DOE/EA–0864

Hazardous Materials Testing At the Hazardous Materials Spill Center, Nevada Test Site

Environmental Assessment

September 2002

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List of Acronyms

BLEVE	Boiling Liquid Expanding Vapor Explosion
CAA	Clean Air Act
CCDAS	Command, Control, and Data Acquisition System
CFR	Code of Federal Regulations
CO	carbon monoxide
CWA	Clean Water Act
DNWR	Desert National Wildlife Refuge
DOE	Department of Energy
DOE/NV	Department of Energy, Nevada Operations Office
DOT	Department of Transportation
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FACE	Free Air CO_2 Enrichment
ft	foot
HSC	Hazardous Materials Spill Center
km	kilometers
m	meters
MBTA	Migratory Bird Treaty Act
NAC	Nevada Administrative Code
NDEP	Nevada Division of Environmental Protection
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NNSA/NV	National Nuclear Security Administration Nevada Operations Office
NTS	Nevada Test Site
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SAR	Safety Analysis Report
STEL	Short Term Exposure Level
TLV	threshold limit value
TSP	total suspended particulates
TWA	time-weighted average

EXECUTIVE SUMMARY

The U.S. Department of Energy National Nuclear Security Administration, Nevada Operations (NNSA/NV), proposes to continue the capability of conducting chemical release tests, sensor development and first responder training at the Nevada Test Site for the purpose of generating data needed to assess risks from accidental releases of hazardous materials. The testing would be conducted at the existing Hazardous Materials Spill Test Facility located on Frenchman Flat.

The Hazardous Materials Spill Test Facility (HSC) is located in Area 5, along the eastern edge of the Nevada Test Site, Nye county, Nevada, on the western edge of the desert playa, Frenchman Lake.

Chemical release tests were initiated at the site in 1986, and at that time the facility was known as the Liquefied Gaseous Fuels Spill Test Facility (LGFSTF). By the mid-1990's, subsequent tests and expansion of the capabilities of the LGFSTF prompted DOE to rename the facility to the Hazardous Materials Spill Test Facility to more accurately reflect current activities. Engineering controls are still instituted to limit downwind concentrations to predetermined values for each test. This accommodates testing of a wide variety of hazardous materials and, as in previous tests, minimizes safety risks to personnel and impacts to the environment.

This environmental assessment, as well as previous environmental assessments, draws extensively on the environmental assessment prepared by Lawrence Livermore National Laboratories in 1986 (DOE/EA-0309, 1986), especially for the description of the affected environment. New information has been added regarding the existing environment, current land use, air quality regulations, and current technology.

The "Environmental Assessment for Hazardous Materials Testing at the Liquefied Gaseous Fuels Spill Test Facility" (DOE/EA-0864, 1994) established limits for environmental exposures from planned releases of hazardous materials. It established the requirement that each facility customer submit to NNSA/NV a test plan containing pertinent information regarding each proposed test or series of tests. In this Environmental Assessment, parameters such as storage limits and time limitations have been clarified; terms such as test series have been defined; wind direction criteria and zone distances have been redefined; and, the scope of activities has been increased to include operations to enhance emergency response and counterterrorism training, such as sensor tests that utilize radioactive sealed sources and small burns to simulate fires. Various props such as empty tanker cars and excessed aircraft could be used to support fire and chemical release scenarios.

1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

The U.S. Department of Energy National Nuclear Safety Administration Nevada Operations (NNSA/NV) proposes to continue to maintain and operate the Hazardous Materials Spill Center (HSC), located on Frenchman Flat, at the Nevada Test Site (NTS), Nye County, Nevada. This Environmental Assessment (EA) identifies and discusses potential environmental impacts associated with the proposed action.

1.1 INTRODUCTION

This section provides background information about the purpose and need for NNSA/NV's proposed action and the proposal to continue operations at the HSC.

1.1.1 Background

The NNSA/NV, previously known as the Department of Energy/Nevada Operations (DOE/NV), is the Federal agency charged with operating and managing the NTS. In 1996, DOE/NV prepared a "Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada" (NTS EIS) (DOE, 1996a). The Record of Decision (ROD) for the NTS EIS stated: "This decision will result in the continuation of the multipurpose, multi-program use of the Nevada Test Site, under which DOE will pursue a further diversification of interagency, private industry, and public education uses while meeting its Defense Program, Waste Management, and Environmental Restoration mission requirements."

1.1.2 Purpose and Need

NNSA/NV has historically supported a variety of research and development activities at the NTS and at other locations in Nevada in cooperation with universities, industry, and other federal agencies. NNSA/NV continues to support ongoing non-defense research and development projects (DOE, 1996a). Research on the behavior and the safety aspects of chemical releases is conducted at the HSC.

The "Environmental Assessment for Hazardous Materials Testing at the Liquefied Gaseous Fuels Spill Test Facility" (DOE/EA-0864) (DOE, 1994) established limits for environmental exposures from planned releases of hazardous materials. It established the requirement that each facility customer submit to NNSA/NV a test plan containing pertinent information regarding each proposed test or series of tests. Tests conducted subsequent to issuance of DOE/EA-0864 (DOE, 1994), while being within the bounds of the EA, have demonstrated the need to clarify parameters such as storage limits and time limitations; define terms such as test series; and, redefine wind direction criteria and zone distances. The scope of activities would also be broadened to address current national needs for emergency response and counterterrorism training.

1.2 REGULATORY REQUIREMENTS

This section briefly describes the major laws, regulations, executive orders, and NNSA/NV orders that may apply to the proposed action and alternatives.

Clean Air Act of 1970 (CAA), as amended. The Clean Air Act, as amended, is intended to protect and enhance the quality of the nation's air resources so as to promote the public health and welfare and productive capacity of its population.

Clean Water Act (CWA). The Clean Water Act was enacted to "restore and maintain the chemical, physical, and biological integrity of the nation's water."

Endangered Species Act (ESA). This act prohibits the harming, harassing, or killing of any threatened or endangered species without authorization by the Secretary of the Interior. The threatened Mojave population of the desert tortoise is the only such species which occurs on the NTS. It is known to occur about 5 km northeast of the HSC in vegetated areas. In August 1996, the U.S. Fish and Wildlife Service (FWS) issued a Biological Opinion. The Opinion stated that NNSA/NV activities associated with Alternative 3 of the Draft Environmental Impact Statement for programmatic activities proposed to occur on the NTS within the next 10 years were not likely to jeopardize the continued existence of the Mojave population of the desert tortoise. Although not currently required under the 1996 Opinion, the Biological Monitoring Plan for the Hazardous Materials Spill Center will document, through field sampling along transects, the presence of tortoises and their sign in the downwind impact zone.

Executive Order 11988 (Floodplain Management). This order requires federal agencies to establish procedures to ensure that the potential effects of flood hazards and floodplain management are considered for actions undertaken in a floodplain.

Federal Land Policy and Management Act of 1976. This act governs the use of federal lands that may be overseen by various agencies and establishes procedures for obtaining land withdrawals and rights of way.

Hazardous and Radioactive Materials Transportation Regulations of the Department of Transportation (DOT). U.S. DOT Regulations at Title 49, Parts 100 through 178 of the Code of Federal Regulations (CFR) contain requirements for the identification of material as hazardous or radioactive. DOT regulations at 49 CFR 397 provide guidance to motor carriers for route selection.

Migratory Bird Treaty Act (MBTA). This act prohibits the harm of any migratory bird, their nest, or eggs without authorization by the Secretary of the Interior. There are over 20 bird species which are known to occur in Frenchman Flat that are protected under the MBTA. The Biological Monitoring Plan for the Hazardous Materials Spill Center will document the

activity of birds and presence of their nests within the downwind impact zone, either before and after each test, each series of tests, or quarterly each year depending upon the materials and quantities being tested.

National Environmental Policy Act of 1969 (NEPA). NEPA established the policy of promoting awareness of the consequences of major federal activities on the quality of the human environment, and consideration of the environmental impacts during the planning and decision-making stages of a project.

National Wildlife Refuge System Administration Act of 1966 (Refuge Act). This act forbids a person to knowingly disturb or injure vegetation or kill vertebrate or invertebrate animals, their nests, or eggs on System lands unless permitted by the Secretary of the Interior. The boundary of the Desert National Wildlife Range (DNWR), land administered within the System, is approximately 5 kilometers downwind of the HSC. The Biological Monitoring Plan for the Hazardous Materials Spill Center will be used to verify that approved tests do not result in downwind air concentrations of toxic chemicals that could harm biota on the DNWR.

Noise Control Act of 1972. The Noise Control Act, as amended, directs all federal agencies to carry out "to the fullest extent within their authority" programs within their jurisdictions in a manner that furthers a national policy of promoting an environment free from noise that jeopardizes health and welfare.

Resource Conservation and Recovery Act (RCRA), as amended. This act, and its implementing regulations at Title 40 CFR, Parts 260 through 273, provide the regulatory framework for "cradle-to-grave" control of hazardous waste by imposing strict management requirements on generators, transporters, and owners and operators of hazardous waste treatment, storage, and disposal facilities.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This section describes the proposed action and the no-action alternative under which the HSC would continue to operate under current conditions.

2.1 PROPOSED ACTION

The NNSA/NV proposes to continue to maintain and operate the HSC, located on Frenchman Flat, at the Nevada Test Site, Nye County, Nevada (Figure 1). Operations would continue to be programmatic, comprised of tests and test series. The scope of operations would be expanded to include testing that required the use of radioactive and biological sources. The HSC would also provide support for emergency response and counterterrorism training and would include sensor tests that utilize radioactive sources. Upgrades would be made to telecommunications, diagnostic systems and power supplies. Tests could be conducted adjacent to and in areas in the immediate vicinity of the HSC; i.e., not exclusively limited to the test bed areas defined in DOE/EA-0864 (DOE, 1994). Two empty railroad tanker cars located directly southeast of the test bed areas would be used as props for various training exercises. Other props such as excessed aircraft bodies could also be situated at the HSC for use in training exercises. Small-scale detonations and open burns that are on occasion an integral part of the tests would also be included. Wind direction criteria would be redefined to reflect current technology; chemical storage limits would be identified for large-scale versus smaller tests and the term “test series” defined to allow for interim storage of chemicals; time limitations for smaller releases would be addressed; and, one or more zones would be redefined for calculation of concentration limitations.

2.1.1 History of Development of the HSC

A detailed history of development of the HSC is provided in DOE/EA-0864 (DOE, 1994) and summarized below. The Environmental Assessments that were issued for each phase of development of the HSC appear in Appendix I.

The HSC is located in Area 5, along the eastern edge of the NTS, Nye County, Nevada, on the western edge of the desert playa, Frenchman Lake (Figure 2). Operations began in the early 80’s with assembly of a temporary facility at Frenchman Flat that conducted truck-load size release tests of liquefied ammonia and nitrogen tetroxide to better understand the hazards and problems associated with such releases. Subsequent tests included larger amounts of these chemicals, and in 1983, Congress appropriated funding for DOE to construct and operate a permanent facility that could accommodate other hazardous or toxic materials. In 1984, Frenchman Flat was selected as the location for the permanent facility. By 1986, operations included an expanded list of chemicals that could be released, including cryogenic fluids and noncryogenic fluids to simulate accidental releases. In addition, the concept of geographic concentration zones and monitoring phased tests was established. In recent years, the list of chemicals that could be released was expanded.

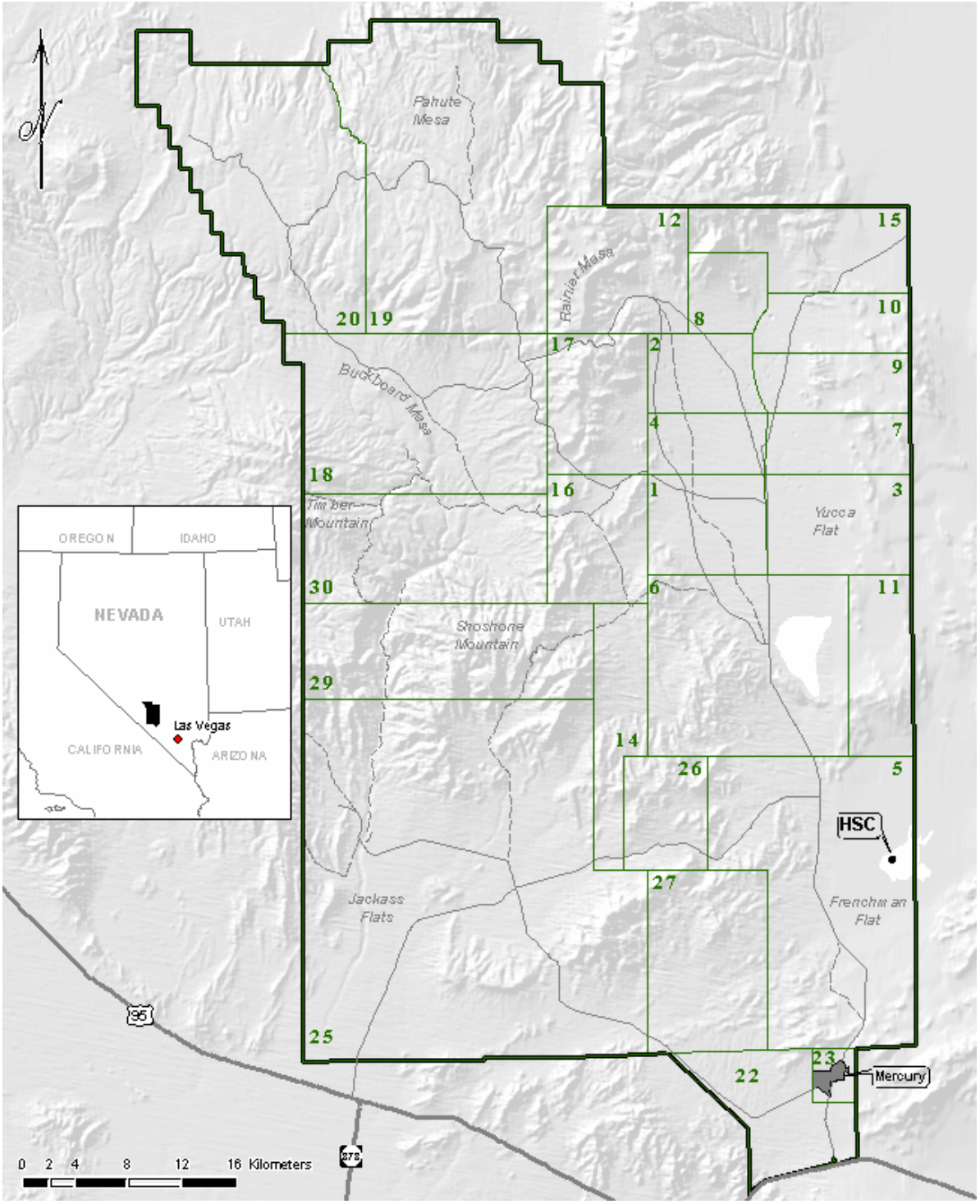

Figure 1. Site Area Map of the Hazardous Materials Spill Center

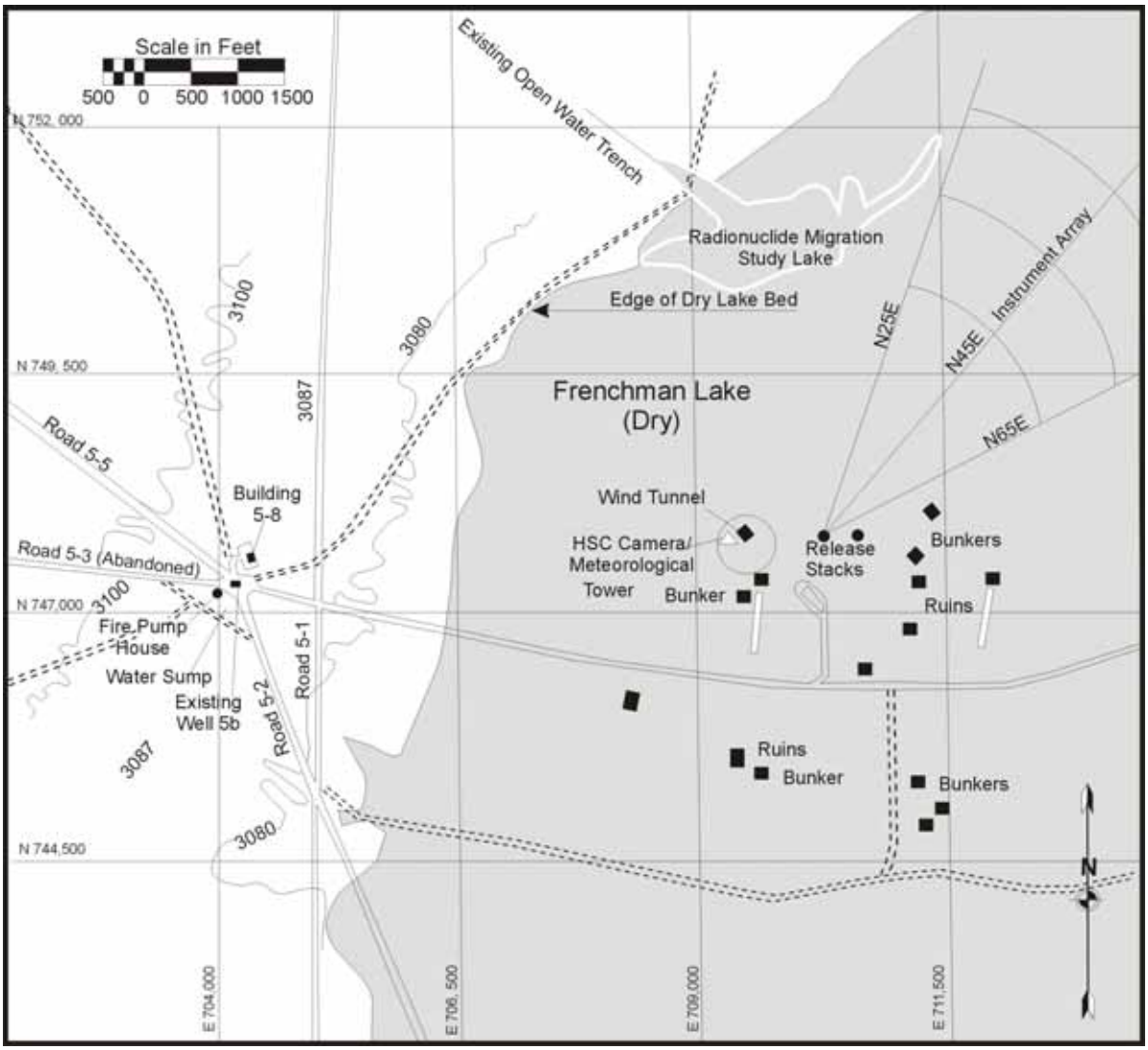

Figure 2. Location Map for the Hazardous Materials Spill Center

2.1.2 Description of the HSC

The HSC still retains its original capability for testing cryogenic materials. Facilities have been expanded and improved to accommodate tests of isothermal, aerosol-forming, and chemically reactive materials. Phenomena such as source definition, dispersion, rapid phase transition, pool fire, and vapor burn can be studied at the site. The facility is also capable of providing testing sites for chemical release control and mitigation techniques, and it has remote sensing and computer equipment to collect data that can be used to validate mathematical models of release and plume behavior. On-site facilities include a tank farm, a wind tunnel, chemical release pads, meteorological and camera towers, a control building, stacks to emulate chemical production facilities, and a personnel safety equipment building (Figure 3). Two empty railroad tanker cars that are used as props for various training exercises are located adjacent to and southeast of the facilities described above. There are four test areas that comprise the facility. These test areas are described in detail in DOE/EA-0864 (DOE, 1994) and summarized below:

1. Test Area 1 consists of a tank farm and contains the large-scale chemical release test facility. The tank farm includes a nitrogen storage and supply system and storage tanks for cryogenic and non-cryogenic fluids. A bulk chemical/storage area is located near the southeast corner of the tank farm, and was built according to National Fire Protection Association (NFPA) 30, "The Flammable and Combustible Liquids Code."

2. Test Area 2 is characterized by the presence of a wind tunnel built in 1988. The tunnel has a working chamber eight feet wide by 16 feet high by 96 feet long designed to test variable release rates and volumes.

3. Test Area 3 has two concrete chemical release pads that are available for smaller-scale releases. One pad is 16 feet square and the other is 40 feet by 70 feet. Previous tests at these locations have been conducted to provide hazardous material crew training and mitigation technique testing.

4. Test Area 4 consists of two stacks that are used to simulate a chemical production facility.

Tests at all four test areas, and from remote/portable release systems, are conducted and controlled from the Command, Control, and Data Acquisition System (CCDAS) building, located one mile northwest from the release point. A high-speed data link enables operators at the CCDAS to observe and control a chemical release and acquire diagnostic data from the meteorological towers, sensor array, photographic stations, and user-supplied portable sensor stations. The operational design of the CCDAS enables automatic shutdown of a test facility if a critical out-of-range condition, such as a failed pressure regulator, is detected. A personnel safety equipment building, located centrally near the four test areas, functions as a storage center for protective clothing and self-contained breathing apparatus. The building also contains emergency medical supplies, and rest areas for test personnel.

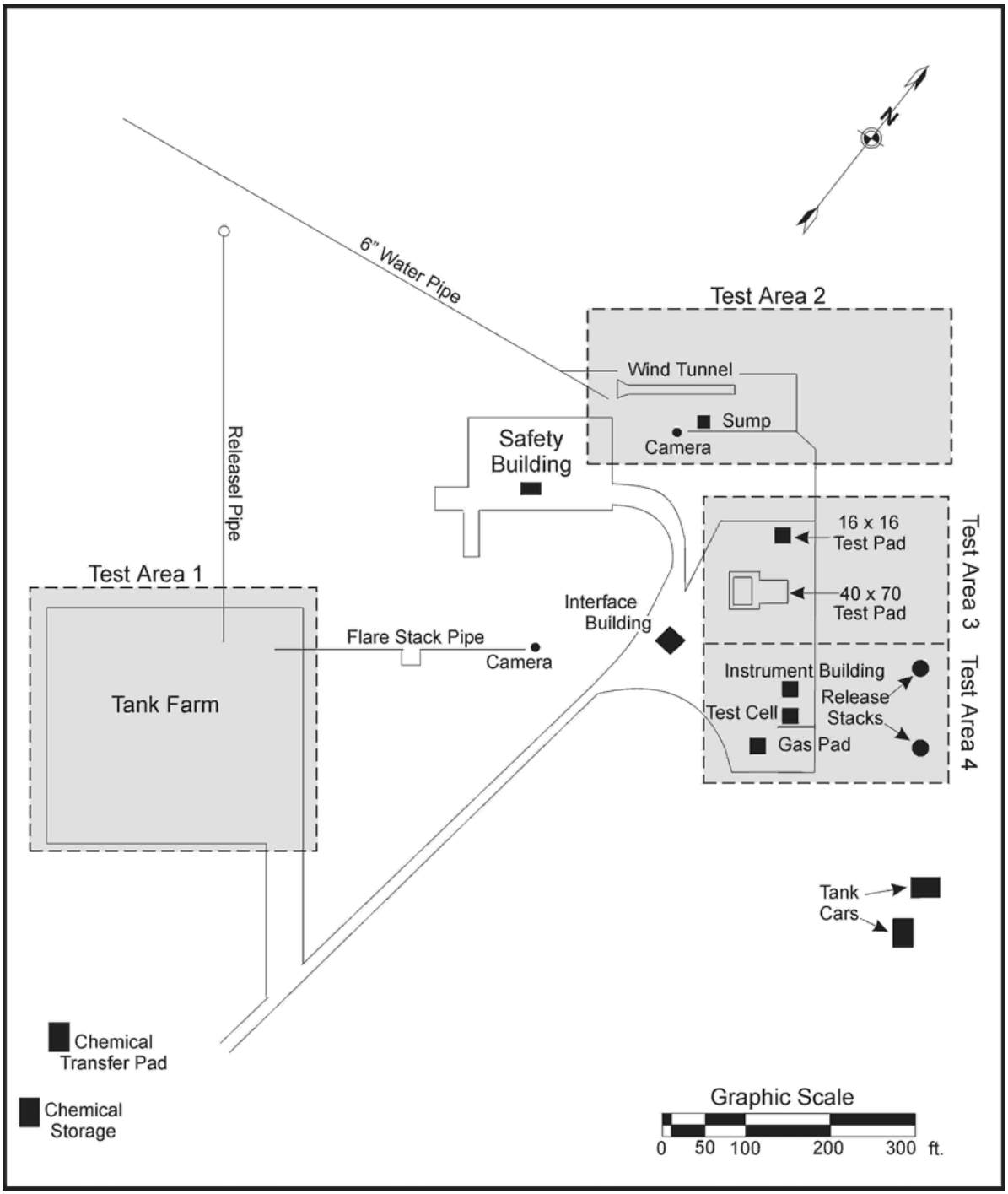

Figure 3. Site Layout of the Hazardous Materials Spill Center

2.1.3 Testing Program and Mitigation Measures

All tests at the HSC are conducted in a manner designed to protect the safety of workers at the facility and persons in uncontrolled areas, and to minimize exposure of biological resources to test materials. All tests are required to have operating procedures. Approval for each test is granted by NNSA/NV, through the recommendations of the HSC Program Manager and the appointed Operations Controller. The guiding principles for operating procedures that were first established in DOE/EA-0309 (DOE, 1986) were intended for large releases that had the potential for environmental impacts in downwind testing sectors. These principles have been modified to include smaller releases. These are:

1. No materials would be considered for testing that have cumulative, long-term persistence in the environment, unless the proponent of tests of such materials can show that the materials will be completely contained, neutralized, or cleaned up as part of the test plan.

2. Individual test releases that are of sufficient quantity and/or concentrations, with the potential for environmental impacts in downwind testing sectors would not exceed 15 minutes. Small releases that would not be of sufficient quantity and/or concentration to impact downwind sectors would not require a time limitation.

3. Sufficient time would be allowed between releases, as necessary, to permit the recovery of natural resources.

The basic approach for designing tests that can be conducted without serious consequences to the environment, first developed in DOE/EA-0225 (DOE, 1983) and later refined in DOE/EA-0309 (DOE, 1986) would also be retained. This approach combines simulated trajectory analysis from extensive meteorological data, results of previous dispersion tests at Frenchman Flat, standard air-quality criteria, occupational exposure limits, and HSC operations procedures to determine the boundaries of geographic impact zones.

In order to prevent the accumulation of hazardous materials stored at the HSC, quantities have been limited to that amount needed for one test series (DOE, 1994). Following the tests, materials are removed from the site. A “test series” has heretofore been assumed to be a sequence of like tests conducted within the same year. For those tests that are conducted for more than one year, chemicals must be removed from the site, and then brought back the following year. The end result is an ongoing purchase/removal cycle involving the same kind of chemicals. Because some chemicals are difficult and expensive to procure in small quantities, a test series is now defined to include like tests conducted over one or more years, so that chemicals may remain at the site until completion of that test series. Storage limits addressed in DOE/EA-0864 (DOE, 1994) would apply only to the largest testing activities where a large volume of chemical would be required to support an individual release. The amounts of chemicals required for smaller test series are far below the maximum allowable storage capabilities analyzed in DOE/EA-0864 (DOE, 1994).

Storage of chemicals in quantities that exceed state and federal threshold planning quantities would require reporting and paperwork in addition to what is already required.

2.1.3.1 Geographic Impact Zones

Three geographic zones were established that would confine the impacts of the largest planned tests of any material to a defined area. The fixed geographic boundaries would limit both the maximum quantity and the maximum rate of discharge. The zones are defined by downwind and lateral dimensions. These geographic impact zones, known as Zone I, Zone II, and Zone III, are described in Section 1.2.4.1 of the 1994 EA and summarized below. Zones I and II remain the same, while Zone III has been modified.

2.1.3.1.1 Downwind Dimensions

Maximum downwind concentrations of test materials for each zone were taken from governmental standards for human occupational exposures to hazardous materials. The zones were determined for a maximum exposure of 15 minutes. The 15-minute limit is valid for larger releases that have the potential for environmental impact in the downwind testing sectors, where there is natural vegetation and wildlife that could be affected. The 15-minute limit is not applicable to smaller releases of longer duration and no time limitation for these smaller releases is necessary, due to the minimal concentrations.

The downwind dimensions of the geographic impact zones are described in Table 1. Zone III is now defined as a constant distance rather than an elevation contour for calculation of concentration limitations. The elevation contour previously used was determined by the drainage of the Frenchman Basin to the northeast of the HSC. Because the elevations elsewhere in the Zone III sector are higher and wind patterns prevent the material from flowing though the mountains, a constant distance for the Zone III boundary is now used.

Procedures would differ for testing those materials that were not previously release tested in any quantity, harbored uncertainty in modeling predictions for expected downwind concentrations, or were to be released in large quantities. Tests for these materials would begin with small quantities, accompanied by extensive monitoring of downwind air concentration and its effect on wildlife and vegetation. Release quantities could be incrementally increased in well-monitored tests until predictions could be made with reasonable certainty that predicted concentrations would remain within the maximum allowed in the fixed geographic zones. Only then would that quantity of material be considered for the largest planned release. This phased approach was initially defined in DOE/EA-0309 (DOE, 1986).

Table 1. Summary of Downwind Dimensions

Zone	Location	Description
Zone I	From the release point to 5 km (3 miles) downwind, an area confined to the playa and the adjacent area, terminating before the Desert National Wildlife Range Boundary.	May contain lethal concentrations for exposures of less than 15 minutes to humans and wildlife.
Zone II	From the release point to 10 km (6 miles) downwind, an area which is confined within the Frenchman Flat basin and includes portions of the Desert National Wildlife Range and Nellis Air Force Range.	May contain concentrations for which an exposure of less than 15 minutes will have a low probability of mortality, but may cause respiratory damage to humans or animals.
Zone III	From the release point to 15 km (9 miles) downwind, which confines toxic concentrations to the Frenchman Flat basin and includes portions of the Desert National Wildlife Range and Nellis Air Force Range.	May contain concentrations that cause mild and reversible respiratory tract irritation on wildlife and minor and reversible effects on vegetation.

2.1.3.1.2 Lateral Dimensions

The lateral dimensions of the geographic impact zones are defined by the limitations of wind direction imposed by each test plan. The HSC is laid out such that the command building is located one mile due west and therefore upwind of the chemical release point with the assumption that the nominal wind direction is from 225 degrees, as determined from the assessment of wind data from Frenchman Flat (DOE/EA-0150, 1981). Test plans for larger releases, such as those conducted in 1986, required the wind direction to be within 225 ± 10º (DOE/EA-0309, 1986), but for the smaller, less toxic releases conducted in 1990 and 1991, test plans allowed the wind to vary from 225 ± 45º (DOE/EA-0407, 1989). Pretest modeling of small-scale (53 gallons was the worst-case scenario) releases of chlorine predicts dispersion to below the STEL (1 ppm) within two miles (Johnson and Swearengen, 1992). The only targets of concern for such a case would be the command building. Tests involving hazardous materials would never be conducted for winds blowing toward the command building, but small-scale tests could be conducted for light winds varying as much as 90º from 225º. Non-hazardous materials may be released in any direction upon the review and concurrence of the Operations Controller, Test Director, and Facility Owner. The closest target of concern at right angles to 225º is the Radioactive Waste Management Site, located four miles due north.

Wind direction requirements would be set for each test on a case-by-case basis. Modeling of Frenchman Flat wind data collected over three years (DOE/EA-0225, 1983) showed that the meander of all trajectories for wind direction 225º ± 10º was contained within a sector ± 35º from the mean wind direction. Figure 4a illustrates the example of geographic impact zones when the wind direction must not vary more than ± 10º from 225º; the lateral boundaries of the geographic impact zones in this case are set at ± 35º.

Figure 4b delineates the outer boundaries of Zone III for winds varying up to ± 90º from 225º. Only small-scale tests could be conducted under these conditions. In general, the STEL-level concentrations would be limited to three miles at ± 90º, six miles at ± 45º, and nine miles at ± 35º.

The general test conditions as revised from DOE/EA-0864 (DOE, 1994) (Table 1) are presented below in Table 2.

Table 2. General Test Conditions

Parameter	Conditions
Release Quantity	Planned release that may cause concentrations approaching the limits of the geographic impact zones must be preceded with small-scale release and extensive monitoring to demonstrate ability to predict concentrations.
Release Duration	15 minutes for large releases that have the potential for environmental impact in the downwind testing sectors where there is natural vegetation and wildlife that could be affected. Smaller releases of longer duration do not require time limitations.
Release Frequency	Releases predicted to cause concentrations approaching the limits of the geographic impact zones may be conducted up to two times per day. Smaller releases may be conducted at a greater frequency, to be determined by the Operations Controller, such that sufficient time is allowed between releases to allow environmental resources to recover. Guidance can be taken from the ACGIH (1991) recommendation that the STEL* not be exceeded by workers more than 4 times per day and that there should be at least 60 minutes between successive exposures at the STEL.
Wind Speed	1-minute average: Calm to 15 meters/second (33.5 miles per hour)
Predominant Wind Direction	260º to 190º for STEL* in Zone 3 (≤ 9 miles) 270º to 180º for STEL* in Zone 2 (≤ 6 miles) 315º to 135º for STEL* in Zone 1 (≤ 3 miles)

*STEL (Short-Term Exposure Level) is the maximum concentration allowed at the boundary of the controlled area, i.e., within the envelope of the geographic impact zones.

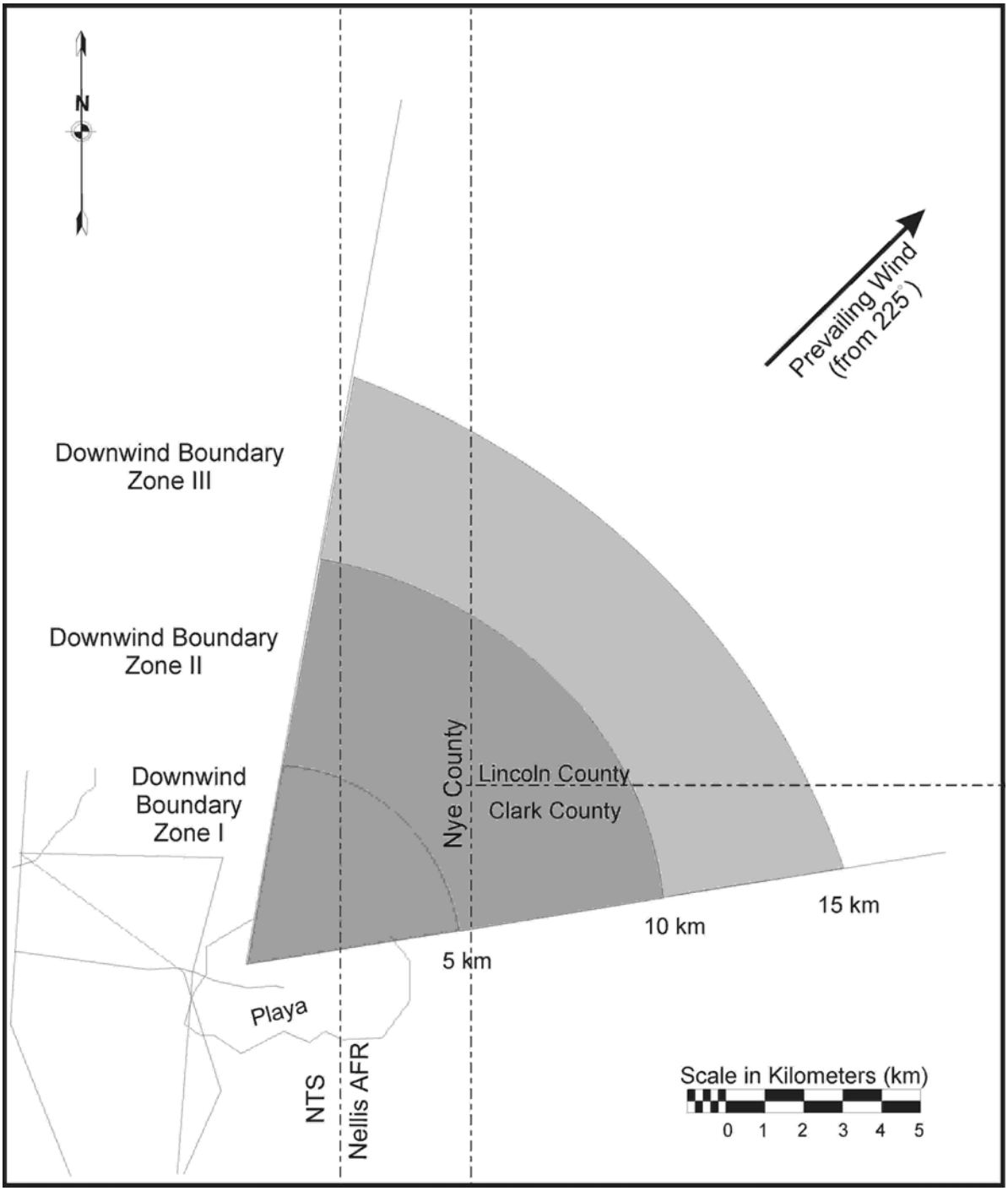

Figure 4a. Geographic Impact Zones and Downwind Boundaries

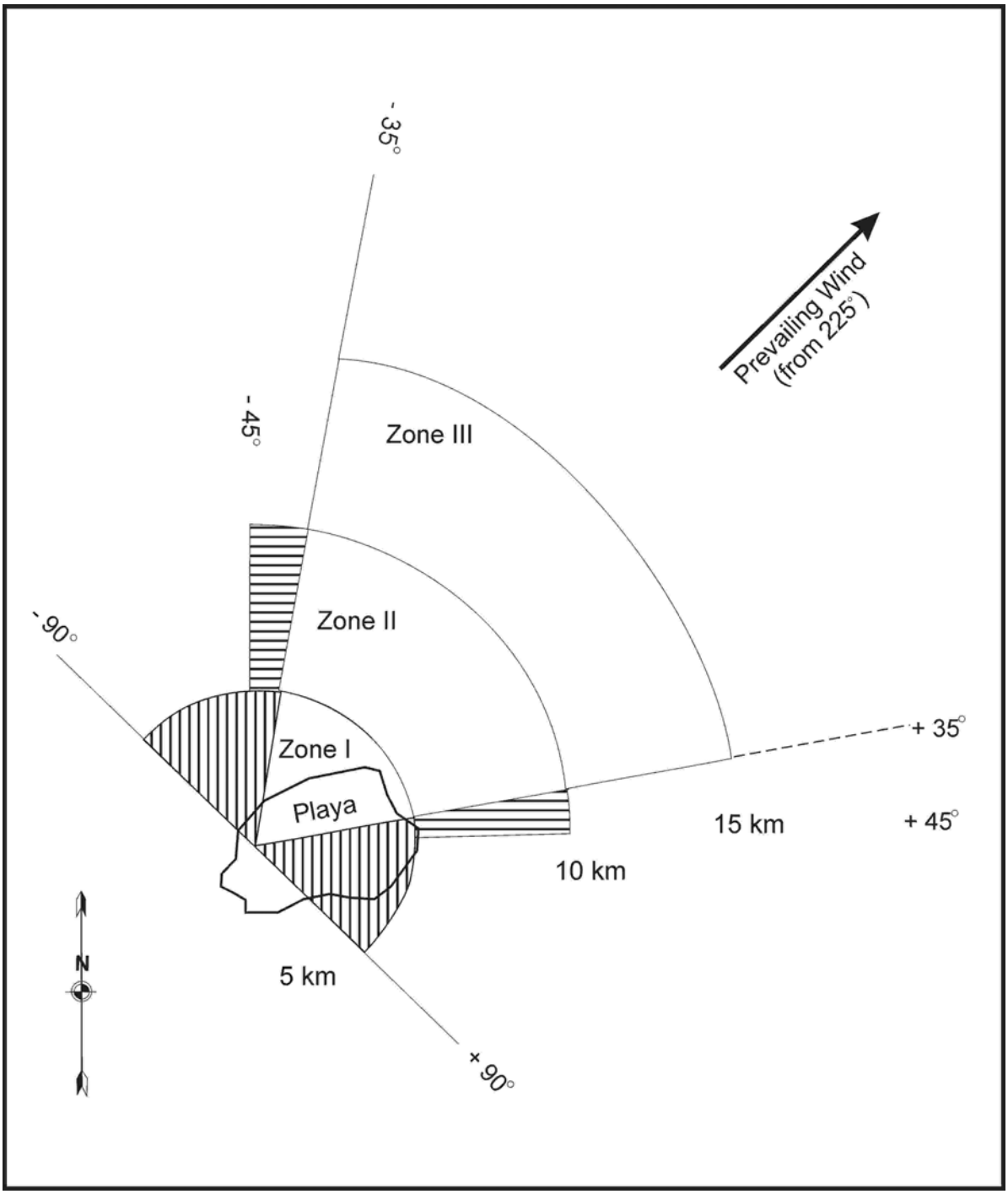

Figure 4b. Outer Boundaries of Zone III

2.1.3.2 User Documentation

NNSA/NV requires facility customers to furnish specific information to establish the test conditions and restrictions. The user estimates the expected emissions and exposures to environment, workers and the public under test conditions and under the scenario of a credible accident. These estimates must be less than the exposure limits specified in this EA.

A summary of customer procedures and required documentation is summarized below in Table 3. All the documentation would be presented to the Nevada Division of Environmental Protection (NDEP), as required in the HSC's Class II Air Quality Operating Permit, AP9711-0556.

Table 3. Documentation

Documentation	Description
Proposal Letter	User submits to NNSA/NV; describes tests, outlines reasons for tests.
Test Plan	User provides detailed description of proposed activity and objectives, expected exposure limits, planning information, and compatibility with this EA.
Safety Assessment Document	User identifies hazards of activity, potential accidents, and mitigation.
Test Management Summary	User provides information to make determinations regarding health and safety of NTS employees, consistency with intended use of facility, compliance with environmental regulations and this EA.
Conditional Approval Letter	Notice of acceptance issued by NNSA/NV following evaluation of customer's Test Plan, Safety Assessment Document and Test Management summary.

2.1.4 Decommissioning and Dismantling the HSC

The HSC would be maintained in a condition suitable for use and made available to users for as long as a need remains. When the facility is no longer needed, NNSA/NV would decommission and dismantle the facility to make the area safe for persons who may walk or work in the area and wildlife that may utilize the area.

Decommissioning and dismantling would include removal of equipment, wood-frame buildings, the wind tunnel, cabling, piping, fencing, and other property. Capital equipment would be salvaged and other materials that were not suitable for reuse would be disposed of in one of the NTS permitted landfills. The site would be surveyed for chemical contamination and items would be decontaminated, if necessary. Buried cable and pipes would be removed. The command building and its septic tank would be left intact, as would all paved roads and concrete pads.

After dismantling, the site could accommodate future development without the risk of workers encountering uncharted debris and hazardous materials. Remnants of the HSC program would include the command building, concrete pads, and roads. The decision to restore the site to the conditions predating these structures would be made at a later time.

2.2 NO ACTION ALTERNATIVE

The No Action Alternative identifies and describes impacts that would be expected to occur at the NTS if the HSC were to continue operating with its current limitations. Assessment of the no action alternative is required by DOE NEPA Implementing Procedures and Guidelines (Title 10 CFR 1021.321).

If the No Action Alternative were the preferred alternative, the HSC would continue to operate in a manner similar to that described in the previous EA and under the limitations of existing environmental review documents. Changes in technology and environmental regulations that have evolved subsequent to issuance of the 1994 EA would not be incorporated into HSC operations. The HSC would eventually cease to be a state-of-the-art research facility and its usefulness to prospective users would become increasingly limited.

3.0 AFFECTED ENVIRONMENT

The affected environment, as it pertains to the entire NTS, is described within the NTS EIS (DOE, 1996a) and referenced below. This section includes brief summaries of the affected environment in the vicinity of the HSC, as well as information on resources that have become available subsequent to issuance of the NTS EIS (DOE, 1996a).

Changes in operations that have necessitated an updated Environmental Assessment would not result in a change to the affected environment. Therefore, the environment that would be affected under the No Action alternative would be similar to that of the proposed action and that of previous operations at the HSC.

3.1 LAND USE

Section 4.1.1 of the NTS EIS (DOE, 1996a) discusses off-site land use and land use of other portions of the NTS. The HSC and surrounding area is located in the Research, Test, and Experiment Zone, as defined in the NTS EIS (DOE, 1996a). The Desert National Wildlife Refuge (DNWR), located approximately two miles east of the NTS/Nellis Air Force Range eastern boundary, was referenced in DOE/EA-0864 (DOE, 1994) as being managed by the Bureau of Land Management. The DNWR is managed by the U.S. Fish and Wildlife Service.

A detailed history of land use in the vicinity of the HSC can be found in Section 2.1 of DOE/EA-0864 (DOE, 1994). The HSC is located along the western edge of Frenchman Flat. Frenchman Flat was the site of a series of atmospheric nuclear weapons tests conducted during the 1950's and 1960's. Subsequent to issuance of the NTS EIS, the Free Air CO_2 Enrichment (FACE) Facility was established approximately two and one half miles south of the HSC. The facility is used to study the effects of elevated levels of atmospheric CO_2 on Mojave Desert vegetation.

3.2 CLIMATE

Existing air quality conditions at the NTS, including local climate, meteorology, and ambient air quality, are discussed in detail in Section 4.1.7 of the NTS EIS.

Frenchman Flat receives an average precipitation of approximately four inches per year. Average daily temperatures are lowest in January and highest in August. Large daily fluctuations in temperature are common, especially on the valley floor.

Regional wind patterns are modified by the terrain to produce the wind patterns of Frenchman Flat, and wind-flow patterns related to two nearby drainages exert considerable influence. During the summer, wind speeds at Frenchman Flat are generally light from midnight to almost noon, then increase rapidly by mid-afternoon, and then decline after nightfall. Average wind speeds are usually below 7 miles per hour.

3.3 AIR QUALITY

Air quality at the NTS is discussed in detail in Section 4.1.7 of the NTS EIS (DOE, 1996a).

Ambient air quality at the NTS is not currently monitored for criteria pollutants or hazardous air pollutants, with the exception of radionuclides. Elevated levels of ozone or particulate matter may occasionally occur because of pollutants transported into the area or because of local sources of fugitive particulates. There are no large sources of other pollutants nearby. The present air quality on the NTS is good.

3.4 WATER RESOURCES

Section 4.1.5 of the NTS EIS (DOE, 1996a) provides discussions of the distribution, characteristics, and quality of surface water and groundwater on the NTS.

In Frenchman Flat and much of the eastern portion of the NTS, the water table occurs generally in the alluvium and volcanic rocks above the regional carbonate aquifer. This area is underlain by the Ash Meadows sub-basin groundwater system. There are three water wells in Area 5. One of the wells is no longer used, while the other two wells are used to supply construction and potable water for Mercury and Area 5.

3.5 BIOLOGICAL RESOURCES

A discussion of the plant and animal communities of the NTS can be found in Section 4.1.6 of the NTS EIS (DOE, 1996a). A more detailed discussion of specific plants and wildlife common to Frenchman Flat is found in DOE/EA-0864 (DOE, 1994). An update to these sections is provided below and presents the most current vegetation classifications for Frenchman Flat and the current federal and state status of species known to occur on the NTS.

There are five shrubland alliances within Frenchman Flat which have been recently mapped (Table 4; Ostler et. al, 2000). They are shown below and are named for their dominant shrub species. Similar vegetation classification has occurred on the southern portion of the Nellis Air Force Range (Pritchett et.al, 1997)

Table 4. Shrubland Alliances in Frenchman Flat

Shrubland Alliance Name	Common Name
Larrea tridentata/Ambrosia dumosa	Creosotebush/white burrobush
Atriplex confertifolia/Ambrosia dumosa	Shadscale saltbush/white burrobush
Atriplex spp.	Saltbush
Lycium shockleyi/Lycium pallidum	Shockley's desert thorn/rabbit thorn
Coleogyne ramosissima	Blackbrush

There are no known plant species on the NTS that are listed as threatened or endangered under the Endangered Species Act (ESA). Five plant species occur within Frenchman Flat which are currently considered "species of concern" by the U.S. Fish and Wildlife Service Service (FWS) but have no formal status or any protection under the ESA. These plants include *Astragalus funereus*, *Camissonia megalantha*, *Cymopteris ripleyi*, var. *saniculoides*, *Phacelia beatleyae*, and *Phacelia parishii*. No known locations of these plants occur within any of the three geographic impact zones of the HSC (Blomquist, et. al, 1995).

No native fish or amphibian is known to occur within or around the HSC (Wills and Ostler, 2001).

The desert tortoise is protected as a threatened species under the ESA, and the HSC lies within the range of the desert tortoise on the NTS. However, the FWS has concurred with DOE/NV's determination that Frenchman Lake playa and its surrounding habitat on the NTS is poor tortoise habitat. *The Final Programmatic Biological Opinion for Nevada Test Site Activities* issued to DOE/NV by the FWS in fact excludes this portion of Frenchman Flat on the NTS from compliance with the terms and conditions of the Biological Opinion. The FWS concurred that the HSC lies within an area where tortoises are absent and not expected to occur (FWS, 1996). At target sites of the South Range of NAFR, desert tortoise densities are described as very low to low (FWS, 1997).

The chuckwalla is the only reptile "species of concern" that occurs on the NTS. It inhabits rock outcrops and boulders within the southern portion of the NTS and is not expected to occur within the HSC impact zones (Steen et. al, 1997).

Among birds, there are currently one endangered (brown pelican, *Pelecanus occidentalis*), one threatened (bald eagle, *Haliaeetus leucocephalus*, and one proposed threatened species (mountain plover, *Charadrius montanus*) that have been sighted on the NTS but have not been sighted near the HSC. Many bird species, all protected under the Migratory Bird Treaty Act, are frequently observed around the sumps at water wells 5b and Ue5c outside of the impact zones. Nine bird "species of concern" occur on the NTS (Wills and Ostler, 2001), but only one of these (western burrowing owl, *Athene cunicularia hypugea*) is common to Frenchman Flat (DOE, 1994).

No mammals of the NTS are protected under the ESA as threatened or endangered. Only one bat species (spotted bat, *Euderma maculatum*) is state-protected, but it appears to frequent only Great Basin Desert habitats in the northern third of the NTS (Hall, 2000). There are two bat "species of concern" (small-footed myotis, *Myotis ciliolabrum* and Yuma myotis, *M. yumanensis*) that have been detected at water sources in Frenchman Flat. These water sources include sewage lagoons at the Device Assembly Facility and the Radioactive Waste Management Site and at drill sumps at drill holes ER5-4 and ER5-3 located within 8 km of HSC. Both lagoons are in the process of being closed and replaced with septic systems, which will eliminate two of the bats' water sources.

3.6 CULTURAL RESOURCES

A discussion of cultural resources throughout the NTS may be found in Section 4.1.10 of the NTS EIS (DOE, 1996a).

Studies have shown that the impact area within the Frenchman Flat basin is clear of archeological and cultural sites.

3.7 GEOLOGY AND SOILS

Section 4.1.4 of the NTS EIS (DOE, 1996a) provides a discussion of the geology, natural resources, and natural hazards of the NTS.

4.0 ENVIRONMENTAL CONSEQUENCES

This section identifies the direct and indirect environmental consequences of the proposed action and the No Action alternatives considered by NNSA/NV. The level of each analysis for each resource area is based upon the potential magnitude of the environmental effect.

Environmental consequences resulting from the No Action alternative would be the same as those resulting from previous operations at the HSC that were discussed in DOE/EA-0864 (DOE, 1994) and in most cases similar to the proposed action. The discussion in the subsections below is summarized from DOE/EA-0864 (DOE, 1994) and expanded where appropriate to include environmental effects from the proposed action.

4.1 LAND USE

Land use within the designated boundaries of the HSC would not change; adjacent areas that could be used to support HSC tests do not contain other facilities or activities. Adjacent areas that would possibly be used are within the same Land Use Zone; i.e., the Research, Test and Experiment Zone.

4.2 AIR QUALITY

The discussion in this section is summarized from DOE/EA-0864 (DOE, 1994) with the addition of current information pertaining to air quality permitting and open burn variances.

The nearest non-attainment area for carbon monoxide (CO) and total suspended particulates (TSP) is the Las Vegas Valley, which is over 60 miles away. The quantity of TSP and CO produced by the planned or accidental ignition of a large quantity of flammable test material, such as a liquefied volatile hydrocarbon, at the HSC, cannot be estimated with precision, but it is not expected that it would impact the overall air quality of the surrounding area or that of the Las Vegas Valley.

Nevada state law defines a substance as a toxic-regulated air pollutant "if the commission determines that it causes or contributes to air pollution which may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible or incapacitating reversible illness, unless a federal standard for the quality of ambient air, standard for the quality of ambient air adopted by the commission, new source performance standard or national emission standard for hazardous air pollutants applies." (Nevada Administrative Code (NAC) 445B.339.) Calculation of acceptable concentrations of each substance by determining the threshold limit value (TLV) time-weighted average (TWA) is no longer valid.

The Operations Controller will ensure through administrative and engineering controls that no one who is not associated with the release test could enter any area that modeling predicted would experience an exposure greater than the state of Nevada acceptable

concentration. Only the largest release tests would require a buffer zone beyond the already established Geographic Impact zones to ensure compliance with the State of Nevada regulations. This buffer zone could easily be provided within the combined boundaries of the NTS and Nellis Air Force Range, both of which maintain restricted access.

Smoke may result from ignition and burn tests of some chemicals or fuels for production of smoke plumes. Although the potential for range fires is low in most years, it would be assessed for each planned test (DOE, 1994). A state of Nevada Open Burn Variance would be obtained in the event that tests were likely to produce smoke.

The state of Nevada Class II Operating Permit for the HSC requires that:

1. A test plan must be submitted to the Bureau of Air Quality at least 15 days before the planned test. A letter of approval will be issued on a case-by-case basis.

2. Monitoring and recording quantities of test chemicals and estimated emissions of regulated and hazardous air pollutants must be performed.

3. A copy of the final analysis of each chemical release test will be submitted to the Bureau of Air Quality within 180 days of completion of the test.

4. The Bureau of Air Quality must be notified within 24 hours of any malfunction or upset of the process, or during start-up or shutdown of the process that resulted in excess emissions, and provide written follow-up within 15 days.

By its nature as a research facility, the HSC provides no air quality controls. The impact of any allowable release chemicals is minimized by controlling the amount and duration of the release. When chemical release tests are conducted, plumes pass through an instrument array and impacts are confined to a defined area. Predictions of impacts for each test are reliable because of extensive meteorological data that is available on wind direction, wind speed, standard deviation of wind direction, vertical turbulence, temperature, humidity, and barometric pressure. In turn, post-release monitoring is used to document the degree of actual impact.

4.3 WATER RESOURCES

Biological agents such as *Bacillus thuringiensis* that would be used in transport and effluent studies to seed a streambed for transport studies are harmless and would not pose a threat to surface water or groundwater. Surface water and groundwater would not be affected under either the proposed action or the No Action alternative.

4.4 BIOLOGICAL RESOURCES

Biological resources within the designated boundaries of the HSC would not undergo any additional effects as a result of continued HSC operations or the proposed action. Consequences to wildlife of conducting chemical release tests are discussed in DOE/EA-0864 (DOE, 1994) and summarized below in Table 5. A Biological Monitoring Plan for Hazardous Materials Testing at the Liquefied Gaseous Fuels Spill Test Facility (DOE, 1996b) was developed to prescribe biological monitoring "for those chemicals for which there are uncertain modeling predictions of downwind air concentrations, that have not been tested before, or that have not been tested in large quantities." Routine biota monitoring is also implemented, as necessary, to validate compliance with pertinent federal legislation, including the Migratory Bird Treaty Act. The Biological Monitoring Plan states that "Any harm to birds observed will be reported to the U.S. Fish and Wildlife Service (FWS), and tests will be modified to prevent any future harm to migratory birds." If such tests cannot be modified, NNSA/NV will consult with FWS for guidance.

Different kinds of fires from the chemical release tests could produce vegetative fire hazard zones. Mitigations such as the construction of fire lines might be necessary, depending on the size and location of the expected fireball. Fire often kills top growth, but re-sprouting occurs from both crowns and roots. Fire does not appear to kill seeds in the soil, which eventually grow to revegetate a burned area. Mitigations for wildlife, in addition to the construction of fire lines, would be similar to mitigations for chemical release tests.

The operating constraints for tests at the HSC are imposed to ensure that no adverse impacts to human health occur and that exposure of biological resources to test materials is minimized. Vegetation and wildlife are rare on Frenchman Lake playa where lethal chemical concentrations would occur for short intervals. At distances further downwind off the playa, the expected low probability of wildlife mortality and temporary non-lethal impacts on vegetation are considered minimal.

In addition to the specific mitigation actions listed in Table 5, biological monitoring to evaluate the effects of individual tests or test series will be conducted as necessary to validate the facility's compliance with pertinent federal legislation regarding biological resources. The National Wildlife Refuge System Administration Act of 1966 (Refuge Act) forbids a person to knowingly disturb or injure vegetation or kill animals, their nests, or eggs on System lands unless permitted by the Secretary of the Interior. The boundary of the DNWR, land administered within this System, is approximately 5 km downwind of the HSC. The biological monitoring plan (DOE, 1996b) prescribes routine, low-level monitoring of downwind and control plots three times a year to establish baseline conditions of the flora and fauna and to verify that no significant impacts to wildlife or vegetation is occurring, particularly over time, on DNWR.

Table 5. Potential Effects of Chemical Release Tests on Biological Resources

Geographic Impact Zone	Potential Effects of Release Tests	Mitigation
Zone I (3 miles)	Exposure to potentially lethal concentrations	Reptiles/rodents/birds – none (species are abundant, widespread, any mortality would be rapidly counterbalanced through reproduction, immigration from surrounding habitat Desert tortoise – none – not known to inhabit Zone I Large mammals/kit fox/western burrowing owl/waterfowl – visual check of area, scare away, remove man-made structures prior to testing Vegetation - none – almost no vegetation in Zone I
Zone II (6 miles)	Possible temporary discomfort or reversible damage to respiratory system	Desert tortoise/kit fox/western burrowing owl – none - gas concentrations would be relatively low, no adverse impacts expected Vegetation – None – Concentrations in Zone II would not likely harm vegetation
Zone III (9 miles)	Mild respiratory tract irritation, possible minor lung damage	Wildlife – none – bighorn sheep habitat is located beyond Zone III, although sheep may pass through area SE of zone to obtain water. Vegetation – None – Concentrations in Zone III would not likely harm vegetation

The Migratory Bird Treat Act (MBTA) prohibits the harm of any migratory bird, their nest, or eggs without authorization by the Secretary of the Interior. There are over 20 bird species which are common in Frenchman Flat that are protected under the MBTA. No significant adverse impacts on these birds is anticipated. Implementation of the routine, low-level monitoring component of the biological monitoring plan (DOE, 1996b) will document compliance with the MBTA.

4.5 CULTURAL RESOURCES

Because no archeological or cultural resources have been identified within the impact zones, there would be no effects from ongoing operations at the HSC. Cultural surveys would be conducted in any undisturbed adjacent areas that were used to support HSC tests, if these areas were not previously surveyed.

4.6 GEOLOGY AND SOILS

It is unlikely that impacts to soil will occur from testing. No chemicals would be released directly on the ground or lakebed; a concrete release pad or plastic liner would be provided to prevent direct contact with soil. However, if any test residue that is determined to be hazardous by the Test Director or the Facility Owner should reach the soil, and if the Operations Controller's Test Safety Advisory Panel concurs, the residue would be removed from the playa or surrounding soil after a chemical release test. The HSC customer is responsible for cleanup operations.

4.7 HUMAN HEALTH EFFECTS

The NTS EIS (DOE, 1996a) contains analyses of chemical exposures, occupational injuries, and illnesses for the entire NTS workforce.

Exposures to chemicals and toxic materials are of primary concern at the HSC. The geographic impact zones that were defined in DOE/EA-0864 (DOE, 1994), and summarized in Section 2.1.3.1 of this EA, were established by using governmental standards for human occupational exposures to hazardous materials to establish maximum downwind concentrations of test materials for each zone. The zones were determined for a maximum exposure of 15 minutes, based on a 15-minute STEL.

Section 4.2 of this EA includes a discussion of toxic contaminants as they relate to public health and safety. Methods of mitigation, such as air monitoring and operational procedures, are also described.

5.0 CUMULATIVE EFFECTS

Cumulative effects are the consequences of multiple impacts, each of which could be insignificant, but when taken together, become potentially significant. The chemical release testing program would consist of a series of tests, each designed to have an insignificant effect on the environment. The current test procedures require that the frequency and duration of test releases be low enough to avoid cumulative impacts. A recovery period is specified between those tests that are of such magnitude that they might have a probable effect on plants or animals. This procedure assures that the capacity of the environment to recover is not exceeded.

Because all the test materials will be volatile, they will not accumulate in the soil. Neither plants nor animals accumulate such materials in their body tissues; therefore, effects are limited to acute exposures. Fluoride concentrations in plants did not change after exposure to hydrogen fluoride (Hunter, et al., 1991). Residue resulting from neutralizing agents and vapor suppressants will be cleaned up. These tests would be conducted on a lined, concrete release pad, not on bare soil.

The total quantity of repeated releases of test materials would not cause a measurable increase in air pollution in areas where the public has access. The chemicals disperse rapidly. During 1990, releases of up to 2,000 pounds of various chemicals were not detected by Environmental Protection Agency (EPA) monitors at the NTS boundary (Hunter et al., 1991).

The cumulative impact of chemical release testing with the impacts from past atomic bomb testing on Frenchman Flat would consist of a potential for re-entraining radioactive soil or dust into the air. This is likely only if a large fire or explosion were to take place over the radioactively contaminated areas or "hot spots." The locations of these hot spots make such an event unlikely, but if it were to happen, the maximum air concentration of ^{240}Pu has been calculated to be insignificant, by a factor of 1,000, compared to protective guidelines (DOE, 1986).

The quantity of containerized test materials to be stored at the site would be limited to that amount needed for one scheduled test series; a test series could include like tests conducted over more than one year.

6.0 MITIGATION MEASURES

Mitigation measures are required for resources that would have major adverse impacts as a result of the proposed action or alternative action. The potential for exposure to lethal concentrations of toxic contaminants is greatest in the Zone I geographic impact zone. Mitigation measures for biological resources were discussed in Section 4.4 (see Table 4) and include performing visual checks and removing man-made structures to discourage the presence of wildlife. Human health effects would be minimized by limiting release quantities, release duration, release frequency, wind speed, and wind direction. These are, in fact, the parameters that comprise the general test conditions.

7.0 RISK OF CREDIBLE ACCIDENTS

The HSC test procedures and customer test documents (See Section 2.1.3.2) are designed to minimize the chance of injury to personnel working on the site. The bounding analysis used here contemplates several accident scenarios that can serve to illustrate the magnitude of the most severe credible release of hazardous materials and/or damage from fire or explosion. Accidents that could occur under the No Action Alternative would be similar to those of the proposed action.

7.1 UNPLANNED RELEASES

Risk from unplanned releases can be minimized by not allowing more test material on site at a given time than is necessary to support the release from a single test or series of like tests (See Section 2.1.3). Credible accident scenarios were summarized in Table 8 of DOE/EA-0864 (DOE, 1994) and generally include tank failure with resulting loss of contents due to rupturing, valve failure, or collision damage. The consequences of these events would be equivalent to the largest planned release; i.e., the capacity of the tanks. If the scenarios included a fire, damage to the facility and injuries to workers could also result.

Workers involved with the chemical release tests wear protective equipment such that accidental releases would not be life threatening. Fire or explosion, however, could be a dangerous situation, even with protective equipment. The rigorous procedures that are followed for each test are intended to preclude most accidents. Failure to follow the procedures could result in a serious accident.

7.2 FIRE AND EXPLOSION

The probability of fire or explosion from HSC operations is remote as is the exposure of the facility to a fire or explosion from an external source. Risk of fire or explosion can be minimized by (1) segregating incompatible chemicals during storage, handling and testing, and (2) by isolating flammable/combustible liquids from flames or sparks.

Chemicals are stored according to compatibility. Flammables/combustibles are grounded and bonded during storage, transfer and testing. Workers involved with chemical testing are trained on the hazards, to include fire and explosion, of the chemicals on hand. Chemical storage, transfer and testing areas are posted “No Smoking.” Those activities using flammables/combustibles are approved and frequently inspected.

8.0 GLOSSARY

Ambient air. That portion of the atmosphere, outside of buildings, to which the general public is exposed.

Endangered Species. A species of possible management concern due to their restricted distribution or the potential for habitat disturbance.

Environmental Impact Statement. A detailed written statement that helps public officials make decisions that are based on understanding of environmental consequences and to take actions that protect, restore, and enhance the environment.

Groundwater. Subsurface water within the zone of saturation.

Hazardous Wastes. Wastes designated as hazardous by Environmental Protection Agency or State of Nevada regulations. Hazardous waste, defined under the Resource Conservation and Recovery Act, is waste from production or operation activities that pose a potential hazard to human health or the environment when improperly treated, stored, or disposed.

Mitigation. Actions and decisions that (1) avoid impacts altogether by not taking a certain action or parts of an action, (2) minimize impacts by limiting the degree or magnitude of an action, (3) rectify the impact by repairing, rehabilitating, or restoring the affected environment, (4) reduce or eliminate the impact over time by preservation and maintenance operation during the life of the action, or (5) compensate for an impact by replacing or providing substitute resources or environments.

Particulate. Fine liquid or solid particles such as dust, smoke, mist, fumes, or smog found in air or emissions.

Playa. A dry, vegetation-free, flat area at the lowest point of an undrained basin.

Record of Decision (ROD). A public document that explains which cleanup alternative would be selected for the area of concern.

Short Term Exposure Level (STEL). A 15-minute time-weighted average exposure which should not be exceeded at any time during a work day. Exposures at the STEL should not be longer than 15 minutes and should not be repeated more than four times per day. There should be at least 60 minutes between successive exposures at the STEL (ACGIH, 1991).

Significant. The common meaning of significant is; “having or likely to have considerable influence or effect.” As it pertains to the National Environmental Policy Act, “significant” requires that both context and intensity be considered in evaluating impacts (40 CFR Part 1508).

9.0 REFERENCES

Regulations, Orders, and Laws

10 CFR Part 1021	U.S. Department of Energy, "Energy: Compliance with the National Environmental Policy Act," *Code of Federal Regulations,* Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, D.C., 1992.
10 CFR Part 1021.331	U.S. Department of Energy, " Energy: Mitigation Action Plans," *Code of Federal Regulations*, Office of Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, D.C., 1995.
29 CFR Part 1910	U.S. Department of Labor "Labor: Occupational Safety and Health Standards," *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, D.C., 1993.
40 CFR Part 1500-1508	Council on Environmental Quality (CEQ), "Protection of the Environment: Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act," *Code of Federal Regulations,* Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, D.C., 1993.
49 CFR Part 172.101	U.S. Department of Transportation, Transportation of Hazardous Materials, Code of Federal Regulations, Office of the Federal Register, National Archives and records Administration, U.S. Government Printing Office, Washington, D.C., 1995
NAC 445B.339	State of Nevada, Nevada Administrative Code, Air Controls, Chapter 445B, Section 339, "Identification of Substances" 1996.
NEPA	National Environmental Policy Act, Public Law 91-190, 42 U.S.C. 4341 et seq., amended by Public Law 94-52 and 9483, 1969.

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DOE, 1996b — U.S. Department of Energy, "Biological Monitoring Plan for Hazardous Materials Testing at the Liquefied Gaseous Fuels Spill Test Facility on the Nevada Test Site," Las Vegas, NV, 1996.

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APPENDIX I

SUMMARY OF ENVIRONMENTAL ASSESSMENTS FOR THE HAZARDOUS MATERIALS SPILL CENTER

Table I. Summary of Environmental Assessments for HSC

DOE/EA Number	Year Issued	Title	Description
0150	1981	Environmental Assessment for a Liquefied Natural Gas Spill Test Facility	Construction and operation of temporary small-scale test facility
0225	1983	Environmental Assessment for Spill Tests of NH_3 and N_2O_4 at Frenchman Flat	Increased the number of tests and chemicals used; established downwind concentration zones
0309	1986	Environmental Assessment for the Liquified Gaseous Fuels Spill Test Facility at Frenchman Flat, Nevada Test Site	Facility now considered permanent; established geographic concentration zones and 15-minute release time
0360	1988	Environmental Assessment for the Spill Testing of Bromine, Methylamine, Phosphorous Oxychloride and Phosphorous Trichloride at the Liquefied Gaseous Fuels Test Facility, Frenchman Flat, Nevada Test Site	Added four chemicals to list of approved test materials; user required to submit toxicity data and modeling results
0407	1989	Environmental Assessment, Liquefied Gaseous Fuels Spill Test Facility Program, Eleven Additional Chemicals	Finding of No Significant Impact (FONSI) issued to conduct small-scale tests to simulate accidental releases of eleven additional chemicals
0864	1994	Environmental Assessment for Hazardous Materials Testing at the Liquefied Gaseous Fuels Spill Test Facility	Established general limits for environmental exposures from planned releases of hazardous and toxic materials