



**Additional Facilities at the
National Missile Defense
Ground-Based Interceptor Development
and Integration Laboratory
Huntsville, Alabama**

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Environmental Assessment

March 1999

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19. ABSTRACT (Continue on reverse if necessary and identify by block number) The Ballistic Missile Defense Organization proposes to install a launch cell simulator site adjacent to Boeing's National Defense (NMD) Ground-Based Interceptor Development and Integration Laboratory (GDIL), located at its Jetplex facility in Huntsville, Alabama. The purpose of the proposed action is to provide an interface between a launch cell simulator and its support equipment and other NMD hardware and software. This will enable the NMD program to improve interceptor missile design and simulate many operational scenarios before significant program resources are committed to the flight test program.					
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**ADDITIONAL FACILITIES AT THE NATIONAL MISSILE DEFENSE GROUND-BASED
INTERCEPTOR DEVELOPMENT AND INTEGRATION LABORATORY HUNTSVILLE,
ALABAMA ENVIRONMENTAL ASSESSMENT**

UNITED STATES ARMY SPACE AND MISSILE DEFENSE COMMAND

AGENCY: Ballistic Missile Defense Organization (BMDO)

ACTION: Finding of No Significant Impact

BACKGROUND: Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (40 CFR 1500-1508), Department of Defense Directive 6050.1, and Army Regulation 200-2, the USASMDC has conducted an Environmental Assessment (EA) of the potential environmental consequences of installing and operating additional facilities at the National Missile Defense (NMD) Ground-Based Interceptor Development and Integration Lab (GDIL) Facility at the Boeing Jetplex Facility, Huntsville, Alabama.

The Department of Defense (DoD) has designated the NMD system a major defense acquisition program. The Ballistic Missile Defense Organization (BMDO) has responsibility within DoD to manage the NMD program. In addition to the ground-based interceptor missiles, other NMD system elements include ground-based sensors; command, control, and communication links; and potential future space-based sensors. As part of its acquisition strategy, BMDO has selected The Boeing Company as the Lead System Integrator to develop the NMD system in preparation for a deployment decision. BMDO has proposed building additional facilities adjacent to Boeing's NMD GDIL facility to enable it to conduct simulations and testing of the various components of the ground-based interceptor element prior to flight testing.

The purpose of the proposed action is to provide an interface between a launch cell simulator and its support equipment and other NMD hardware and software to enable the NMD interceptor missile system to undergo simulations, testing, training and element interface checkout. This will enable the Program to improve interceptor missile design and to simulate many operational scenarios before significant program resources are committed to the flight test program.

The proliferation of weapons of mass destruction and technology of long-range missiles is increasing the threat to our national security. The purpose of the NMD program is defense of the United States (all 50 states) against a threat of a limited strategic ballistic missile attack from a rogue nation. Such a system would also provide some inherent capability against small accidental or unauthorized launch of strategic ballistic missiles from more capable nuclear states.

DESCRIPTION OF THE PROPOSED ACTION: A launch cell simulator site will be located adjacent to Boeing's NMD GDIL, which is located in Building 48-20 at its Jetplex facility in Huntsville, Alabama. This new installation would interface with other GDIL equipment and facilities to simulate the performance of an operational Ground-Based Interceptor system. The launch cell simulator site would include a launch cell to accommodate a simulated interceptor in its canister, an interface vault, an asphalt paved area around the launch cell, site utility distribution, and auxiliary mechanical/electrical equipment to support the launch cell simulator/interface vault.

Site preparation for the missile launch cell simulator/interface vault would involve excavating a hole approximately 23.8 meters (78 feet) deep and 5.0 meters (16.5 feet) in diameter for the launch cell. A construction liner or casing would support the hole until installation of the launch cell. The launch cell is a prefabricated structure approximately 21.3 meters (70 feet) long with an outer diameter of 3.4 meters (11 feet), including insulation and stiffeners. Excavation for the interface vault would require a hole 5.5 meters (18 feet) deep, with sides 4.6 meters wide by 6.1 meters long (15 feet wide by 20 feet long) immediately adjacent to the launch cell hole. Excavation would be accomplished through drilling. If blasting is required, the Airport Authority and other appropriate local agencies would approve the blasting plan prior to the commencement of blasting.

A headworks, consisting of a foundation and top block, would secure the launch cell and interface vault in place at its upper end and provide a mechanism for insertion/removal of the simulated interceptor with inert booster. The Auxiliary Mechanical/Electrical Equipment support would consist of a concrete staging pad for placement of temporary refrigeration and power units. Site preparation would consist of rough grading and installation of a concrete pad approximately 6.1 by 7.6 meters (20 by 25 feet), on which the equipment would be placed.

There would be no change to existing roadways resulting from this proposed activity. The launch cell simulator site would have an asphalt paved surface. The new asphalt paving at the launch cell simulator site would be configured to accommodate the weight and turning radii of the missile transporter, transporter/erector, and other large equipment that will be used at the site to deliver and install the facilities.

A developmental simulated interceptor inside its sealed launch canister would be installed in the launch cell. The missile would be electrically identical to operational missiles that would be flight tested and deployed, with an inert booster that simulates the mass/mass properties of an operational missile. The launch cell simulator will have no capability to launch any missile configuration and will not be connected with the operational NMD system. Launch cell closure doors, supported by the launch cell headworks, would protect the canistered interceptor from the outside environment. The weather sealing and top lip of the access manway to the interface vault would be above grade to prevent storm water from entering the manway and to prevent wheeled vehicles from running over the closed top.

ALTERNATIVES CONSIDERED: Under the No-action Alternative, none of the proposed activities at the Boeing Jetplex facility in Huntsville would occur. The NMD Program would not be able to accomplish the intended simulations, testing and element interface checkout

that is needed to improve interceptor missile design and ensure production of a functional interceptor.

Under the alternative to locate the launch cell simulator/interface vault and GDIL at Redstone Arsenal, the launch cell simulator/interface vault would be located adjacent to the Integration, Assembly, Testing, and Checkout (IAT&C) facility in building 7578 in the old Thiokol area and the Boeing GDIL would be located in Building 7581. This was not carried forward because the high water table and groundwater contamination by previous occupants would increase installation costs; explosive safety quantity distance conflicts would make the proposed building unusable; and location at Redstone Arsenal would separate the GDIL from the majority of the Weapons Systems Integrated Project Team who are located at the Boeing Jetplex facility.

Under the alternative to locate the launch cell simulator/interface vault at Redstone Arsenal and the GDIL in Building 48-20, the launch cell simulator/interface vault would be located adjacent to the IAT&C facility and the GDIL located in Building 48-20 at the Boeing Jetplex facility. This option was not carried forward for some of the same reasons of the previous alternative and because the connection between the GDIL and the launch cell simulator/interface vault must not exceed 45.7 meters (150 feet) in order to replicate the deployed site configuration.

ENVIRONMENTAL EFFECTS: To provide a context for understanding the potential effects of the proposed action and a basis for assessing the significance of potential impacts, several environmental resource areas were evaluated. The resource areas determined to have a potential for adverse impacts were air quality, airspace, geology and soils, health and safety, and water resources. Each environmental resource was evaluated according to a list of activities that were determined to be necessary to accomplish the proposed action.

No impacts to air quality, airspace or health and safety are anticipated from the implementation of this project. Impacts to environmental justice, geology and soils, and water resources are considered to be insignificant.

Under the No-action Alternative, no environmental consequences associated with the GDIL additional facilities construction and operation are anticipated.

CONCLUSION: The resulting environmental analysis shows that no significant impacts would occur from the proposed GDIL additional facilities. Preparation of an Environmental Impact Statement, therefore, is not required.

POINT OF CONTACT: If additional information is needed or to request a copy of the NMD GDIL Additional Facilities EA contact:

U.S. Army Space and Missile Defense Command
Attention: SMDC-EN-V
Post Office Box 1500
Huntsville, Alabama 35807-3801

**ADDITIONAL FACILITIES AT NATIONAL MISSILE DEFENSE GROUND-BASED
INTERCEPTOR DEVELOPMENT AND INTEGRATION LABORATORY HUNTSVILLE,
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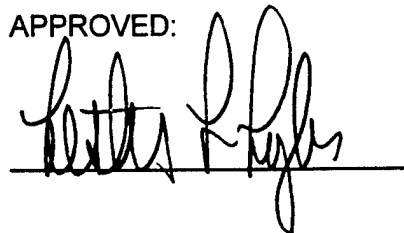
ACTION: Finding of No Significant Impact

PROPONENT:



DATE: 4 Mar '99

APPROVED:



DATE: 8 Mar '99

EXECUTIVE SUMMARY

Introduction

The Department of Defense (DoD) has designated the National Missile Defense (NMD) system a major defense acquisition program. The Ballistic Missile Defense Organization (BMDO) has responsibility within DoD to manage the NMD program. In addition to the Ground-Based Interceptor (GBI) missiles, other NMD system elements include ground-based sensors; command, control, and communication links; and potential future space-based sensors. As part of its acquisition strategy, BMDO has selected The Boeing Company as the Lead System Integrator to develop the NMD system in preparation for a deployment decision. BMDO has proposed building additional facilities adjacent to Boeing's NMD Ground-Based Interceptor Development and Integration Laboratory (GDIL) facility to enable it to conduct simulations and testing of the various components of the GBI element prior to flight testing.

The purpose of the Proposed Action is to provide an interface between a launch cell simulator (i.e., a simulated launch silo) and its support equipment and other NMD hardware and software to enable the NMD interceptor missile system to undergo simulations, testing, element interface checkout, and to provide training for system operators. This will enable the program to improve interceptor missile design and to simulate many operational scenarios before significant program resources are committed to the flight test program. It is a critical step in accomplishing DoD's goal of developing a deployable NMD system to ensure that the United States has the capability to protect its people against ballistic missile threats.

GDIL Testing and Training Facility

BMDO proposes to install a launch cell simulator site adjacent to Boeing's NMD GDIL, which is located in Building 48-20 at its Jetplex facility in Huntsville, Alabama. This new installation would interface with other GDIL equipment and facilities in Building 48-20 to simulate the performance of an operational GBI system. The proposed site would include a missile launch cell simulator to accommodate a simulated interceptor in its canister, its connecting interface vault, an asphalt-paved area around the launch cell simulator, site utility distribution, and auxiliary mechanical/electrical equipment to support the launch cell simulator/interface vault.

Site preparation for the missile launch cell simulator/interface vault would involve excavating a hole approximately 23.8 meters (78 feet) deep and 5.0 meters (16.5 feet) in diameter for the launch cell. During installation of the equipment at the launch cell simulator site, a staging and work area would be established with perimeter security fencing. Permanent site fencing would enclose about 0.4 hectare (1 acre).

Excavation for the interface vault would require a hole approximately 5.5 meters (18 feet) deep, with sides 4.6 meters wide by 6.1 meters long (15 feet wide by 20 feet long)

immediately adjacent to the launch cell hole. The interface vault would be attached to the side of the launch cell near the top.

There would be no change to existing roadways resulting from this proposed activity. The launch cell simulator site would have an asphalt paved surface encompassing approximately 0.25 hectare (0.64 acre).

A developmental simulated interceptor inside its sealed launch canister would be installed in the launch cell. The interceptor would be electrically identical to operational missiles, except with an inert booster that simulates the mass/mass properties of an operational missile.

Methodology

This Environmental Assessment (EA) evaluates the potential environmental effects of installing a launch cell simulator and support structures, and equipment at the Boeing facility in Huntsville, Alabama, to test the GBI electrical components and to serve as training for systems operators. This analysis is tiered from the *Ballistic Missile Defense Final Programmatic Environmental Impact Statement* that evaluated NMD programmatic activities, such as research and development, testing, production, and the general NMD operational concept.

Twelve areas of environmental consideration were considered in this EA to provide a context for understanding the potential effects of the Proposed Action and a basis for assessing the significance of potential impacts. Some of the areas were found to be insignificant and were briefly discussed, while resource areas that had the greatest potential for impacts were more fully discussed. The areas more fully analyzed are air quality, airspace, geology and soils, health and safety, and water resources. Environmental justice is also discussed in section 4.9.

A list of activities necessary to accomplish the Proposed Action was developed. Those activities with a potential for affecting the environment were identified and analyzed to determine the potential impacts.

Results

This section summarizes the conclusions of the analyses made for each of the five areas of environmental consideration based on the application of the described methodology. Within each resource summary, only those activities for which a potential environmental concern was determined are described.

Air Quality. The Proposed Action at the Boeing facility presents the potential for impact to air quality due to dust emissions during installation and emissions from standard day-to-day operations. Standard methods would be employed to minimize installation emissions. Daily operation would result in only a minor increase in traffic levels and related mobile source emissions. Therefore, no long-term impacts to air quality would be anticipated due to proposed activities.

Airspace. Proposed activities at the Boeing facility would require the use of a crane to install the launch cell casing and an erector to install the test missile. The Boeing Company is currently coordinating installation issues with the Federal Aviation Administration and Huntsville International Airport and upon selection of the contractor will submit specific crane height information. None of the proposed facilities or equipment would extend beyond 61.0 meters (200 feet) above ground level; therefore, no informal obstruction evaluation would be necessary. Neither daily operations nor installation activities would have any effect on surrounding airspace activities.

Geology and Soils. Small areas of soils would be disturbed by GDIL launch cell simulator/interface vault installation and fencing. However, the total area to be disturbed would not measurably affect the soils in the region of influence. Activities would be carried out according to existing plans and regulations to minimize soil disturbance. Standard methods employed during installation would minimize dust generation and erosion.

Health and Safety. Proposed additional GDIL activities at the Boeing facility have the potential to impact the health and safety of project personnel and non-project Boeing employees. However, operating procedures and safety measures have been established to minimize the potential for health and safety impacts. Blasting, if required, and other installation activities would comply with applicable safety requirements to control exposure to occupational safety and health hazards.

Facility and equipment designs would incorporate measures to minimize the potential for, and impact of, accidents and fires. Operating procedures and training would be instituted to minimize the potential for, and impact of, releases of hazardous materials. Appropriate emergency response plans would be established and implemented to deal with potential emergencies. These steps are anticipated to protect personnel from adverse health and safety impacts.

Water Resources. All activities would be carried out in accordance with appropriate regulations, and the quality of surface water and groundwater would not be measurably changed.

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ACRONYMS AND ABBREVIATIONS

BMDO	Ballistic Missile Defense Organization
BMD PEIS	<i>Ballistic Missile Defense Final Programmatic Environmental Impact Statement</i>
DoD	Department of Defense
EA	Environmental Assessment
FAA	Federal Aviation Administration
GBI	Ground-Based Interceptor
GDIL	Ground-Based Interceptor Development and Integration Lab
IAT&C	Integration, Assembly, Testing, and Checkout
mg/m ³	Milligrams per cubic meter
µg/m ³	Micrograms per cubic meter
NEPA	National Environmental Policy Act
NMD	National Missile Defense
NPDES	National Pollutant Discharge Elimination System
ppm	Parts per Million
ROI	Region of Influence
SPCC	Spill Prevention Control and Countermeasures
SWPPP	Storm Water Pollution Prevention Plan

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1.0 INTRODUCTION

1.1 INTRODUCTION

The National Environmental Policy Act (NEPA), the Council on Environmental Quality Regulations implementing NEPA, and Department of Defense (DoD) implementing regulations require DoD officials to consider environmental consequences when making decisions to authorize or approve Federal actions.

This Environmental Assessment (EA) provides an environmental analysis to support Federal decisions relating to installation of new facilities adjacent to Boeing's National Missile Defense (NMD) Ground-Based Interceptor Development and Integration Laboratory (GDIL) in Building 48-20 at its Jetplex facility in Huntsville, Alabama. These new facilities would include a launch cell simulator (i.e., a simulated launch silo), its connecting interface vault, and communication and utility lines.

1.2 BACKGROUND

The DoD has designated the NMD system a major defense acquisition program. The Ballistic Missile Defense Organization (BMDO) has responsibility within DoD to manage the NMD program. In addition to the Ground-Based Interceptor (GBI) missiles, other NMD system elements include ground-based sensors; command, control, and communication links; and space-based sensors. As part of its acquisition strategy, BMDO has selected The Boeing Company as the Lead System Integrator (LSI) to develop the NMD system in preparation for a deployment decision. BMDO has proposed building additional facilities adjacent to Boeing's NMD GDIL facility to enable it to conduct simulations and testing of the various components of the GBI element prior to flight testing.

1.3 PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the proposed action is to provide an interface between a launch cell simulator and its support equipment and other NMD hardware and software to enable the NMD interceptor missile system to undergo simulations, testing, and element interface checkout. It would also provide training for system operators. This will enable the program to improve interceptor missile design and to simulate many operational scenarios before significant program resources are committed to the flight test program.

The proliferation of weapons of mass destruction and technology of long-range missiles is increasing the threat to our national security. The purpose of the NMD program is defense of the United States (all 50 states) against a threat of a limited strategic ballistic missile

attack from a rogue nation. Such a system would also provide some inherent capability against small accidental or unauthorized launch of strategic ballistic missiles from more capable nuclear states.

1.4 DECISION(S) TO BE MADE

The BMDO NMD Joint Program Office is the proponent of this action. BMDO would decide whether to implement the proposed action to install a launch cell simulator and its support equipment at Boeing's Jetplex facility to interface with the Boeing GDIL in order to conduct GBI simulations and integration testing at these facilities.

1.5 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

This EA evaluates the potential environmental effects of installation of a launch cell simulator and support structures and equipment, consisting of an interface vault and communication and utility lines to interface with the Boeing GDIL at its Jetplex Huntsville facility. This analysis is tiered from the *Ballistic Missile Defense Final Programmatic Environmental Impact Statement* (BMD PEIS), which evaluated NMD programmatic activities such as research and development, testing, production and the general NMD operational concept. The *Final Supplemental Environmental Impact Statement for Proposed Actions at U.S. Army Kwajalein Atoll* provides adequate analysis for flight testing at Kwajalein Missile Range. The Air Force is preparing an environmental analysis of flight test activities at Vandenberg Air Force Base, California. The Army is preparing an environmental analysis of the reconfiguration of facilities at Redstone Arsenal, Alabama, for an interceptor missile integration facility. Deployment of the NMD system at specific sites is being evaluated in an environmental impact statement, also tiered from the BMD PEIS.

1.5.1 RELATED ENVIRONMENTAL DOCUMENTATION

Ballistic Missile Defense Organization, 1994. *Ballistic Missile Defense Final Programmatic Environmental Impact Statement*, October.

U.S. Army Space and Strategic Defense Command, 1993. *Final Supplemental Environmental Impact Statement for Proposed Actions at U.S. Army Kwajalein Atoll*, December.

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The BMDO proposes to install a launch cell simulator site adjacent to Boeing's NMD GDIL, which is located at its Jetplex facility in Huntsville, Alabama (see figure 2-1). This new installation would interface with other GDIL equipment and facilities in Building 48-20 to simulate the performance of an operational GBI system. The proposed site would include a missile launch cell to accommodate a simulated interceptor in its canister, its connecting interface vault, a fenced asphalt paved area around the launch cell, site utility distribution, and auxiliary mechanical/electrical equipment to support the launch cell simulator/interface vault. Figure 2-2 shows the site layout for this facility installation. The individual facilities and installation requirements are described in the following sections.

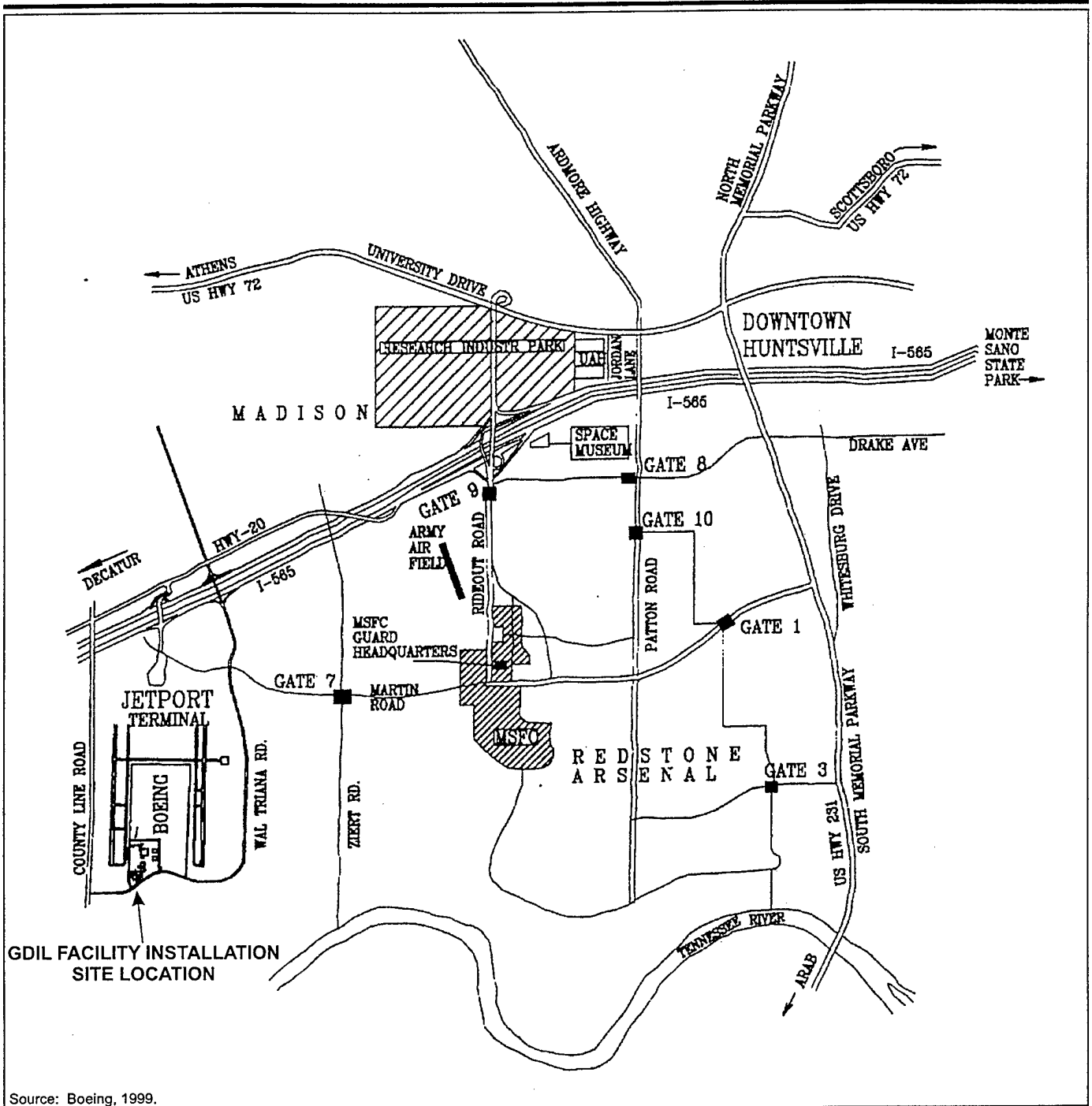
2.1.1 MISSILE LAUNCH CELL SIMULATOR SITE PREPARATION

During installation of the equipment at the launch cell simulator site, a staging and work area would be established with perimeter security fencing. Permanent site fencing would be located approximately 6.1 meters (20 feet) outside the perimeter of the proposed new asphalt paving and would enclose about 0.4 hectare (1 acre). The temporary and permanent fencing is shown in figure 2-2. Other site preparation activities are described below.

2.1.1.1 Missile Launch Cell Simulator/Interface Vault

Site preparation for the missile launch cell simulator/interface vault would involve excavating a hole approximately 23.8 meters (78 feet) deep and 5.0 meters (16.5 feet) in diameter for the launch cell. A construction liner or casing would support the hole until installation of the launch cell simulator.

The launch cell is a prefabricated structure approximately 21.3 meters (70 feet) long with an outer diameter of 3.4 meters (11 feet), including insulation and stiffeners. The excavated hole would contain a mechanism to collect and dispose of water accumulated during site preparation or operation. The discharge would be connected to an existing surface site drainage system with sediment barriers. Excavation for the interface vault would require a hole approximately 5.5 meters (18 feet) deep, with sides 4.6 meters wide by 6.1 meters long (15 feet wide by 20 feet long) immediately adjacent to the launch cell hole. Excavation would be accomplished through drilling. If blasting is required, the blasting plan would be approved by the Airport Authority and other appropriate local agencies prior to the commencement of blasting. Installation of the launch cell simulator would include a concrete base at the bottom of the hole to offset groundwater buoyancy and to provide a base on which to set the launch cell. Installation of the launch cell



Source: Boeing, 1999.

Vicinity Map

Huntsville, Alabama

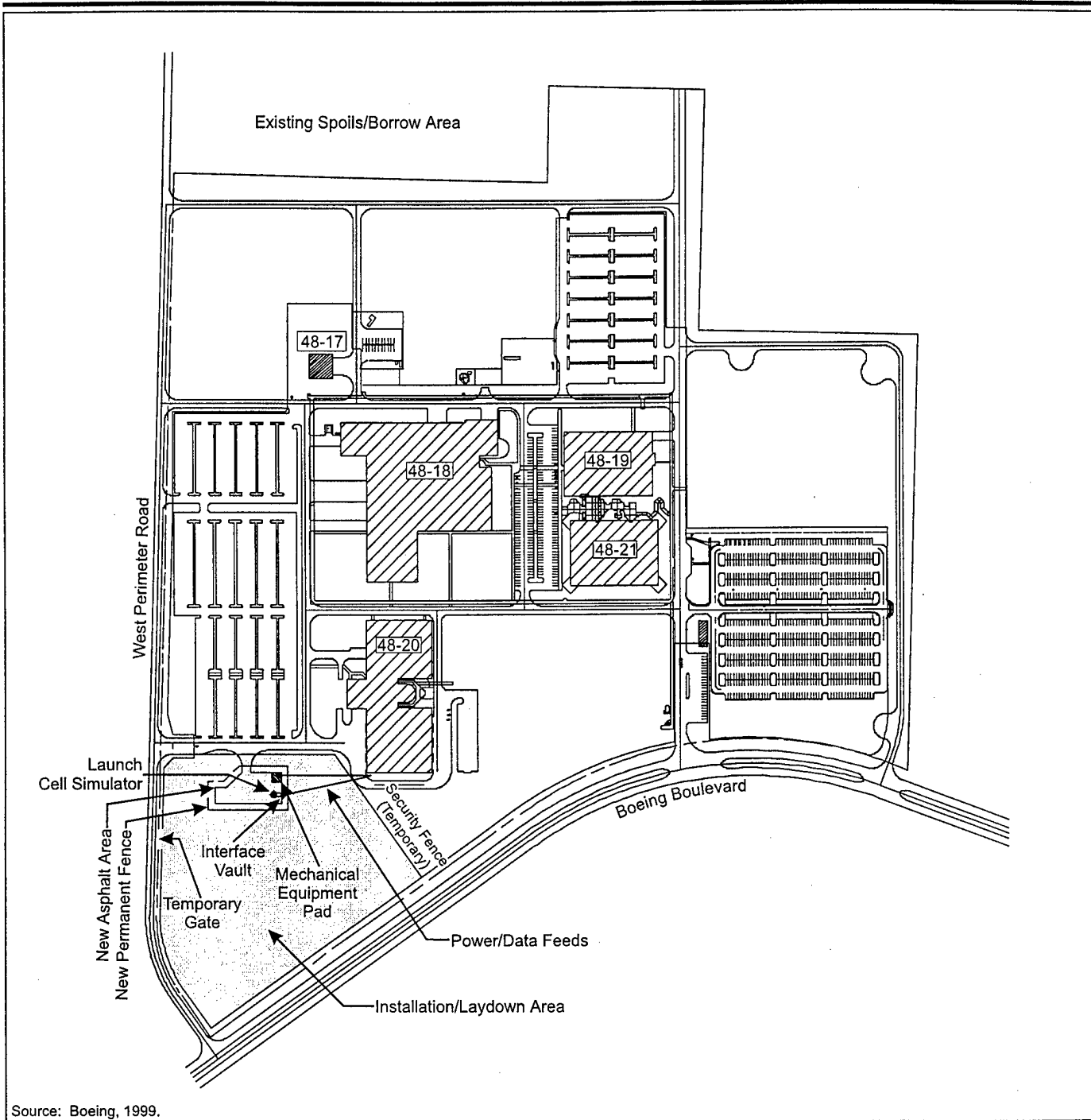
Figure 2-1



Not to Scale

Figure 2-1

NMD GDIL Additional Facilities EA



EXPLANATION

 Installation/Laydown Area

GDIL Facility Installation Site Layout

Huntsville, Alabama

Figure 2-2



Not to Scale

Figure 2-2

NMD GDIL Additional Facilities EA

simulator would also include filling the space between the launch cell and the construction casing with concrete/sand slurry and insulating material. The insulation attached to the construction casing would consist of extruded polystyrene board. The launch cell shell would have corrosion protection and other protective coatings. The coating materials in contact with the earth would consist of coal tar epoxy and concrete/sand slurry. The interface vault would be attached to the side of the launch cell near the top. A headworks, consisting of a foundation and top block, would secure the launch cell and interface in place at its upper end and provide a mechanism for insertion/removal of the simulator interceptor with inert booster. Figure 2-3 depicts a conceptual launch cell simulator/interface vault configuration.

Excavated material from the launch cell simulator/interface vault would be placed on an area currently used for spoil, as shown on figure 2-2. This area would also be the soil borrow area for final grading at the launch cell simulator site. The spoil area would be managed to control erosion/runoff.

2.1.1.2 Auxiliary Mechanical/Electrical Equipment Support Staging Pad

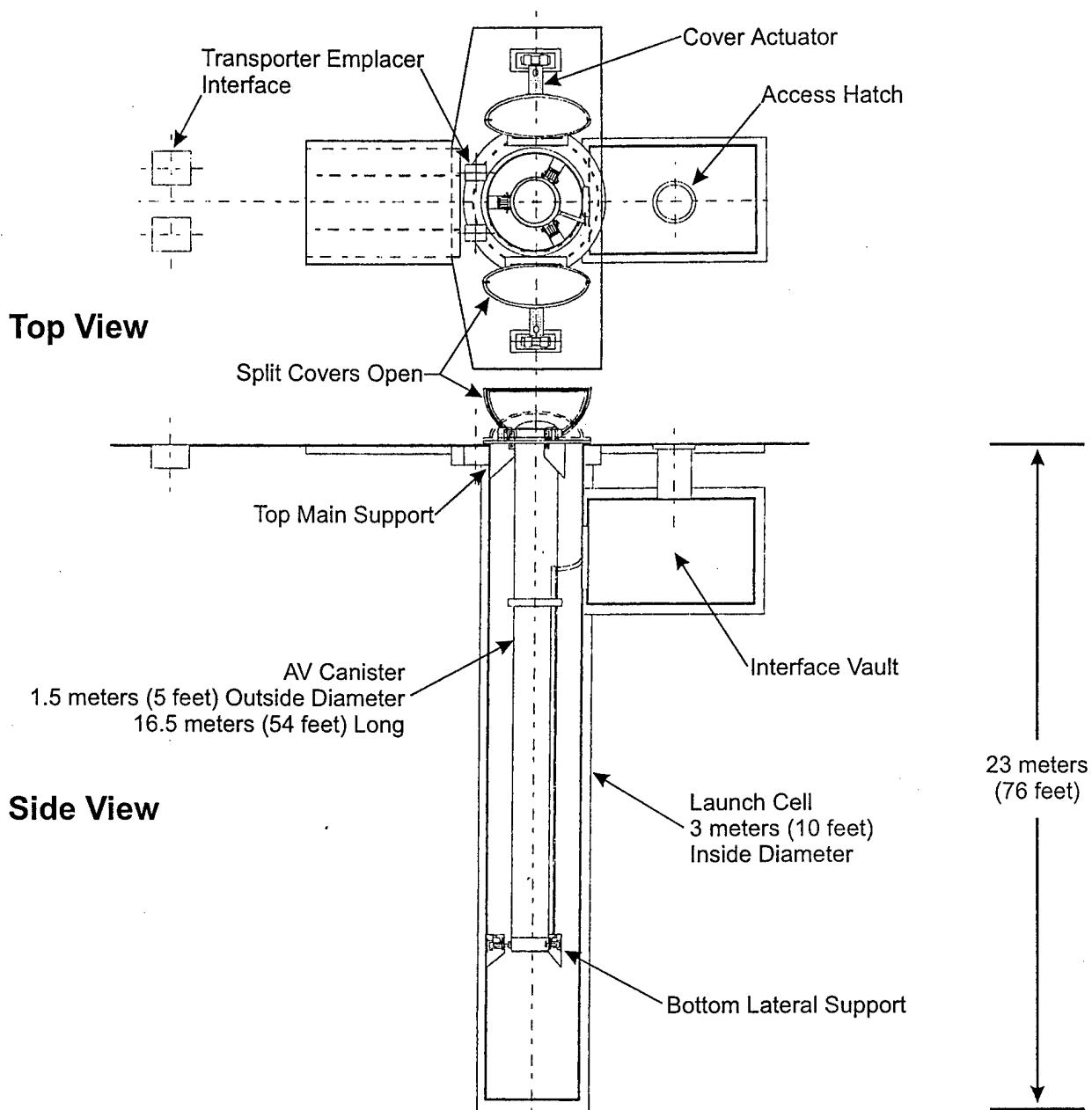
The Auxiliary Mechanical/Electrical Equipment support would consist of a concrete staging pad for placement of refrigeration and temporary power units. Its location relative to the launch cell simulator/interface vault and Building 48-20 is indicated in figure 2-2. Site preparation would consist of rough grading and installation of a concrete pad approximately 6.1 by 7.6 meters (20 by 25 feet), on which the equipment would be placed.

2.1.1.3 Utility/Communication Lines

The launch cell simulator/interface vault would be connected to the mechanical/electrical support equipment by one or more underground lines for power and mechanical requirements. Additionally, a fiber-optic link and copper links would connect the launch cell simulator/interface vault to the Boeing Hardware-in-the-Loop Lab, which is part of the GDIL facility located in Building 48-20. Site preparation for the installation of utility lines would require trenching between the launch cell simulator/interface vault, the mechanical/electrical support site, and building 48-20. The approximate location of utility lines is shown in figure 2-2. The utility lines would be encased in concrete duct banks.

2.1.1.4 Roadways and Paved Areas

There would be no change to existing roadways resulting from this proposed activity. The launch cell simulator site would have an asphalt paved surface. The new asphalt paving at the launch cell simulator site would be configured to accommodate the weight and turning radii of the missile transporter, transporter/erector, and other large equipment that will be used at the site to deliver and install the facilities. The proposed area of new asphalt paving, encompassing approximately 0.25 hectare (0.64 acre), is indicated in figure 2-2.



Source: Boeing, 1999.

NMD Launch Cell Simulator Design Concept

Huntsville, Alabama



Not to Scale

Figure 2-3

Figure 2-3

NMD GDIL Additional Facilities EA

2.1.1.5 Power Sources

Permanent power would be supplied from an existing power panel in Building 48-20 to a new power control center located on an exterior concrete pad as described in paragraph 2.1.1.2. A transfer switch for a diesel generator would be provided.

A diesel operated portable electric generator would be brought in temporarily and utilized as the test/training backup electrical power source for the launch cell simulator/interface vault and GDIL facility.

Exterior lighting for roads, parking lots, and walkways would consist of pole mounted yard lighting. Additional temporary portable light sources could be used to simulate nighttime operations.

2.1.1.6 Water Sources

Potable water for humidification and to support maintenance tasks at the launch cell simulator/interface vault would be provided by a line routed underground, as described in paragraph 2.1.1.3, from Building 48-20 to the interface vault.

Condensate and water extracted from the launch cell would be collected and eliminated by a surface discharge. There are no processes involved in the proposed activities at this site that would introduce contaminants into the water.

2.1.2 SITE OPERATION

2.1.2.1 Missile Launch Cell Simulator/Interface Vault

A developmental simulated interceptor inside its sealed launch canister would be installed in the launch cell. The interceptor would be electrically identical to operational missiles that would be flight tested and deployed, with an inert booster that simulates the mass/mass properties of an operational missile. The launch cell simulator will have no capability to launch any missile configuration and will not be connected to the operational NMD system. Launch cell closure doors, supported by the launch cell headworks, would protect the canistered interceptor from the outside environment. The weather sealing and top lip of the access manway to the interface vault would be above grade to prevent storm water from entering the manway and to prevent wheeled vehicles from running over the closed top.

2.1.2.2 Ground Handling Equipment

Component handling equipment would be used at the site to deliver the simulated canistered interceptor to the launch cell and to install it in the launch cell. The canistered interceptor would be transported to the site by truck.

2.2 ALTERNATIVES TO THE PROPOSED ACTION

2.2.1 NO-ACTION ALTERNATIVE

Under the No-action Alternative, none of the proposed activities at the Boeing Jetplex facility in Huntsville would occur. The proposed launch cell simulator/interface vault and utility lines connecting to the mechanical/electrical equipment would not be installed. Communication lines connecting the launch cell simulator/interface vault with links to the Boeing GDIL in Building 48-20 would not be installed, and the proposed new fencing and paving would not occur. The developmental testing proposed at the launch cell simulator site would not occur. The GDIL, designed as a one-of-a-kind facility, is located in Building 48-20. The launch cell simulator/interface vault and support facilities could not be installed at a different location, since for the testing to be effective, the GDILs launch cell simulator/interface vault must be located in the immediate proximity of the GDIL. Consequently, under the No-action Alternative, the purpose and need of the Proposed Action would not be accomplished. The NMD Program would not be able to accomplish the intended simulations, testing, and element interface checkout that is needed to verify and improve interceptor missile design and ensure production of a functional interceptor.

2.2.2 LOCATE LAUNCH CELL SIMULATOR/INTERFACE VAULT AND GDIL AT REDSTONE ARSENAL

Under this alternative, the launch cell simulator/interface vault would be located adjacent to the Integration, Assembly, Testing, and Checkout (IAT&C) facility in Building 7578 in the old Thiokol area, and the Boeing GDIL would be located in Building 7581. This alternative was not carried forward for the following reasons:

- The groundwater in this area was found to have a high water table and was contaminated by previous occupants. This would significantly increase the cost of installation of the launch cell simulator/interface vault.
- The explosive rating for the missile being processed at the IAT&C facility changed from 1.3 to 1.1, causing the explosive safety quantity distance to change from 83.8 meters (275 feet) to 381.0 meters (1,250 feet). This increased explosive safety quantity distance made the building proposed for use by the GDIL to be unusable.
- Locating the GDIL and launch cell simulator/interface vault at Redstone Arsenal would separate the GDIL (the primary development tool of the Weapons System Integrated Project Team) from the majority of the Weapons System Integrated Project Team personnel who are located at the Boeing Jetplex facility.
- Location of the GDIL and launch cell simulator/interface vault at Redstone Arsenal would degrade the interface between the GDIL and the System Integration Laboratory, which is to be located in Building 48-20 at the Boeing Jetplex facility.

2.2.3 LOCATE LAUNCH CELL SIMULATOR/INTERFACE VAULT AT REDSTONE ARSENAL AND THE GDIL IN BUILDING 48-20

Under this alternative the launch cell simulator/interface vault would be located adjacent to the IAT&C facility, and the GDIL would be located in Building 48-20 at the Boeing Jetplex facility. This alternative was not carried forward for the following reasons:

- The launch cell simulator/interface vault would be connected to the GDIL via fiber optic cable, which must not exceed 45.7 meters (150 feet) in length in order to replicate the deployed site configuration.
- The first two reasons cited in section 2.2.2 also apply to this alternative.

3.0 AFFECTED ENVIRONMENT

This section describes the environmental characteristics that may be affected by the Proposed Action adjacent to Building 48-20 at Boeing's Jetplex facility in Huntsville. The affected environment is described succinctly in order to provide a context for understanding potential impacts. Those components of the affected environment that are of greater concern relevant to the potential impacts are described in greater detail.

Available literature (such as environmental assessments, environmental impact statements, and base master plans) was reviewed, and data gaps (questions that could not be answered from the literature) were identified. To fill the data gaps and to verify and update available information, installation personnel and applicable Federal, state, and local regulatory agencies were contacted. Cited literature, telephone interviews, and other referenced material are presented in section 5.0.

3.1 ENVIRONMENTAL RESOURCES

Twelve broad environmental components were considered to provide a context for understanding the potential effects of the Proposed Action and to provide a basis for assessing the severity of potential impacts. Several of these environmental components are regulated by Federal and/or state environmental statutes, many of which set specific guidelines, regulations, and standards. These standards provide a benchmark that assists in determining the significance of environmental impacts under the NEPA evaluation process. The compliance status of the potential site, with respect to environmental requirements, was included in the information collected on the affected environment. The 12 areas of environmental consideration, discussed briefly as follows, are: air quality, airspace, biological resources, cultural resources, geology and soils, hazardous materials and waste, health and safety, infrastructure, land use, noise, socioeconomics, and water resources.

Activities proposed for the Boeing site consist of the installation of a launch cell simulator site that would interact with other GDIL equipment and facilities to simulate the performance of an operational ground-based interceptor system. The proposed activities would not impact biological resources, cultural resources, hazardous materials and waste, infrastructure, land use and aesthetics, or noise. The five environmental components analyzed for the Boeing site include: air quality, airspace, geology and soils, health and safety, and water resources. Environmental justice is also discussed in section 4.9.

Air Quality—Existing information on air quality was reviewed to identify air quality issues, with particular attention paid to background ambient air quality compared to the primary National Ambient Air Quality Standards. In addition, information was obtained on whether the facility was located in an attainment or nonattainment area. Since there would be

potential air pollutant emissions, compliance with air emission permits was ascertained. This resource area is further discussed in section 3.2.1.

Airspace—Existing information on airspace was reviewed and Federal Aviation Administration (FAA) officials contacted to identify any known conflicts with existing airspace restrictions. Airspace is further discussed in section 3.2.2.

Biological Resources—Existing information on plant and animal species and habitat types in the vicinity of the site was reviewed, with particular attention paid to the presence of any protected species, especially Federal or state threatened or endangered species. No known protected species is known to occur in the vicinity of the proposed site. The proposed activity would only affect a very small portion of land resulting in no significant loss of habitat, and biological resources would not be adversely affected. Therefore, this resource is not further discussed.

Cultural Resources—Existing information on cultural resources and the potential for the presence of resources eligible for inclusion in the National Register of Historic Places (National Register) was reviewed and none were revealed. However, if during the installation process some cultural materials are discovered, all activities would stop and the Alabama State Historic Preservation Officer would be consulted for further action. Therefore, cultural resources are not further discussed.

Geology and Soils—Existing information on topography, geology, and soil resources at the proposed facilities was reviewed to determine if there are any physical resource concerns. This resource area is further discussed in section 3.2.3.

Hazardous Materials and Waste—Existing management practices for hazardous materials and hazardous waste were reviewed to qualitatively determine any potential problems that may occur from specific project activities. No problems were identified. There is the potential for a temporary storage tank to be located at the site to run a generator during certain tests. This would be short in duration and would only occur once or twice a year. Generator usage would be in compliance with all applicable regulations and standard operating procedures. Therefore, this resource is not further discussed.

Health and Safety—Existing health and safety documents were reviewed and facility personnel were contacted to determine if public and occupational health and safety concerns exist as a result of the Proposed Action. Safety regulations were also reviewed with regard to hazardous materials storage, handling, and disposal. This resource is further discussed in section 3.2.4.

Infrastructure—Existing information on the capacity and the current demands of infrastructure elements (electricity, solid waste, sewage treatment, water supply, and transportation) at the facility was examined to identify any infrastructure constraints to conducting the proposed activity. The Proposed Action would only require a minimal

increase in water usage and electricity. The existing systems have sufficient capacity to handle the increased demand; therefore, this resource is not further discussed.

Land Use—Existing documentation was reviewed and Boeing personnel contacted to identify any known conflicts between existing land uses and the proposed activities. Only 19 hectares (46 acres) of the 234-hectare (578-acre) site are currently developed. The developed area is used for offices, laboratories, storage, and light manufacturing. The remainder of the site is used for agricultural purposes. The site is surrounded on three sides by the Huntsville International Airport. (Pierson, 1999) Currently, there are no known land use conflicts, and no land use conflicts are anticipated because the proposed activity would affect less than 0.8 hectare (2 acres), a small percentage of the total Boeing site. Therefore, land use is not further discussed.

Noise—Existing environmental documents were reviewed and facility personnel contacted to determine if noise concerns are an issue. Noise concerns were determined not to be an issue because noise produced from the installation of the launch cell simulator/interface vault and related components would be short-term and would be minimal compared to the noise produced from the adjacent airport facilities. Noise is not further discussed.

Socioeconomics—Existing information on area population and facility personnel was reviewed and compared to the personnel requirements for the proposed activity. Activities associated with this project are considered to be minor with a small number of contracted employees to install the facility. Existing Boeing employees would be utilized to test the system, and some transient workers may be brought in to train on the system. Very few permanent jobs, if any, would be created by the proposed activity. Therefore, socioeconomics is not further discussed.

Water Resources—Existing information on surface water and groundwater quality and supply was reviewed to identify potential water resource concerns at each facility. Water resources are further discussed in section 3.2.5.

Based on the above information the resources of air quality, airspace, health and safety, geology and soils, and water resources will be discussed in the following sections.

3.2 GDIL TEST AND TRAINING FACILITY

3.2.1 AIR QUALITY

Air quality in a given area is a function of the area's topography, meteorology, and pollution release characteristics (specific pollutants, emission rates, frequencies, and emission locations). Air quality is described in terms of the concentrations of various pollutants in a given area of the atmosphere. This is generally expressed in terms of parts per million (ppm), milligrams per cubic meter (mg/m^3), or micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). The lower the overall concentration of a specific pollutant (whether of natural or

manmade origin), the better the air quality in that area. The significance of a pollutant concentration is determined by comparison to Federal, state, and/or local air quality standards. The region of influence (ROI) for air quality is the geographic airshed in which the Proposed Action would take place.

3.2.1.1 Regulatory Framework

Alabama has adopted the National Ambient Air Quality Standards as its ambient air quality standards. These standards are shown in table 3-1.

Table 3-1: Federal Ambient Air Quality Standards

Pollutant	Averaging Time	National Primary Standard	National Secondary Standard
Carbon Monoxide	8-hour	10 mg/m ³ (9 ppm)	None
	1-hour	40 mg/m ³ (35 ppm)	
Lead	Calendar quarter	1.5 µg/m ³	Same as primary
Nitrogen Dioxide	Annual	100 µg/m ³ (0.053 ppm)	Same as primary
Ozone	1-hour	167 µg/m ³ (0.08 ppm)	Same as primary
PM-10	Annual	50 µg/m ³	Same as primary
	24-hour	150 µg/m ³	
Sulfur Dioxide	Annual	80 µg/m ³ (0.03 ppm)	None
	24-hour	365 µg/m ³ (0.14 ppm)	None
	3-hour	None	1,300 µg/m ³ (0.5 ppm)

Source: Clean Air Act, 42 USC 7401 et seq.: Rule 62-204

Note: Measurements averaged for periods longer than 24-hours are to be arithmetic mean
ppm is parts per million by volume, mg/m³ is milligrams per cubic meter, µg/m³ is micrograms per cubic meter

3.2.1.2 Regional Air Quality

The Boeing facility is located in Madison County, which is in attainment or unclassifiable for all criteria air pollutants. There are no Class I Prevention of Significant Deterioration areas within 10 kilometers (6 miles) of the Boeing facility.

3.2.1.3 Air Emissions Sources

Boeing maintains permits to operate several air pollution emissions sources including boilers, fuel storage tanks, a paint booth, and a vapor degreaser. Operations at the Boeing Facility are in compliance with current state and Federal permits. (Pierson, 1999)

3.2.2 AIRSPACE

Airspace, or that space that lies above a nation and comes under its jurisdiction, is finite, having dimensions of height, depth, width, and scheduled time. Scheduled time is an essential element of airspace management and air traffic control. Under Public Law 85-726, the FAA is charged with the safe and efficient use of U.S. airspace in accordance with established criteria and limits. This service is provided through the National Airspace System. This system is "...a common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information and manpower and material." (Aviation Supplies and Academics, Inc., 1996)

Airspace is being considered based on FAA regulation 7400.2C CHG 4 (FAA, 1992) Part 2, Objects Affecting Navigable Airspace. Objects that exceed 61 meters (200 feet) above ground level require a Notice of Proposed Construction or Alteration (FAA Form 7460-1) be submitted to the FAA. The FAA would then perform an obstruction evaluation, and an acknowledgement and/or determination would be issued.

3.2.2.1 Affected Environment at the Boeing Facility

The affected environment is defined as the airspace above or around the Boeing facility. The closest airport is the Huntsville International Airport, which is adjacent to the Boeing facility on three sides to the north, east, and west. Huntsville International has Class C airspace with operational altitudes of surface to 1,402 meters (4,600 feet), 610 meters (2,000 feet) up to 1,402 meters (4,600 feet), and 732 meters (2,400 feet) up to 1,402 meters (4,600 feet).

3.2.3 GEOLOGY AND SOILS

This section provides an overview of the physiography, geology, soils, and geologic hazards in the vicinity of the Boeing facility. In general, the ROI is defined by the regional geologic setting and the areas in the immediate vicinity of the proposed activity that could be affected by the installation of facilities and operational activities.

3.2.3.1 Topography

The topography of the area around the Boeing facility is gently rolling with elevations primarily in the range of 175 to 189 meters (575 to 620 feet) above mean sea level. The terrain generally slopes from north to south toward the Tennessee River. Elevations at the proposed area range from approximately 181 to 186 meters (595 to 610 feet) above mean sea level (Geological Survey of Alabama, 1975; Boeing, 1999).

3.2.3.2 Geology

The geologic units underlying the area around the Boeing facility are sedimentary in origin and are composed of mostly Fort Payne Chert, and other older geologic units. The surface geology consists of unconsolidated sedimentary material (regolith) of mostly Fort Payne

Chert and Tuscumbia Limestone. Regolith formed from the Tuscumbia Formation consists of clay and rectangular to irregular blocks of chert. The Regolith thickness varies from approximately 12.2 to 24.4 meters (40 to 80 feet) in the northern part of the property to as little as 6.1 meters (20 feet) in the southern portion. (Geological Survey of Alabama, 1975)

There are no known areas of volcanic activity within the State of Alabama. The Boeing facility is located in a seismic zone 1, according to the Uniform Building Code. Within this seismic zone there is a low probability of earthquakes.

3.2.3.3 Soils

According to the *Soil Survey, Madison County Alabama*, soils within the area of the Boeing facility are of the Decatur-Cumberland-Abernathy soil association. The predominant soil type mapped for the site is the Decatur and Cumberland soil series that consists of a well drained to moderately drained red fertile soil. (U.S. Department of Agriculture, 1958) This soil is thick over bedrock and is usually found on nearly level to gently rolling terrain (Geological Survey of Alabama, 1975). A soil boring at the site encountered 12.7 centimeters (5 inches) of topsoil, dark red clay with a trace of chert and silt to a depth of 4.6 meters (15 feet), red and yellow high plasticity clay to a depth of 13.9 meters (45.5 feet), and dolomitic limestone and limestone to the bottom of the boring at 30.5 meters (100 feet) (Ground Engineering and Testing Service/AT&E, 1998).

The Boeing property contains areas of prime farmland located throughout the level to gently sloping portions of the grounds, and portions of the Boeing property are leased out for agricultural purposes. (Geological Survey of Alabama, 1975; Pierson, 1999)

Soils within the vicinity of the proposed facility exhibit a low to moderate shrink/swell susceptibility and moderate susceptibility to water and wind erosion (National Resource Conservation Service, 1999).

3.2.4 HEALTH AND SAFETY

Boeing safety and health policies and procedures are designed and enforced to minimize potential impacts to employees, contractors, and the public. The regulatory environment for health and safety issues consists of those regional and local elements that have been established to minimize or eliminate potential risk to the general public and onsite personnel as a result of operations and activities. The ROI for health and safety related impact varies with the type of work activity (installation, support, and testing of missiles). The ROI is the proposed site of installation activity and the areas adjacent to this site.

3.2.4.1 Onsite Safety

All operations are conducted in a manner to minimize risk of injury, loss of life, or health hazards to personnel or the public. All personnel are briefed on anticipated hazards and

trained on safety equipment, emergency procedures, and communications. The Boeing facility is subject to all Occupational Safety and Health Administration requirements.

3.2.5 WATER RESOURCES

Water resources include surface water and groundwater and their physical, chemical, and biological characteristics. The water resource section provides an overview of the surface and groundwater features, water quality, and flood hazard areas in the vicinity of the Boeing facility. In general, the ROI for groundwater is the local aquifers that are directly or indirectly used by the Boeing facility. The ROI for surface water is the drainage system/watershed in which the Boeing facility is located.

3.2.5.1 Water Resource Regulations

Industrial operations that result in the discharge of storm water pollutants are permitted under an individual, multi-sector, or general industrial permit. A general construction permit application is required for activities that result in the disturbance of 2 hectares (5 acres) or more in area. This general construction permit also requires the preparation of a storm water pollution prevention plan (SWPPP).

This section provides an overview of the surface and ground water features, water quality, and flood hazard areas in the vicinity of the Boeing Jetplex Facility, Alabama. The Alabama Department of Environmental Management is responsible for the management of the National Pollutant Discharge Elimination System (NPDES) permit process.

3.2.5.2 Groundwater

The hydrology at the Boeing facility can be characterized by three units: the regolith, Tuscumbia Limestone, and Fort Payne Chert. The Tuscumbia Limestone and Fort Payne Chert compose the limestone aquifer. The lower layers of the regolith occur under water table conditions. Groundwater movement reflects the topography and is generally from north to south toward the Tennessee River. Groundwater in both the limestone aquifer and the water table aquifer moves to lowland areas in the stream basin where it discharges through available openings and provides a base flow to the streams. The water table at the Boeing facility occurs at approximately 13 meters (42 feet) below the surface. (Ground Engineering and Testing Service/AT&E, 1998) None of the aquifers in Madison County have been designated as sole principal drinking water sources under Section 1424(2)g of the Safe Drinking Water Act of 1974 (U.S. Army Missile Command, 1994).

3.2.5.3 Surface Water

There are no major areas of surface water in the immediate vicinity of the Boeing facility. Some watercourses do flow in close proximity to the grounds. These include Bradford Creek, located about 2.8 kilometers (1.8 miles) to the northeast, and Miller Branch, located 2.4 kilometers (1.5 miles) to the south. These both flow into Barren Fork Creek, which in turn flows south and empties into the Tennessee River.

3.2.5.4 Special Flood Hazard Areas

Special Flood Hazard Areas are defined as areas with a 1 percent or greater chance of equaling or exceeding an established flood level in any given year. Such areas are typically referred to as floodplains.

None of the grounds lies within the 100-year floodplain of the Tennessee River. The 100-year floodplain lies at elevations ranging from approximately 174 to 175 meters (570 to 575 feet) above mean sea level in this portion of Madison County. For planning purposes, the 100-year flood level of the Tennessee River is established at approximately 175 meters (572.5 feet) above mean sea level. (Geological Survey of Alabama, 1975)

3.2.5.5 Water Quality

There is the potential for groundwater contamination at the Boeing facility as a result of past waste handling and generation. The Boeing facility does have a general NPDES Permit for the purpose of discharging stormwater. They do not have an industrial wastewater discharge permit. Only domestic sanitary wastewater and non-contact cooling water are discharged to the City of Huntsville wastewater system. (Pierson, 1999)

Surface water quality is generally characterized as moderately hard to hard, moderately high in dissolved solids, and high in manganese. Area surface water is generally suitable for most uses and is classified by the Alabama Department of Environmental Management as suitable for fish and wildlife use. The Tennessee River is located just south of the Boeing facility and has been classified for use as a public water supply and for fish and wildlife uses (U.S. Army Missile Command, 1994).

4.0 ENVIRONMENTAL CONSEQUENCES

This section describes the potential environmental consequences of the proposed activities by comparing these activities with the potentially affected environmental components. Section 4.1 provides discussion of the potential environmental consequences of these activities. The amount of detail presented in each section is proportional to the potential for impacts. Sections 4.2 through 4.9 provide discussions of the following with regard to proposed activities: environmental effects of the No-action Alternative; adverse environmental effects that cannot be avoided; conflicts with Federal, state, and local land-use plans, policies, and controls for the area concerned; energy requirements and conservation potential; irreversible or irretrievable commitment of resources; relationship between short-term uses of the human environment and the maintenance and enhancement of long-term productivity; natural or depletable resource requirements and conservation potential; and Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations*.

To assess the potential for, and significance of, environmental impacts from the proposed facility installation activities, a list of activities necessary to accomplish the Proposed Action and alternatives was first developed (section 2.0). Next, the environmental setting was described, with emphasis on any special environmental sensitivity (section 3.0). The alternatives were then compared with the potentially affected environmental components to determine the environmental impacts of the proposed activities at the Boeing Complex.

Proposed activities were also reviewed against existing environmental documentation on current and planned actions and information on anticipated future projects to determine the potential for cumulative impacts.

To help define the affected environment and determine the significance of program-related effects, written, personal, and telephone contacts were made.

4.1 GDIL TEST AND TRAINING FACILITY

4.1.1 AIR QUALITY

Environmental Effects

Installation. Impacts to the air quality resource due to the Proposed Action would occur during the installation process. Dust emissions would vary from day to day depending on the level and type of ongoing activity, soil makeup, and current meteorological conditions. Standard day-to-day operations at the completed site would also add incrementally to the current emissions levels. However, given the small area of site disturbance, which is less than 0.8 hectare (2 acres), and the short-duration of activities, only minor temporary emissions would be generated.

Standard methods would be employed to minimize fugitive dust emissions during installation activities. These methods could include watering (up to 50 percent reduction of overall site fugitive dust emissions) and chemical stabilization of exposed inactive areas (up to 80 percent reduction in these areas). (Environmental Protection Agency, 1999)

Specific emission levels would change as machinery requirements varied throughout the installation period. However, all installation activities would be conducted in accordance with applicable regulations and permits. Emissions due to these activities, when added to the existing emissions, would not exceed threshold levels or change the regional attainment status; therefore, no long-term impacts to air quality are anticipated.

Operations. Daily operation would result in a slight increase in traffic levels and a commensurate increase in mobile source emissions. Daily power consumption would be provided by established power sources. No impact to air quality is anticipated from these minimal releases.

Cumulative Impacts

Installation activities would generate particulate emissions (dust) that would add to the impacts from other dust sources in the area. Standard dust suppression techniques would be employed to reduce the amount of dust generated. Emissions from mobile sources would add cumulatively to emissions from other traffic sources in the area. These emissions are not anticipated to result in a measurable impact on air quality within the ROI.

4.1.2 AIRSPACE

Environmental Effects

Installation. Proposed activities at the Boeing facility would require the use of a crane to install the launch cell casing and an erector to install the test missile. The crane and the erector height will not be determined until a contractor is selected; however, none of the proposed facilities or equipment are anticipated to extend beyond 61 meters (200 feet) above ground level; therefore, no informal obstruction evaluation would be necessary.

Operations. Daily operation would not have any effect on surrounding airspace activities.

Cumulative Impacts

Adherence to any determinations or recommendations made by the FAA would preclude the potential for cumulative impacts to existing airspace.

4.1.3 GEOLOGY AND SOILS

Environmental Effects

The installation and operational impacts associated with the proposed project at the GDIL installation site could potentially impact soils in the ROI.

Installation. Compliance with the NPDES SWPPP would minimize soil erosion and pollutant discharges during installation activities. In addition, compliance with the Spill Prevention Control and Countermeasures (SPCC) plan would minimize the potential for accidental spills of hazardous chemicals to affect project soils. Also, site disturbance from the proposed activities would affect less than 0.8 hectare (2 acres), which is a very small proportion to the total land area held by Boeing.

Operations. The proposed operations are not expected to result in long-term changes in the chemical composition or physical characteristics of soils located within the project's ROI.

Compliance with the NPDES SWPPP would minimize soil erosion and pollutant discharges during project operations. Compliance with the SPCC plan would minimize the potential for accidental spills of hazardous chemicals to affect project soils. As a result, operational activities are not expected to result in long-term changes in the chemical composition of soils located within the project's ROI.

Because the proposed facility installation site is located in a low seismic risk area, the potential occurrence of liquefaction, seismic settlement, or ground rupture at the project site is considered minimal. In addition, soil at the proposed site exhibits low to moderate shrink/swell susceptibility; therefore, no geotechnical problems are anticipated.

Cumulative Impacts

There are no past, present, or reasonably foreseeable future programs identified within the ROI for the Proposed Action that, when added to the potential impacts of the Proposed Action, would result in cumulative impacts.

4.1.4 HEALTH AND SAFETY

Environmental Effects

Installation. An area would be prepared for equipment laydown, personal vehicle parking, temporary mobile offices (trailers), maintenance facilities, and other needs. Materials would be delivered to the site by truck in accordance with Department of Transportation regulations. Blasting, if required, and other activities would comply with applicable safety requirements to control exposure to occupational safety and health hazards.

Operations. Facility and equipment designs would incorporate measures to minimize the potential for and impact of accidents and fires. Operating procedures and training would be instituted to minimize the potential for, and impact of, releases of hazardous materials. Appropriate emergency response plans would be established and implemented to deal with potential emergencies. All work would be conducted in accordance with Occupational Safety and Health Administration and other applicable health and safety regulations.

Cumulative Impacts

All work on the Proposed Action would be performed in accordance with applicable health and safety regulations. No injuries are anticipated. No other activities have been identified within the ROI that when combined with the Proposed Action would have a cumulative impact on health and safety.

4.1.5 WATER RESOURCES

Environmental Effects

Installation. Installation-related impacts to water resources are largely the result of sedimentation from erosion. Potential impacts associated with erosion and sedimentation include a reduction of basin or channel volumes and reduced availability of dissolved oxygen within receiving waters.

Installation of the additional facilities at the Boeing facility for the GDIL would result in the disturbance of less than 0.8 hectare (2 acres) of land and, therefore, would not be subject to NPDES permit requirements. There is no surface water within 2.4 kilometers (1.5 miles) of the site. The water table is present at a depth of approximately 12.8 meters (42 feet), and any seepage would have to be pumped out during the installation phase. This process would be short in duration and would not be an ongoing process because the launch cell simulator after installation would be waterproof and necessary measures would be taken to help prevent soil erosion associated with the runoff from pumping out the water. A core drill was performed at the proposed launch cell simulator location, and no free flowing water or aquifers were detected (Ground Engineering and Testing Service/AT&E, 1998). The proposed launch cell simulator location is outside of the Madison County and City of Huntsville Wellhead Protection Areas. Soil erosion and pollutant discharges during the installation phase and the potential for accidental spills of hazardous chemicals to affect surface and groundwater resources would be minimal.

Operations. The risk of accidental releases of hazardous materials or wastes is considered minimal. All activities conducted on the project site would be required to comply with the existing SPCC Plan. Compliance with the SPCC Plan would minimize the potential for accidental spills of hazardous chemicals to affect surface and groundwater resources.

Storm water is currently discharged to local water courses in compliance with an NPDES permit administered by the Alabama Department of Environmental Management.

Executive Order 11988, *Floodplain Management*, directs Federal agencies to avoid the long- and short-term adverse impacts associated with occupancy and modification of floodplains. Areas proposed for additional GDIL activities are located within previously disturbed areas that are elevated above the 100-year floodplain. As a result, risk of flooding at the project site is not anticipated.

Cumulative Impacts

There are no past, present, or reasonably foreseeable future programs identified within the ROI for the additional GDIL program activities that, when added to the potential impacts of the Proposed Action, would result in cumulative impacts.

4.2 ENVIRONMENTAL EFFECTS OF THE NO-ACTION ALTERNATIVE

If the No-action Alternative is selected, no environmental consequences associated with the GDIL facility would occur.

4.3 ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

Adverse environmental effects that cannot be avoided include the release of small amounts of pollutants into the atmosphere; minor increase in erosion of soils; minor increased generation of hazardous materials; and increased noise levels at the GDIL installation site. However, through implementation of the program actions described within this document, these effects would be minimized.

4.4 CONFLICTS WITH FEDERAL, REGIONAL, STATE, LOCAL, OR NATIVE AMERICAN LAND-USE PLANS, POLICIES, AND CONTROLS

The proposed installation of facilities and operational activities would comply with applicable Federal, state, and local laws and regulations.

Proposed activities occurring at the site would have virtually no impact on land use itself and present no conflicts with Federal, regional, state, local, or American Indian land-use plans, policies, or controls.

4.5 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

Anticipated energy requirements of program activities can be accommodated within the energy supply of the region. Energy requirements would be subject to any established energy conservation practices.

4.6 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

The Proposed Action would result in a minor loss of habitat for plants or animals, no loss of, or impact on, threatened or endangered species, and no loss of cultural resources, such as archaeological or historic sites. Moreover, there would be no changes in land use nor preclusion of development of underground mineral resources that were not already precluded.

The amount of materials and energy required for any program-related activities would be small. Although the proposed activities would result in some irreversible and irretrievable commitment of resources such as various metallic materials, minerals, and labor, this commitment of resources is not significantly different from that necessary for many other defense research and development programs.

4.7 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE HUMAN ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Proposed installation and operational activities would take advantage of existing facilities and infrastructure. The upgrades to this site would not alter the uses of the site. Therefore, the Proposed Action does not eliminate any options for future use of the environment for the locations under consideration.

4.8 NATURAL OR DEPLETABLE RESOURCE REQUIREMENTS AND CONSERVATION POTENTIAL

Other than the use of various structural materials and fuels, no significant use of natural or depletable resources would be required for proposed installation and operational activities.

4.9 FEDERAL ACTIONS TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS

As described above, no significant impacts to human health and the environment are anticipated from implementation of the Proposed Action. The general area is zoned for commercial and airport use, and there are no nearby residences; therefore, no impacts to disproportionate low-income or minority groups would be expected.

5.0 REFERENCES

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APPENDIX A

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