Environmental Assessment for Integration, Assembly, Test, and Checkout of National Missile Defense Components at Redstone Arsenal, Alabama

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The purpose of the IAT&C program is to provide facilities in which National Missile Defense (NMD) interceptor missiles can be integrated and assembled prior to their use in testing or their deployment as part of the NMD system. Boeing does not have suitable facilities at its Huntsville plant to assemble or store the missiles. There are no facilities at Redstone Arsenal currently configured to be able to assemble the NMD interceptors. Modification of existing government facilities would minimize the time and cost needed to obtain the required facilities. This is critical to DoD's goal of developing a deployable NMD system within 3 years to ensure that the United States has the capability to protect its people against ballistic missile threats.

The proposed action consists of three activities. The first would be the rehabilitation or facility upgrade of an existing complex of buildings and construction of a remote operator test blockhouse to provide an interceptor missile integration and assembly facility. The second activity would be the actual integration and assembly of interceptor missiles at the rehabilitated facility. The third would be storage of interceptor components and completed interceptors that cannot be immediately shipped.

Integration and assembly of the interceptor missile would include installing electronics, wiring, and ordnance in each of the stages; mating the stages together; mating the kill vehicle (KV) to the Flight Vehicle; and containerizing the entire interceptor missile. Final acceptance tests and checks would be made and the sealed shipping canister charged with nitrogen. The assembled and containerized interceptor missile would then be roll transferred into a Missile Transporter, similar to a tractor-trailer. Final deployment sites have not been selected, but alternatives are being evaluated in an NMD Deployment Environmental Impact Statement currently being prepared.

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ENVIRONMENTAL ASSESSMENT
FOR INTEGRATION, ASSEMBLY, TEST, AND CHECKOUT OF NATIONAL MISSILE DEFENSE COMPONENTS AT REDSTONE ARSENAL

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 (DoD) Directive 6050.1, and Army Regulation 200-2, the USASMDC has conducted an Environmental Assessment (EA) of the potential environmental consequences for the Integration, Assembly, Test, and Checkout (IAT&C) of National Missile Defense (NMD) Components at Redstone Arsenal, Alabama, program activities.

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 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 proposed modifying and using existing facilities on Redstone Arsenal to assemble the interceptor missiles.

The purpose of the IAT&C program is to provide facilities in which NMD interceptor missiles can be assembled prior to their use in testing or their deployment as part of the NMD system. There are no facilities at Redstone Arsenal currently configured to be able to assemble the NMD interceptors. Modification of existing government facilities would minimize the time and cost needed to obtain the required facilities.

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: The proposed action consists of three activities. The first would be the rehabilitation or facility upgrade of an existing complex of buildings and construction of a remote operator test blockhouse (ROTB) to provide facilities for interceptor missile integration, assembly, test, and checkout. The second activity would be the actual integration, assembly, test, and checkout of interceptor missiles at the rehabilitated facilities. The third would be storage of completed interceptors that cannot be shipped immediately.

Facility construction, upgrade, and rehabilitation would take place in the "South Plant" of the old Morton-Thiokol facility, located south of Redstone Road on Redstone Arsenal. The facilities upgrade would consist of renovations to three buildings (7571, 7575, 7578) and addition of a security fence that would surround the three buildings. The possible need for increased assembly requirements is anticipated; however, the specific design and location requirements have not yet been determined. A 16-square meter (168-square foot) ROTB would be constructed 229 meters (750 feet) northwest of Building 7578.

Flight vehicle is a term that refers to the missile without the payload. The interceptor flight vehicle would be composed of three stages. These stages or boosters are considered Commercial Off-the-Shelf (COTS) components and were not originally developed for NMD activities. The solid propellant for each of the stages would be installed and sealed before the components arrive at the IAT&C facilities. The propellant would remain in place during assembly and would not be exposed or opened in any way.

Integration and assembly of the interceptor missile would include installing electronics, wiring, and ordnance in each of the stages; mating the stages together; mating the kill vehicle to the Flight Vehicle; and containerizing the entire interceptor missile. Final acceptance tests and checks would be made and the sealed shipping canister charged with nitrogen. The ROTB would house test equipment and approximately four people who would be involved in testing the full up vehicle. Test activities in this building would occur during second shift for approximately one to two days. A cable conduit approximately 10 to 15 centimeters (4 to 6 inches) in diameter would be laid above ground from Building 7578 to within 15 meters (50 feet) of the ROTB. The conduit would be buried below the frost line, at a depth of 30 centimeters (12 inches) for the remaining 15 meters (50 feet). The assembled and containerized interceptor missile would then be roll transferred into a Missile Transporter, similar to a tractor-trailer.

Some interceptors may require storage before they are transported to test or deployment sites. If for some reason interceptors cannot be shipped immediately, they would be moved to one of five concrete ammunition storage igloos (7321, 7322, 7322, 7323, 7324, or 7325) located within Redstone Technical Test Center property on Redstone Arsenal approximately 5 kilometers (3 miles) north of the assembly facility. Additionally, in some cases, interceptor components could arrive before they can be moved into the IAT&C facilities and would be stored until needed. These storage igloos have been upgraded and maintained since original construction, and are environmentally controlled. These storage igloos are currently sited for hazard class 1.1 and 1.3 explosives and meet the explosion hazard distance requirements as set by the DoD Explosive Safety Board.

ALTERNATIVES CONSIDERED: At the outset of the IAT&C proposal, the following locations inside the continental United States were considered for use:

1. Hill AFB—Ogden, Utah
2. Contractor Sites—Magna, Utah, and San Jose, California
3. Redstone Arsenal, Alabama

Hill AFB was initially evaluated as a potential site for the IAT&C Facility. At that time, the NMD Program was assessing whether to use Minuteman vehicles or existing boosters. Hill AFB currently assembles the Minuteman missile and would be an appropriate site for the IAT&C facility if the program chose to use Minuteman vehicles. However, based on

technical requirements, the program selected the COTS booster. Hill AFB is not considered a reasonable alternative based on conflicts with its current mission. The commercial booster manufacturing sites located in Magna, Utah, and San Jose, California, were evaluated as potential sites for the IAT&C facilities. However, IAT&C type facilities are not available at either location so either of these sites would require the construction of new facilities on privately owned property. Building new facilities would have a greater impact to the environment, the program cost, and the program schedule than using existing facilities. Additionally, no Boeing or NMD presence exists within the proximity of these locations and therefore these locations were not considered reasonable alternatives.

Redstone Arsenal, Huntsville, Alabama, was selected as the candidate location for the IAT&C facilities. Redstone Arsenal is a U.S. Army installation, home to the U.S. Army Aviation and Missile Command and has supported the manufacture of missiles since World War II. Numerous facilities are vacant and available for manufacturing and storage of missiles. A fire station, hazardous material response team, security personnel, and airport are located at the Arsenal. Additionally, Redstone Arsenal is within 24 kilometers (15 miles) of existing Boeing and NMD Operations. The choice of Redstone Arsenal minimizes the overall impact to the environment, utilizes existing government facilities, provides the best opportunity for schedule success, and reduces significantly the cost outlay for the program.

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 impacts were air quality, biological resources, cultural resources, geology and soils, hazardous materials and waste, health and safety, land use, noise, 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. Potential environmental impacts are shown in table 1.

Under the No-action Alternative, no environmental consequences associated with the IAT&C activities are anticipated.

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

DEADLINE FOR RECEIPT OF WRITTEN COMMENTS: 30 March 1999

POINT OF CONTACT: Submit written comments or requests for a copy of the IAT&C EA to:

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

ENVIRONMENTAL ASSESSMENT
FOR INTEGRATION, ASSEMBLY, TEST, AND CHECKOUT OF NATIONAL MISSILE DEFENSE COMPONENTS AT REDSTONE ARSENAL

UNITED STATES ARMY SPACE AND MISSILE DEFENSE COMMAND

AGENCY: Ballistic Missile Defense Organization (BMDO)

ACTION: Finding of No Significant Impact

PROPONENT:

Willie B Man DATE: 3 March 1999

APPROVED:

Emmitt E. Gibson DATE: 5 March 1999

Emmitt E. Gibson
Major General, U.S. Army
Commanding

APPROVED:

Leslie R. Kayle DATE: 8 March 1999

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 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 and has proposed modifying and using existing facilities on Redstone Arsenal to assemble the interceptor missiles.

The proposed action is to provide facilities in which NMD interceptor missiles can be assembled prior to their use in testing or their deployment as part of the NMD system. Boeing does not have suitable facilities at its Huntsville plant to assemble or store the missiles. There are no facilities at Redstone Arsenal currently configured to be able to assemble the NMD interceptors. Modification of existing government facilities would minimize the time and cost needed to obtain the required facilities.

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.

Proposed Activities

The proposed action consists of three activities. The first would be the rehabilitation or facility upgrade of an existing complex of buildings and the construction of a concrete Remote Operator Test Blockhouse (ROTB) to provide an interceptor missile integration and assembly facility. The second activity would be the actual integration, assembly, test, and checkout (IAT&C) of interceptor missiles at the rehabilitated facility. The third would be storage of completed interceptors that cannot be shipped immediately.

Facility upgrade, rehabilitation, and construction would take place in the "South Plant" of the old Morton-Thiokol facility, located south of Redstone Road on Redstone Arsenal. The facilities upgrade would consist of renovations to three buildings (7571, 7575, 7578), addition of a security fence that would surround the three buildings, and addition of pavement adjacent to the road in front of Building 7578. A 16-square meter (168-square foot) ROTB would be constructed 229 meters (750 feet) northwest of Building 7578.

Some interceptors may require storage before they are transported to test or deployment sites. If for some reason interceptors cannot be shipped immediately, they would be moved to one of five concrete ammunition storage igloos located on Redstone Arsenal approximately 5 kilometers (3 miles) northwest of the assembly facility. Additionally, in some cases, interceptor components could arrive before they can be moved into the integration and assembly facility and would be stored until needed. These storage igloos have been upgraded and maintained since original construction, and are environmentally controlled, but would require additional paving to allow for movement of the interceptor. The storage igloos are located within secure Redstone Technical Test Center property. These storage igloos are currently sited for hazard class 1.1 and 1.3 explosives and meet the explosion hazard distance requirements as set by the DoD Explosive Safety Board.

Future requirements may involve the upgrade and construction of additional buildings. The possible need for increased assembly requirements is anticipated; however, the specific design and location requirements have not yet been determined. Should the need for more renovations or construction be realized, additional environmental analysis would be prepared.

The interceptor flight vehicle would be composed of three solid propellant stages. These stages or boosters are considered commercial off-the-shelf components and were not originally developed for NMD activities. The solid propellant for each of the stages would be installed and sealed before the components arrive at Redstone Arsenal. The propellant would remain in place during assembly and would not be exposed or opened in any way.

The Kill Vehicle (KV) is located on the very tip of the interceptor missile. This is the part of the missile that actually intercepts and impacts an incoming enemy warhead. The KV would contain approximately 9 to 14 kilograms (20 to 30 pounds) of liquid propellant (monomethylhydrazine and nitrogen tetroxide). These propellants will be properly contained and shipped in sealed tanks. The tanks would be installed on the KV before shipment. No fueling of tanks would occur at the IAT&C facilities. If a leak develops in a tank, it will be site neutralized and returned to the manufacturer.

All transportation of interceptor stages and the final containerized interceptors within the continental United States would be performed in accordance with appropriate U.S. Department of Transportation approved procedures and routing, Occupational Safety and Health Administration requirements, and U.S. Army safety regulations.

Integration and assembly of the interceptor missile would include installing electronics, wiring, and ordnance in each of the stages; mating the stages together; mating the KV to the Flight Vehicle; and containerizing the entire interceptor missile. Final acceptance tests and checks would be made and the sealed shipping canister charged with nitrogen. The assembled and containerized interceptor missile would then be roll transferred into a Missile Transporter, similar to a tractor-trailer.

The first two test interceptors would be transported to Vandenberg Air Force Base (AFB) by either air or road, with air being the preferred option. These interceptors would be

shipped sealed in their canister with destruct ordnance installed, but no liquid fuels on board. Approximately 10 additional test interceptors would be transported to the U.S. Army Kwajalein Atoll by either truck transport to Travis AFB, California, then on to the U.S. Army Kwajalein Atoll by air, or by air transport direct from the Redstone Army Airfield. The first interceptor to Kwajalein would be shipped without liquid fuels; however, all remaining missiles to Kwajalein would be shipped fueled. Transport of interceptors to the deployment sites would be either by road, rail, air, barge, or a combination thereof.

Methodology

This Environmental Assessment (EA) evaluates the potential environmental effects of modifying facilities at Redstone Arsenal, Alabama, to assemble and store NMD interceptor missiles. It also evaluates related activities, such as security and safety measures associated with the assembly and storage of the missiles that could have potential impacts on public health and safety or the environment. This analysis is tiered from the Ballistic Missile Defense Final Programmatic EIS that evaluated NMD programmatic activities, such as research and development, testing, production, and the general NMD operational concept.

Twelve broad areas of environmental consideration were originally 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. Three of the topics, airspace, infrastructure, and socioeconomics, were dismissed. The proposed activities would not impact airspace. No impacts are anticipated to infrastructure since existing infrastructure would be used for the proposed activities and all systems are operating within or under capacity. Although approximately 50 jobs would be created by the proposed action, these personnel would be drawn from Boeing's existing workforce; thus minimizing potential beneficial impacts to the socioeconomics of the region. Nine areas of environmental consideration were evaluated 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. The nine areas are air quality, biological resources, cultural resources, geology and soils, hazardous materials and waste, health and safety, land use, noise, and water resources.

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 nine 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 IAT&C activities at Redstone Arsenal present the potential for impact to air quality due to dust emissions during construction/modification and emissions from standard day-to-day operations. Standard methods would be employed to minimize construction emissions. Daily operation would result in only a minor increase in traffic

levels and related mobile source emissions, and the action would be conducted in accordance with the existing operating permit. Therefore, no long-term impacts to ambient air quality would be anticipated due to proposed activities.

Biological Resources. Construction/modification and all other IAT&C activities would be conducted in accordance with Redstone Arsenal guidelines to minimize disruption of wildlife and habitat in the area. Construction/modification noise and increased human activity would result in localized and short-term effects to wildlife. No listed endangered species are known to occur in the immediate area. IAT&C activities are not expected to result in long-term impacts to any biological species, including threatened or endangered species. Best Management Practices such as filtering sediment from storm water runoff during construction would be implemented and no impacts to wetlands are anticipated.

Cultural Resources. Construction/modification ground disturbance required for IAT&C activities would occur in previously disturbed areas. If cultural sites are located during the proposed fencing activities and determined to be eligible for listing on the National Register of Historic Places, they would be avoided, or appropriate mitigations would be developed in consultation with the Alabama State Historic Preservation Officer and the Advisory Council on Historic Preservation in accordance with Section 106 of the National Historic Preservation Act. If burial sites are detected during ground disturbing activities, work will cease and the Alabama Historical Commission will be notified immediately.

Geology and Soils. Small areas of soils would be disturbed by IAT&C construction/ modification 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 Redstone Arsenal Standard Operating Procedures (SOPs) and Regulations to minimize soil disturbance. Standard methods employed during construction would minimize dust generation and erosion.

Hazardous Materials and Hazardous Wastes. The proposed IAT&C activities would slightly increase the use of hazardous materials and consequently increase the generation of hazardous wastes. At the integration and assembly facilities, these hazardous materials and hazardous wastes could include solvents, paints, oils, and greases normally used in similar operations. Employees at these facilities will handle, store, and dispose of hazardous materials and waste in accordance with all applicable regulations and procedures.

All hazardous materials, such as solvents, paints, propellants, and ordnance would be handled, stored, and disposed of in accordance with Redstone Arsenal's established procedures pertaining to hazardous materials and hazardous wastes and all applicable Federal, state, and local regulations and procedures. IAT&C activities will generate minimal levels of hazardous wastes.

Asbestos that has been identified in pipes and valves in Building 7571 would not be disturbed. Lead-based paints on surfaces of materials to be removed during building

modification would be removed in accordance with the applicable health and safety standards and disposed of as hazardous waste. An investigation conducted as part of the Phase I Environmental Baseline Survey did not identify any PCB-containing transformers at the South Plant and all PCB-containing transformers have been removed from the igloo area.

Health and Safety. IAT&C activities at Redstone Arsenal have the potential to impact the health and safety of project personnel and non-project Arsenal employees. The health and safety of project personnel could be impacted by unforeseen and unplanned emergency conditions. However, operating procedures and safety measures have been established to minimize the potential for health and safety impacts. These measures include the restriction of operations to essential personnel only, establishment of a 381-meter (1,250-foot) explosive safety quantity-distance, and the establishment of appropriate emergency response plans.

The IAT&C program would be located within a restricted access area, and would incorporate a variety of SOPs, security devices, and precautionary operating restraints. The incorporation of these steps and the continuing development of safe operating procedures as each activity is fully defined would protect operations personnel and non-project Redstone Arsenal personnel from adverse health or safety impacts.

Land Use. Proposed activities would occur within an established industrial land use area. The IAT&C activities are compatible with the site land use designations. Activities would not conflict with adjacent surrounding land uses.

The proposed facilities would be compatible with the existing land uses. None of the proposed IAT&C facilities locations would conflict with the base Master Plan. Proposed activities would not impact any off-base land uses.

Noise. The closest noise sensitive receptor to the proposed IAT&C facilities is less than a mile off base. The proposed IAT&C activities would generate construction and testing related noise levels similar to the existing noise environment at Redstone Arsenal and noise levels from the proposed activities would be inaudible in this area. No new noise levels would be produced; therefore, no noise impacts are expected from the IAT&C program.

Water Resources. The potential for accidental spills of hazardous chemicals to affect surface and groundwater would be minimal. All activities would be carried out in accordance with appropriate regulations, and the quality of surface water and groundwater would not be measurably changed.

Environmental Justice. The proposed activities would be conducted in a manner that would not substantially affect human health or the environment. The activities would also be conducted within the existing boundaries of an active military installation, and would not produce emissions or other environmental effects that would have a disproportionate or inordinate impact on low-income or minority groups.

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ACRONYMS AND ABBREVIATIONS

ADEM	Alabama Department of Environmental Management
AFB	Air Force Base
AMCOM	Aviation and Missile Command
AOC	Area of Concern
BMDO	Ballistic Missile Defense Organization
BMD PEIS	*Ballistic Missile Defense Final Programmatic Environmental Impact Statement*
BOE	Bureau of Explosives
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COTS	Commercial Off-the-shelf
CWA	Clean Water Act
dB	Decibel(s)
dBA	A-weighted decibel(s) (sound level)
DEMP	Directorate of Environmental Management and Planning
DoD	Department of Defense
DOT	Department of Transportation
DRMO	Defense Reutilization and Marketing Office
EA	Environmental Assessment
EBS	Environmental Baseline Survey
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESQD	Explosive Safety Quantity-distance

GBI	Ground Based Interceptor
GFF	Government Furnished Facilities
HMWMS	Hazardous Materials/Waste Management System
HVAC	Heating, Ventilation, and Air Conditioning
IAT&C	Integration, Assembly, Test, and Checkout
KV	Kill Vehicle
kVA	Kilovolt-ampere
kW	Kilowatt
LSI	Lead System Integrator
mg/m^3	Milligrams per cubic meter
$\mu g/m^3$	Micrograms per cubic meter
MMH	Monomethylhydrazine
MSFC	Marshall Space Flight Center
msl	Mean Sea Level
MT	Missile Transporter
N_2O_4	Nitrogen Tetroxide
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NMD	National Missile Defense
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
ppm	Parts per Million
PSD	Prevention of Significant Deterioration
RASA	Redstone Arsenal Support Activity

RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
RTTC	Redstone Technical Test Center
SHPO	State Historic Preservation Officer
SPCC	Spill Prevention Control and Countermeasures Plan
SWMU	Solid Waste Management Unit
SWPPP	Storm Water Pollution Prevention Plan
TVA	Tennessee Valley Authority
USAKA	U.S. Army Kwajalein Atoll
USASMDC	U.S. Army Space and Missile Defense Command
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
UST	Underground Storage Tank

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1.0 INTRODUCTION

1.1 INTRODUCTION

The National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) Regulations implementing NEPA, and Department of Defense (DoD) and Army implementing regulations require Army and 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 the modification and use of facilities at Redstone Arsenal in Huntsville, Alabama, to assemble national missile defense (NMD) interceptor missiles. The interceptor missile, an integral element of the NMD system, is designed to destroy enemy missile warheads by impact before they can reach targets in the United States.

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 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 (LSI) to develop the NMD system in preparation for a deployment decision and has proposed modifying and using existing facilities on Redstone Arsenal to assemble the interceptor missiles.

1.3 PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the proposed action is to provide facilities in which NMD interceptor missiles can be assembled prior to their use in testing or their deployment as part of the NMD system. Boeing does not have suitable facilities at its Huntsville plant to assemble or store the missiles. There are no facilities at Redstone Arsenal currently configured to be able to assemble the NMD interceptors. Modification of existing government facilities would minimize the time and cost needed to obtain the required facilities.

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 modify facilities at Redstone Arsenal to assemble and store the NMD interceptor missiles.

1.5 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

This EA evaluates the potential environmental effects of modifying facilities at Redstone Arsenal, Alabama, to integrate, assemble, test, checkout, and store NMD interceptor missiles. It also evaluates related activities, such as security and safety measures associated with the assembly and storage of the missiles that could have potential impacts on public health and safety or the environment. 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. Environmental analysis of flight test activities at Vandenberg Air Force Base (AFB) is also being prepared by the U.S. Air Force. Deployment of the NMD system at specific sites is being evaluated in a separate Environmental Impact Statement (EIS), 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.

Nichols, 1998. *Architectural and Historic Inventory of Buildings and Structures Dating to the Cold War Era (1946-1989) at Redstone Arsenal.*

U.S. Army Corps of Engineers, 1996. *Phase I Environmental Baseline Study Redstone Arsenal Rocket Engine Assembly Facility South Plant*, Brown and Root Environmental, May.

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U.S. Army Missile Command, 1997. *Environmental Assessment for Resource Recovery and Recycling Operations at Redstone Technical Test Center Test Area 10*, July.

U.S. Army Missile Command, 1998. *Architectural Assessment of the WWII Military and Civilian Works,* Redstone Arsenal, Madison County, Alabama, Nolte et al.

U.S. Army Space and Missile Defense Command, 1997. *Theater Ballistic Missile Targets Programmatic Environmental Assessment*, Vandenberg Air Force Base, California, December.

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

U.S. Department of Defense, Ballistic Missile Defense Organization, 1999. *Final National Missile Defense Joint Program Office (NMD JPO) Parcel-specific Environmental Baseline Survey (EBS) for Government-furnished Facilities Rocket Engine Assembly Facility, North and South Plants, Redstone Arsenal, Alabama*, January.

Table 1: IAT&C Proposed Action Activities and Environmental Impacts

Activity	Air Quality	Biological Resources	Cultural Resources	Geology and Soils	Hazardous Materials and Waste	Health and Safety	Land Use	Noise	Water Resources
Integration, Assembly, Test, and Checkout									
Building 7571	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Building 7575	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Building 7578	Insignificant Impact	Insignificant Impact	No Impact	Insignificant Impact	Insignificant Impact	No Impact	No Impact	No Impact	No Impact
Remote Operator Test Blockhouse	Insignificant Impact	Insignificant Impact	No Impact	Insignificant Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Storage Igloos	Insignificant Impact	Insignificant Impact	No Impact	Insignificant Impact	No Impact	No Impact	No Impact	No Impact	No Impact

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2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The BMDO proposes to conduct NMD interceptor missile component assembly at Redstone Arsenal in Huntsville, Alabama. This effort would include the upgrade of existing facilities and the assembly of a minimum of 35 interceptor missiles for testing and deployment. The proposed action consists of three activities. The first would be the rehabilitation of an existing complex of buildings and construction of a concrete Remote Operator Test Blockhouse (ROTB) to provide an interceptor missile assembly and integration facility. The second activity would be the actual integration, assembly, test, and checkout (IAT&C) of interceptor missiles at the rehabilitated facility. The third would be storage of completed interceptors that cannot be shipped immediately. These activities are described in the following sections.

2.1 PROPOSED FACILITIES UPGRADE AND CONSTRUCTION

The proposed activities would take place in the South Plant of the old Morton-Thiokol facility, located south of Redstone Road on Redstone Arsenal (see figure 2-1). The facilities upgrade would consist of renovations to three buildings (7571, 7575, and 7578) and the addition of a security fence that would surround the three buildings. A 16-square meter (168-square foot) ROTB would be constructed 229 meters (750 feet) northwest of Building 7578.

Future requirements may involve the upgrade and use or construction of additional buildings. The possible need for increased assembly requirements is anticipated; however, the specific design and location requirements have not yet been determined. Should the need for more renovations or construction be realized, the required environmental analysis would be performed.

2.1.1 BUILDING 7571 UPGRADE

A portion of this building would be used for production field offices in accordance with the Environmental Site Safety Plan as approved by the DoD Explosive Safety Board. It is located north of Building 7578, as shown in figure 2-2. This building is currently unoccupied and contains 1,024 square meters (11,023 square feet) of floor space. This facility was remodeled in 1995 and would require no rehabilitation or utility upgrade for use in this activity. Some non-load-bearing interior walls may be rearranged to provide optimum use of space for offices. Some computer data/communications lines would also be installed. Approximately 25-30 persons would occupy this building.

Source: City of Huntsville, 1997.

EXPLANATION

- Roads
- Gate
- Project Location

Location Map

Redstone Arsenal, Alabama

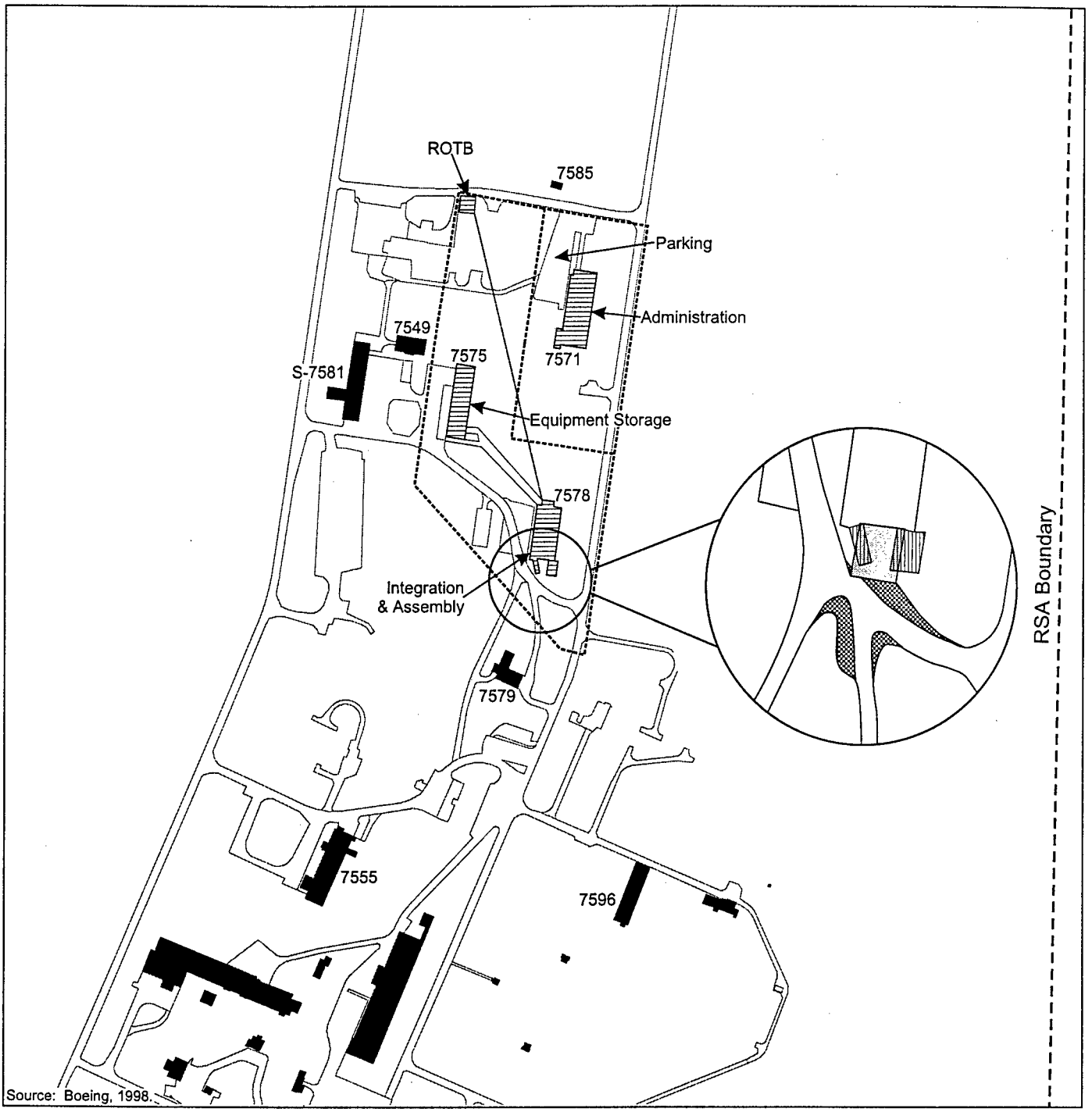
Figure 2-1

NORTH

Scale 1:100,000

0 .8 1.6 Miles

0 1.3 2.5 Kilometers



EXPLANATION

- Building
- IAT&C Facilities
- Fence
- ROTB = Remote Operator Test Blockhouse
- To Be Removed
- New Concrete Pad
- New Pavement

Scale
0 200 400 Feet
0 61 122 Meters
NORTH

004

Proposed IAT&C Activity Locations

Redstone Arsenal, Alabama

Figure 2-2

2.1.2 BUILDING 7575 UPGRADE

Building 7575 would be used to store equipment, tools, and missile components. Inert subassembly activities would occur prior to ordnance being delivered to Building 7578. No explosives or hazardous materials or wastes would be stored in this structure. This facility was originally constructed in 1942 and has been remodeled and enlarged since that time. Personnel would occasionally occupy this building when equipment, tools, or missile components are being checked out for assembly operations.

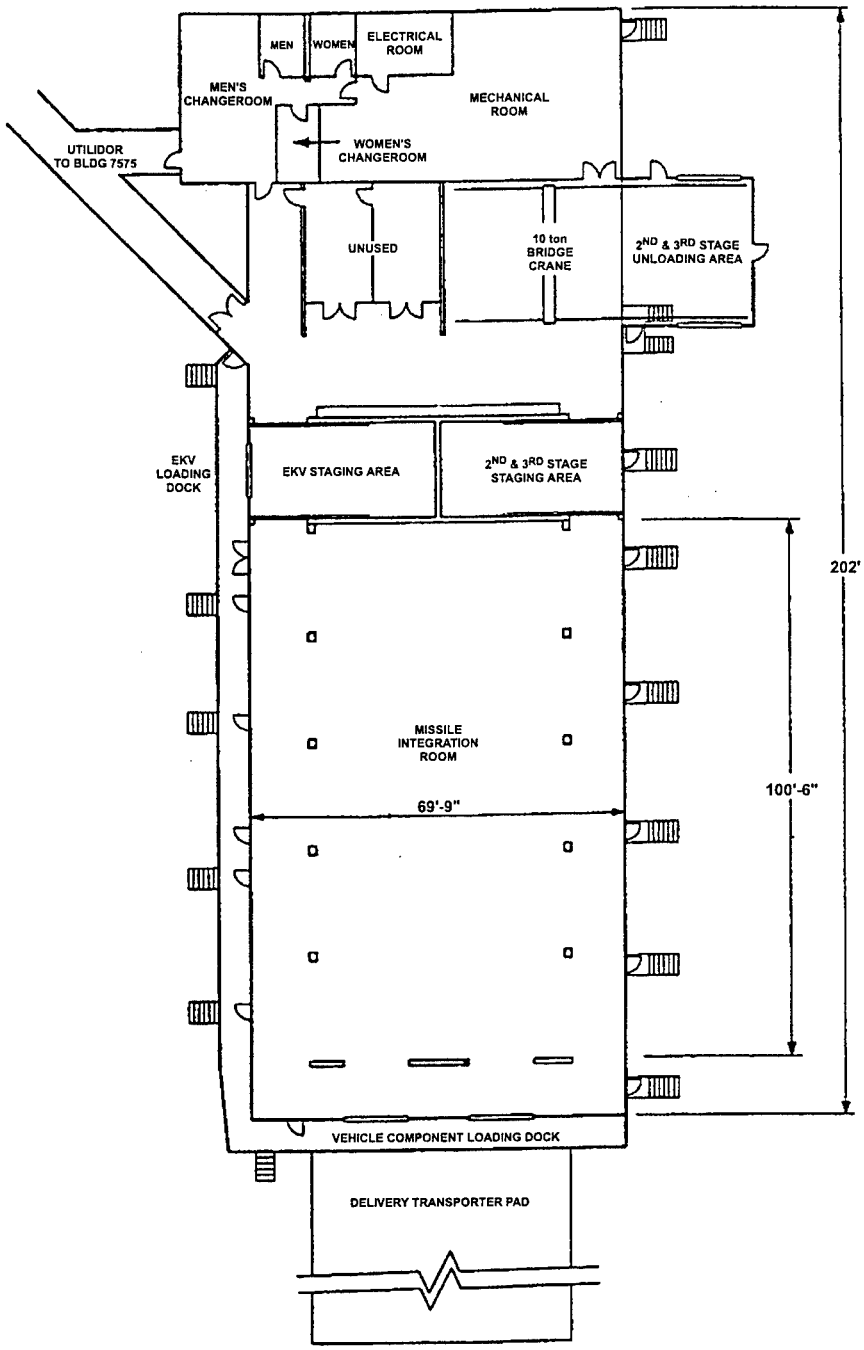
Building 7575 has been unoccupied since 1993. The exterior walls of the building are wood frame with a composite sheathing on the exterior and corrugated metal on the roof. There are four bays on the south end of the building, which are separated by 30-centimeter (12-inch) concrete walls. These bays are not enclosed and are open on each end, and would remain in that configuration. No structural changes would be made to Building 7575 as part of this activity, but extensive upgrades would be made to electrical, communications, and water systems to bring them up to current codes. A new heating and air conditioning system (HVAC) and a modern fire suppression system would also be installed.

Buildings 7575 and 7578 are connected by an aboveground passageway. The passageway is a steel frame structure with corrugated metal roof and side walls. The passageway is not insulated and does not contain any heating or cooling equipment. No modifications or upgrade would be required for the passageway.

2.1.3 BUILDING 7578 UPGRADE

This facility was originally constructed in 1942. It has been unoccupied since 1995. Approximately 20 people would work in this building. The exterior walls of the building are wood frame with a composite sheathing and corrugated metal on the exterior and corrugated metal on the roof. This building would be used for the integration and assembly of the interceptor missile. Extensive upgrade would be made to the electrical, communications, and water systems to bring them up to current codes. A new heating and air conditioning system (HVAC) and a modern fire suppression system would also be installed.

Extensive modifications to this building would be necessary to accommodate the interceptor missile assembly. Several rooms and a loading dock would be removed from the south side of the building. Several areas adjacent to the road in front of Building 7578 would be paved to allow for the turning radius of the transporter delivering the booster stages (figure 2-2). Additionally, two non load-bearing walls would be removed to make a large open bay work area in the center of the building. This area would be approximately 30 meters (100 feet) long. Figure 2-3 shows the Building 7578 floor plan as it would be configured after the proposed modifications.



Source: Boeing, 1998.

Building 7578 Layout

NORTH

fig2_3

Figure 2-3

2.1.4 REMOTE OPERATOR TEST BLOCKHOUSE

A 16-square meter (168-square foot) ROTB would be constructed 229 meters (750 feet) northwest of Building 7578 (figure 2-2). This building would house test equipment and approximately four people who would be involved in testing the full up vehicle. Test activities in this building would occur during second shift for approximately one to two days. A cable conduit approximately 10 to 15 centimeters (4 to 6 inches) in diameter would be laid above ground from the ROTB to within 15 meters (50 feet) of Building 7578. The conduit would be buried below the frost line, at a depth of 30 centimeters (12 inches) for the remaining 15 meters (50 feet). (Boeing, 1999)

2.1.5 SECURITY AND FIRE PROTECTION UPGRADES

The interceptor missile assembly complex would be a secure area with controlled or limited access (figure 2-2). An intrusion detection system (IDS) would be used to provide early warning of attempted intrusions. The intrusion detection system would consist of hardware and software components operated by facility security personnel.

An automatic fire detection and suppression system would be installed in Building 7578. This automatic system would also supervise alarms from manual pull stations. These pull stations would be provided to manually activate the local fire alarm system.

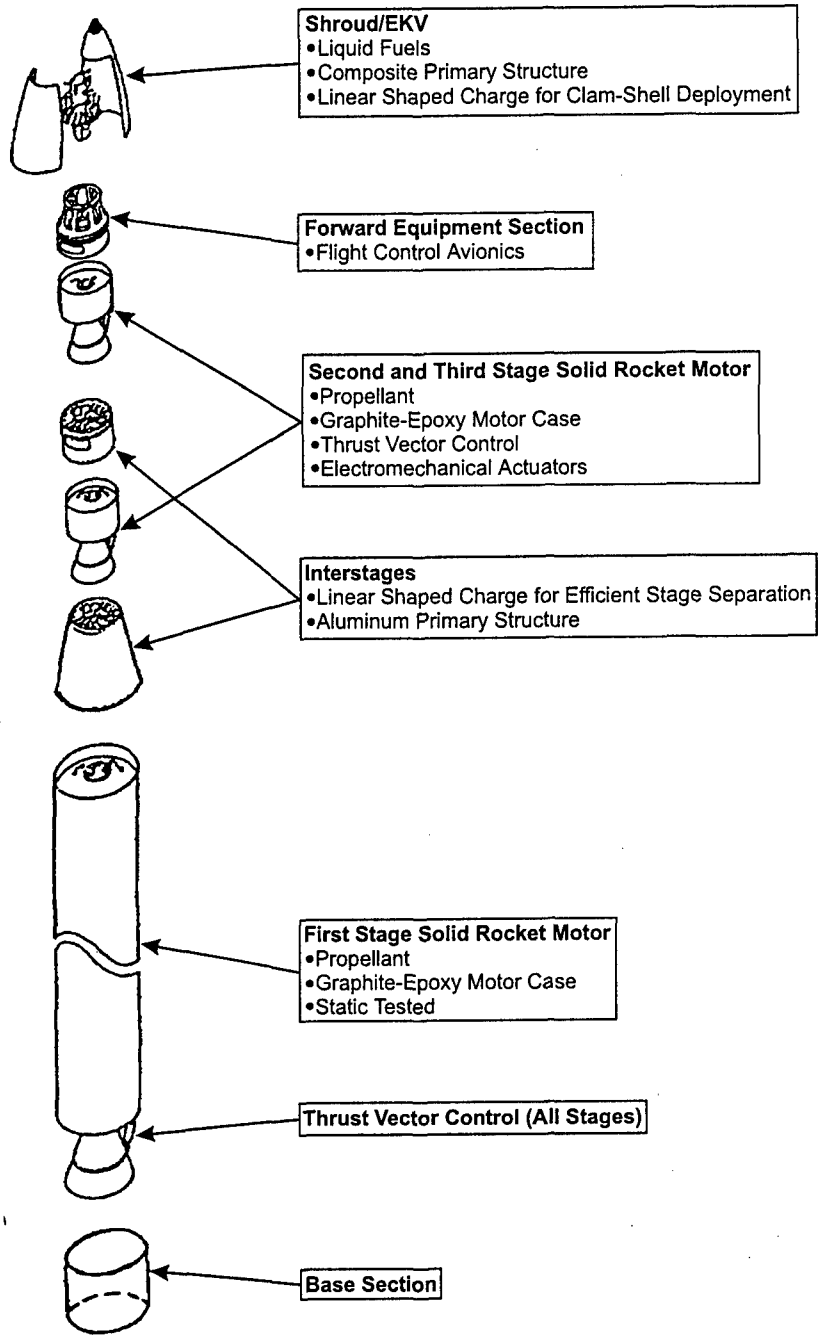
2.2 PROPOSED INTERCEPTOR MISSILE INTEGRATION AND ASSEMBLY

2.2.1 FLIGHT VEHICLE DESCRIPTION

Flight vehicle is a term that refers to the missile without the payload. The interceptor flight vehicle would be composed of three stages. These stages or boosters are considered Commercial Off-the-Shelf (COTS) components and were not originally developed for NMD activities. Figure 2-4 shows representative flight vehicle booster stages. Table 2-1 describes the approximate size and weight of each of the three booster stages.

Table 2-1: Approximate Size and Weight of Booster Stages

Stage	Length meters (feet)	Diameter meters (feet)	Total Weight kilograms (pounds) including propellant
1st Stage	10 (33)	1 (3)	13,120 (28,900)
2nd Stage	1 (4)	0.7 (2.3)	499 (1,100)
3rd Stage	1 (4)	0.7 (2.3)	499 (1,100)
Total	16 (51)	varies with stage	14,255 (31,400)



Source: Boeing, 1998.

Typical Interceptor Stages

Figure 2-4

Each stage of the flight vehicle is powered by solid rocket propellant. The first stage contains approximately 11,778 kilograms (25,942 pounds) of HTPB–QDL, a hydroxyl-terminated polybutadiene based propellant. The second and third stage boosters are much smaller, and each contains approximately 414 kilograms (912 pounds) of HTPB-UTP-19687A, also a hydroxyl-terminated polybutadiene based propellant. The propellant for each of the stages would be installed and sealed before the components arrive at Redstone Arsenal. The propellant would remain in place during assembly and would not be exposed or opened in any way.

2.2.2 PAYLOAD DESCRIPTION

The payload on this flight vehicle is the kill vehicle (KV). The KV is located on the very tip of the interceptor missile. This is the part of the missile that actually intercepts and impacts an incoming enemy warhead. The KV would contain approximately 9 to 14 kilograms (20 to 30 pounds) of liquid propellant. These liquid propellants would consist of monomethylhydrazine (MMH) and nitrogen tetroxide (N_2O_4). These propellants can be extremely hazardous if not properly contained and would be shipped in sealed tanks. The propellants would be put in sealed tanks that would be installed on the KV before shipment to the assembly facility at Redstone Arsenal. No fueling of tanks would occur at the IAT&C facilities. If a leak develops in a tank, it will be site neutralized and returned to the manufacturer.

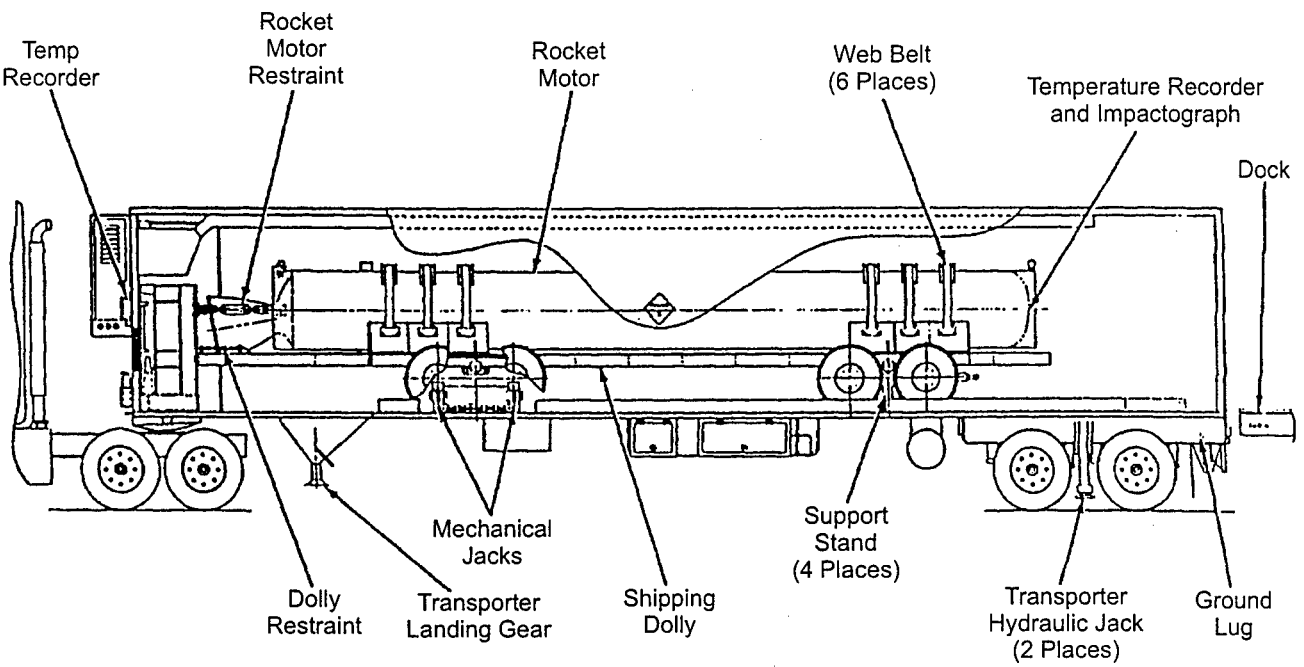
2.2.3 TRANSPORTATION OF COMPONENTS TO REDSTONE ARSENAL

The manufacturer producing the first stage solid rocket booster of the interceptor would be responsible for delivering the boosters to the IAT&C facilities at Redstone Arsenal. The rocket motors would be shipped inside a temperature controlled Air-Ride tractor-trailer transporter. Air Force Minuteman boosters of similar size have been transported on U.S. highways in these same Air-Ride transporters for many years. Only one motor would be shipped per transporter (see figure 2-5).

The manufacturer producing the second and third stage solid rocket boosters of the interceptor would be responsible for delivering the rocket boosters to the IAT&C facilities at Redstone Arsenal. Each rocket booster would be placed into a specially designed shipping container. The shipping container would then be placed inside a temperature controlled Air-Ride tractor-trailer transporter that would then deliver the rocket motor to the IAT&C facilities.

The KV would also be transported to Redstone Arsenal in a specially designed container, which would be placed inside a temperature controlled Air-Ride tractor-trailer transporter.

All transportation within the continental United States would be performed in accordance with appropriate U.S. Department of Transportation (DOT) approved procedures and routing, as well as Occupational Safety and Health Administration (OSHA) requirements and U.S. Army safety regulations. Liquid propellants would be transported in DOT



Source: Boeing, 1998.

Typical Transporter and Shipping Dolly

Figure 2-5

approved containers. Appropriate safety measures would be followed during transportation of the propellants as required by the DOT and as described in the Bureau of Explosives (BOE) Tariff No. BOE 6000-I, *Hazardous Materials Regulations of the Department of Transportation* (Association of American Railroads, 1992).

2.2.4 INTEGRATION, ASSEMBLY, TEST, AND CHECKOUT

Integration and assembly of the interceptor missile would include installing electronics, wiring, and ordnance in each of the stages; mating the stages together; mating the KV to the Flight Vehicle; and containerizing the entire interceptor missile.

The assembly process for each interceptor would require the use of small amounts of solvents and sealers. The solvent would most likely be isopropyl alcohol (or other environmentally acceptable cleaner), and the sealant would be Locktite, a commercially available thread sealant. Over several days of assembly, a maximum of 7.5 liters (2 gallons) of isopropyl alcohol and 0.5 liter (1 pint) of Locktite would be used per interceptor. No other hazardous materials would be used during this process, and no additional hazardous wastes would be generated.

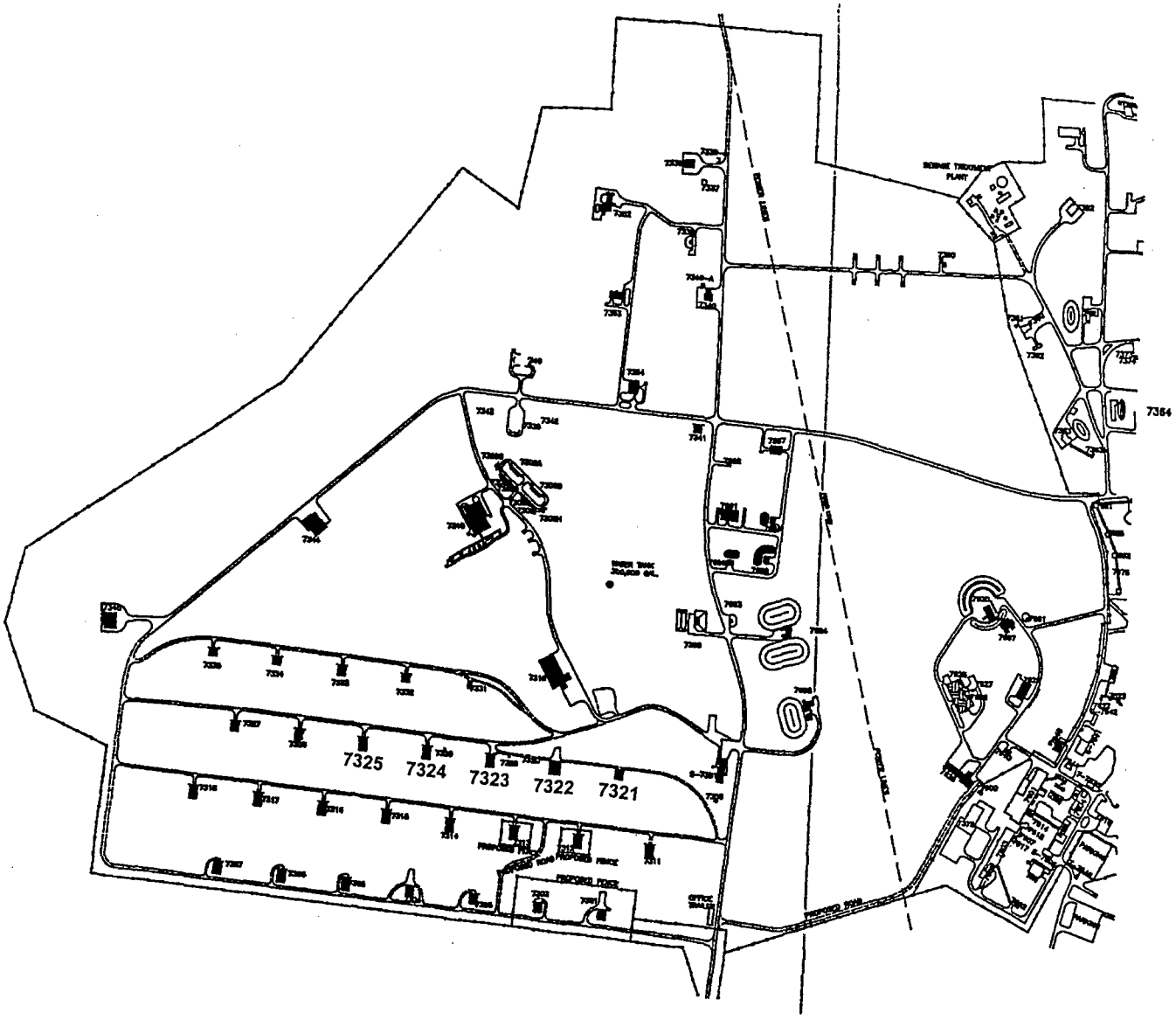
Final acceptance tests and checks would be made and the sealed canister filled with nitrogen. The assembled and containerized interceptor missile would then be roll transferred into an MT.

2.2.5 INTERCEPTOR STORAGE

Some interceptors may require storage before they are transported to test or deployment sites. If interceptors cannot be shipped immediately, they would be moved to one of five concrete ammunition storage igloos located approximately 5 kilometers (3 miles) northwest of the assembly facility (figure 2-6). Additionally, in some cases, interceptor components would arrive before they can be moved into the integration and assembly facilities and would be stored until needed. These storage igloos are World War II vintage. They have been upgraded and maintained since that time, and are environmentally conditioned. Approximately 8 meters (25 feet) and 23 to 46 meters (75 to 150 feet) of pavement may be added to facilitate access to igloo 7323 and igloo 7322, respectively. The storage igloos are located within Redstone Technical Test Center (RTTC) property: Buildings 7321, 7322, 7323, 7324, and 7325. These storage igloos are currently sited for hazard class 1.1 and 1.3 explosives and meet the explosion hazard distance requirements as set by the DoD Explosive Safety Board. The RTTC compound is a secure area, and no additional fencing or security would be required.

2.2.6 TRANSPORTATION OF THE INTERCEPTOR FROM REDSTONE ARSENAL

The interceptor missile would be shipped in its sealed canister from the IAT&C facility at Redstone Arsenal over the road or by rail or air to either the test ranges or to the deployment site in a Missile Transporter (MT). The MT is a special trailer designed to support the canisterized missile structurally and environmentally during both the transport



Source: U.S. Department of the Army, 1997.

Storage Igloos

Redstone Technical Test Center

Not to Scale

NORTH

Figure 2-6

and storage. Loading of the MT will be by roll-transfer direct from the IAT&C assembly rail stand. All interceptors would leave Building 7578 in the MT. The MT is designed to operate over the road at highway speeds or be shipped via military aircraft. Those interceptors departing Redstone by air will be driven to the Redstone Army Airfield about 13 kilometers (8 miles) away, where the MT will be loaded into the transport aircraft.

A cradle and roller system is provided to load and unload the canisterized missile. A crane may be required. Tie-down fittings are provided to secure the canister to the cradle and to the trailer side and end walls.

The first two interceptors would be transported by either air or road, with air being the preferred option, to Vandenberg AFB for testing. These interceptors would be shipped sealed in their canister with destruct ordnance installed, but no liquid fuels on board. Approximately 10 additional interceptors for testing will be transported to U.S. Army Kwajalein Atoll (USAKA) by either truck transport to Travis AFB, California, then on to USAKA by air, or by air transport direct from the Redstone Army Airfield. The first interceptor to USAKA would be shipped without liquid fuels; however, all remaining missiles to USAKA will be shipped fueled. Transport of interceptors to the deployment sites will be either by road, rail, air, barge, or a combination thereof. As stated above, transportation of interceptors would be in compliance with all applicable laws and DOT regulations.

2.2.7 SAFETY AND ENVIRONMENTAL MEASURES

Safety

The KV uses a small amount of liquid propellant in its guidance control motors. These propellants, MMH and N_2O_4, can be extremely hazardous if not properly contained. During all phases of KV integration, leak monitoring devices would be utilized. After the interceptor missile is sealed in its canister, it would be monitored for leaks. An air-monitoring device mounted in the canister and connected to the outside by the canister umbilical would accomplish this. In the event that any amount of liquid propellant leaks from the KV, the monitoring device would detect the leak and provide an indication of the leak. A trained and certified spill reaction team would open the canister and correct the problem.

In the event of a liquid propellant leak, the area would be evacuated, ignition sources would be removed, and vapors would be suppressed with a water fog. All liquid would be contained for treatment and neutralization and disposed of in accordance with all applicable regulations. Small spills would be absorbed with earth, sand, or other non-combustible materials and transferred to containers for disposal.

The assembly facility would be a spark-free area with conductive flooring. Non-static-producing clothing would be required, and personnel grounding would be mandatory. Air powered tools, instead of electric driven, would be utilized to reduce the potential for spark generation, and all other electric motors in the facilities would be explosion-proof.

After renovation, Building 7578 would be sited for the use of up to 13,600 kilograms (30,000 pounds) of 1.1 explosive. The site plan for use of the buildings would be approved by the DoD Explosive Safety Board. The interceptor, as shown in table 2-1, would contain less than 13,600 kilograms (30,000 pounds) of propellant.

Since the interceptor has an interim explosive rating of 1.1, the inhabited building explosive safety quantity-distance (ESQD) hazard area (figure 2-7) would be 381 meters (1,250 feet). In order to reduce the potential for exposure, the final test and checkout of the missile in the shipping canister would occur during the second and third shifts at the facility, when the least number of personnel are present. All electrical circuit testing of the missile in the canister would be conducted from the ROTB located 229 meters (750 feet) from Building 7578.

Environmental

All construction would be conducted in accordance with applicable permits. Standard construction methods would be employed to minimize fugitive dust emissions. These methods could include watering and chemical stabilization of exposed inactive areas.

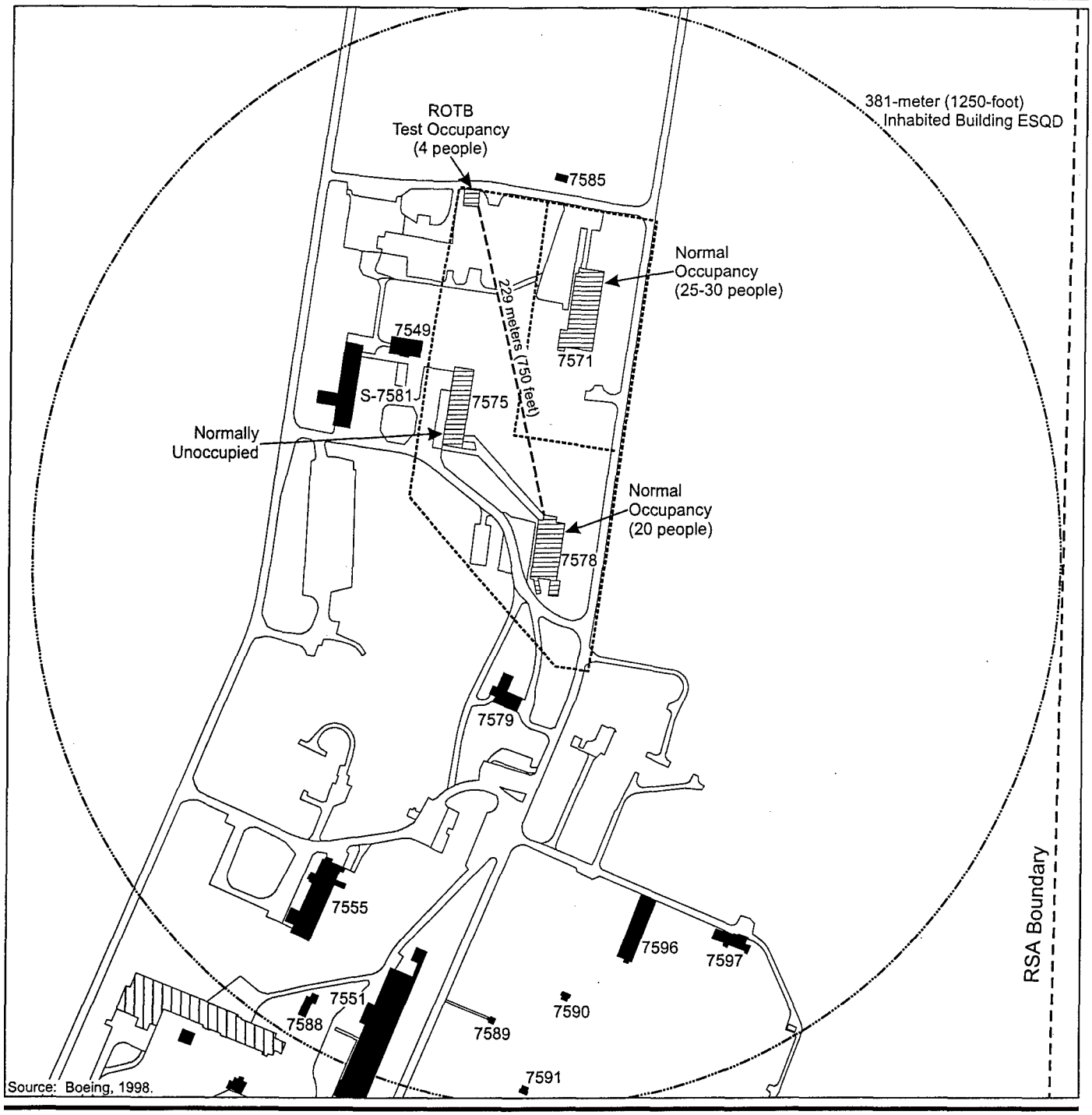
Best Management Practices such as filtering sediment from storm water runoff during construction would be implemented to minimize the potential for impacts to wetlands.

Construction and operations personnel will be informed regarding the sensitivity of archaeological resources and the types of penalties that can be incurred if sites are damaged or destroyed. Any ground disturbance within 30 meters (100 feet) of the Lacey Cemetery fence would require coordination with the Redstone Arsenal Office of Environmental Management to ensure that no graves are disturbed. If burial sites or additional cultural materials are detected during ground disturbance activities, work will cease and the Alabama Historical Commission will be notified immediately.

Compliance with the National Pollutant Discharge Elimination System Storm Water Pollution Prevention Plan and Spill Prevention Control and Countermeasures Plan would minimize soil erosion and pollutant discharges during construction/modification and would minimize the potential for accidental spills of hazardous chemicals to affect project soils.

Lead-based paints on surfaces of materials to be removed during building modification would be removed in accordance with the applicable health and safety standards and disposed of as hazardous waste. Contaminated soils would be excavated and handled and disposed of in accordance with applicable environmental regulations.

Construction activities would be coordinated with the Redstone Department of Public Works Office and would comply with applicable Army safety requirements to control exposure to occupational safety and health hazards.



EXPLANATION

- Unoccupied
- IAT&C Facilities
- Occupied by Another Program
- Fence
- 381-meter (1250-foot) Inhabited Building ESQD

ROTB = Remote Operator Test Blockhouse

Scale 1:4,500

0 188 375 Feet

0 57 114 Meters

NORTH

Explosive Safety Quantity-Distance (ESQD) Hazard Area

Figure 2-7

005

2.3 ALTERNATIVES CONSIDERED

At the outset of the IAT&C proposal, the following locations inside the continental United States were considered for use:

1. Hill AFB—Ogden, Utah
2. Contractor Sites—Magna, Utah and San Jose, California
3. Redstone Arsenal, Alabama

Hill AFB was initially evaluated as a potential site for the IAT&C facility. At that time, the NMD Program was assessing whether to use Minuteman vehicles or existing boosters. Hill AFB currently assembles the Minuteman missile and would be an appropriate site for the IAT&C facility if the program chose to use Minuteman vehicles. However, based on technical requirements, the program selected the COTS booster. Hill AFB is not considered a reasonable alternative based on conflicts with its current mission.

The commercial booster manufacturing sites located in Magna, Utah, and San Jose, California, were evaluated as potential sites for the IAT&C facilities. However, IAT&C type facilities are not available at either location, so either of these sites would require the construction of new facilities on privately owned property. Building new facilities would have a greater impact to the environment, the program cost, and the program schedule than using existing facilities. Additionally, no Boeing or NMD presence exists within the proximity of these locations and therefore these locations were not considered reasonable alternatives.

Redstone Arsenal, Huntsville, Alabama, was selected as the candidate location for the IAT&C facilities. Redstone Arsenal is a U.S. Army installation, home to the U.S. Aviation and Missile Command (AMCOM) and has supported the manufacture of missiles since World War II. Numerous facilities are vacant and available for manufacturing and storage of missiles. A fire station, hazardous material response team, security personnel, and airport are located at the Arsenal. Additionally, Redstone Arsenal is within 24 kilometers (15 miles) of existing Boeing and NMD Operations. The choice of Redstone Arsenal minimizes the overall impact to the environment, utilizes existing government facilities, provides the best opportunity for schedule success, and reduces significantly the cost outlay for the program.

2.4 NO-ACTION ALTERNATIVE

Under the No-action Alternative, the Army would not proceed with any facility modification or construction related to an IAT&C facility or any NMD related integration or assembly at Redstone Arsenal. Selection of the No-action Alternative would adversely affect the capability of delivering fully assembled interceptor missiles to the testing and

deployment sites. Facilities within the South Plant would still have to be upgraded to meet environmental and code standards. National security goals for a NMD system would not be met if the proposed action is not completed.

3.0 AFFECTED ENVIRONMENT

This section describes the environmental characteristics that may be affected by the proposed action. 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 EAs, EISs, 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 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 areas of environmental consideration were originally 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. Three of the topics, airspace, infrastructure, and socioeconomics, were dismissed. The proposed activities would not impact airspace. No impacts are anticipated to infrastructure since existing infrastructure would be used for the proposed activities and all systems are operating within or under capacity. Although approximately 50 jobs would be created by the proposed action, these personnel would be drawn from Boeing's existing workforce; thus minimizing potential beneficial impacts to the socioeconomics of the region. 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 each potential site, with respect to environmental requirements, was included in the information collected on the affected environment.

Activities proposed for Redstone Arsenal consist of integration, assembly, test, and final checkout of the interceptor in modified existing or newly constructed buildings. The nine areas of environmental consideration, discussed briefly as follows, are: air quality, biological resources, cultural resources, geology and soils, hazardous materials and hazardous waste, health and safety, land use and aesthetics, noise, and water resources, and Environmental Justice. Environmental Justice is also discussed in section 4.10.

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 (NAAQS). In addition, information was obtained on whether the installation was located in an attainment or nonattainment area. For those

sites that have potential air pollutant emissions, compliance with air emission permits was ascertained.

Biological Resources—Existing information on plant and animal species and habitat types in the vicinity of the sites was reviewed where applicable, with particular attention paid to the presence of any protected species, especially Federal or state threatened or endangered species.

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.

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.

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.

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.

Land Use—Base master plans, environmental documents, land use permits, and other existing documents, including Memorandums of Understanding and evacuation agreements, were reviewed to identify any known conflicts between existing land uses and the proposed activities.

Noise—Existing environmental documents were reviewed and installation or facility personnel contacted to determine if noise concerns are an issue.

Water Resources—Existing information on surface water and groundwater quality and supply was reviewed to identify potential water resource concerns at each facility.

Environmental Justice—An Environmental Justice determination is included in this document to comply with the intent of Executive Order 12898, *Environmental Justice*, Army, and DoD guidance. The objectives of the Executive Order include development of Federal agency implementation strategies and identification of disproportionately adverse human health or environmental effects on low-income and minority populations potentially impacted from proposed Federal actions.

3.2 INTEGRATION, ASSEMBLY, TEST, AND CHECKOUT FACILITIES

3.2.1 REDSTONE ARSENAL

Redstone Arsenal occupies 15,342 hectares (37,910 acres) in the Tennessee Valley in north central Alabama in the southwestern portion of Madison County. The proposed IAT&C facilities are located within the 121-hectare (300-acre) South Plant of the old Morton-Thiokol facility. The land east of the proposed facility consists of open fields and forest (U.S. Department of Defense, Ballistic Missile Defense Organization, 1999).

3.2.2 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 ($\mu g/m^3$). 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. This area encompasses both direct, immediate impacts due to criteria pollutants and hazardous air pollutants that generally disperse within a few miles of the emissions source, and indirect, delayed impacts due to precursor actions (primarily ozone precursors) that can delay impacts for several hours.

3.2.2.1 Regulatory Framework

Federal and state regulations applicable to the IAT&C program are discussed in appendix A. Redstone Arsenal submitted its Title V permit application in 1998 that consolidates current air permits for numerous small particulate and volatile organic compounds (Redstone Arsenal, 1997). Alabama has adopted the NAAQS as its ambient air quality standards. These are shown in table 3-1.

3.2.2.2 Regional Air Quality

Redstone Arsenal 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 (PSD) areas within 10 kilometers (6 miles) of Redstone Arsenal.

3.2.2.3 Air Emissions Sources

Redstone Arsenal maintains permits to operate several air pollution emissions sources including boilers, fuel storage tanks, a propellant sparging unit, and an incinerator. Operations at Redstone Arsenal are in compliance with current state and Federal permits. (U.S. Army Materiel Command, February 1996)

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 $\mu g/m^3$	Same as primary
Nitrogen Dioxide	Annual	100 $\mu g/m^3$ (0.053 ppm)	Same as primary
Ozone	1-hour	167 $\mu g/m^3$ (0.08 ppm)	Same as primary
PM-10	Annual	50 $\mu g/m^3$	Same as primary
	24-hour	150 $\mu g/m^3$	
Sulfur Dioxide	Annual	80 $\mu g/m^3$ (0.03 ppm)	None
	24-hour	365 $\mu g/m^3$ (0.14 ppm)	None
	3-hour	None	1,300 $\mu g/m^3$ (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/m^3 is milligrams per cubic meter, $\mu g/m^3$ is micrograms per cubic meter

Approximately 23,400 privately owned vehicles transport employees and visitors onto Redstone Arsenal daily. No state or local requirements for testing emissions of these vehicles exist. Air quality monitoring has not identified automotive emissions as an impact to meeting attainment standards in the area. Prescribed burning in the igloo area is conducted by the installation forestry office in accordance with Army Regulation 200-3, *Natural Resources, Land, Forest, and Wildlife Management,* and Technical Manual 5-631, *Natural Resources Forestry Management*. (U.S. Department of the Army, 1997)

3.2.3 BIOLOGICAL RESOURCES

The ROI for biological resources includes the native and introduced plants and animals within the area potentially affected by construction activities and operations. For discussion purposes, these are divided into vegetation, wildlife (including aquatic species), threatened or endangered species, and sensitive habitats. For this analysis, scientific names are only provided the first time that threatened and endangered species are mentioned in the text.

The vegetation and wildlife subsections focus on those species expected to occur in habitats on the project area sites that could potentially be affected by proposed activities. Sensitive species (that is, state species of special concern, and regionally rare and declining species) are included in this discussion. Federally and state-listed threatened and endangered species are discussed under a separate subsection.

Sensitive habitats include wetlands, plant communities that are unusual or of limited distribution, and important seasonal use areas for wildlife (for example, migration routes, breeding areas, crucial summer/winter habitats). It also includes critical habitat as protected by the Endangered Species Act and sensitive ecological areas as designated by state or Federal rulings.

3.2.3.1 Vegetation

The Alabama Natural Heritage Program lists 242 plant species within the variety of vegetation communities that are found at Redstone Arsenal. Upland vegetation on Redstone Arsenal is generally mowed, maintained in an early ecological successional stage, or retained as forest. Forested land comprises about 40 percent of the acreage, with the remainder in pastures and scrub. The forest portion consists of hardwoods, pines, and mixtures of each type. (U.S. Army Missile Command, 1994; 1997)

The proposed IAT&C complex is within a previously disturbed area that is landscaped with grass and some trees near the buildings.

A bottomland hardwood community exists on the north side of the igloo area. Trees associated with this community include overcup oak, willow oak, swamp chestnut oak, and shagbark hickory. Most of the mature timberland in the area is bottomland hardwood complex. (U.S. Department of the Army, 1997)

3.2.3.2 Wildlife

Redstone Arsenal provides suitable habitat for carnivores such as the red and gray fox, bobcat, coyote, and mink. Opossum, cottontail, beaver, gray squirrel, woodchuck, raccoon, white tailed deer, and skunk are also found on the arsenal. Several species of game birds such as the northern bobwhite, mourning dove, wild turkey, and several species of duck are common on Redstone Arsenal. Red-tailed and sharp-shinned hawks, great horned owls, American kestrels, and eastern screech owls are raptors that are present on Redstone Arsenal. Wetlands provide an important amount of waterfowl habitat. Blue, snow, and Canadian geese have been observed in the area. (U.S. Army Missile Command, 1994; 1997)

A wide variety of aquatic invertebrate species have been collected in dredge samples from Huntsville Spring Branch and Indian Creek. According to refuge data and monitoring at Huntsville Spring Branch and Indian Creek, at least 115 species of fish are potentially present in the vicinity of Redstone Arsenal. Reptile and amphibian species are also well represented on the Arsenal. (U.S. Army Materiel Command, 1996; U.S. Army Missile Command, 1997)

Highly mobile species may use the IAT&C complex and igloo areas for foraging and resting, although this may be rare since the areas are disturbed and lack good quality habitat. (U.S. Department of the Army, 1997)

3.2.3.3 Threatened and Endangered Species

Table 3-2 shows the species with Federal or state status potentially located on or near Redstone Arsenal.

Moderate habitat exists on Redstone Arsenal for the federally threatened Price's potato-bean (*Apios priceana*) and the federally endangered Morefield's leatherflower (*Clematis morefieldii*) (U.S. Army Missile Command, 1994). Morefield's leatherflower has not been identified on the Arsenal (Redstone Arsenal, 1998b).

Limited habitat exists on Redstone Arsenal for the Federally and state endangered Mohr's Barbara's buttons (*Marshallia mohrii*). The Federal endangered Tennessee yellow-eyed grass (*Xyris tennesseensis*) is found in calcareous soils of mountain seeps, wet meadows, and along spring fed streams. Neither plant is likely to be located within the project area. (U.S. Army Missile Command, 1994)

The federally endangered Alabama cave shrimp (*Palaemonias alabamae*) have only been identified to exist in Madison County, Alabama, and have been found in flooded caverns on Redstone Arsenal. No caverns are in the vicinity of the project area. The Redstone Arsenal Directorate of Environmental Management and Planning is currently funding habitat and life history investigations on the Alabama cave shrimp species. (U.S. Army Missile Command, 1994; 1997)

Over a decade ago, a number of alligators were released on Wheeler National Wildlife Refuge. Alligators have been sighted, and even captured, on Redstone Arsenal; however, these occurrences are infrequent. (U.S. Army Missile Command, 1994; 1997)

Although bald eagles are known to exist in Wheeler National Wildlife Refuge, they occur merely as transient migrants on Redstone Arsenal. No known nesting attempts have been made, and the birds are absent during the spring and summer months. Moderate habitat is present for the Federal and state endangered gray (*Myotis grisescens*) and Indiana (*Myotis sodalis*) bats, but no caverns exist within the project area. The bats use the Arsenal for foraging habitat (Redstone Arsenal, 1998b). (U.S. Army Missile Command, 1994; 1997)

3.2.3.4 Sensitive Habitats

Sensitive habitats within the ROI include wetlands. No unique habitats have been identified in the area that would require special protection. (U.S. Department of the Army, 1997)

Wetlands

Over 20 percent of Redstone Arsenal land is considered wetland. Wetland communities at the arsenal include riparian areas associated with the major floodplains; terrace wetlands such as oak flats where the water table is close to the surface during part of the year; and spring-fed basins. (U.S. Army Materiel Command, 1996)

Table 3-2: Species with Federal or State Status Potentially Occurring at Redstone Arsenal

Scientific Name	Common Name	Status		Habitat and Distribution
		State	Federal	
Plants				
Apios priceana	Price's potato-bean		T	Mixed hardwoods or clearings, moderate habitat, are found on the Arsenal
Clematis morefieldii	Morefield's leather flower		E	Limestone outcroppings, only five locations in Madison County, moderate habitat, but none identified on Redstone
Marshallia mohrii	Mohr's Barbara's buttons		T	Moist to wet springs and natural clearings in mountainous areas, limited habitat
Xyris tennesseensis	Tennessee yellow-eyed grass		E	Mountain seeps, wet meadows, and along spring fed streams
Crustaceans				
Palaemonaias alabamae	Alabama cave shrimp	SP	E	Exist only in Madison County, Alabama, flooded caverns on the Arsenal
Reptiles and Amphibians				
Alligator mississippiensis	American alligator		T (S/A)	Southern half of Alabama, infrequent on the Arsenal
Birds				
Haliaeetus leucocephalus	Bald eagle	SP	T	Wheeler National Wildlife Refuge, fall and winter, no nesting attempts
Picoides borealis	Red-cockaded woodpecker		E	No nesting habitat, no sightings on the Arsenal
Mammals				
Felis concolor couguar	Eastern cougar		E	No preference for specific habitat type, primary need seems to be large wilderness area with adequate food supply
Myotis grisescens	Gray bat	SP	E	Restricted to caves or cave-like habitats, use Redstone for foraging
Myotis sodalis	Indiana bat	SP	E	Cavernous limestone areas, potentially occur on the Arsenal

Source: U.S. Army Missile Command, 1994; National Aeronautics and Space Administration, 1997; U.S. Fish and Wildlife Service, 1999; Redstone Arsenal, 1998b; Alabama Natural Heritage Program, 1995

–	Not listed
SP	State Protected
E	Endangered
T	Threatened
C	Candidate
(S/A)	Listed by similarity of appearance to a listed species

About half of these wetlands are found within the Wheeler National Wildlife Refuge, which is outside the ROI. Palustrine emergent wetlands (marshlands) are mainly found on the test ranges, although some are in pastures and along edges of ponds. Palustrine Forested and Palustrine Scrub-Shrub wetlands are located west of igloo 7325 (U.S. Department of the Army, 1997). A small palustrine forested wetland associated with a creek outside the Arsenal boundary is east of the project area. More than one-quarter, or 4,047 hectares (10,000 acres), of the arsenal is affected by high stages of the Tennessee River and other tributary streams. The primary streams that traverse the installation are Huntsville Spring Branch, Indian Creek, and McDonald Creek.

3.2.4 CULTURAL RESOURCES

Cultural resources include prehistoric and historic sites, structures, districts, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or any other reason. For ease of discussion, cultural resources have been divided into archaeological resources (prehistoric and historic), historic buildings and structures, and native populations/ traditional resources (for example, Native American sacred or ceremonial sites).

Numerous laws and regulations require that possible effects to cultural resources be considered during the planning and execution of Federal undertakings. These laws and regulations (see appendix A) stipulate a process of compliance, define the responsibilities of the Federal agency proposing the action, and prescribe the relationship among other involved agencies (for example, the State Historic Preservation Officer [SHPO], the Advisory Council on Historic Preservation). In addition to the NEPA, the primary laws that pertain to the treatment of cultural resources during environmental analysis are the National Historic Preservation Act (especially Sections 106 and 110), the Archaeological Resources Protection Act, the American Indian Religious Freedom Act, and the Native American Graves Protection and Repatriation Act.

Only those cultural resources determined to be potentially significant under cultural resources legislation are subject to protection from adverse impacts resulting from an undertaking. To be considered significant, a cultural resource must meet one or more of the criteria established by the National Park Service that would make that resource eligible for inclusion in the National Register of Historic Places (National Register). The term "eligible for inclusion in the National Register" includes all properties that meet the National Register-listing criteria specified in Department of Interior regulations 36 CFR 60.4. Therefore, sites not yet formally evaluated may be considered potentially eligible to the National Register and, as such, are afforded the same regulatory consideration as nominated properties. Whether prehistoric, historic, or traditional, significant cultural resources are referred to as historic properties.

The ROI for cultural resources encompasses all areas of ground disturbance and all buildings and structures subject to modification as a result of program activities. For the purposes of this analysis, the term ROI is synonymous with the area of potential effect as defined under cultural resources legislation.

3.2.4.1 Prehistoric and Historic Archaeological Resources

Archaeological investigations at Redstone Arsenal indicate that human occupation of the Wheeler Basin first occurred approximately 13,000 years ago. Because of the diverse topography, fertile soils, abundant water, and varied plant and animal habitats, the area is among the earliest populated in the southeastern United States. Prehistoric occupation of the area spans the time range from circa 11,000 BC to 1800 AD with the arrival of Euro-American fur traders. It is most simply divided into five successive periods—the Paleo-Indian Period, the Archaic Period, the Gulf Formational Period, the Woodland Period, and the Mississippian Period (AD 900 to 1500). (U.S. Army Materiel Command, 1996; U.S. Army Missile Command, 1994)

Huntsville and the area of Redstone Arsenal remained under the control of indigenous populations until the beginning of the 19th century, when there was a southern movement of Euro-American settlers toward the Tennessee River. Hostilities existed between the Indian tribes as well as between the tribes and Euro-American settlers; however, those tensions stopped after the Creeks were defeated at Horseshoe Bend in 1814. Settlement of the area then grew rapidly and was largely focused on the farming of cotton—an industry that dominated the region around Redstone Arsenal and Huntsville for nearly 45 years (National Aeronautics and Space Administration, 1996).

During the Civil War, the Federal Garrison at Madison Station was raided and a train and rail cars were destroyed in 1864. Numerous other minor encounters occurred in and around the Huntsville area throughout the war years. During the 15 years after the war, the Huntsville area struggled with a series of obstacles to the restoration of the pre-war economy—a series of droughts in the late 1860s and the volatility of the commodity markets (National Aeronautics and Space Administration, 1996). Construction of several large factories in 1891 and mills in 1918 helped to stabilize the economy somewhat, but when the cotton industry waned in the 1920s, the Huntsville economy became as depressed as many other communities in the United States.

During World War II, the Huntsville area was selected as the site for the nation's newest chemical warfare manufacturing plant (Huntsville Chemical Arsenal) and shell-loading plant (Redstone Ordnance Plant—later renamed Redstone Arsenal) (Redstone Arsenal, 1998b). Both were completed by 1942 and operated over a 4-year period. At the end of the war, the manufacturing from both plants essentially ceased and, until the Army relocated its rocket research and development program from White Sands, New Mexico, to Huntsville around 1950, there was little activity on the installation. Under the direction of Dr. Wernher von Braun, the Marshall Space Flight Center (MSFC) was established at the location of the two plants and the Huntsville economy finally stabilized through rocket research activities; these activities continue to the present (National Aeronautics and Space Administration, 1996).

Numerous archaeological investigations have been conducted in the general area of Redstone Arsenal, (National Aeronautics and Space Administration, 1996). The area has been surveyed for archaeological sites and none were identified within the immediate

project area. This survey has been coordinated with the SHPO, who has concurred with the findings for the area potentially encompassed by the proposed action (Alabama Historical Commission, 1999).

As of 1998, approximately 340 prehistoric and historic archaeological sites had been recorded within the boundary of Redstone Arsenal; however, 39 percent of the installation has actually been systematically surveyed. The total number of sites presumably represents only a small fraction of the 1,000 sites estimated to be present on the installation. Of the recorded sites, none are currently listed in the National Register; 121 sites have been determined eligible for listing and 219 have been recommended as ineligible—the Alabama SHPO has concurred (Redstone Arsenal, 1998b; U.S. Army Missile Command, 1994). In addition, there are 46 identified historic period cemeteries within the boundary of the installation (dates ranging from 1820 to 1940)—none are listed, or currently eligible for listing in the National Register. Final recommendations of the current survey will likely modify these data.

There are no archaeological sites identified by the Phase I survey. The Lacey Cemetery is located near the project area.

3.2.4.2 Historic Buildings and Structures

Historic buildings and structures at Redstone Arsenal would be associated with any of the historic activities described in section 3.2.4.1, such as farm and homestead sites, tenant slave and soldier quarters, remains of early manufacturing plants, and public and private cemeteries.

In 1984, a historic buildings and structures inventory was conducted by Building Technology Incorporated for Redstone Arsenal and formally coordinated with the Alabama SHPO (National Aeronautics and Space Administration, 1996). Only four buildings and structures were determined to be historically significant and none are within the ROI for the proposed action. However, since the survey is over 10 years old and many buildings have become 50 years old since 1984, the SHPO no longer accepts the findings (Redstone Arsenal, 1998b). A concurrence letter on the lack of historically significant buildings within the proposed IAT&C facilities was received from the SHPO (Alabama Historical Commission, 1999). (National Aeronautics and Space Administration, 1997a)

The weapons storage igloos were recently evaluated for eligibility for inclusion in the National Register under the World War II historic context (U.S. Army Missile Command, 1997) and preliminarily determined to be ineligible. However, the study further indicated that these structures may be significant under the Cold War historic context and recommended that additional study under that context be conducted. The World War II study and a recently prepared Cold War study (which covered properties constructed between 1946 and 1989 only) are both in draft form and have not yet received concurrence from the Alabama SHPO.

3.2.4.3 Native Populations/Traditional Resources

At the time of Euro-American contact, several tribes, among them the Cherokee, Chickasaw, Coushaita, Creek, Shawnee, and Tunica-Biloxi Indian tribes populated the area of Huntsville and Redstone Arsenal. Tribal boundaries were under constant dispute, and the area was hostile and unsettled. In 1786, the boundaries of two of the tribes were formalized under the Treaty of Hopewell, which placed a Cherokee/Chickasaw boundary line through Madison County. However, neither tribe appeared to have occupied the region after the treaty was ratified.

In 1830, the Indian Removal Act authorized relocation of many Native American tribes to the western United States. One of the most notable of the relocations involved the Five Civilized Tribes of the Choctaw, Chickasaw, Creek, Cherokee, and Seminole (Trail of Tears, 1997). Most of the Native American peoples living in the area of Redstone Arsenal were relocated at that time. Very few remained; of those that chose to stay, ownership of all land in Alabama was relinquished to the U.S. government.

Significant traditional resources sites are subject to the same regulations and are afforded the same protection as other types of historic properties. Traditional sites associated with the identified tribes, could include archaeological and burial sites, mounds, ceremonial areas, caves, rockshelters, hillocks, water sources, plant habitat or gathering areas, or any other natural area important to this culture for religious or heritage reasons. By their nature, traditional resources sites often overlap with (or are components of) archaeological sites. As such, some of the National Register-listed or -eligible sites identified at Redstone Arsenal could also be considered traditional resources sites or contain traditional resources elements. Currently, no traditional cultural properties have been formally identified within the ROI.

3.2.5 GEOLOGY AND SOILS

This section provides an overview of the topography, geology, soils, and geologic hazards in the vicinity of Redstone Arsenal. In general, the ROI is defined by the regional geologic setting and the areas in the immediate vicinity of the proposed government-furnished facilities (GFF) buildings that could be affected by construction and operation activities.

3.2.5.1 Topography

The topography of Redstone Arsenal is gently rolling with elevations primarily in the range of 183 to 198 meters (600 to 650 feet) above mean sea level (msl). The terrain generally slopes from north to south toward the Tennessee River. Peak elevations of approximately 380 meters (1,240 feet) above msl occur in the north central portion of the installation in the Weeden and Madkin Mountains. Low areas are composed of valleys and floodplains along the Tennessee River and its tributaries to the north and are characterized by elevations of approximately 169 to 171 meters (556 to 560 feet) above msl. Elevations at the proposed area range from approximately 175 to 180 meters (575 to 590 feet) above msl (Geological Survey of Alabama, 1975; U.S. Army Corps of Engineers, 1996).

The igloos are in an upland area with elevations ranging from approximately 177 meters (580 feet) to 178 meters (585 feet) above sea level. (U.S. Department of the Army, 1997)

3.2.5.2 Geology

The geologic units underlying Redstone Arsenal are sedimentary in origin and are composed of Tuscumbia Limestone, Fort Payne Chert, Chattanooga Shale, and other older geologic units. Ste. Genevieve Limestone, Hartselle Limestone, and Bangor Limestone overlie the Tuscumbia Limestone. The surface geology consists of unconsolidated sedimentary material (regolith), primarily derived from weathering of bedrock. Regolith formed from the Tuscumbia Formation, consists of clay and rectangular to irregular blocks of chert. The Regolith thickness varies from approximately 6 to 12 meters (20 to 40 feet) in the northeast part of the arsenal to as much as 24 meters (80 feet) in the southern and western portions. (U.S. Army Missile Command, 1994)

There are no known areas of volcanic activity within the State of Alabama. Redstone Arsenal is located in a seismic zone 1, according to the Uniform Building Code. Within this seismic zone there is a low probability of earthquakes. No unique geologic landforms have been identified in the area. (U.S. Department of the Army, 1997)

3.2.5.3 Soils

The soil survey of Madison County (U.S. Department of Agriculture, 1958) identified six different soil associations within Redstone Arsenal. The predominant soil type mapped for the installation consists of a deep, well drained to moderately drained, silt loam to silty clay loam. These soils typically possess a loamy surface horizon underlain by a loamy to clayey subsoil layer with lenses of silty and/or sandy clay. Rock fragments generally occur throughout the clayey material. Soil depths range from very shallow on the mountains to much deeper along the larger tributaries of the Tennessee River. Soils at the proposed GFF buildings include Cumberland loam and Allen fine sandy loam soil series. These soils have moderate permeability with depth to bedrock 1 to 5 meters (4 to 15 feet) below the surface. (U.S. Department of Agriculture, 1958)

The soil in the vicinity of the igloo area is Colbert cherty silty clay loam. This soil has slow permeability and depth to bedrock is 0.6 to 1.2 meters (2 to 4 feet) below the surface. (U.S. Department of Agriculture, 1958)

Soils within the vicinity of the proposed IAT&C buildings exhibit a low to moderate shrink/swell potential and moderate susceptibility to water and wind erosion. Soils in the vicinity of the storage igloos exhibit a moderate to high shrink/swell potential and moderate susceptibility to water and wind erosion. (National Resource Conservation Service, 1999)

Redstone Arsenal contains areas of prime farmland located throughout the level to gently sloping portions of the arsenal, including uplands, foot slopes, stream terraces, and floodplains. However, the Natural Resources Conservation Service has determined that the prime farmland areas at the installation are excluded from consideration as prime farmland

in accordance with the Farmland Protection Policy Act (U.S. Army Missile Command, 1994).

3.2.6 HAZARDOUS MATERIALS AND WASTE

The following subsections discuss hazardous materials, hazardous waste, pollution prevention, remediation sites, and storage tanks. Regulations governing the use and storage of hazardous materials and waste are discussed in appendix A. The ROI for hazardous materials and hazardous waste management encompasses all geographic areas that are exposed to the possibility of a release of hazardous materials or hazardous wastes or that may be affected by an Installation Restoration Program (IRP) site. The ROI includes the areas around the proposed facilities as well as those areas where hazardous materials or wastes related to proposed construction or operation are transported, stored, generated, or disposed and where construction activities are necessary on contaminated sites.

3.2.6.1 Hazardous Materials Management

Numerous types of hazardous materials are used annually to support the various missions and general maintenance operations at Redstone Arsenal. These materials include common building paints, industrial solvents, fuel oil, and gasoline. On-site contractors supporting installation operations also use hazardous materials. Since the buildings proposed for use as the IAT&C facility are currently not in use, no hazardous materials are currently used there.

Hazardous materials management is the responsibility of each individual or organization operating on the Arsenal. The Directorate of Environmental Management and Planning (DEMP) oversees all hazardous materials activities and promulgates Hazardous Material/Waste Management System (HMWMS) Operating Procedures. DEMP has established a tracking system that records and labels each hazardous material item and monitors its storage and use. (Redstone Arsenal, 1997)

Hazardous materials are turned over to Defense Reutilization and Marketing Office (DRMO), which attempts to find another user for the material. If a new user cannot be located, the material is declared waste and is disposed of off-site in a permitted treatment, storage, and disposal facility by a Resource Conservation and Recovery Act (RCRA) approved contractor. The AMCOM Disaster Control Plan for Redstone Arsenal and AMCOM Regulation 420-5 require a Spill Prevention Control and Countermeasures (SPCC) Plan and Installation Spill Contingency Plan for oil and hazardous substances. (U.S. Army Missile Command, 1996; National Aeronautics and Space Administration, 1996) Redstone Arsenal has a qualified hazardous materials response team. (Redstone Arsenal, 1997)

3.2.6.2 Hazardous Waste Management

Redstone Arsenal is a large-quantity generator of hazardous wastes. All hazardous waste generated is labeled with the appropriate U.S. Environmental Protection Agency (EPA) identification number, and is transported, treated, and disposed of under this number. All

individuals or organizations at Redstone Arsenal are responsible for administering and complying with applicable regulations and plans regarding hazardous waste. The wastes are stored at the point of generation in appropriate plastic or steel containers. Wastes slated for disposal are stored in hazardous waste igloos, located on the southern part of the installation in a fenced restricted area. Typically, the storage site operates at less than 50 percent capacity. Redstone Arsenal reported the generation of approximately 192,775 kilograms (425,000 pounds) of hazardous waste in 1997. Hazardous waste generated previously at buildings 7575 and 7578 included solvents, oil, wastewater, paint, and propellant waste. (U.S. Army Corps of Engineers, 1996; Hubbard, 1998)

The DRMO is responsible for managing and marketing excess and recoverable products and waste materials in accordance with applicable regulations. Hazardous items that cannot be marketed by the DRMO are disposed of as hazardous wastes.

3.2.6.3 Pollution Prevention

The Army's primary pollution prevention goal is to reduce reliance on products or processes that generate environmentally degrading impacts to as near zero as feasible. Under this regulation all installations must prepare a pollution prevention plan. Redstone Arsenal has prepared a plan that establishes the overall strategy and describes specific objectives for reducing pollution of the ground, air, surface water, and groundwater. The purpose of the plan is to provide sufficient guidance to pollution prevention management and operations on Redstone Arsenal.

3.2.6.4 Remediation

In response to requirements outlined in Redstone Arsenal's RCRA Part B permit, the U.S. EPA performed a RCRA Facility Assessment in 1989 that identified 107 Solid Waste Management Units (SWMUs) and 3 Areas of Concern (AOCs). The investigations were supplemented by a 1991 study that identified 273 potential SWMUs and 13 potential AOCs. Suspected contaminates identified at the SWMUs/AOCs include heavy metals, pesticides, volatile organic compounds, and chemical warfare materials. As a result of the findings from several RCRA Facility Investigations, Redstone Arsenal was placed on the U.S. EPA's National Priorities List on 30 June 1994. Redstone Arsenal is currently negotiating with U.S. EPA and the Alabama Department of Environmental Management (ADEM) for a Federal Facilities Agreement. Nine SWMUs and 3 AOCs were identified in the South Plant and 75 at the North Plant (igloo location), but none in the area proposed for use. (U.S. Department of Defense, Ballistic Missile Defense Organization, 1999)

3.2.6.5 Storage Tanks

Redstone Arsenal has 61 active tanks, and 17 ADEM registered Underground Storage Tanks (USTs) (U.S. Army Corps of Engineers, 1996). Eight of the USTs meet the 1998 RCRA standards, and the other nine have been removed. The regulated tanks store gasoline, aviation gasoline, diesel, and used oil, while the unregulated tanks store heating oil. Redstone Arsenal is in compliance with all U.S. EPA and Alabama storage tank

regulations. There are two 37,854-liter (10,000-gallon)] #2 fuel oil above ground storage tanks at Building 7579, but no active USTs. The above ground storage tanks are not currently in use (Wassell, 1999). The above ground storage tank at Building 7575 was removed in 1995. (U.S. Army Corps of Engineers, 1996)

Soil samples collected for environmental analysis in support of the Environmental Baseline Survey (EBS) contained two chemicals (benzo (a) pyrene and dibenz (a,h) anthracene) at concentrations above human health risk-based concentrations provided for an industrial exposure scenario (National Missile Defense Joint Program Office, 1999).

3.2.6.6 Asbestos

Building construction at Redstone Arsenal began in the 1940s (U.S. Army Materiel Command, 1996). As such, many of the older buildings have been surveyed and found to contain asbestos containing material. Redstone Arsenal also has an ongoing asbestos testing and remediation program. (U.S. Army Corps of Engineers, 1996)

3.2.6.7 Polychlorinated Biphenyls

Commercial PCBs are industrial compounds produced by chlorination of biphenyls. PCBs were used in electrical equipment, primarily in capacitors and transformers, but their manufacture and distribution were banned in 1978. The U.S. EPA regulates the removal and disposal of all sources of PCBs containing 50 ppm or more.

A survey of all large transformers for PCBs was completed at Redstone Arsenal in 1975. All large transformers containing PCBs were disposed of according to regulations. The U.S. EPA has allowed Redstone Arsenal to test pole mounted transformers for PCBs as they are taken out of service. When transformers are found to have less than 50 ppm PCB concentration, they are sold through DRMO. Those transformers found to contain more than 50 ppm PCBs are disposed of by a PCB disposal contractor at an approved disposal facility. PCB-contaminated equipment could occur at the existing facilities proposed for modification.

3.2.6.8 Lead-Based Paint

Waste containing levels of lead exceeding a maximum concentration of 5 milligrams per liter is defined as hazardous under Title 40 CFR 261. Because of the facility construction date, the buildings scheduled for renovation are assumed to contain lead-based paint. No lead-based paint survey has been conducted at Redstone Arsenal; however, a preliminary sampling report identified low levels of lead-based paint in the IAT&C facilities.

3.2.7 HEALTH AND SAFETY

Army safety and health regulations and procedures are designed and enforced to minimize the potential impact to military members, contractors, and the public.

3.2.7.1 Regulatory Framework

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 on-site personnel as a result of operations and activities. The ROI for health and safety related impact varies with the type of hazard (occupational and non-occupational) and the type of work activity (construction, support, integration, and testing of missiles). The occupational ROI is the proposed industrial area. The non-occupational ROI includes the public areas of Redstone Arsenal and surrounding areas that could be affected by an accident.

3.2.7.2 Regional Safety

Redstone Arsenal Support Activity (RASA) has entered into a mutual aid agreement with every city within an 80-kilometer (50-mile) distance to provide assistance in the event of an on-station emergency. Each organization may request equipment and manpower in the event of a fire or other emergency. In an emergency that may affect off-station areas, RASA contacts the appropriate county emergency management staff. (Redstone Arsenal, 1998a)

3.2.7.3 On-Station Safety

Health and safety for construction and contractor-supported activities is regulated under Corps of Engineers EM 385-1-1 Safety and Health Requirements Manual. Army regulations provide for health and safety programs that are at least as effective as OSHA programs and ensure that safe working conditions exist and personnel protection measures have been selected. All operations are conducted in a manner that prevents injury, loss of life, or a health hazard to personnel or the public. All personnel are briefed on anticipated hazards and trained on safety equipment, emergency procedures, and communications.

3.2.8 LAND USE AND AESTHETICS

This section describes the existing environment in terms of land use and aesthetics for the areas on and surrounding Redstone Arsenal. Topics addressed are regional land use, Redstone Arsenal land use, and aesthetics. The ROI for these resources include the Redstone Arsenal boundaries and potentially affected adjacent lands.

3.2.8.1 Regional Land Use

Top of Alabama Regional Council of Governments, Madison and Morgan Counties, and the cities of Huntsville and Madison are the local planning authorities for incorporated and unincorporated areas around Redstone Arsenal. Currently land to the east is developed in light to moderate residential with some recreational and open areas. Dense residential is to the northwest and northeast. Industrial development occurs along the northern boundary, along with the space center and some commercial areas. There is also a sewage treatment plant in close proximity to the east. Zoning, which indicates the likely long-term

development patterns around Redstone Arsenal, is consistent with existing land patterns, with room for future growth. (Redstone Arsenal, 1989; 1998a)

3.2.8.2 On Base Land Use

Redstone Arsenal encompasses an area of 15,342 hectares (37,910 acres) (U.S. Army Missile Command, 1994). Within this area, the Army uses about 1,649 hectares (4,075 acres) under a permit agreement with the Wheeler National Wildlife Refuge. The Tennessee Valley Authority (TVA) also allows Redstone Arsenal to use approximately 1,176 hectares (2,095 acres) under a land use permit (U.S. Army Missile Command, 1983). The remainder of the land was purchased between 1941 and 1942.

Land uses on Redstone Arsenal are broken down into installation support, family housing, industrial, ammunition supply and storage, test research and development, training areas, and the National Aeronautics and Space Administration (NASA). Family and troop housing, and most community recreation is located in the northern part of Redstone, with some recreation along the Tennessee River. Test and operations areas are on the western and central part of the base. Training areas are scattered throughout the base. The proposed IAT&C areas are located within an industrial land use designation.

3.2.8.3 Aesthetics

The region of influence for aesthetics for Redstone Arsenal includes the general visual environment surrounding Redstone Arsenal and the areas visible from off-base areas.

The visual environment of Redstone Arsenal is characterized by the typical Tennessee Valley's contrast between low mountains and agriculture. Much of the southern half of the installation is covered in forested wetlands (swampland). Topography is gently rolling with elevations ranging from 169 meters (556 feet) at the Tennessee River up to 378 (1,239 feet) at Weeden and Madkin Mountains, with the primary range elevation of 183 to 198 meters (600 to 650 feet) (U.S. Army Missile Command, 1994).

Redstone Arsenal is fairly undeveloped. The most significant aspect of the natural environment is the gentle rolling nature of the land and the densely forested areas and wetlands. The most significant man-made features are test, administrative, and housing areas in the northern portion of Redstone Arsenal. These features are surrounded with grassed and treed open spaces. The landscape is dominated by forested land, with the remaining land being in pasture, scrub shrub, and wetlands. The area has a relatively low visual sensitivity because the lack of relief and heavy vegetation limits any prominent vistas.

Since public access to Redstone Arsenal is restricted, viewpoints are limited to marine traffic on the Tennessee River, the Town of Triana to the southwest, Madison to the northwest, Huntsville to the east, and interstate traffic to the north.

3.2.9 NOISE

Noise is defined as unwelcome or unwanted sound that is usually caused by human activity and added to the natural acoustic setting of a locale. It is further defined as sound that disrupts normal activities or that diminishes the quality of the environment. Typical noise levels are given in table 3-3. The ROI for noise is those areas potentially affected by construction and operation activities of the proposed action.

The characteristics of sound include parameters such as amplitude, frequency, and duration. Sound can vary over an extremely large range of amplitudes. The dB, a logarithmic unit that accounts for the large variations in amplitude, is the accepted standard unit for the measurement of sound. Table 3-3 presents examples of typical sound levels. Different sounds may have different frequency contents. When measuring sound to determine its effects on a human population, A-weighted sound levels (dBA) are typically used to account for the frequency response of the human ear.

Table 3-3: Noise Levels of Common Sources

Source	Noise Level (dBA)	Comment
Air raid siren	120	at 15.2 meters (50 feet) (threshold of pain)
Rock concerts	110	
Airplane, 747	102.5	at 304.3 meters (1,000 feet)
Jackhammer	96	at 3.0 meters (10 feet)
Power lawn mower	96	at 0.9 meters (3 feet)
Football game	88	Crowd size: 65,000
Freight train at full speed	88 - 85	at 9.1 meters (30 feet)
Portable hair dryer	86 - 77	at 0.3 meters (1 foot)
Vacuum cleaner	85 - 78	at 1.5 meters (5 feet)
Long range airplane	80 - 70	Inside
Conversation	60	
Typical suburban background	50	
Bird calls	44	
Quiet urban nighttime	42	
Quiet suburban nighttime	36	
Library	34	
Bedroom at night	30	
Audiometric (hearing testing) booth	10	Threshold of hearing without hearing loss

Source: Cowan, 1994.

3.2.9.1 Background Noise Levels off of Redstone Arsenal

Several populated areas surround Redstone Arsenal: Huntsville borders on the east, north, and west; Madison on the west-northwest; Triana on the southwest; Mooresville to the west; Somerville to the southwest; Decatur to the west-southwest; Hartselle to the

southwest; and Falkville to the south-southwest. The largest population densities adjacent to Redstone Arsenal are in Huntsville on the north and east boundaries and along the northwest portion of the installation boundary in Madison. The Huntsville International Airport and other commercial/industrial land uses, which are not considered to be noise sensitive, are located west of Redstone Arsenal beyond developing residential areas. Isolated farm residences are in the area south of and across the Tennessee River from Redstone Arsenal. The Wheeler National Wildlife Refuge extends into large portions of Redstone Arsenal from the southwestern corner.

The city of Huntsville has adopted a noise ordinance (88-663), which regulates noise production by various sources and defines levels of ambient noise for several types of land use. Daytime noise levels are limited to 55 dBA in residential areas, 62 dBA in commercial areas, and 70 dBA in industrial areas. Noise levels within the developed areas of Redstone Arsenal are typical of an urban environment ranging between 45 and 80 dBA.

3.2.9.2 Background Noise Levels on Redstone Arsenal

For undisturbed areas of Redstone Arsenal, the background noise levels are reported to be 46 dBA. The major operational noise sources on Redstone Arsenal include rocket motor flight tests, static rocket motor firings, ordnance detonations, gun firing, airfield operations, and vehicle traffic. Most test areas are located on remote parts of Redstone Arsenal; therefore, noise generated by testing appears to have little impact on Redstone Arsenal and the surrounding communities. Some weapons firings, small missile firings, and static missile firings can reach decibels near the test location of 150 dB. (National Aeronautics and Space Administration, 1996)

Noise complaints from activities at Redstone Arsenal are minimal because the noise producing activities at Redstone Arsenal are located so that a significant buffer exists between noise producing activities and the nearest population center.

3.2.10 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 ground water features, water quality, and flood hazard areas in the vicinity of Redstone Arsenal. In general, the ROI for groundwater is the local aquifers that are directly or indirectly used by Redstone Arsenal. The ROI for surface water is the drainage system/watershed in which Redstone Arsenal is located.

3.2.10.1 Water Resource Regulations

Regulations governing water resources are discussed in appendix A. 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 construction 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.

This section provides an overview of the surface and ground water features, water quality, and flood hazard areas in the vicinity of Redstone Arsenal, Alabama. In general, the ROI for groundwater is the local aquifers that are directly or indirectly used by Redstone Arsenal. The ROI for surface water is the drainage system/watershed in which Redstone Arsenal is located. ADEM is responsible for the management of the National Pollutant Discharge Elimination System (NPDES) permit process.

3.2.10.2 Groundwater

The hydrology at Redstone Arsenal can be characterized by three units: the regolith, the Tuscumbia Limestone and Fort Payne Chert, and the Chattanooga Shale. The Tuscumbia limestone and Fort Payne Chert compose the limestone aquifer. The upper regolith and the Chattanooga Shale, because they are relatively impermeable, act as the confining units for the limestone aquifer. Water in the lower layers of the regolith, by contrast, occurs 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 aquifers beneath Redstone Arsenal are some of the most productive in Madison County. 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).

3.2.10.3 Surface Water

The Tennessee River, flowing west, forms the southern boundary of Redstone Arsenal. Other major watercourses that flow through the arsenal include Indian Creek, Huntsville Spring Branch, and McDonald Creek. Each of these tributaries generally flows south and empties into the Tennessee River.

The western portion of Redstone Arsenal drains into Indian Creek, and the eastern half drains into Huntsville Spring Branch. McDonald Creek runs along the eastern boundary of Redstone Arsenal and drains the northeastern corner of the installation before joining Huntsville Spring Branch. Huntsville Spring Branch originates at a spring in the city of Huntsville and flows in a southwesterly direction across Redstone Arsenal and empties into Wheeler Lake (U.S. Army Missile Command, 1994).

The water in the eastern portion of the drainage divide of the Arsenal is characterized as hard to very hard, locally acidic, low in dissolved oxygen, locally high in manganese, and high in biochemical oxygen demand. (U.S. Department of the Army, 1997)

3.2.10.4 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. U.S. Army Regulation 200-1 (Environmental Protection and Enhancement) requires Army officials to protect floodplains from Army actions.

Approximately one-third of the installation lies within the 100-year floodplain of the Tennessee River. These areas include most of the Wheeler National Wildlife Refuge, several creeks and ponds, and the Tennessee River Banks. The 100-year floodplain lies at elevations ranging from approximately 174 to 175 meters (570 to 575 feet) above msl at different locations on Redstone Arsenal. For planning purposes, the 100-year flood level of the Tennessee River is established at approximately 175 meters (572.5 feet) above msl. The proposed sites are not located within the 100-year floodplain (U.S. Department of Defense, Ballistic Missile Defense Organization, 1999).

3.2.10.5 Water Quality

There is the potential for groundwater contamination at Redstone Arsenal as a result of past waste handling and generation activities, including the manufacture of chemical weapons and testing of rocket motors. Numerous groundwater investigations are in progress or planned to aid in the identification and remediation of contaminated waste sites under Redstone Arsenal. Where identified, groundwater contamination is being monitored at test wells located across the installation as part of the IRP. The Army has initiated groundwater remediation on several sites and expects complete cleanup to take 10 to 20 years (U.S. Army Missile Command, 1994).

Installation staff periodically sample and test water quality at several arsenal locations on the Indian Creek and Huntsville Spring branches. Surface water quality is generally characterized as moderately hard to hard, moderately high in dissolved solids, and high in manganese. Area surface water, including Indian Creek, Huntsville Spring Branch, and McDonald Creek, are generally suitable for most uses and are classified by ADEM as suitable for fish and wildlife use. The Tennessee River reach adjacent to the Arsenal has been classified for use as a public water supply and for fish and wildlife uses (U.S. Army Missile Command, 1994).

According to the Phase II EBS, the groundwater beneath the proposed IAT&C facilities contains low concentrations of volatile organic compounds (U.S. Army Corps of Engineers, 1997). An investigation of the groundwater is being planned under the Redstone Arsenal Installation Restoration Program (Redstone Arsenal, 1998b). Groundwater beneath the storage igloos has not been evaluated (U.S. Department of Defense, Ballistic Missile Defense Organization, 1999).

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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. Sections 4.1 through 4.2 provide discussions of the potential environmental consequences of these activities. The amount of detail presented in each section is proportional to the potential for impacts. Sections 4.3 through 4.10 provide discussions of the following with regard to proposed IAT&C 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 IAT&C 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 IAT&C activities.

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 with applicable agencies.

4.1 INTEGRATION, ASSEMBLY, AND TEST FACILITIES

4.1.1 AIR QUALITY

Environmental Effects

Impacts to the air quality resource due to the proposed action would occur during building modification. 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.

Standard construction methods would be employed to minimize fugitive dust emissions. 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, 1996b)

Specific emission levels would change as machinery requirements varied throughout the construction/modification period. However, all construction would be conducted in accordance with applicable permits. Emissions due to construction, when added to the existing emissions, would not exceed threshold levels; therefore, no long-term impacts to air quality are anticipated.

Daily operation would result in a minor increase in traffic levels and a commensurate increase in mobile source emissions. Daily power consumption would be provided by established power sources. However, if independent power is required, the new power sources would be incorporated into Redstone Arsenal's Title V air permit. No impact to air quality is anticipated from these minimal releases.

Cumulative Impacts

Construction 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 BIOLOGICAL RESOURCES

Environmental Effects

Proposed activities include modification of IAT&C buildings, operation of these facilities, construction of the ROTB, paving and road improvements, and new fencing around the complex. The areas immediately surrounding the proposed buildings are maintained by mowing. The IAT&C facilities would be located in the eastern portion of Redstone Arsenal as shown in figure 2-3. No threatened or endangered plant species have been identified as occurring within this area.

Construction noise, caused by truck traffic to and from the site, and the potential use of heavy machinery, may disturb wildlife in the immediate vicinity during the construction period. Construction/modification activities could disturb nesting, hatching, and fledging of land and shorebirds and other wildlife in the area; however, this would be a short-term effect. No listed bird species have been identified as nesting on the Arsenal. The likelihood that transient bald eagles would be adversely impacted is anticipated to be slight. No other listed wildlife species are expected to occur in the immediate vicinity of the IAT&C facility. Areas to be paved or improved, such as road widening, are located in areas that were disturbed during original construction and by modifications of previous property users. No impacts to wetlands are anticipated. Best Management Practices such as filtering sediment from storm water runoff would be implemented.

Operational activities would consist of assembly and testing of the interceptors. An increase in human activity would occur at the site; however, no impacts to biological resources are expected.

Cumulative Impacts

The modification to and use of the area for missile assembly is not expected to result in cumulative impacts to vegetation or wildlife in the area.

4.1.3 CULTURAL RESOURCES

Environmental Effects

Prehistoric and Historic Archaeological Resources. Disturbance and/or destruction of a National Register-eligible archaeological site is considered an adverse effect under cultural resources legislation and a significant impact under NEPA. However, no National Register-eligible sites are within the area proposed for use. Construction and operations personnel will be informed regarding the sensitivity of archaeological resources and the types of penalties that can be incurred if sites are damaged or destroyed. Guidance for briefings and avoidance measures will be formulated in coordination with the Redstone Arsenal DEMP.

Although cemeteries at Redstone Arsenal are not National Register eligible, they are protected and cared for by the installation nonetheless. Any ground disturbance within 30 meters (100 feet) of the Lacey Cemetery fence would require coordination with the Redstone Arsenal DEMP to ensure that no graves are disturbed. If burial sites are detected during ground disturbance activities, work will cease and the Alabama Historical Commission will be notified immediately.

Historic Buildings and Structures. Of the currently identified National Register-listed buildings and structures, none are located within the ROI for the IAT&C program; therefore, there will be no effects to these historic properties.

All five igloos, as well as Buildings 7571, 7575, and 7578 have been evaluated for eligibility for inclusion in the National Register in a recent World War II properties study of Redstone Arsenal and preliminarily determined to be ineligible; however, the study further indicated that these structures may be significant under the Cold War historic context and recommended that additional study under that context be conducted. The World War II study and a recently prepared Cold War study (which covered properties constructed after 1946 only) (U.S. Army Corps of Engineers, 1997) are both in draft form and have not yet received concurrence from the Alabama SHPO. However, the SHPO has concurred that historic sites are within the area proposed for use (Alabama Historical Commission, 1999).

In the unlikely event that a mishap occurs, post-mishap recommendations include post-event inspection, non-archival quality 35-mm photography, and documentation revisions

(e.g., the 1997 World War II study) to determine and record the extent of the damage from impacts or fire.

Native Populations/Traditional Resources. There are no formally identified traditional cultural properties within the ROI for IAT&C activities; therefore, no effects are expected.

Cumulative Impacts

There are no past, present, or reasonably foreseeable future programs identified within the ROI for the IAT&C program that, when added to the potential impacts of the proposed action, would result in cumulative impacts.

In addition, because archaeological sites, artifacts, and features occur throughout the Arsenal, as well as within, or adjacent to, the IAT&C ROI, there is some potential for additional cultural materials to be unexpectedly discovered during the course of project activities. In the event this should occur anywhere within the ROI, all activities would halt in the immediate area and the Alabama SHPO consulted through the Redstone Arsenal DEMP. Subsequent actions would follow guidance provided in 36 CFR 800.11.

4.1.4 GEOLOGY AND SOILS

The construction and operational impacts associated with the proposed project at Redstone Arsenal could potentially impact soils in the ROI.

Construction

Compliance with the NPDES Storm Water Pollution Prevention Plan (SWPPP) would minimize soil erosion and pollutant discharges during construction/modification. In addition, compliance with the SPCC would minimize the potential for accidental spills of hazardous chemicals to affect project soils. Soils in the construction area are generally classified with low to moderate shrink/swell and erosion potential. As a result, construction-related impacts to geology and soils are considered minor.

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 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 Redstone Arsenal is located in a low seismic risk area, the potential occurrence of liquefaction, seismic settlement, or ground rupture at the project sites is considered

minimal. In addition, soil at the proposed sites exhibits low to moderate shrink/swell susceptibility; therefore, potential geotechnical problems are considered minor.

Cumulative Impacts

There are no past, present, or reasonably foreseeable future programs identified within the ROI for the IAT&C program that, when added to the potential impacts of the proposed action, would result in cumulative impacts.

4.1.5 HAZARDOUS MATERIALS AND HAZARDOUS WASTE MANAGEMENT

Environmental Effects

Modification of the IAT&C facilities would use small amounts of hazardous materials and generate small amounts of hazardous wastes, primarily paints, oils, and solvents and would require partial demolition and renovation of existing structures. The modification of structures with asbestos-containing material has a potential for releasing asbestos fibers into the air. Asbestos fibers could be released due to disturbance or damage of various building materials; however, asbestos that has been identified in pipes and valves in Building 7571 would not be disturbed. Lead-based paints on surfaces of materials to be removed during building modification would be removed in accordance with the applicable health and safety standards and disposed of as hazardous waste. An investigation conducted as part of the Phase I EBS did not identify any PCB-containing transformers at the South Plant, and all PCB-containing transformers have been removed from the igloo area. (U.S. Department of Defense, Ballistic Missile Defense Organization, 1999)

Contaminated soils would be excavated and handled and disposed of in accordance with applicable environmental regulations.

The operation and maintenance of the IAT&C facilities would only slightly increase the amounts of hazardous materials used and hazardous wastes generated at Redstone Arsenal. These hazardous materials and hazardous wastes include paints, solvents, acids, bases, ethylene glycol, and alcohol. These hazardous materials are similar in type and quantity to those historically used at the proposed site and currently being used at Redstone for similar operations. Redstone permits could absorb the additional burden of hazardous wastes from IAT&C activities. Procedures, personnel, and facilities are in place to manage the additional hazardous materials and wastes. Pollution prevention efforts would apply to IAT&C activities.

Cumulative Impacts

The additional quantities of hazardous materials or hazardous wastes, when added to existing and expected future programs, would not adversely affect existing permits or programs at Redstone Arsenal. Therefore, cumulative impacts relative to hazardous materials or hazardous wastes are not expected.

4.1.6 HEALTH AND SAFETY

Environmental Effects

Existing structures would be used at Redstone Arsenal. The presence of lead-containing paint in the buildings proposed for modification has been determined. These materials would be handled in an appropriate manner before other renovation activities are initiated. An area would be prepared for construction equipment laydown, personal vehicle parking, temporary mobile offices (trailers), maintenance facilities, and other construction needs. Construction materials would be delivered to the site by truck in accordance with DOT and Redstone Arsenal regulations. Construction activities would be coordinated with the Redstone Department of Public Works Office and would comply with applicable Army safety requirements to control exposure to occupational safety and health hazards.

Use of the igloos for IAT&C activities would be in accordance with existing ESQD requirements. An ESQD will be established around Building 7578 to ensure safety of personnel. Non-project personnel in other buildings within this ESQD would be evacuated when the ESQD is in effect.

In the event of a liquid propellant leak, the area would be evacuated, ignition sources would be removed, and vapors would be suppressed with a water fog. All liquid would be contained for treatment and neutralization and disposed of in accordance with all applicable regulations. Small spills would be absorbed with earth, sand, or other non-combustible materials and transferred to containers for disposal. (U.S. Department of Transportation, 1996)

Facility and equipment designs will incorporate measures to minimize the potential for and impact of accidents. Operating procedures and training will be instituted to minimize the potential for and impact of releases of hazardous materials. Appropriate emergency response plans will be established and implemented to deal with potential chemical releases.

Cumulative Impacts

All work on the proposed action will be performed in accordance with applicable health and safety regulations. 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.

4.1.7 LAND USE AND AESTHETICS

Environmental Effects

Regional Land Use. The proposed project would be located in the extreme eastern portion of Redstone Arsenal. Construction/modification and operational activities would not affect adjacent off-site land uses. No noise related impacts on adjacent land use are anticipated because noise should be below background noise levels at the Redstone Arsenal boundary. See section 4.1.8 for additional noise information.

On-Base Land Use. Construction/modification and operation of facilities would occur primarily in the eastern part of the Arsenal, which falls under the industrial land use designation. The facility and site operations would be compatible with the open nature of the base and existing types of activities, and are consistent with overall base objectives. The proposed facilities and operations would not result in a conversion of prime agricultural land or cause a decrease in the utilization of the land.

Aesthetics. Modification of existing buildings would not alter the views surrounding Redstone Arsenal. Views of the proposed site are limited. Therefore, construction and operations of the proposed IAT&C facility would not affect the area's aesthetic quality, nor would it obstruct any scenic views.

Cumulative Impacts

There are no past, present, or reasonably foreseeable future programs identified within the ROI for the IAT&C program that, when added to the potential impacts of the proposed action, would result in cumulative impacts.

4.1.8 NOISE

Environmental Effects

There are no legally established national standards for noise exposure outside of the work environment. Therefore, limits on workplace noise are used as guidelines for exposure of the public to noise.

The Occupational Safety and Health Act of 1970 (Public Law 91-596) was established to "assure safe and healthy working conditions for working men and women." It delegated implementation and enforcement of the law to the United States Department of Labor OSHA. Title 29 CFR Section 1910.95 of the law pertains to the protection of workers from potentially hazardous occupational noise exposure (table 4-1). OSHA regulations require employees exposed to eight-hour time-weighted average levels of noise of 85 dBA and 90 dBA to be monitored and to be provided hearing protection, respectively. For noise levels greater than 90 dBA, hearing protection is required for exposures of shorter duration. Under OSHA regulations, exposure to impulse noise should never exceed a 140 dB peak sound pressure level. Activities would be conducted in compliance with OSHA regulations.

Potential impacts from IAT&C program activities could come from noise generated by construction equipment during construction/modification activities and from noise generated by assembly and testing equipment.

Table 4-1: Permissible Noise Exposure*

Duration (Hours) Per Day	Sound Level dBA Slow Response
8	90
6	92
4	95
3	97
2	100
1 to 1.5	102
1	105
0.5	110
0.25 or less	115

Source: 29 CFR 1910.95, Table G-16
*Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level

At a distance of approximately 15 meters (50 feet), the noise from typical construction equipment falls in the range of 70 dBA to 100 dBA (U.S. Environmental Protection Agency, 1971). As such, under most meteorological conditions, the loudest construction noise would be anticipated to attenuate to 85 dBA at a distance of approximately 520 meters (1,600 feet) from the construction site. As no sensitive receptors outside the Redstone Arsenal facility boundary are anticipated to be closer than this, then impacts to the public from construction noise would not be anticipated.

Cumulative Impacts

There are no past, present, or reasonably foreseeable future programs identified within the ROI for the IAT&C program that, when added to the potential impacts of the proposed action, would result in cumulative impacts.

4.1.9 WATER RESOURCES

Construction-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.

Potential water resources related impacts could also occur if the contaminated groundwater beneath the site is encountered during construction.

Construction

Construction/modification of the IAT&C facilities at Redstone Arsenal would result in the disturbance of less than 2 hectares (5 acres) of land and, therefore, would not be subject to NPDES construction permit requirements. Soil erosion and pollutant discharges during construction and the potential for accidental spills of hazardous chemicals to affect surface

and groundwater resources would be minimal. Intrusive activities are not planned to the estimated 5-meter (15-foot) depth to groundwater. As a result, construction-related impacts to water resources are considered minor.

Operations

Surface waters near Redstone Arsenal are slightly acidic to highly alkaline. Average pH levels range from a low of 6.9 along portions of McDonald Creek to a high of nearly 7.4 along Indian Creek (Ebasco Services, Inc., 1994).

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 SPCC Plan, to be developed and implemented as part of this project. Compliance with the SPCC Plan would minimize the potential for accidental spills of hazardous chemicals to affect surface and groundwater resources.

Operations at Redstone Arsenal, including the proposed IAT&C site, would be required to comply with NPDES industrial permit requirements. Treated storm water is currently discharged to local water courses in compliance with a NPDES industrial permit administered by ADEM.

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 IAT&C activities are located within previously constructed areas that are currently elevated above the 100-year floodplain. As a result, risk of flooding at the project site is considered minor.

Cumulative Impacts

There are no past, present, or reasonably foreseeable future programs identified within the ROI for the IAT&C program that, when added to the potential impacts of the proposed action, would result in cumulative impacts.

4.2 STORAGE IGLOOS

Only minor modifications such as the addition of paving would be required to upgrade the igloos for IAT&C activities. The areas proposed for paving were previously disturbed during original construction of the igloos. Impacts would be similar to those analyzed in section 4.1.

4.3 ENVIRONMENTAL EFFECTS OF THE NO-ACTION ALTERNATIVE

If the No-action Alternative is selected, no environmental consequences associated with the interceptor integration, assembly, and testing are anticipated. Defensive capabilities of deployed military units would remain the same. The upgrade of facilities in the South Plant would result in minor short-term impacts to biological resources from noise and the increased presence of personnel. No other impacts are anticipated.

4.4 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 noise impacts on wildlife; slight disturbance of vegetation; minor increase in erosion of soils; minor increased generation of hazardous materials; and increased noise levels at IAT&C-related sites. However, through implementation of the program actions described within this document, these effects would be minimized.

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

Land-use planning would follow the Installation Master Plan and the requirements of section III (Chapter 2) of AR 200-1, *Environmental Protection and Enhancement.* In addition, IAT&C activities would comply with applicable Federal, state, and local laws and regulations.

Proposed activities occurring at existing manufacturing sites would have no impact on land use itself and present no conflicts with Federal, regional, state, local, or American Indian land-use plans, policies, or controls. The manufacturing facilities were designated and devoted to supporting missile and weapon test and development programs since 1942.

Any potential conflicts with land-use plans, policies, or controls would be a primary focus of agreements that would be negotiated with all affected Federal, regional, state, local, and American Indian agencies before implementation of the proposed action.

4.6 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.

4.7 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. It is similar to the activities that have been carried out in previous defense programs over the past several years.

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

Proposed IAT&C activities would take advantage of existing facilities and infrastructure with minor construction/modification required. The upgrades to some of these sites would not alter the uses of the sites, which are to support weapons tests and development. Therefore, the proposed action does not eliminate any options for future use of the environment for the locations under consideration.

4.9 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 IAT&C activities.

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

The proposed activities would be conducted in a manner that would not substantially affect human health or the environment. The activities would also be conducted within the existing boundaries of an active military installation, and would not produce emissions or other environmental effects that would have a disproportionate or inordinate impact on low-income or minority groups.

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5.0 REFERENCES

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January 29, 1999

Commander, U.S. Army Space and Missile Defense Command
Attention: SMDC-EN-V, Ms. Vanessa Turner
P.O. Box 1500
Huntsville, Alabama 35807-3801

Re: AHC 99-0356
Draft Environmental Assessment
Integration, Assembly, Testing, and Checkout
National Missile Defense
Redstone Arsenal
Madison County, Alabama

Dear Ms. Turner:

Upon review of the draft EA forwarded by your office, the Alabama Historical Commission has determined that the overall document appears to be well executed. However, we have one comment regarding cemeteries. The document states that no ground disturbance will take place within 100 feet of a cemetery fence. While this should suffice as a protection measure, it should also be noted that burials often occur outside of the existing marked boundaries. For this reason, we recommend that a sentence be added to the EA indicating that should burials be detected during ground disturbing activities, work will cease and the Alabama Historical Commission will be notified immediately. With this requested change, our office can concur with draft EA.

We appreciate your efforts on this project. Should you have any questions or comments, please contact Stacye Hathorn or Greg Rhinehart of our office and include the AHC tracking number referenced above.

Sincerely,

Thomas O. Maher, Ph.D.
State Archaeologist

for: Elizabeth Ann Brown
Deputy State Historic Preservation Officer

7-2

United States Department of the Interior

FISH AND WILDLIFE SERVICE

[redacted]
P. O. Drawer 1190
Daphne, Alabama 36526

IN REPLY REFER TO:

February 16, 1999

Mr. John L. Ramey
Lieutenant Colonel, U.S. Army
U.S. Army Space and Missile Defense Command
Post Office Box 1500
Huntsville, Alabama 35807-3801

Dear Mr. Ramey:

Thank you for the opportunity to provide comments on the Draft Environmental Assessment in support of the proposed Integration, Assembly, Testing and Checkout (IAT&C) for National Missile Defense (NMD) Components at Redstone Arsenal, Alabama.

Based on the draft environmental assessment you provided the proposed action consists of rehabilitation or facility upgrade of an existing complex of buildings to provide an interceptor missile assembly and integration facility and the actual assembly and integration of interceptor missiles at the rehabilitated facility.

We have determined that you have accurately identified the endangered, threatened, or proposed species which may occur within the project area in your January 13, 1999, cover letter to the draft environmental assessment.

If you need additional information, please contact Mrs. Barbara Allen at (334) 441-5181, extension 33.

Sincerely,

Larry E. Goldman
Field Supervisor

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APPENDIX A
ENVIRONMENTAL RESOURCES, APPLICABLE LAWS AND REGULATIONS, AND COMPLIANCE REQUIREMENTS

The following Federal environmental laws and regulations were reviewed to assist in determining the significance of environmental impacts under the National Environmental Policy Act (NEPA).

Air Quality

The Clean Air Act seeks to achieve and maintain air quality to protect public health and welfare (42 United States Code [USC] 7401 et seq.). To accomplish this, Congress directed the Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS). Primary standards protect public health; secondary standards protect public welfare (e.g., vegetation, property damage, scenic value). NAAQS address six criteria pollutants: carbon monoxide, nitrogen oxides, lead, sulfur dioxides, ozone, and particulates.

Primary responsibility to implement the Clean Air Act rests with each state. However, each state must submit a state implementation plan (SIP) outlining the strategy for attaining and maintaining the NAAQS within the deadlines established by the act. If the state does not provide a SIP that is acceptable to the EPA, the EPA will provide a SIP which the state is then required to enforce.

The Clean Air Act mandates establishment of performance standards, called New Source Performance Standards, for selected categories of new and modified stationary sources to keep new pollution to a minimum. Under the act, the EPA can establish emission standards for hazardous air pollutants for both new and existing sources. So far, the EPA has set National Emission Standards for Hazardous Air Pollutants (NESHAP) for beryllium, mercury, asbestos, vinyl chloride, and other hazardous materials including radioactive materials.

The Clean Air Act also seeks to prevent significant deterioration of air quality in areas where the air is cleaner than that required by the NAAQS. Areas subject to prevention of significant deterioration regulations have a Class I, II, or III designation. Class I allows the least degradation.

Nonattainment policies also exist. A nonattainment area is one where monitoring data or air quality modeling demonstrates a violation of the NAAQS. The most widespread violation of the NAAQS is related to ozone. For ozone, urban areas are sorted into five categories: marginal, moderate, serious, severe, and extreme. Additionally, stratospheric ozone and climate protection policies have been established. Interim reductions in the

phaseout of chlorofluorocarbons, methyl chloroforms, and halons have been mandated. Hydrochlorofluorocarbons must be phased out of production beginning in 2015, with production elimination set for 2030. State and local governments are required to implement policies that prevent construction or modification of any source that will interfere with attainment and maintenance of ambient standards. A new source must demonstrate a net air quality benefit. The source must secure offsets from existing sources to achieve the air quality benefit.

The Clean Air Act Amendments of 1990 represent the first significant revisions to the Clean Air Act in the past 13 years (42 USC 7401 et seq.). The amendments strengthen and broaden earlier legislation by setting specific goals and timetables for reducing smog, airborne toxins, acid rain, and stratospheric ozone depletion over the next decade and beyond.

The Clean Air Act Amendments of 1990 contain 11 major titles which address various issues of the National Air Pollution Control Program. Title I, Attainment and Maintenance of National Ambient Air Quality Standards, mandates technology-based emissions control for new and existing major air pollution sources. Title II, Mobile Sources, deals with emissions control for motor vehicles in the form of tailpipe standards, use of clean fuels, and mandatory acquisition of clean-fuel vehicles. Hazardous Air Pollutants, Title III, mainly addresses the control of hazardous air pollutants (HAPs) and contingency planning for the accidental release of hazardous substances. There are 189 HAPs identified in the new amendments. Title IV, Acid Rain, focuses on the reduction of sulfur dioxide and nitrogen oxides in the effort to eliminate acid rain. Permits, Title V, establishes a nationwide permit program for air pollution sources. The permits will clarify operating and control requirements for affected stationary sources. Stratospheric Ozone Protection, Title VI, restricts the production and use of chlorofluorocarbons, halons, and other halogenated solvents which, when released into the atmosphere, contribute to the decomposition of stratospheric ozone. Title VII, Enforcement, describes civil and criminal penalties which may be imposed for the violation of new and existing air pollution control requirements. Title VIII of the 1990 amendments contains various miscellaneous provisions concerning the outer continental shelf, international border areas, grants, secondary standards, renewable energy incentives, and visibility. Information and rules related to clean air research can be found in Title IX. The EPA is to conduct studies on improved methods and techniques for measuring individual air pollutants, health effects associated with exposure to air pollutants, improvements in predictive models and response technology for accidental releases of dense gas, acid precipitation, clean fuels, and improved studies on the ecosystem, among others. Title X requires that a certain percentage of Federal funds, set aside for research required under the act, be made available to disadvantaged businesses. Title XI contains laws pertaining to Clean Air Employment Transition Assistance. Topics covered in this title include the Job Partnership Training Act provisions, funding, benefits, and eligibility requirements.

New or modified major sources in attainment areas would also be subject to Prevention of Significant Deterioration (PSD) review as presented in 40 CFR 51.166 in order to ensure the continued maintenance of a high air quality baseline standard. Emissions from new or

modified major sources are controlled using Best Available Control Technology. Geographical areas are ranked into three categories for purposes of PSD. Class I areas are those areas where any appreciable deterioration of air quality would be considered significant. These areas include certain national parks and wilderness areas. Class II is the default classification. Class II areas can allow for moderate, well-controlled industrial growth. Under certain circumstances, states may reclassify areas as Class III. These areas allow for greater industrial development. The overall air quality impacts due to the source in question in combination with other PSD sources in the area must not exceed the area's allowable incremental increases identified in table A-1. Concentrations of particulate pollutants resulting from construction or other temporary emission-related activities of new or modified sources are specifically excluded from determining the portion of the increment consumed.

Table A–1: Permissible PSD Incremental Increase (by Area Classification)

		Maximum Allowable Increase (micrograms per cubic meter)		
Pollutant	**Averaging Time**	**Class I**	**Class II**	**Class III**
Nitrogen dioxide	Annual	2.5	25	50
Sulfur dioxide	Annual	2	20	40
	24-hour	5	91	182
	3-hour	25	512	700
PM_{10}	Annual	4	17	34
	24-hour	8	30	60

Source: 40 CFR 51.166, revised as of July 1, 1995

Alabama Regulations. The Alabama Department of Environmental Management (ADEM) administers all major Federal environmental laws, including the Clean Air Act. ADEM's Air Division and local air pollution control programs in the city of Huntsville implement procedures designed to ensure the NAAQS are met. These measures include monitoring air quality, periodically reviewing state emission-limiting regulations, implementing a permitting system to ensure that facilities comply with applicable regulations and do not violate ambient air quality standards, and monitoring industrial operations to ensure that pollution controls are properly operated and maintained.

Alabama has adopted the NAAQS as its ambient air quality standards.

Biological Resources

The Endangered Species Act declares that it is the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species (16 USC 1531 et seq.). Further, the act directs Federal agencies to use their authorities in furtherance of the purposes of the act.

Under the Endangered Species Act, the Secretary of the Interior creates lists of endangered and threatened species. The term endangered species means any species which is in danger of extinction throughout all or a significant portion of its range. The act defines a threatened species as any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

A key provision of the Endangered Species Act for Federal activities is Section 7 consultation. Under Section 7 of the act, every Federal agency must consult with the Secretary of the Interior, U.S. Fish and Wildlife Service (USFWS), to ensure that any agency action (authorization, funding, or execution) is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat of such species.

The Bald and Golden Eagle Protection Act establishes penalties for the unauthorized taking, possession, selling, purchase, or transportation of bald or golden eagles, their nests, or their eggs (16 USC 668 et seq.). Any Federal activity that might disturb eagles requires consultation with the USFWS for appropriate mitigation.

Through the Fish and Wildlife Coordination Act, Congress encourages all Federal departments and agencies to utilize their statutory and administrative authority, to the maximum extent practicable and consistent with each agency's statutory responsibilities, to conserve and promote conservation of nongame fish and wildlife and their habitats (16 USC 2901 et seq.). Further, the act encourages each state to develop a conservation plan.

The Fish and Wildlife Coordination Act requires a Federal department or agency that proposes or authorizes the modification, control, or impoundment of the waters of any stream or body of water (greater than 4.1 hectares [10 acres]), including wetlands, to first consult with the USFWS. Any such project must make adequate provision for the conservation, maintenance, and management of wildlife resources. The act requires a Federal agency to give full consideration to the recommendations of the USFWS and to any recommendations of a state agency on the wildlife aspects of a project.

Cultural Resources

The Historic Sites Act of 1935 authorizes the Secretary of the Interior to designate areas as national natural landmarks for listing on the National Registry of Natural Landmarks (16 USC 461 et seq.). In conducting an environmental review of a proposed Federal agency action, the responsible official shall consider the existence and location of natural landmarks using information provided by the National Park Service pursuant to 35 Code of Federal Regulations (CFR) 62.6(d) to avoid undesirable impacts upon such landmarks.

Under Section 106 of the National Historic Preservation Act (16 USC 470 et seq.) and Executive Order 11593, if a Federal agency undertaking affects any property with historic, architectural, archaeological, or cultural value that is listed on or eligible for listing on the National Register of Historic Places, the responsible official shall comply with the procedures for consultation and comment promulgated by the Advisory Council on Historic

Preservation in 36 CFR Part 800. The responsible official must identify properties affected by the undertaking that are potentially eligible for listing on the National Register and may request a determination of eligibility from the Keeper of the National Register, Department of the Interior, under the procedures in 36 CFR Part 63.

Under the National Historic Preservation Act, if a Federal agency activity may cause loss or destruction of significant scientific, prehistoric, historic, or archaeological property, the responsible official or the Secretary of the Interior is authorized to undertake data recovery and preservation activities. Data recovery and preservation activities shall be conducted in accordance with implementing procedures promulgated by the Secretary of the Interior.

The American Indian Religious Freedom Act of 1978 (PL 95-341; 92 STAT 469; 42 USC 1996) states that it is the policy of the United States to protect and preserve for Native Americans their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian, including access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites.

The Archaeological Resources Protection Act of 1979 (PL 96-95; 93 STAT 722; 16 USC 470aa-47011) provides guidelines for dealing with archaeological resources on public and American Indian land. It details the permit procedures necessary for excavation and outlines the criminal and civil penalties for the illegal removal of archaeological materials from Federal land.

The Native American Graves Protection and Repatriation Act (1990) (PL 101-601; 25 USC 3001 et seq.) requires any person who wishes to excavate Native American remains and grave goods on Federal land to obtain a permit and to give the Indian tribe most closely associated with those goods the opportunity to reclaim them. The act also addresses the incidental discovery of such items on Federal land by persons engaged in other activities, such as mining or construction. When one or more of these items are found, the activity must cease and a reasonable effort made to protect the items. Written notification must be made to the Federal land manager in charge and to the appropriate tribe or organization, who are allowed 30 days in which to make a determination as to the appropriate disposition for these remains.

General

NEPA (42 USC 4321 et seq.) is the basic U.S. charter for protection of the environment. It establishes policy, sets goals, and provides means for carrying out the policy. The NEPA contains "action-forcing" provisions to make sure that Federal agencies act according to the letter and the spirit of the act. NEPA procedures must ensure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing the NEPA. The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment.

The Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the NEPA (40 CFR 1500-15080) are issued pursuant to NEPA; the Environmental Quality Improvement Act of 1970, as amended (42 USC 4371 et seq.); section 309 of the Clean Air Act, as amended (42 USC 7609); and Executive Order 11514, Protection and Enhancement of Environmental Quality (as amended by Executive Order 11991). The purpose of the regulations is to provide direction to Federal agencies so they understand how to comply with the procedures and achieve the goals of the NEPA process.

Hazardous Materials and Waste

Under the Resource Conservation and Recovery Act (RCRA), Congress declares the national policy of the United States to be, whenever feasible, the reduction or elimination, as expeditiously as possible, of hazardous waste (42 USC 6901 et seq.). Waste that is nevertheless generated should be treated, stored, or disposed of so as to minimize the present and future threat to human health and the environment.

RCRA defines solid waste as any garbage, refuse, or sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations and from community activities. To regulate solid waste, RCRA provides for the development of state plans for waste disposal and resource recovery. RCRA encourages and affords assistance for solid waste disposal methods that are environmentally sound, maximize the utilization of valuable resources, and encourage resource conservation. RCRA also regulates mixed low-level radioactive wastes. A mixed waste contains both a hazardous waste and radioactive waste.

RCRA defines waste as hazardous through four characteristics: ignitability, corrosivity, reactivity, or toxicity. Listed wastes are also classified as hazardous. Once defined as a hazardous waste, the RCRA establishes a comprehensive cradle-to-grave program to regulate hazardous waste from generation through proper disposal or destruction.

RCRA also establishes a specific permit program for the treatment, storage, and disposal of hazardous waste. Both interim status and final status permit programs exist.

Any underground tank containing hazardous waste is also subject to RCRA regulation. Under the act, an underground tank is one with 10 percent or more of its volume underground. Underground tank regulations include design, construction, installation, and release-detection standards.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)—commonly known as Superfund—provides for funding, cleanup, enforcement authority, and emergency response procedures for releases of hazardous substances into the environment (42 USC 9601 et seq.).

CERCLA covers the cleanup of toxic releases at uncontrolled or abandoned hazardous waste sites. By comparison, the principal objective of RCRA is to regulate active

hazardous waste storage, treatment, and disposal sites to avoid new Superfund sites. RCRA seeks to prevent hazardous releases; a release triggers CERCLA.

The goal of the CERCLA-mandated program (Superfund) is to clean up abandoned and inactive waste sites where releases have occurred or where hazardous substances threaten release into the environment. A trust fund supported, in part, by a tax on petroleum and chemicals supports the Superfund. The Superfund allows the Government to take action now and seek reimbursement later.

CERCLA also mandates spill-reporting requirements. The act requires immediate reporting of a release of a hazardous substance (other than a Federally permitted release) if the release is greater than or equal to the reportable quantity for that substance.

Title III of the Superfund Amendments and Reauthorization Act (SARA) (42 USC 9601 et seq.) is a freestanding legislative program known as the Emergency Planning and Community Right to Know Act (EPCRA) of 1986. The act requires immediate notice for accidental releases of hazardous substances and extremely hazardous substances; provision of information to local emergency planning committees for the development of emergency plans; and availability of material safety data sheets, emergency and hazardous chemical inventory forms, and toxic release forms. (EPCRA of 1986, 42 USC 11001 et seq.)

EPCRA requires each state to designate a state emergency response commission. In turn, the state must designate emergency planning districts and local emergency planning commissions (42 USC 11001 et seq.). The primary responsibility for emergency planning is at the local level.

The Pollution Prevention Act of 1990 established that pollution should be prevented at the source, recycled or treated in an environmentally safe manner, and disposed of or otherwise released only as last resort. Executive Order 12856, "Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements," commits Federal agency planning, management, and acquisition to the Pollution Prevention Act of 1990. It also requires all Federal facilities to comply with EPCRA to develop a written pollution prevention strategy emphasizing source reduction, and to develop voluntary goals to reduce total releases and off-site transfers of Toxic Release Inventory toxic chemicals by 50 percent by 1999.

The Toxic Substances Control Act (TSCA) authorizes the administrator of the EPA broad authority to regulate chemical substances and mixtures which may present an unreasonable risk of injury to human health or the environment (15 USC 2601 et seq.).

Under TSCA, the EPA may regulate a chemical when the administrator finds that there is a reasonable basis to conclude that the manufacture, processing, distribution in commerce, use, or disposal of a chemical substance or mixture poses or will pose an unreasonable risk of injury to health or the environment.

Under TSCA, the EPA administrator, upon a finding of unreasonable risk, has a number of regulatory options or controls. The EPA's authority includes total or partial bans on production, content restrictions, operational constraints, product warning statements, instructions, disposal limits, public notice requirements, and monitoring and testing obligations.

The TSCA Chemical Substance Inventory is a database providing support for assessing human health and environmental risks posed by chemical substances. As such, the inventory is not a list of toxic chemicals. Toxicity is not a criterion used in determining the eligibility of a chemical substance for inclusion on the inventory.

The Transportation Safety Act of 1974, subtitled the Hazardous Materials Transportation Act (HMTA) (49 USC 1801-1819), centralized in the Department of Transportation the authority to promulgate and enforce hazardous materials regulations for all modes of transportation. These regulations may govern any safety aspect of transporting hazardous materials, including the packing, repacking, handling, labeling, marking, placarding, and routing (other than with respect to pipelines).

Other areas subject to regulation by the Department of Transportation are the manufacturing, fabricating, marking, maintenance, reconditioning, repairing, and testing of any package or container which is certified or sold for use in transporting hazardous materials. The registration of applicable personnel involved with these operations may also be required and regulated.

HMTA authorized the establishment of criteria for the handling of hazardous materials. This criteria may include the designation of a minimum number of personnel to be involved in hazardous materials shipments, the establishment of minimum qualifications and training levels for such personnel, requirements for inspections, specifications for equipment to be used for the detection of hazardous materials, and the establishment of a system of monitoring safety assurance procedures for the transportation of hazardous materials.

Hazardous waste management at Redstone Arsenal is regulated under 40 CFR 260-280 and Alabama Administrative Code 22-30, Hazardous Waste Management. These regulations are implemented through MICOM Regulation 200-2, Chapter 5, Hazardous and Solid Waste Management. Storage, treatment and disposal hazardous waste operations are conducted in accordance with RCRA Part B permit (AL7-210-020-742). The DEMP's HMWMS Operating Guidelines define specific procedures for analyzing and turning in hazardous wastes. (Redstone Arsenal, 1997, Hazardous Material/Waste Management System Operating Guidelines) Biennial reports of all hazardous waste material generated by the Army and Thiokol are sent to ADEM.

Health and Safety

The U.S. Occupational Safety and Health Administration (OSHA) is responsible for regulations protecting worker health and safety. The OSHA regulations can be found in Title 29 of the CFR.

Each Federal agency has the responsibility to establish and maintain an effective and comprehensive occupational safety and health program that is consistent with national standards. Each agency must:

- Provide safe and healthful conditions and places of employment
- Acquire, maintain, and require use of safety equipment
- Keep records of occupational accidents and illnesses
- Report annually to the Secretary of Labor

Finally, the SARA (42 USC 9601 et seq.) requires the Occupational Safety and Health Administration to issue regulations specifically designed to protect workers engaged in hazardous waste operations. The hazardous waste rules include requirements for hazard communication, medical surveillance, health and safety programs, air monitoring, decontamination, and training. For all Army operations, Army Regulation (AR) 385-10, Army *Safety Program*, establishes the basis for worker safety programs.

Protection of public health and safety is the responsibility of the EPA (mandated through a variety of laws—the RCRA, CERCLA/SARA, and CAA). EPA regulations can be found in 40 CFR. Additional safety responsibilities are placed on the Department of Transportation for transportation issues (49 CFR), Department of Defense (DOD Directives, applicable to military operations only), and Department of the Army (program requirements established in AR 385-10). Protection of flora and fauna is described under biological resources.

49 CFR requirements pertaining to the safe shipping and transport handling of hazardous materials (which can include hazardous chemical materials, radioactive materials, and explosives) are found in the USDOT Hazardous Materials Regulations and Motor Carrier Safety Regulations codified in 49 CFR Parts 107, 171-180 and 390-397). These regulations specify all requirements that must be observed for shipment of hazardous materials over highways (truck shipment) or by air. Requirements include specific packaging requirements, material compatibility issues, requirements for permissible vehicle/shipment types, vehicle marking requirements, driver training and certification requirements, and notification requirements (as applicable).

Executive Order 12898 directs Federal actions to address environmental justice in minority and low-income populations. Each Federal agency must conduct its programs, policies, and activities that substantially affect human health or the environment in a manner that ensures that they do not exclude persons from participation or benefit. Persons will also not be discriminated under such programs, policies, or activities because of their race, color, or national origin.

Noise

The Federal Noise Control Act directs all Federal agencies to the fullest extent within their authority to carry out programs within their control in a manner that furthers the promotion of an environment free from noise that jeopardizes the health or welfare of any American (42 USC 4901 et seq.). The act requires a Federal department or agency engaged in any

activity resulting in the emission of noise to comply with Federal, state, interstate, and local requirements respecting control and abatement of environmental noise.

Water Quality

The objective of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of the nation's waters (33 USC 1251 et seq.).

The Clean Water Act prohibits any discharge of pollutants into any public waterway unless authorized by a permit (33 USC 1251 et seq.). Under the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit establishes precisely defined requirements for water pollution control.

NPDES permit requirements typically include effluent limitations (numerical limits on the quantity of specific pollutants allowed in the discharge); compliance schedules (abatement program completion dates); self-monitoring and reporting requirements; and miscellaneous provisions governing modifications, emergencies, etc.

Under the Clean Water Act the EPA is the principal permitting and enforcement agency for NPDES permits. This authority may be delegated to the states.

The Clean Water Act requires all branches of the Federal government involved in an activity that may result in a point-source discharge or runoff of pollution to U.S. waters to comply with applicable Federal, interstate, state, and local requirements.

The Safe Drinking Water Act sets primary drinking water standards for owners or operators of public water systems and seeks to prevent underground injection that can contaminate drinking water sources (42 USC 300f et seq.).

Under the Safe Drinking Water Act, the EPA has adopted National Primary Drinking Water Regulations (40 CFR, Part 141) that define maximum contaminant levels in public water systems. In addition, under the Safe Drinking Water Act the EPA may adopt a regulation that requires the use of a treatment technique in lieu of a maximum contaminant level. The EPA may delegate primary enforcement responsibility for public water systems to a state.

APPENDIX B
DISTRIBUTION

Federal Agencies

Ballistic Missile Defense Organization
ATTN: JNP/JNT/JNE/JN/I
1725 Jefferson Davis Highway
Suite 809
Arlington, VA 22202

Ballistic Missile Defense Organization
ATTN: TOT
7100 Defense Pentagon
Washington D.C. 20201-7100

Headquarters, Air Force Center for Environmental Excellence
ATTN: Captain Charles Aukland
3207 North Road
Brooks AFB, TX 78235-5363

Program Manager
National Missile Defense Program Office
ATTN: JNPS
P.O. Box 1500
Huntsville, AL 35807-3801

Program Executive Office, Air and Missile Defense
ATTN: SFAE-AMD-GBE-GI
P.O. Box 1500
Huntsville, AL 35807-3801

U.S. Army Aviation and Missile Command
ATTN: AMSAM-RA-EMP
Building 112
Redstone Arsenal, AL 35898-5340

U.S. Army Space and Missile Defense Command
SMDC-LC, SMDC-WS, SMDC-EN-V
P.O. Box 1500
Huntsville, AL 35807-3801

U.S. Department of the Interior
U.S. Fish and Wildlife Service
Larry Goldman, Field Supervisor
P.O. Drawer 1190
Daphne, AL 36256

State Agencies

Alabama Historical Commission
Ms. Elizabeth Ann Brown, DSHPO
468 South Perry Street
Montgomery, Al 36130-0900

Contractors

SciComm
George Wheeler
2111 Wilson Boulevard, Suite 900
Arlington, VA 22201-3001

Teledyne Brown Engineering
Mark Hubbs, Environmental Analyst
300 Sparkman Drive
Huntsville, AL

The Boeing Company
Lori Mullins,
499 Boeing Boulevard MC JN-19
Huntsville, AL 35824-6402

Libraries

Alabama Agriculture and Mining
University (A&M)
J.F. Drake Memorial Learning Resources
Center
PO Box 489
4900 Meridian Street
Normal, AL 35762

Defense Technical Information Center
8725 John. J. Kingman Road
Suite 0944
Ft. Belvoir, VA 22060-6218

Huntsville Madison County Public Library
915 Monroe Street
Huntsville, AL 35801

Huntsville-Madison County Library
Madison Branch
130 Plaza Blvd.
Madison, AL 35758

University of Alabama at Huntsville
Library
Government Documents Department
Huntsville, AL 35899

U.S. Army Missile Command Library
Environmental Office
Building 112
Redstone Arsenal, AL 35898

AD-A360 847

17 March 1999

Subject: Table 1 from Finding of No Significance (FNSI)

Enclosed is a copy of Table 1 that is referenced in the FNSI for the *Environmental Assessment for Integration, Assembly, Test, and Checkout of National Missile Defense Components at Redstone Arsenal, Alabama*. It was inadvertently left out of your original package delivered/mailed on 12 March 1999.