4.11 Health and Safety

This section presents the potential health effects to the public and workers as a result of current operations at INEEL. The discussion includes estimates of impacts from the release of radioactive and nonradioactive material and also includes occupational injury rates. Emphasis is placed on updating information presented in SNF & INEL EIS (DOE 1995) from which this document is tiered. Since INTEC employees would be affected most by the waste processing and facility disposition alternatives, this section emphasizes occupational health and safety at INTEC. Background information related to the material presented in this section and details on the health effects methodology are included in Appendix C.3. ***The baseline radiation dose from air emissions (see Section 4.7) is presented in Section 4.11.1.1, Radiological Health Risk.***

4.11.1 PUBLIC HEALTH AND SAFETY

As discussed in Section 4.7, the primary way in which activities under consideration in this EIS could affect public health is through airborne emissions. There is also a possibility of contamination of groundwater as noted in Section 4.8. Nevertheless, any contamination of soil or groundwater at the INEEL would not be expected to significantly affect the offsite public because of the ***long*** distances between the INTEC area and the offsite public.

A number of independent entities monitor and track both radioactive and nonradioactive releases from INEEL, in air and in water. These entities include the National Oceanic and Atmospheric Administration, the U.S. Geologic Survey, the State of Idaho's INEEL Oversight Program, the EPA, the State of Idaho's Department of Environmental Quality, the Idaho Department of Water Resources, and numerous university research programs and private contractors. Ongoing studies by the Centers for Disease Control and Prevention, an agency of the U.S. Department of Health and Human Services, also carefully tracks possible health effects from past activities at INEEL.

4.11.1.1 Radiological Health Risk

Very low doses of radiation are not known to cause health effects in humans; however, extrapolation of the dose-response relationship from high doses indicates that statistical effects might be observed in large populations. The doses reported in this EIS from INEEL operations are in this very low category. This EIS reports two values: collective dose (in person-rem) and the hypothetical number of latent cancer fatalities. For effects on individuals, DOE reports dose in millirem and latent cancer fatality probability.

Table 4-2*7* provides doses and latent cancer fatality probabilities from annual exposure due to routine airborne releases for the noninvolved worker ***for 1998*** and maximally exposed individual near the site boundary for years 1995, 1996, ***and 1999***. These doses are well below the current regulatory standard, which limits doses to the maximally exposed member of the public to 10 millirem per year (40 CFR 61).

Table 4-2*8* provides summaries of the dose ***to the surrounding population*** and number of latent cancer fatalities based on annual exposure for 1995, 1996, ***and 1999***. ***Based on 1990 U.S. Census Bureau data***, the surrounding population ***consisted*** of approximately 120,000 people within a 50-mile radius of INEEL (ESRF 1997). ***(Using 2000 U.S. Census Bureau data, this population has increased to almost 140,000 (Pruitt 2002).)*** The total collective population dose for 1996 of 0.24 person-rem corresponds to much less than one latent cancer fatality within the entire population over the next 70 years

Table 4-27. Annual dose to individuals from exposure to routine airborne releases at the Idaho National Engineering and Environmental Laboratory.

Maximally exposed individual	Annual dose (millirem)	LCF Probability
Onsite worker ***(1998)***[a]	***0.27***	***1.1×10^{-7}***
Offsite individual (public) (1995)[b]	***0.018***	***9.0×10^{-9}***
Offsite individual (public) (1996)[c]	0.031	1.5×10^{-8}
Offsite individual (public) (1999)[d]	***0.008***	***4.0×10^{-9}***

a. Maximum dose at any onsite area from permanent facility emissions for onsite worker ***(see Section 4.7).***
b. ESRF (1996) for offsite individual, 1995.
c. ESRF (1997) for offsite individual, 1996.
d. ESERP (2002) for offsite individual, 1999.
LCF = latent cancer fatality.

Table 4-28. Estimated increased health effects due to routine airborne releases at the Idaho National Engineering and Environmental Laboratory.

Year	Population dose (person- rem)	Number of latent cancer fatalities
1995	0.08[a]	4.0×10^{-5}
1996	0.24[b]	1.2×10^{-4}
1999	***0.037***[c]	***1.8×10^{-5}***

a. ESRF (1996) for year 1995.
b. ESRF (1997) for year 1996.
c. ESERP (2002) for year 1999.

(ESRF 1997). The conversion from collective dose to number of latent cancer fatalities is performed using risk factors contained in the *1993 Limitations of Exposure to Ionizing Radiation* (NCRP 1993).

Production wells at INTEC and elsewhere on the INEEL are sampled and analyzed for gross alpha, gross beta, tritium, and strontium-90. ***During 1999, 51 of 60 samples contained gross alpha activities above the minimum detectable concentration. The highest concentration observed was 33 percent of the EPA maximum contaminant level for gross alpha activity in drinking water. Six samples had gross beta activities above the minimum detectable concentration. All samples were within the range for naturally occurring beta activity in the Snake River Plain Aquifer. Five onsite production wells and three drinking water distribution systems showed detectable concentrations of tritium in one or more samples. The highest concentration observed was 66 percent of the EPA maximum contaminant level for tritium in drinking water. There is a*** localized plume of strontium-90 in the groundwater near INTEC, ***which is*** routinely sampled. While samples have historically contained detectable levels of strontium-90, none of the 199***9*** samples indicated detectable concentrations of strontium-90 (***ESERP 2002***).

Potential ***lifetime*** health effects to the offsite population from the groundwater pathway are reported in the SNF & INEL EIS and were calculated as an estimated latent cancer fatality risk of 1 occurrence in 170 million.

4.11.1.2 Nonradiological Health Risk

The potential health risk to workers and the public from exposure to carcinogenic and noncarcinogenic chemicals was assessed in Volume 2, Section 4.12.1 of SNF & INEL EIS. The assessment included the evaluation of health effects from routine airborne releases from facilities at INEEL. The three categories of exposed individuals were (1) a maximally exposed offsite individual, (2) population within 50 miles of

INTEC, and (3) noninvolved worker. The potential nonradiological health effects to workers and the public from routine air emissions calculated in DOE (1995) are summarized in the following paragraphs.

For non-occupational exposures to members of the public, data concerning the toxicity of carcinogenic and noncarcinogenic constituents were obtained from dose response values approved by the EPA (EPA 1993, 1994). The values included slope factors and unit risks for evaluating cancer risks, reference doses and reference concentrations for evaluating exposures to noncarcinogens, and primary National Ambient Air Quality Standards for evaluating criteria pollutants. For the individual noncarcinogenic toxic air pollutants (such as fluorides, ammonia, and hydrochloric and sulfuric acids), all hazard quotients were less than one. (The hazard quotient is a ratio of the calculated concentration in the air to the reference concentration.) This indicates that no adverse health effects would be projected as a result of noncarcinogenic emissions. The offsite excess cancer risk from carcinogenic emissions (such as arsenic, benzene, carbon tetrachloride, and formaldehyde) ranged from 1 in 1.4 million to 1 in 625 million. Current emission rates for some toxic pollutants (carcinogenic and noncarcinogenic) are higher than the baseline levels assessed in the SNF & INEL EIS, but resultant ambient concentrations are expected to remain below reference levels for public and occupational exposure. The hazard quotients for maximum baseline offsite criteria air pollutants were all less than one. These results indicate that no adverse health effects were projected from criteria pollutant emissions (DOE 1995). The recent actual site-wide emissions for criteria pollutants presented in Table 4-***11*** of this EIS would result in similar impacts. For each criteria pollutant except lead, the current (199***6*** and 199***7***) emission rates are less than the levels assessed in the SNF & INEL EIS. Table 4-1***2*** shows that ambient air concentrations offsite are all well below the ambient air quality standards.

For occupational exposures to workers at INEEL, DOE compared modeled chemical concentrations with the applicable occupational standard. The comparison was made by calculating hazard quotients, which for noncarcinogenic and carcinogenic air pollutants at INTEC were less than one. With one exception, the estimated INEEL concentrations of toxic air pollutants were estimated at levels well below those established for protection of workers. The exception was for maximum short-term benzene concentration, which slightly exceeded the standard at the maximum predicted location within the Central Facilities Area. These levels result primarily from emissions associated with petroleum fuel storage, handling, and combustion.

Drinking water from INTEC wells and distribution systems is routinely sampled for volatile organic compounds (***ESERP 2002***). For ***1999***, the EPA maximum contaminant levels and the State of Idaho drinking water limits were not exceeded. For chemical carcinogens, ***this means there would be*** an excess incidence of cancer risk of less than 1 occurrence in 1 million. No adverse health effects are expected as a result of ***noncarcinogenic chemical*** contaminants. Potable water at INEEL was monitored for coliform bacteria. ***Three of 76*** samples showed positive results for coliform at INTEC. ***All systems that tested positive were chlorinated and retested. This process is repeated until two consecutive samples show negative results for coliform bacteria (ESERP 2002).***

4.11.2 OCCUPATIONAL HEALTH AND SAFETY

The radiation doses and nonradiological hazards presented here are based on personnel monitoring data and reported occupational incidences at INEEL. For occupational exposure to ionizing radiation, health effects assessments are based on actual exposure measurements. For routine workplace hazards, the health risk is presented as reported injuries, illness, and fatalities in the workforce.

Risks to the worker are reduced by instituting health and safety programs. DOE relies on a program to keep worker exposures to radiation and radioactive material as low as reasonably achievable (ALARA). An effective ALARA program must balance minimizing individual worker doses from external and internal sources with the goal to minimize the collective dose of all workers in a given group. ALARA evaluations must consider individual and collective doses to ensure the minimization of both within the practical limits associated with minimization balancing. INEEL worker doses have typically been well below DOE worker exposure limits, and DOE will continue to use the ALARA program to maintain this level of safety.

DOE's Voluntary Protection Program was established to promote and recognize highly effective safety and health programs. Through the DOE-Voluntary Protection Program, INEEL's operating contractor has established a cooperative relationship in which management administers a comprehensive program that exceeds mere compliance and employees actively participate in the program and work with management to ensure a safe and healthful work site (LMITCO 1998).

Worker safety is also improved by the new Integrated Safety Management System. The INEEL Integrated Safety Management System Program Description (LMITCO 1999) is a document that defines the safety culture for INEEL. Safety at INEEL has been governed by many different procedures. This new plan outlines how all of the various safety programs, procedures, and documents relate to and integrate with each other. The term "safety" includes all aspects of environmental, safety, and health management including pollution prevention and waste minimization. The Plan covers the issues, responsibilities, methodologies, documents, and training (safety culture) that protects the worker, noninvolved worker, public, environment, and programmatic facilities (environmental targets).

4.11.2.1 Radiological Exposure and Health Effects

Radiological workers are trained to work safely in areas controlled for radiological purposes. Radiological workers at INEEL and INTEC may be exposed either internally (from inhalation and ingestion) or externally (from direct exposure) to radiation. The largest fraction of occupational dose received by INEEL and INTEC workers is from external radiation from direct exposure. The average occupational dose from ***1997*** to ***2000*** to individuals with measurable doses was ***84*** millirem, which results in an average annual collective dose of about *77* person-rem (DOE ***2000, 2001***). This collective dose corresponds to ***0.031*** LCFs resulting from each year of exposure to INEEL personnel, including INTEC personnel. The average occupational dose DOE-wide from ***1997*** to ***2000*** to individuals with measurable doses was ***76*** millirem, which results in an average annual collective dose of about ***1,310*** person-rem (DOE ***2000, 2001***); this corresponds to ***0.52*** LCFs resulting from each year of exposure to all DOE workers. For airborne emissions (as shown in Table 4-2*7*), the maximum dose to an onsite worker from permanent facility emissions is 0.***27*** millirem.

4.11.2.2 Nonradiological Exposure and Health Effects to the Onsite Population

At INEEL, occupational nonradiological health and safety programs include industrial hygiene programs and occupational safety programs. Total recordable case rate for injury and illness incidence at INEEL varied from an annual average of 3.1 to 3.7 per 200,000 work hours from 1992 to 1996. During this time, total lost workday cases ranged from 1.3 to 1.8 per 200,000 work hours (DOE 1997). The total recordable case rate for injury and illnesses for INEEL workers is less than that for DOE and its contractors at other facilities, which varied from 3.5 to 3.8 per 200,000 work hours. During this time, total lost workday case rate varied from 1.6 to 1.8 per 200,000 work hours (DOE 1997). Two fatalities have occurred at INEEL between 1992 and July 1998. One incident occurred when a construction worker fell from an elevated area. The second incident occurred when a carbon dioxide fire suppression system activated during routine maintenance in an electrical switchgear building, causing asphyxiation of one employee.

4.12 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs Federal agencies to make the achievement of environmental justice part of their mission. ***Federal agencies do this*** by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations. Where appropriate, Federal agencies will indicate the potential for disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, and Indian tribes. When conducting National Environmental Policy Act evaluations, DOE incorporates environmental justice considerations into both its technical analyses and its public involvement program in accordance with EPA and Council on Environmental Quality guidance (CEQ 1997).

This section identifies minority and low-income populations in the geographic area near the proposed action. Demographic information from the U.S. Bureau of Census (USBC 1992***, 2000***) was used to identify minority populations and low-income populations within a 50-mile radius of INTEC. ***Census 2000 data was used to identify minority populations. Low-income populations are based on the 1990 census data. The low-income population data from the 2000 Census has not been released.*** This 50-mile ***radius*** was selected because it was consistent with the region of influence for air emissions and because it includes portions of the seven counties that constitute the region of influence for socioeconomics. The circle has INTEC at its center since the actions proposed in this EIS would be carried out at INTEC. Therefore, INTEC would be the source of most emissions with the potential for producing disproportionate human health or environmental impacts to minority populations, low-income populations, and children. In addition, all of the facility accidents analyzed in Section 5.2.14 of this EIS were postulated to occur at INTEC. Potential impacts to minority populations and low-income populations in the region of influence from implementation of the proposed alternatives are analyzed in Chapter 5.

4.12.1 COMMUNITY CHARACTERISTICS

Demographic maps were prepared using 1990 ***and 2000*** census data from the U.S. Bureau of Census. These maps were generated with census tracts and Block Numbering Areas (BNAs) defined by the Bureau of the Census, as geographical information system files supplied by Environmental Systems Research Institute, Inc. and provided by Geographic Data Technology, Inc. Census tracts are designated areas that encompass from 2,500 to 8,000 people. Block numbering areas follow the same basic criteria as census tracts in counties without formally-defined tracts. Both are derived from the Bureau of Census TIGER/Line files. Figures 4-2***0*** and 4-2***1*** illustrate census tract distributions for minority populations and low-income populations. Environmental justice guidance developed by the Council on Environmental Quality defines "minority" as individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic (CEQ 1997). The Council defines these groups as minority populations when either the minority population of the affected area exceeds 50 percent or the percentage of minority population in the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis.

Low-income populations are identified using statistical poverty thresholds from the Bureau of Census Current Population Reports, Series P-60 on Income and Poverty. In identifying low-income populations, a community may be considered either as a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect. The threshold for the 1990 census was a 1989 income of $12,674 for a family of four. This threshold is a weighted average based on family size and ages of the family members. Table 4-2***9*** presents the U.S. Census poverty thresholds (USBC 1992).

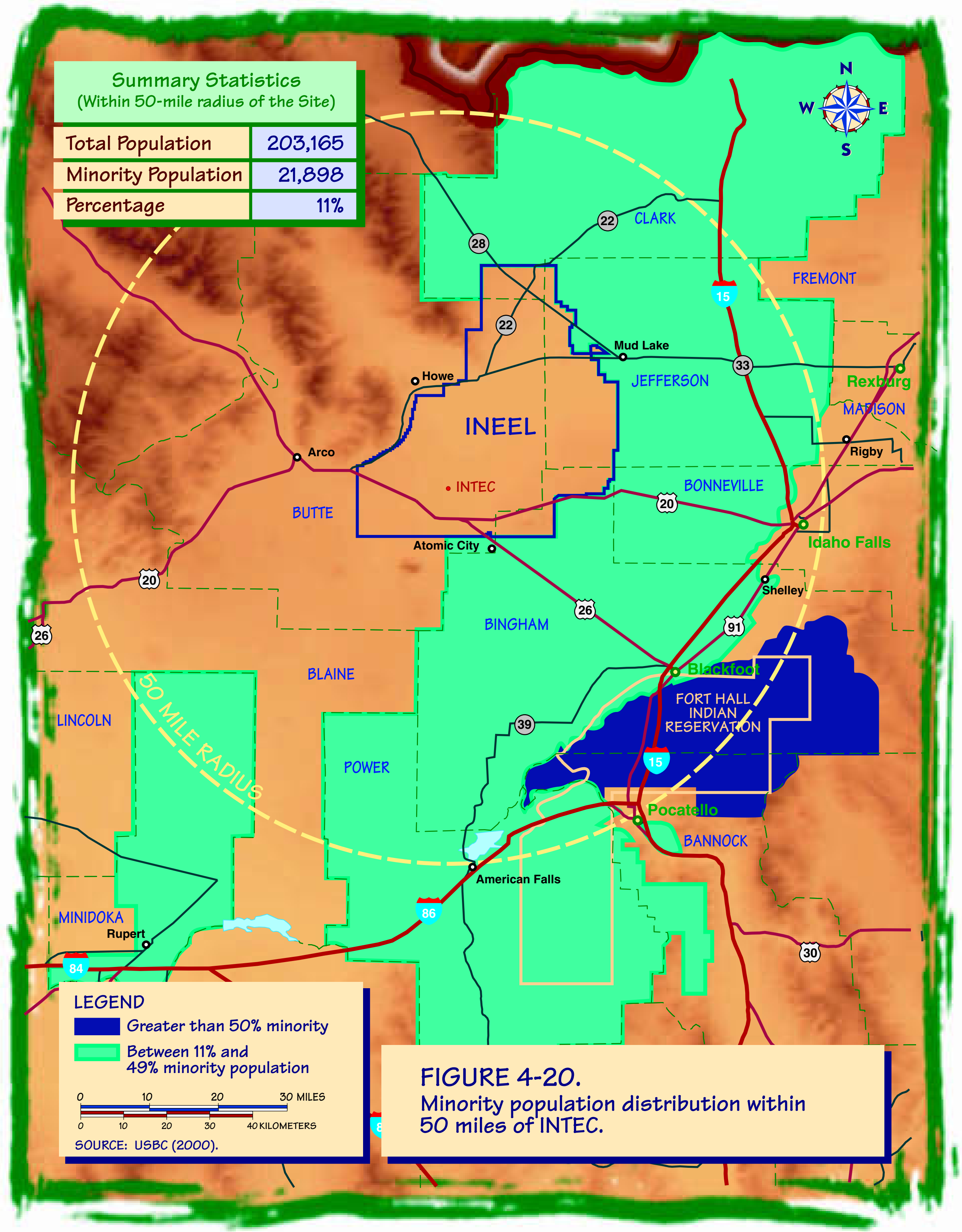

FIGURE 4-20.
Minority population distribution within 50 miles of INTEC.

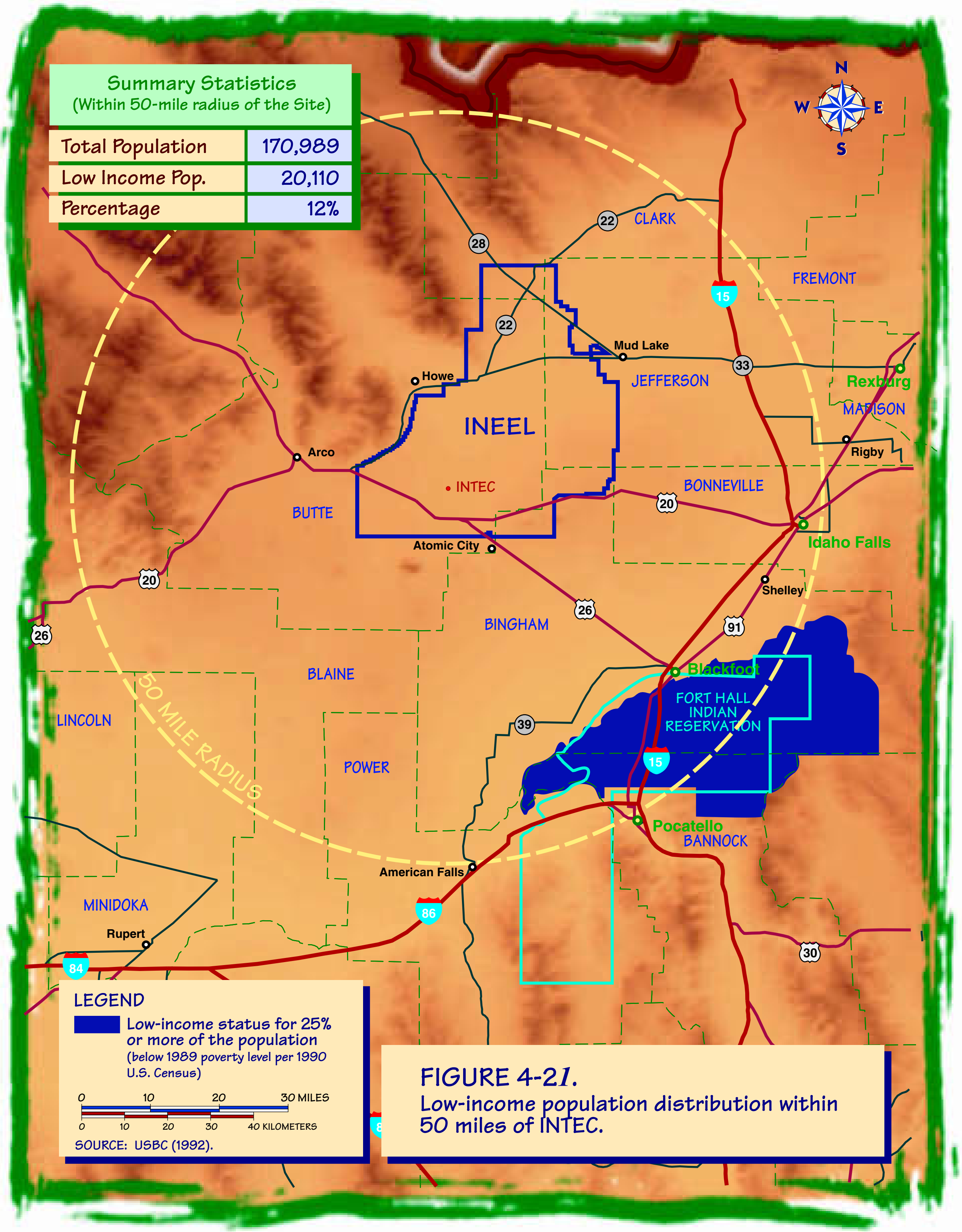

FIGURE 4-21.
Low-income population distribution within 50 miles of INTEC.

Table 4-29. U.S. Census poverty thresholds in 1989 by size of family and number of related children under 18 years.[a]

Size of Family Unit	Weighted average threshold ($)	Children under 18 years None ($)	One ($)	Two ($)	Three ($)	Four ($)	Five ($)	Six ($)	Seven ($)	Eight or more ($)
One person (unrelated individual)	6,310									
Under 65 years	6,451	6,451								
65 years & over	5,947	5,947								
Two persons	8,076									
Household under 65 years	8,343	8,303	8,547							
Household 65 years and over	7,501	7,495	8,515							
Three persons	9,885	9,699	9,981	9,990						
Four persons	12,674	12,790	12,999	12,575	12,619					
Five persons	14,990	15,424	15,648	15,169	14,796	14,572				
Six persons	16,921	17,740	17,811	17,444	17,092	16,569	16,259			
Seven persons	19,162	20,412	20,540	20,101	19,794	19,224	18,558	17,828		
Eight persons	21,328	22,830	23,031	22,617	22,253	21,738	21,084	20,403	20,230	
Nine or more persons	25,480	27,463	27,596	27,229	26,921	26,415	25,719	25,089	24,933	23,973

a. Source: USBC (1992)

4.12.2 DISTRIBUTION OF MINORITY AND LOW-INCOME POPULATIONS

Accordingly to the ***2000*** census data, ***203,165*** people resided within the 50-mile INTEC region of influence. Of that population, approximately ***21,898*** individuals (***11*** percent) are classified as minority individuals. The minority composition is primarily Hispanic, Native American, and Asian. The Fort Hall Indian Reservation of the Shoshone-Bannock Tribes lies largely within the 50-mile region of influence. The spatial distribution of minority populations residing in 42 census tracts within 50 miles of INTEC is shown in Figure 4-2***0***. In some cases, census tracts lie partly within the 50-mile radius circumference. Because the exact distribution of the populations within such tracts is not available, the data are insufficient to allow a precise count. To address this situation, the entire population of census tracts that were bisected by the 50-mile radius circumference line is included in the analysis.

According to the 1990 census data, 170,989 people resided within the 50-mile INTEC region of influence. Of ***that*** total population, approximately 20,110 individuals (12 percent) fall within the definition of low-income for the purpose of this analysis. ***Note that the U.S. Census Bureau has not released low-income population data for the 2000 census.*** Figure 4-2***1*** shows the spatial distribution of low-income individuals within the 50-mile region of influence.

4.13 Utilities and Energy

This section provides baseline usage rates on current INEEL utilities and energy, focusing on INTEC. It includes water consumption, electricity consumption, fuel consumption, and wastewater disposal. The contents of this section are tiered from Volume 2 of the SNF & INEL EIS (DOE 1995).

4.13.1 WATER CONSUMPTION

The water supply system for each INEEL facility area is provided independent of other facilities by a system of wells. DOE holds a Federal Reserve Water Right permitting INEEL to claim 36,000 gallons per minute of groundwater, not to exceed 11.4 billion gallons per year. Water consumption rates at each facility area are calculated based on the cumulative volume of water withdrawn from production wells for each facility. A total of 1.***1*** billion gallons of water was pumped from the aquifer by the INEEL during ***fiscal year (FY) 2000***; of that, 0.***36*** billion gallons was pumped by INTEC (***Fossum 2002***). A majority of this water returns to the aquifer through seepage ponds, with the remaining water lost to the atmosphere through cooling towers and other evaporation processes.

4.13.2 ELECTRICITY CONSUMPTION

DOE presently contracts with Idaho Power Company to supply power to INEEL. The contract allows for power demand of up to 45,000 kilowatts, which can be increased to 55,000 kilowatts by notifying Idaho Power in advance. Power demand above 55,000 kilowatts is possible but would have to be negotiated with Idaho Power. INEEL customers (INTEC, Test Reactor Area, etc.) pay about $0.04***9*** per kilowatt hour, which is a combination of the rate Idaho Power charges and costs the INEEL operating contractor adds for maintaining the INEEL power system and general and accounting costs. Idaho Power transmits power to INEEL via a 230-kilovolt line to the Antelope substation, which is owned by PacifiCorp (Utah Power Company). PacifiCorp also has transmission lines to this substation, which provides backup in case of problems with the Idaho Power system. At the Antelope substation the voltage is dropped to 138 kilovolts, then transmitted to the DOE-owned Scoville substation via two redundant feeders. The INEEL transmission system is a 138-kilovolt 65-mile loop configuration that encompasses seven substations, where the power is reduced to distribution voltages (13.8 or 12.5 kilovolts) for use at the various INEEL facilities. The loop allows for a redundant power feed to all substations and facilities.

Peak demand on this electrical power system for FY ***2001*** was ***36*** megawatts, compared to ***34*** megawatts for FY ***2000***. The monthly average consumption on this system for ***FY 2001*** was ***16,387*** megawatt-hours. Past years were ***16,713*** megawatt-hours for FY ***2000***, ***16,984*** megawatt-hours for FY ***1999***, ***18,067*** megawatt-hours ***for*** FY ***1998***, and ***18,328*** megawatt-hours for FY ***1997***. Yearly average consumption was ***208,000*** megawatt-hours for FYs ***1997*** to ***2001 (Fossum 2002)***. Monthly average consumption of purchased power increased substantially after 1994 because the Experimental Breeder Reactor-II was shut down. Power supplied by this reactor prior to 1995 now must be purchased from Idaho Power Company.

4.13.3 FUEL CONSUMPTION

Fossil fuels consumed at INEEL include fuel oil, diesel fuel, gasoline, ***and*** propane (liquid petroleum gas). All fuels are provided and transported by various distributors to each facility.

Fossil fuels consumed at INTEC include fuel oil. In ***FY 2001***, INTEC facilities used ***1.1 million*** gallons of fuel oil (***Fossum 2002***).

4.13.4 WASTEWATER DISPOSAL

Wastewater systems at smaller facility areas consist primarily of septic tanks, drain fields, and lagoons. Wastewater treatment facilities are also provided for larger facility areas including INTEC, Central Facilities Area, and Test Reactor Area.

Annual wastewater discharge volume at INEEL for 1996 was 1.2 billion gallons, compared to 1.1 billion gallons in 1995 and 1.4 billion gallons in 1994. The difference between water pumped and wastewater discharge is caused mainly by evaporation from ponds and cooling towers.

4.14 Waste ***Management***

This section summarizes the management of wastes (hazardous, mixed low-level, low-level, transuranic, industrial solid, and high-level) and presents an overview of the current status of the various waste types generated, stored, and disposed of at INEEL. This section also summarizes Waste Minimization/Pollution Prevention programs in place to reduce the hazard and quantity of waste generation at INEEL.

The total amount of waste generated and disposed of at INEEL has been reduced through waste minimization and pollution prevention. More detailed descriptions can be found in the *Annual Report of Waste Generation and Pollution Prevention Progress* (DOE 1997a) and the DOE *Pollution Prevention Plan* (DOE 1997b).

INEEL has programs and physical or engineered processes in place to reduce or eliminate waste generation and to reduce the hazard, toxicity, and quantity of waste generated. Waste is also recycled to the extent possible before, or in lieu of, its storage or disposal. In addition, the site has achieved volume reduction of radioactive wastes through more intensive surveying, waste segregation, and use of administrative and engineering controls. These programs and their accomplishments have been described in various documents including site treatment plans (DOE 1998a) and annual progress reports (DOE 1997a).

Waste minimization technologies expected to be used to ***reduce the liquid waste going into the Tank Farm*** include using non-chemical decontamination systems, improving practices in the Process Equipment Waste Facility, and recycling acids for use in the New Waste Calcining Facility calciner. A key milestone under the settlement agreement ***among*** DOE, the State of Idaho, and the U.S. Navy calls for the Tank Farm to be empty of all liquid radioactive waste by 2012. Efforts initiated as a result of the Liquid Waste Minimization Incentive Plan are expected to play a major role in the INEEL's ability to meet this milestone.

Table 4-***30*** provides a summary of waste volumes for individual waste types at INEEL. Each waste type is then discussed further in the sections that follow.

4.14.1 INDUSTRIAL SOLID WASTE

Industrial and commercial solid waste is disposed at the INEEL Landfill Complex in the Central Facilities Area. About 225 acres are available for solid waste disposal at the Landfill Complex. The capacity is sufficient to dispose of INEEL waste for 30 to 50 years. Recyclable materials are segregated from the solid waste stream at each INEEL facility. The average annual volume of waste disposed of at the Landfill Complex from 1988 through 1992 was 52,000 cubic meters (EG&G 1993). For 1996 and 1997, the volume of waste was approximately 45,000 and 54,000 cubic meters, respectively. ***The average annual volume of waste disposed of from 1998 through 2001 was approximately 43,000 cubic meters (Pruitt 2002a).***

Table 4-*30*. Summary of waste volumes awaiting treatment and disposal at INEEL.[a]

Waste type[b]	Current inventory (cubic meters)	Annual generation (cubic meters)
Industrial solid[c]	–[d]	***43,000***
Hazardous waste[e]	None[f]	120
MLLW	***2,100***[g]	***160***[g]
LLW	***980***[h]	***2,900***[h]
Transuranic waste[i,j]	65,000	–
HLW (calcine)	***4,400***	–
Mixed transuranic waste/ SBW	***1,000,000 gallons***	–

a. Does not include waste already disposed of at the Radioactive Waste Management Complex or other locations.
b. Waste types: MLLW = mixed low-level waste; LLW = low-level.
c. Source: ***Pruitt (2002a).***
d. Dash indicates no information is available.
e. Source: DOE (1996).
f. Waste is shipped off-site before any significant inventory buildup.
g. Source: DOE (***2002***).
h. Source: ***Pruitt (2002b)***.
i. Source: DOE (1995).
j. A portion of the 65,000 cubic meters of transuranic waste retrievably stored at the Radioactive Waste Management Complex may be reclassified as alpha MLLW. It has been estimated that approximately 40 percent of the 65,000 cubic meters is alpha MLLW and 60 percent is actually transuranic waste.

4.14.2 HAZARDOUS WASTE

The INEEL's hazardous waste management strategy is to minimize generation and storage, and use private sector treatment and disposal. Approximately 120 cubic meters of hazardous waste are generated at the site each year. Hazardous waste is treated and disposed of at offsite facilities and is transported by the contracted commercial treatment facility. The waste is packaged for shipment according to the receiving facility's waste acceptance criteria. The waste generator normally holds waste in a temporary accumulation area until it is shipped directly to the offsite commercial treatment facility.

4.14.3 MIXED LOW-LEVEL WASTE

Presently, there are about ***2,100*** cubic meters of mixed low-level waste in inventory at INEEL (DOE ***2002***). In addition to the current volume of mixed low-level waste in inventory at the site, approximately ***160*** cubic meters of mixed low-level waste is generated annually (DOE ***2002***). Several mixed waste treatment facilities exist at the INEEL.

4.14.4 LOW-LEVEL WASTE

Approximately 170,000 cubic meters of low-level waste have been disposed of at the Radioactive Waste Management Complex (DOE 1995, 1997c). Currently, about ***980*** cubic meters of low-level waste are in inventory at INEEL (***Pruitt 2002b***). All on-site-generated low-level waste is stored temporarily at generator facilities until it can be shipped directly to the Radioactive Waste Management Complex for disposal. DOE expects ***to stop accepting contact-handled low-level waste and remote-handled low-level waste at*** the Radioactive Waste Management Complex in ***2020 (Seitz 2002)***.

4.14.5 TRANSURANIC WASTE

Approximately 65,000 cubic meters of transuranic and alpha-contaminated mixed low-level waste are retrievably stored, and 60,000 cubic meters of transuranic waste have been buried at the Radioactive Waste Management Complex (DOE 1995). The Radioactive Waste Management Complex is made up of seven Type II storage modules, each of which can hold up to 4,465 cubic meters of waste in drums or boxes. The total storage capacity is 31,255 cubic meters. The processing capacity of the Advanced Mixed Waste Treatment Facility is 6,500 cubic meters per year and the expected duration of facility operation is 30 years (DOE 1999). All 65,000 cubic meters of the retrievably stored waste were considered to be transuranic waste when first stored at INEEL. In 1982, DOE Order 5820.2 changed the definition of transuranic waste. The new definition excluded alpha-emitting waste less than 100 nanocuries per gram at the time of assay. Since all of the waste was initially considered to be transuranic waste, the alpha wastes were comingled in the same containers as the transuranic waste.

DOE has not determined the disposition of the buried transuranic waste (DOE 1995). However, DOE currently plans to treat and repackage the retrievably-stored transuranic and alpha-contaminated low-level waste so that all the resulting waste qualifies as transuranic waste. This waste would then be certified and shipped to the Waste Isolation Pilot Plant in New Mexico for final disposition. The Record of Decision from the *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement* was issued in January 1998 (DOE 1998***b***) and the first shipments of transuranic waste from the INEEL to the Waste Isolation Pilot Plant occurred in April and August 1999. Since the October 1988 ban by the State of Idaho on shipments of transuranic waste to INEEL, DOE has shipped only small amounts of transuranic waste generated on the site to the Radioactive Waste Management Complex for interim storage.

4.14.6 HIGH-LEVEL WASTE

From 1952 to 1991, DOE processed spent nuclear fuel and irradiated targets at the INTEC. The resulting liquid mixed HLW was stored in the Tank Farm. Mixed transuranic waste/SBW generated from the cleanup of solvent used to recover uranium and from decontamination processes at the INTEC is also stored in the Tank Farm. Although not directly produced from spent nuclear fuel processing, mixed transuranic waste/SBW at INEEL has been historically managed as HLW because of some of its physical properties. For purposes of analysis, the EIS assumes that SBW is mixed transuranic waste.

At present, approximately ***4,400*** cubic meters of HLW calcine are stored at INTEC. INEEL no longer generates liquid mixed HLW because spent nuclear fuel processing has been terminated (DOE 1995). All liquid mixed HLW produced from past processing has been blended and reprocessed, through calcination, to produce granular calcine. Mixed transuranic waste/SBW is generated from incidental activities associated with operations at INTEC (DOE 1996). Currently, there are approximately ***1*** million gallons of mixed transuranic waste/SBW in storage at INTEC and this is expected to be reduced to about 800,000 gallons by the time processing begins under the proposed action (Barnes 1999).