## 3.3 IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY

INEEL is on 230,700 hectares (570,000 acres) in southeastern Idaho and is 55 kilometers (34 miles) west of Idaho Falls, 61 kilometers (38 miles) northwest of Blackfoot, and 35 kilometers (22 miles) east of Arco. INEEL is owned by the Federal Government and administered, managed, and controlled by DOE. It is primarily within Butte County, but portions of the site are also in Bingham, Jefferson, Bonneville, and Clark counties. The site is roughly equidistant from Salt Lake City, Utah, and Boise, Idaho.

There are approximately 450 buildings and 2,000 support structures at INEEL, with more than 279,000 square meters (3,000,000 square feet) of floor space in varying conditions of utility. INEEL has approximately 25,100 square meters (270,000 square feet) of covered warehouse space and an additional 18,600 square meters (200,000 square feet) of fenced yard space. The total area of the various machine shops is 3,035 square meters (32,665 square feet).

Fifty-two research and test reactors have been designed and deployed at INEEL over the years to test reactor systems, develop fuel and target designs, and test the overall safety of reactor systems. In addition to nuclear reactor research, other INEEL facilities are operated to support reactor operations. These facilities include high-level radioactive and low-level radioactive waste processing and storage sites; hot cells; nuclear materials storage vaults; analytical laboratories; machine shops; laundry, railroad, and administrative facilities. Other activities include management of one of DOE’s largest storage sites for low-level radioactive waste, transuranic waste, and spent nuclear fuel (both highly enriched and low-enriched uranium).

### 3.3.1 Land Resources

Land resources include land use and visual resources. Each of these resource areas is described for the site as a whole, as well as for the locations of the proposed activities.

#### 3.3.1.1 Land Use

Land may be characterized by its potential for the location of human activities (land use). Natural resource attributes and other environmental characteristics could make a site more suitable for some land uses than for others. Changes in land use may have both beneficial and adverse effects on other resources such as ecological, cultural, geological, aquatic, and atmospheric.

##### 3.3.1.1.1 General Site Description

The Federal Government, the State of Idaho, and private parties own lands surrounding INEEL. Regional land uses include grazing, wildlife management, mineral and energy production, recreation, and crop production. Approximately 60 percent of the surrounding area is used by sheep and cattle for grazing. Small communities and towns near the INEEL boundaries include Mud Lake to the east; Arco, Butte City, and Howe to the west; and Atomic City to the south. Two National Natural Landmarks border INEEL: Big Southern Butte (2.4 kilometers [1.5 miles] south) and Hell's Half Acre (2.6 kilometers [1.6 miles] southeast). A portion of Hell's Half Acre National Natural Landmark is designated as a Wilderness Study Area. The Black Canyon Wilderness Study Area is also adjacent to INEEL.

Land use categories at INEEL include facility operations, grazing, general open space, and infrastructure such as roads. Generalized land uses at INEEL and vicinity are shown in **Figure 3–6**. Facility operations include industrial and support operations associated with energy research and waste management activities. Land is also used for recreation and environmental research associated with the designation of INEEL as a National

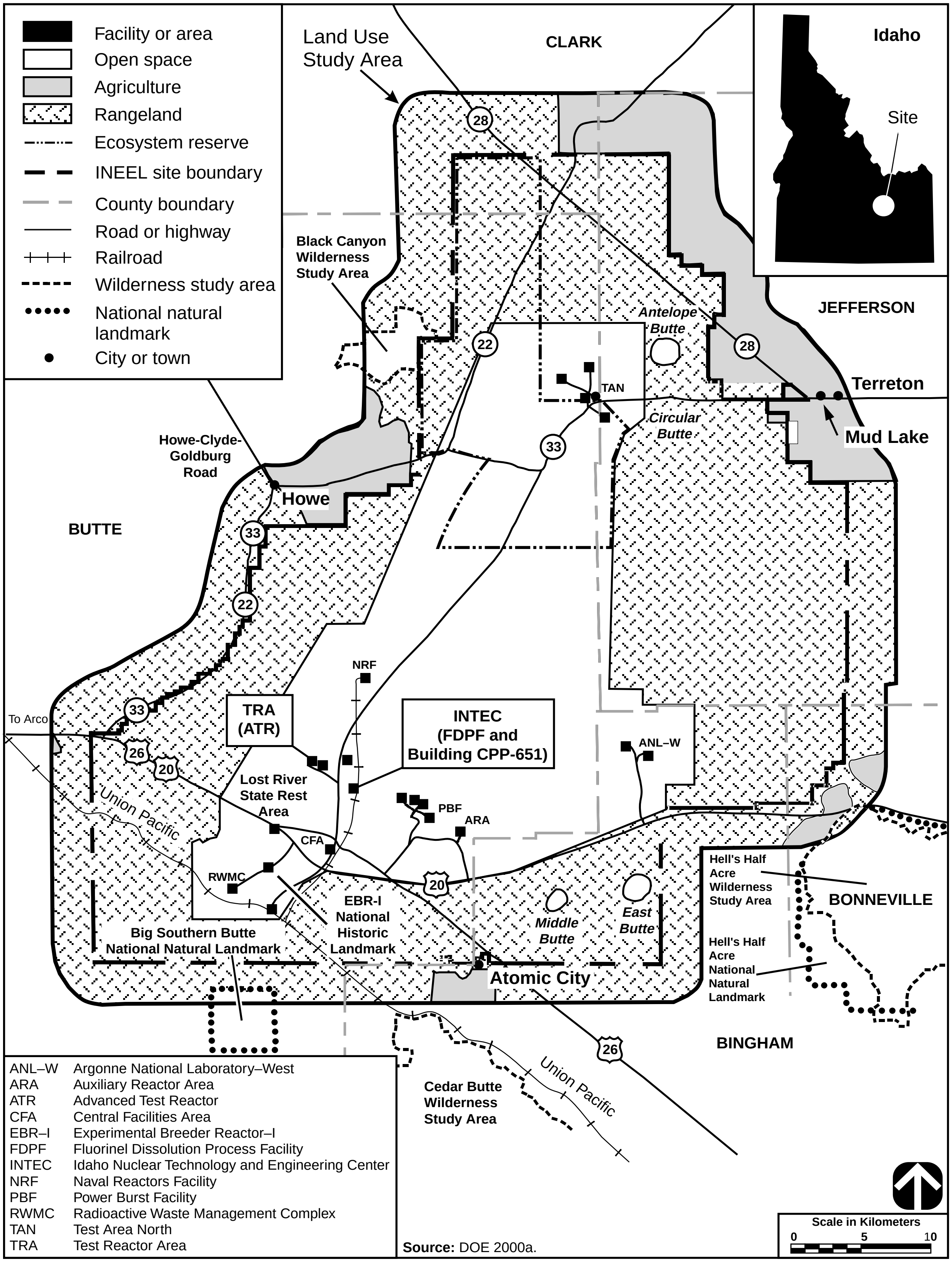


**Figure 3–6 Generalized Land Use at Idaho National Engineering and Environmental Laboratory and Vicinity**

Environmental Research Park. Much of INEEL is open space that has not been designated for specific use. Some of this space serves as a buffer zone between INEEL facilities and other land uses. Recently, 29,950 hectares (74,000 acres) of open space in the north central portion of the site has been designated as the INEEL Sagebrush Steppe Ecosystem Reserve (DOE 1999g). This area represents one of the last sagebrush steppe ecosystems in the United States and provides a home for a number of rare and sensitive species of plants and animals. Approximately 2 percent of the total INEEL site area (4,600 hectares [11,400 acres]) is used for facilities and operations. Facilities are sited within a central core area of about 93,100 hectares (230,000 acres) (Figure 3–6). Public access to most facilities is restricted. DOE land use plans and policies applicable to INEEL are discussed in the *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DOE 1995a:vol. 2, part A, 4.2-1–4.2-4).

All county plans and policies encourage development adjacent to previously developed areas to minimize the need for infrastructure improvements and to avoid urban sprawl. Because INEEL is remote from most developed areas, its lands and adjacent areas are not likely to experience residential and commercial development, and no new development is planned near the site. Recreational and agricultural uses, however, are expected to increase in the surrounding area in response to greater demand for recreational areas and the conversion of rangeland to cropland (DOE 1999e:3-82).

The Fort Bridger Treaty of July 3, 1868, secured the Fort Hall Reservation as the permanent homeland of the Shoshone-Bannock Peoples. According to the treaty, tribal members reserved rights to hunting, fishing, and gathering on surrounding unoccupied lands of the United States. While INEEL is considered occupied land, it was recognized that certain areas on the INEEL site have significant cultural and religious significance to the tribes. A *1994 Memorandum of Agreement with the Shoshone-Bannock Tribes* (DOE 1994) provides tribal members access to the Middle Butte to perform sacred or religious ceremonies or other educational or cultural activities.

#### 3.3.1.1.2 Locations of Proposed Activities

##### IDAHO NUCLEAR TECHNOLOGY AND ENGINEERING CENTER

Land within Idaho Nuclear Technology and Engineering Center (INTEC) is highly disturbed, and is used to store spent nuclear fuel and radioactive wastes, treat radioactive wastes, and develop waste management technologies. The area includes about 85 hectares (210 acres) within the perimeter fence and an additional 22 hectares (54 acres) outside the fence (DOE 1997b:31, 95–111). A number of wastewater and percolation ponds are also present on the site. INTEC is 12 kilometers (7.5 miles) north of the site boundary, and 0.8 kilometer (0.5 mile) southeast of the Big Lost River. Facilities at INTEC include spent fuel storage and processing areas, a waste solidification facility and related high-level waste storage facilities, remote analytical laboratories, and a coal-fired steam-generating plant that is in standby.

##### TEST REACTOR AREA

The Test Reactor Area is in the southwestern portion of INEEL (Figure 3–6). Land in the Test Reactor Area is currently disturbed, and is designated for reactor operations. The area includes about 15 hectares (37 acres) within the security fence, plus several sewage and waste ponds outside of the fence. The Test Reactor Area is about 11 kilometers (6.8 miles) southeast of the nearest site boundary and about 2.6 kilometers (1.6 miles) northwest of the Big Lost River. The Materials Test Reactor and Engineering Test Reactor (both shut down), the Test Reactor Area Hot Cells, and ATR, which achieved initial criticality in 1967, are in the Test Reactor Area. In addition, numerous support facilities (i.e., storage tanks, maintenance buildings, warehouses), laboratories, and sanitary and radioactive waste treatment facilities are in the area (DOE 1997b:32, 189–201).

### 3.3.1.2 Visual Resources

Visual resources are natural and human-created features that give a particular landscape its character and aesthetic quality. Landscape character is determined by the visual elements of form, line, color, and texture. All four elements are present in every landscape. The stronger the influence exerted by these elements in a landscape, the more interesting the landscape.

#### 3.3.1.2.1 General Site Description

The Bitterroot, Lemhi, and Lost River mountain ranges border INEEL on the north and west. Volcanic buttes near the southern boundary of INEEL can be seen from most locations on the site. INEEL generally consists of open desert land predominantly covered by big sagebrush and grasslands. Pasture and farmland border much of the site.

Ten facility areas are on the INEEL site. Although INEEL has a comprehensive facility and land use plan (DOE 1997b), no specific visual resource standards have been established. INEEL facilities have the appearance of low-density commercial/industrial complexes widely dispersed throughout the site. Structure heights generally range from 3 to 30 meters (10 to 100 feet); a few stacks and towers reach 76 meters (250 feet). Although many INEEL facilities are visible from highways, most facilities are more than 0.8 kilometer (0.5 mile) from public roads. The operational areas are well defined at night by the security lights.

Lands adjacent to INEEL, under Bureau of Land Management jurisdiction, are designated as Visual Resource Management Class II areas. Lands within the INEEL site are designated as Visual Resource Management Class II and III. Management activities within these classes may be seen but should not dominate the review (DOI 1986). The Black Canyon Wilderness Study Area, adjacent to INEEL, is under consideration by Bureau of Land Management for Wilderness Area designation, approval of which would result in an upgrade of its Visual Resource Management rating from Class II to Class I. The Hell’s Half Acre Wilderness Study Area is 2.6 kilometers (1.6 miles) southeast of INEEL’s eastern boundary. This area, famous for its lava flow and hiking trails, is managed by the Bureau of Land Management. The Craters of the Moon Wilderness Area is about 20 kilometers (12 miles) southwest of INEEL’s western boundary.

#### 3.3.1.2.2 Locations of Proposed Activities

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While the Fuel Processing Facility is the largest building at INTEC, the tallest structure is the main stack, which is 76 meters (250 feet) tall. The Visual Resource Management rating of INTEC is Class IV, which means management activities dominate the view and are the focus of the viewers attention. INTEC is visible in the middle ground from State Highways 20 and 26, with Saddle Mountain in the background. Natural features of visual interest within a 40-kilometer (25-mile) radius include Big Lost River at 0.8 kilometer (0.5 mile), Middle Butte at 18 kilometers (11 miles), Big Southern Butte National Natural Landmark at 20 kilometers (11 miles), East Butte at 23 kilometers (14 miles), Hell’s Half Acre Wilderness Study Area at 33 kilometers (21 miles), and Saddle Mountain at 40 kilometers (25 miles).

**TEST REACTOR AREA**

The tallest structure at ATR within the Test Reactor Area is the main stack, which can be seen from Highways 20, 26, and 22. Developed areas within the Test Reactor Area are consistent with a Visual Resource Management Class IV rating. Natural features of visual interest within a 40-kilometer (25-mile) radius include

Big Lost River at 2.6 kilometers (1.6 miles), Middle Butte at 20 kilometers (12 miles), Big Southern Butte National Natural Landmark at 18 kilometers (11 miles), East Butte at 23 kilometers (14 miles), Hell's Half Acre Wilderness Study area at 35 kilometers (22 miles), and Saddle Mountain at 40 kilometers (25 miles).

## 3.3.2 Noise

Noise is unwanted sound that interferes or interacts negatively with the human or natural environment. Noise may disrupt normal activities or diminish the quality of the environment.

### 3.3.2.1 General Site Description

Major noise emission sources within INEEL include various industrial facilities, equipment, and machines (e.g., cooling systems, transformers, engines, pumps, boilers, steam vents, paging systems, construction and materials-handling equipment, and vehicles). Most INEEL industrial facilities are far enough from the site boundary that noise levels at the boundary from these sources are not measurable, or are barely distinguishable from background levels (DOE 1996b:3-112).

Existing INEEL-related noises of public significance are from the transportation of people and materials to and from the site and in-town facilities via buses, trucks, private vehicles, and freight trains. Noise measurements along U.S. Route 20, about 15 meters (50 feet) from the roadway, indicate that the sound levels from traffic range from 64 to 86 dBA, and that the primary source is buses (71 to 80 dBA). While few people reside within 15 meters (50 feet) of the roadway, the results indicate that INEEL traffic noise might be objectionable to members of the public residing near principal highways or busy bus routes. Noise levels along these routes may have decreased somewhat due to reductions in employment and bus service at INEEL in the last few years. The acoustic environment along the INEEL site boundary in rural areas and at nearby areas away from traffic noise is typical of a rural location; the average day-night sound level is in the range of 35 to 50 dBA. Except for the prohibition of nuisance noise, neither the State of Idaho nor local governments have established any regulations that specify acceptable community noise levels applicable to INEEL (DOE 1996b:3-114). The EPA guidelines for environmental noise protection recommend an average day-night sound level of 55 dBA as sufficient to protect the public from the effects of broadband environmental noise in typically quiet outdoor and residential areas (EPA 1974:29). Land use compatibility guidelines adopted by the Federal Aviation Administration and the Federal Interagency Committee on Urban Noise indicate that yearly day-night average sound levels less than 65 dBA are compatible with residential land uses (14 CFR Part 150). These guidelines further indicate that levels up to 75 dBA are compatible with residential uses if suitable noise reduction features are incorporated into structures. It is expected that for most residences near INEEL, the day-night average sound levels are compatible with the residential land use, although for some residences along major roadways, noise levels may be higher than 65 dBA.

### 3.3.2.2 Locations of Proposed Activities

#### IDAHO NUCLEAR TECHNOLOGY AND ENGINEERING CENTER

No distinguishing noise characteristics at INTEC have been identified. INTEC is far enough from the site boundary (12 kilometers [7.5 miles]) that noise levels at the boundary from these sources are not measurable or are barely distinguishable from background levels.

**TEST REACTOR AREA**

No distinguishing noise characteristics at the Test Reactor Area have been identified. The Test Reactor Area is far enough from the site boundary (11 kilometers [6.8 miles]) that noise levels at the site boundary from these sources are not measurable or are barely distinguishable from background levels.

### 3.3.3 Air Quality

Air pollution refers to the introduction, directly or indirectly, of any substance into the air that could endanger human health, harm living resources and ecosystems as well as material property, and impair or interfere with the comfortable enjoyment of life or other legitimate uses of the environment. Air pollutants are transported, dispersed, or concentrated by meteorological and topographical conditions. Air quality is affected by air pollutant emission characteristics, meteorology, and topography.

#### 3.3.3.1 General Site Description

The climate at INEEL and the surrounding region is characterized as that of a semiarid steppe. The average annual temperature at INEEL is 5.6 °C (42 °F); average monthly temperatures range from a minimum of -8.8 °C (16.1 °F) in January to a maximum of 20 °C (68 °F) in July. The average annual precipitation is 22 centimeters (8.7 inches) (Clawson, Start, and Ricks 1989:55, 77). Prevailing winds at INEEL are southwest or northeast (DOE 1999h:4.7-1). The annual average wind speed is 3.4 meters per second (7.5 miles per hour) (DOE 1996b:3-112).

INEEL is within the Eastern Idaho Intrastate Air Quality Control Region #61. None of the areas within INEEL and its surrounding counties are designated as nonattainment areas with respect to the NAAQS for criteria air pollutants (40 CFR Section 81.313). The nearest nonattainment area for particulate matter is in Pocatello, about 80 kilometers (50 miles) to the south. Applicable NAAQS and Idaho State ambient air quality standards are presented in **Table 3–15**.

The primary sources of air pollutants at INEEL include calcination of sodium-bearing waste, combustion of coal for steam, and combustion of fuel oil for heating. Other emission sources include waste burning, coal piles, industrial processes, stationary diesel engines, vehicles, and fugitive dust from waste burial and construction activities. The existing ambient air concentrations attributable to sources at INEEL are presented in Table 3–15. These concentrations are based on dispersion modeling at the INEEL site boundary centered at the INTEC facility, performed for the *High-Level Waste and Facilities Disposition Draft EIS* using 1997 actual emissions and excluding Argonne National Laboratory–West; dispersion modeling at the INEEL site boundary centered on Argonne National Laboratory–West using 1997 actual emissions for Argonne National Laboratory–West; and meteorological data from 1991–1992 (DOE 1999i, 2000a). The estimated concentrations are conservative and bound the actual INEEL contribution to ambient levels, as some of the modeled sources are currently in standby. Concentrations shown in Table 3–15 represent a small percentage of the ambient air quality standards. Concentrations of any hazardous and toxic compounds would be well below regulatory levels.

Because INEEL sources are limited and background concentrations of criteria pollutants are well below ambient standards, INEEL emissions should not result in air pollutant concentrations that violate the ambient air quality standards.

**Table 3–15 Comparison of Modeled Ambient Air Concentrations from INEEL Sources with Most Stringent Applicable Standards or Guidelines**

| Pollutant | Averaging Period | Most Stringent Standard or Guideline (micrograms per cubic meters)[a] | INEEL Concentration without ANL–W (micrograms per cubic meters) | ANL–W Concentration (micrograms per cubic meters) |
|---|---|---|---|---|
| **Criteria pollutants** | | | | |
| Carbon monoxide | 8 hours | 10,000[b] | 78 | 41 |
| | 1 hour | 40,000[b] | 206 | 59 |
| Nitrogen dioxide | Annual | 100[b] | 0.46 | 13 |
| Ozone | 1 hour | 235[c] | (d) | (d) |
| $PM_{10}$ | Annual | 50[b] | 0.49 | 0.14 |
| | 24 hours | 150[b] | 12 | 1.1 |
| Sulfur dioxide | Annual | 80[b] | 0.14 | 3.3 |
| | 24 hours | 365[b] | 5.3 | 27 |
| | 3 hours | 1,300[b] | 24 | 60 |

a. The more stringent of the Federal and state standards is presented if both exist for the averaging period. The NAAQS (40 CFR Part 50), other than those for ozone, particulate matter, and lead, and those based on annual averages, are not to be exceeded more than once per year. The annual arithmetic $PM_{10}$ mean standard is attained when the expected annual arithmetic mean concentration is less than or equal to the standard.
b. Federal and state standard.
c. Federal 8-hour standard is currently under litigation.
d. Not directly emitted or monitored by the site.

**Note:** NAAQS also include standards for lead. No sources of lead emissions have been identified for any alternative evaluated. Emissions of hazardous air pollutants not listed here have been identified at INEEL, but are not associated with any of the alternatives evaluated. EPA revised the ambient air quality standards for particulate matter and ozone in 1997 (62 FR 38856, 62 FR 38652); however, these standards are currently under litigation, but could become enforceable during the life of this project.
**Source:** 40 CFR Part 50; DOE 1999i, 2000a; ID DHW 1998.

The nearest Prevention of Significant Deterioration Class I area to INEEL is Craters of the Moon Wilderness Area, Idaho, 53 kilometers (33 miles) west-southwest from the center of the site. A Class I area is one in which very little increase in pollution is allowed due to the pristine nature of the area. There are no other Class I areas within 100 kilometers (62 miles) of INEEL. INEEL and its vicinity are classified as a Class II area in which more moderate increases in pollution are allowed (DOE 1996b:3-112).

EPA has established Prevention of Significant Deterioration increments for certain pollutants: sulfur dioxide, nitrogen dioxide and particulate matter less than or equal to 10 microns in diameter. The increments specify a maximum allowable increase above a certain baseline concentration for a given averaging period, and apply only to sources constructed or modified after a specified baseline date. These sources are known as increment-consuming sources. The baseline date is the date of submittal of the first application for a Prevention of Significant Deterioration permit in a given area.

Prevention of Significant Deterioration permits have been obtained for the coal-fired steam-generating facility next to the Idaho Nuclear Technology and Engineering Center and Fuel Processing Facility, which is not expected to be operated (DOE 1996b). In addition to this facility, INEEL has other increment consuming sources on site. The current amounts of Prevention of Significant Deterioration increment consumption in Class I and Class II areas by INEEL's increment-consuming sources based on dispersion modeling analyses are specified in **Tables 3–16** and **3–17**, respectively.

**Table 3–16 Prevention of Significant Deterioration Increment Consumption at Craters of the Moon Wilderness (Class I) Area by Existing (1996) and Projected Sources Subject to Prevention of Significant Deterioration Regulation**

| Pollutant | Averaging Period | Allowable Prevention of Significant Deterioration Increment[a] (micrograms per cubic meter) | Amount of Prevention of Significant Deterioration Increment Consumed (micrograms per cubic meter) |
|---|---|---|---|
| Nitrogen dioxide | Annual | 2.5 | 0.06 |
| Respirable particulates[b] | Annual | 4 | 0.008 |
| | 24 hours | 8 | 0.7 |
| Sulfur dioxide | Annual | 2 | 0.09 |
| | 24 hours | 5 | 1.9 |
| | 3 hours | 25 | 6.2 |

a. All increments specified are State of Idaho standards (ID DHW 1998).
b. Data on particulate size are not available for most sources. For purposes of comparison to the respirable particulate increments, it is conservatively assumed that all particulates emitted are of respirable size (i.e., 10 microns or less in diameter).
**Note:** Estimated increment consumption includes existing sources, projected increases from planned projects, including the Advanced Mixed Waste Treatment Project, and excludes the New Waste Calcining Facility.
**Source:** DOE 1999i.

**Table 3–17 Prevention of Significant Deterioration Increment Consumption at Class II Areas by Existing (1996) and Projected Sources Subject to Prevention of Significant Deterioration Regulation at INEEL**

| Pollutant | Averaging Period | Allowable Prevention of Significant Deterioration Increment[a] (micrograms per cubic meter) | Amount of Prevention of Significant Deterioration Increment Consumed (micrograms per cubic meter) |
|---|---|---|---|
| Nitrogen dioxide | Annual | 25 | 1.6 |
| Respirable particulates[b] | Annual | 17 | 0.92 |
| | 24 hours | 30 | 17 |
| Sulfur dioxide | Annual | 20 | 2.4 |
| | 24 hours | 91 | 31 |
| | 3 hours | 512 | 140 |

a. All increments specified are State of Idaho standards (ID DHW 1998).
b. Data on particulate size are not available for most sources. For purposes of comparison to the respirable particulate increments, it is conservatively assumed that all particulates emitted are of respirable size (i.e., 10 microns or less in diameter).
**Note:** Estimated increment consumption includes existing sources, projected increases from planned projects, including the Advanced Mixed Waste Treatment Project, and excludes the New Waste Calcining Facility.
**Source:** DOE 1999i.

Routine offsite monitoring for nonradiological air pollutants is generally only performed for particulates. Monitoring for $PM_{10}$ is performed by the Environmental Science and Research Foundation at the site boundary and at communities beyond the boundary. In 1998, 55 samples were collected at Rexburg (about 60 kilometers [19.3 miles] east of the site) by the Foundation. The mean $PM_{10}$ concentration at Rexburg for 1998 was 27 micrograms per cubic meter. Forty-eight samples were collected at the Mountain View Middle School in Blackfoot, with a mean concentration of 23 micrograms per cubic meter. Forty-four samples were collected at Atomic City in 1998, with a mean concentration of 21 micrograms per cubic meter (Saffle et al. 2000).

Some monitoring data has also been collected by the National Park Service at the Craters of the Moon Wilderness Area. The monitoring program has shown no exceedances of the 1-hour ozone standard, low levels of sulfur dioxide (except for one exceedance of the 24-hour standard in 1985), and total suspended particulates within applicable standards (DOE 1999h). Note that the total suspended particulate standards have been replaced with $PM_{10}$ standards.

### 3.3.3.2 Locations of Proposed Activities

The meteorological conditions for INEEL are considered to be representative of the INTEC and Test Reactor Area sites.

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Primary sources of nonradiological air pollutants include the New Waste Calcining Facility and coal-fired steam-generating facility. Both of these facilities are in standby. These facilities are sources of carbon monoxide, nitrogen dioxide, sulfur dioxide, and $PM_{10}$. The New Waste Calcining Facility is a large source of nitrogen dioxide at INEEL.

**TEST REACTOR AREA**

The ATR facility operates a diesel generator as a source of backup electrical power. This generator is a source of nonradioactive air emissions at ATR. Other diesel engines are also operated periodically and contribute to air emissions (LMIT 1997:11–23). The existing ambient air pollutant concentrations attributable to sources at ATR are presented in **Table 3–18**. These concentrations are estimated using SCREEN3 and are expected to overestimate the contribution to site boundary concentrations.

**Table 3–18 Comparison of Modeled Ambient Air Concentrations from ATR Sources with Most Stringent Applicable Standards or Guidelines**

| Pollutant | Averaging Period | Most Stringent Standard or Guideline (micrograms per cubic meters)[a] | ATR Concentration (micrograms per cubic meters) |
|---|---|---|---|
| **Criteria pollutants** | | | |
| Carbon monoxide | 8 hours | 10,000[b] | 33.6 |
| | 1 hour | 40,000[b] | 48 |
| Nitrogen dioxide | Annual | 100[b] | 9.19 |
| Ozone | 1 hour | 235[c] | (d) |
| $PM_{10}$ | Annual | 50[b] | 4.72 |
| | 24 hours | 150[b] | 37.7 |
| Sulfur dioxide | Annual | 80[b] | 1.50 |
| | 24 hours | 365[b] | 12 |
| | 3 hours | 1,300[b] | 26.9 |

a. The more stringent of the Federal and state standards is presented if both exist for the averaging period. The NAAQS (40 CFR Part 50), other than those for ozone, particulate matter, and lead, and those based on annual averages, are not to be exceeded more than once per year. The annual arithmetic mean $PM_{10}$ standard is attained when the expected annual arithmetic mean concentration is less than or equal to the standard.
b. Federal and state standard.
c. Federal 8-hour standard is currently under litigation.
d. Not directly emitted or monitored by the site.
**Source:** Modeled concentrations using SCREEN3 and emissions estimates for diesel generators.

### 3.3.4 Water Resources

Water resources include all forms of surface water and subsurface groundwater.

### 3.3.4.1 Surface Water

Surface water includes marine or freshwater bodies that occur above the ground surface, including rivers, streams, lakes, ponds, rainwater catchments, embayments, and oceans.

#### 3.3.4.1.1 General Site Description

INEEL is in the Mud Lake-Lost River Basin (also known as the Pioneer Basin). This closed drainage basin includes three main streams—the Big and Little Lost Rivers and Birch Creek (**Figure 3–7**). These three streams are essentially intermittent and drain the mountain areas to the north and west of INEEL, although most flow is diverted for irrigation in the summer months before it reaches the site boundaries. Flow that reaches INEEL infiltrates the ground surface along the length of the stream beds, in the spreading areas at the southern end of INEEL and, if the stream flow is sufficient, in the ponding areas (playas or sinks) in the northern portion of INEEL. During dry years, there is little or no surface water flow on INEEL. Because the Mud Lake-Lost River Basin is a closed drainage basin, water does not flow off INEEL but rather infiltrates the ground surface to recharge the aquifer or is consumed by evapotranspiration. The Big Lost River flows southeast from Mackay Dam, past Arco and onto the Snake River Plain. On INEEL, near the southwestern boundary, a diversion dam prevents flooding of downstream areas during periods of heavy runoff by diverting water to a series of natural depressions or spreading areas. During periods of high flow or low irrigation demand, the Big Lost River continues northeastward past the diversion dam, passes within about 60 meters (200 feet) of INTEC and ends in a series of playas 24 to 32 kilometers (15 to 20 miles) northeast of INTEC and the Test Reactor Area, where the water infiltrates the ground surface.

Flow from Birch Creek and the Little Lost River infrequently reaches INEEL. The water in Birch Creek and Little Lost River is diverted in summer months for irrigation prior to reaching INEEL. During periods of unusually high precipitation or rapid snow melt, water from Birch Creek and Little Lost River may enter INEEL from the northwest and infiltrate the ground, recharging the underlying aquifer (DOE 1999i:4-50, 4-51). Other than the three intermittent streams, the only other surface water bodies on the site include natural wetland-like ponds and manmade percolation and evaporation ponds (DOE 1999h:4.8-1).

Big Lost River, Little Lost River, and Birch Creek have been classified by the State of Idaho for irrigation for agriculture, cold water biota development, salmon spawning, and primary and secondary recreation (DOE 1999h:4.8-9). Surface waters, however, are not used for drinking water on the site, nor is effluent discharged directly to them; thus, there are no surface water rights issues at INEEL (DOE 1996b:3-115). Although there are no routine wastewater discharges to surface waters, an NPDES permit application has been filed with EPA Region 10 for minor discharges from INTEC production wells to the Big Lost River. However, these discharges are subject to Idaho water quality standards and criteria. INEEL facilities are also covered by EPA's multisector general stormwater permit issued in 1998 (63 FR 52430). Stormwater is managed via the INEEL Storm Water Pollution Prevention Plan (first implemented in 1993). Annual stormwater evaluations are conducted as part of the plan, and stormwater is monitored in accordance with the permit and DOE Orders. In 1998, INEEL also submitted a Notice of Intent to EPA for renewal of the site's General Permit for Storm Water Discharges from Construction Sites. As for industrial activities, a pollution prevention plan covering construction activities is maintained. Application has been made to the State of Idaho for Wastewater Land Application Permits for all existing wastewater treatment facilities on the site (e.g., percolation ponds and sewage treatment irrigation systems); four permits have been issued (Saffle et al. 2000:2-6, 2-7).

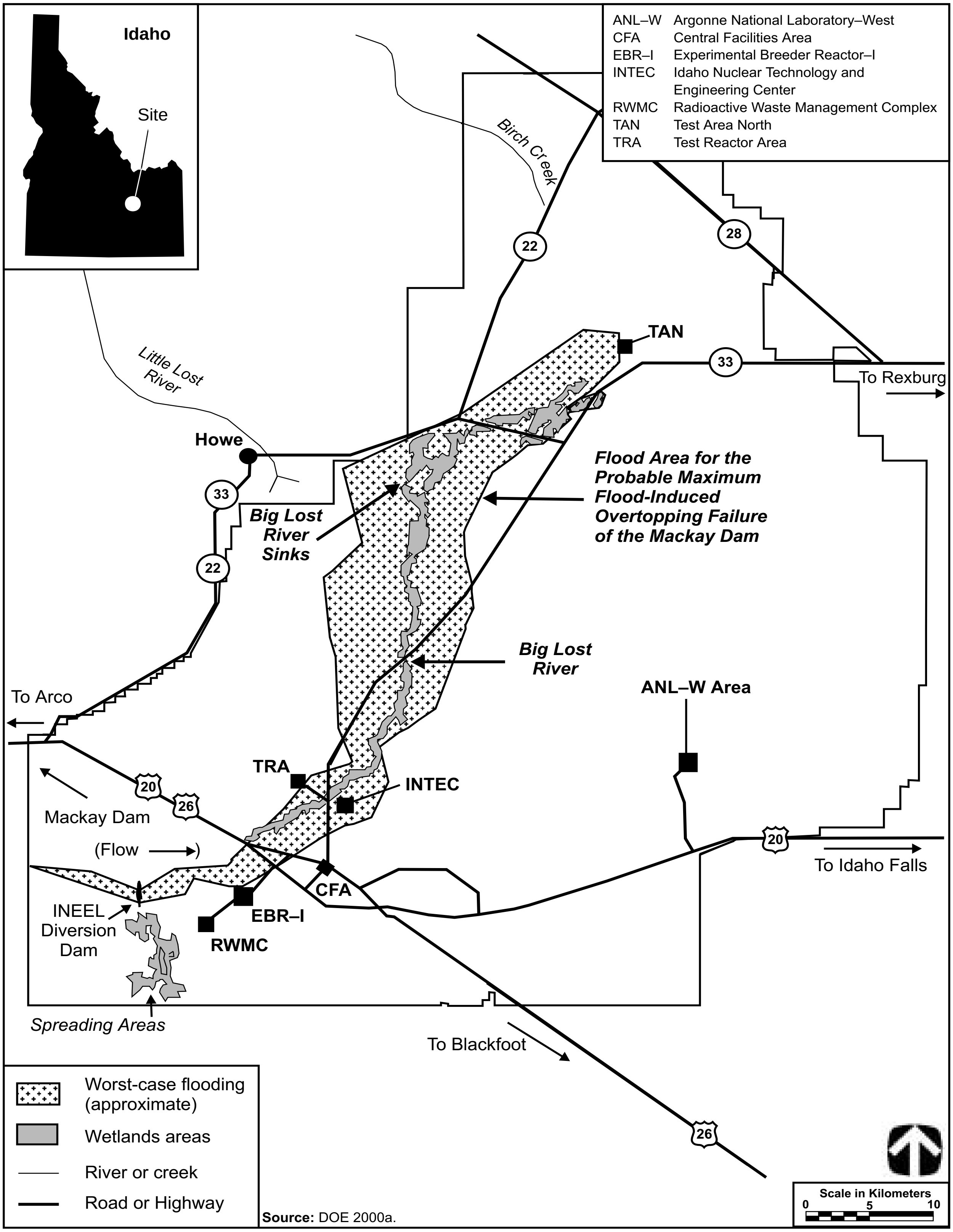


**Figure 3–7 Surface Water Features at the Idaho National Engineering and Environmental Laboratory**

None of the rivers on or near INEEL have been classified as a Wild and Scenic River. The INEEL diversion dam constructed in 1958 and enlarged in 1984 secured INEEL from the 300-year flood of the Big Lost River by directing flow through a diversion channel into four spreading areas (DOE 1995a:4.8-3, 4.8-4, 4.8-13; 1996b:3-115).

### 3.3.4.1.2 Locations of Proposed Activities

There are no named streams within INTEC and the Test Reactor Area; there are only unnamed drainage ditches that carry storm flows away from buildings and facilities at the site. Outside INTEC and the Test Reactor Area, the only surface water is a stretch of Big Lost River. As described above, this is an intermittent stream that flows past the diversion dam and across INEEL near INTEC and the Test Reactor Area mainly during wet periods such as when it carries snowmelt from the nearby mountains, and/or when upstream irrigation demand is low (Abbott, Crockett, and Moor 1997:5; DOE 1999i:4-50). The stream channel is immediately adjacent to the northwest corner of INTEC and is 1,365 meters (4,480 feet) from the southeast corner of the Test Reactor Area fenced boundary (LMIT 1997:2-47). During the period September 1995 to July 1996, flow of the Big Lost River on INEEL averaged 1.51 cubic meters (53.5 cubic feet) per second with the highest one-day flow of 10.36 cubic meters (366 cubic feet) per second (DOE 1999h:4.8-1). A summary of water quality data for Big Lost River in the vicinity of INEEL is provided in the *Storage and Disposition PEIS* and shows no unusual concentrations of the parameters analyzed (DOE 1996b:3-115–3-117). In general, the water quality of Big Lost River, Little Lost River, and Birch Creek is similar with the chemical quality reflecting the carbonate mineral composition of the mountain ranges drained by them, along with the quality of irrigation water return flows (DOE 1995a:4.8-4; 1999i:4-54).

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Sanitary waste with no potential for radioactive contamination is treated in the INTEC Sewage Treatment Facility (CPP–615) and associated treatment lagoons. This facility has a Wastewater Land Application Permit from the State of Idaho for discharge to infiltration trenches, located on the northeast corner of INTEC, after treatment and does not discharge to surface waters. The only effluent criteria associated with flows to the sewage treatment ponds are for total suspended solids and nitrogen. All compliance points for the ponds are in wells downgradient from the ponds, and the maximum allowable concentrations are similar to those in the National Primary and Secondary Drinking Water Standards (Abbott, Crockett, and Moor 1997:9, 10, 13; DOE 1999i:4-52, 4-58). In 1998, INTEC generated and disposed of about 60.4 million liters (15.95 million gallons) of sanitary wastewater (French, Tallman, and Taylor 1999a:INTEC-12).

Drainage from corridors, roof and floor drains, and condensate from process heating, and heating, ventilation, and air conditioning systems, with very low potential for radiological contamination are routed to the INTEC service waste system. This system discharges under a Wastewater Land Application Permit to two percolation ponds located on the south side of the INTEC complex. Service Waste Pond 1 has a surface area of about 18,400 square meters (198,000 square feet) and is 4.9 meters (16 feet) deep. It has a disposal capacity of 5.7 million liters (1.5 million gallons) per day. Service Waste Pond 2, immediately west of Service Waste Pond 1, has a surface area of approximately 23,100 square meters (248,700 square feet). It has a disposal capacity of 11 million liters (2.9 million gallons) per day. Both ponds are fenced to keep out wildlife (Abbott, Crockett, and Moor 1997:9). Approximately 1.96 billion liters (517 million gallons) of process wastewater was discharged to the service waste percolation ponds in 1998 (French, Tallman, and Taylor 1999a:INTEC-7, 12). Based on 1998 monitoring results from the INTEC service waste system, none of the parameter concentrations exceeded applicable standards that would define the effluent as hazardous (Saffle et al. 2000:7-5).

Consideration is being given to relocating the percolation pond to reduce the potential impacts on a contaminated perched water zone. Consideration is also being given to obtaining an NPDES permit to allow direct discharge into Big Lost River. These actions are independent of the proposed action analyzed in this NI PEIS and would be preceded by appropriate NEPA documentation (Abbott, Crockett, and Moor 1997:10). Waste management activities and facilities are discussed in greater detail under Section 3.3.11.

Flooding scenarios that involve the failure of MacKay Dam and high flows in the Big Lost River have been evaluated. The results indicate that in the event of a failure of this dam, flooding would occur at INTEC. The flood area calculated for this worse-case event is shown on Figure 3–7. The low velocity and shallow depth of the water, however, would not pose a threat of structural damage to most facilities (Barghusen and Feit 1995:2.3-21; DOE 1999i:4-51, 4-53, 4-54). Localized flooding can occur due to rapid snowmelt and frozen ground conditions, but none has been reported at INTEC (Barghusen and Feit 1995:2.3-23).

A separate flood study conducted by USGS and published in 1998 calculated that the 100-year flood would produce a flow at the Arco gauging station of about 205.6 cubic meters (7,260 cubic feet) per second, resulting in failure of the INEEL Diversion Dam and inundating the northern third of INTEC (DOE 1999i:4-54, 4-55). A 1999 Bureau of Reclamation paleoflood study confirms that while INTEC is potentially subject to flooding by the Big Lost River, it is predominantly sited on geomorphic surfaces that are well in excess of 10,000 years of age, indicating that the hazard of significant flooding is low under natural channel conditions. However, extensive modification of the Big Lost River channel throughout much of INEEL indicates that the characterization of flood stage due to Big Lost River flows will require a detailed assessment of channel stability and behavior for different flows (DOI 1999). Nevertheless, the results of the Bureau of Reclamation study indicate that neither the 100- or 500-year flood would inundate any more than the northern-most portion of INTEC. The study did not, however, consider dam failure (DOE 1999i:4-54, 4-56, 4-57). No flood maps are available from the Federal Emergency Management Agency.

#### TEST REACTOR AREA

Sanitary wastewater from Test Reactor Area facilities is collected by the sanitary sewer system and discharged to two sewage evaporation lagoons located just to the east of the Test Reactor Area (i.e., Test Reactor Area Sanitary Waste Ponds) (Saffle et al. 2000:7-6). In 1998, the Test Reactor Area generated and disposed of about 42.4 million liters (11.2 million gallons) of sanitary wastewater (French, Tallman, and Taylor 1999a:TRA-12).

Radiological liquid effluents at the Test Reactor Area result from canal wastewater, primary coolant leakage, and activities associated with ATR power monitoring. This process wastewater is treated by the ATR Warm Waste Treatment Facility system. The resultant wastewater, containing tritium, limited concentrations of activation, and fission products below the volatile and nonvolatile release limits established by the State of Idaho, is released to the Test Reactor Area Warm Waste Evaporation Ponds, Test Reactor Area–715. As a result, there is no direct discharge to groundwater. Nevertheless, this released wastewater is also below applicable requirements for nonradiological hazardous constituents specified in the pond operating permit (LMIT 1997:11-10, 11-11, 11-42; Moor and Peterson 1999:7). The ATR Warm Waste Treatment Facility has a design flow rate of 567.8 liters (150 gallons) per minute or about 817,646 liters (216,000 gallons) per day (LMIT 1997:11-41, 11-43). Effluent discharges to the Warm Waste Evaporation Ponds totaled approximately 15.8 million liters (4.17 million gallons) in 1998 (French, Tallman, and Taylor 1999a:TRA-8).

Nonradiological process waste effluents (primary ATR secondary cooling water) collect at the cold well sump (Test Reactor Area–703) and sampling station (Test Reactor Area–764) where they are collected continuously, sampled daily, and pumped out to the Cold Waste Pond (Test Reactor Area–702) located outside the Test Reactor Area fence. Sampling data indicate that during routine operation, the Test Reactor Area cold waste effluent is characterized as nonhazardous industrial wastewater (LMIT 1997:11-10–11-12; Moor and Peterson 1999:7; Saffle et al. 2000:7-6, 7-7). Approximately 793.7 million liters (209.67 million gallons) of process wastewater was discharged to the Cold Waste Pond in 1998 (French, Tallman, and Taylor 1999a:TRA-5). Waste management activities and facilities are discussed in greater detail under Section 3.3.11.

Flooding scenarios that involve the failure of MacKay Dam have been evaluated and the results indicate that flood waters would not reach ATR, even if the failure was concurrent with the probable maximum flood (Figure 3–7). The effects of intense local precipitation and snowmelt runoff have also been evaluated and are not expected to result in flood damage to ATR because the reactor building main floor is at a higher elevation than its surroundings (LMIT 1997:2-47-2-51).

The 1998 USGS and 1999 Bureau of Reclamation flood studies described earlier also evaluated the potential for flooding at Test Reactor Area with the results indicating that none of the scenarios evaluated would result in inundation of the Test Reactor Area.

#### 3.3.4.2 Groundwater

Aquifers are classified by Federal and state authorities according to use and quality. The Federal classifications include Classes I, IIA, IIB, and III groundwater. Class I groundwater is either the sole source of drinking water or is ecologically vital. Classes IIA and IIB are current or potential sources of drinking water or other beneficial use, respectively. Class III is not considered a potential source of drinking water and is of limited beneficial use.

##### 3.3.4.2.1 General Site Description

The Snake River Plain aquifer is classified by EPA as a Class I sole source aquifer. It lies below the INEEL site and covers about 2,486,000 hectares (6,143,000 acres) in southeastern Idaho. This aquifer serves as the primary drinking water source in the Snake River Basin and is believed to contain 1.2 quadrillion to 2.5 quadrillion liters (317 trillion to 660 trillion gallons) of water. The aquifer consists of 610 to 3,048 meters (2,000 to 10,000 feet) of interbedded sediments, lava flows, and rhyolite. Recharge of the groundwater comes from Henry's Fork of the Snake River, Big Lost River, Little Lost River, and Birch Creek. Rainfall and snowmelt also contribute to the aquifer's recharge (DOE 1996b:3-115–3-117). Groundwater generally flows laterally at a rate of 1.5 to 6.1 meters (5 to 20 feet) per day. Groundwater flow is toward the south-southwest. It emerges in springs along the Snake River from Milner to Bliss, Idaho. Depth to the groundwater table ranges from about 60 meters (200 feet) below ground in the northeast corner of the site, to about 300 meters (1,000 feet) in the southeast corner (DOE 1995a:4.8-5; 1996b:3-117). Perched water tables also occur below the site. These perched water tables tend to slow the migration of pollutants that might otherwise reach the Snake River Plain aquifer (DOE 1996b:3-117). Perched water tables have been detected beneath INTEC and the Test Reactor Area mainly attributable to disposal ponds (DOE 1995a:4.8-8).

INEEL has a large network of monitoring wells that are maintained and monitored by USGS. This network includes 125 observation wells in the Snake River Plain aquifer and 45 drilled to monitor perched aquifers. An additional 120 auger holes have been drilled for monitoring shallow perched groundwater (Saffle et al. 2000:3-34, 3-35). INEEL's management and operations contractor also routinely monitors drinking water quality via 17 production wells and 10 distribution systems (Saffle et al. 2000:3-27).

Historical waste disposal practices have produced localized plumes of radiochemical and chemical constituents in the Snake River Plain Aquifer at INEEL. Of principal concern over the years has been the movements of the tritium and strontium-90 plumes. The general extent of these plumes beneath INEEL are shown in **Figure 3–8**.

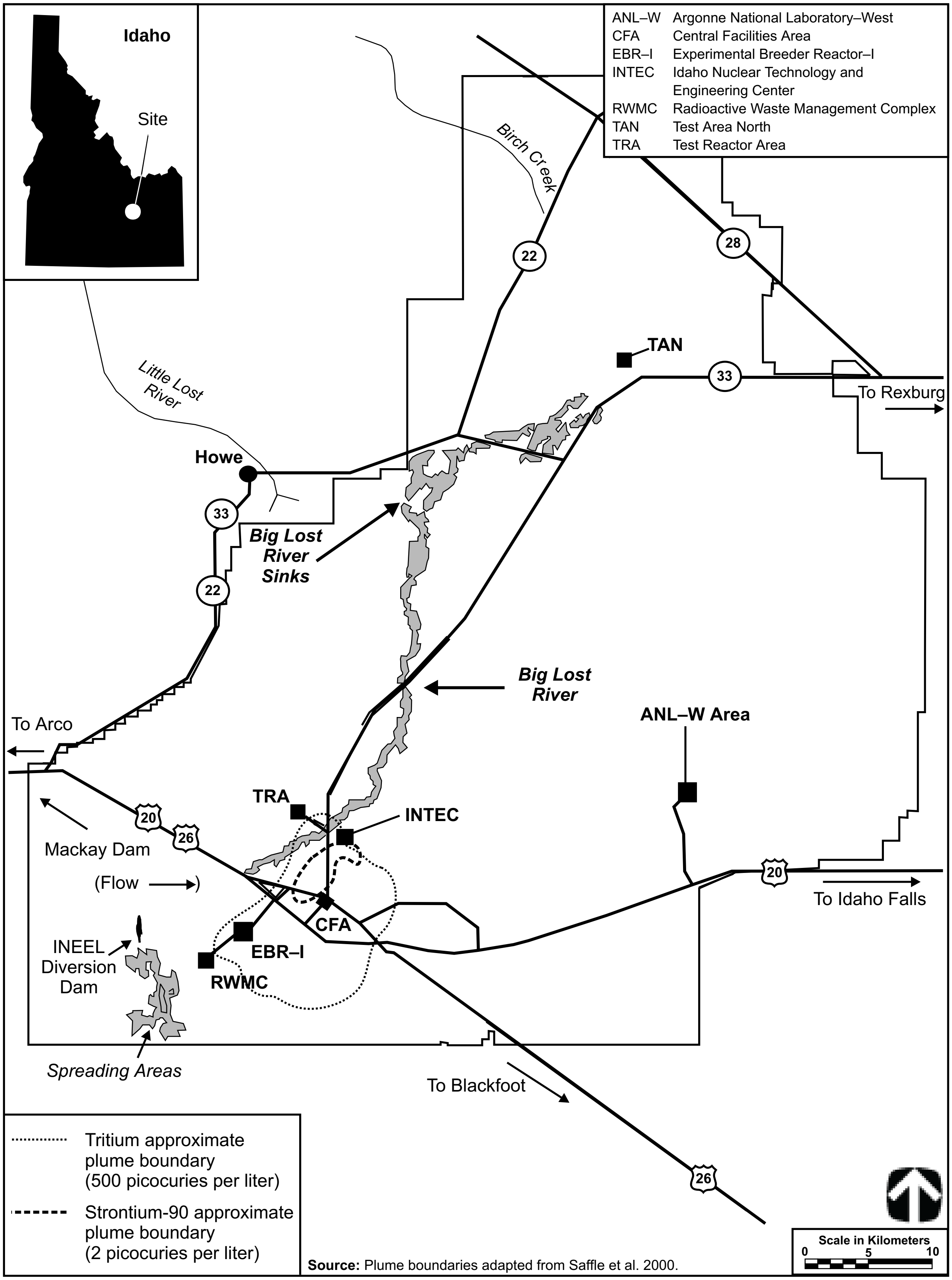


**Figure 3–8 Extent of Tritium and Strontium-90 Plumes within the Snake River Plain Aquifer on the Idaho National Engineering and Environmental Laboratory (1995)**

The main sources of tritium contamination of groundwater have been the injection of wastewater through the INTEC disposal well and the discharge of wastewater to the infiltration/percolation ponds at INTEC and Test Reactor Area. Since 1984, wastewater has been discharged only to the infiltration ponds, and since 1993 principally to lined evaporation ponds at the Test Reactor Area. The extent of the tritium contamination plume has remained about the same since 1991; however, concentrations in well water within the plume have decreased significantly. This is attributed to radioactive decay and a decrease in tritium disposal rates (Saffle et al. 2000:6-10, 6-12, 6-13).

The extent of the strontium-90 contaminant plume, also originating from INTEC, as well as the concentrations of strontium-90 have remained essentially constant since 1991. This is attributed to a lack of groundwater recharge from the Big Lost River that would otherwise dilute concentrations, and to the disposal of other chemicals in the INTEC infiltration ponds which may have decreased strontium-90 adsorption to soil and rock causing more to remain in the liquid phase (Saffle et al. 2000:6-13). Other known contaminants include cesium-137, iodine-129, strontium-90, and nonradioactive compounds such as trichloroethylene. Components of nonradioactive waste entered the aquifer as a result of past waste disposal practices. Elimination of groundwater injection exemplifies a change in disposal practices that has reduced the amount of these constituents in the groundwater (DOE 1996b:3-117, 3-119). Information on more recent groundwater monitoring and chemical analysis is presented in the annual site environmental report (Saffle et al. 2000).

From 1982 to 1985, INEEL used about 7.9 billion liters (2.1 billion gallons) per year from the Snake River Plain aquifer, the only source of water at INEEL. This represents less than 0.3 percent of the groundwater withdrawn from that aquifer. Since 1950, DOE has held a Federal Reserved Water Right for the INEEL site that permits a pumping capacity of approximately 2.3 cubic meters (80 cubic feet) per second, with a maximum water consumption of 43 billion liters (11.4 billion gallons) per year. Total groundwater withdrawal at INEEL historically averages between 15–20 percent of that permitted amount (DOE 1996b:3-119; Moor and Peterson 1999:6). In 1998, INEEL's production well system withdrew a total of about 4.83 billion liters (1.276 billion gallons) of water. Most of the groundwater withdrawn for use by INEEL facilities is returned to the subsurface via percolation ponds (French, Tallman, and Taylor 1999a:v).

### 3.3.4.2.2 Locations of Proposed Activities

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Water for INTEC is supplied by two deep wells (CPP–01 and CPP–02) in the northwest corner of the area. The wells are about 180 meters (590 feet) deep and about 36 centimeters (14 inches) in diameter (Abbott, Crockett, and Moor 1997:9, 13). These wells can each supply up to approximately 11,400 liters per minute (3,000 gallons per minute) of water for use in the INTEC fire water, potable water, treated water, and demineralized water systems (Werner 1997). INTEC withdrew approximately 2.20 billion liters (581 million gallons) of groundwater in 1998 (French, Tallman, and Taylor 1999a:INTEC-12). Water use by individual facilities within INTEC (e.g., FDPF or CPP–651) is not generally metered (Folk 2000). Pumping has little effect on the level of the groundwater, because the withdrawals are small relative to the volume of water in the aquifer and the amount of recharge available. The production wells at INTEC have historically contained measurable quantities of strontium-90 (Barghusen and Feit 1995:2.3-23–2.3-29).

Water from the potable production well system at INTEC was sampled and analyzed in 1998 for lead, copper, and nitrogen as nitrate, with maximum levels measuring 0.004, 0.3, and 2.0 milligrams per liter, respectively. None of these constituents were above the EPA maximum contaminant levels or the State of Idaho drinking water limits of 0.015, 1.3, and 10 milligrams per liter, respectively. Also, routine sampling and analysis in 1998 of the potable water distribution system serving INTEC for purgeable organic compounds revealed the presence of total trihalomethanes (i.e., trichloromethane [chloroform], dibromochloromethane, bromodichloromethane, and tribromomethane [bromoform]) and total xylenes at maximum levels of 11.3 and 0.3 micrograms per liter, respectively. However, these concentrations are well below the corresponding maximum contaminant levels for these contaminants of 100 and 10,000 micrograms per liter. Monitoring was also conducted in 1998 for radiochemical contaminants in INEEL production well and distribution systems. Of the 59 samples analyzed in 1998, seven revealed detectable gross alpha activity with the highest level (7 picocuries per liter) at INEEL from the INTEC distribution system. This is below the maximum contaminant level of 15 picocuries per liter. Tritium was also detected in several wells and distribution systems sampled in 1998. The maximum tritium concentration was 15,700 picocuries per liter (maximum contaminant level of 20,000 picocuries per liter) in the Central Facilities Area; the maximum concentration measured from an INTEC production well was 500 picocuries per liter (Saffle et al. 2000:6-10–15).

Purgeable (volatile) organics such as 1,1-dichloroethylene, toluene, and 1,1,1-trichloroethane have also historically been detected in monitoring wells within and near INTEC but at levels below maximum contaminant levels. Maximum values for tritium in samples from INTEC wells previously averaged 23,700 picocuries per liter, and maximum strontium-90 values averaged 53 picocuries per liter (Abbott, Crockett, and Moor 1997:11, 12). These values exceed the drinking water standards for tritium and strontium-90 of 20,000 picocuries per liter and 8 picocuries per liter, respectively. Selected USGS monitoring wells were sampled in 1998 for volatile organics with measurable quantities found in four wells downgradient (southwest) of INTEC. Contaminants found included 1,1,1-trichloroethane (maximum contaminant level of 200 micrograms per liter) in two wells at a maximum concentration of 0.4 micrograms per liter and dichlorodiflouromethane in four wells at a maximum concentration of 0.2 micrograms per liter (no established maximum contaminant level) (Saffle et al. 2000:6-8, 6-9). Based on the most recently published data for USGS monitoring wells, concentrations in the tritium plume originating at INTEC have continued to decrease with the concentration in well 77 south of INTEC decreasing from about 41,700 picocuries per liter in 1991 to 25,100 picocuries per liter in 1995. In contrast, strontium-90 concentrations have remained relatively constant since 1991 with concentrations between 1992 and 1995 ranging from 2.6 to 76 picocuries per liter. Nevertheless, while sampling has historically found detectable levels of strontium-90 in INTEC production wells, no strontium-90 was detected in INTEC production wells based on 1998 sampling results (Saffle et al. 2000:6-12–6-14). The general extent of the tritium and strontium-90 plumes is depicted in Figure 3–8.

#### TEST REACTOR AREA

All water used at Test Reactor Area is groundwater from the Snake River Plain aquifer tapped by three deep wells (TRA-01, TRA-02, and TRA-03). The depth to the groundwater at the Test Reactor Area is approximately 140 meters (460 feet). In general, Test Reactor Area, encompassing the ATR complex, uses approximately 190 million liters (50 million gallons) per month of water (Moor and Peterson 1999:6; LMIT 1997:2-59). In 1998, groundwater withdrawals from these three wells for Test Reactor Area uses totaled approximately 1.80 billion liters (475.5 million gallons) (French, Tallman, and Taylor 1999a:TRA-11). For 1999, total groundwater production was similar at about 1.78 billion liters (471 million gallons) (Perry 2000). Water use by individual facilities within the Test Reactor Area is not generally metered (Folk 2000).

As part of routine potable production well system monitoring, water from the Test Reactor Area distribution system was sampled and analyzed in 1998 for copper and nitrogen as nitrate, with concentrations measuring 1.2 and 1.1 milligrams per liter, respectively; results were below the established maximum contaminant levels (Saffle et al. 2000:6-11, 6-12). In 1998, the Test Reactor Area distribution system was also monitored for purgeable organics such as total trihalomethanes with a maximum detected concentration of 0.3 micrograms per liter, below the maximum contaminant level of 100 micrograms per liter. The tritium concentration measured in the Test Reactor Area potable water distribution system during 1998 was much lower than at INTEC and other sites with a maximum concentration of 30 picocuries per liter (maximum contaminant level of 20,000 picocuries per liter). USGS monitoring well data for tritium indicate that tritium concentrations continue to decrease, as observed near INTEC, with the concentration in well 65 south of the Test Reactor Area decreasing from about 37,800 picocuries per liter in 1991 to 21,200 picocuries per liter in 1995 (Saffle et al. 2000:6-12, 6-15).

### 3.3.5 Geology and Soils

Geologic resources are consolidated or unconsolidated earth materials, including ore and aggregate materials, fossil fuels, and significant landforms. Soil resources are the loose surface materials of the earth in which plants grow, usually consisting of disintegrated rock, organic matter, and soluble salts.

#### 3.3.5.1 General Site Description

INEEL is on the northwestern edge of the eastern Snake River Plain that is bounded on the north and south by north to northwest trending mountains and valleys of the Basin and Range physiographic province (DOE 1999h:4.6-1; LMIT 1997:2A-3). The upper 1 to 2 kilometers (0.6 to 1.2 miles) of the crust beneath INEEL is composed of a sequence of Quaternary age (recent to 2 million years old) basalt lava flows and poorly consolidated sedimentary interbeds collectively called the Snake River Group. The sediments are composed of fine-grained silts that were deposited by wind; silts, sands, and gravels deposited by streams; and clays, silts, and sands deposited in lakes. Rhyolitic (granite-like) volcanic rocks of unknown thickness lie beneath the basalt sediment sequence. The rhyolitic volcanic rocks were erupted between 4.3 and 6.5 million years ago during the upper Tertiary Period (Barghusen and Feit 1995:2.3-17; LMIT 1997:2A-15, 2A-16). The variability of the volcanic-sedimentary sequences underlying INEEL is illustrated by logs of deep drill holes completed at INEEL (**Figure 3–9**). Lava tubes, which could have similar adverse effects as karst, occur in the INEEL area (Abbott, Crockett, and Moor 1997:10).

Within INEEL, economically viable sand, gravel, pumice, silt, clay, and aggregate resources exist. Several quarries supply these materials to various onsite construction and maintenance projects (DOE 1999h:4.6-4). Geothermal resources are potentially available in parts of the Eastern Snake River Plain, but neither of two boreholes drilled near INTEC encountered rocks with significant geothermal potential (Abbott, Crockett, and Moor 1997:12).

The Arco Segment of the Lost River Fault is thought to terminate about 7 kilometers (4.3 miles) from the INEEL boundary. The Howe Segment of the Lemhi Fault terminates near the northwest boundary of the site (LMIT 1997:2A-44, 2A-45, 2A-77) **(Figure 3–10)**. Both segments are considered capable. A capable fault is one that has had movement at or near the ground surface at least once within the past 35,000 years, or recurrent movement within the past 500,000 years (10 CFR Part 100, Appendix A).

The seismic characteristics of the Eastern Snake River Plain and the adjacent Basin and Range Province are different; the Snake River Plain has historically experienced few and small earthquakes (DOE 1999h:4.6-1). Monitoring by the INEEL seismic network has detected relatively few microearthquakes (magnitude less than 1.5) as having occurred on or near the site (Barghusen and Feit 1995:2.3-17; Jackson et al. 1993:680–695). Since 1973, there have been a total of nine small earthquakes (ranging in magnitude from 3.0 to 3.6) recorded within a radius of 90 kilometers (56 miles) of central INEEL (INTEC and Test Reactor Area), with none closer than 75 kilometers (47 miles) (USGS 2000c).

The largest historic earthquake near INEEL took place in October 1983, about 90 kilometers (56 miles) to the northwest, near Borah Peak in the Lost River Range. It occurred on the middle portion of the Lost River Fault. The earthquake had a surface-wave magnitude of 7.3 (moment magnitude of 6.9) producing peak horizontal accelerations of 0.022g to 0.078g at INEEL (DOE 1999h:E-2-1; Jackson 1985:385; USGS 2000c). The reported Modified Mercalli Intensity was VII at the event's epicenter (USGS 2000c). The Test Reactor Area

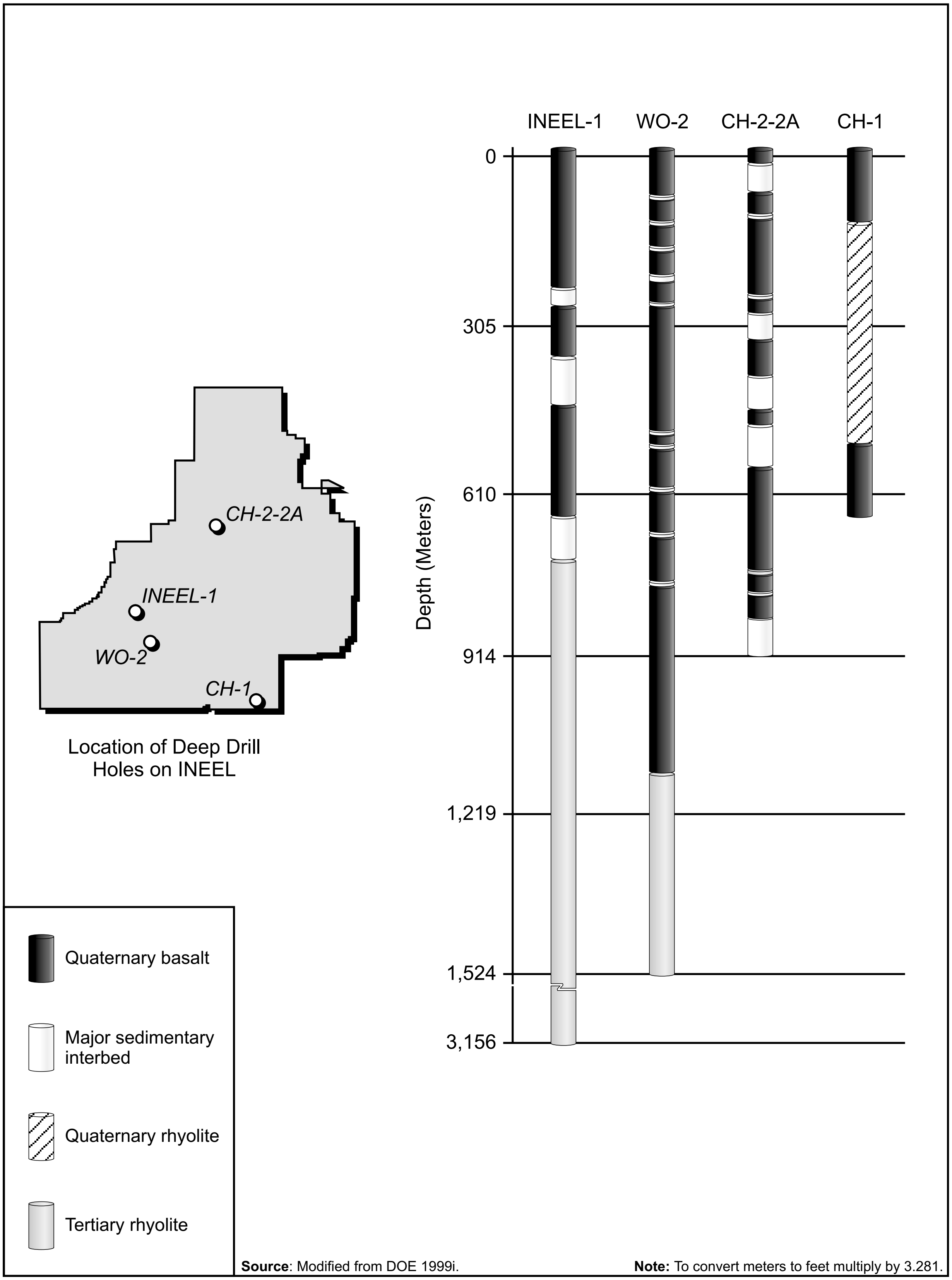


**Figure 3–9 Lithologic Logs of Deep Drill Holes on Idaho National Engineering and Environmental Laboratory**

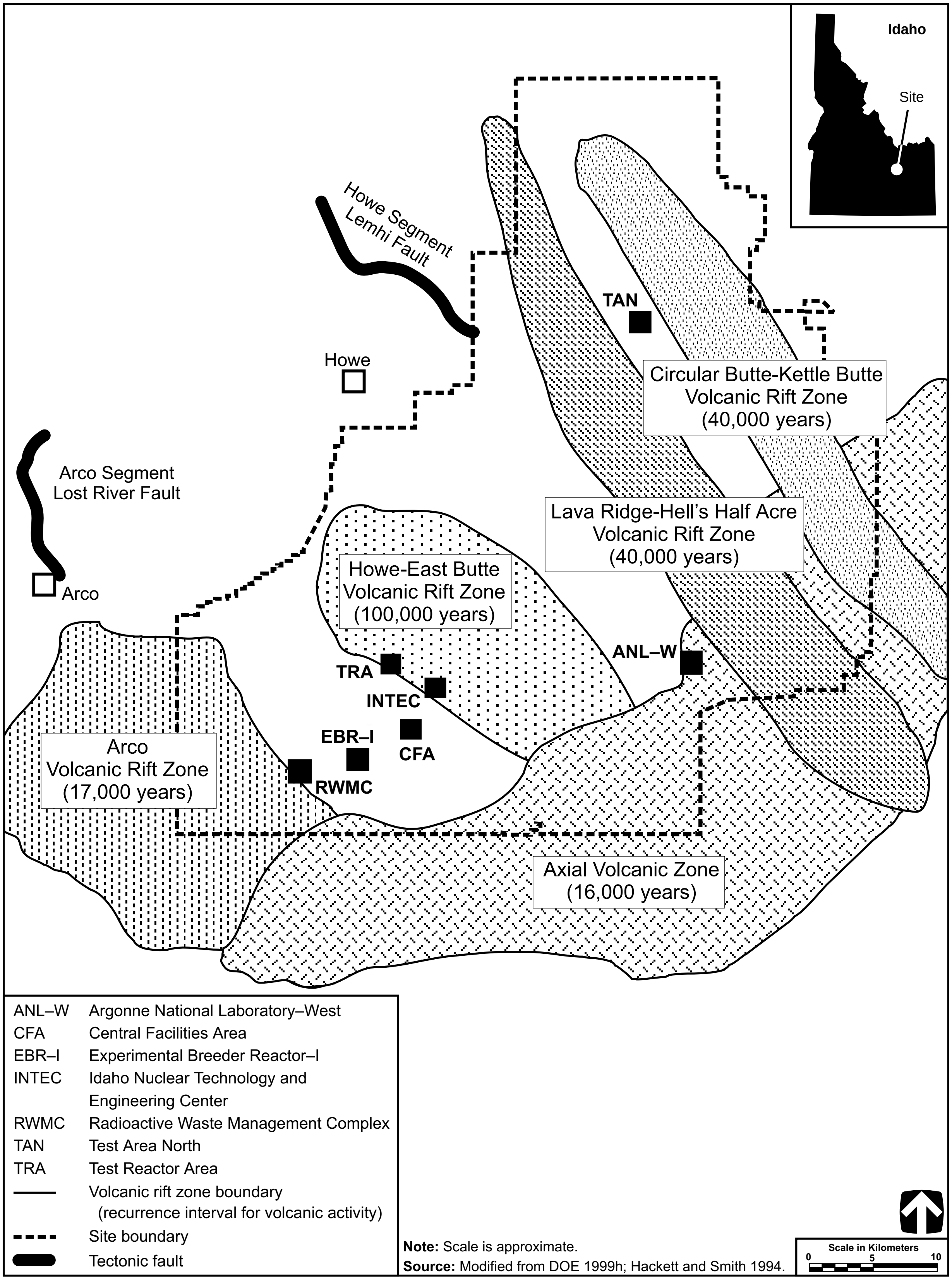


**Figure 3–10 Major Geologic Features of the Idaho National Engineering and Environmental Laboratory**

(i.e., ATR) experienced a Modified Mercalli Intensity of VI during this event with no damage to ATR found upon inspection (LMIT 1997:2A-29). An earthquake with a maximum horizontal acceleration of 0.15g is calculated to have an annual probability of occurrence of 1 in 5,000 at a central INEEL location (Barghusen and Feit 1995:2.3-17).

As discussed in more detail in Section 3.2.5.1, USGS has developed new seismic hazard maps as part of the National Seismic Hazard Mapping Project that are based on response spectral acceleration. These maps have been adapted for use in the new *International Building Code* (ICC 2000) (Figures 1615 (1) and 1615(2) in the code) and depict maximum considered earthquake ground motion of 0.2- and 1.0-second spectral response acceleration, respectively, based on a 2 percent probability of exceedance in 50 years. INEEL lies within the 0.35g to 0.40g mapping contours for a 0.2-second spectral response acceleration and the 0.10g to 0.15g contours for a 1.0-second spectral response acceleration.

Basaltic volcanic activity occurred from about 2,100 to 4 million years ago in the INEEL site area. Although no eruptions have occurred on the Eastern Snake River Plain during recorded history, lava flows of the Hell's Half Acre lava field erupted near the southern INEEL boundary as recently as 5,400 years ago. The most recent eruptions within the site area occurred about 2,100 years ago 30 kilometers (19 miles) southwest of the site at the Craters of the Moon Wilderness Area. Five volcanic zones have been identified on INEEL. The estimated recurrence interval for volcanism in these zones ranges from 16,000 to 100,000 years (DOE 1999h:4.6-3, 4.6-4; Hackett and Smith 1994:9, 12, 14, 20). These zones are depicted in Figure 3–10.

Four basic soilscapes exist at INEEL: river-transported sediments deposited on alluvial plains, fine-grained sediments deposited into lake or playa basins, colluvial sediments originating from bordering mountains, and wind-blown sediments over lava flows. The alluvial deposits follow the courses of the modern Big Lost River and Birch Creek. The playa soils are in the north-central part of the site. The colluvial sediments are along the western edge of INEEL. Wind-blown sediments (silt and sand) covering lava plains occupy the rest of the landscape of the site (DOE 1997b:52–54). The thickness of surfical sediments ranges from less than 0.3 meters (1 foot) at basalt outcrops east of INTEC to 95 meters (312 feet) near the Big Lost River sinks (DOE 1999h:4.6-1). No prime farmland lies within INEEL boundaries (DOE 1999e:3-71).

### 3.3.5.2 Locations of Proposed Activities

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The nearest capable fault to INTEC is the Howe Segment of the Lemhi Fault, located about 19 kilometers (12 miles) north of the site (Abbott, Crockett, and Moor 1997:10; LMIT 1997:2A-82). Surficial geologic materials at INTEC include alluvial materials deposited by the Big Lost River. These alluvial deposits are a mixture of gravel, sand, and silt ranging in thickness from approximately 7.6 to 19.8 meters (25 to 65 feet) and locally interbedded with silt and clay deposits up to 2.9 meters (9.5 feet) thick (DOE 1999i:4-31). These surficial materials overlie the interbedded basaltic lavas of the Snake River Group. While lava tubes do occur in the INEEL area, extensive drilling in the INTEC area has not revealed any lava tubes below the site. All soil near INTEC was originally fine loam over a sand or sand-cobble mix deposited in the floodplain of the Big Lost River. However, all natural soils within INTEC fences have been disturbed. The soils beneath INTEC area are not subject to liquefaction because of the high content of gravel mixed with the alluvial sands and silts. In addition, the sediments are not saturated (Abbott, Crockett, and Moor 1997:10, 12; LMIT 1997:2A-83).

**TEST REACTOR AREA**

The nearest capable fault to the Test Reactor Area is the Howe Segment of the Lemhi Fault, which is about 19 kilometers (12 miles) north-northeast of ATR (LMIT 1997:2A-82). Surficial materials within the site area, like INTEC, consist of Big Lost River alluvium comprised mostly of gravel, gravelly sands, and sands ranging from 9 to 15 meters (30 to 50 feet) in depth. A relatively thin layer of silt and clay underlies the alluvium in some locations creating a low-permeability layer at the basalt bedrock interface. These sediments overlie the interbedded basalts of the Snake River Group, with basaltic rock exposed at the surface to the north and west of the Test Reactor Area. The sedimentary interbeds of the Snake River Group consist mainly of silts, clayey silts, and sandy silts (LMIT 1997:2A-17, 2A-18). There is no potential for unstable conditions due to lava tubes at the site. Soils on the site, although highly disturbed by existing facilities, are derived from the Big Lost River alluvium. The soils and sediments are not subject to liquefaction (LMIT 1997:2A-17, 2A-83; Moor and Peterson 1999:7).

### 3.3.6 Ecological Resources

Ecological resources include terrestrial resources, wetlands, aquatic resources, and threatened and endangered species. Material presented in this section, unless otherwise noted, is from the *Storage and Disposition PEIS* (DOE 1996b).

#### 3.3.6.1 Terrestrial Resources

This section addresses the plant and animal communities of INEEL and includes a plant community map of the site. Terrestrial resources are described for the site as a whole, as well as for the proposed facility locations.

##### 3.3.6.1.1 General Site Description

INEEL lies in a cool desert ecosystem dominated by shrub-steppe communities. Most land within the site is relatively undisturbed and provides important habitat for species native to the region. Facilities and operating areas occupy 2 percent of INEEL; approximately 60 percent of the area around the periphery of the site is grazed by sheep and cattle. Although sagebrush communities occupy about 80 percent of INEEL, a total of 20 plant communities have been identified (**Figure 3–11**). In total, 398 plant taxa have been documented at INEEL.

The interspersion of low and big sagebrush communities in the northern portion of INEEL, and juniper communities in the northwestern and southeastern portions of the site are considered sensitive habitats. The former provides critical winter and spring range for sage grouse and pronghorn, while the latter is important to nesting raptors and songbirds. Riparian vegetation, primarily cottonwood and willow along the Big Lost River and Birch Creek provides nesting habitat for hawks, owls, and songbirds. Recently, approximately 29,950 hectares (74,000 acres) of open space in the north central portion of the site have been designated as the INEEL Sagebrush Steppe Ecosystem Reserve (DOE 1999g). The area represents some of the last sagebrush steppe habitat in the United States and provides habitat for numerous rare and sensitive plants and animals.

INEEL supports numerous animal species, including two amphibian, 11 reptile, 225 bird, and 44 mammal species (Reynolds 1999). Common animals on INEEL include the short-horned lizard, gopher snake, sage sparrow, Townsend's ground squirrel, and black-tailed jackrabbit. Important game animals include the sage grouse, mule deer, elk, and pronghorn. During some winters, 4,500 to 6,000 pronghorn, or about 30 percent of Idaho's total pronghorn population, may be found on INEEL. Pronghorn wintering areas are located in the northeastern portion of the site, in the area of the Big Lost River sinks, in the west-central portion of the site

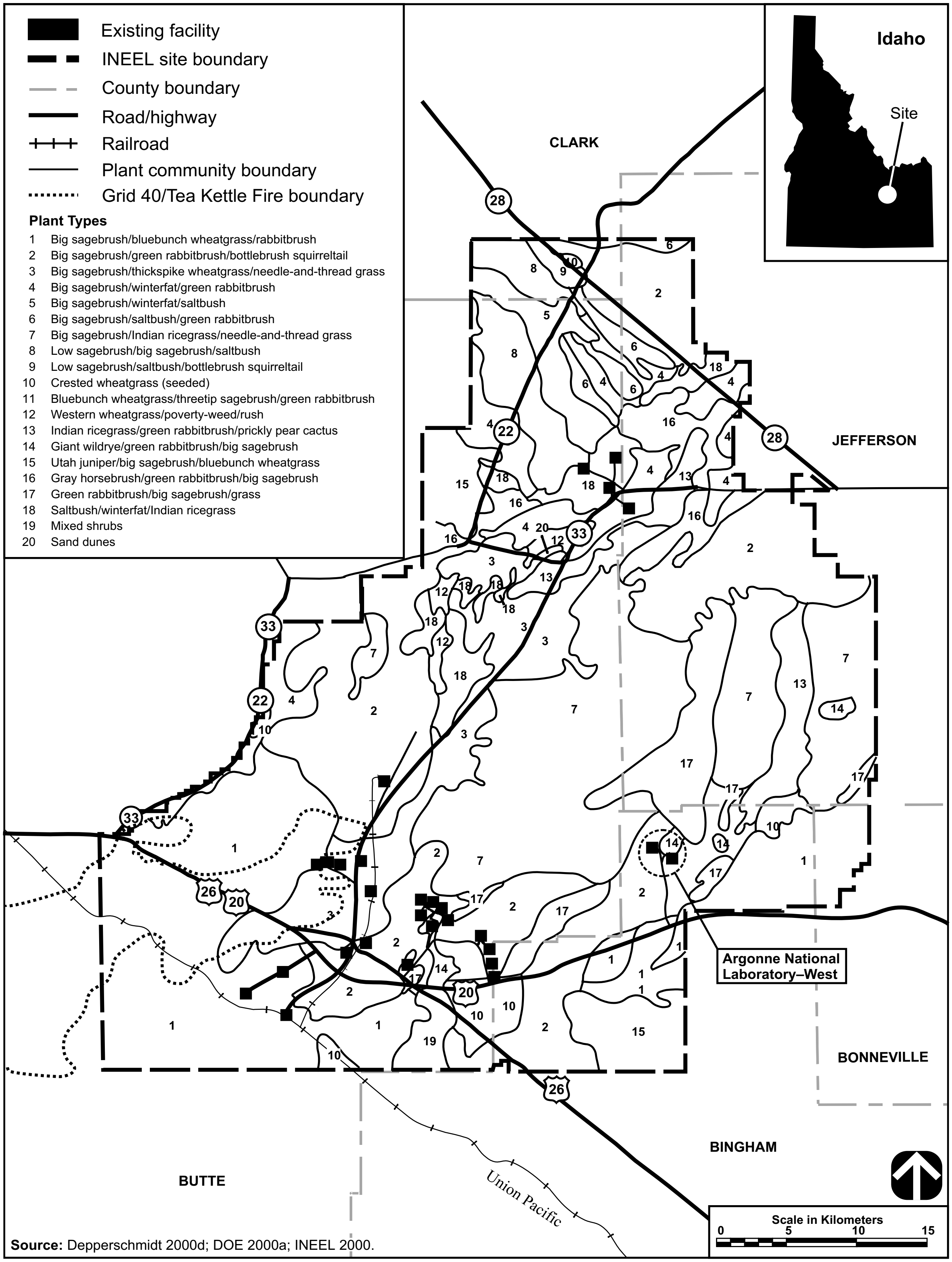


**Figure 3–11 Distribution of Plant Communities at Idaho National Engineering and Environmental Laboratory**

along the Big Lost River, and in the south-central portion of the site (DOE 1996b:3-125). Hunting elk and pronghorn is permitted only within 0.8 kilometers (0.5 miles) of the site boundary on INEEL lands adjacent to agricultural lands (DOE 1997b). Numerous raptors, such as the golden eagle and prairie falcon, and carnivores, such as the coyote and mountain lion, are also found on INEEL. A variety of migratory birds have been found at INEEL.

On July 27 and 28, 2000, a wildfire, known as the Grid 40/Tea Kettle Fire, burned across the southwestern portion of INEEL (Figure 3–11). The total burn area encompassed an estimated 19,830 hectares (49,000 acres) (Depperschmidt 2000a). The immediate effect of the fire on ecological resources on INEEL, aside from plants and animals that perished as a direct result of the fire, was the displacement of animals from their habitat. A longer-term concern for plant communities affected by fire and the animals that depend on them is that nonnative, invasive plant species may have a better competitive advantage at the expense of the native grasses and shrubs.

#### 3.3.6.1.2 Locations of Proposed Activities

##### IDAHO NUCLEAR TECHNOLOGY AND ENGINEERING CENTER

INTEC is within an area dominated by big sagebrush communities. The site itself is developed with little vegetation, other than that associated with landscaped areas. In fact, bare ground comprises 85 percent of the site, while facilities and pavement make up 13 percent of the area. Animal species present at INTEC are primarily limited to those adapted to disturbed industrial areas, such as mice, rabbits, sparrows, finches, and lizards (DOE 1999e:3.3.8.1.2). Wastewater ponds associated with INTEC attract a variety of wildlife (Cieminski and Flake 1995:105).

##### TEST REACTOR AREA

Vegetative communities in which big sagebrush is the dominant plant occur in the vicinity of the Test Reactor Area (Figure 3–11). Grasslands comprised primarily of wheat grasses also occur in the area. The Test Reactor Area itself is a developed area with little or no vegetation. Lawns and ornamental vegetation are used by a number of species such as songbirds, raptors, rabbits, and mule deer. Ponds in and around the Test Reactor Area are known to be frequented by waterfowl, shorebirds, swallow, passerines, and to a limited extent, by raptors such as the American kestrel, ferruginous hawk, and northern harrier. Mammals have been observed at the disposal ponds despite perimeter fences, and amphibians have been reported at Test Reactor Area industrial waste and sewage disposal ponds (Moor and Peterson 1999:9).

### 3.3.6.2 Wetlands

Wetlands include "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR Section 328.3). Wetlands are described for INEEL as a whole, as well as for the proposed facility locations.

#### 3.3.6.2.1 General Site Description

National Wetland Inventory maps prepared by the U.S. Fish and Wildlife Service have been completed for most of INEEL. These maps indicate that the primary wetland areas are associated with the Big Lost River, the Big Lost River spreading areas, and the Big Lost River sinks, although smaller (less than about 0.4 hectares [1 acre]) isolated wetlands also occur. Wetlands associated with the Big Lost River are classified as riverine/intermittent, indicating a defined stream channel with flowing water during only part of the year. The only area of jurisdictional wetland is the Big Lost River sinks (Evans et al. 1998:2-7). Wetland areas on INEEL are shown in Figure 3–11.

#### 3.3.6.2.2 Locations of Proposed Activities

**IDAHO NUCLEAR TECHNOLOGY AND ENGINEERING CENTER**

The Big Lost River spreading areas and Big Lost River sinks are seasonal wetlands and are approximately 14 kilometers (8.7 miles) southwest, and 25 kilometers (15.5 miles) north of INTEC. These areas can provide more than 809 hectares (2,000 acres) of wetland habitat during wet years. Riparian wetland vegetation exists along the Big Lost River and along Birch Creek. Plants found along the Big Lost River, which is about 0.8 kilometer (0.5 mile) northwest of the site, are in poor condition due to recent years of only intermittent flows. There are no wetlands within the immediate INTEC area (Abbott, Crockett, and Moor 1997:15).

**TEST REACTOR AREA**

The Big Lost River, Big Lost River spreading areas, and the Big Lost River sinks are about 2 kilometers (1.2 miles) southeast, 13 kilometers (8 miles) southwest, and 21 kilometers (13 miles) north-northeast of the Test Reactor Area. Natural wetlands do not occur in the immediate vicinity of the Test Reactor Area.

### 3.3.6.3 Aquatic Resources

Aquatic resources at INEEL are described for the site as a whole, as well as for the proposed facility location.

#### 3.3.6.3.1 General Site Description

Aquatic habitat on INEEL is limited to the Big Lost River, Little Lost River, Birch Creek, and a number of liquid waste disposal ponds. All three streams are intermittent and drain into four sinks in the north-central part of the site. Six species of fish have been observed within water bodies located on site (Reynolds 1999). Species observed in the Big Lost River include: brook trout, rainbow trout, mountain whitefish, speckled dace, shorthead sculpin, and kokanee salmon. The Little Lost River and Birch Creek, northwest and northeast of the Test Reactor Area, respectively, enter INEEL only during periods of high flow. Surveys of fish in these surface water bodies have not been conducted. The liquid waste disposal ponds on INEEL, while considered aquatic habitat, do not support fish.

#### 3.3.6.3.2 Locations of Proposed Activities

**IDAHO NUCLEAR TECHNOLOGY AND ENGINEERING CENTER**

There is no natural aquatic habitat on the INTEC site. The nearest such habitat is the Big Lost River which is about 0.8 kilometer (0.5 mile) to the northwest. Disposal ponds in the vicinity of INTEC do not support populations of fish. However, these ponds do support a variety of aquatic invertebrates (Cieminski and Flake 1995).

**TEST REACTOR AREA**

Although a number of disposal ponds occur in the vicinity of the Test Reactor Area, they do not support populations of fish. Aquatic invertebrates, however, are supported by habitat provided by the ponds (Moor and Peterson 1999:9). The Big Lost River is 2 kilometers (1.2 miles) southeast of the Test Reactor Area.

### 3.3.6.4 Threatened and Endangered Species

Endangered species are those plants and animals in danger of extinction throughout all or a large portion of their range. Threatened species are those species likely to become endangered within the foreseeable future. Threatened and endangered species are described for INEEL as a whole, as well as for the proposed facility locations.

#### 3.3.6.4.1 General Site Description

Fifteen Federal and state-listed threatened, endangered, and other special status species occur, or possibly occur, on INEEL (see Table 4–18 of the *Idaho High-Level Waste Facilities Disposition Draft Environmental Impact Statement* [DOE 1999i). The bald eagle is listed by the U.S. Fish and Wildlife Service as threatened (but has been proposed to be delisted) and by the State of Idaho as endangered. The bald eagle has rarely been seen in the western and northern portions of INEEL. The gray wolf (listed endangered, experimental population) has been sighted several times on INEEL since 1993. On July 27 and 28, 2000, a wildland fire called the Grid 40/Tea Kettle fire burned across 19,830 hectares (49,000 acres) of the southwestern portion of INEEL. DOE is currently assessing the impacts of that fire on threatened and endangered species and species of concern (e.g., sage grouse) (Depperschmidt 2000a, 2000c). No critical habitat for threatened or endangered species, as defined in the Endangered Species Act, exists on INEEL. Consultation to comply with Section 7 of the Endangered Species Act was conducted with the U.S. Fish and Wildlife Service. Consultation was also conducted with the state. The results of these consultations are presented in Chapter 4.

#### 3.3.6.4.2 Locations of Proposed Activities

**IDAHO NUCLEAR TECHNOLOGY AND ENGINEERING CENTER**

No threatened, endangered or other special status plant or wildlife species have been recorded at or within 0.5 kilometer (0.3 mile) of INTEC (Abbott, Crockett, and Moor 1997:15). The common loon, listed by Idaho as a species of special concern, was observed once at a percolation pond during a 3-year study in the early 1990s (Werner 1997:7). Other state species of special concern potentially occurring in the vicinity of the site include the black tern, loggerhead shrike, northern goshawk, trumpeter swan, pygmy rabbit, and Townsend's western big-eared bat. A complete list of threatened, endangered, or other special status species potentially occurring in areas surrounding INTEC is provided in the *Surplus Plutonium Disposition EIS* (DOE 1999e).

**TEST REACTOR AREA**

No threatened, endangered, or other special status plant or wildlife species have been recorded at or near the Test Reactor Area. However, one federally listed species, the bald eagle, and a number of state-listed species of special concern potentially occur in the area. State species of special concern include the northern goshawk, loggerhead shrike, black tern, trumpeter swan, pygmy rabbit, and Townsend's western big-eared bat. Of these species, only the loggerhead shrike is commonly seen in areas surrounding the Test Reactor Area (Moor and Peterson 1999:10-11).

### 3.3.7 Cultural and Paleontological Resources

Cultural resources are human imprints on the landscape and are defined and protected by a series of Federal laws, regulations, and guidelines. INEEL has a well-documented record of cultural and paleontological resources. Guidance for the identification, evaluation, recordation, curation, and management of these resources is included in the *Idaho National Engineering Laboratory Management Plan for Cultural Resources (Final Draft)* (Miller 1995). Past studies, which covered 4 percent of the site, identified 1,506 cultural resource sites and isolated finds including 688 prehistoric sites, 38 historic sites, 753 prehistoric isolates, and 27 historic isolates (DOE 1996b). As of January 1998, approximately 7 percent of INEEL had been surveyed, raising the number of potential archeological sites to 1,839 (DOE 1999h). Most surveys have been conducted near major facility areas in conjunction with major modification, demolition, or abandonment of site facilities.

Cultural sites are often occupied continuously or intermittently over substantial time spans. For this reason, a single location may contain evidence of use during both historic and prehistoric periods. In the discussions that follow, the numbers of prehistoric and historic resources are presented. However, the sum of these resources may be greater than the total number of sites reported due to this dual-use history at sites. Therefore, where the total number of sites reported is less than the sum of prehistoric and historic sites, certain locations were used during both periods. DOE is currently evaluating the impacts to cultural resources from fire suppression activities during the Grid 40/Tea Kettle fire that burned across 19,830 hectares (49,000 acres) of the southwestern portion of INEEL on July 27 and 28, 2000 (Depperschmidt 2000a, 2000c).

### 3.3.7.1 Prehistoric Resources

Prehistoric resources are physical properties that remain from human activities that predate written records.

#### 3.3.7.1.1 General Site Description

Prehistoric resources identified at INEEL are generally reflective of Native American hunting and gathering activities. Resources appear to be concentrated along the Big Lost River and Birch Creek, atop buttes, and within craters or caves. They include residential bases, campsites, caves, hunting blinds, rock alignments, and limited-activity locations such as lithic and ceramic scatters, hearths, and concentrations of fire-affected rock. Most sites have not been formally evaluated for nomination to the National Register of Historic Places, but are considered to be potentially eligible. Given the rather high density of prehistoric sites at INEEL, additional sites are likely to be identified as surveys continue.

#### 3.3.7.1.2 Locations of Proposed Activities

**IDAHO NUCLEAR TECHNOLOGY AND ENGINEERING CENTER**

The INTEC area has been subjected to a number of archaeological survey projects over the past two decades. Most of these investigations have been concentrated around the perimeter of the site and along existing roadways or power line corridors. Survey coverage within 1 kilometer (0.6 mile) of Building 691, located roughly in the center of INTEC, is complete. Archaeological resources identified within the surveyed area include prehistoric isolates such as camp sites and isolated artifacts reflecting Native American hunting and gathering activities. These resources are not likely to yield additional information and are, therefore, not likely to be potentially eligible for National Register nomination (Abbott, Crockett, and Moor 1997:16).

**TEST REACTOR AREA**

A variety of archaeological survey projects have been completed in the Test Reactor Area. During a 1984 examination of a 100-meter-wide (328-foot-wide) corridor surrounding the fenced perimeter of the Test Reactor Area, no prehistoric resources were identified. It is also unlikely that undisturbed prehistoric resources are present within the fenced perimeter of the facility, although no specific archaeological surveys have been conducted inside the fence. Although no prehistoric sites are known to occur around the periphery of the Test Reactor Area, significant sites have been documented in the vicinity, including a multi-component archaeological site, and smaller Native American campsites (Moor and Peterson 1999:12).

### 3.3.7.2 Historic Resources

Historic resources consist of physical properties that postdate the existence of written records. In the United States, historic resources are generally considered to be those that date no earlier than 1492.

#### 3.3.7.2.1 General Site Description

Thirty-eight historic sites and 27 historic isolates have been identified at INEEL. These resources are representative of European-American activities, including fur trapping and trading, immigration, transportation, mining, agriculture, and homesteading, as well as more recent military and scientific/ engineering research and development activities. Examples of historic resources include Goodale's Cutoff (a spur of the Oregon Trail), remnants of homesteads and ranches, irrigation canals, and a variety of structures from the World War II era. The Experimental Breeder Reactor–I, the first reactor to achieve a self-sustaining chain reaction using plutonium instead of uranium as the principal fuel component, is listed on the National Register of Historic Places and is designated as a National Historic Landmark. Many other INEEL structures built between 1949 and 1974 are considered eligible for the National Register because of their exceptional scientific and engineering significance, and their major role in the development of nuclear science and engineering since World War II. Additional historic sites are likely to exist in unsurveyed portions of INEEL. Consultation to comply with Section 106 of the National Historic Preservation Act was initiated with the State Historic Preservation Office. The results of this consultation are presented in Chapter 4.

#### 3.3.7.2.2 Locations of Proposed Activities

**IDAHO NUCLEAR TECHNOLOGY AND ENGINEERING CENTER**

Two historic sites that may be eligible for nomination to the National Register of Historic Places, a homestead and nearby trash dump, have been identified near INTEC. These sites are potential sources of information on Carey Act–sponsored agricultural activities in the region. This act, which was passed in 1894, was designed to aid in the reclamation (through irrigation) and settlement of desert lands. In addition, six historic structures associated with INTEC have been identified. An historic resource inventory of all buildings within INTEC is being conducted and will likely identify additional historic structures built between 1949 and 1974 (Abbott, Crockett, and Moor 1997:16).

**TEST REACTOR AREA**

All three of the major reactors within the Test Reactor Area (the Materials Test Reactor, the Engineering Test Reactor, and ATR), along with numerous support facilities, are considered eligible for listing on the National Register of Historic Places. As a result of an historic building inventory conducted in 1997, 59 Test Reactor Area buildings are considered to be eligible for the National Register (Moor and Peterson 1999:13).

### 3.3.7.3 Native American Resources

Native American resources are sites, areas, and materials important to Native Americans for religious or heritage reasons. In addition, cultural values are placed on natural resources such as plants, which have multiple purposes within various Native American groups. Of primary concern are concepts of sacred space that create the potential for land use conflicts.

#### 3.3.7.3.1 General Site Description

Native American resources at INEEL are associated with the two groups of nomadic hunters and gatherers that used the region at the time of European-American contact: the Shoshone and Bannock. Both of these groups used the area that now encompasses INEEL, as they harvested plant and animal resources and obsidian from Big Southern Butte and Howe Point. Because INEEL is considered part of the Shoshone-Bannock Tribes' ancestral homeland, it contains many localities that are important for traditional, cultural, educational, and religious reasons. This includes not only prehistoric archaeological sites which are important in a religious or cultural heritage context, but also includes features of the natural landscape and air, plant, water, and animal resources that have special significance. Consultation was conducted with the Shoshone and Bannock Tribes. The results of this consultation are presented in Chapter 4.

#### 3.3.7.3.2 Locations of Proposed Activities

**IDAHO NUCLEAR TECHNOLOGY AND ENGINEERING CENTER**

Although INTEC and the surrounding area may contain Native American resources (Abbott, Crockett, and Moor 1997:16), it is unlikely that undisturbed Native American resources exist within the fenced perimeter of the site.

**TEST REACTOR AREA**

Over the past two decades, efforts have been underway to assemble complete inventories of cultural resources in the vicinity of major operating facilities at INEEL. A variety of survey projects have been completed near the Test Reactor Area, including a 1984 examination of a 100-meters-wide (328-foot-wide) corridor surrounding the fenced perimeter of the site. No Native American resources were identified within the surveyed area, and it is unlikely that undisturbed Native American resources are present within the fenced perimeter of the Test Reactor Area, although no specific surveys have been conducted. Cultural resource surveys in the vicinity of the Test Reactor Area have identified small Native American campsites, and an area that may be of traditional and cultural importance to the Shoshone-Bannock Tribes (Moor and Peterson 1999:12).

### 3.3.7.4 Paleontological Resources

Paleontological resources are the physical remains, impressions, or traces of plants or animals from a former geological age. Paleontological remains consist of fossils and their associated geologic information.

#### 3.3.7.4.1 General Site Description

The region encompassing INEEL has abundant and varied paleontological resources, including plant, vertebrate, and invertebrate remains in soils, lake and river sediments, and organic materials found in caves and archaeological sites. Vertebrate fossils recovered from the Big Lost River floodplain consist of isolated bones and teeth from large mammals of the Pleistocene or Ice Age. These fossils were discovered during excavations and well drilling operations. Fossils have been recorded in the vicinity of the Naval Reactors Facility. Occasional skeletal elements of fossil mammoth, horse, and camel have been retrieved from the Big Lost River diversion dam and Radioactive Waste Management Complex on the southwestern side of INEEL, and from river and alluvial fan gravels and Lake Terreton sediments near Test Area North (DOE 1999e). In total, 24 paleontological localities have been identified in INEEL (Miller 1995).

#### 3.3.7.4.2 Locations of Proposed Activities

**IDAHO NUCLEAR TECHNOLOGY AND ENGINEERING CENTER**

Vertebrate fossils recovered from the Big Lost River floodplain consist of isolated bones or teeth from large mammals of the Pleistocene or Ice Age. These fossils were discovered during excavations and well-drilling operations. A single mammoth tooth was salvaged during the excavation of a percolation pond located to the south of INTEC (Abbott, Crockett, and Moor 1997:16).

**TEST REACTOR AREA**

A mammoth tooth dating from the late Pleistocene has been recovered from the Test Reactor Area (Miller 1995:J-15).

### 3.3.8 Socioeconomics

Statistics for employment and regional economy are presented for the regional economic area, as defined in Appendix G.8, which encompasses 13 counties around INEEL located in Idaho and Wyoming. Statistics for population, housing, community services, and local transportation are presented for the region of influence, a four-county area in Idaho in which 94.4 percent of all INEEL employees reside, as shown in **Table 3–19**. In 1997, INEEL employed 8,291 persons (about 5.5 percent of the regional economic area civilian labor force) (DOE 1999e).

**Table 3–19 Distribution of Employees by Place of Residence in the INEEL Region of Influence, 1997**

| County | Number of Employees | Total Site Employment (percent) |
|---|---|---|
| Bonneville | 5,553 | 67.0 |
| Bingham | 1,077 | 13.0 |
| Bannock | 615 | 7.4 |
| Jefferson | 583 | 7.0 |
| Region of influence total | 7,828 | 94.4 |

**Source:** DOE 1999e.

#### 3.3.8.1 Regional Economic Characteristics

Between 1990 and 1996, the civilian labor force in the regional economic area increased 26 percent, to the 1996 level of 150,835. In 1996, the annual unemployment average in the regional economic area was 4.8 percent, which was slightly less than the annual unemployment average for Idaho (5.2 percent) and Wyoming (5.0 percent) (DOE 1999e).

In 1995, service activities represented the largest sector of employment in the regional economic area (27.1 percent). This was followed by retail trade (20.4 percent), and government (19.5 percent). The totals for these employment sectors in Idaho were 21.5 percent, 19.6 percent, and 18.7 percent, respectively. The totals for these employment sectors in Wyoming were 21.1 percent, 20.8 percent, and 25 percent, respectively (DOE 1999e).

#### 3.3.8.2 Population and Housing

In 1996, the region of influence population totaled 213,547. Between 1990 and 1996, the region of influence population increased by 10.6 percent, compared to a 17.5 percent increase in Idaho's population. Between

1980 and 1990, the number of housing units in the region of influence increased by 6.7 percent, compared to a 10.2 percent increase in Idaho. The total number of housing units in the region of influence in 1990 was 69,760. The 1990 region of influence homeowner vacancy rate was 2.1 percent, compared to Idaho's rate of 2 percent. The region of influence rental vacancy rate was 8.3 percent compared to Idaho's rate of 7.3 percent (DOE 1999e).

### 3.3.8.3 Community Services

#### 3.3.8.3.1 Education

In 1997, thirteen school districts providing public education in the INEEL region of influence were operating at capacities between 50 percent and 100 percent. Total student enrollment in the region of influence in 1997 was 50,168, and the student-to-teacher ratio in the region of influence averaged 18.8:1. In 1990, Idaho's average student-to-teacher ratio was 12.8:1 (DOE 1999e).

#### 3.3.8.3.2 Public Safety

In 1997, a total of 475 sworn police officers served the four-county region of influence. In 1997, the average region of influence officer-to-population ratio was 2.2 officers per 1,000 persons, compared to the 1990 state average of 1.5 officers per 1,000 persons. In 1997, 560 paid and volunteer firefighters provided fire protection services in the INEEL region of influence. The region of influence firefighter-to-population ratio in 1997 was 2.6 firefighters per 1,000 persons, compared to the 1990 state average of 1.2 firefighters per 1,000 persons (DOE 1999e).

#### 3.3.8.3.3 Health Care

In 1996, a total of 329 physicians served the region of influence. The average region of influence physician-to-population ratio was 1.5 physicians per 1,000 persons, compared to the 1996 state average of 1.7 physicians per 1,000 persons. In 1997, there were five hospitals serving the four-county region of influence. The hospital bed-to-population ratio was 4.6 hospital beds per 1,000 persons, compared to the 1990 state average of 3.3 hospital beds per 1,000 persons (DOE 1999e).

### 3.3.8.4 Local Transportation

Vehicular access to INEEL is provided by U.S. Routes 20 and 26 to the south, and State Routes 22 and 33 to the north. U.S. Routes 20 and 26, and State Routes 22 and 33 all share rights-of-way west of INEEL (Figure 3–6).

There are two road segments that could be affected by the alternatives considered in this NI PEIS; U.S. Route 20 from U.S. Routes 26 and 91 at Idaho Falls to U.S. Route 26 East, and U.S. Routes 20 and 26 from U.S. Route 26 East to State Routes 22 and 33.

There are at least 10 pending projects to be completed by the Idaho Transportation Department that could impact access into INEEL as well as within the INEEL site. The type of work includes laying new base, widening and rehabilitation, and pavement rehabilitation, which are all very extensive. Some projects only include a new seal coat, which can be completed in 2 weeks. The projects include: (1) a base and resurfacing and minor widening project scheduled for late in the summer of 2000 for U.S. Route 20 from Brunt Road to Cinder Butte Road; (2) a minor widening and pavement rehabilitation for State Highway 22 from the Butte County line to the Clark County line scheduled for October 2000; (3) a minor widening and rehabilitation and base resurfacing project for State Highway 33 on the INEEL site at the Test Reactor Area NE in Jefferson

County scheduled for October 2000; (4) a minor widening and restoration and paving rehabilitation project for State Highway 22 on the INEEL site from the junction of State Highway 33 to the Clark County line scheduled for July 2001; (5) a new seal coat will be placed on State Highway 33 at Terreton East and West scheduled after July 2000; (6) a new seal coat for U.S. Route 20 leading into the INEEL site at Arco East scheduled for October 2000; (7) a paving rehabilitation and restoration and new base and resurfacing for State Highway 22 located off site from the Jefferson County line to Mile Post 52.24 scheduled in July 2002; (8) a new seal coat for U.S. Route 20 leading into the site just above the Bonneville County line scheduled for October 2002; (9) a new seal coat for State Highway 22 leading into the site from the junction of State Highway 28 to Medicine Lodge scheduled for July 2003; (10) a new seal coat for State Highway 33 on the INEEL site from Mile Post 38.5 to the junction of State Highway 28 in Jefferson County scheduled for 2003 (Cole 2000).

DOE buses provide transportation between INEEL facilities and Idaho Falls for DOE and contractor personnel. The major railroad in the region of influence is the Union Pacific Railroad. The railroad's Blackfoot-to-Arco Branch provides rail service to the southern portion of INEEL. A DOE-owned spur connects the Union Pacific Railroad to INEEL by a junction at Scoville Siding. There are no navigable waterways within the region of influence capable of accommodating waterborne transportation of material shipments to INEEL. Fanning Field in Idaho Falls and Pocatello Municipal Airport in Pocatello provide jet air passenger and cargo service for both national and local carriers. Numerous smaller private airports are located throughout the region of influence (DOE 1999e).

### 3.3.9 Existing Human Health Risk

Existing human health risk issues include the determination of potentially adverse effects on human health that result from acute and chronic exposures to ionizing radiation and hazardous chemicals.

#### 3.3.9.1 Radiation Exposure and Risk

##### 3.3.9.1.1 General Site Description

Major sources and levels of background radiation exposure to individuals in the vicinity of INEEL are shown in **Table 3–20**. Annual background radiation doses to individuals are expected to remain constant over time. The total dose to the population, in terms of person-rem, changes as the population size changes. Background radiation doses are unrelated to INEEL operations.

Releases of radionuclides to the environment from INEEL operations provide another source of radiation exposure to individuals in the vicinity of INEEL. Types and quantities of radionuclides released from INEEL operations in 1998 are listed in the *Idaho National Engineering and Environmental Laboratory Site Environmental Report for Calendar Year 1998* (Saffle et al. 2000:8-4, 8-8). The doses to the public resulting from these releases are presented in **Table 3–21**. These doses fall within radiological limits per DOE Order 5400.5, and are much lower than those of background radiation.

Using a risk estimator of 500 cancer deaths per 1 million person-rem to the public (Appendix H), the risk of a latent cancer fatality to the maximally exposed member of the public due to radiological releases from INEEL operations in 1998 is estimated to be $4\times10^{-9}$. That is, the estimated probability of this person dying of cancer at some point in the future from radiation exposure associated with 1 year of INEEL operations is less than 1 in 200 million. It takes several to many years from the time of radiation exposure for a cancer to manifest itself.

**Table 3–20 Sources of Radiation Exposure to Individuals in the INEEL Vicinity Unrelated to INEEL Operations**

| Source | Effective Dose Equivalent (millirem per year) |
|---|---|
| **Natural background radiation**[a] | |
| Cosmic radiation | 48 |
| External terrestrial radiation | 71 |
| Internal radiation | 40 |
| Radon in homes (inhaled) | 200 |
| **Other background radiation**[b] | |
| Diagnostic x-rays and nuclear medicine | 53 |
| Weapons test fallout | Less than 1 |
| Air travel | 1 |
| Consumer and industrial products | 10 |
| **Total** | 424 |

a. Saffle et al. 2000.
b. NCRP 1987:11, 40, 53.
**Note:** Value of radon is an average for the United States.

**Table 3–21 Radiation Doses to the Public from INEEL Normal Operations in 1998 (Total Effective Dose Equivalent)**

| Members of the Public | Atmospheric Releases | | Liquid Releases | | Total | |
|---|---|---|---|---|---|---|
| | Standard[a] | Actual | Standard[a] | Actual | Standard[a] | Actual |
| Maximally exposed individual (millirem) | 10 | 0.008 | 4 | 0 | 100 | 0.008 |
| Population within 80 kilometers (person-rem)[b] | None | 0.075 | None | 0 | 100 | 0.075 |
| Average individual within 80 kilometers (millirem)[c] | None | $6.2\times10^{-4}$ | None | 0 | None | $6.2\times10^{-4}$ |

a. The standards for individuals are given in DOE Order 5400.5. As discussed in that order, the 10-millirem-per-year limit from airborne emissions is required by the Clean Air Act, and the 4-millirem-per-year limit is required by the Safe Drinking Water Act; for this NI PEIS, the 4-millirem-per year value is conservatively assumed to be the limit for the sum of doses from all liquid pathways. The total dose of 100 millirem per year is the limit from all pathways combined. The 100-person-rem value for the population is given in proposed 10 CFR Part 834, as published in 58 FR 16268. If the potential total dose exceeds the 100-person-rem value, it is required that the contractor operating the facility notify DOE.
b. Based on a population of about 121,500 in 1998.
c. Obtained by dividing the population dose by the number of people living within 80 kilometers (50 miles) of the site.
**Source:** Saffle et al. 2000.

According to the same risk estimator, $3.8\times10^{-5}$ excess cancer fatality is projected in the population living within 80 kilometers (50 miles) of INEEL from normal operations in 1998. To place this number in perspective, it may be compared with the number of cancer fatalities expected in the same population from all causes. The 1997 mortality rate associated with cancer for the entire U.S. population was 0.2 percent per year (Famighetti 1998:964). Based on this mortality rate, the number of cancer fatalities expected during 1998 from all causes in the population living within 80 kilometers (50 miles) of INEEL was 243. This expected number of cancer fatalities is much higher than the $3.8\times10^{-5}$ cancer fatality estimated from INEEL operations in 1998.

INEEL workers receive the same doses as the general public from background radiation, but they also receive an additional dose from working in facilities with nuclear materials. The average dose to the individual worker and the cumulative dose to all workers at INEEL from operations in 1998 are presented in **Table 3–22**. These doses fall within the radiological regulatory limits of 10 CFR Section 835.202. According to a risk estimator

**Table 3–22 Radiation Doses to Workers from INEEL Normal Operations in 1998 (Total Effective Dose Equivalent)**

| Occupational Personnel | Onsite Releases and Direct Radiation | |
|---|---|---|
| | Standard[a] | Actual |
| Average radiation worker (millirem) | None[b] | 87[c] |
| Total workers (person-rem)[d] | None | 65[c] |

a. The radiological limit for an individual worker is 5,000 millirem per year. However, DOE's goal is to maintain radiological exposure as low as is reasonably achievable. It has therefore established the Administrative Control Level of 2,000 millirem per year; the site must make reasonable attempts to maintain individual worker doses below this level.
b. No standard is specified for an "average radiation worker"; however, the maximum dose that this worker may receive is limited to that given in footnote "a."
c. Does not include doses received at the Naval Reactors Facility. The impacts associated with this facility fall under the jurisdiction of the Navy as part of the Nuclear Propulsion Program.
d. Based on a worker population of 743 with measurable doses in 1998.

**Source:** 10 CFR Section 835.202; DOE 1999p.

of 400 cancer fatalities per 1 million person-rem among workers (Appendix H), the number of projected latent cancer fatalities among INEEL workers from normal operations in 1998 is 0.026.

A more detailed presentation on the radiation environment, including background exposures and radiological releases and doses, is presented in the *Idaho National Engineering and Environmental Laboratory Site Environmental Report for Calendar Year 1998* (Saffle et al. 2000). The concentrations of radioactivity in various environmental media (including air, water, and soil) in the site region (on and off site) are also presented in that report.

#### 3.3.9.1.2 Locations of Proposed Activities

**IDAHO NUCLEAR TECHNOLOGY AND ENGINEERING CENTER**

External radiation doses and concentrations of gross alpha and beta in air have been measured in the vicinity of INTEC. In 1998, the annual average dose within INTEC was about 171 millirem. This is about 40 millirem higher than the average dose measured at the offsite control locations. This onsite dose would affect workers only and is well below annual worker dose limits as identified in Table 3–22. Concentrations in air of gross alpha and beta were $1.1\times10^{-15}$ microcuries per milliliter and $2.4\times10^{-14}$ microcuries per millilter, respectively (Saffle et al. 2000:4-4, 4-5, 4-15, 4-20).

**TEST REACTOR AREA**

Radiological health effects resulting from the release of radionuclides from the stack that serves ATR and the ATR Critical Facility are shown in **Table 3–23**. Estimates shown in the table are based on 1999 release data discussed in Appendix H. Doses listed in Table 3–23 show that the risk of a latent cancer fatality to the maximally exposed member of the public due to emissions from ATR and the ATR Critical Facility in 1999 would be $6.5\times10^{-10}$. The risk of an excess cancer fatality among the public residing within 80 kilometers (50 miles) of ATR would be $6.5\times10^{-6}$.

**Table 3–24** lists radiation doses to average Test Reactor Area and ATR workers in 1998. The average risk of an excess cancer fatality among workers at the Test Reactor Area and ATR due to onsite releases and direct radiation in 1999 would be $4.2\times10^{-5}$ and $5.0\times10^{-5}$, respectively.

**Table 3–23 Radiation Doses to the Public from Normal Operations at ATR and ATR Critical Facility in 1999 (Total Effective Dose Equivalent)**

| | Atmospheric Releases | | Liquid Releases | | Total | |
|---|---|---|---|---|---|---|
| Members of the Public | Standard | Actual | Standard | Actual | Standard | Actual |
| Maximally exposed individual (millirem) | 10 | $1.3\times10^{-3}$ | 4 | 0 | 100 | $1.3\times10^{-3}$ |
| Population within 80 kilometers (person-rem) | None | 0.013 | None | 0 | 100 | 0.013 |
| Average individual within 80 kilometers (millirem) | None | $7.9\times10^{-4}$ | None | 0.00 | None | $7.9\times10^{-4}$ |

**Table 3–24 Radiation Doses to Workers from the Test Reactor Area and ATR Normal Operations in 1998 (Total Effective Dose Equivalent)**

| | Onsite Releases and Direct Radiation | |
|---|---|---|
| Occupational Personnel | Standard[a] | Actual |
| Average Test Reactor Area worker (millirem) | None[b] | 105 |
| Average ATR worker (millirem) | None[b] | 126 |

a. The radiological limit for an individual worker is 5,000 millirem per year. However, DOE's goal is to maintain radiological exposure as low as is reasonably achievable. It has therefore established the Administrative Control Level of 2,000 millirem per year; the site must make reasonable attempts to maintain individual worker doses below this level.

b. No standard is specified for an "average radiation worker"; however, the maximum dose that this worker may receive is limited to that given in footnote "a."

**Source:** DOE 1999p.

### 3.3.9.2 Chemical Environment

The background chemical environment important to human health consists of the atmosphere, which may contain hazardous chemicals that can be inhaled; drinking water, which may contain hazardous chemicals that can be ingested; and other environmental media through which people may come in contact with hazardous chemicals (e.g., surface water during swimming, soil through direct contact, or food). Hazardous chemicals can cause cancer and other adverse health effects.

**Carcinogenic Effects.** Health effects in this case are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the potential carcinogen. This could be incremental or excess individual lifetime cancer risk.

**Noncarginogenic Effects.** Health effects in this case are determined by the ratio between the calculated, or measured concentration of the chemical in the air and the reference concentration or dose. This ratio is known as the Hazard Quotient. Hazard Quotients for noncarcinogens are summed to obtain the Hazard Index. If the Hazard Index is less than 1, no adverse health effects would be expected.

Effective administrative and design controls that decrease hazardous chemical releases to the environment and help achieve compliance with permit requirements (e.g., air emissions and NPDES permit requirements) contribute to minimizing health impacts on the public. The effectiveness of these controls is verified through the use of monitoring information and inspection of mitigation measures. Health impacts on the public may occur through inhaling air containing hazardous chemicals released to the atmosphere during normal INEEL operations. Risks to public health from other possible pathways, such as ingestion of contaminated drinking water or direct exposure, are lower than those via the inhalation pathway. At INEEL, the risk to public health from water ingestion and direct exposure pathways is low because surface water is not used for drinking or as a receptor for wastewater discharges.

Baseline air emission concentrations and applicable standards for hazardous chemicals are addressed in Section 3.3.3.

The baseline concentrations are estimates of the highest existing offsite concentrations and represent the highest concentrations to which members of the public could be exposed. These concentrations are in compliance with applicable guidelines and regulations. Information on estimating the health impacts of hazardous chemicals is presented in Appendix H.

Exposure pathways to INEEL workers during normal operations may include inhaling contaminants in the workplace atmosphere and direct contact with hazardous materials. The potential for health impacts varies among facilities and workers, and available information is insufficient for a meaningful estimate of impacts. However, workers are protected from workplace hazards through appropriate training, protective equipment, monitoring, substitution, and engineering and management controls. INEEL workers are also protected by adherence to OSHA and EPA standards that limit workplace atmospheric and drinking water concentrations of potentially hazardous chemicals. Appropriate monitoring that reflects the frequency and amounts of chemicals used in the operational processes ensures that these standards are not exceeded. Additionally, DOE requires that conditions in the workplace be as free as possible from recognized hazards that cause, or are likely to cause, illness or physical harm.

#### 3.3.9.3 Health Effects Studies

Epidemiological studies were conducted on communities surrounding INEEL to determine whether there are excess cancers in the general population. Two of these are described in more detail in Appendix M.4.4 of the *Storage and Disposition PEIS* (DOE 1996b:M-233, M-234). No excess cancer mortality was reported, and although excess cancer incidence was observed, no association thereof with INEEL was established. A study by the State of Idaho completed in June 1996, found excess brain cancer incidence in the six counties surrounding INEEL, but a follow-up survey concluded that "No common factors were identified that clearly linked the cases, and individuals expressed varying concerns about possible exposures or causes for brain cancer" (ID DHW 1997).

No occupational epidemiological studies have been completed at INEEL to date, but several worker health studies have been initiated recently at INEEL. Researchers from the Boston University School of Public Health, in cooperation with the National Institute of Occupational Safety and Health, are investigating the effects of workforce restructuring (downsizing) in the nuclear weapons industry. The health of displaced workers will be studied. Under a National Institute of Occupational Safety and Health cooperative agreement, the epidemiologic evaluation of childhood leukemia and paternal exposure to ionizing radiation now includes INEEL as well as other DOE sites. Another study, begun in October 1997, *Medical Surveillance for Former Workers at INEEL*, is being carried out by a group of investigators from the Oil, Chemical, and Atomic Workers International Union, Mt. Sinai School of Medicine, the University of Massachusetts at Lowell, and the Alice Hamilton College. DOE has implemented an epidemiologic surveillance program to monitor the health of current INEEL workers. A discussion of this program is given in Appendix M.4.4 of the *Storage and Disposition PEIS* (DOE 1996b:M-233, M-234).

#### 3.3.9.4 Accident History

DOE conducted a study, the Idaho National Engineering Laboratory Historical Dose Evaluation, to estimate the potential offsite radiation doses for the entire operating history of INEEL (DOE 1996b:3-139). Releases resulted from a variety of tests and experiments as well as a few accidents at INEEL. The study concluded that these releases contributed to the total radiation dose during test programs of the 1950s and early 1960s. The frequency and size of releases have declined since that time. There have been no serious unplanned or accidental releases of radioactive or other hazardous substances at INEEL facilities in the 10 years of operation prior to 1998. However, in July 1998, an incident occurred at INEEL's Test Reactor Area. One fatality and several injuries resulted from an accidental release of fire retardant carbon dioxide during routine maintenance operation. No nuclear materials were involved and there was no threat to public safety (DOE 1998a, 1998b, 1998c, 1998d).

#### 3.3.9.5 Emergency Preparedness

Each DOE site has established an emergency management program that would be activated in the event of an accident. This program has been developed and maintained to ensure adequate response to most accident conditions and to provide response efforts for accidents not specifically considered. The emergency management program includes emergency planning, preparedness, and response.

Government agencies whose plans are interrelated with the INEEL emergency plan for action include the State of Idaho, Bingham County, Bonneville County, Butte County, Clark County, Jefferson County, the Bureau of Indian Affairs, and the Fort Hall Indian Reservation. INEEL contractors are responsible for responding to emergencies at their facilities. Specifically, the emergency action director is responsible for recognition, classification, notification, and protective action recommendations. At INEEL, emergency preparedness resources include fire protection from onsite and offsite locations and radiological and hazardous chemical material response. Emergency response facilities include an emergency control center at each facility, the INEEL Warning Communication Center, and the INEEL site Emergency Operations Center. Seven INEEL medical facilities are also available to provide routine and emergency service.

DOE has specified actions to be taken at all DOE sites, implementing lessons learned from the emergency response to an accidental explosion at Hanford in May 1997.

### 3.3.10 Environmental Justice

Under Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* Federal agencies are responsible for identifying and addressing the possibility of disproportionately high and adverse health, economic, and environmental impacts of programs and activities on minority and low-income populations in potentially affected areas. Minority populations refer to persons of any race self-designated as Asian, Black, Native American, or Hispanic. Low-income populations refer to households with incomes below the Federal poverty thresholds. In the case of INEEL, the potentially affected area includes only parts of central Idaho.

The potentially affected area surrounding ATR is defined by a circle with an 80-kilometer (50-mile) radius centered at the Test Reactor Area (latitude 43° 35'8" N, longitude 112° 57'47" W). The total population residing within that area in 1990 was 105,939. Minorities made up 10.1 percent of the total population. In 1990, approximately one-fourth of the total population was comprised of persons self-designated as members of a minority group; minorities made up 7.8 percent of the State of Idaho's total population.

At the time of the 1990 census, Hispanics and Native Americans were the largest minority groups within the potentially affected area, accounting for 6.2 percent and 2.7 percent of the total population, respectively. Asians constituted about 1.1 percent, and Blacks, about 0.3 percent (DOC 1992).

In 1990, the poverty threshold was $9,981 for a family of three with one related child under 18 years of age. A total of 13,188 persons (12.6 percent of the total population) residing within the potentially affected area around ATR reported incomes below that threshold (DOC 1992). Data obtained during the 1990 census also show that of the total population of the contiguous United States, 13.1 percent reported incomes below the poverty threshold. The corresponding percentage for Idaho was 13.3 percent.

The potentially affected area surrounding FDPF is defined by an 80-kilometer (50-mile) circle centered at INTEC (latitude 43° 34′12.5″ N, longitude 112° 55′55.4″ W). The total population residing within the potentially affected area in 1990 was 121,472. Approximately 10 percent of the total population was comprised of persons self-designated as members of a minority. Data from the1990 census show that minorities represented approximately 24 percent of the national population, and approximately 8 percent of the population of the State of Idaho. Hispanics (6.2 percent) and Native Americans (2.7 percent) were the largest minority groups within the population at risk. Asians (1.1 percent) and Blacks (0.3 percent) made up the remainder of the minority population at risk. Approximately 12 percent of the population at risk reported incomes below the poverty threshold of 1990.

### 3.3.11 Waste Management

Waste management includes minimization, characterization, treatment, storage, transportation, and disposal of waste generated from ongoing DOE activities. The waste is managed using appropriate treatment, storage, and disposal technologies, and in compliance with all applicable Federal and state statutes and DOE orders.

#### 3.3.11.1 Waste Inventories and Activities

INEEL manages the following types of waste: high-level radioactive, transuranic, mixed transuranic, low-level radioactive, mixed low-level radioactive, hazardous, and nonhazardous. Waste generation rates and the inventory of stored waste from activities at INEEL are provided in **Table 3–25**.

**Table 3–25 Waste Generation Rates and Inventories at INEEL**

| Waste Type | Generation Rate (cubic meters per year) | Inventory (cubic meters) |
|---|---|---|
| High-level radioactive | 0[a] | 4,200[b] |
| Transuranic and mixed transuranic | 0[a, c] | 65,000[d, e] |
| Sodium-bearing waste | 0[a] | 5,300[b] |
| Low-level radioactive | 6,400[f] | 6,000[g] |
| Mixed low-level radioactive[h] | 230 | 1,700 |
| Hazardous | 835[c, i] | NA[j] |
| Nonhazardous | | |
| Liquid | 2,000,000[c, k] | NA[j] |
| Solid | 62,000[c] | NA[j] |

a. Refer to the text.
b. DOE 1999i. The sodium-bearing waste is managed by the high-level radioactive waste program.
c. Moor and Peterson 1999:chap. 3.
d. Includes both alpha low-level radioactive waste and transuranic waste.
e. DOE 1995a:4.14-2.
f. Willson 1998:2-9 and 2-10.
g. Bright 1999.
h. DOE 1998e:4-5.
i. Includes 760 cubic meters that is recyclable.
j. Generally, hazardous and nonhazardous wastes are not held in long-term storage.
k. Projected annual average generation amounts for 1997–2006.
**Note:** To convert from cubic meters to cubic yards, multiply by 1.308.
**Key:** NA, not applicable.

Waste generation rates specifically for ATR and FDPF activities are provided in **Table 3–26**. The INEEL waste management capabilities are summarized in **Table 3–27**. More detailed descriptions of the waste management system capabilities at INEEL are included in the *Storage and Disposition PEIS* (DOE 1996b:3-141–145, E-33–E-48) and the *Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DOE 1995a:2.2-30).

**Table 3–26 Waste Generation Rates at ATR and FDPF**

| Waste Type | ATR[a] (cubic meters per year) | FDPF (cubic meters per year) |
|---|---|---|
| High-level radioactive | 0 | 0 |
| Transuranic | 0 | 0 |
| Low-level radioactive | 404 | 0 |
| Mixed low-level radioactive | <1 | 0 |
| Hazardous | 190 | 0 |
| Nonhazardous | | |
| Process wastewater | 794,000 | 0 |
| Sanitary wastewater | 42,000 | 0 |
| Solid | 4,208 | 0 |

a. The data includes all facilities within the Test Reactor Area, which includes ATR.
**Note:** To convert from cubic meters to cubic yards, multiply by 1.308.
**Source:** Depperschmidt 2000b; French, Tallman, and Taylor 1999a, 1999b.

**Table 3–27 Waste Management Capabilities at INEEL**

| Facility Name/Description | Capacity | Status | Applicable Waste Type: HLW | TRU | Mixed TRU | LLW | Mixed LLW | Haz | Non-Haz |
|---|---|---|---|---|---|---|---|---|---|
| **Treatment Facility (cubic meters per year except as otherwise specified)** | | | | | | | | | |
| INTEC HEPA Filter Leach, cubic meters per day | 0.21 | Online | | | X | | X | | |
| INTEC Debris Treatment and Containment, cubic meters per day | 88 | Waiting on Part B Permit | | | X | | X | | |
| Advanced Mixed Waste Treatment Project | 6,500 | Planned for 2003 | | | X | | X | | |
| INTEC NWCF | 248 | Standby[a] | X | | X | | | | |
| ANL–W Remote Treatment Facility | 42 | Planned for 2000 | | X | X | X | X | | |
| ANL–W HFEF Waste Characterization Area | 37 | Online | | X | X | | | | |
| INTEC Waste Immobilization Facility | 48 | Planned for 2008 | X | | | | | | |
| INTEC Liquid Effluent Treatment and Disposal Facility | 11,365 | Online | | | | | X | | |
| INTEC High-Level Radioactive Waste Evaporator | 6,138 | Online | X | | X | | X | | |
| INTEC Process Equipment Waste Evaporator | 13,000 | Online | | | X | X | X | | |
| ANL–W Sodium Processing Facility | 698 | Online | | | | | X | | |

| Facility Name/Description | Capacity | Status | Applicable Waste Type | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | HLW | TRU | Mixed TRU | LLW | Mixed LLW | Haz | Non-Haz |
| Test Area North Cask Dismantlement | 11 | Online | | | | | X | | |
| Test Reactor Area Evaporation Pond, cubic meters per day | 820 | Online | | | | X | | | |
| WROC - Debris Sizing, kilograms per hour | 1,149 | Planned for 2000 | | | | X | X | | |
| WROC - Macroencapsulation, kilograms per hour | 2,257 | Planned for 2001 | | | | | X | | |
| WROC - Stabilization, cubic meters per day | 7.6 | Online | | | | | X | | |
| WERF | 49,610 | Shutdown[b] | | | | X | X | X | |
| INTEC Sewage Treatment Plant | 3,200,000 | Online | | | | | | | X |
| **Storage Facility (cubic meters)** | | | | | | | | | |
| INTEC Calcine Bin Sets | 6,950 | Online | X | | | | | | |
| ANL–W Radioactive Sodium Storage | 75 | Online | | | X | | X | | |
| ANL–W Sodium Components Maintenance Shop | 200 | Online | | | | | X | | |
| ANL–W Radioactive Scrap and Waste Storage | 193 | Online | | X | X | X | X | | |
| ANL–W EBR II Sodium Boiler Drain Tank | 64 | Online | | | | | X | | |
| ANL–W HFEF Waste Characterization Area | 37 | Online | | X | X | | | | |
| INTEC Tank Farm | 12,533 | Online | X[c] | | X | | | | |
| INTEC FDPF HEPA Storage | 25 | Online | | | X | | X | | |
| INTEC NWCF HEPA Storage | 56 | Online | | | X | | X | | |
| INTEC CPP-1619 Storage | 45 | Online | | | | | X | X | |
| INTEC CPP-1617 Staging | 8,523 | Online | | | | | X | X | |
| RWMC Transuranic Storage Area-RE[c] | 64,900 | Online | | X | X | X | X | | |
| RWMC Waste Storage[d] | 112,400 | Online | | X | X | X | X | | |
| RWMC Intermediate-Level Storage | 100 | Online | | X | | | | | |
| WROC PBF Mixed Low-level Radioactive Waste Storage | 129 | Online | | | | | X | X | |
| Portable Storage at SPERT IV | 237 | Online | | | | | X | X | |
| PBF WERF Waste Storage Building | 685 | Online | | | | | X | X | |
| Test Area North 647 Waste Storage | 104 | Online | | | | | X | | |
| Test Area North 628 SMC Container Storage | 125 | Online | | | | | X | | |

| Facility Name/Description | Capacity | Status | Applicable Waste Type | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | HLW | TRU | Mixed TRU | LLW | Mixed LLW | Haz | Non-Haz |
| **Disposal Facility (cubic meters per year)** | | | | | | | | | |
| RWMC Disposal Facility | 37,700 | Online | | | | X | | | |
| CFA Landfill Complex | 48,000 | Online | | | | | | | X |
| Percolation Ponds | 2,000,000 | Online | | | | | | | X |
| FPF Sanitary Sewer | 166,000 | Online | | | | | | | X |
| TRA Warm Waste Evaporation Ponds | 31,830 | Online | | | | X | | | |
| TRA Sanitary Waste Ponds | 51,720 | Online | | | | | | | X |
| TRA Cold Waste Pond | 795,800 | Online | | | | | | | X |

a. NWCF was shut down on June 1, 2000, and is in standby pending facility upgrades and issuance of a new air permit.
b. WERF was denied its RCRA permit and required to shutdown by November 2, 2000.
c. Sodium-bearing waste is managed by the high-level radioactive waste program.
d. For these facilities, the low-level radioactive and mixed low-level radioactive wastes are considered alpha-contaminated low-level radioactive waste and alpha-contaminated mixed low-level radioactive waste (waste containing between 10 and 100 nanocuries of alpha activity per gram).

**Note:** To convert from cubic meters to cubic yards, multiply by 1.308.

**Key:** ANL–W, Argonne National Laboratory–West; CFA, Central Facilities Area; CPP, Chemical Processing Plant; EBR, Experimental Breeder Reactor; FDPF, Fluorinel Dissolution Process Facility; FPF, Fuel Processing Facility; Haz, hazardous; HEPA, high-efficiency particulate air; HFEF, Hot Fuel Examination Facility; HLW, high-level radioactive waste; INTEC, Idaho Nuclear Technology and Engineering Center; LLW, low-level radioactive waste; NWCF, New Waste Calcining Facility; PBF, Power Burst Facility; RWMC, Radioactive Waste Management Complex; SMC, Specific Manufacturing Complex; SPERT, Special Power Excursion Reactor Test; TRA, Test Reactor Area; TRU, transuranic waste, WERF, Waste Experimental Reduction Facility; WROC, Waste Reduction Operations Complex.

**Source:** Depperschmidt 2000b; DOE 1999e:3-54, 3-55; Perry 2000.

EPA placed INEEL on the National Priorities List on December 21, 1989. In accordance with CERCLA, DOE entered into a consent order with EPA and the State of Idaho to coordinate cleanup activities at INEEL under one comprehensive strategy. This agreement integrates DOE's CERCLA response obligations with RCRA corrective action obligations. Aggressive plans are in place to achieve early remediation of sites that represent the greatest risk to workers and the public. The goal is to complete remediation of contaminated sites at INEEL to support delisting from the National Priorities List by 2019 (DOE 1996b:3-141). More information on regulatory requirements for waste disposal is provided in Chapter 5.

### 3.3.11.2 High-Level Radioactive Waste

High-level radioactive waste at INEEL was generated in the process of extracting useful isotopes from spent nuclear fuel at INTEC. Most of this fuel was from the Naval Reactors Program. Most aqueous solutions from spent nuclear fuel processing and isotope extraction were concentrated by evaporation and separated into low-level and high-level radioactive waste streams in the Process Equipment Waste Evaporator. The liquid high-level radioactive waste was stored in subsurface tanks and then transformed by calcination into solid metallic oxides in a granular form. This calcination was completed in February 1998. The calcine is stored in stainless steel bins in near-surface concrete vaults where it awaits further processing into a form suitable for emplacement in a Federal repository. INEEL met the requirements of a December 1991 consent order with the State of Idaho and EPA to calcine all the high-level radioactive waste by June 30, 1998. Subsequently, the calcined waste will be treated to meet RCRA provisions on a schedule to be negotiated with the State of Idaho under the Federal Facility Compliance Act.

Although sodium-bearing waste is not high-level radioactive waste as specified in the Nuclear Waste Policy Act of 1982, it has been historically managed as high-level radioactive waste at INEEL. This is because some of the physical and chemical properties of these two waste types are similar (e.g., both are acidic and both contain similar radionuclides, including transuranics) (DOE 1999i:1-11). About 5,300 cubic meters ($1.4\times10^6$ gallons) of liquid-sodium-bearing waste remain in the INTEC Tank Farm. New treatment processes for the remaining liquid-sodium-bearing wastes are being analyzed in the *Idaho High-Level Waste and Facilities Disposition Environmental Impact Statement*.

### 3.3.11.3 Transuranic and Mixed Transuranic Waste

Transuranic waste generated since 1972 is segregated into contact-handled and remotely handled categories and stored at the Radioactive Waste Management Complex in a form designed for eventual retrieval (DOE 1996b:3-144). Some transuranic waste is also stored at the Radioactive Scrap and Waste Facility at Argonne National Laboratory–West (DOE 1995a:2.2-36). There is virtually no transuranic waste generated at INEEL. Most of the transuranic waste in storage was received from the Rocky Flats Environmental Technology Site (DOE 1996b:3-144). Transuranic waste is currently being stored, pending shipment to WIPP. Transuranic waste will be treated to meet WIPP waste acceptance criteria, packaged in accordance with DOE and Department of Transportation (DOT) requirements, and transported to WIPP for disposal (DOE 1996b:3-144) or a suitable geologic repository. The first shipment of transuranic waste from INEEL was received at WIPP on April 28, 1999 (DOE 1999j).

The existing treatment facilities for transuranic waste at INEEL are limited to testing, characterization, and repackaging. The Advanced Mixed Waste Treatment Project will be operated as a private sector treatment facility after its construction is completed (Moor and Peterson 1999). This facility will (1) treat waste to meet the most current requirements; (2) reduce waste volume and life-cycle cost to DOE; and (3) perform tasks in a safe and environmentally compliant manner (Saffle et al. 2000:3-11). The construction of the incinerator component of this facility has been deferred, pending the recommendation of a blue ribbon panel of experts. This panel of experts will assess and recommend new technology alternatives to incineration. The panel's recommendation is expected in December 2000 (DOE 2000b).

Waste containing between 10 and 100 nanocuries of alpha activity per gram of transuranic radionuclides is called alpha low-level radioactive waste. Although this waste is technically considered low-level radioactive waste rather than transuranic waste, it cannot be disposed of at INEEL because it does not meet all of the INEEL low-level radioactive waste disposal facility acceptance criteria. Alpha low-level radioactive waste and alpha mixed low-level radioactive waste are managed together as part of the transuranic waste program. It is expected that these wastes will be treated by the Advanced Mixed Waste Treatment Project and then be disposed of at WIPP (DOE 1995a:2.2-34, 2.2-35).

### 3.3.11.4 Low-Level Radioactive Waste

Liquid low-level radioactive waste is solidified before disposal (DOE 1996b:E-35). INTEC has the capability to treat aqueous low-level radioactive waste. Liquid low-level radioactive waste is concentrated at the INTEC Process Equipment Waste Evaporator, with the condensed vapor processed by the Liquid Effluent Treatment and Disposal Facility. The concentrated materials remaining after evaporation are stored in the Chemical Processing Plant–604 storage tanks. The Waste Experimental Reduction Facility was required to shutdown by November 2, 2000. In addition, aqueous low-level radioactive wastes are discharged to the two double-lined ponds at the Test Reactor Area for evaporation (DOE 1995a:2.2-39). The two Test Reactor Evaporation Ponds have a capacity of 36,790 cubic meters (48,100 cubic yards) each with a flow rate of 30 liters (8 gallons) per minute.

Low-level radioactive waste disposal occurs in pits and concrete-lined soil vaults in the subsurface disposal area of the Radioactive Waste Management Complex (DOE 1995a:2.2-39). Approximately 60 percent of the low-level radioactive waste generated at INEEL is treated for volume reduction prior to disposal at the Radioactive Waste Management Complex. Additionally, some low-level radioactive waste is shipped off site to be incinerated, and the residual ash is returned to INEEL for disposal. The Radioactive Waste Management Complex is expected to be filled to capacity by the year 2030 (Mitchell et al. 1996b:3-26), although some proposals would close the low-level radioactive waste disposal facility by 2006 (DOE 1998f:B-4).

### 3.3.11.5 Mixed Low-Level Radioactive Waste

Mixed low-level radioactive waste is divided into two categories for management purposes: alpha mixed low-level radioactive waste and beta-gamma mixed low-level radioactive waste. Most of the alpha mixed low-level radioactive waste stored at INEEL is waste that has been reclassified from mixed transuranic waste and is managed as part of the transuranic waste program. Therefore, this section deals only with beta-gamma mixed low-level radioactive waste (DOE 1995a:2.2-39, 2.2-40).

Mixed low-level radioactive waste, including polychlorinated biphenyl–contaminated low-level radioactive waste, is stored at several onsite areas awaiting the development of treatment methods (DOE 1996b:3-144). Mixed low-level radioactive waste is stored at the Mixed Waste Storage Facility (or Waste Experimental Reduction Facility Waste Storage Building) and in portable storage units at the Power Burst Facility area. In addition, smaller quantities of mixed low-level radioactive waste are stored in various facilities at INEEL, including the Hazardous Chemical/Radioactive Waste Facility at INTEC, and the Radioactive Sodium Storage Facility and Radioactive Scrap and Waste Storage Facility at Argonne National Laboratory–West (DOE 1995a:2.2-41). Although mixed wastes are stored in many locations at INEEL, the bulk of that volume is solid waste stored at the Radioactive Waste Management Complex (DOE 1996b:E-38).

As part of the INEEL Site Treatment Plan and Consent Order required by the Federal Facility Compliance Act, preferred treatment options have been identified to eliminate the hazardous waste component for many types of mixed low-level radioactive waste (DOE 1995a:2.2-42). Mixed low-level radioactive waste is or will be processed to RCRA Land Disposal Restrictions treatment standards through several treatment facilities. Those treatment facilities and their operational status are: (1) Waste Experimental Reduction Facility Incinerator (shutdown), (2) Waste Experimental Reduction Facility Stabilization (operational), (3) Test Area North cask dismantlement (operational), (4) Sodium Process Facility (operational), (5) High-Efficiency Particulate Air Filter Leach (operational), (6) Waste Reductions Operations Complex Macroencapsulation (March 2001), (7) Debris Treatment (operational), and (8) Advanced Mixed Waste Treatment Project (March 2003). Commercial treatment facilities are also being considered, as appropriate. Currently, limited amounts of mixed low-level radioactive waste are disposed of at Envirocare of Utah (DOE 1999e:3-57).

### 3.3.11.6 Hazardous Waste

Approximately 1 percent of the total waste generated at INEEL (not including liquid nonhazardous waste) is hazardous waste. Most of the hazardous waste generated annually at INEEL is transported off site for treatment and disposal (DOE 1995a:2.2-45). Offsite shipments are surveyed to determine that the wastes have no radioactive content, and therefore are not mixed waste (DOE 1996b:3-145).

Highly reactive or unstable materials, such as waste explosives, are addressed on a case-by-case basis, and are either stored, burned, or detonated, as appropriate. The Waste Handling Facility Project at Argonne National Laboratory–West will be implemented to handle Argonne National Laboratory–West hazardous waste (DOE 1996b).

### 3.3.11.7 Nonhazardous Waste

Approximately 90 percent of the solid waste generated at INEEL is classified as industrial waste and is disposed of on site in a landfill complex in the Central Facilities Area and off site at the Bonneville County landfill (DOE 1995a:2.2-47). The onsite landfill complex contains separate areas for petroleum-contaminated media, industrial waste, and asbestos waste (Werner 1997). The onsite landfill is 4.8 hectares (12 acres), and is being expanded by 91 hectares (225 acres) to provide capacity for at least 30 years (DOE 1996b:3-145).

Sewage is disposed of in surface impoundments in accordance with terms of the October 7, 1992 Consent Order. Waste in the impoundments is allowed to evaporate, and the resulting sludge is placed in the landfill. Solids are separated and reclaimed where possible (DOE 1996b:3-145). Nonhazardous service wastewater generated at INTEC is disposed of in percolation ponds at a flow rate of 3.8 million to 7.6 million liters (1 million to 2 million gallons) per day (Werner 1997). The INTEC sanitary sewer system collects and transfers sanitary waste to the sewage treatment lagoons east of INTEC for treatment and disposal. This system has a capacity of 3,200,000 cubic meters (4,190,000 cubic yards) per year (DOE 1999e:3-58). The Test Reactor Area Cold Waste Pond disposes of about 1,500 liters (400 gallons) per minute of nonhazardous wastewater with a capacity of 33,960 cubic meters (44,400 cubic yards). The TRA sanitary sewer system collects and transfers about 98 liters (26 gallons) per minute of sanitary wastewaters to the sewage treatment lagoons east of the Test Reactor Area for treatment and disposal. This system has a capacity of 20,600 cubic meters (26,900 cubic yards).

### 3.3.11.8 Waste Minimization

The DOE Idaho Operations Office has an active waste minimization and pollution prevention program to reduce the total amount of waste generated and disposed of at INEEL. This is accomplished by eliminating waste through source reduction or material substitution; by recycling potential waste materials that cannot be minimized or eliminated; and by treating all waste that is generated to reduce its volume, toxicity, or mobility prior to storage or disposal. The Idaho Operations Office published its first Waste Minimization Plan in 1990, which defined specific goals, methodology, responsibility, and achievements of programs and organizations. The achievements and progress have been updated at least annually. Implementing pollution prevention projects reduced the total amount of waste generated at INEEL in 1998 by approximately 1,100 cubic meters (1,400 cubic yards). Examples of pollution prevention projects completed in 1998 at INEEL include: reduction of routine operations hazardous waste by approximately 55 metric tons (61 tons) by collecting engine oil by a recycling vendor for energy recovery; reducing cleanup/stabilization of hazardous waste by approximately 20 metric tons (22 tons) by dismantling the Mobile Test Assembly Cask and sending the clean lead to the clean lead storage area for recycling; and reducing both routine operations and cleanup/stabilization low-level radioactive waste by approximately 19 cubic meters (25 cubic yards) by recycling depleted uranium scrap metal from both normal facility operations and deactivation of a facility (DOE 1999f:44).

### 3.3.11.9 Waste Management PEIS Records of Decision

The *Waste Management PEIS* Records of Decision affecting INEEL are shown in **Table 3–28** for the waste types analyzed in this NI PEIS. Decisions on the various waste types were announced in a series of Records of Decisions that have been issued on the *Waste Management PEIS*. The transuranic waste Record of Decision was issued on January 20, 1998 (63 FR 3629); the hazardous waste Record of Decision was issued on August 5, 1998 (63 FR 41810); the high-level radioactive waste Record of Decision was issued on August 12, 1999 (64 FR 46661); and the low-level radioactive and mixed low-level radioactive waste Record of Decision was issued on February 18, 2000 (65 FR 10061). The transuranic waste Record of Decision states that DOE will develop and operate mobile and fixed facilities to characterize and prepare transuranic waste

**Table 3–28 Waste Management PEIS Records of Decision Affecting INEEL**

| Waste Type | Preferred Action |
|---|---|
| High-level radioactive | DOE has decided that INEEL should store its immobilized high-level radioactive waste on site until transfer to a geologic repository.[a] |
| Transuranic and mixed transuranic | DOE has decided that INEEL should prepare and store its transuranic waste on site pending disposal at WIPP[b] or another suitable geologic repository. |
| Low-level radioactive | DOE has decided to treat INEEL's low-level radioactive waste on site.[c] |
| Mixed low-level radioactive | DOE has decided to regionalize treatment of mixed low-level radioactive waste at INEEL.[c] This includes the onsite treatment of INEEL's wastes and could include treatment of some mixed low-level radioactive waste generated at other sites. |
| Hazardous | DOE has decided to continue to use commercial facilities for treatment of INEEL nonwastewater hazardous waste. DOE will also continue to use onsite facilities for wastewater hazardous waste.[d] |

a. From the Record of Decision for high-level radioactive waste (64 FR 46661).
b. From the Record of Decision for transuranic waste (63 FR 3629).
c. From the Record of Decision for low-level radioactive and mixed low-level radioactive waste (65 FR 10061).
d. From the Record of Decision for hazardous waste (63 FR 41810).
**Source:** 63 FR 3629; 63 FR 41810; 64 FR 46661; 65 FR 10061.

for disposal at WIPP. Each DOE site that has or will generate transuranic waste will, as needed, prepare and store its transuranic waste on site. The hazardous waste Record of Decision states that most DOE sites will continue to use offsite facilities for the treatment and disposal of major portions of the nonwastewater hazardous waste with ORR and SRS continuing to treat some of their own nonwastewater hazardous waste, on site in existing facilities, where this is economically feasible. The high-level radioactive waste Record of Decision states that immobilized high-level radioactive waste will be stored at the site of generation until transfer to a geologic repository. The low-level radioactive waste and mixed low-level radioactive waste Record of Decision states that for the management of low-level radioactive waste, minimal treatment will be performed at all sites, and disposal will continue, to the extent practicable, on site at INEEL, LANL, ORR, and SRS. In addition, Hanford and the Nevada Test Site will be available to all DOE sites for low-level radioactive waste disposal. Mixed low-level radioactive waste will be treated at Hanford, INEEL, ORR, and SRS, and disposed of at Hanford and the Nevada Test Site. More detailed information concerning DOE's decisions for the future configuration of waste management facilities at INEEL is presented in the high-level radioactive waste, transuranic waste, hazardous waste, and low-level radioactive waste and mixed low-level radioactive waste Records of Decision.