from emissions would be <math>1.2 \times 10^{-4}</math> millirem per year to offsite MEI and <math>4.4 \times 10^{-3}</math> millirem per year to noninvolved worker. Collective population dose to the general public is <math>6.6 \times 10^{-3}</math> person-rem per year. Two criteria pollutants (sulfur dioxide and nitrogen oxides) would exceed significance thresholds.</p> <p><b>PLANNING BASIS OPTION</b></p> <p>Radiation dose from emissions would be <math>1.8 \times 10^{-3}</math> millirem per year to offsite MEI and <math>9.0 \times 10^{-3}</math> millirem per year to noninvolved worker. Collective population dose to the general public is 0.11 person-rem per year. Two criteria pollutants (sulfur dioxide and nitrogen oxides) would exceed significance thresholds.</p> <p><b>TRANSURANIC SEPARATIONS OPTION</b></p> <p>Radiation dose from emissions would be <math>6.0 \times 10^{-5}</math> millirem per year to offsite MEI and <math>3.4 \times 10^{-3}</math> millirem per year to noninvolved worker. Collective population dose to the general public is <math>3.6 \times 10^{-3}</math> person-rem per year. Two criteria pollutants (sulfur dioxide and nitrogen oxides) would exceed significance thresholds.</p> <p>Maximum offsite impact from carcinogenic toxic pollutant emissions would be 4.5 to 10 percent of the applicable standard under the Separations Alternative.</p>	<p><b>HOT ISOSTATIC PRESSED WASTE OPTION</b></p> <p>Radiation dose from emissions would be <math>1.8 \times 10^{-3}</math> millirem per year to offsite MEI and <math>3.6 \times 10^{-3}</math> millirem per year to noninvolved worker. Collective population dose to the general public is 0.11 person-rem per year. Two criteria pollutants (sulfur dioxide and nitrogen oxides) would exceed significance thresholds.</p> <p><b>DIRECT CEMENT WASTE OPTION</b></p> <p>Radiation dose from emissions would be <math>1.7 \times 10^{-3}</math> millirem per year to offsite MEI and <math>3.0 \times 10^{-3}</math> millirem per year to noninvolved worker. Collective population dose to the general public is 0.11 person-rem per year. One criteria pollutant (sulfur dioxide) would exceed significance threshold.</p> <p><b>EARLY VITRIFICATION OPTION</b></p> <p>Radiation dose from emissions would be <math>8.9 \times 10^{-4}</math> millirem per year to offsite MEI and <math>4.8 \times 10^{-3}</math> millirem per year to noninvolved worker. Collective population dose to the general public is 0.056 person-rem per year. No criteria pollutant would exceed significance threshold.</p> <p><b>STEAM REFORMING OPTION</b></p> <p>Radiation dose from emissions would be <math>6.2 \times 10^{-4}</math> millirem per year to offsite MEI and <math>2.2 \times 10^{-3}</math> millirem per year to noninvolved worker. Collective population dose to the general public is 0.040 person-rem per year. No criteria pollutant would exceed significance threshold.</p> <p>Maximum offsite impact from carcinogenic toxic pollutant emissions would be 0.71 to 2.9 percent of the applicable standard under the Non-Separations Alternative.</p>	<p>At INEEL - Radiation dose from emissions would be <math>9.5 \times 10^{-4}</math> millirem per year to offsite MEI and <math>1.0 \times 10^{-4}</math> millirem per year to noninvolved worker. Collective population dose to the general public is 0.056 person-rem per year. No criteria pollutant would exceed significance threshold.</p> <p>Maximum offsite impact from carcinogenic toxic pollutant emissions would be 1.0 percent of the applicable standard.</p> <p>At Hanford - Radiation dose from emissions would be <math>1.7 \times 10^{-5}</math> millirem per year to offsite MEI and <math>1.3 \times 10^{-3}</math> millirem per year to noninvolved worker. Collective population dose to the general public is <math>1.3 \times 10^{-3}</math> person-rem per year. One criteria pollutant (carbon monoxide) would exceed significance threshold.</p>	<p><b>VITRIFICATION WITHOUT CALCINE SEPARATIONS OPTION</b></p> <p>Radiation dose from emissions would be <math>6.5 \times 10^{-4}</math> millirem per year to offsite MEI and <math>2.3 \times 10^{-5}</math> millirem per year to noninvolved worker. Collective population dose to the general public is 0.045 person-rem per year. No criteria pollutant would exceed significance threshold.</p> <p>Maximum offsite impact from carcinogenic toxic pollutant emissions would be 1.7 percent of the applicable standard.</p> <p><b>VITRIFICATION WITH CALCINE SEPARATIONS OPTION</b></p> <p>Radiation dose from emissions would be <math>6.8 \times 10^{-4}</math> millirem per year to offsite MEI and <math>2.3 \times 10^{-5}</math> millirem per year to noninvolved worker. Collective population dose to the general public is 0.047 person-rem per year. Two criteria pollutants (sulfur dioxide and nitrogen oxides) would exceed significance thresholds.</p> <p>Maximum offsite impact from carcinogenic toxic pollutant emissions would be 9.5 percent of the applicable standard.</p>

TABLE S-2. Summary of impacts from waste processing and facility disposition alternatives (1 of 12).

No Action Alternative	Continued Current Operations Alternative	Separations Alternative	Non-Separations Alternative	Minimum INEEL Processing Alternative	Direct Vitrification Alternative
<b>Impacts to Transportation - Waste Processing</b>					
No offsite transportation would occur.	<p>Incident-free LCF from truck transport: public: 0.013 workers: <math>1.8 \times 10^{-3}</math></p> <p>Accident LCF risk for the public from transport: truck: <math>5.7 \times 10^{-4}</math> rail: <math>4.6 \times 10^{-5}</math></p>	<p><b>FULL SEPARATIONS OPTION</b> Incident-free LCF from truck transport: public: 0.077 workers: 0.022</p> <p>Accident LCF risk for the public from transport: truck: <math>8.9 \times 10^{-5}</math> rail: <math>1.8 \times 10^{-5}</math></p> <p><b>PLANNING BASIS OPTION</b> Incident-free LCF from truck transport: public: 0.091 workers: 0.026</p> <p>Accident LCF risk for the public from transport: truck: <math>6.7 \times 10^{-4}</math> rail: <math>6.6 \times 10^{-5}</math></p> <p><b>TRANSURANIC SEPARATIONS OPTION</b> Incident-free LCF from truck transport: public: 0.23 workers: 0.035</p> <p>Accident LCF risk for the public from transport: truck: 0.10 rail: 0.038</p>	<p><b>HOT ISOSTATIC PRESSED WASTE OPTION</b> Incident-free LCF from truck transport: public: 0.47 workers: 0.068</p> <p>Accident LCF risk for the public from transport: truck: <math>5.7 \times 10^{-4}</math> rail: <math>4.6 \times 10^{-5}</math></p> <p><b>DIRECT CEMENT WASTE OPTION</b> Incident-free LCF from truck transport: public: 1.4 workers: 0.21</p> <p>Accident LCF risk for the public from transport: truck: 0.023 rail: <math>1.3 \times 10^{-3}</math></p> <p><b>EARLY VITRIFICATION OPTION</b> Incident-free LCF from truck transport: public: 0.98 workers: 0.14</p> <p>Accident LCF risk for the public from transport: truck: <math>1.5 \times 10^{-6}</math> rail: <math>7.8 \times 10^{-8}</math></p> <p><b>STEAM REFORMING OPTION</b> Incident-free LCF from truck transport: public: 0.78 workers: 0.11</p> <p>Accident LCF risk for the public from transport: truck: 0.039 rail: <math>2.0 \times 10^{-3}</math></p>	<p>Incident-free LCF from truck transport: public: 1.1 workers: 0.16</p> <p>Accident LCF risk for the public from transport: truck: 0.018 rail: <math>2.9 \times 10^{-3}</math></p>	<p><b>VITRIFICATION WITHOUT CALCINE SEPARATIONS OPTION</b> Incident-free LCF from truck transport: public: 0.99 workers: 0.15</p> <p>Accident LCF risk for the public from transport: truck: <math>1.5 \times 10^{-6}</math> rail: <math>9.9 \times 10^{-8}</math></p> <p><b>VITRIFICATION WITH CALCINE SEPARATIONS OPTION</b> Incident-free LCF from truck transport: public: 0.12 workers: 0.027</p> <p>Accident LCF risk for the public from transport: truck: <math>7.9 \times 10^{-5}</math> rail: <math>1.2 \times 10^{-5}</math></p>

TABLE S-2. Summary of impacts from waste processing and facility disposition alternatives (2 of 12).

No Action Alternative	Continued Current Operations Alternative	Separations Alternative	Non-Separations Alternative	Minimum INEEL Processing Alternative	Direct Vitrification Alternative
<b>Impacts to Waste and Materials - Waste Processing</b>					
<p>Approximately 15,000 cubic meters of industrial waste, 0 cubic meters of hazardous waste, 1,500 cubic meters of mixed low-level waste, and 190 cubic meters of low-level waste generated through year 2035 (includes construction and operations phases).</p>	<p>Approximately 26,000 cubic meters of industrial waste, 30 cubic meters of hazardous waste, 3,400 cubic meters of mixed low-level waste, and 9,500 cubic meters of low-level waste generated through year 2035 (includes construction and operation phases).</p>	<p><b>FULL SEPARATIONS OPTION</b></p> <p>Approximately 110,000 cubic meters of industrial waste, 2,400 cubic meters of hazardous waste, 7,000 cubic meters of mixed low-level waste, and 1,500 cubic meters of low-level waste generated through year 2035 (includes construction and operation phases).</p> <p><b>PLANNING BASIS OPTION</b></p> <p>Approximately 110,000 cubic meters of industrial waste, 2,100 cubic meters of hazardous waste, 9,000 cubic meters of mixed low-level waste, and 10,000 cubic meters of low-level waste generated through year 2035 (includes construction and operation phases).</p> <p><b>TRANSURANIC SEPARATIONS OPTION</b></p> <p>Approximately 82,000 cubic meters of industrial waste, 1,200 cubic meters of hazardous waste, 6,400 cubic meters of mixed low-level waste, and 1,200 cubic meters of low-level waste generated through year 2035 (includes construction and operation phases).</p>	<p><b>HOT ISOSTATIC PRESSED WASTE OPTION</b></p> <p>Approximately 69,000 cubic meters of industrial waste, 790 cubic meters of hazardous waste, 7,500 cubic meters of mixed low-level waste, and 10,000 cubic meters of low-level waste generated through year 2035 (includes construction and operation phases).</p> <p><b>DIRECT CEMENT WASTE OPTION</b></p> <p>Approximately 80,000 cubic meters of industrial waste, 560 cubic meters of hazardous waste, 9,700 cubic meters of mixed low-level waste, and 10,000 cubic meters of low-level waste generated through year 2035 (includes construction and operation phases).</p> <p><b>EARLY VITRIFICATION OPTION</b></p> <p>Approximately 65,000 cubic meters of industrial waste, 640 cubic meters of hazardous waste, 7,100 cubic meters of mixed low-level waste, and 1,100 cubic meters of low-level waste generated through year 2035 (includes construction and operation phases).</p> <p><b>STEAM REFORMING OPTION</b></p> <p>Approximately 49,000 cubic meters of industrial waste, 260 cubic meters of hazardous waste, 5,200 cubic meters of mixed low-level waste, and 560 cubic meters of low-level waste generated through year 2035 (includes construction and operation phases).</p>	<p>At INEEL - Approximately 61,000 cubic meters of industrial waste, 380 cubic meters of hazardous waste, 6,800 cubic meters of mixed low-level waste, and 810 cubic meters of low-level waste generated through the year 2035 (includes construction and operation phases).</p> <p>At Hanford - Approximately 26,000 cubic meters of industrial waste, 43 cubic meters of hazardous waste, 0 cubic meters of mixed low-level waste, and 1,500 cubic meters of low-level waste generated through year 2030 (includes construction and operation phases).</p>	<p><b>VITRIFICATION WITHOUT CALCINE SEPARATIONS OPTION</b></p> <p>Approximately 53,000 cubic meters of industrial waste, 570 cubic meters of hazardous waste, 7,100 cubic meters of mixed low-level waste, and 2,300 cubic meters of low-level waste generated through the year 2035 (includes construction and operation phases).</p> <p><b>VITRIFICATION WITH CALCINE SEPARATIONS OPTION</b></p> <p>Approximately 85,000 cubic meters of industrial waste, 2,200 cubic meters of hazardous waste, 8,600 cubic meters of mixed low-level waste, and 3,000 cubic meters of low-level waste generated through the year 2035 (includes construction and operation phases).</p>

TABLE S-2. Summary of impacts from waste processing and facility disposition alternatives (3 of 12).

No Action Alternative	Continued Current Operations Alternative	Separations Alternative	Non-Separations Alternative	Minimum INEEL Processing Alternative	Direct Vitrification Alternative
<b>Impacts to Waste and Materials - Waste Processing (continued)</b>					
<p>No product wastes would be produced under this alternative.</p>	<p>Approximately 110 cubic meters of transuranic waste.</p>	<p><b>FULL SEPARATIONS OPTION</b></p> <p>Approximately 27,000 cubic meters of low-level waste and 470 cubic meters of HLW.</p> <p><b>PLANNING BASIS OPTION</b></p> <p>Approximately 30,000 cubic meters of low-level waste, 110 cubic meters of transuranic waste, and 470 cubic meters of HLW.</p> <p><b>TRANSURANIC SEPARATIONS OPTION</b></p> <p>Approximately 23,000 cubic meters of low-level waste and 220 cubic meters of transuranic waste.</p>	<p><b>HOT ISOSTATIC PRESSED WASTE OPTION</b></p> <p>Approximately 110 cubic meters of transuranic waste and 3,400 cubic meters of HLW.</p> <p><b>DIRECT CEMENT WASTE OPTION</b></p> <p>Approximately 110 cubic meters of transuranic waste and 13,000 cubic meters of HLW.</p> <p><b>EARLY VITRIFICATION OPTION</b></p> <p>Approximately 360 cubic meters of transuranic waste and 8,500 cubic meters of HLW.</p> <p><b>STEAM REFORMING OPTION</b></p> <p>Approximately 2,600 cubic meters of transuranic waste and 4,400 cubic meters of HLW.</p>	<p>At INEEL - Approximately 7,500 cubic meters of transuranic waste.</p> <p>At Hanford - Approximately 14,000 cubic meters of low-level waste and 3,500 cubic meters of HLW.</p>	<p><b>VITRIFICATION WITHOUT CALCINE SEPARATIONS OPTION</b></p> <p>Approximately 8,900 cubic meters of HLW (including 440 cubic meters of vitrified SBW).</p> <p><b>VITRIFICATION WITH CALCINE SEPARATIONS OPTION</b></p> <p>Approximately 24,000 cubic meters of low-level waste and 910 cubic meters of HLW (including 440 cubic meters of vitrified SBW).</p>

TABLE S-2. Summary of impacts from waste processing and facility disposition alternatives (4 of 12).

No Action Alternative	Continued Current Operations Alternative	Separations Alternative	Non-Separations Alternative	Minimum INEEL Processing Alternative	Direct Vitrification Alternative
<b>Impacts to Health and Safety - Waste Processing - Construction Impacts</b>					
Total lost workdays: 30. Total recordable cases: 3.9.	Total lost workdays: 110. Total recordable cases: 14.	FULL SEPARATIONS OPTION Total lost workdays: 1,500. Total recordable cases: 190. PLANNING BASIS OPTION Total lost workdays: 1,500. Total recordable cases: 200. TRANSURANIC SEPARATIONS OPTION Total lost workdays: 1,100. Total recordable cases: 150.	HOT ISOSTATIC PRESSED WASTE OPTION Total lost workdays: 520. Total recordable cases: 67. DIRECT CEMENT WASTE OPTION Total lost workdays: 620. Total recordable cases: 81. EARLY VITRIFICATION OPTION Total lost workdays: 530. Total recordable cases: 69. STEAM REFORMING OPTION Total lost workdays: 770. Total recordable cases: 100.	At INEEL - Total lost workdays: 620. Total recordable cases: 81.  At Hanford - Total lost workdays not reported. Total recordable cases: 230.	VITRIFICATION WITHOUT CALCINE SEPARATIONS OPTION Total lost workdays: 710. Total recordable cases: 93.  VITRIFICATION WITH CALCINE SEPARATIONS OPTION Total lost workdays: 1,300. Total recordable cases: 170.
<b>Impacts to Health and Safety - Waste Processing - Operations Impacts</b>					
Total lost workdays: 850. Total recordable cases: 110.  The estimated LCF in involved workers would be 0.14.	Total lost workdays: 1,100. Total recordable cases: 150.  The estimated LCF in involved workers would be 0.16.	FULL SEPARATIONS OPTION Total lost workdays: 3,000. Total recordable cases: 400. PLANNING BASIS OPTION Total lost workdays: 3,700. Total recordable cases: 480. TRANSURANIC SEPARATIONS OPTION Total lost workdays: 2,300. Total recordable cases: 300. FULL SEPARATIONS OPTION The estimated LCF in involved workers related to waste processing under this option would be 0.31. PLANNING BASIS OPTION The estimated LCF in involved workers related to waste processing under this option would be 0.39. TRANSURANIC SEPARATIONS OPTION The estimated LCF in involved workers related to waste processing under this option would be 0.27.	HOT ISOSTATIC PRESSED WASTE OPTION Total lost workdays: 2,500. Total recordable cases: 320. DIRECT CEMENT WASTE OPTION Total lost workdays: 2,900. Total recordable cases: 380. EARLY VITRIFICATION OPTION Total lost workdays: 2,500. Total recordable cases: 330. STEAM REFORMING OPTION Total lost workdays: 1,400. Total recordable cases: 180. HOT ISOSTATIC PRESSED WASTE OPTION The estimated LCF in involved workers related to waste processing under this option would be 0.31. DIRECT CEMENT WASTE OPTION The estimated LCF in involved workers related to waste processing under this option would be 0.43. EARLY VITRIFICATION OPTION The estimated LCF in involved workers related to waste processing under this option would be 0.29. STEAM REFORMING OPTION The estimated LCF in involved workers related to waste processing under this option would be 0.25.	At INEEL - Total lost workdays: 2,000. Total recordable cases: 270.  At Hanford - Total lost workdays not reported. Total recordable cases: 27.  At INEEL - The estimated LCF in involved workers would be 0.27.  At Hanford - The estimated LCF in involved workers would be 0.14.	VITRIFICATION WITHOUT CALCINE SEPARATIONS OPTION Total lost workdays: 1,900. Total recordable cases: 250.  VITRIFICATION WITH CALCINE SEPARATIONS OPTION Total lost workdays: 2,500. Total recordable cases: 330.  VITRIFICATION WITHOUT CALCINE SEPARATIONS OPTION The estimated LCF in involved workers related to waste processing under this option would be 0.20.  VITRIFICATION WITH CALCINE SEPARATIONS OPTION The estimated LCF in involved workers related to waste processing under this option would be 0.26.

TABLE S-2. Summary of impacts from waste processing and facility disposition alternatives (5 of 12).

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- New Information -

Idaho HLW & FD EIS

No Action Alternative	Continued Current Operations Alternative	Separations Alternative	Non-Separations Alternative	Minimum INEEL Processing Alternative	Direct Vitrification Alternative
<b>Impacts to Health and Safety - Waste Processing - Operations Impacts(continued)</b>					
<p>The estimated probability of an LCF for the offsite MEI would be <math>1.0 \times 10^{-8}</math>.</p> <p>The estimated probability of an LCF for the noninvolved worker would be <math>1.0 \times 10^{-10}</math>.</p> <p>The estimated LCF in the population within 50 miles of INTEC would be <math>7.0 \times 10^{-4}</math>.</p>	<p>The estimated probability of an LCF for the offsite MEI would be <math>1.0 \times 10^{-8}</math>.</p> <p>The estimated probability of an LCF for the noninvolved worker would be <math>8.0 \times 10^{-11}</math>.</p> <p>The estimated LCF in the population within 50 miles of INTEC would be <math>6.0 \times 10^{-4}</math>.</p>	<p><b>FULL SEPARATIONS OPTION</b></p> <p>The estimated probability of an LCF for the offsite MEI would be <math>1.2 \times 10^{-9}</math>.</p> <p>The estimated probability of an LCF for the noninvolved worker would be <math>3.7 \times 10^{-10}</math>.</p> <p>The estimated LCF in the population within 50 miles of INTEC would be <math>7.0 \times 10^{-5}</math>.</p> <p><b>PLANNING BASIS OPTION</b></p> <p>The estimated probability of an LCF for the offsite MEI would be <math>3.2 \times 10^{-9}</math>.</p> <p>The estimated probability of an LCF for the noninvolved worker would be <math>3.4 \times 10^{-10}</math>.</p> <p>The estimated LCF in the population within 50 miles of INTEC would be <math>2.0 \times 10^{-4}</math>.</p> <p><b>TRANSURANIC SEPARATIONS OPTION</b></p> <p>The estimated probability of an LCF for the offsite MEI would be <math>6.5 \times 10^{-10}</math>.</p> <p>The estimated probability of an LCF for the noninvolved worker would be <math>2.8 \times 10^{-10}</math>.</p> <p>The estimated LCF in the population within 50 miles of INTEC would be <math>3.8 \times 10^{-5}</math>.</p>	<p><b>HOT ISOSTATIC PRESSED WASTE OPTION</b></p> <p>The estimated probability of an LCF for the offsite MEI would be <math>1.0 \times 10^{-8}</math>.</p> <p>The estimated probability of an LCF for the noninvolved worker would be <math>2.3 \times 10^{-10}</math>.</p> <p>The estimated LCF in the population within 50 miles of INTEC would be <math>6.5 \times 10^{-4}</math>.</p> <p><b>DIRECT CEMENT WASTE OPTION</b></p> <p>The estimated probability of an LCF for the offsite MEI would be <math>1.0 \times 10^{-8}</math>.</p> <p>The estimated probability of an LCF for the noninvolved worker would be <math>1.4 \times 10^{-10}</math>.</p> <p>The estimated LCF in the population within 50 miles of INTEC would be <math>6.5 \times 10^{-4}</math>.</p> <p><b>EARLY VITRIFICATION OPTION</b></p> <p>The estimated probability of an LCF for the offsite MEI would be <math>1.5 \times 10^{-8}</math>.</p> <p>The estimated probability of an LCF for the noninvolved worker would be <math>5.2 \times 10^{-10}</math>.</p> <p>The estimated LCF in the population within 50 miles of INTEC would be <math>1.0 \times 10^{-5}</math>.</p> <p><b>STEAM REFORMING OPTION</b></p> <p>The estimated probability of an LCF for the offsite MEI would be <math>1.1 \times 10^{-8}</math>.</p> <p>The estimated probability of an LCF for the noninvolved worker would be <math>1.9 \times 10^{-10}</math>.</p> <p>The estimated LCF in the population within 50 miles of INTEC would be <math>7.0 \times 10^{-4}</math>.</p>	<p>At INEEL - The estimated probability of an LCF for the offsite MEI would be <math>1.0 \times 10^{-8}</math>.</p> <p>The estimated probability of an LCF for the noninvolved worker would be <math>5.6 \times 10^{-10}</math>.</p> <p>The estimated LCF in the population within 50 miles of INTEC would be <math>7.0 \times 10^{-4}</math>.</p> <p>At Hanford - The estimated probability of an LCF for the offsite MEI would be <math>2.5 \times 10^{-11}</math>.</p> <p>The estimated probability of an LCF for the noninvolved worker would be <math>9.2 \times 10^{-12}</math>.</p> <p>The estimated LCF in the population within 50 miles of 200-East Area would be <math>1.1 \times 10^{-6}</math>.</p>	<p><b>VITRIFICATION WITHOUT CALCINE SEPARATIONS OPTION</b></p> <p>The estimated probability of an LCF for the offsite MEI would be <math>1.1 \times 10^{-8}</math>.</p> <p>The estimated probability of an LCF for the noninvolved worker would be <math>1.9 \times 10^{-10}</math>.</p> <p>The estimated LCF in the population within 50 miles of INTEC would be <math>7.5 \times 10^{-4}</math>.</p> <p><b>VITRIFICATION WITH CALCINE SEPARATIONS OPTION</b></p> <p>The estimated probability of an LCF for the offsite MEI would be <math>1.2 \times 10^{-8}</math>.</p> <p>The estimated probability of an LCF for the noninvolved worker would be <math>1.9 \times 10^{-10}</math>.</p> <p>The estimated LCF in the population within 50 miles of INTEC would be <math>7.5 \times 10^{-4}</math>.</p>

TABLE S-2. Summary of impacts from waste processing and facility disposition alternatives (6 of 12).

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No Action Alternative	Continued Current Operations Alternative	Separations Alternative	Non-Separations Alternative	Minimum INEEL Processing Alternative	Direct Vitrification Alternative
<b>Potential Impacts from Abnormal Events* - Waste Processing</b>					
<b>BOUNDING ABNORMAL EVENT</b> Degraded bin set fails in seismic event after 500 years. MEI dose: 83,000 millirem; 42 in a thousand likelihood of LCF. Noninvolved worker dose: 5.7 million millirem; nearly certain death from acute radiation. Offsite population dose: 530,000 person-rem; 270 LCFs.	<b>BOUNDING ABNORMAL EVENT</b> Same as No Action Alternative.	<b>BOUNDING ABNORMAL EVENT</b> Equipment failure results in release during transfer operation. MEI dose: 40 millirem; 20 in a million likelihood of LCF. Noninvolved worker dose: 2,700 millirem; 1.4 in a thousand likelihood of LCF. Offsite population dose: 470 person-rem; less than one LCF.	<b>BOUNDING ABNORMAL EVENT</b> Same as Separations Alternative.	<b>BOUNDING ABNORMAL EVENT</b> Same as Separations Alternative.	<b>BOUNDING ABNORMAL EVENT</b> Same as Separations Alternative.
<b>Potential Impacts from Bounding Design Basis Events** - Waste Processing</b>					
Flood Induced failure of bin set. MEI dose: 880 millirem; 440 in a million likelihood of LCF. Noninvolved worker dose: 59,000 millirem; 59 per thousand likelihood of LCF.*** Offsite population dose: 57,000 person-rem; 29 LCFs.	Same as No Action Alternative.	Same as No Action Alternative.	Same as No Action Alternative.	Same as No Action Alternative.	Same as No Action Alternative.
<div style="border: 1px solid black; padding: 5px;"> <p>*Greater than once in a thousand years.</p> <p>**Greater than once in a million years.</p> <p>***For doses potentially exceeding exposure rates of 10 rad per hour, the increased likelihood of an LCF is doubled to account for the human body's diminished capability to repair radiation damage.</p> </div>					

**TABLE S-2. Summary of impacts from waste processing and facility disposition alternatives (7 of 12).**

- New Information -

Idaho HLW & FD EIS

No Action Alternative	Continued Current Operations Alternative	Separations Alternative	Non-Separations Alternative	Minimum INEEL Processing Alternative	Direct Vitrification Alternative
<b>Potential Impacts from Beyond Design Basis Events* - Waste Processing</b>					
<p><b>BOUNDING BEYOND DESIGN BASIS EVENT</b></p> <p>External event causes failure of bin set structure. MEI dose: 14,000 millirem; 7 in a thousand likelihood of LCF. Noninvolved worker dose: 930,000 millirem; 94 percent likelihood of LCF. Offsite population dose: 120,000 person-rem; 61 LCFs.</p>	<p><b>BOUNDING BEYOND DESIGN BASIS EVENT</b></p> <p>Same as No Action Alternative.</p>	<p><b>BOUNDING BEYOND DESIGN BASIS EVENT</b></p> <p><b>FULL SEPARATIONS AND PLANNING BASIS OPTIONS</b></p> <p>External event results in a release from vitrification facility. MEI dose: 17,000 millirem; 8.5 in a thousand likelihood of LCF. Noninvolved worker dose: 1.2 million millirem; nearly certain death from acute radiation. Offsite population dose: 150,000 person-rem; 76 LCFs.</p> <p><b>TRANSURANIC SEPARATIONS OPTION</b></p> <p>Same as No Action Alternative.</p>	<p><b>BOUNDING BEYOND DESIGN BASIS EVENT</b></p> <p>Same as No Action Alternative.</p>	<p><b>BOUNDING BEYOND DESIGN BASIS EVENT</b></p> <p>Same as No Action Alternative.</p>	<p><b>BOUNDING BEYOND DESIGN BASIS EVENT</b></p> <p><b>VITRIFICATION WITHOUT CALCINE SEPARATIONS OPTION</b></p> <p>Same as No Action Alternative.</p> <p><b>VITRIFICATION WITH CALCINE SEPARATIONS OPTION</b></p> <p>External event results in a release from vitrification facility. MEI dose: 17,000 millirem; 8.5 in a thousand likelihood of LCF. Noninvolved worker dose: 1.2 million millirem; nearly certain death from acute radiation. Offsite population dose: 150,000 person-rem; 76 LCFs.</p>
<p>*Less than once in a million years</p>					

TABLE S-2. Summary of impacts from waste processing and facility disposition alternatives (8 of 12).

No Action Alternative	Continued Current Operations Alternative	Separations Alternative	Non-Separations Alternative	Minimum INEEL Processing Alternative	Direct Vitrification Alternative
<b>Impacts to Air (New Facilities) - Facility Disposition</b>					
<p>No impacts from No Action Alternative are anticipated.</p>	<p><b>RADIATION EFFECTS</b> Radiation doses from emissions would be <math>1.1 \times 10^{-10}</math> millirem per year to offsite MEI and <math>4.0 \times 10^{-9}</math> person-rem per year to the offsite population.</p> <p><b>HAZARDOUS/CARCINOGENIC</b> Maximum <i>offsite</i> impacts of carcinogenic toxic pollutant emissions are estimated to be 0.65 percent of the applicable standard.</p>	<p><b>RADIATION EFFECTS</b> <b>FULL SEPARATIONS OPTION</b> Radiation dose from emissions would be <math>3.3 \times 10^{-10}</math> millirem per year to offsite MEI and <math>1.2 \times 10^{-8}</math> person-rem per year to the offsite population. <b>PLANNING BASIS OPTION</b> Radiation dose from emissions would be <math>3.9 \times 10^{-10}</math> millirem per year to offsite MEI and <math>1.4 \times 10^{-8}</math> person-rem per year to the offsite population. <b>TRANSURANIC SEPARATIONS OPTION</b> Radiation dose from emissions would be <math>4.7 \times 10^{-10}</math> millirem per year to offsite MEI and <math>1.3 \times 10^{-8}</math> person-rem per year to the offsite population.</p> <p><b>HAZARDOUS/CARCINOGENIC</b> Maximum <i>offsite</i> impacts of carcinogenic toxic pollutant emissions are estimated to be 1.8 to 2.6 percent of the applicable standard.</p>	<p><b>RADIATION EFFECTS</b> <b>HOT ISOSTATIC PRESSED WASTE OPTION</b> Radiation dose from emissions would be <math>1.8 \times 10^{-10}</math> millirem per year to offsite MEI and <math>5.7 \times 10^{-9}</math> person-rem per year to the offsite population. <b>DIRECT CEMENT WASTE OPTION</b> Radiation dose from emissions would be <math>1.3 \times 10^{-10}</math> millirem per year to offsite MEI and <math>4.5 \times 10^{-9}</math> person-rem per year to the offsite population. <b>EARLY VITRIFICATION OPTION</b> Radiation dose from emissions would be <math>1.4 \times 10^{-10}</math> millirem per year to offsite MEI and <math>4.6 \times 10^{-9}</math> person-rem per year to the offsite population. <b>STEAM REFORMING OPTION</b> Radiation dose from emissions would be <math>2.4 \times 10^{-10}</math> millirem per year to offsite MEI and <math>8.8 \times 10^{-9}</math> person-rem per year to the offsite population.</p> <p><b>HAZARDOUS/CARCINOGENIC</b> Maximum <i>offsite</i> impacts of carcinogenic toxic pollutant emissions are estimated to be 0.72 to 2.1 percent of the applicable standard.</p>	<p><b>RADIATION EFFECTS</b> At INEEL - radiation dose from emissions would be <math>5.6 \times 10^{-10}</math> millirem per year to offsite MEI and <math>1.6 \times 10^{-8}</math> person-rem per year to the offsite population.</p> <p><b>HAZARDOUS/CARCINOGENIC</b> Maximum <i>offsite</i> impacts of carcinogenic toxic pollutant emissions are estimated to be 2.0 percent of the applicable standard.</p>	<p><b>RADIATION EFFECTS</b> <b>VITRIFICATION WITHOUT CALCINE SEPARATIONS OPTION</b> Radiation dose to the offsite MEI would be <math>2.1 \times 10^{-10}</math> millirem per year. Collective population dose to the general public would be <math>7.0 \times 10^{-9}</math> person-rem per year. <b>VITRIFICATION WITH CALCINE SEPARATIONS OPTION</b> Radiation dose to the offsite MEI would be <math>3.0 \times 10^{-10}</math> millirem per year. Collective population dose to the general public would be <math>9.9 \times 10^{-9}</math> person-rem per year.</p> <p><b>HAZARDOUS/CARCINOGENIC</b> Maximum <i>offsite</i> impacts of carcinogenic toxic pollutant emissions are estimated to be 1.6 to 2.2 percent of the applicable standard.</p>

TABLE S-2. Summary of impacts from waste processing and facility disposition alternatives (9 of 12).

No Action Alternative	Continued Current Operations Alternative	Separations Alternative	Non-Separations Alternative	Minimum INEEL Processing Alternative	Direct Vitrification Alternative
<b>Impacts to Health and Safety (New Facilities) - Facility Disposition</b>					
No impacts from No Action Alternative are anticipated.	<p><b>DOSE EFFECTS</b> Estimated radiation dose to involved workers will result in <i>0.017 LCF and 43 person-rem.</i></p> <p><b>INDUSTRIAL EFFECTS</b> Total lost workdays: <i>70.</i> Total recordable cases: <i>9.2.</i></p>	<p><b>DOSE EFFECTS</b> Estimated radiation dose to involved workers will result in: FULL SEPARATIONS OPTION <i>0.11 LCF and 270 person-rem.</i> PLANNING BASIS OPTION <i>0.11 LCF and 270 person-rem.</i> TRANSURANIC SEPARATIONS OPTION <i>0.077 LCF and 190 person-rem.</i></p> <p><b>INDUSTRIAL EFFECTS</b> Total lost workdays and recordable cases: FULL SEPARATIONS OPTION <i>570 and 74, respectively.</i> PLANNING BASIS OPTION <i>570 and 74, respectively.</i> TRANSURANIC SEPARATIONS OPTION <i>420 and 54, respectively.</i></p>	<p><b>DOSE EFFECTS</b> Estimated radiation dose to involved workers will result in: HOT ISOSTATIC PRESSED WASTE OPTION <i>0.12 LCF and 290 person-rem.</i> DIRECT CEMENT WASTE OPTION <i>0.084 LCF and 210 person-rem.</i> EARLY VITRIFICATION OPTION <i>0.068 LCF and 170 person-rem.</i> <b>STEAM REFORMING OPTION</b> <i>0.033 LCF and 83 person-rem.</i></p> <p><b>INDUSTRIAL EFFECTS</b> Total lost workdays and recordable cases: HOT ISOSTATIC PRESSED WASTE OPTION <i>610 and 79, respectively.</i> DIRECT CEMENT WASTE OPTION <i>410 and 54, respectively.</i> EARLY VITRIFICATION OPTION <i>510 and 67, respectively.</i> <b>STEAM REFORMING OPTION</b> <i>140 and 19, respectively.</i></p>	<p><b>DOSE EFFECTS</b> At INEEL - Estimated radiation dose to involved workers will result in <i>0.055 LCF and 140 person-rem.</i></p> <p><b>INDUSTRIAL EFFECTS</b> At INEEL - Total lost workdays: <i>350.</i> Total recordable cases: <i>45.</i></p>	<p><b>DOSE EFFECTS</b> <i>Estimated radiation dose to involved workers will result in:</i> <b>VITRIFICATION WITHOUT CALCINE SEPARATIONS OPTION</b> <i>0.071 LCF and 180 person-rem.</i> <b>VITRIFICATION WITH CALCINE SEPARATIONS OPTION</b> <i>0.12 LCF and 290 person-rem.</i></p> <p><b>INDUSTRIAL EFFECTS</b> <b>VITRIFICATION WITHOUT CALCINE SEPARATIONS OPTION</b> <i>Total lost workdays: 520. Total recordable cases: 68.</i> <b>VITRIFICATION WITH CALCINE SEPARATIONS OPTION</b> <i>Total lost workdays: 610. Total recordable cases: 79.</i></p>

TABLE S-2. Summary of impacts from waste processing and facility disposition alternatives (10 of 12).

No Action Alternative	Continued Current Operations Alternative	Separations Alternative	Non-Separations Alternative	Minimum INEEL Processing Alternative	Direct Vitrification Alternative
<b>Impacts to Waste and Materials (New Facilities) - Facility Disposition</b>					
<p>No impacts from No Action Alternative would be anticipated.</p>	<p>Approximately 4,800 cubic meters of industrial waste, 11 cubic meters of mixed low-level waste, and 5,600 cubic meters of low-level waste would be generated.</p>	<p><b>FULL SEPARATIONS OPTION</b>                      Approximately 70,000 cubic meters of industrial waste, 900 cubic meters of mixed low-level waste, and 68,000 cubic meters of low-level waste would be generated.</p> <p><b>PLANNING BASIS OPTION</b>                      Approximately 72,000 cubic meters of industrial waste, 480 cubic meters of mixed low-level waste, and 73,000 cubic meters of low-level waste would be generated.</p> <p><b>TRANSURANIC SEPARATIONS OPTION</b>                      Approximately 44,000 cubic meters of industrial waste, 710 cubic meters of mixed low-level waste, and 44,000 cubic meters of low-level waste would be generated.</p>	<p><b>HOT ISOSTATIC PRESSED WASTE OPTION</b>                      Approximately 68,000 cubic meters of industrial waste, 340 cubic meters of mixed low-level waste, and 50,000 cubic meters of low-level waste would be generated.</p> <p><b>DIRECT CEMENT WASTE OPTION</b>                      Approximately 95,000 cubic meters of industrial waste, 350 cubic meters of mixed low-level waste, and 49,000 cubic meters of low-level waste would be generated.</p> <p><b>EARLY VITRIFICATION OPTION</b>                      Approximately 80,000 cubic meters of industrial waste, 480 cubic meters of mixed low-level waste, and 41,000 cubic meters of low-level waste would be generated.</p> <p><b>STEAM REFORMING OPTION</b>                      Approximately 18,000 cubic meters of industrial waste, 69 cubic meters of mixed low-level waste, and 15,000 cubic meters of low-level waste would be generated.</p>	<p>At INEEL - Approximately 28,000 cubic meters of industrial waste, 140 cubic meters of mixed low-level waste, and 15,000 cubic meters of low-level waste would be generated.</p>	<p><b>VITRIFICATION WITHOUT CALCINE SEPARATIONS OPTION</b>                      Approximately 81,000 cubic meters of industrial waste, 530 cubic meters of mixed low-level waste, and 41,000 cubic meters of low-level waste would be generated.</p> <p><b>VITRIFICATION WITH CALCINE SEPARATIONS OPTION</b>                      Approximately 77,000 cubic meters of industrial waste, 900 cubic meters of mixed low-level waste, and 80,000 cubic meters of low-level waste would be generated.</p>

**TABLE S-2. Summary of impacts from waste processing and facility disposition alternatives (11 of 12).**

No Action Alternative	Clean Closure	Performance-Based Closure	Closure to Landfill Standards
<b>Accidents - Facility Disposition</b>			
There are no anticipated accidents.	Approximately 1,100 injuries/illnesses and 2.4 fatalities are calculated.	Approximately 280 injuries/illnesses and 0.64 fatalities are calculated.	Approximately 210 injuries/illnesses and 0.48 fatalities are calculated.

Air	Water	Health & Safety	Waste & Materials
<b>Increment of INEEL Cumulative Impacts - Waste Processing and Facility Disposition</b>			
The maximum cumulative dose to the offsite MEI is 0.16 millirem per year and includes waste processing activities and is less than 2 percent of the 10 millirem per year dose limit.	<p><b>USE</b> Activities associated with this EIS will require an increased water withdrawal from the aquifer of 12 percent.</p> <p><b>CONTAMINATION</b> A full-time occupant at INTEC would receive a lifetime dose of 420 millirem from using the contaminated groundwater after failure of 5 storage tanks. Because of the 500-year delay in reaching the aquifer, the iodine-129 and total plutonium contamination would not add cumulatively to the existing groundwater contamination.</p>	<p>The maximum annual collective dose from waste processing would add 0.10 person-rem to the population living within 50 miles of INTEC.</p> <p>The occupational radiation dose received by the entire INEEL workforce would result in less than one LCF.</p>	<i>The waste processing and facility disposition alternatives would generate about 100,000 cubic meters of low-level waste and about 440,000 cubic meters of industrial waste.</i>

TABLE S-2. Summary of impacts from waste processing and facility disposition alternatives (12 of 12).

## 7.0 Other Environmental Review Requirements

### 7.1 Endangered Species Act

The U.S. Fish and Wildlife Service has *indicated* the types of actions considered in this EIS would be unlikely to adversely impact any threatened or endangered species or critical habitat under the Endangered Species Act.

### 7.2 Clean Air Act

States have the primary responsibility to ensure that air quality within their jurisdictional borders is maintained at a level that meets the national ambient air quality standards. This is achieved by implementing source-specific State requirements.

As a minimum, DOE would need a Permit to Construct and a review pursuant to the National Emissions Standards for Hazardous Air Pollutants before beginning construction of any facility. If any facility must be permitted under the Prevention of Significant Deterioration program, Federal Land Managers of pristine (Class I) areas, including the *Wilderness Area of Craters of the Moon National Monument*, are provided an early opportunity to review a project for visibility concerns.

### 7.3 Floodplain/Wetlands Management

DOE has established procedures to ensure that the potential effects of its actions in a floodplain are evaluated, and that floodplain management goals and wetlands protection considerations are incorporated into its decision-making process in order to minimize the impacts of floods to the extent practicable. Because parts of INTEC might be in a flood-prone area, this concern is analyzed in this EIS. If DOE selects an alternative that would be implemented in a floodplain, DOE will follow the requirements for compliance with floodplain activities in accordance with Federal regulations.

DOE is also required to avoid any adverse impacts to wetlands whenever there is a practicable alternative. None of the alternatives evaluated in this EIS would affect wetlands.

As a part of the National Pollutant Discharge Elimination System program, the existing INTEC Stormwater Pollution Prevention Plan would have to be revised to reflect new construction activities.

## 8.0 Reading Rooms and Information Locations

The EIS is available for review at the following Reading Rooms and information locations.

### Colorado

**Rocky Flats Field Office**  
**U.S. Department of Energy**  
**Public Reading Room**  
 Front Range Community College Library  
 3645 West 112th Avenue  
 Westminster, Colorado 80030

### Idaho

**Boise INEEL Outreach Office**  
 800 Park Blvd. Suite 790  
 Boise, Idaho 83712

**Boise Public Library**  
 715 S. Capital Blvd.  
 Boise, Idaho 83702

**Boise State University**  
 Albertson Library  
 1910 University Drive  
 Boise, Idaho 83725

**Shoshone-Bannock Library**  
 Bannock and Pima Drive  
 Fort Hall, Idaho 83203

**Idaho Falls Public Library**  
 457 Broadway  
 Idaho Falls, Idaho 83402

*Summary*

**Idaho Operations Office**  
U.S. Department of Energy  
Public Reading Room  
1776 Science Center Drive  
Idaho Falls, Idaho 83415-2300

**Lewis-Clark State College Library**  
500 8th Avenue  
Lewiston, Idaho 83501-2698

**University of Idaho Library**  
Rayburn Street  
Moscow, Idaho 83844

**Idaho State University**  
Eli M. Oboler Library  
850 S 9th Ave  
Pocatello, Idaho 83209-8089

**Twin Falls Public Library**  
434 2nd St. E  
Twin Falls, Idaho 83301

**Montana**

**University of Montana**  
Mansfield Library  
32 Campus Drive  
Missoula, Montana 59812-9936

**Nevada**

**Nevada Operations Office**  
U.S. Department of Energy  
Public Reading Room  
2621 Losee Road, B-3 Building  
North Las Vegas, Nevada 89030

**New Mexico**

**Albuquerque Operations Office**  
U.S. Department of Energy  
Zimmerman Library  
University of New Mexico  
Albuquerque, New Mexico 87131-1466

**Oregon**

**Bonneville Power Administration**  
U.S. Department of Energy  
905 Northeast 11th Avenue  
Portland, Oregon 97232

**Utah**

**Marriott Library**  
University of Utah  
295 S. 1500 East  
Salt Lake City, Utah 84112-0860

**Washington**

**Office of River Protection/  
Richland Operations Office**  
U.S. Department of Energy  
Public Reading Room  
Washington State University/Tri-Cities Campus  
2770 University Drive  
Richland, Washington 99352

**Wyoming**

**Teton County Public Library**  
125 Virginian Lane  
Jackson, Wyoming 83001

**Wyoming State Library**  
Government Documents Collection  
2301 Capitol Avenue  
Cheyenne, Wyoming 82002-0060

**District of Columbia**

**Headquarters**  
U.S. Department of Energy  
FOIA Reading Room  
Room 1E-190, Forrestal Building  
1000 Independence Avenue, SW  
Washington, D.C. 20585