DOE/EA-1555

ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED CONSOLIDATION AND EXPANSION OF IDAHO NATIONAL LABORATORY RESEARCH AND DEVELOPMENT AT A SCIENCE AND TECHNOLOGY CAMPUS

March 2007

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ACRONYMS

APAD	Air Permit Applicability Determination
CAES	Center for Advanced Energy Studies
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DOE	Department of Energy
EA	Environmental Assessment
EDE	Effective Dose Equivalent
EPA	Environmental Protection Agency
EPAct	Energy Policy Act of 2005
EROB	Engineering Research Office Building
FEMA	Federal Emergency Management Agency
INL	Idaho National Laboratory
IRC	INL Research Center
ISU	Idaho State University
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NHSB	National and Homeland Security Building
PSD	Prevention of Significant Deterioration
R&D	Research and Development
RESL	Radiological and Environmental Sciences Laboratory
ROI	Region of Interest
RTC	Reactor Technology Complex
STC	Science and Technology Campus
STL	Science and Technology Laboratory
T&E	Threatened and Endangered
WCB	Willow Creek Building

1. PURPOSE AND NEED FOR AGENCY ACTION

The Energy Policy Act of 2005 (EPAct) directs the Secretary of Energy to conduct programs of civilian nuclear energy research, development, demonstration, and commercial application. In conducting those programs, the EPAct requires the Department of Energy (DOE) to consider several objectives that include enhancing nuclear power's viability as part of the United States energy portfolio; providing the technical means to reduce the likelihood of nuclear proliferation; and developing, planning, constructing, acquiring, and operating special equipment and facilities for the use of researchers. In addition to nuclear energy research, the Idaho National Laboratory (INL) is involved with various national security programs. The national security program at INL has been expanding due to rapidly changing and sophisticated national security threats, resulting in a need to expand its research and development activities to assess and counter those threats.

The INL has been, and continues to be, the core of the Nation's expertise in civilian nuclear power research, development, and demonstration. Since its inception in the early 1950s as the National Reactor Testing Station, the INL has maintained the unique infrastructure and expertise for leading and supporting other national and energy security missions of the Nation, especially the Navy. Presently, the DOE's Idaho Operations Office maintains laboratory, research and development, and business facilities in Idaho Falls, Idaho for the purpose of supporting these research activities, currently referred to as the INL Science and Technology Campus (STC). These facilities include the Idaho Research Center (IRC), used principally as an experimental research facility dedicated to such research topics as industrial microbiology, geochemistry, materials characterization and testing, welding, ceramics, thermal fluids behavior, analytical and environmental chemistry, and biotechnology. The IRC also supports nuclear and other energy-related programs that are located at the INL

Site west of Idaho Falls (Figure 1), and provides the capability for conducting independent research and development in cooperation with other government

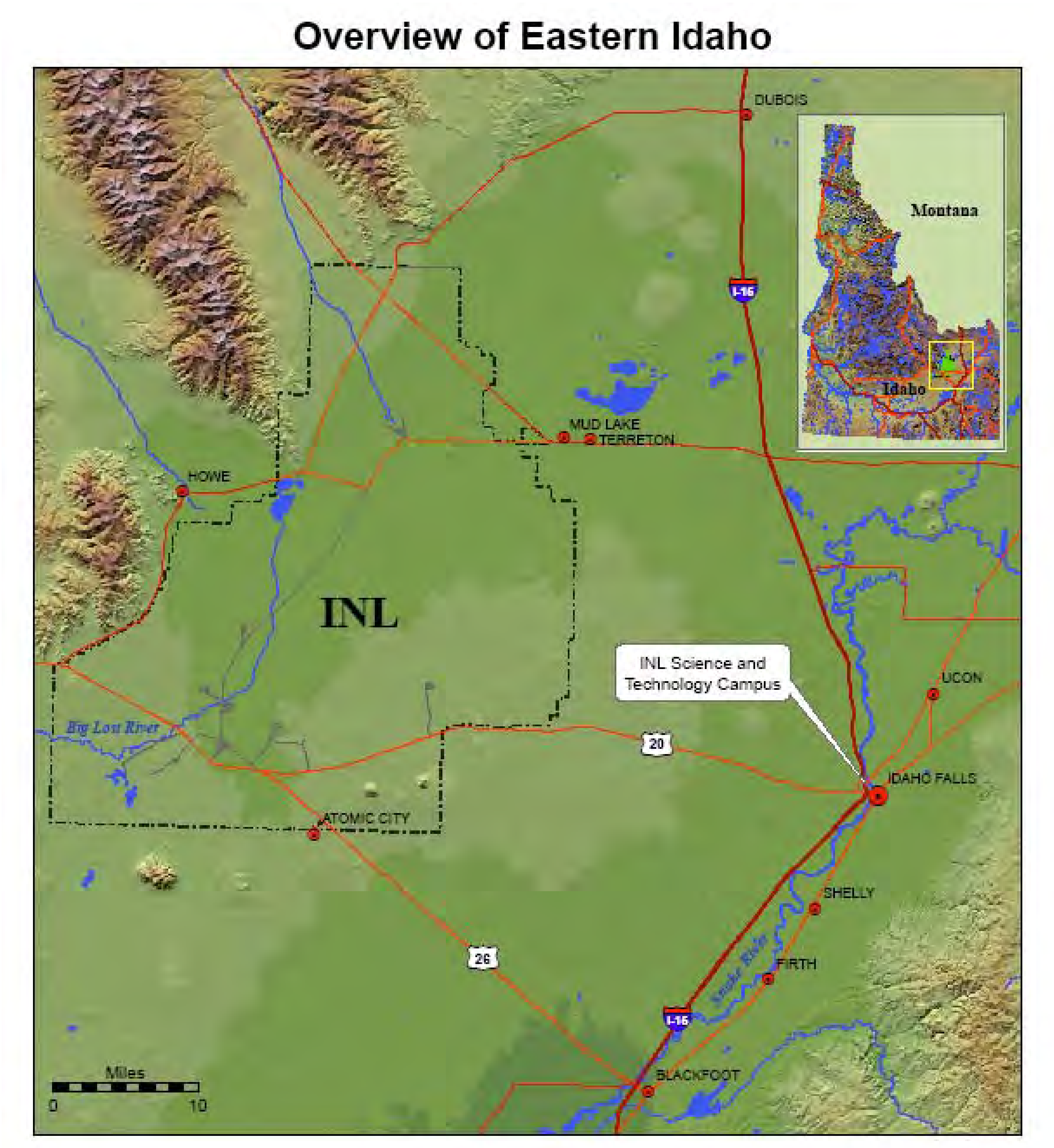

Figure 1. Map of eastern Idaho showing separation of Idaho Falls and the Idaho National Laboratory Site.

agencies, private companies, universities, and nonprofit organizations. Other leased and government-owned facilities throughout the Idaho Falls area include the North Holmes Laboratory, May Street North and May Street South, the North Yellowstone Laboratory, the Heyrend Way Laboratory, and the INL Bus Dispatch site (Figure 2). These outlying leased sites are necessary largely due to inadequate infrastructure available at the IRC. These office and research areas are located miles apart from each other, having been acquired over time as research needs have expanded.

To respond to Congressional direction in the EPAct for further expansion of research and development and changing national security threats, it is very important that the INL have access to updated and co-located facilities for conducting multidisciplinary, leading-edge research, business, and collaborative activities to enhance efficiency and minimize administrative and other costs. These facilities are also necessary if the INL is to compete for, attract, and retain high quality researchers and staff as well as collaboration with internationally recognized scientists and engineers, including university faculty, representatives of other federal agencies, state and regional government officials, business (industrial) partners, and other prominent personnel involved in research relevant to energy security.

Effective intellectual and business collaboration is not possible in cramped buildings that are not up-to-date technologically and are broadly scattered throughout the area, operating under differing business arrangements, with varying ownership. Furthermore, as the existing facilities continue to age and without extensive maintenance and upgrade, facility performance will continue to deteriorate and make operations of existing laboratories and office buildings impractical. DOE must decide the best way to accommodate expected program growth as well as programs that may need to be relocated due to substandard facility conditions.

1.1 Proposed Action: The proposed action is to consolidate and expand existing laboratory and business capabilities and operations within a single geographic area, or central campus, within the Science and Technology Campus (STC) located in Idaho Falls. The proposed expanded operations would accommodate anticipated program growth while allowing for the consolidation of various activities located around the Idaho Falls area. Selected projects and programs currently housed at facilities at the INL Site west of Idaho Falls may also be relocated to the STC. These include low-hazard programs currently performed at the Reactor Technology Complex (RTC) and the Radiological and Environmental Science Laboratory (RESL). It should be emphasized, however, that only programs that present minimal potential hazards to workers or the public will be moved to or developed in Idaho Falls; activities associated with higher potential hazard levels will remain at the INL Site approximately 50 miles west of the city.

1.2 Summary of Research and Development Activities to be Conducted at the Science and Technology Campus

Research and development (R&D) programs that would be conducted at the STC include microbiology (less than bio safety level 3), geochemistry, materials characterization and testing, welding, ceramics, thermal fluids behavior, analytical and environmental chemistry, and biotechnology. Those programs would operate a variety of sealed radiation sources, and would maintain state-of-the-art irradiation, measurement, and spectrometry capabilities.

2. DESCRIPTION OF THE ALTERNATIVES

As described in Section 1, a need has been identified to enhance INL laboratory and business capabilities to accommodate expected program growth and project and programs that may need to be relocated due to substandard facility conditions. This Environmental Assessment (EA) will analyze four alternatives identified by the Department of Energy:

- Alternative 1 (**preferred alternative**): Lease of privately-owned and constructed STC facilities at a single location;
- Alternative 2: DOE construction and ownership of new STC facilities funded by Congressional line-item and at a single location;
- Alternative 3: Consolidation and expansion within existing facilities; and
- Alternative 4: No action.

The following two criteria are established for the evaluation of the alternatives identified and described in this environmental assessment:

1. Allows for effective collaboration with partner companies, laboratories, and universities. Effectiveness will be judged in terms of time, safety and facilitation of international collaborations.
2. Provides adequate space and capabilities to meet expected program growth. Adequacy will be judged in terms of support system capabilities, laboratory configurations, collaboration space availability and security/classified space needs.

These criteria were used to help determine the range of potential alternatives that best met the purpose and need. Using these criteria, the three alternatives selected for full evaluation in this NEPA assessment are those that were deemed most responsive from the range of alternatives which included other options such as performing work at new or existing facilities at the INL Site.

2.1 Alternative 1 (Preferred Alternative) – Lease of privately-owned and constructed STC facilities: The preferred alternative is to consolidate and expand INL laboratory and business operations in privately-owned and constructed facilities at a single geographic area, or central campus, in the city of Idaho Falls. Activities associated with this alternative would accommodate or allow for:

1. Anticipated growth of several key mission programs;
2. Consolidation of activities presently conducted at small, leased facilities in Idaho Falls; and
3. Relocation to town of selected projects and programs currently located at the INL Site.
4. The best programmatic approach to obtain the needed capabilities.

The location for the proposed central campus under this alternative would be on privately-owned land primarily to the north and east of the existing Engineering Research Office Building (EROB) in Idaho Falls (Figure 3). Currently existing INL buildings in the general area would also be considered as integral parts of the STC. This would include both existing DOE-owned and the privately-owned buildings that are currently leased by the INL contractor. Work in the satellite leased facilities in Idaho Falls could be relocated to either the IRC or central campus buildings, as appropriate.

The new facilities would potentially include a Science and Technology Laboratory (STL), a National and Homeland Security Building and new parking garages and outside parking lots. An additional laboratory building and an administration building not shown on Figure 3 may be added at some time in the future. Some changes in this current configuration could still occur.

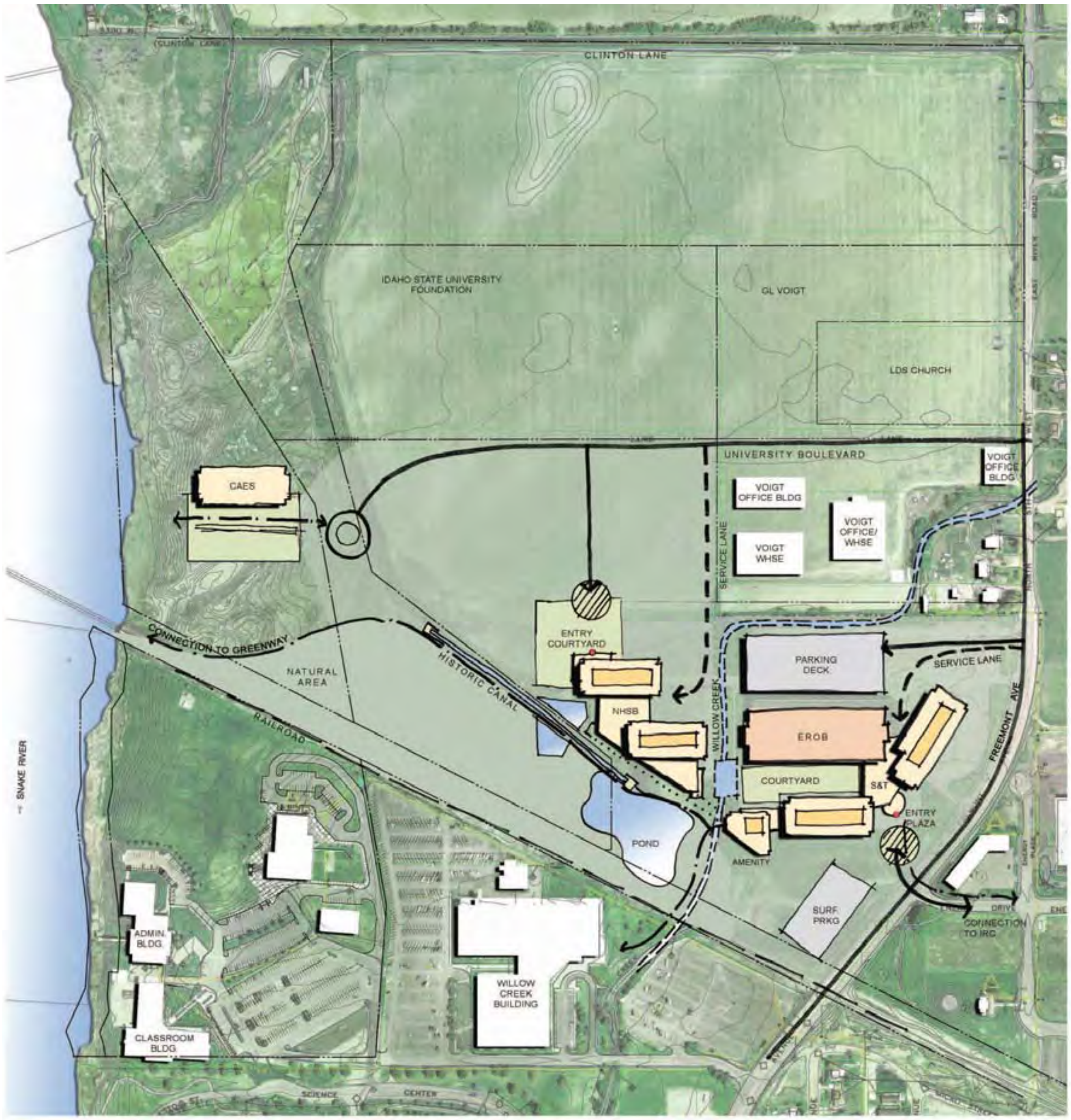

Figure 3. Planned layout for proposed INL Science and Technology Central Campus. Also shown in Figure 3 is the location for the Idaho State University (ISU) Center for Advanced Energy Studies (CAES) and a series of planned privately owned buildings labeled as "Voigt" buildings. Although INL will collaborate with ISU in activities conducted at the CAES, the facility will be owned and operated exclusively by the University.

Work performed within the STL would be consistent with identified research and development programs. Laboratories and activities required to be at the INL Site for reasons relating to logistics or potential hazard level would ***not*** be housed at the STC or other in-town facilities. Activities and radiological inventories proposed for the STL and other buildings comprising the STC are typical of the types of R&D conducted at major research universities found in the region such as Idaho State University in Pocatello, Utah State University in Logan, and the University of Utah in Salt Lake City (see table 1).

Table 1. Radionuclide inventories for three regional universities, as licensed by the U.S. Nuclear Regulatory Commission.

Nuclide	Idaho State University (Ci)	Utah State University (Ci)	University of Utah (Ci)
Pu-239	1.00E-03	1.00E-02	6.10E-02
Np-237	1.00E-03	1.00E-03	5.00E-01
Am-241	1.00E-03	1.00E-03	5.00E-01
U-238	1.00E-03	1.00E-03	1.00E+00
Cs-137	2.50E-01	1.00E+00	5.00E-01
Tc-99	2.50E-01	1.00E+00	5.00E-01
C-14	2.50E-01	1.00E+01	5.00E-01
P-32	2.50E-01	1.00E+00	5.00E-01
Ce-144	2.50E-01	1.00E+00	5.00E-01
S-35	2.50E-01	1.00E+00	5.00E-01
H-3	1.00E+01	2.00E+01	2.00E+01

2.2 Alternative 2 – DOE Congressional Line-Item Construction and Ownership: This alternative differs from the preferred alternative in that DOE would obtain funding for the construction and operation of new STC buildings and ancillary facilities. Under this alternative, DOE would request federal appropriations from Congress to cover all construction costs for new facilities. Potential delays in obtaining line-item funding could also mean that land described above presently available for the development of the central campus may no longer be available, and an alternative site would have to be selected.

2.3 Alternative 3 – Consolidation and Expansion Within Existing Facilities: Under this alternative, programs would continue to use existing facilities, and no new buildings would be constructed or leased at a central location within the Science and Technology Campus. Program growth would be restricted primarily by the availability of laboratory space, and some existing programs would likely be terminated to make room for new programs. Total growth of INL R&D activities would therefore in turn be restricted. Although this alternative would allow for DOE to meet a substantial proportion of the stated needs, restrictions in program growth resulting from antiquated and limited existing laboratory space would not likely provide for the full extent of DOE needs for consolidation and expansion of R&D activities.

2.4 Alternative 4 – No Action**:** The "no action" alternative is used as a baseline against which the proposed action and alternatives may be compared. Under the "No action" alternative, therefore, DOE would continue use the IRC and to lease currently used facilities throughout the Idaho Falls vicinity with no major expansion of R&D activities, and no changes in emission types or rates.

3. AFFECTED ENVIRONMENT

The purpose of this section is to describe the current environmental conditions that could potentially be impacted by the proposed action. Included are descriptions of the location of the central campus as described for the preferred alternative, and of current INL facilities in Idaho Falls. Summaries of the environmental and cultural resources present in the area are provided. Socioeconomic information and existing infrastructure present in the area are also summarized.

3.1 Location and Land Ownership: The City of Idaho Falls (Bonneville County) is located in southeastern Idaho on the southeastern margin of the Snake River Plain (Figure 1). The existing IRC complex, Willow Creek Building (WCB), and EROB are located on the northern edge of the city. The site of the central campus in the preferred alternative is in the area immediately surrounding the existing EROB (Figure 3). Most of the proposed development area is just outside of the current city limits, and is therefore presently administered by Bonneville County. However, the central campus site is slated to be annexed into the city to accommodate industrial residential, commercial and/or educational institution growth including (but not limited to) that associated with expansion of INL activities as shown by the City of Idaho Falls Land Use Plan (December 2000) and current zoning maps.

The central campus development area is currently under multiple ownership (Figure 4). Note that the locations shown for various buildings in Figure 4 are based on an old model of the central campus. Current planned locations are shown in Figure 3. The area that is expected to be used for construction of central campus is either owned by the Idaho State University (ISU) Foundation, Inc. or is privately held land. For the purposes of this EA, the area assessed includes all of the parcels shown in yellow and blue on Figure 4.

INL Science and Technology Campus - Ownership

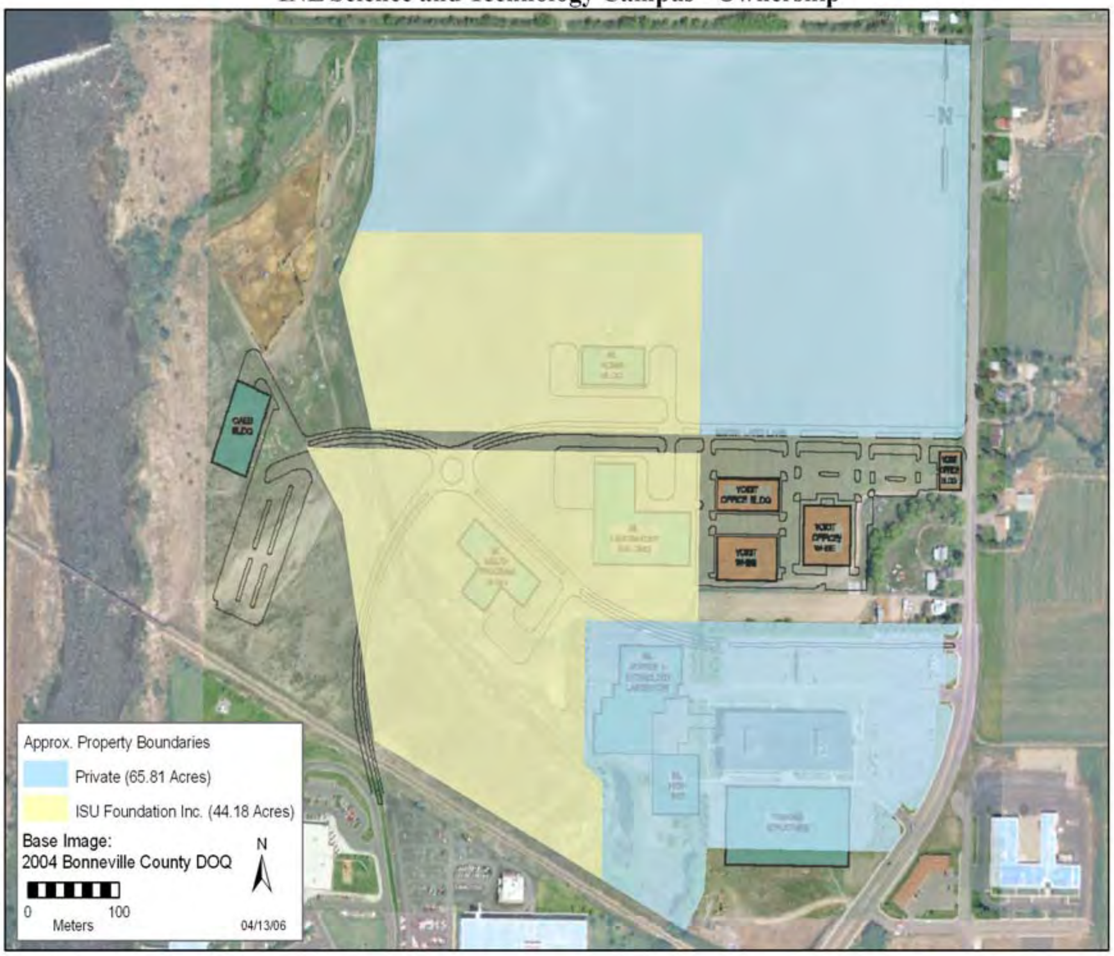

Figure 4. Current land ownership for the central campus area.

3.2 Climate: The climate of the Snake River Plain is characterized as that of a semiarid steppe. The average annual temperature is approximately 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 approximately 22 centimeters (8.7 inches), and prevailing winds are southwest or northeast. The annual average wind speed is 3.4 meters per second (7.5 miles per hour). The regional climate for the INL and surrounding area has been summarized by Clawson et al. (1989).

3.3 Land Use: Most of the area that could become available for development of the central campus was converted from native vegetation to irrigated agriculture many years ago and is considered prime farm land if irrigated (NRSC, 2007). As such, biological and cultural resources that may have once been present at the central campus site have been subject to long-term disturbance. The lone exception is a small area on the southeast corner of the proposed development area along railroad tracks. This small area retains a semblance of its native vegetation, although it has also been subject to some level of disturbance (e.g. habitat fragmentation, physical disturbance associated with the construction of the original canals system, drift of pesticides, fertilizers, or irrigation water from the adjacent agricultural field). No INL buildings are currently planned for this relatively undisturbed area. Within Bonneville County, approximately 178,000 acres of agricultural land are considered prime farm land if irrigated (NRCS, 2007).

3.4 Air Quality: The area in which central campus site is located is designated an attainment area with respect to the National Ambient Air Quality Standards (NAAQS). This means that ambient concentrations of all criteria pollutants in the area are below the NAAQS and that air quality in the region is generally good. The EPA criteria pollutants are carbon monoxide, lead, nitrogen dioxide, sulfur oxides, ozone, and particulate matter. The requirements of the EPA's Prevention of Significant Deterioration (PSD) regulations ensure that new sources do not contribute to the degradation of local air quality or cause ambient concentrations of criteria pollutants to exceed the NAAQS. The central campus location, the existing IRC, and the surrounding area is in a PSD Class II air quality area, which is defined as an area that requires reasonably or moderately good air quality protection while still allowing moderate industrial growth. In conducting new source reviews, the state of Idaho, which administers the air quality regulations, uses regional background concentration estimates for comparison purposes unless the “special or unusual cases arise”. For Idaho Falls, the following background values are used for criteria pollutants (Hardy, 2003):

- PM_{10}: 26.6 µg/m^3 (annual average) or 55 µg/m^3 (1-hour average).
- CO: 15,600 µg/m^3 (1-hour average) or 5,200 µg/m^3 (8-hour average).
- NO_2: 40 µg/m^3 (annual average).
- SO_2: 120 µg/m^3 (3-hour average) or 40 µg/m^3 (24-hour average) or 10 µg/m^3 (annual average).
- Pb: 0.04 µg/m^3 (quarterly average).
- O_3: 0.08 ppm (annual average).

The existing INL facilities in Idaho Falls (IRC complex, WCB, EROB, and the INL Administrative Building) all contribute to local air emission loads through the use of natural gas-fired heat combustion sources. Because it includes laboratory facilities, the IRC emits small quantities of other atmospheric pollutants as well.

At the time of construction in 1983, the IRC was granted a conditional exemption, and no state air permit was required (DOE, 1994). However, a Title V air permit was later issued for the facility by the Idaho Department of Environmental Quality, and this permit remains in effect. Although the specific types and quantities of volatile emissions released from IRC varies over time as programs and program activities change, these releases remain small, and continue to be subjected to existing IRC controls as well as the conditions of the Title V permit.

Fume hoods located in the original IRC laboratory facility discharge effluent through a series of horizontal louvers. Effluent from hoods in the biotechnology wing of the IRC is discharged through dedicated stacks, and effluent from hoods used with potentially biohazardous materials is passed through a high efficiency particulate air (HEPA) filter before discharge to the environment (DOE, 1994).

Additionally, one IRC fume hood is equipped with an acid vapor chemical scrubber.

Emissions of volatile organic compounds (VOCs) from the existing laboratory fume hood and ventilation systems occur from evaporation of organic solvents used in laboratory research. For the 1994 Environmental Assessment for the expansion of the IRC, VOC emissions were conservatively estimated at a maximum annual usage of 2560 gal/yr (1.27 gal/hr), with a peak usage of 5 gal/hr (DOE, 1994). Similarly conservative estimates were made that 50% of these chemicals would be used under fume hoods, and that 10% of these volumes would be allowed to evaporate in the hood. It was therefore assumed that the remaining 50% of the chemicals in the IRC were used in processes or disposed of as hazardous waste, without evaporation. VOC emissions are greatest during periods when all laboratories are being used, and such activities normally occur during normal working hours throughout the year (2080 hr/yr). Peak emissions from IRC laboratory operation were estimated to be 2.4 lb/hr (DOE, 1994). Based on programmatic knowledge, VOC emissions from IRC today are comparable to those estimated in 1994.

3.5 Background radiation: Natural background radiation sources include cosmic, terrestrial, and internal body sources, and these sources are not related to human activities. Average annual effective dose equivalent (EDE) to people in the Idaho Falls area from these natural radiation sources has been estimated at about 360 mrem/yr (DOE 2005). In addition, humans are also exposed to radiation from medical x-rays and other medical procedures (53 mrem/yr for the average person), global nuclear weapons fallout (<1 mrem/yr), air travel (1 mrem/yr), and consumer products (10 mrem/yr). Collectively, these additional sources expose members of the public on average to an additional 65 mrem/yr EDE (DOE, 2004; NRCP, 1987).

3.6 Surface Water: The site of the central campus described in alternatives 1 and 2 lies between the Snake River and Willow Creek, a small tributary. At its closest point, the Snake River is approximately 300 m (1000 ft.) from the central campus development area, while Willow Creek cuts through the southeast corner of the site near the existing EROB and WCB facilities. The existing IRC is located approximately 500 m further east from Willow Creek. The general area also includes some irrigation canals that tie into the Snake River and tributaries.

Surface water runoff from low permeability materials found in the area flows into localized areas and percolates into the high permeability dune sand sediments, or drains directly into irrigation canals, Willow Creek and, ultimately, the Snake River. The natural drainage pattern of the area has been altered by the construction of roads, railroad beds, buildings, agricultural practices, and irrigation canals.

The IRC site and the central campus site are located at elevations of approximately 5.5 to 7.6 m (15-25 ft) above the river level, and the existing and proposed facilities are not located in a floodplain. The failure of the Teton Dam in 1976 resulted in the second largest recorded river flow north and west of Idaho Falls, and caused extensive flooding in the city. However, the central campus site and existing IRC site were not flooded during this extreme event. The Federal Emergency Management Agency (FEMA) has therefore identified the area as a Zone C Area, indicating that the central campus site is not considered a potential floodplain (FEMA, 1981).

3.7 Groundwater: The IRC and the central campus site are located on the Eastern Snake River Plain Aquifer, a primarily fractured-basaltic rock aquifer. Depth to the water table is approximately 52 m (170 ft), and groundwater in the vicinity moves from northwest to the southeast. The aquifer is the primary source of drinking water in the region, and is also used for irrigation. Groundwater in the aquifer is generally of naturally high quality relative to drinking water standards, and has total dissolved solids that average 280 mg/l and range from 230 to 330 mg/L (personal communication to Joel Hubbell from the Idaho Falls Water Department, April 24, 2006). The EPA has designated the aquifer as a “sole source aquifer” pursuant to the Safe Drinking Water Act.

The Snake River is perched above the aquifer in the Idaho Falls area. This means that the surface waters are separated from the groundwater by a relatively impermeable barrier, such that surface waters do not enter the groundwater. Because of this lack of a direct hydraulic connection, it can be concluded that stormwater from developed or undeveloped sites in the general area will enter the surface waters, but will not generally reach the groundwater.

The City of Idaho Falls operates a water production well located approximately 0.15 km (0.09 mi) southeast of the central campus area that is routinely analyzed for the presence of regulated materials including metals and other contaminants. Groundwater is also currently extracted from a well near the IRC to supply that facility with a closed-coil heat exchange system. Water extracted for this purpose is returned to its source without being altered chemically.

3.8 Ecological Resources: The Idaho National Laboratory Site and the Idaho Falls area lie in a cool desert ecosystem dominated by shrub-steppe communities. A survey of ecological resources in the central campus development area was conducted for the Department of Energy by the Stoller Corporation in March, 2006, and the results are provided in a letter from Stoller to the Department of Energy (Stoller, 2006).

The Stoller report (and others) reported the area of the central campus to be heavily disturbed from an ecological perspective due to the use of the area for agriculture and livestock grazing. The central campus development area contains both native and non-native vegetation, with crested wheatgrass and tumble mustard dominant in the fallow areas. Non-tilled areas are limited, and contain sagebrush, needle-and-thread grass, and hoary aster, among other species. The Stoller survey reported the presence of musk thistle, which is listed by the state of Idaho as a noxious weed.

Willow Creek flows through the development area, and the Snake River is nearby. Wildlife species, including bald eagle, are often abundant near these water sources. However, only one tree was within the proposed project area and there was no indication of eagle use during the survey or from the previous winter. Additional trees on the opposing bank across the river from the project area were surveyed, and also showed no sign of active use by bald eagles. Wildlife (especially waterfowl) is also often observed around a small wetland area near the southwest corner of the existing EROB. This wetland was enhanced with the construction of EROB.

Overall, the area of the central campus is used by a diverse complement of mammals, reptiles, and breeding bird species common to the sagebrush steppe and the Idaho Falls area. Species that are currently designated as Threatened, Endangered, or Candidate species may occur in the area, including bald eagle, yellow-billed cuckoo, Ute ladies tresses, and desert valvata, but were not observed during the Stoller survey.

3.9 Noise: The primary source of noise at the current IRC or the central campus is due to traffic. Transportation noise sources are associated with moving vehicles that generally result in fluctuating noise levels above ambient noise levels for a short period of time. Other than traffic, noise emission sources include heating and cooling systems, transformers, engines, pumps, materials-handling equipment, and others. Current noise levels associated with the IRC are consistent with similar facilities located elsewhere in the city.

3.10 Socioeconomics: This section provides summary information on current socioeconomic conditions within a six-county region of influence (ROI) where over 99 percent of the INL workforce resides. The six counties of the ROI are Bonneville, Jefferson, Bingham, Madison, Butte, and Bannock. Recent population levels and growth rates for the state of Idaho and for each of the six ROI counties are provided in Table 2, and these populations are also broken down by race. Table 2 also provides an estimate of the median household income and percent of the population that lives below the poverty level for each county.

The city of Idaho Falls is located in Bonneville County and has a population of approximately 52,000, representing roughly 60 percent of the Bonneville County population. Many of the remaining county residents live in close proximity, just outside the city limits. In February 2006, the seasonally-adjusted unemployment rate for Idaho Falls was estimated at 2.6 percent. This represented a slight decrease from the 3.2% level reported for February 2005, according to Idaho Commerce and Labor statistics (http://cl.idaho.gov/lmi/uirates.htm, accessed May, 2006). In comparison, the same source reported the statewide unemployment rate as 3.3 percent in 2005, down from 4.1 percent in 2005.

The INL currently leases approximately ten “satellite” facilities in Idaho Falls that are outside of the IRC and central campus areas. Each houses no more than about 20 employees, and most are used for science and technology research programs. The current annual lease value for the ten satellite facilities is approximately $420,000.

Table 2. U.S. Census Bureau Population Statistics for the state of Idaho and the six-county region of interest.							
	State of Idaho	**Bonneville County**	**Jefferson County**	**Bingham County**	**Madison County**	**Butte County**	**Bannock County**
2004 Population	1,393,262	89,653	20,782	43,205	30,782	2,838	75,672
2000 Population	1,293,953	82,522	19,155	41,735	27,487	2,899	75,565
Percent Change (2000 to 2004)	7.5%	8.2%	8.5%	11.0%	12.1%	-2.1%	0.1%
Percent White, non-Hispanic (2000)	88.0%	90.2.5%	88.5%	78.6%	94.1%	93.3%	89.5%
Hispanic or Latino (2000)	7.9%	6.9%	10.0%	13.3	3.9%	4.1$	4.7%
American Indian or Alaska Native (2000)	1.4%	0.6%	0.5%	6.7%	0.3%	0.7%	2.9%
Black or African American (2000)	0.4%	0.5%	0.3%	0.2%	0.2%	0.3%	0.6%
Median Household Income (1999)	$37,572	$41,805	$37,737	$36,423	$32,607	$30,473	$36,683
Percent Below Poverty Level (1999)	11.8%	10.1%	10.4%	12.4%	30.5%	18.2%	13.9%
Source: U.S. Census Bureau – State and County Quick Facts: http://quickfacts.census.gov/qfd/states/16000.html (accessed May, 2006)							

3.11 Transportation/Traffic: The central campus site is located on the northern edge of the city of Idaho Falls, less than a mile east of interstate highway I-15 and approximately the same distance northwest of U.S. highway 20. Approximately 2000 employees currently work in the area of the central campus. The current IRC complex is essentially adjacent to U.S. highway 20 on the west, and about a mile from the central campus site. Most employees approach the EROB and WCB from the south along Fremont Avenue (either directly from the city center via Riverside Avenue, or after exiting Highway 20 onto Riverside Avenue) or from the east along Science Center Drive.

All of this traffic passes through a stoplight at the intersection of Fremont Drive and Science Center Drive. For the IRC complex, most traffic approaches from

Anderson (eastbound) or Science Center Drive (westbound), turning north on North Boulevard.

3.12 Cultural Resources: The cultural resources assessment identified City Canal (10-BV-178), a hand-dug canal completed in 1901 by Perham Brothers Contractors to feed water from the Snake River south to the first hydroelectric power plant in the city of Idaho Falls. The canal was diverted from the Snake River at the current site of the Upper Power Plant (north of the central campus area), then flowed southeast to form a small lake in the area where A. H. Bush school now stands. Water was released as needed from the lake to a 125 horsepower generator located at what is now the intersection of 10th St and South Boulevard in Idaho Falls. This small plant provided electricity until 1911, when it was replaced by a larger facility.

The City Canal is potentially eligible to the National Register of Historic Places under criterion "a" of 36 CFR Part 63 for its important contribution to the development of the city of Idaho Falls. The canal and its associated structures allowed the city to be one of the first communities in the nation to have electric streetlights and started an enterprise of hydropower generation that has continued uninterrupted since 1901. The canal runs roughly north to south on land being considered for the central campus development to the west and northwest of the EROB (Figure 5).

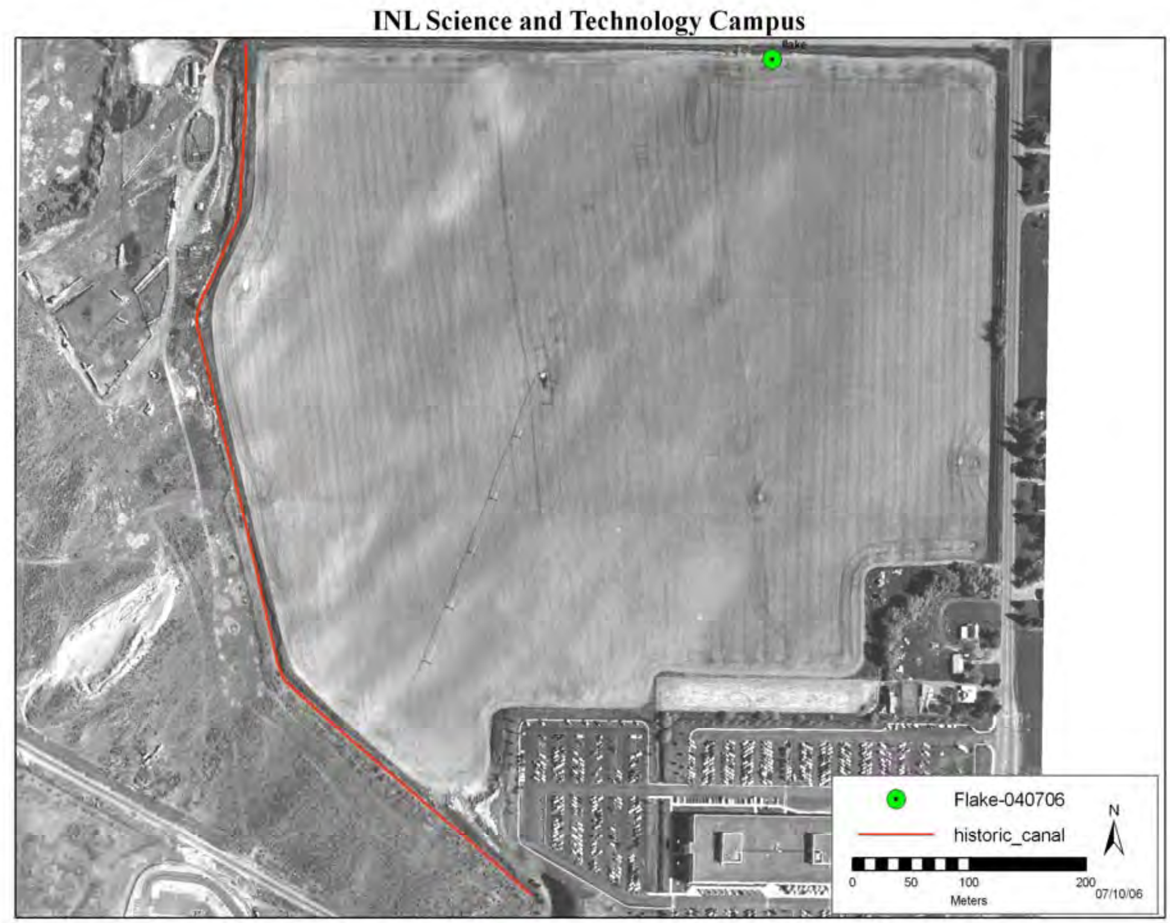

Figure 5. Historic and cultural resources identified in the central campus development area.

In addition to the City Canal, a single obsidian flake was observed near the northern boundary of the potential development area (Figure 5). This isolated artifact probably reflects very short term prehistoric activity in the area and is not eligible for nomination to the National Register of Historic Places. A larger concentration of lithic artifacts probably reflecting more intensive activities was also identified outside the central campus area (Field # 2006-17-1) near the Snake River. This material is described by Pace (2006) but lies outside the area of potential effects for the central campus. No specific tribal concerns were identified during a briefing and visit on April 24, 2006.

4. POTENTIAL ENVIRONMENTAL IMPACTS/ CONSEQUENCES

This section provides an analysis of the potential impacts from implementing any of the alternatives identified in Section 2. Conservative assumptions have been applied whenever possible to yield the highest reasonably predictable potential impacts.

4.1 Potential Impacts to Land Use: Both the preferred alternative and the “DOE Line Item Construction” alternative would involve changes in land use. In contrast, no changes in land use would occur under the “Consolidation and Expansion Within Existing Facilities” or the “No Action” alternatives.

Alternative 1 – Leasing of New Laboratory Facilities (Preferred Alternative): The preferred alternative would result in the development of a central campus primarily through the leasing of privately owned buildings constructed in the vicinity of the existing EROB building. Prior to development, the area would be annexed into the City of Idaho Falls and rezoned for residential, commercial or industrial development. This annexation is planned regardless of whether the central campus is developed, as construction by ISU and Voigt is planned and/or underway for the site independent of INL activities. Annexation into the city would allow for the central campus to be served by city utilities, and would also therefore require compliance with municipal regulations and codes.

Construction of buildings associated with this alternative would collectively result in the conversion of up to 75 acres of agricultural land to commercial or industrial use.

Alternative 2 – DOE Line Item Construction of New Facilities: Under this alternative, and based on the assumption that the resulting central campus would be located at the same site and involve the same number and types of buildings as described for the preferred alternative, impacts to land use would be identical to those for the preferred alternative. However, impacts to land use would have to be reassessed should a different site be selected for the DOE Line Item Construction alternative.

Alternative 3 – Consolidation and Expansion Within Existing Facilities: No new facilities would be required under this alternative, and therefore no impacts to land use would occur.

Alternative 4 – No Action: The "No action" alternative would not impact land use.

4.2 Potential Impacts to Air Quality:

The release of both radiological and chemically hazardous materials into the atmosphere from the INL laboratories and other facilities would occur regardless of which alternative is selected, although the quantities of these pollutants discharged varies between alternatives. All such atmospheric discharges are subject to regulation by the EPA, the Idaho Department of Environmental Quality, and DOE Orders.

4.2.1 Non-Radiological Air Quality:

Air quality can be influenced by both programmatic (i.e. research and development projects and activities) and non-programmatic (i.e. heating systems, space heaters, water heaters, etc.) activities.

Alternative 1 – Leasing of New Laboratory Facilities (Preferred Alternative): The preferred alternative would result in the leasing of up to three new laboratory buildings and at least one non-laboratory administrative building. Each new building would be subject to appropriate controls to limit atmospheric emissions as is being performed currently at the IRC, including fume hoods and HEPA filters, where appropriate.

As a bounding case, the conservative releases calculated for the IRC can be applied to each new laboratory building. This assumes similar building volumes, heating capacities, and administrative controls, as well as similar use of hazardous chemicals. On a regional basis, therefore, it can be assumed that expansion and consolidation of INL research and development activities into a central campus would increase emissions of non-radiological air pollutants by a factor of four over what is currently emitted from the IRC laboratory building. Estimated emission rates of non-radioactive pollutants from the IRC laboratory and associated buildings are shown in Table 3. Along the same vein, a new administrative building would be expected to generate air emissions similar to those of the existing EROB, again assuming that the building volume and other parameters are similar.

Table 3. Estimated emission rates of non-radiological atmospheric pollutants from IRC sources (DOE 1994), and estimated emissions from STC buildings.

	Pollutant (tons/year)				
Facility	**PM-10**	**SO_2**	**NO_2**	**CO**	**VOC[a]**
IRC Laboratory Buildings	0.36	0.047	10.4	2.59	2.6
Estimated STC Emissions[b]	**1.4**	**0.2**	**41.6**	**10.4**	**10.4**

[a]VOC emissions account for combustion sources and evaporation of organic solvents. Calculations assume an average density of 1.1 kg/L (9.42 lb/gal) for VOCs that could evaporate and average release rates for 2080 hours of operation. Calculations for combustion assume sources operate 24 hours per day and 365 days per year. VOC emissions from the research laboratory additionally include 0.12 tons per year from evaporation of chemicals and 0.06 tons per year from combustion.

[b]Values for STC assumed to be four times that of IRC buildings.

Alternative 2 – DOE Line Item Construction of New Facilities: Impacts to ambient air quality under this alternative would be similar to those resulting from the preferred alternative provided the site of the DOE-constructed central campus is the same as for the preferred alternative.

Alternative 3 – Consolidation and Expansion Within Existing Facilities: Although some measurable increase in research and development activities could occur at the IRC as the result of upgrades or limited expansion of existing facilities, these changes are expected to be minor. Changes in non-radiological atmospheric emissions would therefore be minor. Again, changes in programs over time would alter the types and volumes of specific VOCs emitted, but the total release rates would remain similar to current release rates.

Alternative 4 – No Action: The "No action" alternative would not affect regional air quality, as R&D programs would continue at levels close to what was estimated for the IRC (Table 3).

4.2.2 Radiological Air Quality: Atmospheric emissions of radionuclides from DOE facilities will occur under any of the alternatives evaluated, including the "No action", and are limited by EPA regulations found under National Emission Standards for Hazardous Air Pollutants (NESHAPs) regulations (40 CFR 61, Subpart H). The NESHAP establishes a dose limit of 10 millirem (mrem) per year for any member of the public.

Laboratory activities at the proposed central campus or at the existing IRC would include the use of small quantities of radionuclides, a small fraction of which could be released out facility vents to the atmosphere. Once released, these constituents could travel downwind and deposit on the ground, potentially causing human health impacts through a variety of pathways including inhalation, ingestion of soil or contaminated foods, or direct exposure to gamma radiation from contaminated surfaces. Although the amount of radioactivity expected to be released from INL facilities either at the IRC or at the central campus facilities would be extremely small, conservative estimates of emission rates, downwind transport, environmental buildup, and the resulting dose to a maximally-exposed member of the public near the central campus were made to confirm that maximum health impacts would be well within accepted standards.

Radionuclide annual emission rates for central campus laboratory buildings were estimated using the following two methods:

(1) Annual anticipated radionuclide inventories (i.e. radionuclide quantities that are expected to be used per year [Ci/year]) were developed based on *anticipated potential* projects. The annual inventories were then multiplied by conservative airborne release fractions given in Appendix D to 40 CFR Part 61—*Methods for Estimating Radionuclide Emissions* to obtain annual emission rates (Ci/year). All of the radionuclides were assumed to be in either a solid or liquid form, with the exception of Xe-133, which is gaseous. The comprehensive list of inventories and emission rates can be found in Table A-1 of Appendix A.

Radionuclide emission rates for operations and research currently performed at the Radiological and Environmental Services Laboratory (RESL), building CFA-690, Central Facilities Area (CFA) that may be transferred to the STC facilities were taken from the 2004 INEEL NESHAPs analysis. These are abated emission rates that take credit for offgas emission controls present at the RESL facility, and can be found in Table A-2 of Appendix A.

Dose assessment modeling was performed using CAP88-PC Version 3.0, which incorporates the latest EPA dose and risk factors. Dose and risk conversion factors include the effective dose equivalent (EDE) calculated according to the methods in ICRP Publication Number 72 (ICRP 1996).

Central campus building locations, designs, stack parameters, and the locations of specific research projects have not yet been finalized, so modeling from specific release points is not yet possible. As a bounding case, modeling was performed for two locations: the site of the proposed Science and Technology Laboratory, which is the first new building that would be constructed under that

Proposed Action, and the existing INL Research Center (IRC). The proposed STL location is adjacent to the southeast corner of the existing EROB (Figure 6), and is used to represent the entire STC as a bounding condition. The IRC is located 840 meters east-southeast of EROB, on the east side of U.S. Highway 20 (Figure 7).

Since the building or process locations have not been finalized and there are numerous existing or potential residences in the immediate area, a bounding release scenario was evaluated that assumes the following:

1. All of the emissions calculated based on the anticipated radionuclide inventories in Appendix A are released from a single ground-level point source that could be located in either of the two locations;
2. A public residence has the potential to exist in any direction around the release point; and
3. A residence is located at a minimum distance of 150 m from the center of the facility.

This conservative scenario provides an upper-bound assessment of all likely release locations, release conditions, and actual residence locations. The actual distances and directions to the closest public residence are 190 m north-northeast from the assumed atmospheric emission release point for the central campus location (Figure 6), and 230 m northwest of the IRC (a potential residence – Figure 7).

Unit emission rates (1 Ci/year) of the radionuclides were evaluated in the modeling runs, which yields effective dose equivalent (EDE) results in mrem/year per Ci/year released. These “unit EDE” values were then multiplied by the annual emission rate for each radionuclide and summed to obtain the radionuclide-specific EDE for the maximally-exposed individual. Actinides (Am, Cm, Np, Pu, and U) were evaluated in separate modeling runs to keep their respective progeny dose contributions grouped with the individual parent actinide.

INL Science and Technology Campus: Release Analysis

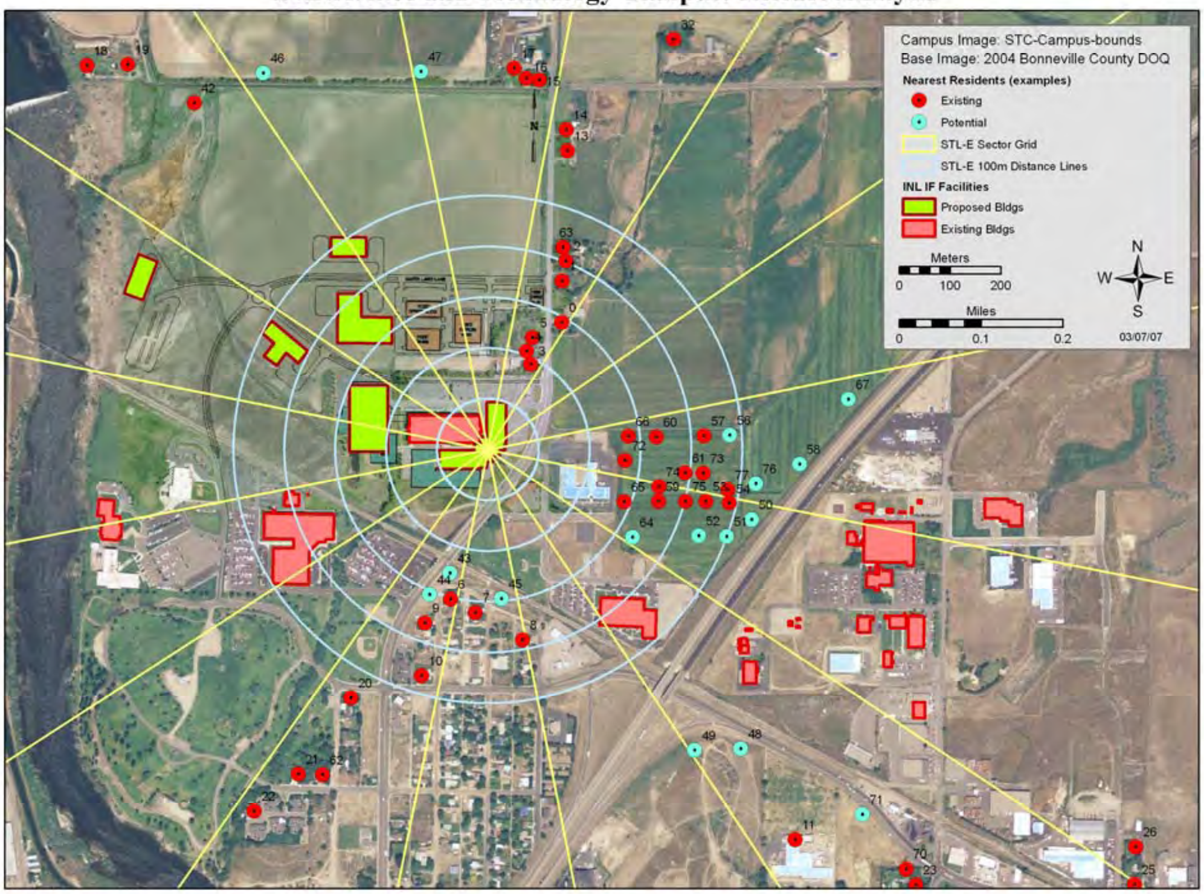

Figure 6. Assumed atmospheric contaminant release point for STC. Public residences are shown relative to sector and 100-m interval distance lines from the facility.

Radionuclides were screened to eliminate those that would contribute less than 0.1% of the total EDE from each facility. The total EDE calculated for a maximally-exposed member of the public from the STC source emissions is 0.078 mrem/year (Table 4). The dose from the RESL project emissions is much smaller (5.4E-06 mrem/year) and does not contribute significantly to the total.

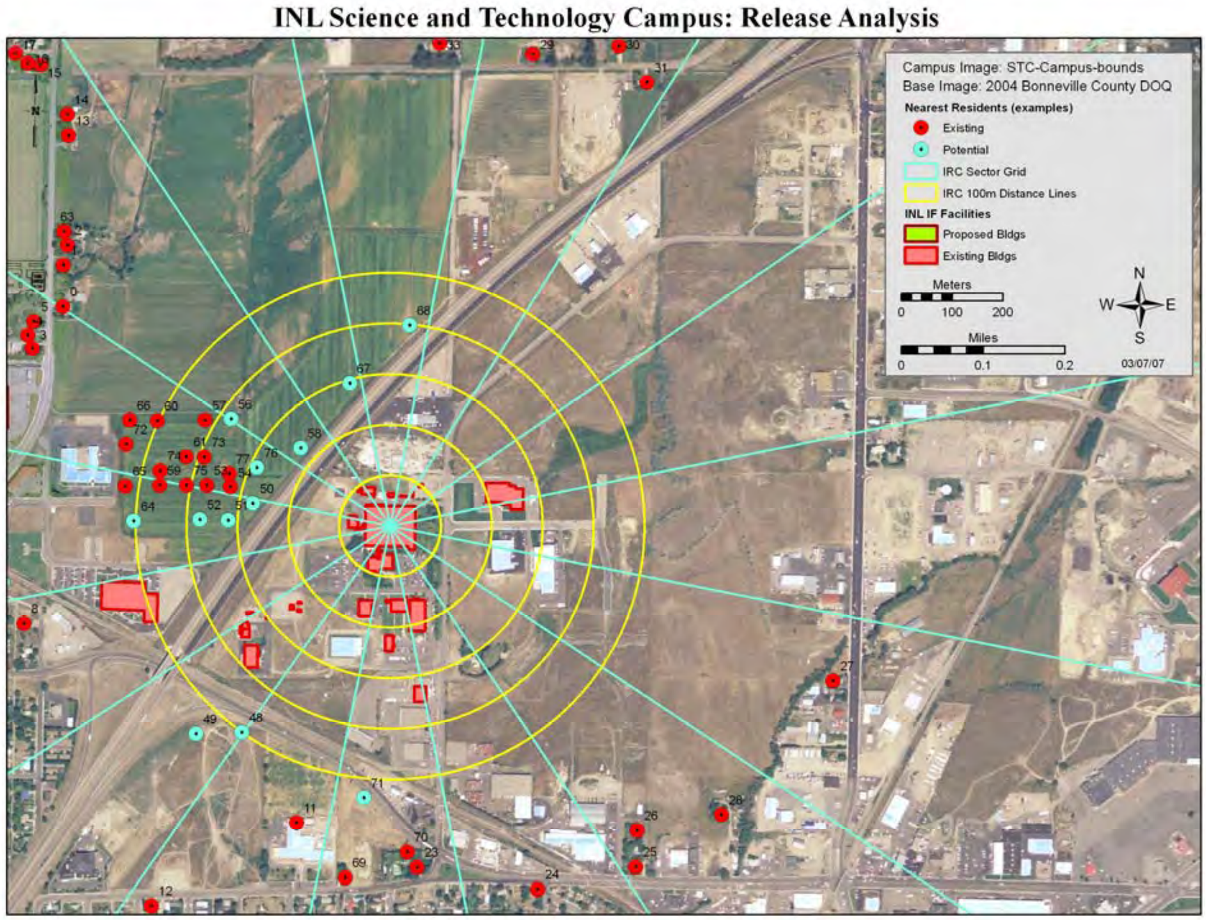

Figure 7. Existing location of the IRC, with public residences and sector and 100-m interval distance lines from the facility.

The total dose estimate (0.078 mrem/year) is less than 1% of the applicable dose standard of 10 mrem/year provided in 40 CFR 61 Subpart H *National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities* (NESHAPs). This NESHAPs standard is considered to be very conservative by health physicists, who generally agree on limiting a person's non-background dose to less than 100 mrem/year. In the Idaho Falls area, the estimated annual-average EDE from background radiation sources is about 360 mrem/year with an additional 65 mrem/year on average resulting from other manmade sources such as consumer products, medical procedures, and air travel (DOE 2005).

Table 4. STC radionuclide emission rates and CAP88-PC Effective Dose Equivelents (EDE) for a maximally-exposed member of the public.

Nuclide	Total Program Inventory (Ci/year)	Max Release (Ci/year)	CAP-88PC 150-m Unit Dose (mrem/Ci)	EDE (mrem/year)	Cumulative Fraction of Total
Xe-133	2.0E+01	2.0E+01	1.2E-03	2.3E-02	0.295
Pu-239	5.0E-04	5.0E-07	1.1E+04	5.4E-03	0.364
Np-237	1.0E-03	1.0E-06	5.1E+03	5.1E-03	0.429
Th-232	5.0E-04	5.0E-07	9.1E+03	4.6E-03	0.488
Am-243	5.0E-04	5.0E-07	8.9E+03	4.5E-03	0.545
Am-241	5.0E-04	5.0E-07	8.9E+03	4.4E-03	0.602
U-238	5.7E-03	5.7E-06	7.4E+02	4.2E-03	0.656
Pu-242	4.0E-04	4.0E-07	1.0E+04	4.0E-03	0.708
Bk-247	2.5E-04	2.5E-07	1.5E+04	3.7E-03	0.755
Cm-248	1.0E-04	1.0E-07	9.9E+04	9.9E-03	0.882
Cm-244	5.0E-04	5.0E-07	5.5E+03	2.8E-03	0.917
Cs-137	1.1E-02	1.1E-05	2.2E+02	2.4E-03	0.948
Cf-249	1.0E-04	1.0E-07	1.5E+04	1.5E-03	0.968
Sr-90	5.1E-03	5.1E-06	1.9E+02	9.7E-04	0.980
Tc-99	5.0E-03	5.0E-06	1.1E+02	5.4E-04	0.987
U-235	5.1E-04	5.1E-07	8.2E+02	4.2E-04	0.992
C-14	1.0E-01	1.0E-04	2.6E+00	2.6E-04	0.996
I-129	5.0E-03	5.0E-06	1.6E+01	8.2E-05	0.997
P-32	1.0E-01	1.0E-04	7.0E-01	7.0E-05	0.998
Eu-154	5.1E-03	5.1E-06	1.1E+01	5.6E-05	0.998
Ce-144	5.0E-03	5.0E-06	7.5E+00	3.7E-05	0.999
S-35	1.0E-01	1.0E-04	3.0E-01	3.0E-05	0.999
H-3	1.0E+01	1.0E-02	2.9E-03	2.9E-05	1.000
Co-60	5.7E-03	5.7E-06	4.6E+00	2.6E-05	1.000
			***Total* =**	**7.8E-02**	

These modeled dose results represent conservative, upper-bound estimates, indicating that the maximum individual annual dose from actual emissions will likely be significantly less than this estimate. The conservative assumptions applied in this modeling include: (1) upper bound estimates of annual inventories, (2) the use of conservative NESHAPs Appendix D releases fractions, (3) that all new STC (i.e. non-RESL) emissions are unabated and have no offgas emissions controls, (4) the release of all emissions from a single ground-level point source, (5) the use of "rural" food production parameters in CAP88-PC, and

(6) the selection of a maximally-exposed individual at the point of maximum air concentration/deposition in any direction from the facility and at a distance of 150m.

A complete description of the radiological assessment summarized above is provided in Appendix A.

Alternative 1 – Leasing of New Laboratory Facilities (Preferred Alternative): As described above, the radiological dose modeling for the proposed action evaluated single ground level releases associated with the entire potential radionuclide inventory at the planned location for the proposed STL. Since the radiological inventory and assumptions regarding a single release point are the same for this scenario as for the IRC scenario, the maximum modeled dose to an individual is the same (0.078 mrem/year) regardless of whether the new facilities or programs are located at the central campus location (Alternatives 1 and 2) or at the existing IRC site (Alternative 3). The distance from the anticipated STL release point is 190 m from the nearest residence. This increased distance (190 m actual distance vs. 150 m modeled distance) confers an additional reduction in possible dose rates.

Even using extremely conservative assumptions, the modeled maximum dose of 0.078 mrem/year is less than one percent of the applicable dose standard of 10 mrem/year required by 40 CFR 61, subpart H. The modeled dose is also below the 0.1 mrem/year level that would require monitoring of emissions. As additional information on building locations, release heights, and the distribution of the radionuclide inventory between different buildings become better known, modeled doses would be expected to be reduced.

Alternative 2 – DOE Line Item Construction of New Facilities: DOE assumed the parameters that provide input into the radiological dose models would be the same for a DOE Line Item scenario, in which case impacts would be the same as for the preferred alternative. However, if this scenario ultimately results in the construction of an STC in a different location, modeling for that location will have to be performed.

Alternative 3 – Consolidation and Expansion Within Existing Facilities: This alternative would not change the distance from IRC to the nearest residence. Given the same assumption that the entire radionuclide inventory described above and in Appendix A was realized within the IRC, the maximum modeled dose to the public would remain below 0.1% of the NESHAPs limit of 10mrem/yr, and would be the same as for alternatives 1 or 2.

Alternative 4 – No Action: Under the “No action” alternative, programs would not expand or consolidate. Radiolabeled compounds of ^{14}C, ^{35}S, and ^{32}P would continue to be acceptable for use in experiments, with the maximum inventories of 10 mCi of each of these three radionuclides allowed. The modeled maximum radiological dose to a person from this inventory was modeled to be 0.029 mrem/year (DOE 1994).

4.3 Potential Impacts to Groundwater and Surface Water:

Future planned INL research and development activities are primarily laboratory-based R&D programs, and as such they may potentially impact local water resources.

Alternative 1 – Leasing of New Laboratory Facilities (Preferred Alternative): As is the case currently with WCB, EROB, IRC, and other in-town INL facilities, water used at the central campus would be provided by the City of Idaho Falls water system. Although water requirements for the new facilities at the central campus are not known at this time, full development of the central campus would include additional laboratory and office buildings which would require a proportional increase in water use. The City of Idaho Falls has reported that the IRC complex uses up to almost 11,000,000 L (2,900,000 gal.) of water per month. Using this figure as a basis, a reasonable estimation for the proposed new facilities located at the central campus would be approximately 44,000,000 L (11,600,000 gal.) per month (Gary Callen, conversation with City of Idaho Falls Utility Division).

Wastewater from central campus laboratories and other facilities would be treated at the publicly-owned wastewater treatment facility operated by the City of Idaho Falls, as is occurring at present for the IRC. Central campus facilities would operate under similar permits or a modification of the existing IRC permit, and with similar administrative controls. In 1994, IRC facilities were estimated to release approximately $2.16X10^7$ L/year (5.56×10^6 gal/year) to the City of Idaho Falls Wastewater Treatment Plant, and represented less than 0.2 percent of the wastewater processed by the wastewater treatment plant annually (DOE, 1994). It may be reasonably assumed that the addition of up to three new laboratory buildings at the central campus would increase this load proportionately. Under this assumption, the entire central campus would still contribute less than one percent of the wastewater load handled routinely by the city treatment plant.

Although none of the central campus development area is immediately adjacent to the Snake River, Willow Creek runs through the development area before joining the river approximately a mile downstream. Stormwater drainage to surface waters could increase due to the increased parking area required for employees. However, the design and operation of new facility areas would incorporate appropriate stormwater management controls to safely collect and convey stormwater from facilities while minimizing washout and soil erosion.

No groundwater would be extracted for construction or operation of facilities associated with the central campus with the exception of the groundwater water currently used for cooling at the IRC. The hydrologic separation of groundwater from surface waters in the Idaho Falls area would prevent any contaminants present in the surface water from entering the groundwater.

Alternative 2 – DOE Line Item Construction of New Facilities: Impacts to groundwater and surface waters from construction and operation of a DOE-owned and funded central campus would be similar to those of the preferred alternative provided that the site of the central campus does not change. Construction activities would be conducted to comply with DOE requirements for stormwater control. If this alternative resulted in the construction of the central campus at a different location, impacts to surface and groundwater resources would have to be re-evaluated.

Alternative 3 – Consolidation and Expansion Within Existing Facilities: Under this alternative, some additional groundwater could be extracted during the operation or renovation of existing facilities, and some additional stormwater runoff could be anticipated. Wastewater discharge volumes to the city treatment plant would also remain similar to current IRC levels. Increased impacts to groundwater and surface water resources would therefore not be expected for this alternative.

Alternative 4 – No Action: The "No action" alternative would not change water use or the potential for release or transport of contaminants. Water would continue to be provided by the City of Idaho Falls, and groundwater would continue to be extracted and reinjected without chemical alteration at IRC to supply that facility with a closed-coil heat exchange system.

4.4 Potential Impacts to Ecological Resources: This section describes the ecological resources present (or potentially present) in the vicinity the central campus site, including threatened and endangered (T&E) species, noxious weeds, and floodplains and wetlands.

Alternative 1 – Leasing of New Laboratory Facilities (Preferred Alternative): As noted in Section 3, the majority of the potential central campus development area was converted to agriculture over 100 years ago, and only limited natural vegetation is currently present within the proposed development area. There will be very little habitat destruction caused by the proposed project, and ample riparian habitat remains along the river corridor to support bald eagle wintering activity. Noise from construction activities may create some impact, but would expectedly be low and not constitute harassment of birds observed along the river corridor. Based on this and the lack of evidence of bald eagle use, it can be concluded that the construction project at the STC would not pose any direct threat to bald eagle wintering populations. No threatened or endangered (T&E) species, nor their critical habitats, were identified within the proposed development area.

A nesting bird survey would be conducted before any activity occurs that has the potential to impact migratory birds to ensure compliance with the Migratory Bird Treaty Act that protects migratory birds, their nests and eggs. Revegetation and weed management would be conducted to avoid infestation with cheatgrass or other noxious weeds. The constructed wetlands west of the EROB building would be protected.

Alternative 2 – DOE Line Item Construction of New Facilities: Impacts to ecological resources for this alternative would be similar to those of the preferred alternative during the operational phase. If an alternate central campus site were to be selected under this alternative, a new survey would be required.

Alternative 3 – Consolidation and Expansion Within Existing Facilities: Impacts to ecological resources would not be anticipated under this alternative, as no new facilities would be developed.

Alternative 4 – No Action: The “No action” alternative would not cause any additional disturbance to ecological resources as no new facilities would be developed.

4.5 Potential Impacts to Socioeconomic Factors: Socioeconomic factors such as housing availability and employment rates could be impacted by the proposed action or alternatives.

Alternative 1 – Leasing of New Laboratory Facilities (Preferred Alternative): Under this preferred alternative, the laboratory contractor would lease laboratories designed, financed, and constructed privately at a site near the existing EROB building. Consolidation of programs at a central campus would eliminate the need for ten existing leased satellite facilities with a total annual lease value of approximately $418,000.

Operation of the central campus would ultimately result in a net increase of approximately 1580 new or relocated employees most of whom would live in Bonneville County or neighboring counties included in the Region of Interest described in Table 1 of Section 3. Any increase would influence local housing markets and community services, although the effect would be spread over several years as the various central campus buildings come on line and new programs begin. It should be pointed out, however, that over the past decade, total INL employment was reduced by approximately 4000.

Alternative 2 – DOE Line Item Construction of New Facilities: Socioeconomic impacts resulting from the construction of a central campus under DOE Line-Item funding would be similar to those described above for the preferred alternative. The primary difference would involve the time frame, with the impacts beginning several years later under this alternative. Employment for the construction of the facilities would have a short- and long-term positive benefits on employment rates and income in the region. Most construction jobs would likely be filled by the existing labor force.

Alternative 3 – Consolidation and Expansion Within Existing Facilities: This alternative calls for some expansion of programs using existing facilities.

Overall growth would be small, controlled primarily by existing space constraints at IRC and other existing INL facilities.

Alternative 4 – No Action: Under the "No action" alternative, INL personnel would continue to occupy existing office space, laboratory, and support buildings both at the INL Site and in Idaho Falls. Because these facilities are currently operating near capacity, impacts to socioeconomic factors such as the local economy, housing market, or demand for community services would not be expected.

4.6 Potential Impacts to Transportation/Traffic: With the IRC and central campus located on the edge of the City of Idaho Falls, local traffic volumes in the immediate area could be impacted by some of the alternatives, as described below.

Alternative 1 – Leasing of New Laboratory Facilities (Preferred Alternative): The preferred alternative would result in an approximate doubling of the traffic in the central campus development area surrounding the current EROB and WCB facilities. Buildings currently planned would represent a total resident population of these new buildings of approximately 1580 persons. Although DOE anticipates that nearly half of the individuals that would reside in the new facilities would be current employees presently located in other INL buildings, the sum of the current occupancy of existing buildings and the projected capacity of proposed new central campus buildings results in an approximate doubling of the residents in the central campus development area. DOE therefore anticipates that traffic flow into the area would approximately double.

Alternative 2 – DOE Line Item Construction of New Facilities: Line-item construction of a similar central campus as described in the preferred alternative would result in similar increased residency and traffic patterns assuming that the campus is developed in the same location. However, if the central campus under this scenario is developed at a different location than that described for the preferred alternative, traffic patterns would have to be reevaluated.

Alternative 3 – Consolidation and Expansion Within Existing Facilities: Under this alternative, growth would be restricted by available space at the IRC complex. Increased traffic would be minimal.

Alternative 4 – No Action: The "No action" alternative would not result in an increase in traffic volume or change in traffic pattern.

4.7 Potential Impacts to Noise Levels: Changes in noise levels associated with the various alternatives relate to short-term increases in noise level associated with construction activities or with long-term increases from operations and increased traffic flow.

Alternative 1 – Leasing of New Laboratory Facilities (Preferred Alternative): Increases in noise levels during operation of the central campus could result from industrial operations such as heating and cooling systems in the new buildings or from increased traffic. As with the current IRC, however, noise emissions associated with the central campus is expected be consistent with those of similar activities located elsewhere in the city of Idaho Falls.

Alternative 2 – DOE Line Item Construction of New Facilities: Operational impacts to noise levels under this alternative would be similar to those of the preferred action, with increased noise resulting from industrial activities such as heating and cooling systems as well as from increased routine traffic. This alternative would also result in short term increases in noise associated with the construction of buildings and parking facilities.

Alternative 3 – Consolidation and Expansion Within Existing Facilities: Under this alternative, no new buildings would be added to the infrastructure –

therefore sources of noise are not expected to change. Minor increases in traffic levels in the IRC area could occur, but this would related to increased programmatic activities which would be limited by the existence of available space. Noise emissions associated with this alternative would remain consistent with those of similar activities located elsewhere in the city of Idaho Falls.

Alternative 4 – No Action: No changes in noise level would occur under the “no action” alternative, as program activities and the total number of workers housed at IRC would be expected to remain essentially constant.

4.8 Potential Impacts to Cultural Resources:

Alternative 1 – Leasing of New Laboratory Facilities (Preferred Alternative): City Canal (10-BV-178) described in Section 3 would potentially be impacted by the development of the central campus. However, current planning for the campus can include a portion of the canal within the design in such a way that the effects to this historic property will not be adverse. In this context, the canal can be incorporated into drainage control for the area, serving a practical need for the new facilities and enhancing the surrounding landscaping. Installation of an interpretive sign near the old canal can commemorate the important role it played in shaping the future of the City of Idaho Falls and will provide an opportunity to demonstrate INL pride in the local community by taking a modest but active role in preserving its past.

Alternative 2 – DOE Line Item Construction of New Facilities: Construction of the central campus under DOE Line Item Funding would result in the same potential impacts to cultural resources as described for the preferred alternative, presuming that the development occurs in the same geographic area. Recommendations for the protection of cultural resources would be the same as well. However, construction of the campus at an alternate site would require a separate evaluation of cultural resources.

The isolated flake of obsidian found during the cultural resources survey may also be impacted by construction but these impacts would not be adverse because this artifact is not eligible for the National Register. During construction, project personnel would be required to remain alert to the potential for inadvertent discovery of additional prehistoric artifacts from the sandy soils that dominate the project area. In the event that such materials are discovered, work would temporarily halt and the INL Cultural Resource group would be consulted immediately to salvage important remains and make necessary notifications.

Alternative 3 – Consolidation and Expansion Within Existing Facilities: This alternative would not impact cultural resources because no new facilities would be constructed and no new areas would be disturbed.

Alternative 4 – No Action: The “No action” alternative would not impact cultural resources.

4.9 Environmental Justice: Environmental justice is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (EPA 2006). None of the alternatives assessed would result in high adverse impacts on the local population – therefore no disproportionately high and adverse effects to minority or low-income populations would occur.

4.10 Intentional Destructive Acts: The plausible impacts from intentional destructive acts are similar to potential accident scenarios (e.g. fires, explosions, drops, punctures, airplane crashes). A hazard assessment has been performed for the IRC, which is representative of the work to be performed under all of the alternatives. Based on the analyses in the hazard assessment, material release scenarios do not exceed “alert” class operational emergency limits at the site boundary under the proposed alternatives. A nonradiological hazardous material release scenario is classified as an alert emergency if the airborne concentrations for the analyzed hazardous material exceeds the material's Emergency Response Planning Guidelines (EPRG)-2/Temporary Emergency Exposure Limit (TEEL)-2 at 30 meters but does not exceed the material's EPRG-2/TEEL-2 value at the facility boundary. Based on the limited quantities of radioactive material that would be in the facilities at any given time and the limits identified in 10 CFR 30.72 Schedule C, radiological releases from an incident would be so small that an emergency response plan for those releases is not required.

5. POTENTIAL CUMULATIVE IMPACTS

Cumulative impacts are defined by EPA as “the combined, incremental effects of human activity”, and result when the effects of an action are added to or interact with other effects in a particular place and within a particular time. While they may be insignificant by themselves, cumulative impacts potentially accumulate over time from one or more sources, and can result in the degradation of important resources. Because federal projects cause or are affected by cumulative impacts, assessment of cumulative impacts is required under NEPA.

For all alternatives evaluated in this EA, impacts to the environment and cultural resources are anticipated to be minor, and the resulting cumulative impacts to these resources is also expected to be minor.

5.1 Land Use: For the preferred alternative and the “DOE Line Item Construction” alternative, an area of approximately 75 acres that has traditionally been in agriculture will be rezoned for commercial, residential or industrial development. This rezoning will occur regardless of whether the preferred alternative is ultimately selected because of other, non-INL development planned for the area. Although the area potentially impacted by these alternatives would be small, this change in land use does continue a trend for lands immediately surrounding Idaho Falls where agriculture is being replaced by industry or housing. Land use would not change as the result of the for either the “Consolidation and Expansion Within Existing Facilities” alternative or the “No Action” alternative.

5.2 Air Quality: Alternatives 1 through 3 would result in small increases in emissions of atmospheric pollutants. The increased number of buildings proposed in the first two alternatives would result in a proportional increase in emissions from heating systems. These emissions would be similar to those of any other large, gas-heated building. The additional laboratory buildings would result in increased emission of volatile chemicals. Regulatory and administrative controls on these facilities would reduce the impacts from these materials to levels that would minimize or eliminate any quantifiable cumulative effect on air quality.

Modeling of off-site doses from radioactive emissions have been calculated and determined to be less than one percent of the regulatory limit despite the application of extremely conservative assumptions on radionuclide inventories and release parameters. The modeled offsite dose for the various action alternatives are also below the requirement for emissions monitoring, indicating that cumulative (or non-cumulative) impacts are not anticipated to occur. The primary NRC-licensed facilities in the Idaho Falls area include the local hospital and an independent radioisotope laboratory. The hospital uses radioactive materials in sealed sources and in internal medicine procedures with virtually no airborne emissions. The radioisotope laboratory also uses primarily sealed sources, and is not considered an atmospheric emission source.

5.3 Water Resources: The first three alternatives would result in increased water use and increased wastewater treatment. The estimated wastewater load for the new central campus facilities would remain less than one percent of the wastewater treated by the City of Idaho Falls. Based on the availability of ample surface and ground water, and the adherence to local, state, and federal water quality regulations, none of the alternatives would create a cumulative burden on the existing water supply. On a city-wide basis, increased stormwater runoff to the Snake River System resulting from the proposed action would be small regardless of which action alternative is selected.

5.4 Ecological Resources: The land proposed for the central campus has been used for agriculture for many years, and is therefore already severely disturbed from an ecological perspective. Development of the central campus on this site would not increase the area of ecological disturbance. No threatened or endangered species, nor their critical habitats, were identified within the proposed development area.

5.5 Socioeconomic Factors: Full development of a central campus under alternatives 1 or 2 would impact result in increased employment opportunities and average family income while also contributing to an increase in the need for local housing and community services. However, the total number of new jobs that could become available at a fully-developed central campus would not completely offset reductions in total INL employment over the past decade. The consolidation of activities under the three action alternatives would also result in the reduction of approximately $418,000 per year of lease payments for the currently leased satellite facilities. This loss of revenue would be more than made up for under the preferred alternative when factoring in the lease values of the new central campus facilities.

5.6 Transportation/Traffic and Noise: On a local scale, the development of the central campus under alternatives 1 or 2 would result in an estimated doubling of the number of employees (and therefore the amount of traffic) in the campus area. Most of the increase in long-term noise levels in the area would also be due to the increased traffic. The Center for Advanced Energy Studies, commercial buildings and new apartments are currently being constructed near the central campus, and additional residential and industrial growth is taking place immediately to the north and east of the site. As the area continues to be developed and noise and traffic volumes continue to increase, additional traffic controls may be required for the immediate area.

5.7 Cultural Resources: As indicated in Section 4, impacts to cultural resources are not anticipated for any of the alternatives evaluated. Protection and recognition of the canal identified in the cultural resources survey would present a net positive impact to cultural resources.

6. PERMITS AND REGULATORY REQUIREMENTS

The U.S. Department of Energy complies with all applicable federal and state laws, regulations, orders, and other requirements.

Air Quality Regulations and Permits

Regulations and permits required for the central campus are based on the assumption that the DOE contractor would be operator of the facilities regardless of the alternative that is ultimately selected. The INL contractor would therefore be responsible for evaluating the need for and obtaining any permits related to air quality for operation of new buildings as "stationary sources".

Federal air quality requirements for radioactive materials are found in the regulations of 40 CFR Part 61, Subpart H (National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities). These regulations apply to any facility owned or operated by the Department of Energy that emits any radionuclide other than radon into the air. An Application to Construct would not be required for the central campus because the estimated dose to the maximally exposed individual is less than one percent of the federal standard (i.e. less than 0.1 mrem). Non-radioactive pollutants controlled by regulations pursuant to the Clean Air Act of 1970 are not anticipated to be emitted at levels that would require federal or state permits.

Air quality regulations for the state of Idaho are found in IDAPA 58.01.01 (Rules of the Department of Environmental Quality), and IDAPA 58.01.01 ("Rules for the Control of Air Pollutants in Idaho"). The Idaho air quality regulations in Section 200 (Procedures and Requirements for Permits to Construct, or PTC) require the owner or operator of any stationary source that emits or may emit air pollution to obtain a PTC from DEQ before beginning construction or modifying the source unless the activity is specifically exempt from the need of such a permit. As with the federal regulations, the central campus would be exempt from this requirement because the estimated dose to the maximally exposed individual is less than one percent of the federal standard of 40 CFR Part 61, or 0.1 mrem.

For non-radiological toxic air pollutants, emissions from laboratory buildings at the central campus would be subject to an Air Permit Applicability Determination (APAD) similar to that conducted for the IRC. The APAD would establish the appropriate maximum 24-hour and maximum annual emission limits for toxic pollutants that would be used in the laboratory. Administrative controls based on inventory limits and/or Independent Hazard Reviews for new programs would then be implemented to assure that these limits would not be exceeded.

Water Quality and Water Use

The primary requirements and permits related to water include those pertaining to storm water and wastewater pursuant to the Clean Water Act of 1972, as amended, as well as those associated with water use. The principal requirements relevant to the central campus would include the following:

Industrial Wastewater Acceptance Permits (IWA) - All sewage and/or industrial wastewater generated at the central campus would be discharged into the city of Idaho Falls Publicly Owned Treatment Works. City of Idaho Falls Industrial Pretreatment Disclosure Forms would therefore have to be obtained. City sewer discharge permits would also have to be obtained in accordance with the Idaho Falls Code of Ordinances, Title 8 (Public Utilities and Property), Chapter 1 (Sewers). Construction of sampling and flow monitoring locations, if appropriate, must be in accordance with these rules.

Storm Water for Industrial Activities - A determination would be required by the INL (or the builders) as to whether the storm water drainage system at the central campus would be considered a separate small municipal separate storm sewer system (MS4) regulated under the National Pollutant Discharge Elimination System (NPDES) Phase II Storm Water General Permit (40 CFR 122.32). If the storm water system connects to the Idaho Falls city storm drains, the INL would be required to notify the City of Idaho Falls and meet Idaho Falls city requirements found in Title 8 (Public Utilities and Property), Chapter 1 (Sewers), Sections 8-1-7 and 8-1-8.

Storm Water for Construction Activities - If central campus facilities are constructed using DOE funds (Alternative 2), the construction activity must follow the federal NPDES General Permit for Storm Water Discharges from Construction Activities (as modified on January 21, 2005). This would require that the INL contractor prepare and follow a storm water pollution prevention plan (SWPPP) and then submit a Notice of Intent to EPA describing the proposed activity. A Notice of Termination would also be required once the project is completed.

Water Use - The INL contractor would be required to receive permission via a “will serve” letter from Idaho Falls that they will supply water.

Waste Management and Pollution Prevention

Disposal of all waste forms generated at the proposed central campus would be performed in accordance with existing INL programs and in full compliance with all federal, state, and local laws and ordinances. The STC is not currently, nor will be, classified as a hazardous waste storage or disposal facility, so RCRA hazardous waste permits would not be required.

Ecological Resources

DOE is required to review as guidance the most current U.S. Fish and Wildlife Service (FWS) list for threatened and endangered (T&E) plant and animal species. A biological assessment has been conducted of the central campus development area. DOE has determined that formal consultation with the FWS is not required for this action. DOE is also required to comply with the requirements of the Migratory Bird Treaty Act. As such, DOE would have to ensure that activities associated with the project do not impact migratory birds, their young or eggs.

The proximity of the central campus development area to the Snake River indicates that the Bald and Golden Eagle Protection Act of 1973 (as amended) be considered. A permit must be obtained from the U.S. Department of the Interior to relocate an eagle nest if it is found to interfere with resource development.

The Federal Noxious Weed Act (as amended in Section 15 of the 1990 Food, Agriculture, Conservation and Trade Act) requires control of noxious weeds.

Cultural Resources

Compliance with regulations such as the National Historic Preservation Act of 1966 (as amended) and the Native American Graves Protection and Repatriation Act of 1990 would be required regardless of the alternative selected for the central campus. A survey has been conducted of the area, and recommendations have been made for preserving historical and cultural resources in the area. However, no permits are required for these activities. Compliance with these federal mandates results in compliance with similar state law (Idaho Code Title 67 Chapter 41).

At the INL, a tailored process for compliance with all of the federal, state, and DOE-specific drivers has been developed and is located in these INL documents:

- INL Cultural Resource Management Plan (DOE/ID-10997) and associated Programmatic Agreement between DOE-ID, the Idaho State Historic Preservation Office and Advisory council on Historic Preservation; and
- Agreement in Principle between DOE-ID and the Shoshone-Bannock Tribes

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Appendix A

Public Dose Assessment of Atmospheric Radionuclide Releases from the Proposed INL Science and Technology Campus

Introduction

Laboratory activities at the proposed INL Science and Technology Campus (STC) facilities would include the use of small quantities of radionuclides, small fractions of which could be released out facility vents to the atmosphere. Once released, these constituents can travel downwind and deposit on the ground, potentially causing human health impacts through inhalation, ingestion of soil or contaminated foods, or direct exposure to gamma radiation from contaminated surfaces. Although the amount of hazardous material expected to be released from the STC facilities is extremely small, conservative estimates of emission rates, downwind transport, environmental buildup, and the resulting dose to a maximally-exposed member of the public near the STC were made to confirm that maximum health impacts would be well within accepted standards. For low-level exposures to radionuclides in the environment, the applicable standard is 40 CFR 61 Subpart H *National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities* (NESHAPs). This standard requires that emissions of radionuclides to ambient air not exceed those amounts that would cause any member of the public to receive an effective dose equivalent of 10 millirem per year (mrem/y) or greater.

Methods

Radionuclide annual emission rates for central campus laboratory buildings were estimated using the following two methods:

1. Annual radionuclide inventories (radionuclide amounts expected to be used in the facility per year [Ci/y]) were developed based on anticipated

and potential STC projects (Table A-1). These projects include light laboratory operations currently at the Reactor Technology Complex (RTC) and research projects associated with Nuclear Engineering (NE), National and Homeland Security (N&HS), and Biotechnology (Bio). The annual inventories were then multiplied by conservative airborne release fractions given in Appendix D to 40 CFR Part 61—*Methods for Estimating Radionuclide Emissions* to obtain annual emission rates (Ci/y). All of the radionuclides were assumed to be in either a solid or liquid form, with the exception of Xe-133 which is gaseous. The 40 CFR 61 App. D release fractions are 0.001 (0.1%) for solids and liquids and 1 (100%) for gases.

2. Radionuclide emission rates for operations and research currently performed at the Radiological and Environmental Services Laboratory (RESL), building CFA-690, Central Facilities Area (CFA) that may be transferred to the STC facilities were taken from the 2004 INEEL NESHAPs analysis (Table A-2). These are abated emission rates that take credit for offgas emission controls present at the RESL facility.

Table A-1. Anticipated radionuclide inventories and maximum unabated (no offgas controls) annual radionuclide emission rates for planned STC projects.

Nuclide	RTC Program Inventory (Ci/y)	NE Program Inventory (Ci/y)	NS, Bio, Other Additions (Ci/y)	Total Program Inventory (Ci/y)	Max Release (Ci/y)
Am-241	5.1E-08	5.0E-04		5.0E-04	5.0E-07
Am-243	2.2E-09	5.0E-04		5.0E-04	5.0E-07
As-73		1.0E-03		1.0E-03	1.0E-06
Bk-247		2.5E-04		2.5E-04	2.5E-07
C-14	4.4E-08	1.0E-03	1.0E-01	1.0E-01	1.0E-04
Ce-144		5.0E-03		5.0E-03	5.0E-06
Cf-249		1.0E-04		1.0E-04	1.0E-07
Cm-242	1.1E-10			1.1E-10	1.1E-13
Cm-243	1.8E-09			1.8E-09	1.8E-12
Cm-244	3.6E-09	5.0E-04		5.0E-04	5.0E-07
Cm-248		1.0E-04		1.0E-04	1.0E-07
Co-57	1.7E-07			1.7E-07	1.7E-10
Co-60	6.5E-04	5.0E-03		5.7E-03	5.7E-06
Cs-134	1.0E-05			1.0E-05	1.0E-08
Cs-137	6.0E-03	5.0E-03		1.1E-02	1.1E-05
Eu-152	5.5E-05			5.5E-05	5.5E-08
Eu-154	1.2E-04	5.0E-03		5.1E-03	5.1E-06
Eu-155	4.1E-05			4.1E-05	4.1E-08
Fe-55	1.3E-05			1.3E-05	1.3E-08
H-3	1.1E-06		1.0E+01	1.0E+01	1.0E-02
Hg-203		5.0E-03		5.0E-03	5.0E-06
I-125			1.0E-06	1.0E-06	1.0E-09
I-129	7.2E-09	5.0E-03	1.0E-06	5.0E-03	5.0E-06
I-131			2.0E-03	2.0E-03	2.0E-06
K-40	6.4E-08			6.4E-08	6.4E-11
Mn-54	1.7E-07			1.7E-07	1.7E-10
Ni-59	3.5E-09			3.5E-09	3.5E-12
Ni-63	1.0E-05			1.0E-05	1.0E-08
Np-237	1.4E-08	1.0E-03		1.0E-03	1.0E-06
P-32			1.0E-01	1.0E-01	1.0E-04
Pu-238	4.1E-08			4.1E-08	4.1E-11
Pu-239	2.4E-08	5.0E-04		5.0E-04	5.0E-07
Pu-240	2.0E-08			2.0E-08	2.0E-11
Pu-241	2.7E-08			2.7E-08	2.7E-11
Pu-242	6.5E-10	4.0E-04		4.0E-04	4.0E-07
Ra-226	6.0E-10			6.0E-10	6.0E-13
S-35			1.0E-01	1.0E-01	1.0E-04
Sb-125	1.4E-05			1.4E-05	1.4E-08
Sr-85		5.0E-03		5.0E-03	5.0E-06
Sr-89	2.4E-06			2.4E-06	2.4E-09
Sr-90	6.6E-05	5.0E-03		5.1E-03	5.1E-06
Tc-99	4.3E-08	5.0E-03		5.0E-03	5.0E-06
Tc-99m		5.0E-03		5.0E-03	5.0E-06
Th-230	4.7E-09			4.7E-09	4.7E-12
Th-232		5.0E-04		5.0E-04	5.0E-07
U-232	3.8E-11			3.8E-11	3.8E-14
U-233	1.4E-08			1.4E-08	1.4E-11
U-234	4.4E-07			4.4E-07	4.4E-10
U-235	5.1E-08	5.0E-04	1.3E-05	5.1E-04	5.1E-07
U-236	1.2E-09			1.2E-09	1.2E-12
U-238	3.3E-06	5.0E-03	6.7E-04	5.7E-03	5.7E-06
Xe-133			2.0E+01	2.0E+01	2.0E+01
Zn-65	1.7E-07			1.7E-07	1.7E-10
Zr-95		2.0E-03		2.0E-03	2.0E-06

Table A-2. Radionuclide emission rates for current RESL (CFA-690) activities that may be moved to the STC.

Nuclide	2004 INL Site NESHAPs Emissions (Ci/y)
Am-241	5.3E-10
Co-60	2.6E-08
Cs-137	2.3E-08
Pu-239	1.4E-10
Pu-238	6.7E-11
U-234	1.3E-10
U-238	1.4E-10
Cs-134	4.2E-09
Zn-65	3.3E-09
Sr-90	4.2E-10
Mn-54	1.8E-09
Am-243	4.0E-13
Co-57	1.4E-09
U-232	2.5E-13
Th-232	1.8E-13
Np-237	1.5E-13
Sn-113	4.4E-10
Pu-242	1.5E-13
Pu-236	2.5E-13
Ni-63	1.4E-09
Fe-55	4.0E-10
U-235	1.5E-14

Dose assessment modeling was performed using CAP88-PC Version 3.0 (http://www.epa.gov/radiation/assessment/CAP88/index.html). Version 3 incorporates the latest EPA dose and risk factors from Federal Guidance Report 13 (FGR 13, EPA 1999) in place of the RADRISK data that was used in previous CAP88 versions. Dose and risk conversion factors include the effective dose equivalent (EDE) calculated according to the methods in ICRP Publication Number 72 (ICRP 1996). The dose from Cm-248, which was not in the CAP88-PC database, was estimated by multiplying the Cm-244 CAP88-PC dose by the ratio of the Cm-248 to Cm-244 internal dose conversion factors taken from Federal Guidance Report 11 (EPA 1988).

STC building locations, designs, stack parameters, and the locations of specific research projects have not yet been finalized, so modeling from specific release points is not yet possible. The most likely facilities in which the new STC research projects will be located are the proposed Science and Technology Laboratory (STL) and/or the existing INL Research Center (IRC). The proposed STL would be sited adjacent to the southeast corner of the existing Engineering Research Operations Building (EROB) (Figure A-1). The IRC is located 840 meters east-southeast of EROB, on the east side of U.S. Highway 20 (A-2). Since the building or process locations have not been finalized and there are numerous existing or potential residences in the immediate area, a bounding release scenario was evaluated that assumes: (1) all of the emissions in Tables A-1 and A-2 are released from a single ground-level point source that could be located in either of the two locations, (2) a public residence has the potential to exist in any direction around the release point, and (3) a residence is located at a minimum distance of 150 m from the center of the facility. This conservative scenario provides an upper-bound assessment of all likely release locations, release conditions, and actual residence locations. The actual distances and directions to the closest public residence are 190 m north-northeast from the assumed atmospheric emission release point for the central campus location (Figure A-1), and 230 m northwest of the IRC (potential residence – Figure A-2).

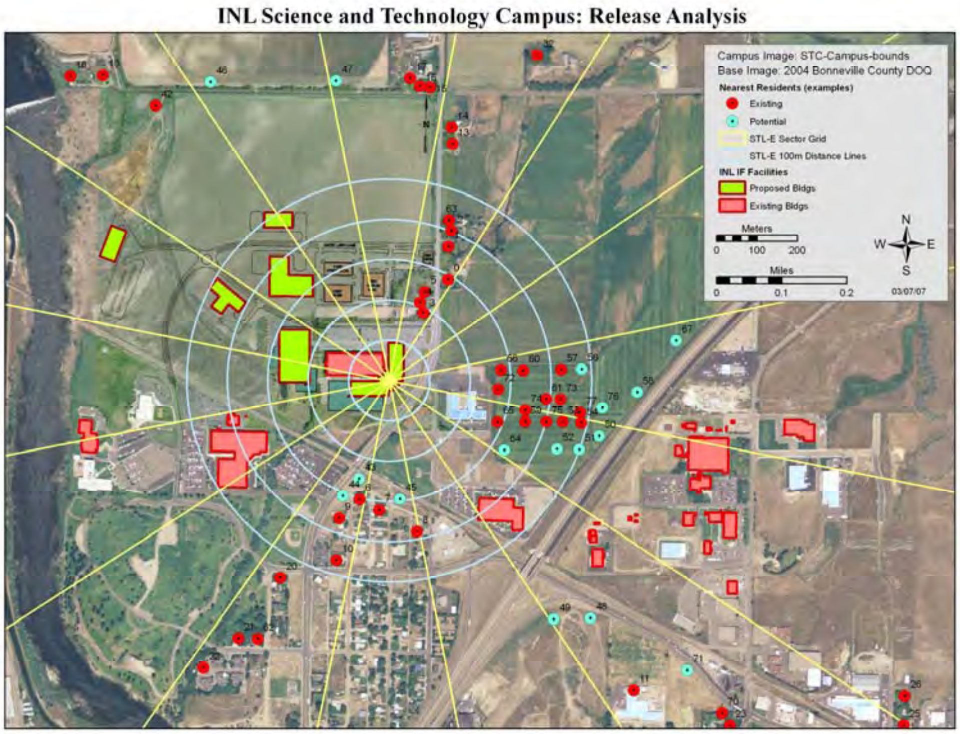

Figure A-1. Assumed atmospheric contaminant release point for STC. Public residences are shown relative to sector and 100-m interval distance lines from the facility.

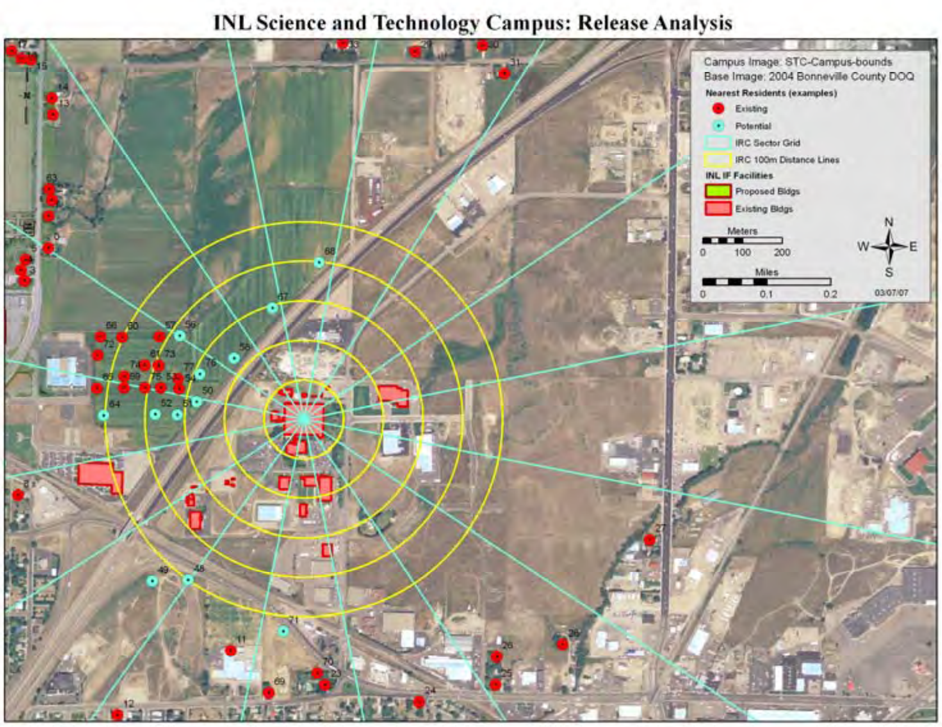

Figure A-2. Existing location of the IRC, with public residences and sector and 100-m interval distance lines from the facility.

Two years of meteorological data (2003-2004) from the 15 m meteorological tower near the Idaho Falls “greenbelt” were used to develop two one-year CAP88-PC wind files. The wind file with the worst-case annual dispersion (IDAL04.WND) was used in the final dose modeling. The food supply fractions used in CAP88-PC were set to the conservative “rural” category which assumes that 70% of the vegetables, 44% of the meat products, and 40% of the milk products ingested are produced at the receptor location. Site-specific annual-average climatological inputs included 7°C air temperature, 28 cm/y precipitation, 4 g/m^3 absolute humidity, and 800-m mixing height. EPA default values were selected for all other CAP88-PC input parameters. All dose calculations conservatively assumed 50 years of soil buildup and exposure.

Unit emission rates (1 Ci/y) of the radionuclides listed in Tables A-1, A-2, and A-3 were evaluated in the modeling runs, which gives effective dose equivalent (EDE) results in mrem/y per Ci/y released. These “unit EDE” values were then multiplied by the annual emission rate for each radionuclide and summed to obtain the radionuclide-specific EDE for the maximally-exposed individual. Most of the radionuclides (those without long decay chains) were evaluated in a single CAP88-PC run (OthersH0.DAT input file). Actinides (Am, Cm, Np, Pu, and U) were evaluated in separate CAP88-PC runs to keep their respective progeny dose contributions grouped with the individual parent actinide.

Results

Radionuclides were screened to eliminate those that would contribute less than 0.1% of the total EDE from each facility. The screening was performed by ranking the radionuclides by their CAP88-PC EDE and selecting those nuclides that contribute to 99.9% of the cumulative radionuclide EDE. The total EDE calculated for a maximally-exposed member of the public from the STC source emissions is 0.078 mrem/y (Table A-3). The dose from the RESL project emissions is much smaller (5.4E-06 mrem/y) and does not contribute significantly to the total.

The total dose estimate (0.078 mrem/y) is less than 1% of the NESHAPs dose standard of 10 mrem/y. This NESHAPs standard is considered to be very conservative by health physicists, who generally agree on limiting a person's non-background dose to less than 100 mrem/y. In the United States, the estimated annual-average EDE from background radiation sources (natural, medical) is about 360 mrem/y (DOE, 2005).

These dose results are conservative, upper-bound estimates, meaning that the maximum individual annual dose from actual emissions will likely be significantly less than this estimate. The conservative assumptions include: (1) upper bound estimates of annual inventories, (2) the use of conservative NESHAPs Appendix D. releases fractions, (3) the assumption that all new STC (non-RESL) emissions are unabated and have no offgas emissions controls, (4) the release of all emissions from a single ground-level point source, (5) the use of "rural" food production parameters in CAP88-PC, and (6) the selection of a maximally-exposed individual at the point of maximum air concentration/deposition in any direction from the facility and at a distance of 150m.

Table A-3. STC radionuclide emission rates and CAP88-PC Effective Dose Equivelents (EDE) for a maximally-exposed member of the public.

Nuclide	Total Program Inventory (Ci/y)	Max Release (Ci/y)	CAP-88PC 150-m Unit Dose (mrem/Ci)	EDE (mrem/y)	Cumulative Fraction of Total
Xe-133	2.0E+01	2.0E+01	1.2E-03	2.3E-02	0.295
Pu-239	5.0E-04	5.0E-07	1.1E+04	5.4E-03	0.364
Np-237	1.0E-03	1.0E-06	5.1E+03	5.1E-03	0.429
Th-232	5.0E-04	5.0E-07	9.1E+03	4.6E-03	0.488
Am-243	5.0E-04	5.0E-07	8.9E+03	4.5E-03	0.545
Am-241	5.0E-04	5.0E-07	8.9E+03	4.4E-03	0.602
U-238	5.7E-03	5.7E-06	7.4E+02	4.2E-03	0.656
Pu-242	4.0E-04	4.0E-07	1.0E+04	4.0E-03	0.708
Bk-247	2.5E-04	2.5E-07	1.5E+04	3.7E-03	0.755
Cm-248	1.0E-04	1.0E-07	9.9E+04	9.9E-03	0.882
Cm-244	5.0E-04	5.0E-07	5.5E+03	2.8E-03	0.917
Cs-137	1.1E-02	1.1E-05	2.2E+02	2.4E-03	0.948
Cf-249	1.0E-04	1.0E-07	1.5E+04	1.5E-03	0.968
Sr-90	5.1E-03	5.1E-06	1.9E+02	9.7E-04	0.980
Tc-99	5.0E-03	5.0E-06	1.1E+02	5.4E-04	0.987
U-235	5.1E-04	5.1E-07	8.2E+02	4.2E-04	0.992
C-14	1.0E-01	1.0E-04	2.6E+00	2.6E-04	0.996
I-129	5.0E-03	5.0E-06	1.6E+01	8.2E-05	0.997
P-32	1.0E-01	1.0E-04	7.0E-01	7.0E-05	0.998
Eu-154	5.1E-03	5.1E-06	1.1E+01	5.6E-05	0.998
Ce-144	5.0E-03	5.0E-06	7.5E+00	3.7E-05	0.999
S-35	1.0E-01	1.0E-04	3.0E-01	3.0E-05	0.999
H-3	1.0E+01	1.0E-02	2.9E-03	2.9E-05	1.000
Co-60	5.7E-03	5.7E-06	4.6E+00	2.6E-05	1.000
			Total =	**7.8E-02**	

References

EPA, 1999, EPA 402-R-99-001 Federal Guidance Report 13, “Cancer Risk Coefficients for Environmental Exposure to Radionuclides”, USEPA Office of Radiation and Indoor Air, Washington, DC.

ICRP, 1996, International Commission on Radiological Protection, “Age Dependent Doses to Members of the Public from Intake of Radionuclides, Part 5. Compilation of Ingestion and Inhalation Dose Coefficients” ICRP Publication 72, Pergamon Press, Oxford.

EPA, 1988, EPA-520/1-88-020, “Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors For Inhalation, Submersion, and Ingestion,” USEPA Office of Radiation Programs, Washington, DC.

Appendix B

Responses to Public Comments the Draft Environmental Assessment

<u>Comments from Shoshone-Bannock Tribes:</u>

Comment 1: "We would like to see if there were any types of artifacts, or sites that were there prior to the occupation of this area."

Response: As indicated in Section 3.12, page 23, "a single obsidian flake was observed near the northern boundary of the potential development area (Figure 5). This isolated artifact probably reflects very short term prehistoric activity in the area and is not eligible for nomination to the National Register of Historic Places."

Comment 2: "In reference to the Bald Eagles they migrate to this area during the winter months and the survey may have been completed in the summer months."

Response: The ecological evaluation was conducted in March. Only one tree was within the proposed project area and there was no indication of eagle use during the survey or from the previous winter. Additional trees on the opposing bank across the river from the project area were surveyed, and also showed no sign of active use by Bald Eagles.

Comment 3: "In the paragraph 3 on Page 18 of the document there is a bracket at the end of the "valvata" I was questioning where the beginning bracket started and what it referred to?"

Response: Typographical error has been corrected in the final document.

<u>Comment from Harry Williams</u>:

Comment: "I suggest that DOE consider a completely new complex, including location…is should be west of Idaho Falls on the road to the site (highway 20)."

Response: Based on alternative selection criteria 1 in Section 2 of the EA, the suggested alternative is not a reasonable alternative. DOE needs to create an effective, collaborative campus with the participation of universities. To meet that need, DOE and university facilities need to be in close proximity to each other. Moving the DOE portion of the campus away from existing university facilities does not meeting the meet criteria 1 and it is unreasonable to require universities to move their facilities.

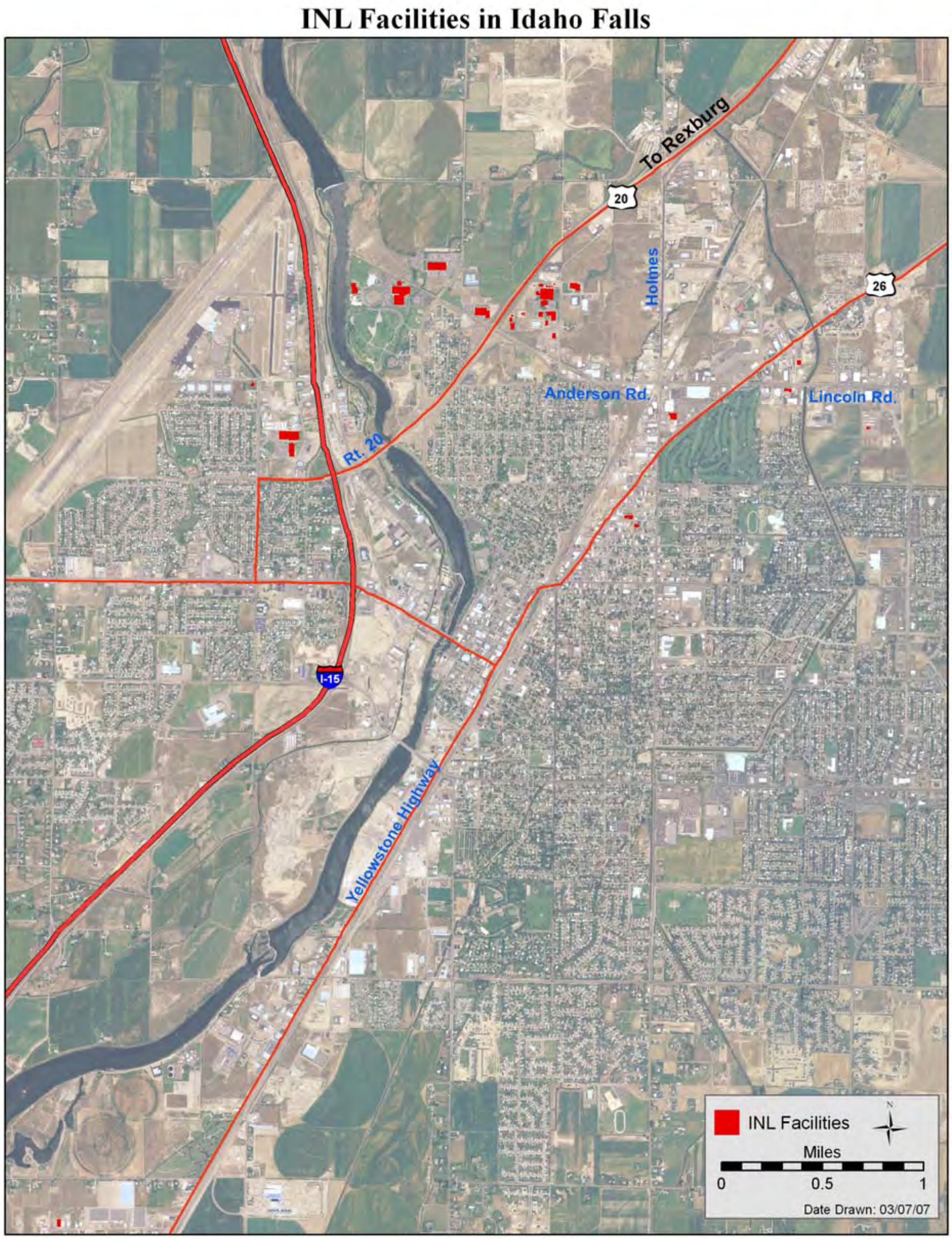

Figure 2. Map of Idaho Falls showing locations of currently owned and leased facilities as part of the current Science and Technology Campus.