4.0 ENVIRONMENTAL CONSEQUENCES

This section evaluates the environmental consequences of the Proposed Action, Alternative Actions and the No Action alternative. The Proposed Action is additionally evaluated for the effects of site preparation, construction, and operation at three optional locations. However, the environmental consequences from site preparation, construction and routine operation are, but with one exception (transportation), no different for the three optional locations. Therefore, the difference between effects at optional locations will only be discussed for this one affected resource area.

4.1 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

4.1.1 Human Health

Site Preparation and Construction. Human health effects during site preparation and construction for the proposed BSL-3 laboratory would be the same as for any small single-story construction project at LANL. The effects would be very localized and affect only site workers or visitors to the site. There would be no public human health effects. Routine construction activities have the potential for exposing workers or site visitors to a number of common hazards including, for example:

- Biological hazards (snake bites, poison ivy, and insect stings)
- Electrical hazards (temporary electrical drops, excavations in areas with underground utilities, heavy equipment lifting with overhead utilities)
- Fire and explosion hazards (portable gasoline containers for generators and other gas-powered equipment, fuel transfers for onsite heavy equipment operation)
- Physical hazards (slips-trips-falls, walking-working surfaces, powered hand-tool operation, pinch-points, hoisting, motor-vehicle operation, excavations, ladders, noise, heat stress, cold stress, sunburn, dust and particulates)

These hazards would be reduced or eliminated by compliance with Federal Occupational Safety and Health Administration (OSHA) regulations (29 CFR 1910.12, 29 CFR 1926, 29 CFR 1990), National Fire Protection Association (NFPA) codes (NFPA 1997, 1998, 2000) and the DOE directives which mandate these worker protection requirements for DOE facilities (DOE 1997c, 1998).

UC workers at LANL would not be directly involved in the construction of the BSL-3 facility, but they would be active in management, site inspections, and utility hookups. Approximately three peak-period UC workers would support construction activities. Because of the limited involvement of UC workers in the construction of the new buildings, no effects on these workers is anticipated.

The Proposed Action is expected to have no effect on the health of any non-UC construction workers under normal operation conditions. Approximately 15 peak period construction workers would be actively involved in potentially hazardous activities such as heavy equipment operations, soil excavations, and the handling and assembly of various building materials. Construction activities would take approximately one year to complete. Appropriate personal protection measures would be a routine part of the construction activities, such as personal protection device use (such as gloves, hard hats, steel-toed boots, eye shields, and ear plugs or covers).

Potentially serious injuries are possible during the construction phases of the Proposed Action. Adverse effects could range from relatively minor (for example, lung irritation, cuts, or sprains) to major (for example, lung damage, broken bones, or fatalities). To prevent serious exposures and injuries, all site construction contractors are required to submit and adhere to a Construction Safety and Health Plan (Plan). This Plan is reviewed and approved by UC staff before construction activities can begin. Following approval of this Plan, UC and DOE site inspectors would routinely verify that construction contractors are adhering to the Plan, including applicable Federal and state health and safety standards. In addition, UC staff would provide site-specific hazard training (for example, construction safety, waste handling, etc.) to construction contractors as needed. Adherence to an approved Plan and completion of appropriate hazards training are expected to prevent any major adverse effects on construction workers. UC at LANL has been successful in reducing its OSHA-recordable injury and illness rate per 100 full time employees over the last 4 years from 4.37 cases per 100 full time workers in 1997 to 1.51 cases per 100 full time workers in 2000 (LANL 2001l). These low rates for daily operations (including construction activities), reflect UC at LANL's effectiveness in implementing a comprehensive health and safety program to assure worker safety. Due to the nature of this construction project (single-story frame construction), no fatalities and only an extremely small incidence of minor injuries would be expected. In comparison with the LANL injury and illness rate, data from the U.S. Bureau of Labor Statistics (BLS) reports nonfatal injury and illness industry rates for nonresidential building construction (employing at total of about 650,000 workers in 1999) went from 11.2 cases per 100 full time workers in 1997 to 8.9 cases in 1999 per 100 full time workers (BLS 2001). In 1999, about 85 percent of the total number of nonfatal injuries and illness were due to injuries and 15 percent were due to illnesses.

Operations. The type and rate of injuries and illnesses expected during operation of the proposed BSL-3 laboratory would be the same as those demonstrated for CDC-registered laboratories, U.S. Army Biological Defense Research Program (BDRP) laboratories and existing biological research laboratories operated by LANL. While the most obvious potential concern of operating a BSL-3 laboratory involves handling of infectious organisms (listed in Appendix E), the proposed facility would have attributes of most laboratories in that it would have identified physical, electrical, and chemical hazards. The proposed laboratory would not use radioactive materials, propellants, or high explosive materials, and the quantities of hazardous chemicals to be used would be less than 230 lbs per year (104 kg per year) (LANL 2001b); hazardous chemicals would be handled according to established

LANL procedures (LANL 1999g, 2001b). The potential for injuries and illnesses involving routine laboratory operations presents a greater health risk to workers than does the potential for injury and illnesses associated with handling infectious substances. Moreover, the combination of utilizing the guidelines, standards, practices and procedures established by the CDC, NIH, Human Health Services, and public health services together with BSL-3 safety equipment and facility safety barriers, results in the an overall potential risk of illness to site workers or visitors from operations involving select agents that would be best characterized as minor. There would be no discernable public human health effect from routine BSL-3 laboratory operations at the proposed facility.

There has been an extremely low incidence of acquired-infections associated with operations in CDC-registered laboratories since the implementation of CDC-developed guidelines issued in 1974 (See Appendix F). Specifically, a recent bibliographic database (Collins 2000) based on reports starting from about the beginning of the 20th century and continuing up through August 2000 reveals substantial reductions in laboratory-acquired infections reported in the 1990's. There is a particularly notable lack of reported cases in the literature relating to laboratory acquired infections in the United States in the last 10 years.

The experience of the U.S. Department of the Army (DA) at their BDRP facilities over several decades provides further insight to the potential for laboratory-acquired infection. The DA program underwent a programmatic NEPA evaluation in 1989, the *Final Programmatic Environmental Impact Statement Biological Defense Research Program* (BDRP)(PEIS) (DA 1989). Since 1976, there have been no occurrences of overt disease in laboratory workers handling infectious organisms within the DA BSL-3 facilities, although in 1980, one focal infection with *F. tularensis* occurred at the site of a puncture wound (DA 1989)." The BDRP PEIS (DA 1989) also estimated laboratory-acquired infection rates for their U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) facility for different biocontainment levels (roughly equivalent to the CDC BSL levels) over different periods of time. For their BSL-3 equivalent laboratory operations from 1960 to 1962 they estimated there were six laboratory-acquired infections for a rate of 2 per million man-hours worked. For their BSL-4 equivalent laboratory operations from 1960 to 1969, they estimated seven laboratory-acquired infections for a rate of 1 per million man-hours worked. These infections included sub-clinical infections and mild illnesses where hospitalization was not required (DA 1989).

Overall, the BDRP PEIS estimated the rate of public infection from USAMRIID as less than 0.001 per 1,000,000 person-years and the risk of death to a laboratory worker for the Defensive Period (1970 to 1989) as 0.005 per 1,000,000 person-years (DA 1989). By way of comparison, the Offensive or Weapons Period (1954 to 1964) was associated with values for the risk of death to laboratory workers of about 5 orders of magnitude higher (DA 1989).

Experience with biological research laboratories at LANL spans a period of several decades of biological studies. Based on information provided by the LANL Safety Group, ESH-5, LANL has operated BSL-1 and BSL-2 equivalent laboratories for at least the last 20 years

without any exposures or infections associated with their operation (PC 2002a). In addition, there were no releases to the environment or public associated with the LANL biological research laboratories. Additionally, the LANL Biological Safety Officer reviewed available Occurrence Reporting and Processing System (ORPS) Reports (2566 reports from the past 10 years) and the Occupational Medicine Exposure Incident Log for LANL (2283 entries from the past 10 years), and the LANL Injury and Illness Program Manager also reviewed the LANL Occupational Safety Health Administration (OSHA) 200 log (from 1993 forward to the present) for information regarding laboratory acquired infections by LANL workers. These reports and logs include information on workers at BSL-1 and -2 laboratories. The results of these reviews was that there have been no incidences of laboratory acquired infections recorded for LANL workers (PC 2002a).

As part of the preparation of this EA, NNSA contacted the University of New Mexico's (UNM's) School of Medicine regarding their BSL-3 laboratory operations. This contact was initiated to obtain operating experience information involving a BSL-3 laboratory facility located in a major metropolitan area with regional proximity to the proposed LANL BSL-3 laboratory facility. NNSA ascertained information indicating no incidence of laboratory acquired infections reported over the last 8 years (PC 2002b).

Anecdotal reporting of human health issues elsewhere at BSL-3 or similar laboratories have indicated that while laboratory-acquired or laboratory-associated infections (specifically, the "all other" category of nonfatal injury and illness rates reported by the BLS) do occur, they should be considered abnormal events due to their infrequency of occurrence (see Appendix F). As such, the human health effects of these events are discussed within this chapter in Section 4.2, Abnormal Events. There are a number of reasons that routine BSL-3 laboratory or similar laboratory operations do not normally produce infectious disease-related health effects to workers, their families, or the general public. In general, these are a result of the implementation of the comprehensive CDC and NIH guidelines (see Appendix A) that were based upon historical published accounts (anecdotal information) over many decades of experience in medical and bacteriological laboratories (CDC 1999) (see Appendix F).

Potential Pathways for Infectious Agents to Escape BSL-3 Containment. Potential means for infectious agents to leave the BSL-3 containment and possibly cause human health impacts would include five pathways. These are direct transmission,[19] vector-borne transmission,[20] vehicle-borne transmission,[21] airborne transmission[22], and water-borne transmission.[23]

[19] Direct transmission: Direct and essentially immediate transfer of infectious agents to a receptive portal of entry through which human or animal infection may take place. This may be by direct contact such as touching, biting, kissing or sexual intercourse, or by the direct projection (droplet spread) of droplet spray onto the conjunctiva or onto the mucous membranes of the eye, nose or mouth during sneezing, coughing, spitting, singing or talking (usually limited to about 1 meter or less) (Benenson 1995).

[20] Vector-borne transmission can include mechanical or biological transmission of infectious agents. Mechanical transmission includes carriage by crawling or flying insects through soiling of feet or proboscis or

Direct Transmission. Operations as described minimize opportunities for direct transmission. Direct transmission would first require a worker to be exposed to an infectious agent. The likelihood of a worker inhaling or otherwise becoming exposed (for example, through cuts in the skin or ingestion) to an infectious agent would be extremely remote. While it would be very unlikely that a worker would be exposed, if exposed with a sufficient dose, it would be possible for them to be carriers[24] for those agents and through direct transmission expose others. This potential is further reduced through the intervention of effective vaccines or therapeutic measures (CDC 1999).

Vector-borne Transmission. The facility would be designed to severely limit the potential for possible vector-borne transmission through insects and rodents. The use of pest control programs (Appendix G of CDC 1999) would limit the potential for transmission of infectious agents from animals to humans.

Vehicle-borne Transmission. The primary concern for vehicle-borne transmission would be by the workers clothing or skin and hair, as all other materials leaving the BSL-3 must go through a sterilizing autoclave. The guidelines established by the CDC and NIH, which would be followed by the proposed BSL-3 facility, are designed to reduce this potential method of transmission. This substantially reduces any potential for a worker to unknowingly transport infectious microbes from the facility.

Airborne Transmission. All air leaving the BSL-3 laboratories during normal conditions would exit through ductwork that is HEPA-filtered prior to emission through stacks on the building roof. The number of viable vegetative microorganisms after HEPA filtration would be near zero. HEPA filters are rated as 99.97 percent efficient. The rating efficiency point is at the particle size where the filter is least efficient and is certified by removal of 0.3 microns[25] diameter dioctylphthalate (DOP) particles (NSC 1996). This means that HEPA filters remove 99.97 percent of all the particulates that hit the filters. The remaining particles can penetrate or pass through the filters. Filters are made from randomly laid non-woven

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by passage of organisms through its gastrointestinal tract. This does not require multiplication or development of the organism. Biological transmission includes the propagation (multiplication), cyclic development, or a combination of these (Benenson 1995).

[21] Vehicle-borne transmission is the transmission of infectious agents through contaminated inanimate materials or objects such as handkerchiefs, soiled clothes, surgical instruments, water, food, and biological products (Beneneson 1995).

[22] Airborne transmission is the passage of microbial aerosols to a suitable portal of entry, usually the respiratory tract. Microbial aerosols are suspensions of particles in the air consisting partially or wholly of microorganisms (Benenson 1995).

[23] Water-borne transmission is the transmission of infectious agents through contamination of water. It can be considered a subcategory of vehicle-borne transmission.

[24] A carrier is a person or animal that harbors a specific infectious agent without discernable clinical disease and serves as a potential source of infection (Benenson 1995).

[25] A micron, also known as a micrometer, is one millionth of a meter or four hundred thousandths of an inch.

natural or synthetic fiber materials made into a flat sheet that is pleated and placed into a filter container. Pleating increases the surface area and improves filter loading and reduces air resistance. HEPA filters have fiber diameters ranging from 0.65 to 6.5 microns in three diameter groupings. The process of aerosol filtration does not simply rely on the size of the opening between fibers, but uses a number of physical properties of air movement around fibers to capture the particles. These forms of capture are called interception, sedimentation, impaction, and diffusion. Electrostatic attraction also plays a part in capturing small particles and the fiber material is often selected specifically to enhance this effect (for example, electret fibers and wool resins). The exact combination of capture mechanisms varies. Larger particles are generally removed by impaction and interception while light particles are removed by diffusion and interception. These mechanisms remove essentially all particles larger than 0.6 microns in diameter and low flow rates let diffusion effectively remove all particles below 0.1 micron (NSC 1996). A most "penetrating particle size" exists between 0.2 and 0.4 microns which is the reason for testing and certifying HEPA filters for particle removal at 0.3 microns (NSC 1996).

HEPA filters at the BSL-3 facility would be replaced routinely and checked periodically for any malfunctions. Given the proposed operations of the facility, there is no expectation that the HEPA filters would become moisture-saturated or torn – the two major reasons for HEPA filter failures.

Regardless of the presence or failure of HEPA filters, many environmental factors effectively kill airborne microbes in their vegetative state. These factors include ultraviolet light, dehydration, high temperatures, freezing temperatures, and the presence of free oxygen. Together these factors account for a substantial reduction in the number of microorganisms. While outdoors the sun, temperature, and other atmospheric conditions ensure that microbial populations die off quickly, generally within minutes. Mathematical predictions of the potential survival of microorganisms in the environment estimate that only about 0.01 percent are able to resist the chemical or physical inactivation found in the outside environment (Mitscherlich and Marth 1984).

Water-borne Transmission. Potable water would not be affected by the implementation of the Proposed Action. Facility design features, such as backflow preventers and State of New Mexico-adopted uniform plumbing code requirements would prevent microbes within the facility from migrating back through the water supply piping to the public. Also, none of the effluent water from the Sanitary Wastewater Systems Consolidation (SWSC) treatment plant contributes directly to any potable water source. Potable water supply wells for Los Alamos County are a good distance from the proposed facility and the LANL sanitary sewer system discharge point. Water exiting through the sink drains would be combined and diluted by sanitary waste in the sewer system at the LANL facility and would undergo a series of treatment steps prior to discharge. These treatment steps consist of aeration, secondary clarification, disinfection, dechlorination (for environmental discharges), water reuse system, effluent holding ponds, and sludge drying beds (JCNNM 2000b). A portion of the SWSC treated water is diverted to cooling towers located at TA-3 where it is reused after

undergoing additional treatment. It is very unlikely that aerosol mists from cooling towers would contain discernable quantities of infectious agents due the extensive water treatment and dilution with other wastewaters.

According to the EPA Surface Water Treatment Rule (40 CFR 9, 141, and 142) public water treatment systems must physically remove or inactivate 99.9 percent of the cyst-forming protozoans *Giardia spp*. and *Cryptosporidium spp*. Treatment system operators comply with this rule by determining the amount of chlorine and contact time along with temperature and pH that it takes to produce the required killing of pathogenic microorganisms. Contact time on the order of hours along with a measurable free available chlorine means that all but the most resistant pathogens would likely be killed. It is anticipated that there would be no discernable effects from water-borne transmission.

4.1.2 Ecological Resources

As stated in Section 3.3.2, no threatened or endangered species habitat or buffer areas would be located at or adjacent to the three proposed BSL-3 laboratory facility optional locations (DOE 1999d; LANL 2001e). Furthermore, the implementation of the Wildfire Hazard Reduction Program (WHRP) and subsequent long-term maintenance projects would drastically reduce the potential risk and damages from an uncontrolled and catastrophic wildfire within the boundaries of LANL. Therefore, neither of these are considered potential effect areas and will not be further evaluated.

Site Preparation and Construction. An estimated one-half to one acre (0.2 to 0.4 hectares) of previously disturbed land would be used for site preparation, utility installation, and other construction activities at Option A or B sites (PC 2001c). It would be expected that continuous and impact noise (described in Section 4.1.6) could have temporary effects to wildlife. However, these minor effects would not be long term.

Site preparation and construction would have some effect upon the resulting soil characteristics. Some soil horizons would be removed entirely where they would be under foundation footings and other parts of the building.

Operation. The operation of the proposed BSL-3 facility would have little if any biota effects. Infectious microorganisms handled in the proposed facility might be introduced into the environment under two conditions. The first is the disposal of sanitary wastewater to the SWSC plant discussed previously. Sanitary waste passing through the wastewater treatment plant undergoes several stages of treatment that would inactivate any microbes that survived the initial disinfectant treatment at the BSL-3 facility (see discussion of water-borne transmission in Section 4.1.1 Human Health).

The second relates to emergency response operations. There is a potential for micro-organisms to be introduced into the environment if they were not contained within the laboratory during a fire-response event. However, even if they did escape containment, there

are a number of environmental factors that effectively kill microorganisms in the vegetative state. These are enumerated in Section 4.1.1. They include ultraviolet light, dehydration, high temperatures, freezing temperatures, and the presence of free oxygen. The survival or death curves indicate that microbial populations die off quickly (DA 1989).

It is unlikely that natural or man-made radioactive materials in the soil or air would have any perceptible effect on microbe growth or viability either in the environment at the proposed BSL facility or within the laboratories themselves. The effects of radioactive materials and naturally occurring radioactive environments on microorganisms was discussed in Section 3.3.2.

4.1.3 Transportation

Site Preparation and Construction. While there would be some material hauling trucks coming and going to deliver construction materials, the size of the BSL-3 building (about 3,000 ft^2 or 279 m^2) would indicate that these would account for only a very small fraction of the vehicular traffic in comparison to the nearby construction activities (specifically the NISC, SCC, and the Research Park). These deliveries and the vehicles from the construction crews would cause an imperceptible increase in traffic on LANL's main access points (see Table 3-2). Also, waste generation (such as soil and construction debris) for the single-story construction would require few trucks for waste removal and disposal since much of the excavation material would likely be reused onsite for landscaping. The sum of these daily trips would be minor in comparison with the approximately 43,000 ADTs associated with the four main access roads (Table 3-2).

As with any construction project, the installation of utility lines may cause some temporary delays in traffic movement. Road closure or traffic slowdowns would have the most effect at the Option B location, since it is adjacent to the most heavily trafficked LANL road, Pajarito Road. The Option A location would also have some possible traffic slow-down effects on Sigma Road during utility trenching depending upon the exact construction corridors at this location.

Parking spaces would not be an issue at location Option C during the construction phase. This location currently has no parking spaces, and therefore, would have no parking effects from construction of the facility at this site. At the Option B location, none of the parking spaces are currently being utilized since building TA-03-16 is not being used. Approximately 15 parking spaces would be taken out of use during the site preparation and construction activities at both the Option A and Option B locations (PC 2001d). These would easily be accommodated at the other existing and future LANL parking lots and structures. The number of relocation parking spaces for individuals currently using these parking lots would be between 15 to 20 spaces (PC 2001d).

Operation. Vehicular traffic due to the operation of the proposed BSL-3 facility would have little effect on the TA-3 traffic congestion. At least half of the 8 to 10 workers expected for

the proposed facility would be relocated from the HRL building (see Section 2.1). These workers already contribute to the ADTs at the LANL main access points (Table 3-2). Some of the other expected site workers might come from other LANL jobs or be hired from out of town. The increased traffic from these additional workers would also have minimal impact on the traffic congestion in the area.

Fourteen parking spaces would become available upon completion of the BSL-3 facility. This would be an increase to the overall TA-3 parking capability only if the Option C location was chosen. Overall, LANL parking would be unaffected by implementing the Proposed Action at either Option A or B locations.

4.1.4 Waste Management

Site Preparation and Construction. The incremental increase in waste materials produced during this phase of work would be minimal with respect to the waste production of the entire LANL facility. Construction debris primarily comprised of wood, metal, asphalt, paper and plastic would be the typical waste expected to be generated during construction of the BSL-3 facility building and any associated parking area. This solid waste would be disposed of either at the Los Alamos County Landfill or at another appropriate replacement solid waste landfill. Additionally, the project would generate excess uncontaminated soil from excavation activities. The soil could be stockpiled onsite or at a location on Sigma Mesa (TA-60) or other approved material management area for future use.

Operation. No additional waste disposal facilities would be developed as a result of the Proposed Action. Waste quantities and disposal practices were discussed in Chapters 2 and 3. The incremental waste production associated with the operation of the facility would be minimal with respect to the total waste volumes generated by the entire LANL facility and disposed of at existing waste disposal facilities.

4.1.5 Utilities and Infrastructure

Site Preparation and Construction. Temporary water and electrical utilities would be provided to the selected site during the construction phase. These temporary services would be removed and replaced upon completion of the construction. Minimal additional site disturbance would result from the installation of permanent utilities on the site.

Operation. The effect of providing utilities to the proposed facility would be nearly imperceptible relative to the demands of other existing facilities in the TA-03 area with high computing and HVAC utilities demands. Effects to infrastructure would include the need for personnel support by LANL facilities management, computing, occupational health and safety, emergency response, and authorization basis personnel. This effect is captured in Section 4.1.7, Socioeconomics, of this EA.

4.1.6 Noise

Site Preparation and Construction. Measurements made at construction sites by LANL personnel showed decibel values that peaked over 100 dBA with a minimum of about 38 dBA (Knight and Vrooman 2000). It would be expected that noise levels would exceed at least for periods of several minutes at a time the 8-hour 85 dBA threshold limit value (TLV) (ACGIH 2000), but only during daylight hours. Members of the public would be exposed to lower noise levels because of the substantial drop in noise with distance from the source. Residential areas would not be exposed to noise levels exceeding the Los Alamos County standard of 65 dBA during the daytime and 53 dBA at nighttime.

Heavy equipment such as front-end loaders and backhoes would produce intermittent noise levels at around 73 to 94 dBA at 50 ft (15 m) from the work site under normal working conditions (Cantor 1996; Magrab 1975). Construction truck traffic would occur frequently but would generally produce noise levels below that of the heavy equipment. The finishing work within the building structures would create noise levels slightly above normal background levels for office work areas. Noise levels may go up to around 80 dBA at the work site if light machinery is used in this stage of construction (Cantor 1996). Workers would be required to have hearing protection if site-specific work produced noise levels above the LANL action level of 80 dBA for steady-state noise. Sound levels would be expected to dissipate to background levels at the LANL boundaries or nearby residential areas. The additional construction worker personal vehicular traffic would not be expected to increase the present noise level produced by vehicular traffic on Diamond Drive or West Jemez Road during rush hour. The vehicles of construction workers would remain parked during the day and would not contribute to the background noise levels during this time. Therefore, noise levels are not expected to exceed the established permissible exposure limit (PEL).

Operation. The expected noise levels during operation of the proposed BSL-3 facility would be consistent with other existing facilities (see Section 3.3.6). Noise studies for these facilities have indicated sound values of about 50 dBA during rush hours and nighttime averages in the 40 dBA range. These noise levels would be due to vehicular traffic passing through the facility area and from the facility's HVAC system operation. Residential areas would not be exposed to noise levels exceeding the Los Alamos County standard of 65 dBA during the daytime and 53 dBA at nighttime.

4.1.7 Socioeconomics

Site Preparation and Construction. The total estimated cost to NNSA of designing, preparing all appropriate documentation and construction of the proposed BSL-3 facility is $3.5 million (PC 2001c). It is conservatively estimated (using a 1.5 multiplier, see Section 3.3.7) (Lansford et al. 1999) that this expenditure would result in more than $5.25 million in revenue to the State of New Mexico. While all of these expenditures are not specifically site preparation and construction they would be considered pre-operational costs.

The Proposed Action would not have a major long-term effect on socioeconomic conditions in the LANL area. Only an increase of up to five UC employees is anticipated as a result of the Proposed Action. The additional revenue generated by the construction projects would be limited in duration resulting in a short-term effect only. Construction of the BSL-3 facility would generate jobs and revenue into the local economy. Most building supplies would be purchased in New Mexico. During peak construction, approximately 15 construction workers may be working on these new facilities. Close to $5 million would be spent on construction and design and oversight contracts. Approximately one-half of this amount would be for labor and one-half for materials. Construction is scheduled to take approximately one year beginning in about mid-2002. The additional 15 peak construction jobs would be likely be drawn from the regional work force, residing in Los Alamos, Rio Arriba, and Santa Fe Counties. Because these temporary jobs would be filled by an existing regional work force, there would be no effect on area population or increase in the demand for housing or public services in the region.

Operation. Operational costs for the proposed facility are estimated at an annual cost of about $400,000. Other personnel costs for site safety support, monitoring of the authorization basis, issuance of work orders and other administrative costs would be approximately $200,000 per year (PC 2001f). This would result in a yearly operating cost of about $300,000. It is also estimated that there would be an additional one-time startup cost of $200,000 (PC 2001f). Therefore, the first year of operation would result in expenses of $800,000 and a conservatively estimated revenue within the State of New Mexico of $1,200,000. Subsequent year expenses would be estimated at $600,000 resulting in revenues within the state at $900,000 per year. Operation of the proposed facility would also potentially create about five new jobs. The effect of the expenditures of the BSL-3 facility would not be discernable in relation to the NNSA's annual input to the local economy of $3.2 billion (LANL 2000c).

4.1.8 Geology, Soils, Seismicity

Site Preparation and Construction. Except for the temporary disturbance of 0.5 to 1 acre (0.2 to 0.4 hectares) of land (PC 2001c) during site preparation and construction, there would be little effect upon geology, soils, or seismicity. Soil erosion prevention measures would be in place during the construction phase to minimize erosion from stormwater. Also, dust suppression measures would be employed to minimize wind erosion. The disturbed construction area would be reseeded.

Operation. There would be little effect from the proposed BSL-3 facility operation on geology, soils, or seismicity. Soils surfaces which are not paved would be landscaped to control erosion from stormwater runoff at the facility.

4.1.9 Visual Resources

Site Preparation and Construction. During site preparation and construction there would be temporary effects to the viewshed due to the clearing of land, excavation of footings, and the erection of the building structure. When completed, the application of stucco and paint to the building would result in a facility that would be visually compatible with surrounding structures. Landscaping around the building would contribute to the visual merging of the proposed facility into the surrounding area. As the BSL-3 facility would be a one-story structure, it would not be a visually disruptive element against the natural lines of the background landscape as seen from distant vantage points.

Operation. During operation the proposed BSL-3 facility would fit into the LANL TA-3 viewshed with minimal effects since its building footprint and height would be small relative to surrounding structures. Site lighting would be minimal and serve only to illuminate the facility and associated parking spaces.

4.1.10 Air Quality

Site Preparation and Construction. During site preparation and construction, the use of heavy equipment would generate combustive-engine exhausts that would contribute to air pollution. However, since there would be very few of these pieces of equipment and their use would be limited in time the potential effect to air quality would be temporary and localized. During construction there would be a temporary increase in particulate emissions. Operation of construction vehicles such as dump trucks, bulldozers, cranes, and waste disposal actions would also produce temporary and localized emissions of other air pollutants. Construction activities, which are not considered stationary sources of regulated air pollutants under the air quality requirements, are exempt from permitting under Title 20 of the New Mexico Administrative Codes, Sections 2.72 and 2.70. Mobile sources, such as construction and waste transport vehicles, would produce other air pollutants (such as sulfur oxide), but the emissions would be expected to be similar to those from other recent construction actions, such as those involved in the construction of the Administration Building, SCC and NISC buildings at LANL.

Operation. Air quality effects during the operation of the facility relate in part to the generation of gas-combustion engine emissions from private motor vehicles during workers' commute to and from work. About one-half of the workers would be relocated from HRL so there would be no net effect to air quality from these individuals. The addition of three to five new workers would not produce a substantial contribution to the Los Alamos County air emissions since the area is well within the attainment area for the six state and nationally regulated pollutants (see Section 3.3.10). The emergency generator for the proposed BSL-3 facility would also emit pollutant air emissions, but its operation would be expected to account for only very few hours per year for testing purposes and therefore, contribute little to air pollution. Periodic use of disinfecting gases could be part of the routine operation of the facility. These gases or vapors, such as formaldehyde (from paraformaldehyde) and

hydrogen peroxide, would not effect the overall local air quality. Effects of these gases would be temporary and localized and would dissipate quickly. There would be no increase in steam or power production from the TA-3 power plant that would cause increased emissions of regulated pollutants. Since vehicle use would not change substantially as a result of operating the new facility, emissions from automobiles would not noticeably increase within the TA-3 area.

4.2 ANALYSIS OF ABNORMAL EVENTS AND ACCIDENT SCENARIOS

4.2.1 Site Preparation and Construction

Section 4.1.1 describes the injury and illness statistics for nonresidential building construction. These take into consideration the routine type of accidents that occur on construction sites (for example, slips, trips and falls). They do not take into consideration accidents with more substantial consequences, such as those resulting from catastrophic events. The area in and around the three optional site locations has potential for earth movements due to earthquakes. The predicted ground acceleration due to a 2,000-year return period earthquake is 0.30 g (see Table 3-4). This magnitude of earthquake could cause damage to the proposed one-story building during construction and could injure construction workers. However, no RCRA-regulated hazardous materials would be present onsite and therefore, no exposures would result to workers or the public from a seismic event that occurred during construction.

4.2.2 Operation

This section evaluates potential abnormal event scenarios for operation of the BSL-3 facility that has a reasonable probability of occurrence. These abnormal events are all selected on the basis of historical knowledge at similar facilities over many years of operation or from concerns expressed by members of the public. The first discussion covers the potential for laboratory-acquired infections which in the literature is considered both a routine health risk and as an accident due to the frequency of exposures through, for example, needle-sticks. The routine aspect of operating the facility is discussed in Section 4.1 and the accident potential is discussed in Sections 4.2.2.1 through 4.2.2.3. The following sections discuss the potential for laboratory-acquired infection, a laboratory accident, the potential for transportation accidents, and the potential for terrorist actions.

LANL's Emergency Management and Response Program is responsible for operating an Emergency Operations Center (Center). NNSA recently broke ground on the construction of a state-of-the-art Center. To effectively operate during an emergency of any kind, memorandum of understanding have been established among DOE, Los Alamos County, and the State of New Mexico to provide mutual assistance during emergencies and to provide access to medical facilities. To assist emergency responders, the Emergency Management and Response Program and maintains a database with facility-specific information that includes information such as building managers, phone numbers, building locations, and

chemicals or materials of concern. In addition, the Emergency Management and Response Program has an Emergency Management Plan that contains all procedures for mitigating emergencies and collecting response data. Operational accidents at the BSl-3 facility would be adequately managed by knowledgeable, trained emergency responders.

4.2.2.1 Analysis of Abnormal Events and Accidents for Facility Operation

Laboratory-acquired infection. Laboratory-acquired infections are those infections acquired by workers due to the routine performance of their duties. When the exposure to an infectious agent occurs during an event it is often considered an accident (such as a needle-stick). When the exposure occurs incidentally during contact with a contaminated surface it is considered a routine health risk (see Section 4.1.1.1). The following discussion deals only with the accidental laboratory-acquired infection.

Many sources were reviewed that compiled laboratory-acquired infection statistics (CDC 1999; Collins 2000; Collins and Kennedy 1999; Pike 1979, 1976; Pike et al. 1965; Sewell 1995; and Sulkin and Pike 1951, 1949). Much of these data are reviewed and discussed in Appendix C, Section 1.1. The most recent bibliographic compilation of microbial disease reports (Collins 2000) covers the period from the turn of the century up until August of 2000, and shows a noticeable lack of laboratory-acquired infection reports in the United States during the last ten years. The Department of the Army (DA) *Final Programmatic Environmental Impact Statement, Biological Defense Research Program* (BDRP) (PEIS) (DA 1989) states that since 1976, there have been no occurrences of overt disease in laboratory workers handling infectious organisms within BSL-3- and BSL-4-equivalent BDRP laboratory facilities. The DA estimated the risk to their workers for laboratory-acquired infection for the period from 1970 to 1989 as 0.005 per 1,000,000 person-years (DA 1989). This was a period of heavy activity using large volumes of infectious agents. The incidence of infection is much lower today in large part due to decreased laboratory activity levels since 1968.

Control of infection in laboratories has achieved a high level of sophistication, to the point that virtually no reports of infection occur in microbiological laboratories. The CDC says that common acceptance of standard laboratory practices indicates that laboratory-acquired infections should be virtually non-existent today (CDC 1999). However, they do still occur and the primary route of exposure is through autoinnoculation or the unintentional injection or needle-stick (Sewell 1995). Needles would not be used in the proposed BSL-3 facility, but broken glass with sharp edges could result from accidents with infrequently used glassware. Broken glass presents a low likelihood of exposure but infections could be promptly treated with antibiotics, antiviral drugs or other appropriate medical strategies. The potential for accidental laboratory-acquired infection would be reduced to the improbable level of occurrence.

The Laboratory Release Accident Scenario. The proposed BSL-3 facility would be unique at LANL and throughout the DOE complex in that the material at risk would be non-

radiological and non-chemical. The potentially hazardous material would consist of infectious microorganisms in containers holding liquid suspensions or on semi-solid media. Accident scenarios usually envisioned for DOE facilities, that would normally be seen to exacerbate or enhance a release or spread of the hazardous materials, would for the BSL-3 facility potentially render these materials innocuous (heat, fire, and wind). These are not applicable for work with microorganisms and would usually result in microorganisms being killed. Consequently, catastrophic events such as earthquake, fire, explosions and airplane crashes, normally considered as initiating events in DOE accident analyses, were viewed as having the potential to reduce the consequences of releases. An earthquake, explosion, or similar event that would result in a breech or rupture of the facility's walls would be bounded by the following accident analysis of a *Coxiella brunetti* release from the structure. The probability of catastrophic events (due to earthquake or volcanic activity) is very low. The potential for volcanic activity is such that forewarning would allow putting the facility in a safe mode and hence making a microorganism release scenario extremely unlikely. Likewise the low probability of an earthquake capable of rupturing the facility containment, coupled with an additionally low probability of such an event having to occur during an activity where microorganism containment would be vulnerable, also makes it an unlikely event. The proposed laboratory accident release scenario, which itself is very unlikely due to the simultaneous occurrence of several factors that must be combined to produce a release, bounds the catastrophic release scenario. Appendix F provides background information on microbiological accidents.

The BSL-3 facility would have only a few operations or activities that would hypothetically place larger (up to 10 liters) quantities of material containing infectious organisms at risk at any point in time. These operations or activities would occur at infrequent times and a release to the environment from a catastrophic event would require several simultaneous conditions to coexist: a worker is transferring a quantity of infectious material when the catastrophic event occurs; the containers aren't properly sealed; the entire set of containers is dropped; the containers break open; and the catastrophic event simultaneously causes a structural breach in the BSL-3 containment walls. Engineering and procedural controls minimize opportunities for this hypothetical scenario. For example, culture samples would be kept in locked freezers or within incubation chambers most of the time and would not become aerosolized in such an event. Therefore, catastrophic events capable of resulting in a substantial release of microorganisms from the confinement of the facility (specifically at greater than infectious dose quantities) are unlikely to occur.

A literature search and discussions with BSL-3 laboratory regulators and operators (CDC, NIH, and the U.S. Army) revealed no incidents of infectious materials released from catastrophic accidents at microbiological laboratories. According to the U.S. Army (DA 1989), the likelihood of such catastrophic occurrences is too small to be considered as reasonably foreseeable. No such event has occurred in the more than 50 years in which the military has been conducting biological defense research activities (DA 1989). Based on this historical information, this hypothetical scenario was not analyzed further in this EA.

Historical information suggests that other types of accidents would be reasonably foreseeable; these could involve infectious material, and would have a relatively higher probability of occurrence than a catastrophic event. Accidents involving the production of aerosols during the use of normal laboratory equipment such as centrifuges, blenders, homogenizers, shakers, sonicators, and mixers are reported. According to *Laboratory-Associated Infections and Biosafety*, this is the second most common route of exposure after laboratory-acquired infection due to needle-sticks (Sewell 1995). Even though these accidents are more frequently reported, they rarely result in workers actually contracting diseases due to the use of vaccines and drug therapies.

Appendix F describes accident scenarios used in other NEPA documents for analysis of BSL facilities. One accident scenario that was analyzed involved the release of a biotoxin from the common soil bacterium *Clostridium botulinum* (BMI 1993). The accident scenario analysis resulted in an estimated potential release of biotoxin that was several orders of magnitude lower than the dose at which "no effect" resulted. UC at LANL is not proposing to handle biotoxins at LANL except as a collateral production during the growth of *Clostridium spp*. Another NEPA document (DA 1996) accident scenario postulated the release of *Brucella spp*. bacteria transmitted by direct contact with animal secretions. The qualitative analysis indicated no release to the public.

Another relevant NEPA accident analysis was prepared by the U.S. Army for its BDRP PEIS covering several facilities across the United States and is considered most relevant to the Proposed Action. The DA has for decades operated a series of the most extensive infectious agent laboratory facilities in the world. This PEIS addresses the entire BDRP, including multiple facilities, and involves a far greater level of operations than NNSA proposes at LANL. The reason this accident analysis should be considered relevant to the proposed BSL-3 facility at LANL is because the PEIS analyzed BSL-3 facilities with engineering and operating characteristics similar to those proposed for LANL, such as similar HVAC system designs for negative pressure and air turnover; the facilities have similar HEPA filtration; the facilities would operate under the same procedures established by CDC (CDC 1999; 32 CFR 627); and the facilities would be designed to handle the same types of microorganisms.

Important differences between the DAs accident analysis modeling and the conditions at the proposed LANL BSL-3 facility would be due to the model's input parameters (also called modeling assumptions) associated with the meteorological conditions and the proximity to non-involved workers and the public. The DA's accident assumes to have essentially non-windy site conditions and nearby non-involved facility workers and members of the public. The LANL site is usually windy and the proposed facility would not be located next door to another LANL facility. Members of the public would usually be several hundred feet away at the location of the maximally exposed individual. The differences in the DA's modeling assumptions and the conditions at LANL result in the accident analysis being more conservative than one that more accurately reflects LANL conditions. Therefore, the effects

of such a scenario, if it were to actually occur, would be less adverse at LANL than those hypothesized for a DA site.

The BDRP PEIS accident scenario is referred to as the Maximum Credible Event (MCE) in accordance with the DA's *Biological Defense Safety Program, Technical Safety Requirements* (32 CFR 627). The microorganism chosen for the MCE accident is *Coxiella burnetii (C. burnetii)*, the organism responsible for causing Q fever. According to the *Control of Communicable Diseases Manual* (Benenson 1995), this organism has an unusual stability, can reach high concentrations in animal environments, and is relatively resistant to many disinfectants. The CDC states that *Coxiella burnetii* probably presents the greatest risk of laboratory infection. The organism is highly infectious and remarkably resistant to drying and environmental conditions. The estimated HID with a 25 to 50 percent chance of containing the disease through the inhalation route for Q fever is 10 organisms (CDC 1999).

The rickettsial microorganism*, C. burnetii,* is considered representative of all types of BSL-1, BSL-2, and BSL-3 laboratory microorganisms (bacteria, rickettsia, viruses, fungi, parasites, and prions) because it is highly durable, infectious, and transmissible, and has excellent environmental survivability. Other types of microorganisms were considered for accident scenarios but rejected for specific analysis because they represent a relatively lower human health hazard (fungi and parasites) or have a generally lower environmental survivability (specifically, the prions and viruses). All prions and parasites are BSL-1 or BSL-2 microorganisms. Only one fungus identified by the CDC requires BSL-3 and all the rest are BSL-2 or below (CDC 1999). Many viruses require BSL-3 but cannot survive long in the environment without a host such as a human or other animal. Bacteria and their subcategory, rickettsia, represent a high risk to human health and many require BSL-3 or BSL-4.

Of the bacteria, *C. burnetii* is a durable rickettsia that can be handled in the laboratory with little or no loss in viability. It can survive being aerosolized and remain viable, although once separated from a nutrient food source, it dies off at a slow rate. This microorganism can be as infectious as any other microorganism. The CDC reports that exposure to only 10 microorganisms can cause an individual with normal immunocompetancy to develop symptoms of disease. Others report this to be as low as five microorganisms or possibly even one (CDC 2001b). *C. burnetii* has the added advantage of being one of the CDC select agents (42 CFR 72) and is considered a critical biological agent[26] (CDC 2000a).

The scenario for the MCE (detailed in Appendix F) involves an instantaneous release of a fixed amount of infectious material as follows. A worker uses a BSC to place a 1-L slurry of *C. burnetii* into six 250 ml polypropylene centrifuge tubes. The worker fails to insert the O-rings or tighten the centrifuge caps which are the screw-on type. The worker takes the tubes

[26] The CDC Strategic Planning Workgroup has prepared a plan to address the deliberate dissemination of biological and chemical agents. Certain organisms are designated as "critical biological agents" and are assigned priority ratings based on characteristics that pose a risk to national security.

out of the BSC and inserts them into a free-standing centrifuge and turns the equipment on. All six tubes leak, with some of the slurry leaking into the rotor, and some leaks into the centrifuge compartment. Most of the slurry that is not aerosolized settles (99 percent) and 90 percent of that which settles becomes droplets inside the chamber. The worker opens the centrifuge and notices the leak. The worker obtains help from two workers, and four more workers enter the laboratory not knowing what has happened. The room air exhausts to the outside of the building through a stack on the roof after passing through two sets of HEPA filters that, for conservatism, were estimated to have a filter efficiency of 95 percent.

For the workers, the accident produces 9,900,000,000 (9.9×10^9) airborne HIDs at a 50 percent rate of contracting the disease (HID_{50} or ID_{50}) which occurs in a 3 ft^3 of space above and around the centrifuge. This volume of contaminated air then disperses throughout the room in response to the ventilation system flow characteristics (for example, the volume of air in the room and the HVAC ducting, and the room air turnover rates). The excited worker who opened the centrifuge is potentially exposed to 100,000 HID_{50} due to a higher rate of respiration at l5 L or 0.5 ft^3 per minute (normal is 4 to 6 L or 0.14 to 0.21 ft^3) (NSC 1996). The two co-workers coming to his assistance receive an only slightly lower dose. The other four workers incidentally exposed receive 100 to 300 HID_{50}.

The result to the general public was calculated by this scenario using a gaussian plume dispersion model under relatively calm wind conditions (stronger winds would dilute more readily). At the maximum air-concentration described above the model predicted less than 1 HID_{50} per liter of air at a distance of less than 7 ft (2 m) from the stack, less than 0.1 HID_{50} per liter of air at 53 ft (16 m) from the stack, and less than 0.01 HID_{50} per liter of air at a distance of 125 ft (38 m) from the stack. The concentrations dissipate readily after reaching these maximums since the accident scenario resulted in a one-time instantaneous release.

While not specifically mentioned in the PEIS, some conclusions can be drawn for the proposed LANL BSL-3 facility comparison. One is that members of the public would have a very low likelihood of being exposed to 1 HID_{50} due to the fact that this facility would be behind security fences that would be constructed at a distance of tens of feet away from the building. One very conservative assumption used in the model is the 95 percent filter efficiency resulting from filter failure. The HEPA filter for the proposed LANL facility would be much more efficient. *C. burnetii* would be effectively 100 percent removed even on a single-pass filtration. Adverse health effects to the public would be extremely unlikely to develop from this scenario. Similarly, adverse effects to the environment from the accidental release of non-indigenous organisms would be extremely unlikely as well.

4.2.2.2 Transportation Accident

Infectious substances (etiologic agents) in transit on the Nation's highways, railways, and airports are regulated by the U.S. Department of Transportation (DOT) regulations (49 CFR 171, 172, 173, and 178). These regulations are described in Appendix G-1. As a consequence of these regulations the DOT tracks and reports accidents and, in particular,

hazardous materials incident reports. The general population risk report by DOT from 1994 to 1998 from all hazardous materials transportation is 1 in 8,129,000, or as otherwise stated, 0.11 fatalities per million shipments (DOT 2001a). By comparison, the general population risk per year for motor vehicle accidents is 1 in 6,300 or 1.7 deaths per 100 million vehicle miles (161 million kilometers). The number of hazardous materials shipments is about 800,000 per day with at least 10,000 involving waste hazardous materials identified generally as medical wastes and various other hazardous materials. For the hazardous materials category that includes infectious substances, about 80 percent of these shipments are carried by truck with the remainder carried by rail (DOT 1998). There are an estimated 4,300 non-hospital waste generating facilities (laboratories) that are potential generators of medical waste and other kinds of infectious substances including diagnostics specimens. These facilities generate 73,037 tons per year of infectious medical waste and ship about 200 tons (181,000 kg) per day (DOT 1998). Additional detailed information is included in Appendix G-1.

Information extracted from the DOT Hazardous Materials Information System (HMIS) database (DOT 2001b) is shown in Appendix G-2. Information available on infectious substances transportation from 1995 to 1999 show that infectious substance incidents are too few to even be ranked except from some minor injuries that occurred in 1999. The number of infectious substance incidents from 1995 through 1999, is respectively, 2, 3, 9, 10, and 166. While low and not substantial in comparison to all other hazardous materials accidents, it is unknown why there is an apparent increasing trend. Only three minor injuries were reported in association with the incidents in 1999 and none resulted in infectious material exposures. Most of the accidents were due to human error and occurred on loading docks. New Mexico has consistently had about 1 percent of all hazardous materials incidents which is less than the neighboring states of Arizona and Colorado which range from 1 to 3 percent of the national incidents each year. Texas, which is very industrialized, tends to vary between 7 an 8 percent, nationally. There is also an apparent national increase in hazardous materials incidents, which rose from 14,700 in 1995 to 17,069 in 1999.

Accidents due to transportation of microorganisms are not expected to increase due to the Proposed Action. The addition of milliliter quantity samples shipped to and from the BSL-3 facility through the U.S. Postal Service or by commercial or private courier would not be expected to change the overall incidence of risk of transportation accidents. Samples could consist of cells in media contained within DOT-certified packages. The consequences of such accidents would be anticipated to be minor, based on the historical data.

4.2.2.3 Terrorist Action

Terrorist threats to LANL operations are taken very seriously by NNSA and UC. Sabotage as a threat to activities within DOE is an unfortunate but practical consideration in operations. DOE orders define the systematic approach used to address such threats at DOE and NNSA facilities. Graded protection is provided for all safeguard and security interests, classified matter, property and sensitive information from theft, diversion, industrial

sabotage, radiological sabotage, espionage, unauthorized access or modification, loss or compromise, or other hostile acts that could cause unacceptable adverse impacts on national security, our business partners, or on the health and safety of employees and the public. The defense-in-depth approach includes definition of the threat(s), vulnerability analyses, and a safeguards and security program that provides for numerous features designed to negate such threats through materials accountability, threat detection and assessment, a highly trained security force, and a variety of facility protective features. These systems are audited and tested periodically to ensure that high standards are applied and that the systems established are effective in addressing the threat of sabotage at a DOE or NNSA site.

Site specific security measures would be part of the Proposed Action as noted in Chapter 2 of this EA. Scenarios involving a deliberate terrorist attack are not considered and evaluated in the same way as potential accidents in a NEPA analysis. These latter events lend themselves to a conventional approach of qualitative or quantitative analyses of probability and consequence, so that the Federal Manager, and members of the public, can see the residual risks posed by the activity to the workers, public, and environment as required by NEPA. Other factors are considered by the Federal Manager in making decisions on potential actions, including mission compatibility, personnel resources, budget constraints, and infrastructure and security concerns. Terrorist scenarios are evaluated in security processes that evaluate potential threats and that then design measures to counteract these potential threats. The potential for terrorist attacks to postal workers or facilities, or other courier services would be minor. It is the responsibility of these organizations to safeguard their operations from theft and attack.

4.3 PREFABRICATION ALTERNATIVE

Construction: The environmental effects that would be likely to result from installing prefabricated units together to form the BSL-3 facility would be very similar to the effects from constructing the permanent BSL-3 facility onsite. The general type of machinery involved in the effort and the emissions would be almost the same for both alternatives; earth moving equipment would be required to clear the site; trucks and cranes would be required to set the modular units into place; hand-held tools would be required to join them together and finish them. Cement trucks may be brought onsite to install footer walls or a concrete pad. Potential air quality effects would be almost the same for both the Proposed Action and the Prefabrication Alternative. All other resource area effects would be the same from the construction stage.

Operations. The operation of the BSL-3 facility, if it were constructed of modular units, would be the same as for the Proposed Action. Effects discussed in Chapter 4, Section 4.1 are descriptive of the effects that could be expected from implementing the Prefabrication Alternative.

4.4 PARTIAL PREFABRICATION/BUILD ALTERNATIVE

Construction. The environmental effects that would be likely to result from installing a single prefabricated unit to serve as a BSL-3 laboratory while constructing the permanent BSL-3 facility onsite would be an additive to the Proposed Action alone. Implementing the Partial Prefabrication/Build Alternative would potentially require clearing of two previously disturbed sites instead of just one, and the installation of utilities to both sites instead of one. Additional air emissions would occur at both construction sites from heavy machinery used on construction effects at the sites. However, even with the small increase in emissions, the incremental effects would be negligible. Waste production would be slightly greater but the incremental effects would be negligible. Human health effects as a result of additional site worker activities is also expected to be negligible.

Operations. The operations of the BSL-3 laboratory would phase out as the new BSL-3 facility commenced operations. The overall result of implementing the Partial Prefabrication/Build Alternative would be to move up the time period of effects from the operation of such a facility by about one year in time. Otherwise the effects of the operation of the Proposed Action facility and the laboratory and facility described in the Partial Prefabrication/Build Alternative would be the same.

4.5 ENVIRONMENTAL CONSEQUENCES OF THE NO ACTION ALTERNATIVE

Under this alternative, LANL would continue contracting out all of the work proposed for the BSL-3 laboratory with no change in the level of operations at LANL. Optional site locations would not be used for construction and operation of the facility, and no site preparation or construction would occur. There would be no change from the current conditions with respect to human health, ecological resources, transportation, waste management, utilities and infrastructure, noise, geology, soils, seismicity, visual resources, or air quality.

However, there are some socioeconomic consequences of the *status quo*. Revenue to the contracted laboratories of $300,000 per year has a compounded positive effect in those communities ($450,000 using socioeconomic multipliers) by continuing to support employment at those locations, generating revenue for those businesses and organizations, and supporting a local, state, and Federal tax base (if other than non-profit) that helps support schools and other community infrastructure. Conversely, since that revenue is coming from LANL and going to another geographic area, it is a continuing revenue loss at the LANL area. While not considered a resource area, continuing problems with the quality of data produced by these outside laboratories (part of the purpose and need for action) could affect the ability of UC to conduct research on BSL-3 organisms and may additionally adversely effect NNSA's security mission capabilities.