DOE/EA-1081

ENVIRONMENTAL ASSESSMENT

OF THE

CARLSBAD ENVIRONMENTAL MONITORING & RESEARCH CENTER FACILITY

DEPARTMENT OF ENERGY
CARLSBAD AREA OFFICE

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LIST OF ACRONYMS

°C	degrees Celsius
°F	degrees Fahrenheit
$\mu g/m^3$	microgram per cubic meter
μm	micrometer
CESQG	Conditionally Exempt Small Quantity Generator
CFR	Code of Federal Regulations
dBA	decibels, A-weighted scale
DOE	Department of Energy
EA	Environmental Assessment
EPA	Environmental Protection Agency
gpd	gallons per day
HEPA	High Efficiency Particulate Air
kg	kilogram
km	kilometer
lb	pound
Living Desert	Living Desert Zoo and Garden State Park
MBTA	Migratory Bird Treaty Act
mi	mile
NEPA	National Environmental Policy Act of 1969
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
NMSU	New Mexico State University
PM_{10}	particulates that are 10 microns or smaller in aerodynamic diameter
the Center	Carlsbad Environmental Monitoring & Research Center
USFWS	United States Fish & Wildlife Service
WERC	Waste-management Education & Research Consortium
WIPP	Waste Isolation Pilot Plant

EXECUTIVE SUMMARY

This Environmental Assessment has been prepared to determine if the Proposed Action, which is defined as continuing U.S. Department of Energy (DOE) funding of the Carlsbad Environmental Monitoring & Research Center (the Center), or its alternatives would have significant environmental impacts that must be analyzed in an Environmental Impact Statement.

DOE's proposed action is to continue funding the Center. While DOE is not funding construction of the planned Center facility, operation of that facility is dependent upon continued funding. To implement the proposed action, the Center would initially construct a facility of approximately 2,300 square meters (25,000 square feet). The Phase 1 laboratory facilities and parking lot will occupy approximately 1.2 hectares (3 acres) of approximately 8.9 hectares (22 acres) of land which were donated to New Mexico State University (NMSU) for this purpose.

The facility would contain laboratories to analyze chemical and radioactive materials typical of potential contaminants that could occur in the environment in the vicinity of the DOE Waste Isolation Pilot Plant (WIPP) site or other locations. The facility also would have bioassay facilities to measure radionuclide levels in the general population and in employees of the WIPP.

Operation of the Center would meet the DOE requirement for independent monitoring and assessment of environmental impacts associated with the planned disposal of transuranic waste at the WIPP. The Center was established in 1991 and is funded through a DOE grant. The Center has been conducting limited operations from rented commercial office space in Carlsbad, New Mexico. DOE funding has been used primarily to establish environmental monitoring programs in the Carlsbad area, to evaluate air and soil samples collected near the WIPP, and to plan the future activities of the Center.

Alternatives to the proposed action that were considered include:

- The No Action Alternative, which is to discontinue DOE funding of the Center. This alternative also would discontinue operations at facilities connected to the Proposed Action.
- Continuing to sponsor Center operations, but to locate Phase 1 facilities elsewhere or share existing facilities in place of building a facility.

If the Center's funding was discontinued, DOE would need to explore other means for independent monitoring and assessment of environmental impacts associated with the WIPP program and of evaluating the efficiency of DOE waste disposal operations. Using alternative facilities would have essentially the same impacts as the Proposed Action and cause an indeterminate delay in the availability of the Center's services.

The consequences of the Proposed Action and No Action Alternative are examined in this Environmental Assessment. The environmental effects include:

- noise of construction activities
- air emissions of construction activities and routine operations
- potential transportation issues of employees and equipment
- waste generation and disposal
- water use
- potential impacts to biological resources at the proposed site
- cumulative impacts

Noise and air quality effects to construction workers and the general public would be minimal. There would be minimal impact on traffic in the local area from employees and visitors to the Center. The probability of a traffic accident involving the mobile bioassay laboratory would be very small and no radioactive or hazardous materials would be present in the laboratory so none of these materials would be released if an accident were to occur. The rate of water use is typical for a facility of this type and would be less than for a number of single family residences of similar size. The Center would generate small amounts of hazardous chemical wastes and low-level radioactive wastes that would be disposed of at existing permitted facilities. None of the plant and animal species present at the proposed site are listed as threatened, endangered or sensitive species. The Proposed Action is expected to have little impact on the environment.

1.0 GENERAL

This Environmental Assessment (EA) has been prepared to comply with Council on Environmental Quality regulations implementing procedural provisions of the National Environmental Policy Act of 1969 (NEPA), as amended, and the U.S. Department of Energy (DOE) NEPA regulations found in the Code of Federal Regulations (CFR) under 40 CFR Parts 1500-1508 and 10 CFR Part 1021, respectively (CEQ, 1978, as amended; DOE, 1992). This EA presents results of investigations conducted to determine if the Proposed Action, which is defined as continuing DOE funding of the Carlsbad Environmental Monitoring & Research Center (the Center), or its alternatives would have significant environmental impacts that must be analyzed in an Environmental Impact Statement.

1.1 BACKGROUND INFORMATION

The DOE Waste Isolation Pilot Plant (WIPP) is approximately 42 kilometers (km) (26 miles [mi]) east of Carlsbad, New Mexico. DOE plans to operate the WIPP as a disposal facility for transuranic wastes. Radionuclides contained in transuranic waste, even in very low concentrations, may present a potential health hazard if ingested or inhaled. Transuranic waste contains radioactivity in excess of 100 nanocuries per gram of radioactive isotopes that emit alpha particles, are heavier than uranium, and have a half life of over 20 years. Consequently, government regulations for managing and disposing of transuranic radioactive wastes, which are found under 40 CFR Part 191 (DOE, 1993a), set very low exposure limits. Precise equipment and monitoring techniques are required to detect low concentrations. Independent analysis and monitoring would maximize public confidence in the data collected.

1.2 PURPOSE AND NEED FOR ACTION

DOE has requirements to provide for independent monitoring and assessment of environmental impacts for its activities. Independent monitoring and assessment through funding of the Center would provide data to identify and quantify environmental impacts of transuranic waste disposal operations planned for the WIPP, and to increase public confidence in the information relating to WIPP's environmental impacts.

DOE also needs to conduct additional research on the impacts of waste disposal operations, including studies of the movement of pollutants in the environment that would be provided by the whole body counting that would be done by the Center. This research would provide data to help improve the quality of environmental monitoring programs and assist DOE in conducting waste disposal operations in a manner that minimizes health risks and other environmental impacts.

2.0 DESCRIPTION OF THE ALTERNATIVES

2.1 DESCRIPTION OF THE PROPOSED ACTION

The Waste-management Education & Research Consortium (WERC) was formed in 1989 to further the national capability to address issues associated with the management of radioactive, hazardous and solid wastes. WERC is a DOE-sponsored consortium of New Mexico State University (NMSU), University of New Mexico, New Mexico Institute of Mining and Technology, Navajo Community College, and Sandia and Los Alamos National Laboratories. In 1991, the Center was established as a division of WERC and funded independently through a DOE grant. The Center has been conducting limited operations from rented commercial office space in Carlsbad. DOE funding has been used primarily to establish environmental monitoring programs in the Carlsbad area, to evaluate air monitoring samples collected near the WIPP, and to plan the future activities of the Center.

DOE's proposed action is to continue funding operation of the Center. While DOE is not funding construction of the planned Center facility, operation of that facility is dependent upon continued DOE funding of operations and will be analyzed here as a connected action.

To implement the proposed action, the Center would initially construct a facility of approximately 2,300 square meters (25,000 square feet). The Phase 1 laboratory facilities and parking lot will occupy approximately 1.2 hectares (3 acres) of approximately 8.9 hectares (22 acres) of land which were donated to NMSU for this purpose.

Laboratories would have sufficient instrumentation to analyze chemical and radioactive materials typical of potential contaminants that could occur in the environment in the vicinity of the WIPP site or other locations. Laboratory analysis would provide information needed for laboratory comparisons, data validations, and establishment of monitoring standards. Bioassay facilities would consist of whole-body counter, a mobile bioassay laboratory, and other radiation detecting and sampling instruments.

Operation of the Center would meet the need for an independent evaluation of the environmental impacts associated with the planned waste disposal at the WIPP by:

- providing contract bioassay services for the WIPP radiation workers
- assessing background radionuclide levels in the general population surrounding the WIPP
- monitoring air, water, soil, flora, and fauna in the vicinity of the WIPP
- developing state-of-the-art monitoring and research resources
- providing laboratory evaluation of environmental samples collected near the WIPP
- maintaining an unbiased and independent environmental database and system for reporting information

Operation of the Center would also satisfy the need for additional research on waste disposal operations. The Center would become a permanent establishment to study and recommend

solutions to the problems dealing with waste disposal and environmental issues. DOE would use information provided by the Center's research activities to improve its waste management programs. The public will benefit from having independent scientific experts review the WIPP's environmental impacts and make unbiased and independent information available to the public.

2.2 NORMAL OPERATIONS

The Center will be conducting research to modify and improve currently available sample collecting methods and to develop more effective analytical detection procedures. The Center's analytical chemistry and radiochemistry instrumentation to support monitoring work, sampling research, and other programs would include

- a gamma ray spectroscopy system to initiate and conduct radionuclide background studies
- an atomic absorption spectrophotometer with a graphite furnace to support inorganic analyses
- an alpha particle detection system
- a liquid scintillation counting system
- a gas proportional counting system
- an inductively-coupled plasma mass spectrometer
- an ion chromatograph

This equipment would be present in the environmental chemistry and radiochemistry laboratories.

The Center's mobile bioassay laboratory initially would be used to determine baseline radionuclide body burdens of the WIPP workers and the general public. This state-of-the-art laboratory would periodically travel to the WIPP, surrounding communities, and other outlying communities to conduct follow-up screenings and to determine if changes have occurred in body concentrations of radionuclides.

A uniquely designed, computer-based, laboratory information management system would be developed to manage field and laboratory programs, collect and store sampling and analytical data, perform complex multiple program calculations, and provide data and project quality control. Once developed, this system will accept electronic input from meteorologic, geographic and seismic sensors; field sampling systems; analytical instrumentation; and radionuclide detectors. The Center would develop and deploy a network of computer-based field monitoring stations with communication links to laboratory facilities.

On a periodic basis, the Center would provide educational opportunities for scientists and educators to promote environmental research. The Center also would provide conference areas and tours for visitors and scientists.

2.3 ALTERNATIVES TO THE PROPOSED ACTION

2.3.1 No Action Alternative

The No Action Alternative is to discontinue DOE funding of the Center. This alternative would not meet DOE's needs as set forth in Section 1.2, Purpose and Need. However, this alternative is presented as a baseline against which to compare the impacts of the Proposed Action.

Discontinuing funding would mean that the Center would not be able to continue operations. DOE would need to explore other means of acquiring capabilities for the independent monitoring and assessment of environmental impacts associated with the WIPP program and of evaluating the efficiency of DOE waste disposal operations. Finally, if funding were to be discontinued, there would be no reason to construct the facilities connected to the Proposed Action for the Center.

2.3.2 Alternative Locations for the Center

An alternative to the No Action Alternative is for DOE to continue to sponsor the Center operations but to locate the planned facilities elsewhere or share existing facilities. Another option would be to separate some operations, such as the laboratories, and to lease or purchase only the amount of space needed to accommodate these operations. Alternative locations considered were in the City of Carlsbad, at the NMSU campus at Carlsbad, or at the WIPP. These alternative sites all were considered less desirable than the proposed site.

There are no laboratory-type facilities in Carlsbad that could accommodate the activities of the Center. Therefore, land or commercial building space would have to be purchased or leased. This would entail additional expenses over the Proposed Action. Laboratory facilities would have to be constructed that could handle chemicals and radionuclides in a safe manner. While this alternative would eventually meet DOE's purpose and need, it would delay the availability of many of the Center's functions. Also, the impacts would essentially be the same as the impacts of the Proposed Action.

The current NMSU campus at Carlsbad facilities consist of approximately 11,000 square meters (118,000 square feet) of floor space that is completely occupied by classrooms, teaching laboratories, or administrative functions. There is no surplus space on campus to accommodate the Center. In fact, additional classrooms and computer laboratories are expected to be added in the near future. In addition, the types of laboratories and equipment needed by the Center do not exist on campus; therefore, entirely new facilities and equipment would be needed to accommodate the Center. The impacts of this alternative would essentially be the same as the impacts of the Proposed Action.

If the Center were to be located at the WIPP, there is the possibility that over time the background levels of radiation would interfere with the development of increasingly more sensitive detection and sampling techniques. This interference could be the result of increased sensitivity of new detection methods, or it might be the result of increased background radiation

levels at the WIPP. In addition, the distance from Carlsbad to the WIPP site would preclude active visitation by members of the public. The distance also could limit educational and work-study opportunities for students and faculty members who are interested in learning about the state-of-the-art monitoring techniques and environmental assessment activities. Locating the Center at the WIPP also would lead to public doubt about the independence of the Center and monitoring of the WIPP.

3.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 REGIONAL SETTING

The property for the Center is somewhat trapezoidal in shape and encompasses approximately 8.9 hectares (22 acres) of moderately disturbed desert scrub habitat. Only 1.2 hectares (3 acres) will be impacted by construction. The northern border of the site is contiguous with the NMSU at Carlsbad campus. Along the common border between these two properties runs an arroyo that drains several medium-sized hills and a mesa approximately 0.5 km (0.13 mi) west of the Center construction site. Atop the mesa, near the head of the arroyo, is a dirt/gravel thoroughfare extending toward the Living Desert that is located directly northwest of the site. In addition, the Center would be adjacent to two residential neighborhoods, consisting of small tract homes varying in age from twenty-five to seventy-five years.

3.1.1 Land Use and Demography

The proposed site for the Center is located within the city limits of Carlsbad, Eddy County, New Mexico. Figure 1 shows the location of Carlsbad in relation to other towns in New Mexico and the Center's location in Carlsbad. The 1990 U.S. Population Census shows Carlsbad having a population of 24,952 (DOC, 1991).

The proposed layout of the facility is shown in Figure 2. Land for the proposed facility was donated to NMSU by a private citizen with the understanding that it would be used only for the Center. The land transfer agreement states that ownership of the land will revert to the Carlsbad Municipal Schools if the Center is not built as proposed. The property donated for the Center is adjacent to the southern portion of the NMSU at Carlsbad campus and approximately 200 meters (656 feet) west of U.S. Highway 285, which also is named West Pierce Street. Guadalupe Medical Center, commercial establishments, residences, and the Living Desert Zoo and Garden State Park (Living Desert) are located within 0.8 km (0.5 mi) radius of the proposed Center.

Land west of the proposed site is vacant. Land south of the proposed site is essentially single-family residential property. Land between the proposed site and West Pierce Street is zoned for commercial use. Although the proposed site and nearby surrounding area was once range land, none of the land adjacent to or near the proposed site is now used for agricultural purposes.

3.1.2 Geology, Hydrology, and Climatology

The property is situated on a bench of the Ocotillo Hills that slopes from west to east toward the Pecos River. Topography of the property is typified by a slight west-east downslope and several very shallow, dry washes punctuated by a deeper arroyo running between the proposed Center and the NMSU at Carlsbad campus.

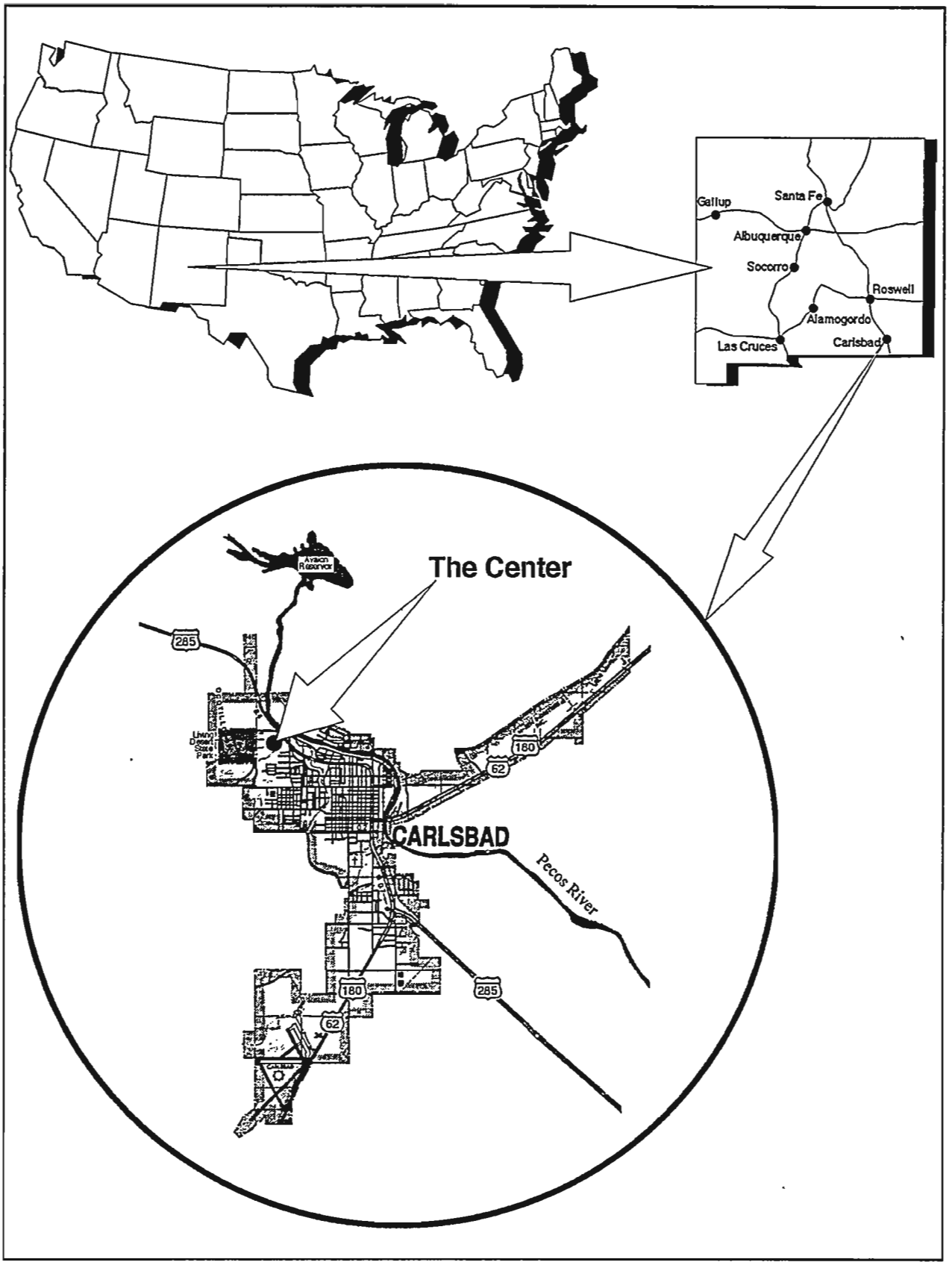

Figure 1. Map of the General Location of Carlsbad, NM

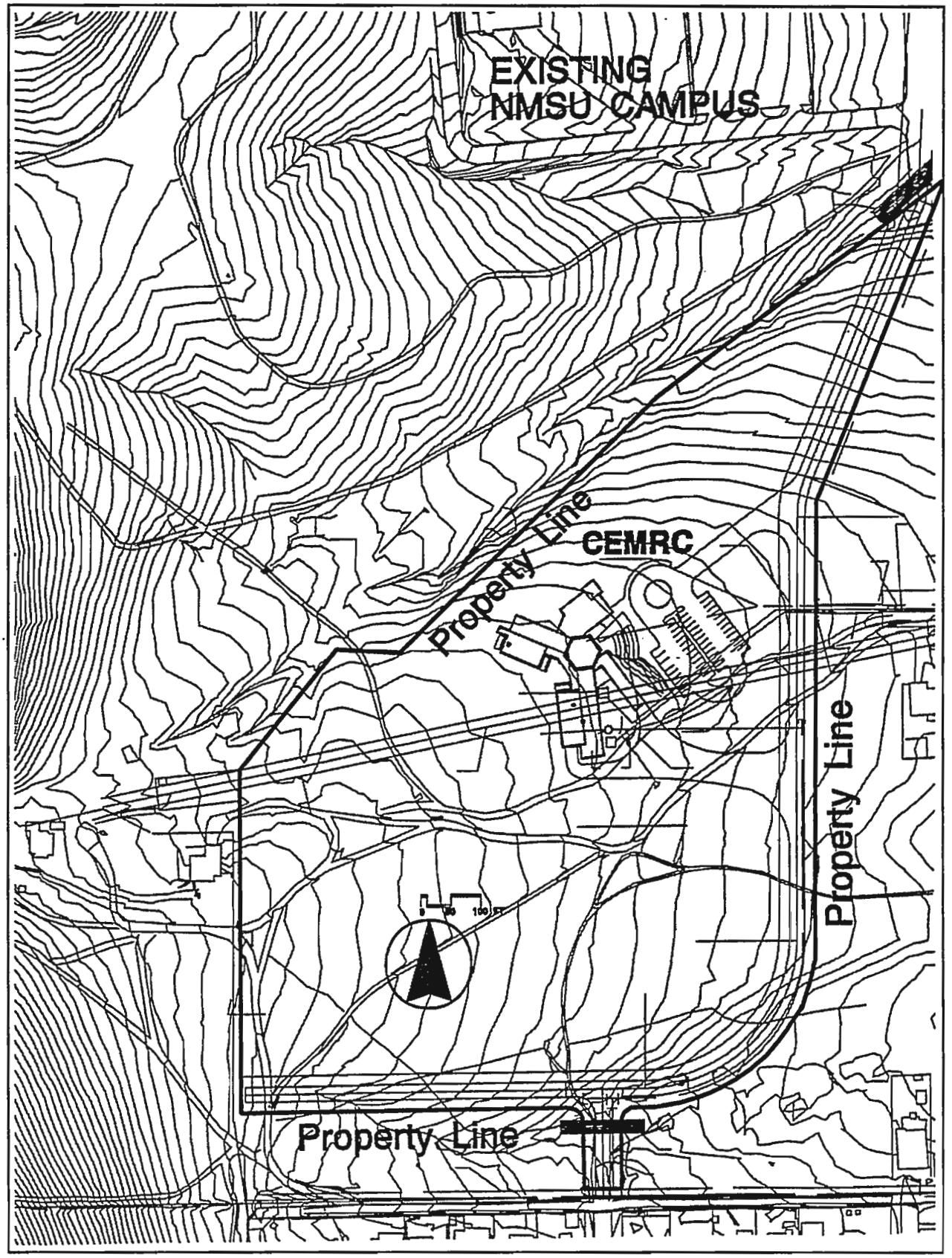

Figure 2. Proposed Center Facility

Most of the surface of the property is barren, consisting primarily of coarse calcareous, gravelly soil, and is classified as Upton Gravelly loam soil (USDA, 1971). These shallow soils cover caliche and cemented gravel. Wind and water erosion have moved finer soil particles into dry washes and arroyos. The nearest perennial water source is the Pecos River, which is downhill and less than 2 km (1.2 mi) from the Center.

The Carlsbad area is classified in the *Uniform Building Code* (ICBO, 1990) as Seismic Risk Zone 1. This classification means there is little seismic activity in the region. With the exception of the extreme southeast corner of New Mexico, which is on the western edge of a large region of seismic activity that extends south and east into Texas, there have been very few recorded earthquakes near Carlsbad. An earthquake centered near Alpine, Texas in 1995 registered 5.6 on the Richter scale and was felt in Carlsbad and as far north as Roswell, New Mexico (Silver, 1995c). The most prominent concentration of earthquake activity in New Mexico occurs in the Rio Grande rift between Socorro and Belen and north of Los Alamos in central and north-central New Mexico.

The climate in Carlsbad is mild and arid, but given to large diurnal and seasonal variations in temperatures. Day to night (diurnal) variations of 25° Celsius (C) are not uncommon. Clear, sunny days with light to moderate winds predominate. In 1994, the maximum and minimum recorded temperatures at the Carlsbad Airport were 45°C (119° Fahrenheit [F]) and -7.8° C (18° F) respectively (NOAA, 1994). Carlsbad receives an annual rainfall of approximately 30.5 centimeters (12 inches) with approximately 80 percent of the rainfall occurring between May and October (Williams, 1986).

Winds blow predominately from the south-southeast or the south-southwest direction. Highest wind speeds are usually observed in the spring with an average wind speed in March and April of about 15 miles per hour (Williams, 1986). The eastern portion of New Mexico experiences approximately three tornadoes a year with the Carlsbad area occasionally reporting a tornado (Flora, 1973).

3.1.3 Biota and Ecology

The proposed construction site is geographically located within the Chihuahuan Desertscrub Biotic Community (Brown, 1982; Dick-Peddie, 1993). Two arroyos border the property on the north and the south. The northern arroyo, which is well developed and vegetated, lies adjacent to the south-facing slope below the Living Desert. This arroyo consists predominantly of limestone gravel and bedrock and runs west to north past the NMSU at Carlsbad campus entrance. The southern arroyo lies between the proposed Center construction site and the residential area at the southern boundary of the site. This arroyo also is well vegetated, but shallower, is much less rocky, and is topographically heterogeneous. Dominant soil conditions throughout the area are desert pavement, dry coarse-textured soil, and gravel. The upslope area along the western boundary of the Center project area has sparse shrub cover and consists predominantly of limestone rock with sparse gravel and shallow topsoil.

A 100 percent biological census of the 22 acre property was conducted for threatened, endangered, and sensitive species of plants and animals. The area surveyed included all connecting roadways, powerlines, and arroyos. A 100 percent census was necessary to determine the presence, distribution, and critical habitat characteristics of all species of special concern listed by Federal and State of New Mexico environmental resources agencies. "Species of special concern" is a collective term used to distinguish species that are threatened, endangered, sensitive, or protected by Federal or state regulation and those species whose presence are rare for the geographic area. The Endangered Species Act defines critical habitat as that geographic area within the area occupied by the species at the time of its listing, and the habitat that the U.S. Fish and Wildlife Service (USFWS) determines to be essential to the conservation of the species and requires special management consideration or protection.

Although the 100 percent botanical survey was conducted late in the flowering season, it was timely enough as an aid for locating threatened, endangered, sensitive or unique species of plants to be affected by construction. The survey also was useful for determining general habitat characteristics of species associated with different elevations, topography, and drainage basin conditions in the arroyos, which are not affected by construction activities, except for those species that flower later in the year such as varieties of the Pincushion cacti (*Coryphanta*, spp.).

In addition, although many species of migrating birds had already left the area at the time of the of the biological survey, suitable nesting, perching, roosting, and foraging habitat for avian species was recorded. All lesser game and nongame species of wildlife were recorded by visual observation of individual animals or by the presence of tracks, scat, burrow systems, or nests. Bones in carnivore scat and those found associated with woodrat nests are particularly good indicators of the small mammal species composition in the local area.

In accordance with recommendations of the New Mexico Department of Game and Fish (NMDGF), all major wildlife communities and unique wildlife habitat within the proposed survey area were delineated, including the presence and distribution of lesser faunal and floral species and their sensitive habitats, for example, travel corridors, foraging areas, nesting sites (NMDGF, 1991, 1992).

The property has the potential to support 34 species of plants (13 plant families) and 60 species of animals (15 animal families) that are listed as endangered, threatened, or sensitive by various Federal or State of New Mexico resource agencies. This list was compiled from biological field surveys of areas in southern New Mexico that exhibit similar environmental conditions as found at the Center site (Sullivan and Nethers, 1995), and after consultation with appropriate resource agencies (i.e., USFWS, NMDGF, and the New Mexico Department of Forestry). Appendix B includes lists of plant and animal species observed in the proposed project area.

Of plant species of special concern potentially present, no threatened, endangered, or sensitive species of plants were observed. Dominant shrubby vegetation associated with the Center construction site included Catclaw (*Acacia greggii*), White Thorn (*Acacia constricta*), Little Leaf Sumac (*Rus microphylla*), and Algerita (*Berberis trifiolata*). Dominant grass species included Sporobulus Grass (*Sporobulus* spp.) and Muhly Grass (*Muhlenbergia* spp.).

There were dense populations of various species of cacti distributed throughout the area, especially along the slopes and shallow drainage of the northern-most arroyo where, in some areas, densities of the Texas Rainbow Cactus (*Echinocereus dasyacanthus* var. *dasyacanthus* Eng.) reached two plants per square meter. Turk's Head Cactus (*Echinocactus horizonthalonius*) and Robust Hedgehog Cactus (*Echinocereus fasciculatus*) also were common throughout the proposed construction site.

Of animal species of special concern potentially occurring throughout Eddy County, four taxa (8%) were documented. These taxa included primarily small-to-large-sized raptoral bird species, including the Turkey Vulture (*Cathartes aura*), Northern Harrier (*Circus cyaneous*), Loggerhead Shrike (*Lanius ludovicianus*), and American Kestrel (*Falco sparverius*).

- Turkey Vulture (*Cathartes aura*) (Federal protection under the Migratory Bird Treaty Act [MBTA]; State of New Mexico Protected Raptor)—Two birds were observed during the biological survey soaring overhead. Sensitivity of this species is considered to be low because the species is common and wide-ranging throughout the Southwest, and because of the small number of individual birds observed at the site. In addition, similar construction activities in north- and south-central New Mexico historically have not resulted in documented adverse effects on the species biology or ecology.

- Northern Harrier (*Circus cyaneous*) (Federal protection under MBTA; State of New Mexico Protected Raptor)—one bird was observed soaring over the proposed project area.

- American Kestrel (*Falco sparverius*) (Federal protection under MBTA; State of New Mexico Protected Raptor)—one bird was observed during the biological survey. This species was not common at the site, but was observed in association with the powerline bisecting the construction site.

- Loggerhead Shrike (*Lanius ludovicianus*) (Federal protection under MBTA and a Category 2 Candidate; no State of New Mexico status)—one bird was observed during the biological survey.

The latter three species are not common on the construction site, but were observed at the northern-most border of the property adjacent to the Living Desert. Sensitivity of these species is considered to be low because of the more abundant natural habitat associated with the nearby Living Desert and the small number of birds observed at the site. Further, similar construction activities in north- and south-central New Mexico historically have not resulted in documented adverse effects on the biology, reproduction, or ecology of these or similar species.

Of the plants and animal species present, none is listed as threatened, endangered, or sensitive species.

3.1.4 Cultural Resources and Native American Concerns

An archaeological investigation in 1995 of the entire property found no historic or prehistoric sites on the property (Condrey, 1995). For this study, the property was surveyed by walking multiple, parallel transects 5 meters wide. This transect spacing allowed an area to be viewed from both sides. This method increases the visibility for artifact location by viewing light reflection on the ground's surface from two different angles. The transects were aligned east-west across the property to take full advantage of sunlight reflection. All areas received adequate coverage, with special attention given to areas of higher visibility or site potential, such as arroyos, erosional areas, and animal holes.

No historical sites, archaeological sites, or cultural resources were observed. The site does, however, have areas of contemporary cultural debris. Light scattering of glass and aluminum beverage containers were observed throughout the site. In addition, several areas of refuse dumping were noted on the northern boundary, near the arroyo. The refuse consisted of tin cans and rocks. Scattered remains of lumber, fencing, and livestock containment (chicken wire) were noted along the northeast boundary. Four contemporary stone fire rings were noted. One is located within the building foot print and the others are located in the southern portion of the site. Some of the fire rings contained nails, broken glass, and scattered beverage containers.

Based on the survey, there is no record of any historical structures, historical sites, archaeological sites. Because of these factors, there will be no impact to cultural resources.

3.2 NOISE ENVIRONMENT

The proposed site is located in a quiet neighborhood of Carlsbad near West Pierce Street. The predominate noise in the area is from vehicular traffic on the highway and vehicles entering and leaving the NMSU at Carlsbad campus and the Guadalupe Medical Center. Noise measurements were taken at approximately 0900 hours on Monday, May 22, 1995. These measurements were averaged over a 120 second period of time. At the proposed building site, three measurements were 52, 54, and 55 decibels on the A-weighted measurement scale (dBA). Another noise measurement was made at an empty lot on West Pierce Street across from the Medical Center. A noise level of 63 dBA was recorded at this location. In general, the proposed building site is relatively unaffected by traffic noise because it lies several hundred meters west of West Pierce Street.

3.3 AIR QUALITY

Carlsbad is in the U.S. Environmental Protection Agency (EPA) Pecos-Permian Basin Intrastate Air Quality Control Region. Air quality regulations are administered by the New Mexico Environment Department (NMED). According to NMED Air Quality Control Regulation 706, *Air Quality Management Areas*, the region is in compliance with State air quality standards.

Once the laboratory is fully operational, routine laboratory sample processing may generate small quantities of chemical and radiological emissions. Chemical emissions are regulated by the

NMED Air Quality Bureau, while radiological emissions are regulated by the NMED Hazardous and Radioactive Materials Bureau. NMED has preconstruction notification requirements and operating permit requirements for facilities that have the potential to exceed toxic air pollutant emission standards or for radiological emissions expected to exceed 10 milliroentgen equivalent man per year or 1 x 10^{-5} Sievert per year.

3.4 WASTE GENERATION AND DISPOSAL

3.4.1 Sanitary Waste and Solid Waste

Disposal of sanitary waste and solid waste would be provided through the City of Carlsbad. The Center would be connected to the Municipal Sewage Treatment Facility that has an excess capacity of approximately 1 million gallons per day (gpd) (Silver, 1995a) and would easily manage the anticipated waste water discharge of 1,750 gpd by the Center (Silver, 1995b).

The Center would also subscribe to the City of Carlsbad for solid waste disposal services of an estimated 9.1 cubic meters (10 cubic yards) of common office-type trash monthly. Some paper and cardboard would be recycled. The estimated quantity of non-hazardous solid waste is only a small percentage of the waste handled monthly by the City of Carlsbad. This estimate does not include wastes that are regulated in accordance with NMED hazardous waste regulations.

3.4.2 Hazardous, Radiological, and Medical Wastes

Routine laboratory operations would generate small quantities of chemical and low-level radiological wastes. These materials would be managed and handled in accordance with established NMSU procedures to satisfy NMED regulatory requirements. None of these wastes would be discharged to the Carlsbad city sewer system.

Typical sources of wastes would include:

- residues from empty containers
- analyses and samples
- off-specification analytical standards
- sample intermediates
- cleaning solutions
- photographic chemicals

The Center would accumulate the following quantities of hazardous waste based on an estimate in which approximately one-half of the total chemical inventory would be utilized and then disposed of as hazardous waste every 6 months.

- 136 kilograms (kg) (300 pound [lb]) of solvents
- 27 kg (60 lb) of chloroform and carbon tetrachloride
- 9 kg (20 lb) of hydrofluoric acid
- 182 kg (401 lb) of organic/inorganic acids

These quantities are extremely conservative since most chemicals would be consumed or neutralized in sample processing or analytical procedures. Sulfuric acid, for example, is highly reactive and would be neutralized during acid digestion of sample constituents.

The amounts listed above are easily handled by conventional waste handling means. Wastes would be packaged appropriately and would be transported by commercial hazardous waste disposal service to an EPA- or state-permitted disposal site.

A six month waste accumulation would consist of three 55-gallon drums and three 5-gallon containers as follows:

- solvents would be placed in one 55-gallon drum
- organic and inorganic acids would be placed into two 55-gallon drums
- hydrofluoric acid would be placed into one 5-gallon container
- chloroform and carbon tetrachloride would be placed into two 5-gallon containers

At this generation rate, the Center would qualify as a Conditionally Exempt Small Quantity Generator (CESQG). CESQGs are exempt from most formal reporting requirements, such as obtaining a waste generator registration number from NMED, but they are required to manage waste in accordance with requirements specified in NMED regulations.

Radioactive materials would be used primarily for calibration and to prepare validation samples. The vast majority of the quantity of each material would be retained in the laboratory and would eventually be disposed of as radiological waste.

The impacts of potential radiological emissions to the local community were estimated using quantities of radionuclides taken from the Nuclear Regulatory Commission license application for the facility and the *COMPLY* computer program (EPA, 1989). The license application lists all materials that potentially could be required to perform the work of the Center. It is unlikely that all of the materials on the license application will be stored at the proposed facility or in the maximum quantities indicated. The Center's radioactive materials license application lists the radioisotopes shown in Appendix A. This is the maximum inventory that could be stored at the Center, and this inventory is expected to be sufficient for several years of operation. Except for isotopes that are gases, most of the radioisotopes would be used in liquid form. The following assumptions were made:

- For non-sealed materials, one percent of the maximum storage quantity would be released each year.
- Non-sealed solid materials required in sample processing would be handled in a fume hood equipped with a High Efficiency Particulate Air (HEPA) filter. Ninety-nine percent of the solid materials and reaction products released into the air flow would be trapped by the filter and would be released.
- For carbon-14, iodine-125, -129, and -131, krypton-85 and -87, tritium, and xenon-133, the materials themselves or their potential reaction products would be gaseous. Gaseous materials would not be trapped by the HEPA filter.

- When periodic maintenance of the filter indicates that replacement is required, the filter would radiologically monitored and would be handled in such a way that none of the trapped material would become airborne.

The Center would also generate small quantities of radiological waste. The amount of radiological waste would be dependent upon the number and type of procedures performed at the Center. To assess the impact of waste disposal, it is assumed that short half-life nuclides such as iron-59 would be allowed to decay (through ten half-lives) to a point that they are no longer considered radioactive so that they may be disposed as non-radioactive waste. It is assumed that one-half of the remaining inventory with longer half-life radionuclides would become a waste for disposal or be emitted as an air emission per year. This is a conservative estimate since not all radionuclides would be expended in two years.

If the total activity levels for all radionuclides were combined only approximately 35 microcuries of radioactive waste would be disposed of each year. Liquids would be allowed to evaporate to minimize that quantity of waste that would require disposal. A permitted radiological waste disposal service would transport this material to a permitted disposal site.

The Center will appoint a hazardous and radiological waste coordinator to ensure operations are conducted safely in accordance with NMED requirements. The coordinator would establish a plan that would include the following components:

- a hazardous waste management plan that incorporates radiological waste handling in accordance with the Center's Radiation Safety Manual
- a record keeping system that includes information on manifesting, marking and labeling containers, and tracking waste
- a storage/accumulation area in a convenient, accessible location in the laboratory
- a storage area with spill containment equipment, packing and absorption materials, spill control materials, fire extinguishers, and personal protective equipment.

Bioassay analyses may involve the collection of 24-48-hour urine specimens and collection of various plant and animal tissues. These types of samples do not meet the definition of regulated medical wastes according to the EPA definition found in 40 CFR Part 259 (EPA, 1991a). These wastes would be disposed of as part of the sanitary and solid wastes generated by the Center.

3.5 TRANSPORTATION

The mobile bioassay laboratory is mounted on a semi-trailer truck and would travel an estimated 4,800 km (3,000 mi) per year to the WIPP and various locations outside of Carlsbad.

It is anticipated that there would be approximately 42 full-time employees that would reside in the Carlsbad area and commute by automobile to the site. In addition, another 30 people per week would be expected as visitors. Occasionally, larger groups from schools or other organizations would also be expected.

3.6 WATER USE

The building design is based on water and sewage use rate of 50 gpd per person or approximately 2,100 gpd (Silver, 1995b). A xeric landscape design (xeriscape) is proposed incorporating native plants from the site. Some watering will be necessary until the plants are established; afterward, very little water is expected to be used for landscape purposes.

4.0 ENVIRONMENTAL CONSEQUENCES

This section examines potential consequences to the existing environment associated with the Proposed Action and the No Action Alternative. In general, the amount of detail presented with respect to the various environment categories is proportional to the potential for adverse impacts.

There would be minimal impacts to cultural resources or Native American concerns and they are not discussed further in this EA.

4.1 NOISE IMPACTS

4.1.1 Impacts of the Proposed Action

The Proposed Action should have no substantial noise impacts to the surrounding community. Sources of temporary noise impacts would arise from the construction of the facility. No long-term impacts from noise are expected once the facility becomes operational. Noise levels generated by construction equipment can range from 76 to 91 dBA at a distance from the equipment of 15.2 meters (50 feet) (May, 1978). Initial site preparation using heavy equipment would be temporary. Noise exposure for construction workers is likely to exceed NMED regulations for hearing conservation. Construction workers would use hearing protection devices in accordance with NMED requirements. Individuals who are not involved with the construction activities, such as residents in the area, would be located several hundred meters from the construction site. Over this distance, noise would be attenuated sufficiently that levels would be expected to range from 56 to 71 dBA. At these levels, construction activities are not expected to be a source of disturbance in the local area.

4.1.2 Impacts of the No Action Alternative

Under the No Action Alternative funding would be discontinued and the proposed Center would not be constructed. As a result, there would be no impacts due to noise.

4.2 AIR QUALITY IMPACTS

4.2.1 Impacts of the Proposed Action

Certain contaminants would be released into the air during construction and operation of the facility. The Proposed Action would not have substantial adverse effects on air quality. Air emissions resulting from the Proposed Action would be well below levels that could be expected to cause any adverse impacts.

The air contaminants that would be emitted during site preparation for construction would be temporary, small in quantity, and widely dispersed in space and time and would have negligible effects on air quality, except in the immediate vicinity of the construction site. Air emissions resulting from construction of the building would be equivalent to those from any medium-scale

construction project in the area, and would have only minor, temporary effects in the immediate vicinity of the construction site.

Air emissions resulting from heating and cooling equipment would be equivalent to a small cluster of single-family homes, and effects would be very minor. Air emissions resulting from the release of chemicals and radiological materials during operation of the Center would be well within existing regulations pertaining to hazardous air pollutants and radiological materials and would not adversely affect human health.

The approach, calculations, and results emission rate estimates of toxic air pollutants were presented to the NMED Air Quality Bureau for an informal review. NMED accepted these results based on "worst-case assumptions," and concluded that there would be no need for the Center to submit a Preconstruction Notification Application or seek an Air Quality Permit. In addition, since anticipated emission levels are low, NMED concluded that computer modeling, as further substantiation of emission levels, was not warranted. The information supplied to NMED is found in Appendix A.

4.2.2 Impacts of the No Action Alternative

Under the No Action Alternative, there would be no impacts to air quality since no construction or operation of the Center would occur.

4.3 TRANSPORTATION IMPACTS

4.3.1 Impacts of the Proposed Action

The Proposed Action should have no substantial transportation-related impacts. Based on the average truck accident rate for the U.S. of 3.1 accidents per 10,000,000 km (6.21 million mi) (DOE, 1993b), the likelihood of an accident involving the mobile bioassay laboratory would be approximately 1 in every 667 years or 1.5×10^{-3} accidents per year. The bioassay laboratory would not contain any hazardous materials that could be released and increase the severity of the accident if an accident were to occur.

The impact to local traffic on West Pierce from the Proposed Action is expected to be minimal. The New Mexico Highway Department traffic counts on West Pierce indicate that an average of 3,113 vehicles drive past the entrance to the proposed facility over a 24-hour period. If each employee drove to work individually, approximately 42 additional vehicles would be added to the 24-hour traffic count. Over a 24-hour period, this is a 1.25 percent increase. Most of these vehicles would be on West Pierce during the morning and afternoons commuting hours. West Pierce is a 4-lane roadway that can easily accommodate this very small increase in traffic.

4.3.2 Impacts of the No Action Alternative

Under the No Action Alternative, the proposed Center would not be constructed, and there would be no impacts due to traffic.

4.4 WASTE GENERATION AND DISPOSAL

4.4.1 Impacts of the Proposed Action

Hazardous and radiological wastes would be disposed of by a commercial disposal service. The quantities of hazardous waste that would be generated are commonly handled by commercial disposal firms and should not pose a disposal issue. The quantities are well within the capabilities of commercial disposal companies that service the Carlsbad area; therefore, hazardous waste from the proposed action would have a minimal impact to the environment.

The quantities and types of radiological waste also would have a minimal impact to the environment. The quantities and types of radiological waste are well within the capabilities of commercial disposal companies that service the Carlsbad area. For airborne emissions of radiological materials, *COMPLY* predicts that the facility would be in compliance with EPA (and therefore New Mexico) air quality regulations.

4.4.2 Impacts of the No Action Alternative

Under the No Action alternative, the facility will not be constructed and waste generating activities would not occur.

4.5 WATER USE IMPACTS

4.5.1 Impacts of the Proposed Action

Essentially the floor space of the Center is the equivalent to 10 single-family homes of 2,500 square feet. Typically, water use is estimated at 100 gpd per resident (Silver, 1995b). By assuming four people per residence, 10 homes would consume 4,000 gpd. The Center is expected to use about 2,100 gpd; hence, water use is less than that for comparable number of residences.

4.5.2 Impacts of the No Action Alternative

Under the No Action alternative, the facility will not be constructed and water consuming activities would not occur.

4.6 BIOTA AND ECOLOGICAL IMPACTS

4.6.1 Impacts of the Proposed Action

The Proposed Action should have no substantial impacts to the biota and ecology of the site. On the basis of the biological survey, none of the plant and animal species present at the proposed construction site are listed as threatened, endangered, or sensitive.

The arroyos that border the site on the north and south have the highest density of plants, and the biological survey did not definitively determine the absence of some species of special concern in these areas. However, vegetation-disturbing construction activities would involve only

a small portion of the entire site and would not adversely impact plant communities in either arroyo.

A qualified biologist from the Center will monitor the construction site to ensure that construction activities protect the arroyos. In addition, once the engineering survey is completed and locations of the road, parking area, and building site are staked, a landscape architect will supervise removal of those native plants that are suitable for transplanting.

4.6.2 Impacts of the No Action Alternative

Under the No Action Alternative, the biota and ecology of the site will not be affected because no activities will take place, and the site will remain as is.

4.7 CUMULATIVE IMPACTS

The Center would be located in the vicinity of New Mexico State University, the Guadalupe Medical Center, and the Radiation Oncology Center. None of these facilities releases any radioactive materials. There are some chemical emissions from the New Mexico State University chemical laboratory, but these emissions are small compared to the emissions expected from the Center. The combined impacts of chemical emissions from the Center and New Mexico State University would be essentially the same as from the Center alone.

The Center is also a potential location for the National Park Service National Cave and Karst Research Institute. The Park Service selected Carlsbad, New Mexico, as the proposed location for the Institute. While DOE and this document are not connected with the Institute, this EA could serve as a model for NEPA compliance purposes if the Center were to be selected as the site for the Institute. It is possible that the Institute would be physically located at the Center and share the Center's facilities.

The Institute would consist of the following activities and facilities.

- technical library
- computer laboratory
- small museum and visitor area
- restrooms
- meetings/conference rooms
- offices, equipment storage, and laboratory space
- photographic laboratory and darkroom

The Institute would be a national center to further scientific research, education, and management policies dealing with Karst and cave management. The construction and operation of the Institute essentially would have the same or even less impact than those discussed in this EA. The operational impacts of such an institute would be expected to be less than those discussed here because no chemicals (except those used in the photographic laboratory) and no radionuclides would be used in operating the Institute.

5.0 PERSONS AND AGENCIES CONSULTED

Written consultation has been initiated with the following state agencies and Indian tribes

- **New Mexico Department of Game and Fish**, Andrew V. Sandoval, Chief Conservation Services Division, Santa Fe, New Mexico
- **State of New Mexico, Office of Cultural Affairs, Historic Preservation Division**, Dan Reiley, Staff Archaeologist, Santa Fe, New Mexico
- **Mescalero Apache Tribe**, Wendell Chino, Governor, Mescalero, New Mexico

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APPENDIX A

1.0 AIR QUALITY INVESTIGATIONS

The primary air quality effects from the Proposed Action would be from the construction of the proposed facility. These impacts are

- dust generated by construction activities
- engine exhaust products from heavy construction equipment
- organic vapors released by paints and adhesives

Other important impacts would occur once the proposed facility was in operation. These impacts are

- heating and cooling requirements
- chemical and radiological emissions from laboratory operations

The methodology and computations used to evaluate the impacts of are presented in the following sections.

1.1 IMPACTS FROM CONSTRUCTION ACTIVITIES

The Compilation of Air Pollutant Emission Factors (EPA, 1990) recommends emission factors for a wide range of construction activities. Taking into account an estimated 10 percent silt content of the soil at the construction site, the estimated dust-emission factor is 0.6 ton per acre per month of activity for particles less than 30 micrometer (μm) in diameter. Approximately two-thirds of this total or 0.4 ton per acre per month would be in the range of 10 μm or smaller (PM_{10}). This value applies to moderate-intensity construction projects in semi-arid climates that are similar to the Proposed Action, such as apartment buildings and shopping centers. It is estimated that soil disturbing activities would require no more than one month. Therefore, the estimated PM_{10} emissions would be 3.6 tons, which would be equivalent to the annual dust emissions from farming approximately 250 acres. This level of dust would be potentially annoying in the immediate vicinity of the site, but would be comparable to any other medium-scale construction project. Use of water or other palliatives would minimize dust production.

Engine emissions from construction equipment were estimated assuming a backhoe/loader, scraper, roller, three miscellaneous pieces of equipment each operating for 160 hours, and five medium trucks each operating for 320 hours. These vehicles would release 1.9 tons of carbon monoxide, 0.41 ton of hydrocarbons, 1.9 tons of nitrogen oxides, up to 0.2 ton of sulfur oxides (depending on the sulfur content of the fuel), and 0.2 ton of exhaust particulates during the construction period. The quantity of exhaust emissions would be approximately equivalent to that from a typical year of operation of a single over-the-road truck. The contaminant concentrations at the proposed construction site would be smaller than those experienced near a major city intersection.

Based on a 25,000 square-foot floor space, the interior of the facility is estimated to contain approximately 67,000 square feet of paintable wall space. Approximately 90 percent of this space would be painted with water-based paint that would emit negligible quantities of air contaminants. The remaining 10 percent would be painted with oil-based paint. In addition, oil-based adhesives would be used to apply carpet and other floor coverings and laminated counter tops. The total quantity of oil-based paints and adhesives required is estimated to be 72 gallons, and each gallon would emit approximately 4 pounds of volatile organic material while drying. Thus, approximately 0.14 ton of volatile organic compounds would be emitted. This level is smaller than that resulting from construction equipment hydrocarbon engine emissions.

1.2 IMPACTS OF ROUTINE OPERATIONS

The major categories of air contaminants that could be released during routine operations of the facility are:

- Certain exhaust products of combustion-driven heating and cooling systems.
- Vapors released by reagents and solvents during analytical processes. These could include corrosive gases from acids used to dissolve samples and vapors released by organic solvents.
- Radionuclides in gaseous and particulate form released from analytical samples and calibration materials.

1.2.1 Heating and Cooling

Modern climate control systems are very efficient and produce only small quantities of carbon monoxide, nitrogen oxides, hydrocarbons, sulfur oxides, and particulates. Annual quantities of contaminants that would be released are estimated to be 0.06 ton of carbon monoxide, 0.29 ton of nitrogen oxides, 0.02 ton of hydrocarbons, and negligible quantities of particulates and sulfur oxides. For comparison, the 25,000-square foot floor space represented by the facility is roughly equivalent to 10 single-family residences. Air contaminant production would be even smaller than for 10 residences because larger buildings require less fuel per square foot; therefore, space heating requirements would have a negligible effect on air quality.

1.2.2 Impacts from Emissions of Toxic Air Pollutants

It is anticipated that some sample processing and analysis by the laboratories would release small quantities of toxic chemicals. These chemicals, which are listed in Table 1, would be used in laboratory fume hoods and exhausted to the ambient environment.

Air quality regulations allow emissions of these chemicals at levels up to a specified maximum. The criteria are found in NMED Air Quality Control Regulation 752, *Registration of Existing Toxic Air Pollution Sources* (NMED, 1987). Emission rates were calculated for each chemical listed above and compared with the NMED standards. The results are displayed in Table 2.

Table 1. Chemicals Used in Laboratory Testing

Acetone	Hydrofluoric Acid
Xylene	Sulfuric Acid
Ethyl Alcohol	Nitric Acid
Carbon Tetrachloride	Hydrochloric Acid
Acetic Acid	Pentane
Methyl Isobutyl Ketone	Hexane
Ethyl Ether	Acetonitrile
Chloroform	Methanol

Table 2. Estimates for Emission Rates in Pounds per Hour and Occupational Exposure Limits (OELs) for Toxic Air Pollutant Emissions

Chemical	Estimated Total Annual Use (gal)	Computed Daily Emission Rates		NMED Air Quality Control Regulation 752 Standards & OEL[b]	
		Rate (lb/hr)[a]	Concentration (mg/m^3)	Rate (lb/hr)	Concentration (mg/m^3)
Xylene	10	0.0389	5.78	29.00	435.00
Acetone	20	0.0687	10.19	39.30	590.00
Ethyl alcohol	20	0.0685	10.17	125.30	1,880.00
Carbon tetrachloride	10	0.0692	10.28	2.00	12.60
Acetic acid	10	0.0455	6.76	1.67	25.00
MIBK[c]	10	0.0350	5.16	13.70	200.00
Ethyl ether	10	0.0310	4.60	80.00	1,200.00
Hydrofluoric acid	10	0.0551	8.19	0.17	2.50
Sulfuric acid	10	0.0798	11.86	0.07	1.00
Nitric acid	50	0.3061	45.44	0.33	5.00
Hydrochloric Acid	50	0.2913	43.24	0.467	7.00
Pentane	20	0.0544	8.07	23.30	350.00
Hexane	20	0.0573	8.51	12.00	180.00
Acetonitrile	20	0.0684	10.15	2.27	34.00
Methanol	20	0.0687	10.20	17.30	260.00
Chloroform	20	0.1289	19.13	0.65	9.75

a. Lb/hr were calculated for the chemicals to be used at the Center by considering the density and assuming that the release would be continuous and steady.

b. New Mexico Air Toxic Standards are based on concentrations rather than emission rates. Standards are referenced to 1986-1987 ACGIH Threshold Limit Values and OEL in the NIOSH Manual of Analytical Methods, Third Ed.

c. Methyl Isobutyl Ketone.

The methodology used for the emission rate estimates follows the NMED toxic air pollutant screening process and produces a very conservative emission rate estimate (NMED, 1987). Even at these conservative levels, none of the computations, except for nitric, sulfuric, and hydrofluoric acids, exceed NMED standards.

The computational method, shown below for sulfuric acid, assumes that each chemical shown in Table 2 would be equally distributed over 12 months. The method also assumes that the entire amount would be released as air emissions to the environment. These assumptions produce a "worst-case scenario" for emission purposes. In reality, most of the chemicals would react during analytical procedures producing fewer toxic air emissions. Nitric, sulfuric, hydrochloric, and hydrofluoric acids, for example, are highly reactive and would produce soluble and insoluble nitrates, sulfates, and fluorides respectively. Some of this material would be discarded as Resource Conservation Recovery Act (RCRA) hazardous waste. Hence, actual emissions would be lower than shown in Table 2.

The NMED Air Quality Bureau reviewed the method of estimating daily emission rates and agreed with both the approach and results shown in Table 2. Sulfuric acid is used in the following example to compute a daily emission rate.

15.35 pounds per gallon × 10 gallons = 153.5 pounds

The density of sulfuric acid is 15.35 pounds per gallon; therefore, 10 gallons would weigh 153.5 pounds. The emission rate is found by dividing the weight by the hours sulfuric acid would be used.

153.5 lb ÷ (20 days per month x 12 months) ÷ 8 hours per day = 0.08 lb per day

Assuming that sulfuric acid would be used steadily 20-days per month and up to 8 hours per day, the emission rate is computed as 0.08 pounds per hour.

Average emission rates of reagents and solvents in Table 2 correspond to the concentration of the materials in the air at the fume hood exhaust outlet. In the outside air, the vapors would be rapidly diluted. The EPA Guideline Screening Model SCREEN (EPA, 1991b) was used to investigate the maximum time-averaged concentrations at "breathing height", which is approximately 2 meters (6 feet) from the ground. Using the assumption that all of the material would become airborne, the acids would be present in the following concentrations

- nitric acid would be 63 microgram per cubic meter ($\mu g/m^3$)
- sulfuric acid would be 16 $\mu g/m^3$
- hydrofluoric acid would be 11 $\mu g/m^3$

These concentrations are over 700 times smaller than the concentrations in the exhaust stack and much smaller than the American Conference of Governmental Industrial Hygienists recommended concentration limits for workplace exposure.

Table 3. Radioactive Materials Inventory

Element and Mass Number	Activity (μ Curies)
Americium-241	18
Americium-243	2
Antimony-125	1,000
Barium-133	1,000
Barium-140	1,000
Beryllium-7	1,000
Bismuth-210	1,000
Carbon-14	10,000
Cesium-134	1,000
Cesium-137	10,000
Cobalt-57	10,000
Cobalt-60	1,000
Curium-242	5
Curium-243	2.5
Curium-244	2.5
Europium-152	300
Europium-154	100
Europium-155	1,000
Iodine-125	1,000
Iodine-129	100
Iodine-131	1,000
Iron-55	10,000
Iron-59	1,000
Krypton-85	10,000
Krypton-87	10,000
Lead-210	5
Manganese-54	1,000
Neptunium-237	2
Neptunium-239	1,000
Nickel-59	10,000
Nickel-63	1,000

Table 3. Radioactive Materials Inventory (continued)

Element and Mass Number	Activity (μ Curies)
Niobium-95	1,000
Phosphorus-32	1,000
Polonium-208	2
Polonium-209	2
Polonium-210	100
Potassium-40	1,000
Radium-226	10
Uranium-233	2.63×10^{-4}
Uranium-235	2.3
Plutonium-236	4.70×10^{-9}
Plutonium-238	1.43×10^{-7}
Plutonium-239	4.07×10^{-5}
Plutonium-240	1.10×10^{-5}
Plutonium-241	2.22×10^{-8}
Plutonium-242	6.41×10^{-4}
Ruthenium-106	100
Silver-100m	100
Strontium-85	1,000
Strontium-89	100
Strontium-90	10
Technetium-99m	10,000
Technetium-99	1,000
Tritium	10,000
Xenon-133	10,000
Yttrium-90	1,000

APPENDIX B

List of plant species observed at the proposed Carlsbad Environmental Monitoring and Research Center building site.

Family	Scientific Name	Common Name
Agavaceae	*Agave lechuguilla*	Lechuguilla
Anacardiaceae	*Rhus microphylla*	Little Leaf Sumac
Asteraceae	*Artemisia ludoviciana*	Louisiana White Sage
	Grindellia squarrosa	Gum Weed
	Guttierezia Sarothrae	Desert Snake Weed
	Lasthenia californica	Goldfields
	Perezia nana	Desert Holly
Berberidaceae	*Berberis trifiolata*	Algerita
Brassicaceae	*Lesquerella gordonii*	Bladderpod
Cactaceae	*Coryphantha macromeris*	Flabby Pincushion
	Echinocactus bicolor	Gory of Texas
	Echinocactus texensis	Horse Crippler
	Echinocactus horizonthalonius	Turk's Head
	Echinocereus dasyacanthus var.	Texas Rainbow Cactus
	Echinocereus fasciculatus	Robust Hedgehog
	Echinocereus pectinatus	Texas Rainbow
	Echinocereus reichenbachii	Lace Cactus
	Opuntia engelmannii var. *texana*	Engelmann's Prickly Pear
	Opuntia imbricata	Tree Cholla
	Opuntia leptocaulis	Desert Christmas Cactus
	Opuntia phaeacantha	New Mexico Prickly Pear
	Opuntia violacea var. *macrocentra*	Purple Prickly Pear
Celastraceae	*Mortonia scabrella*	Mortonia
Convolvulaceae	*Convolvulus* species	Morning Glory
Cupressaceae	*Juniperus monosperma*	One-seeded Juniper

Family	Scientific Name	Common Name
Cucurbitaceae	*Cucurbita foetidissima*	Buffalo-gourd
Ephederaceae	*Ephedra trifurca*	Mormon-tea
Fabaceae	*Acacia constricta*	White Thorn
	Acacia greggii	Cat Claw
	Dalea formosa	Feather Plume
	Prosopis glandulosa	Honey Mesquite
Fouquieriaceae	*Fouquieria splendens*	Ocotillo
Koeberliniaceae	*Koeberlinia spinosa*	All-Thorn
Liliaceae	*Allium species*	Onion
	Dasylirion wheeleri	Sotol
	Yucca baccata	Banana Yucca
	Yucca elata	Soap Tree Yucca
	Yucca torreyi	Torrey Yucca
Limiaceae	*Salvia arizonica*	Desert Sage
Onagraceae	*Oenthera primaveris*	Yellow Desert Primrose
Poaceae	*Bouteloua* spp.	Grama Grass
	Erioneuron pulchellum	Fluff Grass
	Sporobulus spp.	Sporobulus Grass
	Muhlenbergia spp.	Muhly Grass
Polypodiaceae	*Cheilanthes tomentosa*	Woolly Lipfern
Rhamnaceae	*Microhamnus ericoides*	Javelina Bush
Rosaceae	*Fallugia paradoxa*	Apache Plume
	Cowania mexicana	Cliff Rose
Solanaceae	*Solanum elaegnifolium*	Bull-nettle
Zygophylaceae	*Larrea tridentata*	Creosote Bush
	Kallstroemia hirsutissima	Summer-poppy

List of animal species observed in the project area or expected to occur in the project area. Species marked by shading are threatened, endangered, protected, or of special concern.

SCIENTIFIC NAME	COMMON NAME	OBSERVED	EXPECTED
	MAMMALS		
Ammospermophilus interpres	Antelope Ground Squirrel		X
Antilocapra americana	Pronghorn		X
Canus latrans	Coyote	X	
Dipodomys merriami	Merriam's Kangaroo Rat		X
Dipodomys ordii	Ord's Kangaroo Rat		X
Dipodomys spectabilis	Banner-tailed Kangaroo Rat	X	
Erithizon dorsatum	Porcupine		X
Lepus californicus	Blacktailed Jackrabbit	X	
Neotoma albigula	White-throated Woodrat		X
Neotoma micropus	Plains Woodrat		X
Odocoileus hemionus	Mule Deer	X	
Onychomys spp.	Northern Grasshopper Mouse		X
Perognathus flavus	Silky Pocket Mouse		X
Peromyscus maniculatus	Deer Mouse	X	
Spermophilus variegatus	Rock Squirrel	X	
Sylvilagus auduboni	Desert Cottontail	X	
Urocyon cinereoargenteus	Gray Fox		X
	BIRDS		
Aimophila cassinii	Cassin's Sparrow		X
Ammodramus savannarum	Grasshopper Sparrow	X	
Amphispiza belli	Sage Sparrow		X
Amphispiza bilineata	Black-throated Sparrow	X	
Archilochus alexandri	Black Chinned Hummingbird	X	
Speotyto cunicularia	Western Burrowing Owl		X
Buteo jamaicensis	Red-tailed Hawk		X

SCIENTIFIC NAME	COMMON NAME	OBSERVED	EXPECTED
Buteo regalis	Ferruginous Hawk		X
Buteo swainsoni	Swainson's Hawk		X
Calamospiza melanocorys	Lark Bunting		X
Callipepla squamata	Scaled Quail	X	
Caprimulgus vociferus	Whip-poor-will	X	
Cathartes aura	Turkey Vulture	X	
Charadrius vociferus	Killdeer	X	
Chondestes grammacus	Lark Sparrow		X
Circus cyaneus	Northern Harrier	X	
Columba livia	Rock Dove	X	
Corvus cryptoleucus	Chihuahuan Raven	X	
Empidonax difficilis	Western Flycatcher	X	
Eremophila alpestris	Horned Lark	X	
Falco sparverius	American Kestrel	X	
Geococcyx californianus	Roadrunner	X	
Icterus pasisorum	Scott's Oriole		X
Lanius ludovicianus	Loggerhead Shrike	X	
Melospiza melodia	Song Sparrow	X	
Mimus polyglottos	Northern Mockingbird	X	
Molothrus ater	Brown-headed Cowbird	X	
Oreoscoptes montanus	Sage Thrasher	X	
Parabuteo unicinctus	Harris's Hawk		X
Passer domesticus	House Sparrow	X	
Phainopepla nitens	Phainopepla	X	
Pipilo fuscus	Brown (Canyon) Towhee	X	
Cardinalis sinuatus	Pyrrhuloxia	X	
Quiscalus quiscula	Common Grackle	X	
Riparia riparia	Bank Swallow	X	

SCIENTIFIC NAME	COMMON NAME	OBSERVED	EXPECTED
Salpinctes obsoletus	Rock Wren	X	
Spizella passerina	Chipping Sparrow	X	
Sturnella neglecta	Western Meadowlark	X	
Zenaida macroura	Mourning Dove	X	
	REPTILES		
Cnemidophorus exsanguis	Chihuahuan Spotted Whiptail		X
Cnemidophorus gularis	Texas-spotted Whiptail	X	
Cnemidophorus inornatus	Little Striped Whiptail		X
Cnemidophorus tesselatus	Checkered Whiptail		X
Cnemidophorus tigris	Western Whiptail	X	
Crotalus atrox	Western Diamondback		X
Crotalus viridis	Western Rattlesnake		X
Crotaphytus collaris	Collared Lizard		X
Crotaphytus wislizenii	Leopard Lizard		X
Eumeces multivirgatus	Many-lined Skink		X
Eumeces obsoletus	Sonoran Skink		X
Holbrookia maculata	Lesser Earless Lizard		X
Holbrookia texana	Greater Earless Lizard		X
Masticophis flagellum	Coachwhip		X
Pituophis melanoleucus	Bullsnake		X
Phrynosoma cornutum	Texas Horned Lizard		X
Phrynosoma douglassi	Short-horned Lizard		X
Phrynosoma modestum	Round-tailed Horned Lizard		X
Sceloporus magister	Desert Spiny Lizard		X
Sceloporus poinsetti	Rock Crevice Spiny Lizard		X
Sceloporus undulatus	Eastern Fence Lizard	X	
Urosaurus ornatus	Tree Lizard	X	
Uta stansburiana	Side-blotched Lizard	X	

SCIENTIFIC NAME	COMMON NAME	OBSERVED	EXPECTED
	AMPHIBIANS		
Bufo cognatus	Great Plains Toad		X
Bufo punctatus	Red-spotted (Desert) Toad		X
Bufo speciosus (compactus)	Texas Toad		X
Bufo woodhousei	Woodhouse Toad		X
Scaphiopus bombifrons	Central Plains Spadefoot Toad		X
Scaphiopus couchi	Couch's Spadefoot Toad		X
Scaphiopus hammondi	Western Spadefoot Toad		X

APPENDIX C

State of New Mexico
ENVIRONMENT DEPARTMENT
Harold Runnels Building
1190 St. Francis Drive, P.O. Drawer 26110
Santa Fe, New Mexico 87502-0110
(505) 827-2855
Fax: (505) 827-2836

GARY E. JOHNSON
Governor

MARK E. WEIDLER
Secretary

EDGAR T. THORNTON, III
Deputy Secretary

September 19, 1995

Harold Johnson
NEPA Compliance Officer
Carlsbad Area Office
U.S. Department of Energy
P.O. Box 3090
Carlsbad, N.M. 88221

Dear Mr. Johnson:

RE: ENVIRONMENTAL ASSESSMENT OF THE CARLSBAD ENVIRONMENTAL MONITORING AND RESEARCH CENTER FACILITY (DRAFT), DOE/EA-1081, DEPARTMENT OF ENERGY, CARLSBAD AREA OFFICE, AUGUST 1995

This transmits New Mexico Environment Department (NMED) staff comments concerning the above-referenced Draft Environmental Assessment (DEA).

20 NMAC 4.1 in general, and Subparts I, II, and III (40 CFR §§260, 261, and 262) in particular, define New Mexico's hazardous waste management program, identify hazardous wastes, and delineate standards applicable to generators of hazardous waste. Section 3.4.2 (pages 13-15) of the DEA describes the types and estimated quantities of waste generated and accumulated at the proposed facility. The DEA correctly states, "At this generation rate, the Center would qualify as a Conditionally Exempt Small Quantity Generator . . . exempt from most formal reporting requirements, . . . but they are required to manage waste in accordance with requirements specified in NMED regulations." These requirements are described in 20 NMAC 4.1 Subpart II, 40 CFR §261.5.

We found no conflicts with hazardous wastes generation and disposal regulations; the DEA, however, does contain a potential inaccuracy on page 14, paragraph 2, relating to disposal of hazardous waste: "Wastes . . . would be transported by commercial hazardous disposal service to an EPA-permitted disposal site." The disposal site may also be permitted by the state where the disposal facility is located, if EPA has authorized that state's hazardous waste program.

Although continued funding and construction of the Carlsbad Environmental Monitoring and Research Center Facility (Center)

entails minimal environmental impacts, adequate justification for the facility has not been provided. The environmental impacts inherent with any new facility construction could be avoided by adopting the No Action Alternative and discontinue funding of the Center.

The DEA states that the need for the facility is twofold: to provide for independent monitoring and assessment and to study impacts on the population from waste disposal operations at WIPP through whole body counting and bioassay. With respect to the first stated purpose, DOE has already funded one independent monitoring and evaluation entity and provided funding to federal and state agencies to oversee the WIPP project. The Environmental Evaluation Group (EEG) has over 15-years experience overseeing the WIPP project and already has an analytical laboratory facility in Carlsbad. The NMED has technical staff at the WIPP site to conduct independent environmental monitoring and assessment on an ongoing basis. Should there be real or perceived gaps in the monitoring and oversight activities of NMED and EEG, it is likely that they could be filled by either one of the entities.

The DEA does not provide adequate justification for the whole body counting capability which DOE states is needed. Worst case scenarios involving radioactive waste disposal accidents at WIPP result in a negligible dose prediction for the residents of Carlsbad. Such base line data determination is not conducted for populations surrounding nuclear power plants where worst case scenarios may involve significant doses to that population.

The document states that the Center will also be used to conduct bioassay for the WIPP radiation workers. While developing contracts to provide the WIPP project with this capability seems appropriate, there are surely existing companies providing such services, or DOE or Westinghouse could develop the capability in-house.

We appreciate the opportunity to review this document. Please let me know if you have any questions.

Sincerely,

Gedi Cibas, Ph.D.
Environmental Impact Review Coordinator

NMED File No. 924ER

Department of Energy
Carlsbad Area Office
P. O. Box 3090
Carlsbad, New Mexico 88221

OCT 10 1995

Mr. Ed Kelley, Director
Waster and Waste Management Division
New Mexico Environment Department
Harold Runnels Building
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502

Dear Mr. Kelley:

Thank you for the New Mexico Environment Department's (NMED) comments on the draft Environmental Assessment (EA) for operation of the Carlsbad Environmental Monitoring and Research Center (CEMRC). We will incorporate the change suggested by your staff in the hazardous waste discussion to recognize that the hazardous waste disposal site might also be permitted by the state in which it is located.

The NMED comments indicate that the EA does not "adequately justify" the proposed action. The reasons given are that the Environmental Evaluation Group (EEG) and the NMED are already providing environmental monitoring of the WIPP site, that the whole body counting capability that CEMRC would provide is not needed for Carlsbad residents because of the negligible dose consequences that would result from WIPP operations and that the monitoring could be obtained from other sources for WIPP workers.

An EA is not a decision making document that provides the reasoning to "justify" the agency's decision. An EA is intended to provide an objective analysis of the environmental impacts of an agency's proposed action and alternatives to that proposed action so that the agency can consider those impacts in deciding whether to proceed with the proposed action. NMED's comment letter agrees that the proposed action "entails minimal environmental impacts," but appears to question the need for the proposed action. Under these circumstances, I am issuing a Finding of No Significant Impact for the proposed action.

I believe there is a need for the proposed action. NMED admits in its comments that there is a need for bioassay of WIPP radiation workers, and indicates that there may be a need to fill in "gaps" in the NMED and EEG monitoring. While it might be possible to provide for these needs by providing additional funding to NMED or EEG, continued funding for the CEMRC would also fulfill these needs. In addition, the CEMRC monitoring program would also fulfill other DOE needs.

One of the primary objectives of the CEMRC program is to obtain data on the movement of pollutants associated with waste disposal operations in the environment and develop better techniques for detecting low levels of pollutants. To obtain this data, CEMRC would monitor for changes in the level of pollutants near the

threshold of detection, which are well below the levels that might be expected to cause adverse health impacts. DOE believes that this information will enable it to improve the way it handles and disposes of its wastes in the future. This need is reflected in the second paragraph of the statement of purpose and need (Draft EA, Section 2.1, page 1). Existing monitoring programs are aimed at detecting pollutant levels that might cause adverse health or environmental impacts and would not fulfill the same need as the proposed CEMRC program would.

If you have any questions concerning this proposal or need further information, please contact Harold Johnson, the Carlsbad Area Office NEPA Compliance Officer at (505) 234-7349.

George E. Dials

George E. Dials
Manager

APPENDIX D

Finding of No Significant Impact

Finding of No Significant Impact
Environmental Assessment
of the
Carlsbad Environmental Monitoring & Research Center
Carlsbad, New Mexico

AGENCY: U.S. Department of Energy

ACTION: Finding of No Significant Impact

SUMMARY: The U.S. Department of Energy (DOE) has prepared an Environmental Assessment (EA), DOE/EA-1081, to assess potential impacts of a proposal to continue funding the Carlsbad Environmental Monitoring & Research Center (the Center).

Operation of the Center would meet the DOE need for independent monitoring and assessment of environmental impacts associated with the planned disposal of transuranic waste at the DOE Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico. The purpose of this monitoring would be not only to detect concentrations of environmental pollutants that are likely to adversely affect human health and the environment, but also to detect changes in concentrations below levels likely to affect human health or the environment in the vicinity of WIPP. This basic research along with the development of improved environmental monitoring techniques by the Center will give DOE additional knowledge regarding the movement of pollutants in the environment and could help DOE to improve its waste management operations in the future. The Center would contain laboratories to analyze chemical and radioactive materials typical of potential contaminants that could occur in the environment in the vicinity of the WIPP site or other locations. The facility also would have bioassay facilities to measure radionuclide levels in the general population and in employees of the WIPP.

Based on evaluation in the Environmental Assessment, the DOE has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. 4321, et seq. Therefore, the preparation of an Environmental Impact Statement is not required.

Addresses and Further Information:

Single copies of the Environmental Assessment and further information about the proposed project are available from:

Mr. Harold Johnson, NEPA Compliance Officer
U.S. Department of Energy
Carlsbad Area Office
101 West Greene Street
Carlsbad, NM 88220
Phone: (505) 234-7349

For further information regarding the DOE NEPA process, contact:

Ms. Carol M Borgstrom, Director
Office of NEPA Oversight (EH-25)
U.S. Department of Energy
1000 Independence Ave., S.W.
Washington, D.C. 20585
Phone: (202) 586-4600 or leave a message at (800) 472-2756

Background: The Center was established in 1991 and is funded through a DOE grant. DOE funding has been used primarily to establish environmental monitoring programs in the Carlsbad area, to evaluate air and soil samples collected near the WIPP, and to plan the future activities of the Center. The Center has been conducting limited operations from rented commercial office space in Carlsbad, New Mexico.

Proposed Action: The proposed action would involve continuation of DOE funding for the Center. While DOE is not funding construction of the planned Center facility, operation of that facility is dependent upon the continuation of funding. To implement the proposed action, the Center initially would construct a facility of approximately 2,300 square meters (25,000 square feet). The facility and parking lot would occupy approximately 1.2 hectares (3 acres) of a tract of land (of approximately 8.9 hectares [22 acres]) which was donated to New Mexico State University (NMSU) for this purpose.

Alternatives Considered: In addition to the no action alternative, which would discontinue DOE funding of the Center and thereby eliminate programs to independently monitor and assess impacts of the WIPP program, the Department considered continued sponsorship of the Center operations at facilities constructed other locations or at existing facilities.

If the Center's funding was discontinued, DOE would need another means of assessing impacts associated with transuranic waste disposal at the WIPP. Existing buildings do not have the type of laboratory facilities needed for the Center's tests and monitoring studies. Construction of suitable facilities at alternative locations would create impacts similar to those of the proposed action, but cause an indeterminate delay in the availability of the Center's services due to the need to obtain additional funding to purchase another site.

Environmental Impacts: The proposed action would take place on approximately 8.9 hectares (22 acres) of land. The Center's facilities and parking lot would occupy approximately 1.2 hectares (3 acres). The total land area that would be impacted by construction activities is expected to be approximately 2 hectares (5 acres).

Construction activities would generate noise and dust. Noise and air emissions resulting from construction of the building would be equivalent to those from any medium-scale construction project in the area, and would have only minor, temporary effects. These impacts would be temporary and should have no substantial effect on the surrounding community. No long-term impacts from noise or dust are expected once the facility becomes operational.

Once the laboratory is fully operational, routine laboratory sample processing may generate small quantities of chemical and radiological emissions. Sample processing would take place within laboratory ventilation system enclosures that exhaust air outdoors. Emission levels including radiological emissions are not expected to exceed New Mexico Environment Department standards.

As an additional precaution, radiological materials would be filtered. Air emissions are expected to have no discernible impact on the environment or human health.

The impact to local traffic would be minimal. The increase in traffic over a 24-hour period is expected to be 1.25 percent, which can easily be accommodated by existing streets. The probability of a vehicular traffic accident involving a vehicle from the Center would be very remote. For example, based on the average truck accident rate for the U.S. of 3.1 accidents per 10,000,000 kilometers (6.21 million miles), the likelihood of an accident involving the mobile bioassay laboratory would be approximately 1 in every 667 years or 0.0015 accidents per year. The mobile bioassay laboratory would contain no radioactive or hazardous materials that could be released to the environment if it were to be involved in a traffic accident.

The rate of water use, sanitary waste disposal, and solid waste generation would be typical for a facility of this type and would be less than for a number of single family residences of similar total square footage. The Center also would generate small amounts of hazardous chemical wastes and low-level radioactive wastes that would be transported by a commercial service to an existing permitted disposal facility.

The construction site was surveyed for plant and animal species and historic and cultural resources. No historical sites, archeological resources, or cultural resources were found. No species present at the proposed construction site are listed as threatened, endangered or sensitive species nor would construction activities disturb any such species. The proposed action is expected to have little impact on the natural environment.

Cumulative Impacts: The proposed action is expected to have minimal impacts on the surrounding community. The Center would be located in the vicinity of the New Mexico State University Carlsbad campus, the Guadalupe Medical Center, and the Radiation Oncology Center. None of these facilities release any radioactive materials. There are some chemical emissions from the New Mexico State University chemistry laboratory, but these emissions are even smaller than those from the Center. The combined impacts of chemical emissions from the Center and New Mexico State University would be essentially the same as from the Center alone.

The Center is also a potential location for the National Park Service National Cave and Karst Research Institute. The Institute would further scientific research, education, and management policies dealing with Karst and cave management. The Institute would have the same or even less impact than the Center because no chemicals (except those used in the photographic laboratory) and no radionuclides would be used in operating the Institute.

Determination: Based on the analysis in the EA, I conclude that the proposed action is not a major Federal action significantly affecting the human environment within the meaning of the National Environmental Policy Act. Therefore, an Environmental Impact Statement is not required for the proposed action.

Issued at Carlsbad, N.M. this 10th day of October, 1995.

George E. Dials
Manager
Carlsbad Area Office

Jnited States Government **Department of Energy**

memorandum

Carlsbad Area Office
Carlsbad, New Mexico 88221

DATE: OCT 10 1995

REPLY TO ATTN OF: CAO:PSA:HJ 95-2532

SUBJECT: Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for the Carlsbad Environmental Monitoring and Research Center

TO: George E. Dials, Manager

In August 1995, the draft EA was sent to the State of New Mexico and the Mescalero Apache Indian Tribe for a 25 day review and comment period. One comment (attached) was received from the New Mexico Environment Department (NMED).

Based on the recommendation of the Management and Review Team and the, which included CAO Legal Counsel and the Albuquerque and CAO NEPA Compliance Officers, I request that you approve this environmental assessment (DOE/EA-1081), and sign the attached FONSI. Also attached for your signature is a reply to the NMED comment letter.

A copy of the EA; the concurrence sign-off from the Management and Review Team; the NMED letter and proposed reply (for your signature); and the proposed FONSI (for your signature) are attached.

Harold Johnson

Harold Johnson
NEPA Document Manager

Attachments