ENVIRONMENTAL ASSESSMENT:

PROPOSED CONSTRUCTION OF

BOULDER SEISMIC STATION MONITORING SITES

BOULDER, WYOMING

Air Force Technical Applications Center

Hill Air Force Base, Utah 84056

February 2009

Prepared in accordance with the Department of the Air Force Environmental Impact Analysis Process 32 CFR Part 989, effective July 6, 1999, which implements the National Environmental Policy Act, and the President's Council on Environmental Quality regulations

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FINDING OF NO SIGNIFICANT IMPACT
CONSTRUCTION OF BOULDER SEISMIC STATION MONITORING SITES
BOULDER, WYOMING

Pursuant to the Council on Environmental Quality regulations for implementing procedural provisions of the National Environmental Policy Act (NEPA) (40 Code of Federal Regulations [CFR] 1500-15080, the Air Force Regulation 32 CFR Part 989, and Department of Defense Directive 6050.1, Air Force Technical Applications Center (AFTAC) has prepared an Environmental Assessment (EA) to assess the potential environmental impacts of the Center's proposed action to install and operate seven additional seismic monitoring stations near Boulder, Wyoming.

Purpose of and Need for the Proposed Action (EA Sections 1.3 and 1.4, page 1)

Since its inception in 1973, AFTAC's mission has been monitoring nuclear treaty compliance and nuclear proliferation, including seismic monitoring to detect nuclear explosions. To accomplish this mission, AFTAC must be on the cusp of modern monitoring technology. One of AFTAC's goals is continuous improvement of the U.S. Atomic Energy Detection System, a global network of nuclear monitoring technology. To reach this goal, AFTAC must test and evaluate newly developed equipment based on seismo-acoustic monitoring technology. This requires construction of seven additional seismic monitoring stations dedicated for test and evaluation use at the AFTAC's existing site at Boulder, Wyoming.

The underlying purpose is for AFTAC to achieve its continuous improvement goal by installing new seismic monitoring stations at their existing location and using them to test and evaluate seismo-acoustic monitoring equipment and methods. Seismo-acoustic monitoring uses a combination of seismological data and acoustic readings to better identify differences between nuclear and non-nuclear explosions, such as routine mining blasts (Stump et al. 2004).

Alternatives Considered but Eliminated from Detailed Analysis (Section 2.4, pg 11)

Due to the size of land needed for the testing, the required borehole layout pattern, location of the riparian and wetland corridor, necessary proximity to existing operational arrays for comparison testing, and availability of leasable land, there were no other alternatives considered beyond the Proposed Action and the No Action Alternative in this EA. In addition, because the impacts of each borehole site are fixed to the surface vault specifications, moving the borehole locations to other locations in the project area will not change the type or amount of potential impacts from the Proposed Action.

Description of the Proposed Action and Alternatives Proposed Action (EA Section 2.2, pgs 7-11)

AFTAC proposes to construct seven sites that would be used to test research prototypes of seismic and acoustic devices. The proposed project area is located in Section 3, Township 32 North, Range 107 West, in Boulder, Wyoming, near the juncture of Spring Creek and Scab Creek Road (EA Section 1.4, pages 1&2). The sites would require drilling of seven boreholes. Each of the boreholes would be surrounded by a surface vault measuring 4 feet wide, 4 feet deep, and 6.5 feet long with the ability to support up to 10,000 pounds without collapsing. Borehole depth would be between 175 and 300 feet (refer to Table 2-1, pgs 8-9 for depths of each borehole). Depth is dependent on casing being 5 meters (m) deep in competent bedrock. The vault would be 3 feet below grade and 1 foot above grade. In addition each site would contain a 12-foot pole with two solar panels measuring 59.1 inches by 39 inches each, as well as one omni antenna and an air terminal. The borehole would be used to test different seismometers, digitizers, and authentication devices. The vault would house the solar power battery box and controllers, WiFi radio, network switch, vault seismometers, infrasonic digitizers, and excess cabling.

In addition to the permanent infrastructure listed above, temporary testing equipment would be installed at each site. The testing equipment consists of 25 microphones per central surface vault installed uniformly around the circumference of a 50-foot-radius circle. From each site's surface vault, five 50-foot cables would each extend out to their full length at a 72-degree separation from each adjacent cable. At the end of each cable, a 4 × 2 × 1–inch metal box (the summing amplifier) would be installed with six micro-connectors per box. One connector would service the 50-foot cable, with the other five connectors servicing the summing amplifier's five microphones. For the five microphones per connector, there would be three different leader cable lengths: 6 inches, 12 feet, and 24 feet. One 6-inch cable would extend outward on the same path as the 50-foot cable before connecting the microphone to the summing amplifier. Two 12-foot cables with associated microphones would extend from each side of the box at angles of 14.4 degrees off-center from the 50-foot cable. The 24-foot cables with associated microphones would extend from each side of the box at angles of 28.8 degrees off-center from the 50-foot cable.

The testing period is preliminarily scheduled for two years, but could be extended if test results are determined to be necessary. The testing equipment installation would include short-term impacts due to trenching and burial, and again during equipment removal. Following construction the area used for testing would be limited to the borehole and surface vault floor, and within a 50-foot radius of the boreholes.

Affected Environment (EA Section 3.0, pages 12 & 13)

Temporary impacts are defined as areas where there would be minor disturbance of vegetation and soil in order to travel to the test site and install testing equipment. Temporary impacts to this project consist of up to 5.03 acres of land use; the total acreage

for the buffers around each borehole where trenching activities and access would occur. It is not anticipated the entire 5.03 acres would be impacted on even a temporary basis.

Long-term impacts are defined as direct disturbance of vegetation for the life of the boreholes and surface vaults. These long-term impacts would persist until the surface vault is removed. The long-term impacts would primarily come from the surface vaults installed around the boreholes.

Immediately upon completion, each site will be cleared of all unused equipment, debris, materials, and trash. All drilled materials will be contained and hauled from each site to a BLM-approved offsite disposal area. The method of containment will be determined upon selection of a drilling contractor and approved by the BLM prior to construction. Any soil excavated from a site during installation of the vault and pole will be spread within the confines of that site. AFTAC will reseed the project area immediately after completion of drilling and the installation of all infrastructures. The proposed seed mixture is detailed in the EA, Table 2-1, page 8.

No Action Alternative: Under the No Action Alternative, the proposed project will not result in additional impacts to the human environment. However, other current uses will continue in the area, including livestock grazing and other ongoing seismic testing activities.

Environmental Consequences (EA Section 4.0, pages 14-17)

Land Use

The Proposed Action will result in the direct long-term disturbance of 0.004 acre from the Scab Creek individual grazing allotment which is a small fraction of one parcel out of 607 parcels available in the Scab Creek allotment. The surface vaults will be fenced in order to keep out grazing livestock. Grazing currently occurs from May through July. The Proposed Action will therefore not result in long-term impacts to livestock grazing within the project area.

Vegetation

Temporary impacts to the Shrub habitat will occur on up to 5.03 acres (less than one percent of the project area) and will occur during construction of the proposed sites from trenching, construction activities, and cross-country travel. It is unlikely that disturbance will occur on the entire 5.03 acres. Temporary vehicular impacts will include disturbance from crushing of vegetation over a total of approximately 26 days, or four days per site. Reseeding will take place immediately after installation.

Long-term impacts will occur on approximately 0.004 acres and will occur from permanent vegetation disturbance due to installation of the surface vaults. These long-term impacts will last until the surface vaults are removed.

Soils

Temporary impacts to soils will occur during construction of the proposed sites from trenching, construction activities, and installation of the infrasound test equipment. Cross-country travel has the potential to compact and mix soils. Temporary impacts to

soils will be up to 5.03 acres, or less than one percent of the project area (see Section 4-1). As discussed in Section 2.2.1, it is unlikely that disturbance will occur on the entire 5.03 acres.

Long-term impacts to soils will occur from the installation of the central surface vaults and will total approximately 0.004 acres. Soils impacted by the Proposed Action can be found in Table 4-1. In order to minimize compaction and rutting of soils, all construction and travel will take place in the early spring when the ground is still frozen.

Cumulative Effects

Due to the small amount of disturbance that will occur to land use, vegetation, soils, and wildlife habitat, the overall cumulative effects of the Proposed Action will not be significant.

Public Review and Interagency Coordination

The public comment period occurred March 12 to April 13, 2009. Public notices were published in the *Standard Examiner*, *Hill Top Times*, *Pinedale Roundup*, and *Sublette Examiner*. The notice was also featured on *Pinedale On-Line*. There were two requests for the document, and one comment was received. No comments were received from other agencies.

FINDING OF NO SIGNIFICANT IMPACT

Based upon my review of the facts and analyses contained in the attached EA and as summarized above, I find the proposed action to construct Seismic Station Monitoring Sites at Boulder, Wyoming will not have a significant impact on the natural or human environment; therefore, an environmental impact statement is not required. This analysis fulfills the requirements of NEPA, the President's Council on Environmental Quality, and 32 CFR Part 989.

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EXECUTIVE SUMMARY

PURPOSE AND NEED

This Environmental Assessment (EA) has been prepared to analyze the potential impacts of the Air Force Technical Applications Center's (AFTAC) planned installation and evaluation of seismo-acoustic monitoring equipment in the Boulder, Wyoming area. The EA is a site-specific analysis of potential impacts that could result from the implementation of the Proposed Action or alternatives to the Proposed Action.

In order to fully carry out its mission to monitor worldwide nuclear treaty compliance, AFTAC proposes to install seven new boreholes at the Boulder Seismic Station for research, development, test, and evaluation (RDT&E) as part of the U.S. Nuclear Treaty monitoring mission. The Boulder Seismic Station is located in Section 3, Township 32 North, Range 107 West, in Boulder, Wyoming, near the juncture of Spring Creek and Scab Creek Road.

The underlying purpose for the Proposed Action is for AFTAC to use Bureau of Land Management (BLM) property to install monitoring sites to test and evaluate seismo-acoustic methods. Seismo-acoustic monitoring, or a combination of seismological data and acoustic readings, has been shown to better identify differences between routine explosions, such as routine mining blasts and nuclear explosions (Stump et al. 2004).

SCOPE OF REVIEW

Environmental issues addressed during the initial scoping process include the following:

- Air Installation Compatible use Zone/Land Use
- Air Quality
- Water Resources
- Safety and Occupational Heath
- Hazardous Materials/Waste
- Biological Resources
- Cultural Resources
- Geology and Soils
- Socioeconomics
- Storm Water

PROPOSED ACTION

AFTAC proposes to construct seven semi permanent seismo-acoustic test and evaluation sites. The proposed project occurs in Section 3, Township 32 North, Range 107 West in Boulder, Wyoming, near the juncture of Spring Creek and Scab Creek Road. The sites would require the drilling of seven wellheads and construction of associated surface infrastructure. Each of the wellheads would be surrounded by a surface vault measuring 4.0 feet wide, 4.0 feet deep, and 6.5 feet long, and would have the ability to support up to 10,000 pounds without collapsing. The

vault will be 3 feet below grade and 1 foot above grade. In addition, each site would contain a 12-foot pole with two solar panels, one omni antenna, and an air terminal.

Under the No Action Alternative, AFTAC would not construct seven semi permanent seismo-acoustic test and evaluation sites.

RESULTS OF THE ENVIRONMENTAL ASSESSMENT

This EA has analyzed the impacts brought forward from the original scoping process. Of the possible environmental issues identified, an environmental baseline study (EBS) conducted by SWCA (2008), a cultural resource survey conducted by SWCA (2008), and an onsite natural resources assessment conducted by Hill Air Force Base determined that vegetation and soils would be affected by the Proposed Action.

It has been determined that the project would have a short-term impact on approximately 5.03 acres and a long-term impact on 0.004 acres of vegetation and soils. The impacts would take place within Shrub habitat (USAF 2008). Short-term impacts would occur during construction of the proposed sites from trenching, construction activities, and cross-country travel. Short-term impacts would last approximately 26 days during construction and until the impacted vegetation on the site has recovered. Long-term impacts would occur from the installation of the surface vaults and until the surface vaults are removed. The project area has been identified as non-agricultural. Human use of the area is limited to some livestock grazing and seismic testing. No evidence of use by either Federally Threatened or Endangered Species or Wyoming Species of Special Status has been documented.

No significant impacts, either short-term or long-term, are anticipated to occur based on either the Proposed Action or the No Action Alternative.

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LIST OF ABBREVIATIONS

ACEC: Area of Critical Environmental Concern

AFTAC: Air Force Technical Applications Center

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

CEQ: Council on Environmental Quality

CFR: Code of Federal Regulations

CIAA: Cumulative Impact Analysis Area

IRP: Installation Restoration Program

EA: Environmental Assessment

EBS: Environmental Baseline Study

EIAP: Environmental Impact Analysis Process

NEPA: National Environmental Policy Act

DRMP: Draft Resource Management Plan

PFO: Pinedale Field Office

RCRA: Resource Conservation and Recovery Act

RDT&E: Research, Development, Test, and Evaluation

SWCA: SWCA Environmental Consultants

SWPPP: Storm Water Pollution Prevention Plan

USAF: United States Air Force

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1.0 Introduction and Need for the Proposed Action

1.1 Introduction

This Environmental Assessment (EA) has been prepared to analyze the potential impacts of the Air Force Technical Applications Center's (AFTAC) planned installation and evaluation of seismo-acoustic monitoring equipment in the Boulder, Wyoming area. The EA is a site-specific analysis of potential impacts that could result from the implementation of the Proposed Action or alternatives to the Proposed Action.

1.2 Background

The Boulder Seismic Station is located in Section 3, Township 32 North, Range 107 West, in Boulder, Wyoming, near the juncture of Spring Creek and Scab Creek Road (Figure 1). Currently, the Boulder Seismic Station has a 13-element array of seismometers on the property. The land is considered non-agricultural, and, aside from periodic cattle grazing, other projects are not known to exist within the project area.

1.3 Proposed Action

AFTAC proposes to install seven new boreholes at the Boulder Seismic Station for research, development, test, and evaluation (RDT&E) as part of the U.S. Nuclear Treaty monitoring mission.

The proposed project occurs in Section 3, Township 32 North, Range 107 West, near the juncture of Spring Creek and Scab Creek Road in Sublette County (see Figure 1). Each borehole will include a surface vault, a network of seismic monitoring equipment (including buried cables, microphones, and above-ground support equipment) and a 50-foot-radius area for testing and monitoring.

1.4 Need for the Proposed Action

In order to accomplish its mission to monitor nuclear treaty compliance and nuclear proliferation, AFTAC needs to be on the cusp of modern monitoring technology. One goal of AFTAC is to improve its ability to maintain and improve the U.S. Atomic Energy Detection System, a global network of nuclear monitoring technology. As part of this mission, AFTAC proposes to conduct tests and evaluations of seismo-acoustic monitoring by installing seven sites in the project area.

1.5 Purpose of the Proposed Action

The underlying purpose for the Proposed Action is for AFTAC to use Bureau of Land Management (BLM) property to install monitoring sites to test and evaluate seismo-acoustic methods. Seismo-acoustic monitoring, a combination of seismological data and acoustic readings, has been shown to better identify differences between routine explosions, such as routine mining blasts, and nuclear explosions (Stump et al. 2004).

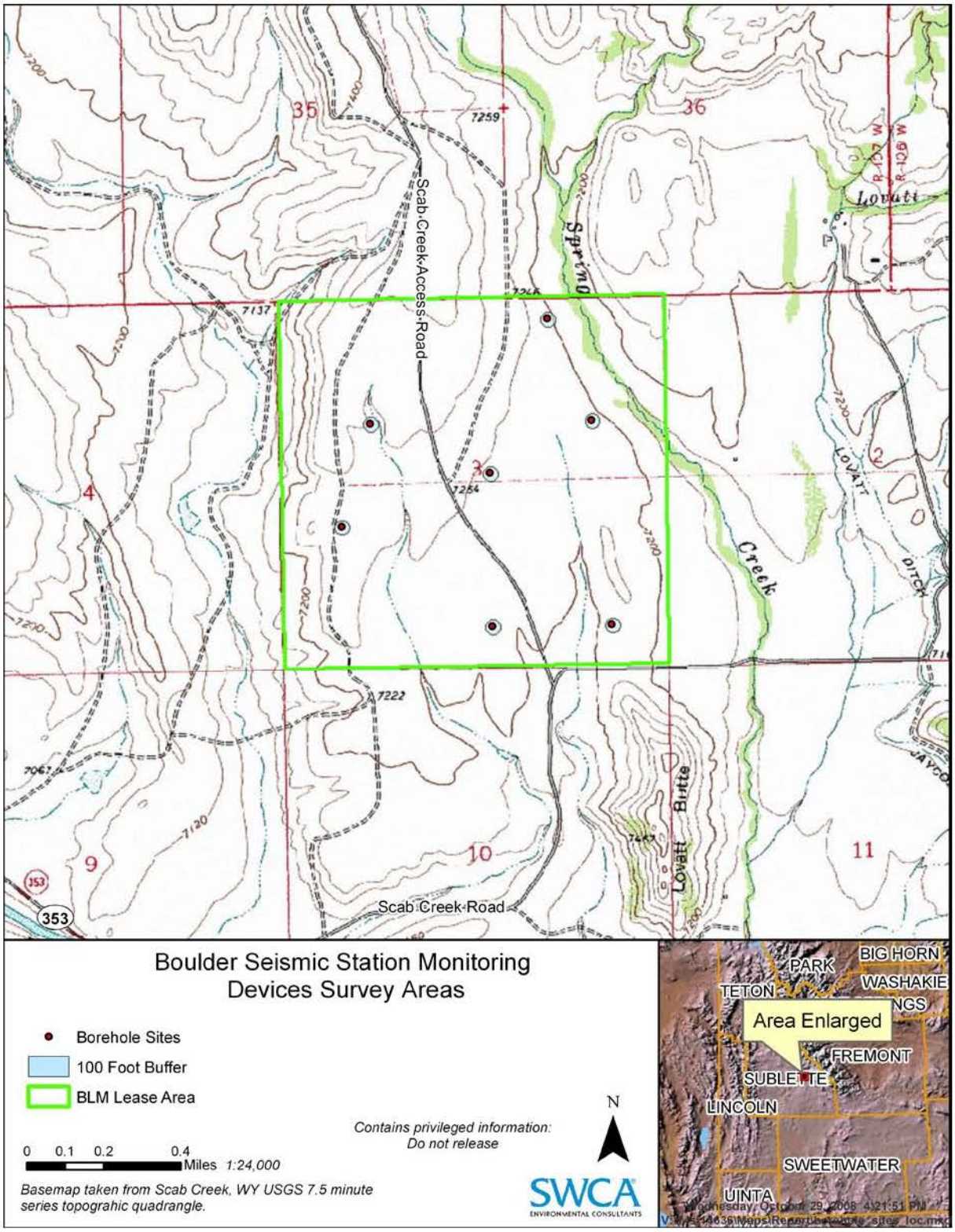

Figure 1. Location of the proposed Boulder Seismic Station, borehole locations and associated buffers.

1.6 SCOPING ISSUES

This EA addresses the potential environmental impacts of the Proposed Project and the No Action Alternative on the project area.

1.6.1 SCOPING

Environmental issues addressed during the initial scoping process include the following:

- Air Installation Compatible use Zone/Land Use
- Air Quality
- Water Resources
- Safety and Occupational Heath
- Hazardous Materials/Waste
- Biological Resources
- Cultural Resources
- Geology and Soils
- Socioeconomics
- Storm Water

1.6.2 ENVIRONMENTAL ISSUES

The project is described and resources that need to be analyzed in this EA are outlined in the Air Force Form 813, Request for Environmental Impact Analysis (Form 813) (Appendix A). Form 813 identifies the environmental issues discussed in the following sections.

1.6.2.1 AIR INSTALLATION COMPATIBLE USE ZONE/LAND USE

The scoping discussion did not identify any issues related to Air Installation Compatible use Zone/Land Use.

1.6.2.2 AIR QUALITY

The scoping discussion did not identify any issues related to air quality.

1.6.2.3 WATER RESOURCES

No drinking water facilities are found within the project area, and no wastewater facilities were found during the EBS prepared by SWCA (2008). Water required for drilling the seven wellheads would come via truck from a commercial supplier.

1.6.2.4 SAFETY AND OCCUPATIONAL HEALTH

The scoping discussion did not identify any issues related to occupational safety and health.

1.6.2.5 HAZARDOUS MATERIALS/WASTE

An environmental baseline survey (EBS) was conducted in June 2008. The report prepared by SWCA Environmental Consultants (SWCA) details that no known hazardous materials or petroleum-based products have been found within the project area (SWCA 2008). The Boulder

Seismic Station contains a 200-gallon diesel fuel tank for the facility backup generator and propane tank for heating. Due to the depth of ground water, the depth of the proposed boreholes (175-300 feet), and the direction of groundwater flow, the chance of contamination is minimal. In addition, AFTAC has committed to 100% containment during and following drilling. Borehole depth would be between 175-300 feet, so the risk to groundwater resources is minimal. All drilled materials and fluids would be contained and hauled from each site to an approved off-site disposal area. Soils excavated from each site during installation of the vault and pole would be spread within confines of the site. No hazardous materials or wastes would be generated by the Proposed Action.

1.6.2.6 Biological Resources (Wetlands, Floodplains, Threatened or Endangered Species, Vegetation)

A site-specific presence/absence survey for individuals of and suitable habitat for federally listed threatened, endangered, and candidate species and Wyoming sensitive species was conducted in June and August 2008. This survey determined that no individuals or habitat are found within the area of proposed surface disturbance (USAF 2008).

Sublette County is known to contain crucial winter habitat for moose and winter habitat and crucial winter habitat for mule deer. Impacts created by the Proposed Action will be further analyzed in Chapter 4 of this document.

The project area would be near the juncture of Spring Creek and Scab Creek Road. Portions of Spring Creek are listed on the National Wetlands Inventory, and riparian meadow can be found near some of the proposed borehole sites. However, no wetlands or floodplains would be impacted by the proposed project. Wetlands and floodplains will not be further analyzed in Chapter 4 of this document.

There would be impacts to general vegetation from the installation of equipment; therefore vegetation will be further analyzed in Chapter 4 of this document.

1.6.2.7 Cultural Resources

A cultural resources survey was completed on October 8, 2008. The area surveyed comprised a 100-foot radius circular buffer around the coordinates of boreholes PSR01, PSR03, PSR04, PSR06, and PSR07, and a 500-foot radius circular buffer around the coordinates of boreholes PSR02 and PSR05. This is considered the Area of Potential Effect (APE) for the proposed action. No cultural materials were observed within any of the surveyed areas, and the potential for buried cultural features and artifacts was judged to be low. This negative finding for cultural resources was provided to the Wyoming State Historic Preservation Office (SHPO) on 15 January 2009 (see Appendix B). The project will have no effect on cultural or historical resources.

Potential inadvertent discoveries, if any, would be addressed under 36 CFR§800.13, Post-review Discoveries, and applicable provisions of the BLM-PFO (BLM 2008).

1.6.2.8 Geology and Soils

The scoping discussion did not identify any issues related to geology. There would be impacts to soils from the installation of equipment; therefore soils will be analyzed in Chapter 4 of this document.

1.6.2.9 Ground Water

According to the Wyoming Ground Water Vulnerability Assessment Handbook (1998), sections of the groundwater are ranked on a scale of vulnerability based on the height of the water table, sandy soils, and high hydraulic conductivity. Based on the map provided in the handbook, the project area lies within a zone of medium ground water vulnerability. Ground water levels are estimated to lie between 10-50m underneath the surface. The majority of this land in Sublette County is found in the southern Green River Basin and consists of rangeland (Hamerlinck et al., 1998). The boreholes will be 100% contained in order to prevent any impacts on ground water. Combined with the relative shallow boreholes, no impact on ground water is anticipated. Ground water issues will therefore not be carried forward for analysis in this EA.

1.6.2.10 Socioeconomics

The scoping discussion did not identify any issues related to socioeconomics.

1.6.2.11 Storm Water

According to the Storm Water Pollution Prevention Plan (SWPPP) as developed by the Wyoming Water Quality Rules and Regulations, the Wyoming Environmental Quality Act and the federal Clean Water Act, a storm water permit is required when more than one acre of direct disturbance takes place. Direct disturbance includes access roads, gravel pits, oil and gas well pad construction, mud pit excavation, stockpiles or storage areas, parking areas, installations of pipelines, and any other activities that result in disturbance (WYPDES 2008).

The proposed project's direct vegetation removal impacts would total 0.004 acre, well under the one acre threshold under which SWPPP would require a permit. Due to the low number of acres disturbed from the proposed project and the low risk from storm water runoff, storm water impacts will not be carried forward for analysis in this EA.

1.7 Issues Carried forward for Detailed Analysis

Based on Section 1.6 of this report, the EBS prepared by SWCA (2008) and the cultural resources survey conducted by SWCA, the following issues have been carried forward for detailed analysis:

- Biological resources – Vegetation and Wildlife Winter Range
- Geology and Soils - Soils

1.8 Relationships to Statutes, Regulations, or Other Plans

The Proposed Action and the No Action Alternative are consistent with the following federal, state, and local laws, regulations, and plans:

- National Environmental Policy Act (NEPA), 42 U.S.C. 4321 *et seq.*, 1969
- Council on Environmental Quality (CEQ) regulations, 40 C.F.R. Parts 1500–1508
- U.S. Air Force–specific requirements contained in Title 32 of the Code of Federal Regulations (CFR) Part 989, Environmental Impact Analysis Process (EIAP)
- Relevant *Air Force Office of Safety and Health* standards including Air Force Instruction 91-301

- *Determining Conformity of Federal Actions to State or Federal Implementation Plans*, 40 CFR 93.154
- The Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Chapter 82, and regulations promulgated thereunder, 40 C.F.R. Part 260 *et seq.*

1.9 SCOPE AND ORGANIZATION

This EA is intended to address issues and resources that could be affected by the Proposed Action, and these issues and resources are discussed in the following chapters.

- **Chapter 2, Description of the Proposed Action and Alternatives:** Discussion of the Proposed Action Alternative and the No Action Alternative
- **Chapter 3, Affected Environment:** Description of the environmental state of the project area that would be affected by the Proposed Action Alternative.
- **Chapter 4, Environmental Consequences:** Analysis of each alternative and the associated environmental consequences
- **Chapter 5, List of Preparers:** A list of those involved with the preparation of this EA
- **Chapter 6, Persons and Agencies Consulted:** A list of individuals and agencies contacted during the creation of this EA, including topics and dates
- **Chapter 7, References:** A list of sources used in the preparation of this EA
- **Appendices**

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

This EA will focus on the Proposed Action and the No Action Alternative. The No Action Alternative is considered and analyzed to provide a baseline for comparison of the impacts of the Proposed Action. No other alternatives were considered due to the low impact from the Proposed Action.

2.2 THE PROPOSED ACTION

AFTAC proposes to construct seven sites that would be used to test research prototypes of seismic and acoustic devices. The proposed project area is located in Section 3, Township 32 North, Range 107 West, in Boulder, Wyoming, near the juncture of Spring Creek and Scab Creek Road. The sites would require the drilling of seven wellheads. Each of the wellheads would be surrounded by a surface vault measuring 4 feet wide, 4 feet deep, and 6.5 feet long with the ability to support up to 10,000 pounds without collapsing. Borehole depth would be between 175-300 feet (see Table 2-1 for depths of each borehole). Depth is dependent on casing being five meters in competent bedrock. The vault will be 3 feet below grade and 1 foot above grade. In addition, each site would contain a 12-foot pole with two solar panels, one omni antenna, and an air terminal. The borehole would be used to test different seismometers, digitizers, and authentication devises. The vault will house the solar power battery box and controllers, WiFi radio, network switch, vault seismometers, infrasonic digitizers, and excess cabling.

In addition to the permanent infrastructure listed above, temporary testing equipment will be installed at each site. The testing period is preliminarily scheduled for two years, but could be extended if test results are determined to be necessary. The testing equipment installation would include short term impacts due to trenching and burial, and again during equipment removal. Following construction, the area used for testing will be limited to the borehole, surface vault floor, and within a 50-foot radius of the boreholes.

The testing equipment consists of a total of 25 microphones per central surface vault installed uniformly around the circumference of a 50-foot-radius circle. From each site's surface vault, five 50-foot cables would each extend out to their full length at a 72-degree separation from each adjacent cable. At the end of each cable, a 4 × 2 × 1–inch metal box (the summing amplifier) would be installed with six micro-connectors per box. One connector would service the 50-foot cable, with the other five connectors servicing the summing amplifier's five microphones. For the five microphones per connector, there would be three different leader cable lengths: 6 inches, 12 feet, and 24 feet. One 6-inch cable would extend outwards on the same path as the 50-foot cable before connecting the microphone to the summing amplifier. Two 12-foot cables with associated microphones would extend from each side of the box at angles of 14.4 degrees off-center from the 50-foot cable. The 24-foot cables with associated microphones would extend from each side of the box at angles of 28.8 degrees off-center from the 50-foot cable (Figure 2).

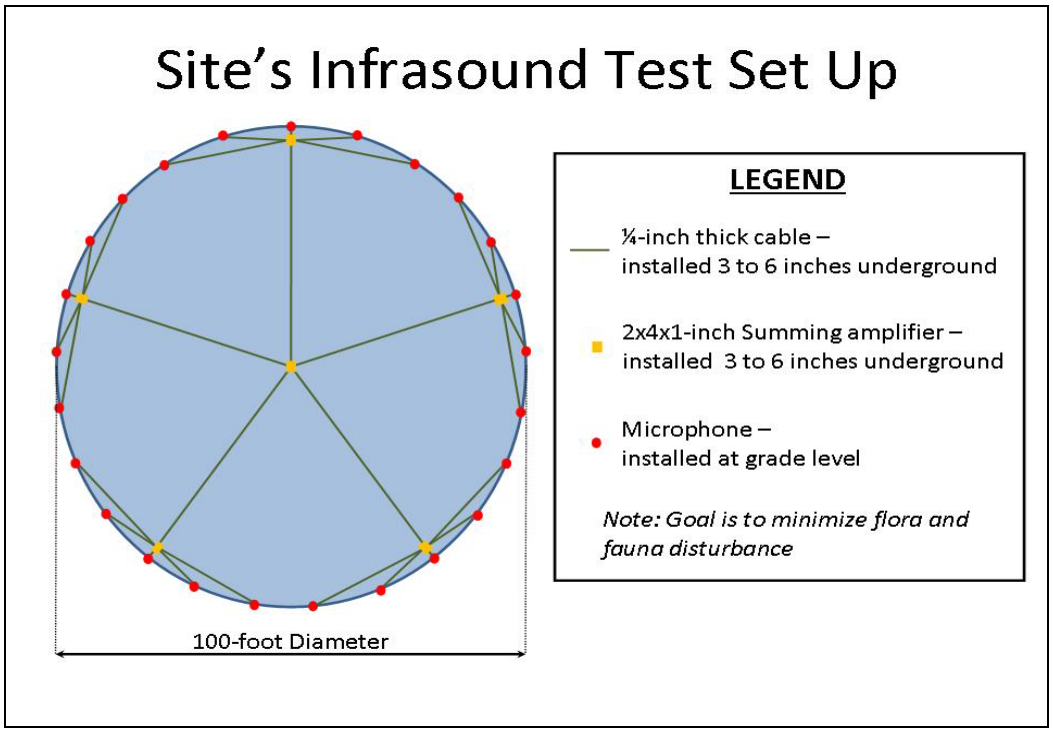

Figure 2. Infrasound test set up for borehole locations.

The locations and dimensions for each of the sites are shown below in Table 2-1. All borehole sites include a temporary 100-foot radius around each wellhead for construction and access. The entire project would take approximately 26 business days to construct. Construction is anticipated to occur in early spring of 2009.

Table 2-1. Proposed Sites and Associated Disturbance

Site	Location		Borehole Depth (feet)	Surface Vault Size (feet)	Short-Term Impact (acres)	Long-Term Impact (acres)
	Latitude	Longitude				
PSR01	42.77169	-109.586887	300	4.0 × 4.0 × 6.5	0.718	0.0006
PSR02	42.77363	-109.581648	175	4.0 × 4.0 × 6.5	0.718	0.0006
PSR03	42.76584	-109.580772	175	4.0 × 4.0 × 6.5	0.718	0.0006
PSR04	42.76584	-109.586882	175	4.0 × 4.0 × 6.5	0.718	0.0006
PSR05	42.76973	-109.594510	175	4.0 × 4.0 × 6.5	0.718	0.0006
PSR06	42.77363	-109.592982	175	4.0 × 4.0 × 6.5	0.718	0.0006
PSR07	42.77753	-109.583811	175	4.0 × 4.0 × 6.5	0.718	0.0006
				Total	**5.03**	**0.0042**

2.2.1 ACCESS

Existing roads would be used to access the project area. Temporary access to each of the sites would be cross-country from the existing roads in the project area and would be confined within the 100-foot buffer around each site. The BLM is requiring that cross-country travel be randomized within this buffer in order to minimize disturbance to vegetation. No long-term vegetation impacts would result from access.

2.2.2 FACILITIES

Each of the wellheads would be surrounded by a surface vault measuring 4.0 feet wide, 4.0 feet deep, and 6.5 feet long, and would have the ability to support up to 10,000 pounds without collapsing. The vault will be 3 feet below grade and 1 foot above grade. In addition, each site would contain a 12-foot pole with two solar panels, one omni antenna, and an air terminal.

During installation of the testing equipment, trenches would be dug by hand at a width of approximately 0.5 inch and a depth of 3–6 inches. Summing box holes would be 3–6 inches deep and approximately 4 inches wide, and microphone holes would be 3 × 2 inches and 3–6 inches deep.

2.2.3 WATER SUPPLY

Water required for drilling the seven wellheads would come via truck from a commercial supplier.

2.2.4 RECLAMATION

Immediately upon completion, each site would be cleared of all unused equipment, debris, materials, and trash. All drilled materials and fluids would be contained and hauled from each site to an approved off-site disposal area. The method of containment will be determined upon selection of a drilling contractor. Any soil excavated from a site during installation of the vault and pole will be spread within the confines of that site. AFTAC has committed to reseeding the project area after completion of drilling and the installation of all infrastructures. The proposed seed mixture is detailed in Table 2-2.

Table 2-2. Proposed Reclamation Seed Mix

Seed Mixture	Scientific Name	lbs/acre
Great Basin Wild Rye	*Elymus cinereus*	0.5
Bluebunch Wheatgrass	*Agropyron spicatum*	2
Mountain Timothy	*Phleum alpinum*	1
Squirrel Tail Grass (Bottle Brush)	*Stianion hystrix*	1
Nevada Bluegrass	*Poa nevadensis*	1
Idaho Fescue	*Festuca idahoensis*	2
Indian Rice Grass	*Oryzopsis hymenoides*	1
Needle-and-Thread Grass	*Stipa comata*	1
Blue Wild Rye	*Elymus glaucus*	2
Silvery Mountain Lupine	*Lupinus argenteus*	0.5

Table 2-2. Proposed Reclamation Seed Mix

Seed Mixture	Scientific Name	lbs/acre
Common Yarrow	*Achillea millefolium*	0.5
	Total lbs/acre	**12.5**

2.2.5 TESTING/MONITORING

Following construction, site visits for testing and monitoring would occur at different times throughout the life of the project. These visits would primarily occur in the summer and fall due to weather conditions in the project area. The sites would be accessed primarily by walking from existing access roads to the surface vault. If testing equipment is too large to be carried to the vault, a truck would be used for access. If a truck is used, the BLM requires that all cross-country travel would be randomized within the 100-foot buffer in order to minimize long-term disturbance to vegetation.

2.3 ALTERNATIVE B: THE NO ACTION ALTERNATIVE

Under the No Action Alternative, AFTAC would not construct seven semi-permanent seismo-acoustic test and evaluation sites.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

AFTAC has explored other locations but due to the size of land needed for the testing, the required borehole layout pattern, and necessary proximity to existing operational arrays for comparison testing there were no other alternatives considered beyond the proposed action and the no action alternative in this EA. In addition, moving the borehole locations to other locations within the section would not change the type or amount of potential impacts from the proposed action.

3.0 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

The affected environment of the Proposed Action and the No Action Alternative were considered and analyzed by an interdisciplinary team, as documented in Section 1.6. This chapter indicates which resources of concern are present and would be affected by the action and would therefore require analysis in the EA.

3.2 GENERAL SETTING

The proposed boreholes would be located in Sublette County, Wyoming near the juncture of Spring Creek and Scab Creek Road in Section 3, Township 32 North, Range 107 West. The property is unimproved and vacant, and is used occasionally for cattle grazing. A private ranch and residence, roads, and other seismic sites currently occur within the project area. Seismographic instruments are maintained in the area for the purposes of testing monitoring equipment to be used to track the nuclear activities of countries such as China and North Korea.

The climate of this part of Wyoming is influenced by the Pacific Ocean and by the surrounding high mountain ranges. Winds are generally from the west or southwest and average slightly more than 10 mph. It is typically dry in the lower elevations with 10 to 14 inches of precipitation annually. Higher elevations receive 15 to 19 inches of precipitation annually. Most precipitation comes from winter snowstorms and spring thunderstorms. The growing season is generally 160 days long, but a killing frost can occur any time of the year. Temperatures in the area range from negative 63 to 103 Fahrenheit.

The area is dominated by the Wind River Uplift, a faulted uplift that created the massive granite peaks of the Wind River Mountains. These mountains were formed an estimated 70 million years ago during the Cretaceous Period. More recently, glaciers have advanced and retreated, leaving behind their unique erosion and deposition landforms.

3.3 RESOURCES AND ISSUES BROUGHT FORWARD FOR ANALYSIS

3.3.1 VEGETATION

The vegetation in the project area consists primarily of Shrub habitat. This habitat is found in the foothills of the Wind River Mountain range of Wyoming and is a widespread matrix of black sagebrush (*Artemisia nova)* and big sagebrush (*Artemisia tridentate*) systems. Shallow soils, stony, or poorly drained clays produce this shrub habitat. This habitat will usually occur on flat to moderately sloping land and is found on all exposures. Slopes range from 0 to 60 percent. The elevations of this habitat range from 6,500 to 8,000 feet, with most occurring above 7,000 feet. The dominant vegetation is big sage and black sage, and various bunch grasses (USAF 2008).

3.3.2 SOILS

The project area consists of loamy/sandy glacial till based on shale, sandstone, and limestone. A hardened calcified layer exists 2 feet below the surface level (USAF 2008). A list of soils in the project area can be found in Table 3-1 and descriptions of each soil type.

Table 3-1. Soils Found in the Project Area

Soil Type	Description	Permeability	Slopes (percent)	Acres in the Project Area
Gelkie	Sandy Loam	Moderate	3-10	2.16
Relsob	Sandy Loam	Moderate	0-10	2.16
Boulder	Gravelly Sandy Loam	Moderately Rapid	0-30	1.44

3.3.3 WILDLIFE

The proposed project area is known to contain winter habitat and crucial winter habitat for moose and mule deer (Sublette County, 2008). GIS data indicates that within the project area, 362 acres are identified as crucial winter habitat and 258 acres are designated as winter habitat for mule deer, and 172 acres are identified as crucial winter/year-round moose habitat.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

The potential direct and indirect impacts from the Proposed Action and the No Action Alternative are discussed in the following sections. Direct impacts to soils and vegetation in the following analyses are described in terms of short-term and long-term impacts. Short-term impacts are defined as areas where there would be minor disturbance or removal of vegetation and soil in order to travel to the test site and install testing equipment. These areas would be allowed to reestablish and are therefore considered short-term impacts. Short-term disturbance is classified as up to five acres and includes the entire 100-foot buffer surrounding each borehole. Because AFTAC has committed to random travel within the 100-foot buffer in order to mitigate impacts to vegetation and soils, cross country travel could occur at any point within the 100-foot buffer. Therefore it is not possible to precisely estimate where and how much short-term disturbance could occur within the buffer. Testing equipment, including the cable and microphone array, is estimated to remain in place for approximately 2 years. After the two years, if no additional testing is needed, the cables and microphones would be removed and the area reseeded if required by the BLM PFO. Therefore, the impacts due to installation and removal of the testing equipment are also considered short-term in this EA.

Long-term impacts are defined as areas of vegetation and soil disturbance from installation of the permanent surface vaults.

4.2 PROPOSED ACTION

4.2.1 VEGETATION

Short-term impacts to the Shrub habitat would occur on up to 5.03 acres and would occur during construction of the proposed sites from trenching, construction activities, and cross-country travel (see Section 4-1). In order to minimize impacts on vegetation, all cross-country vehicle travel would be random. Vehicular impacts would include direct vegetation and soil disturbance from crushing and removal of vegetation over approximately 26 days. Short-term impacts would last for approximately 4 days per site during construction and until the impacted vegetation on the site has recovered. Long-term impacts would occur on approximately 0.004 acres and would occur from the installation of the surface vaults. These long-term impacts would occur from the removal of vegetation for installation of the central surface vaults and would last until the surface vaults are removed.

4.2.2 SOILS

Short-term impacts to soils would occur during construction of the proposed sites from trenching, construction activities, and installation of the infrasound test equipment. Cross country travel has the potential to compact and mix soils. Short-term impacts to soils would be up to 5.03 acres (see section 4-1). Long-term impacts to soils would occur from the installation of the central surface vaults and would total approximately 0.004 acres. Soils impacted by the Proposed Action can be found in Table 4-1. In order to minimize compaction of soils, cross-country travel would be random within the 100 foot buffer surrounding the bore holes. In addition, construction is anticipated to occur during the early spring, when soils are frozen. This would minimize the impact from potential compaction and mixing of soils.

Table 4-1. Soils Disturbed by the Proposed Action

Borehole	Soil Type	Acres Disturbed (Long-Term)	Acres Disturbed (Short-term)
PSR01	Gielke	0.0006	0.72
PSR02	Boulder	0.0006	0.72
PSR03	Relsob	0.0006	0.72
PSR04	Relsob	0.0006	0.72
PSR05	Relsob	0.0006	0.72
PSR06	Gelkie	0.0006	0.72
PSR07	Gelkie	0.000	0.26
PSR07	Boulder	0.0006	0.46
Total Acres Disturbed		**0.004**	**5.03**

4.2.3 WILDLIFE

Short-term impacts to moose and mule deer winter range would occur during construction of the proposed sites from trenching, construction activities, and installation of the infrasound test equipment. The sites would also require routine return visits for maintenance and monitoring. These impacts could include the possible displacement of wintering wildlife. However, the proposed project is scheduled to be constructed in early spring of 2009 and return visits would take place in summer and fall; therefore impacts to wintering wildlife from construction of the sites would be minimal.

Reviews of GIS data reveal that there are approximately 362 acres of crucial winter mule deer habitat within the project area and 172 acres of crucial winter/yearlong moose habitat. An additional 258 acres of winter mule deer habitat also exists within the project area.

Five of the seven boreholes are located within either moose or mule deer crucial winter habitat, long-term impacts would include the removal of approximately 0.003 acre of crucial winter range. The remaining two boreholes would create a long-term impact of approximately 0.001 acre in mule deer winter habitat. Impacts would occur from the installation of the surface vaults and would last until the surface vaults have been removed. Due to the minute fraction of the project area's 640 acres that will be impacted by the Proposed Action, there would not be a significant long term impact to wintering wildlife.

4.3 NO ACTION ALTERNATIVE

Under the No Action Alternative, no impacts to the project area would take place from the proposed project. However, other current uses will continue in the area as described in Chapter 3 of this EA.

4.4 REASONABLY FORESEEABLE DEVELOPMENT AND CUMULATIVE IMPACTS ANALYSIS

4.4.1 CUMULATIVE IMPACTS

"Cumulative impact(s) are the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 C.F.R. 1508.7)

The cumulative impacts analysis area (CIAA) for all resources is the Pine/Boulder Seismic Research Facility (PSRF) which contains eight sections of land in Township 32 North, Range 107 West, Sections 1, 2, 3, 4, 9, 10, 11, and 12. The CIAA is a total of 3,840 acres. Of the 3,840 acres within the CIAA, 27 acres have been disturbed with roads and bore holes sites. Current disturbance is less than one percent of the total area of the CIAA. The entire area is grazed by local ranchers. This area also contains migratory routes for mule deer, elk and pronghorn antelope. Shiras moose and mule deer utilize the area as crucial wintering grounds.

4.4.1.1 SOILS AND VEGETATION

Impacts to vegetation and soils within the area managed by the CIAA are attributed to livestock-related activities, private residences, roads, and other seismic projects within the CIAA. Impacts within the CIAA from livestock are primarily related to annual forage removal by grazing livestock. Roads within the CIAA increase the risk of weed infestations, erosion, soil compaction, and dust on native vegetation.

The Proposed Action would contribute another 5.03 acres (18.6%) of short-term disturbance and 0.004 acres (0.0001%) of long-term disturbance to the total disturbance of the CIAA. Due to the low number of acres disturbed, it is not anticipated that the Proposed Action's impact would significantly contribute to impacts within the CIAA. The No Action Alternative would not result in an accumulation of impacts.

4.4.1.2 WILDLIFE

According to GIS data, approximately 3,200 acres of the CIAA's 3,840 acres are identified as crucial moose winter habitat and 2,318 acres are identified as crucial mule deer winter habitat with significant overlap between the two. The Proposed Action would impact approximately 0.004 acre wintering habitat within the CIAA. Past, current and future actions in the area have or will disturb approximately 27 acres within the CIAA, the majority of which affect crucial winter range for moose or mule deer. Additional disturbance created by the Proposed Action would not significantly contribute to impacts on crucial wildlife winter range in the region.

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5.0 List of Preparers

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6.0 PERSONS AND AGENCIES CONSULTED

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7.0 REFERENCES

Bureau of Land Management and the State Historical Preservation Office. 2006. State Protocol between the BLM and SHPO. Accessed online at http://wyoshpo.state.wy.us/Section106/pdf/ProtocolFinal.pdf, November 2008.

Bureau of Land Management. 2008. Final Environmental Impact Statement for the Pinedale Resource Management Plan. Pinedale Field Office. Pinedale, Wyoming.

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APPENDIX A: AIR FORCE FORM 813 - REQUEST FOR ENVIRONMENTAL IMPACT ANALYSIS

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REQUEST FOR ENVIRONMENTAL IMPACT ANALYSIS	*Report Control Symbol* RCS:**343**

INSTRUCTIONS: ***Section I to be completed by Proponent; Section II and III to be completed by Environmental Planning Function. Continue on seperate sheets as necessary. Reference appropriate item number(s).***

SECTION I - PROPONENT INFORMATION

1. TO (*Environmental Planning Function*)	2. FROM (*Proponent organization and functional address symbol*)	2a. TELEPHONE NO.
75 CEG/CEV	**775 CES/CERR (Loni Johnson)**	**777-3550**

3. TITLE OF PROPOSED ACTION

Obtain ROW from Wyoming BLM

4. PURPOSE AND NEED FOR ACTION *(Identify decision to be made and need date)*

Use of BLM property for research and development purposes

5. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES *(DOPAA) (Provide sufficient details for evaluation of the total action.)*

Air Force Technical Applications Center has a requirement for a section of land in Wyoming for research and development purposes. The property is identified as Township 32 North, Range 107 West, Section 3. They currently have 13 element array of scismometers with outfitted wellheads on the property. They need to construct five semi-permanent sites that would entail drilling five wellheads to a depth of not more than 500 feet. The wellheads would be surrounded by a surface vault with dimension of 4 eet by 3 feet and would extend 1 foot above ground. It will be constructed to support the full weight of a steer on its lid. Future use may also entail the installation of solar panels and fencing. They may be conducting other experiments on the property in the future but none of them will require construction. They expect to peacefully coexist with any grazing in the area.

6. PROPONENT APPROVAL *(Name and Grade)*	6a. SIGNATURE	6b. DATE
Loni Johnson	**loni.johnson**	**30-Jan-2008**

SECTION II - PRELIMINARY ENVIRONMENTAL SURVEY. *(Check appropriate box and describe potential environmental effects Including cumulative effects.) (+ = positive effect; 0 = no effect; - = adverse effect; U = unknown*	+	0	-	U
7. AIR INSTALLATION COMPATIBLE USE ZONE/LAND USE *(Noise, accident potential, encroachment, etc.)*	☐	☒	☐	☐
8. AIR QUALITY *(Emissions, attainment status, state implementation plan, etc.)*	☐	☒	☐	☐
9. WATER RESOURCES *(Quality, quantity, source, etc.)*	☐	☐	☐	☒
10. SAFETY AND OCCUPATIONAL HEALTH *(Asbestos/radiation/chemical exposure, explosives safety quantity-distance, bird/wildlife aircraft hazard, etc.)*	☐	☒	☐	☐
11. HAZARDOUS MATERIALS/WASTE *(Use/storage/generation, solid waste, etc.)*	☐	☐	☐	☒
12. BIOLOGICAL RESOURCES *(Wetlands/floodplains, threatened or endangered species, etc.)*	☐	☐	☐	☒
13. CULTURAL RESOURCES *(Native American burial sites, archeological, historical, etc.)*	☐	☐	☐	☒
14. GEOLOGY AND SOILS *(Topography, minerals, geothermal, Installation Restoration Program, seismicity, etc.)*	☐	☒	☐	☐
15. SOCIOECONOMIC *(Employment/population projections, school and local fiscal impacts, etc.)*	☐	☒	☐	☐
16. OTHER *(Potential impacts not addressed above.)*	☐	☒	☐	☐

SECTION III - ENVIRONMENTAL ANALYSIS DETERMINATION

17. ☐ PROPOSED ACTION QUALIFIES FOR CATEGORICAL EXCLUSION *(CATEX)* (see below for list of CATEXs); OR
☒ PROPOSED ACTION DOES NOT QUALIFY FOR A CATEX; FURTHER ENVIRONMENTAL ANALYSIS IS REQUIRED.

18. REMARKS

Proposed Action does not qualify for a Categorical Exclusion under 32 CFR 989, an environmental assessment and an environmental baseline survey will be required. The proponent will be required to fund these efforts.

19. ENVIRONMENTAL PLANNING FUNCTION CERTIFICATION	19a. SIGNATURE	19b. DATE
Kay Winn	Winn, Kay	03-Apr-2008
AF IMT 813, 19990901, V1	THIS FORM CONSOLIDATES AF FORM 813 and 814. PREVIOUS EDITIONS OF BOTH FORMS ARE OBSOLETE.	

Electronic 813 Comments:

Section:	Provided By:	Assigned:	Provided:
Coordination Offices	Jaynie Hirschi		12-Feb-2008
Please see attached cultural resources comments.			
Coordination Offices	Kay Winn		03-Apr-2008
Proposed Action does not qualify for a Categorical Exclusion under 32 CFR 989, an environmental assessment and an environmental baseline survey will be required. The proponent will be required to fund these efforts.			

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813 ID #343
WYOMING BLM ROW
CULTURAL RESOURCES REVIEW

The proposed project requires coordination with the BLM office who manages the land for the proposed ROW. Because it is their property, they will determine if an archaeological inventory is necessary or has been conducted in the past and will advise on completing the Section 106 requirements. Until the BLM has determined effect, any projects proposed in the ROW should not proceed. Please contact Jaynie Hirschi 95-6920) with any questions.

12 February 2008 Jaynie Hirschi

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APPENDIX B: STANDARD SIGNED NOTIFICATION DOCUMENTING NHPA COMPLIANCE

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STANDARD SIGNED NOTIFICATION DOCUMENTING NHPA COMPLIANCE

PROJECT REVIEW UNDER SECTION 106

DBU Number: DBU_WY_2009_130

Project Name: United States Air Force Hill AFB; Pinedale Research Seismic Project
Agency Project No.: 046-09-075
Project Proponent: United States Air Force Hill AFB
Distinct Actions: 1

Legal Location

T32.00N R107.00W Sec. 3

Undertaking Name: Pinedale Research Seismic Project

Other Agency Nos: WYW-148043 amdt. #1
DBI_WY_2008_1447
Field Org. Project No.: 14636

Brief Description: Seven borehole locations are proposed

Associated Sites

Site Number	Site Type	Eligibility	Criteria	Impact	Effect Statement

Lead Agency Activities

Review Framework: State Protocol
Time Frame: Notify and Proceed
Interested Parties:

Date Accepted: 01/15/2009 **Fiscal Year:** 2009 **Date Printed:** 01/15/2009

Requirements and Stipulations

Stipulations: Cultural resource clearance with the standard cultural and paleontological resource stipulations.

Finding of Effect for Project

Lead Agency: No Effect

Notes:

Reviewer: Vicek, Dave DV (initials)

Certifying Official: Archaeologist, BLM Pinedale

01/15/2009
Date Sent to SHPO (SHPO-WYCRO, Laramie)

1/15/2009 1