



Hill Air Force Base, Utah

Proposed Final

**Environmental Assessment:
Proposed Photovoltaic Array,
Hill Air Force Base, Utah**

August 28, 2008

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FINDING OF NO SIGNIFICANT IMPACT

1. **NAME OF ACTION:** Construct a photovoltaic array at Hill Air Force Base (AFB), Utah.
2. **DESCRIPTION OF THE PROPOSED ACTION:** Hill AFB proposes to accommodate current United States Air Force (USAF) missions by constructing a photovoltaic array, supplying an initial 439,000 kilowatt hours (kWh) of electricity per year from renewable sources, eliminating the requirement to purchase this same amount of electricity from Rocky Mountain Power. A ground mounted 230 kilowatt (kW) solar powered photovoltaic array would be provided, starting with 12 photovoltaic panels and later expanded to 48 panels, which could ultimately provide Hill AFB with an estimated 1,756,000 kWh per year of electricity from renewable sources. The proposed action would be located on the north side of Wardleigh Road, due west of an existing fill dirt and spoils lot.

The proposed action would support Hill AFB in its effort to have renewable sources produce a minimum of 25 percent of USAF's total energy portfolio by the year 2025.

3. **SELECTION CRITERIA:** The following criteria were used to assemble alternatives. The facility that provides renewable energy to Hill AFB described in this document should:

- initially provide at least 400,000 kWh per year of electricity;
- have sufficient space to house all of the necessary equipment;
- be expandable in the future up to 1,600,000 kWh per year of electricity;
- be compatible with other Hill AFB land uses; and
- be protective of facilities, human health, and the environment.

4. **ALTERNATIVES CONSIDERED OTHER THAN THE PROPOSED ACTION:**

Under the no action alternative, the photovoltaic array would not be constructed, and electricity from renewable sources would not be provided. The 439,000 kWh per year of electricity would continue to be purchased from Rocky Mountain Power, whose primary source of electricity is from coal-fired power plants.

The Energy Management Office program managers evaluated, but eliminated, other potential technologies and locations for supplying electricity from renewable sources.

- 1) Landfill Gas: Hill AFB already owns and operates the first landfill gas to energy generating facility in the Department of Defense, and the first such project constructed in Utah. The power plant began operating in 2005. With three generators now operating, this energy source is being used to its fullest capacity of 15,000,000 kWh per year.
- 2) Fuel Cells: Hydrogen fuel cell technology was recently studied as a demonstration project on Hill AFB. The researchers concluded this technology currently ranks very poorly on a life cycle basis, and there is no feasible application for fuel cells on Hill AFB in the foreseeable future.

- 3) Wind Power: The Department of Energy's National Renewable Energy Laboratory has classified all of Davis and Weber Counties as having poor potential related to wind power, poor being the lowest of the seven possible classifications. On Hill AFB, there would be additional limitations for wind power, due to the height of towers and blades creating flight safety hazards.
- 4) Geothermal Power: The closest areas to Hill AFB with promising geothermal resources are Ogden Hot Springs near the mouth of Ogden Canyon (nine miles northeast of the proposed action) and Hooper Hot Springs in Hooper (eight miles west of the proposed action).

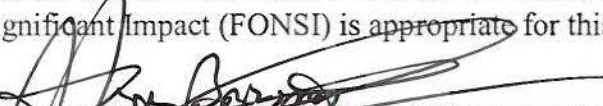
Six other locations were considered but eliminated due to concerns with aircraft safety, questionable electrical infrastructure, land use conflicts, and utility conflicts.

5. SUMMARY OF ANTICIPATED ENVIRONMENTAL EFFECTS:

Issue	Alternative A No Action	Alternative B Proposed Action
Air Quality	No effects	Construction equipment would create temporary emissions. Fugitive dust emissions would be mitigated. Operating the proposed action would not create air emissions.
Solid and Hazardous Waste	No effects	If contaminated soils are identified, they would be properly handled during the construction process. Solid and liquid wastes containing regulated substances would all be properly contained, stored, transported, disposed, re-used, and/or recycled. Operating the proposed action would not create solid or hazardous waste.
Biological Resources	No effects	Attempts to preserve trees could be unsuccessful. Up to 62 trees could be removed. New trees would be planted at a location approved by the Hill AFB natural resources manager in accordance with the Hill AFB tree removal and replacement plan. A small isolated artificial wetland, which is not hydrologically connected to other waters, would be eliminated. Due to its extremely small size (100 square feet) and lack of any connection to other waters, it neither provides habitat of significance, nor would mitigation be required.
Water Quality	No effects	During construction and operations, water quality would be protected by implementing stormwater management practices.

6. **FINDING OF NO SIGNIFICANT IMPACT:** Based on the above considerations, a Finding of No Significant Impact (FONSI) is appropriate for this assessment.

Approved by:


HARRY BRUESMASTER III, Colonel, USAF
Commander, 75th Civil Engineer Group

Date: 20 April 2008

Proposed Final
Environmental Assessment (EA):
Proposed Photovoltaic Array,
Hill Air Force Base, Utah

Contract FA 8222-05-D-0001, Delivery Order #0012

**Department of the Air Force
Air Force Materiel Command
Hill Air Force Base, Utah 84056**

August 28, 2008

Prepared in accordance with the Department of the Air Force Environmental Impact Analysis Process (EIAP) 32 CFR Part 989, Effective July 6, 1999, which implements the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality (CEQ) regulations.

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2. **DESCRIPTION OF THE PROPOSED ACTION:** Hill AFB proposes to accommodate current United States Air Force (USAF) missions by constructing a photovoltaic array, supplying an initial 439,000 kilowatt hours (kWh) of electricity per year from renewable sources, eliminating the requirement to purchase this same amount of electricity from Rocky Mountain Power. A ground mounted 230 kilowatt (kW) solar powered photovoltaic array would be provided, starting with 12 photovoltaic panels and later expanded to 48 panels, which could ultimately provide Hill AFB with an estimated 1,756,000 kWh per year of electricity from renewable sources. The proposed action would be located on the north side of Wardleigh Road, due west of an existing fill dirt and spoils lot.

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3. **SELECTION CRITERIA:** The following criteria were used to assemble alternatives. The facility that provides renewable energy to Hill AFB described in this document should:

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- have sufficient space to house all of the necessary equipment;
- be expandable in the future up to 1,600,000 kWh per year of electricity;
- be compatible with other Hill AFB land uses; and
- be protective of facilities, human health, and the environment.

4. **ALTERNATIVES CONSIDERED OTHER THAN THE PROPOSED ACTION:**

Under the no action alternative, the photovoltaic array would not be constructed, and electricity from renewable sources would not be provided. The 439,000 kWh per year of electricity would continue to be purchased from Rocky Mountain Power, whose primary source of electricity is from coal-fired power plants.

The Energy Management Office program managers evaluated, but eliminated, other potential technologies and locations for supplying electricity from renewable sources.

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- 2) Fuel Cells: Hydrogen fuel cell technology was recently studied as a demonstration project on Hill AFB. The researchers concluded this technology currently ranks very poorly on a life cycle basis, and there is no feasible application for fuel cells on Hill AFB in the foreseeable future.

- 3) Wind Power: The Department of Energy's National Renewable Energy Laboratory has classified all of Davis and Weber Counties as having poor potential related to wind power, poor being the lowest of the seven possible classifications. On Hill AFB, there would be additional limitations for wind power, due to the height of towers and blades creating flight safety hazards.
- 4) Geothermal Power: The closest areas to Hill AFB with promising geothermal resources are Ogden Hot Springs near the mouth of Ogden Canyon (nine miles northeast of the proposed action) and Hooper Hot Springs in Hooper (eight miles west of the proposed action).

Six other locations were considered but eliminated due to concerns with aircraft safety, questionable electrical infrastructure, land use conflicts, and utility conflicts.

5. SUMMARY OF ANTICIPATED ENVIRONMENTAL EFFECTS:

Issue	Alternative A No Action	Alternative B Proposed Action
Air Quality	No effects	Construction equipment would create temporary emissions. Fugitive dust emissions would be mitigated. Operating the proposed action would not create air emissions.
Solid and Hazardous Waste	No effects	If contaminated soils are identified, they would be properly handled during the construction process. Solid and liquid wastes containing regulated substances would all be properly contained, stored, transported, disposed, re-used, and/or recycled. Operating the proposed action would not create solid or hazardous waste.
Biological Resources	No effects	Attempts to preserve trees could be unsuccessful. Up to 62 trees could be removed. New trees would be planted at a location approved by the Hill AFB natural resources manager in accordance with the Hill AFB tree removal and replacement plan. A small isolated artificial wetland, which is not hydrologically connected to other waters, would be eliminated. Due to its extremely small size (100 square feet) and lack of any connection to other waters, it neither provides habitat of significance, nor would mitigation be required.
Water Quality	No effects	During construction and operations, water quality would be protected by implementing stormwater management practices.

6. FINDING OF NO SIGNIFICANT IMPACT: Based on the above considerations, a Finding of No Significant Impact (FONSI) is appropriate for this assessment.

Approved by: _____
STEPHANIE H. BINGGELI, YF-03, DAF
Director, 75th Civil Engineer Group

Date: _____

EXECUTIVE SUMMARY

Purpose and Need

The purpose of the proposed action is to supply approximately 439,000 kilowatt hours (kWh) of electricity per year from renewable sources to Hill Air Force Base (AFB), eliminating the requirement to purchase this same amount of electricity from Rocky Mountain Power.

The proposed action is needed to support Hill AFB in its effort to comply with the Energy Policy Act of 2005, Executive Order 13423, and the Energy Independence and Security Act of 2007, whereby each federal agency must increase the use of energy from renewable sources to achieve a minimum of 25 percent of the agency's total energy portfolio by the year 2025.

Scope of Review

During a scoping meeting and subsequent interactions, the following environmental issues were addressed:

- air quality;
- solid and hazardous wastes (including liquid waste streams);
- biological resources;
- geology and surface soils;
- water quality;
- cultural resources;
- occupational safety and health;
- air installation compatible use zone (AICUZ); and
- socioeconomic resources.

As explained in the body of this document, the issues that were identified for detailed consideration are: air quality, solid and hazardous wastes (including liquid waste streams), biological resources, and water quality.

Selection Criteria

The facility that provides renewable energy to Hill AFB described in this document should:

- initially provide at least 400,000 kWh per year of electricity;
- have sufficient space to house all of the necessary equipment;
- be expandable in the future up to 1,600,000 kWh per year of electricity;
- be compatible with other Hill AFB land uses; and
- be protective of facilities, human health, and the environment.

Alternatives Considered in Detail

Alternative A (No Action Alternative) - Under the no action alternative, the photovoltaic array would not be constructed, and electricity from renewable sources would not be provided. The

439,000 kWh per year of electricity would continue to be purchased from Rocky Mountain Power, whose primary source of electricity is from coal-fired power plants.

Alternative B (Proposed Action - Construct a Photovoltaic Array) - The proposed action would be located on the north side of Wardleigh Road, due west of an existing fill dirt and spoils lot. The proposed action, expanded to its full capability, would consist of:

- Installing up to 48 photovoltaic panels, each mounted on a steel frame embedded in concrete footings.
- Providing an inverter to convert direct current to alternating current and an electrical transformer. The inverter and the transformer would be mounted on concrete pads.
- Excavating and installing a 300 foot electrical duct to the southwest that would connect the output of the array to an existing 12,470 volt electrical distribution line running east to west along Wardleigh Road.
- Grading the site, covering it with crushed stone, erecting a six-foot high chain link security fence. The area to be disturbed by the project (if all 48 panels are eventually provided) would be approximately seven acres.

Decisions That Must Be Made

Hill AFB must decide which alternative to select:

- Do not provide energy from renewable sources at this time (no action).
- Construct a photovoltaic array.
- Construct a different type of energy facility using renewable sources.

Results of the Environmental Assessment

Alternatives A and B were both considered in detail. The results of the environmental assessment are summarized in the following table.

Summary Comparison of Alternatives

Issue	Alternative A No Action	Alternative B Proposed Action
Air Quality	No effects	Construction equipment would create temporary emissions. Fugitive dust emissions would be mitigated. Operating the proposed action would not create air emissions.
Solid and Hazardous Waste	No effects	If contaminated soils are identified, they would be properly handled during the construction process. Solid and liquid wastes containing regulated substances would all be properly contained, stored, transported, disposed, re-used, and/or recycled. Operating the proposed action would not create solid or hazardous waste.
Biological Resources	No effects	Attempts to preserve trees could be unsuccessful. Up to 62 trees could be removed. New trees would be planted at a location approved by the Hill AFB natural resources manager in accordance with the Hill AFB tree removal and replacement plan. A small isolated artificial wetland, which is not hydrologically connected to other waters, would be eliminated. Due to its extremely small size (100 square feet) and lack of any connection to other waters, it neither provides habitat of significance, nor would mitigation be required.
Water Quality	No effects	During construction and operations, water quality would be protected by implementing stormwater management practices.

Identification of the Preferred Alternative

Hill AFB prefers Alternative B (the proposed action).

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LIST OF ACRONYMS AND CHEMICAL TERMS

AFB	Air Force Base
AFOSH	Air Force Occupational Safety and Health
AICUZ	Air Installation Compatible Use Zone
ALC	Air Logistics Center
APE	Area of Potential Effect
bgs	Below the Ground Surface
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CWA	Clean Water Act
DAQ	Division of Air Quality (Utah)
dBA	Decibel (A-weighted)
DBH	Diameter at Breast Height
DRMO	Defense Reutilization and Marketing Office
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency (United States)
FONSI	Finding of No Significant Impact
FQI	Floristic Quality Index
HAP	Hazardous Air Pollutant
kW	Kilowatt
kWh	Kilowatt Hours
MS4	Municipal Separate Storm Sewer Systems
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NDSD	North Davis Sewer District
NEPA	National Environmental Policy Act
NO _x	Oxides of Nitrogen
NRHP	National Register of Historic Places

O ₃	Ozone
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
PM-10	Particulates Smaller Than 10 Microns in Diameter
PM-2.5	Particulates Smaller Than 2.5 Microns in Diameter
RCRA	Resource Conservation and Recovery Act
RHI	Range Health Index
ROD	Record of Decision
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO ₂	Sulfur Dioxide
SOC	Species of Concern
SO _x	Oxides of Sulfur
SWPPP	Stormwater Pollution Prevention Plan
UAC	Utah Administrative Code
UPDES	Utah Pollutant Discharge Elimination System
USAF	United States Air Force
USC	United States Code
VOC	Volatile Organic Compound
WCI	Wildlife Community Index
WFRC	Wasatch Front Regional Council

1 PURPOSE OF AND NEED FOR ACTION

1.1 Introduction

Hill Air Force Base (AFB) is located approximately 25 miles north of downtown Salt Lake City and seven miles south of downtown Ogden, Utah (Figure 1). Hill AFB is surrounded by several communities: Roy and Riverdale to the north; South Weber to the northeast; Layton to the south; and Clearfield, Sunset, and Clinton to the west. The base lies primarily in northern Davis County with a small portion located in southern Weber County.

Hill AFB is an Air Logistics Center (ALC) that maintains aircraft, missiles, and munitions for the United States Air Force (USAF). In support of that mission, Hill AFB: provides worldwide engineering and logistics management for the F-16 Fighting Falcon and A-10 Thunderbolt; accomplishes depot repair, modification, and maintenance of the F-16, A-10 Thunderbolt, and C-130 Hercules aircraft; and overhauls and repairs landing gear, wheels and brakes for military aircraft, rocket motors, air munitions, guided bombs, photonics equipment, training devices, avionics, instruments, hydraulics, software, and other aerospace-related components.

Significant quantities of electricity (246,000,000 kilowatt hours [kWh] per year) are consumed by USAF activities at Hill AFB. This document addresses renewable energy facilities in the form of a photovoltaic array, proposed for Hill AFB.

1.2 Purpose of the Action

The purpose of the proposed action is to supply approximately 439,000 kWh of electricity per year from renewable sources to Hill AFB (see Figure 1 for the approximate location), eliminating the requirement to purchase this same amount of electricity from Rocky Mountain Power.

1.3 Need for the Action

The proposed action is needed to support Hill AFB in its effort to comply with the Energy Policy Act of 2005, Executive Order 13423, and the Energy Independence and Security Act of 2007, whereby each federal agency must increase the use of energy from renewable sources to achieve a minimum of 25 percent of the agency's total energy portfolio by the year 2025.

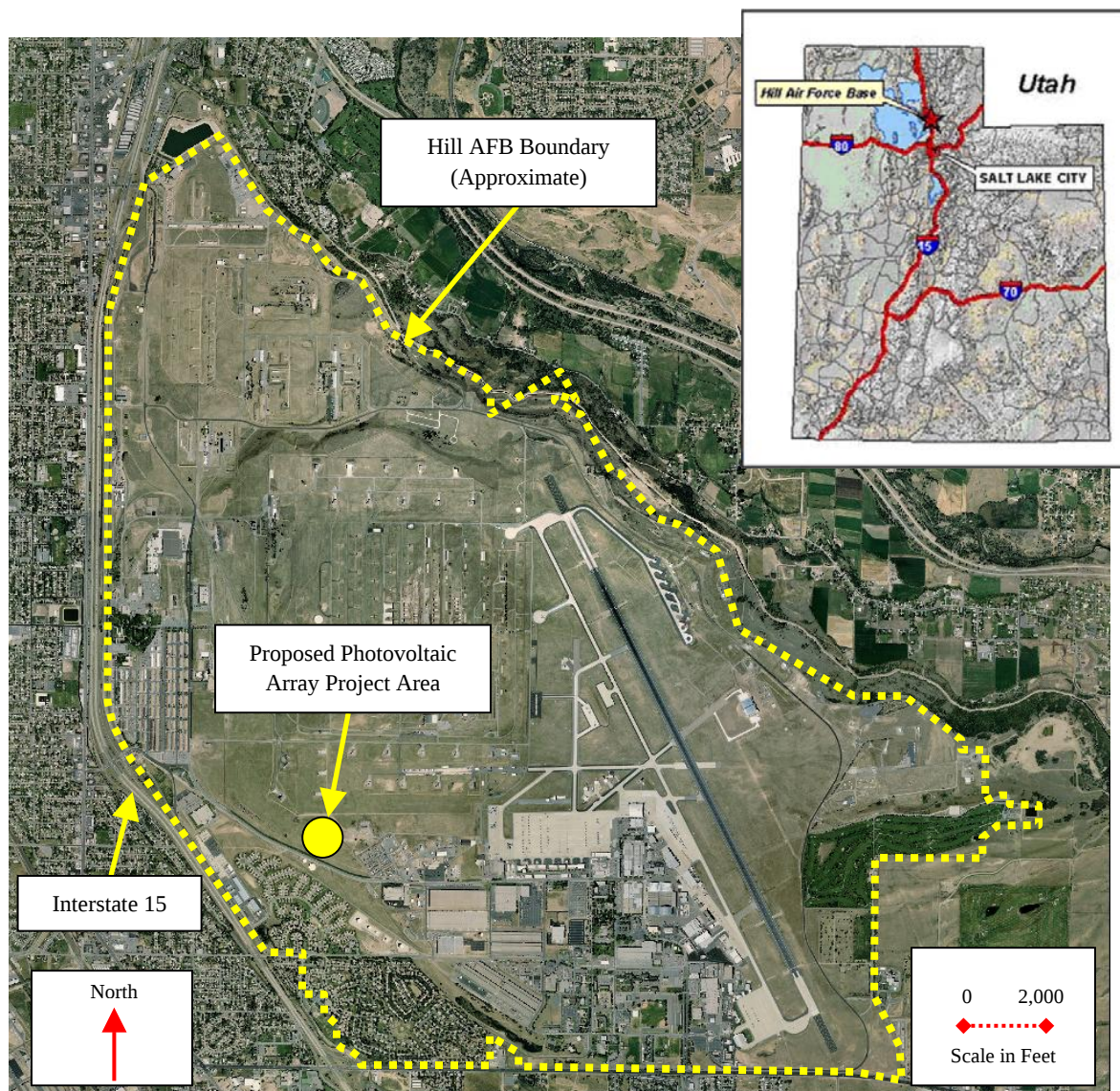


Figure 1: Location of the Proposed Action on Hill AFB

1.4 Alternative Selection Criteria

Due to the considerations presented in the preceding sections, the following selection criteria were established. The facility that provides renewable energy to Hill AFB described in this document should:

- initially provide at least 400,000 kWh per year of electricity;
- have sufficient space to house all of the necessary equipment;
- be expandable in the future up to 1,600,000 kWh per year of electricity;
- be compatible with other Hill AFB land uses; and
- be protective of facilities, human health, and the environment.

1.5 Relevant Plans, EISs, EAs, Laws, Regulations, and Other Documents

During the scoping process, no relevant plans, environmental impact statements (EISs), or environmental assessments (EAs) were identified.

The following federal, state, and local laws, regulations, and permits would apply to the proposed action:

- The National Environmental Policy Act (NEPA), Title 42 of the United States Code (USC) Section 4321 *et seq.*
- Council on Environmental Quality regulations, Title 40 of the Code of Federal Regulations (CFR) Parts 1500-1508.
- USAF-specific requirements contained in 32 CFR Part 989, Environmental Impact Analysis Process (EIAP).
- Safety guidelines of the Occupational Safety and Health Administration (OSHA).
- Relevant Air Force Occupational Safety and Health (AFOSH) standards.
- Utah's fugitive emissions and fugitive dust rules (Utah Administrative Code [UAC] Section R307-309).
- Utah's State Implementation Plan (UAC Section R307-110), which complies with the General Conformity Rule of the Clean Air Act (CAA), Section 176 (c).
- Determining Conformity of Federal Actions to State or Federal Implementation Plans, 40 CFR Part 93.154.

- The Hill AFB Title V Operating Permit (Permit Number: 1100007001, and subsequent versions).
- Utah Asbestos Rules, UAC, Section R307-801.
- The Resource Conservation and Recovery Act (RCRA), 42 USC Chapter 82, and regulations promulgated thereunder, 40 CFR Part 260 *et seq.*
- Federal facility agreement dated April 10, 1991 under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 42 USC Section 9601 *et seq.*
- Utah hazardous waste management regulations contained in UAC Section R315, and the Hill AFB *Hazardous Waste Management Plan* dated May, 2001, and subsequent versions.
- The Clean Water Act (CWA), 33 USC Section 1251 *et seq.*
- Industrial pretreatment permit number 110 issued by the North Davis Sewer District (NDSD), dated November 1, 2007, and subsequent versions.
- General Multi-Sector Permit for Storm Water Discharges Associated with Industrial Activity permit number UTR000444, which expired December 2007 (but will be valid until a new permit is issued, the application for which has been submitted), and subsequent versions.
- Utah Pollutant Discharge Elimination System (UPDES) General Permit for Discharges from Small Municipal Separate Storm Sewer Systems (MS4s), permit number UTR090028, which expired December 2007 (but will be valid until a new permit is issued, the application for which has been submitted), and subsequent versions.
- The Hill AFB *Stormwater Management Plan Municipal Stormwater Permit*, dated April, 2007, and subsequent versions.
- The Hill AFB *Integrated Natural Resources Management Plan*, dated 2006, and subsequent versions.
- The Hill AFB *Integrated Cultural Resources Management Plan*, dated January, 2007, and subsequent versions.
- The National Historic Preservation Act (NHPA), 16 USC Section 470 *et seq.*
- The Energy Policy Act of 2005.
- The Energy Independence and Security Act of 2007.
- Strengthening Federal Environmental, Energy, and Transportation Management, Executive Order 13423, 2007.

During the scoping process, no other documents were identified as being relevant to the proposed action.

1.6 Decisions That Must Be Made

Hill AFB must decide whether to:

- not provide energy from renewable sources at this time (no action);
- construct a photovoltaic array; or
- construct a different type of energy facility using renewable sources.

If Hill AFB decides to construct an energy facility using renewable sources, the proponent and environmental managers would then decide what mitigation and/or monitoring measures, if any, should be implemented.

If Hill AFB decides to construct an energy facility using renewable sources, the base would then decide if the selected alternative would or would not be a major federal action significantly affecting the quality of the human environment. If judged as not significantly affecting the quality of the human environment, then a finding of no significant impact (FONSI) would be prepared and signed, and the project would proceed. If judged as significantly affecting the quality of the human environment, then an EIS and a record of decision (ROD) would have to be prepared and signed before the project could proceed.

1.7 Scope of this Environmental Analysis

The scope of the current environmental analysis is to explore environmental issues related to the proposed action (construct a photovoltaic array) and the reasonable alternatives identified within this document.

1.7.1 History of the Planning and Scoping Process

Scoping discussions were held: to identify potential environmental concerns; to facilitate an efficient environmental analysis process; to identify issues and alternatives that would be considered in detail while devoting less attention and time to less important issues; and to save time in the overall process by helping to ensure that draft documents would adequately address relevant issues, thereby reducing the time required to proceed to a final document.

On June 2, 2008, an initial scoping meeting was conducted in Building 5, Hill AFB. Attendees included proponents of the proposed action, managers of Hill AFB's NEPA program, other environmental program managers, and the authors of this document.

During this meeting and subsequent scoping interaction, the following environmental issues were addressed:

- air quality;

- solid and hazardous wastes (including liquid waste streams);
- biological resources;
- geology and surface soils;
- water quality;
- cultural resources;
- occupational safety and health;
- air installation compatible use zone (AICUZ); and
- socioeconomic resources.

1.7.2 Issues Studied in Detail

The issues that have been identified for detailed consideration and are therefore presented in Sections 3 and 4 are:

- **Air Quality** (attainment status, emissions, Utah's state implementation plan [SIP])

Air emissions would be produced by construction equipment. Operating the proposed action would not create air emissions. Air quality effects are discussed in Section 4 of this document.

- **Solid and Hazardous Wastes** (materials to be used, stored, recycled, or disposed, including liquid waste streams; existing asbestos, lead-based paint, mercury, and polychlorinated biphenyls [PCBs])

During construction, solid wastes would be generated, and other hazardous wastes might be generated that would require proper treatment and/or disposal. Additional hazardous wastes could be generated if a spill of fuel, lubricants, or construction-related chemicals were to occur.

Operating the proposed action would not be expected to create solid and hazardous wastes (to include solid and liquid wastes). Effects related to solid and hazardous wastes are discussed in Section 4 of this document.

- **Biological Resources** (threatened, endangered, sensitive species, wetlands, floodplains)

Approximately seven acres of undeveloped land would be disturbed by the proposed action. Effects related to biological resources are discussed in Section 4 of this document.

- **Water Quality** (surface water, groundwater, water quantity, wellhead protection zones)

Based on the Hill AFB preliminary siting diagram that was prepared for the proposed action, the land area to be disturbed would be approximately seven acres in size. The proposed action would be subject to stormwater permit requirements both during the construction period and during operations.

Contamination of groundwater is not known to exist in the vicinity of the proposed action. Additionally, since the proposed action would not require excavations deeper than 10 feet below ground surface, (bgs), groundwater effects were not addressed in detail.

The scoping discussions did not identify any issues related to quantity of water or wellhead protection zones.

Effects related to water quality are discussed in Section 4 of this document.

Liquid waste streams created during construction and from operating the proposed action are included in the discussions related to solid and hazardous wastes (Section 4 of this document).

1.7.3 Issues Eliminated From Further Study

The issues that were not carried forward for detailed consideration in Sections 3 and 4 are:

- **Geology and Surface Soils** (seismicity, topography, minerals, geothermal resources, land disturbance, known pre-existing contamination)

The scoping discussions did not identify any issues related to seismicity, topography, minerals, or geothermal resources.

Excavations would be necessary to install: footings and an electrical duct. Discussions related to preventing soil erosion (stormwater pollution prevention) are addressed under water quality effects (Section 4 of this document).

Contamination of shallow soil is not known to exist in the vicinity of the proposed action. Potential discovery of suspicious soils during excavation is addressed under solid and hazardous wastes (Section 4 of this document).

- **Cultural Resources** (archaeological, architectural, traditional cultural properties)

No significant cultural resources have been identified in the area of potential effect (APE) for the proposed action. Three previous inventories for archaeological resources were conducted on Hill AFB in 1991, 1995, and 2001, comprising 840 acres total. This has resulted in the survey of 12.5 percent of the total area of Hill AFB. Results from these projects included the recordation of one historic refuse dump and two prehistoric isolates, all determined ineligible for

listing in the National Register of Historic Places (NRHP). None of the previous inventories included the APE of the proposed action. Given the lack of previous findings and the extensive development and disturbance of Hill AFB, the potential for historic properties is extremely low. However, if any are found during construction, ground-disturbing activities in the immediate vicinity will cease, the Hill AFB Cultural Resources Program will be notified, and unanticipated discovery of archaeological deposits procedures will be implemented with direction from the Hill AFB Cultural Resources Program in accordance with Standard Operating Procedure 5 in the Hill AFB *Integrated Cultural Resources Management Plan* (Hill 2007a). The Utah State Historic Preservation Office (SHPO) concurred with a finding of no adverse effect after reviewing the proposed action (Appendix A). Hill AFB has determined formal consultation with American Indian Tribes is not warranted given the absence of resources that may be reasonably construed as being of interest to them.

- **Occupational Safety and Health** (physical and chemical hazards, radiation, explosives, bird and wildlife hazards to aircraft)

Throughout the construction phase of the project, Hill AFB contractors would follow OSHA safety guidelines as presented in the CFR. Hazardous materials that could be used during construction are included in the discussions related to solid and hazardous wastes (Section 4 of this document).

Related to Hill AFB military personnel and civilian employees, the Bio-environmental Engineering Flight (75 AMDS/SGPB) is responsible for implementing AFOSH standards. The AFOSH program addresses (partial list): hazard abatement, hazard communication, training, personal protective equipment and other controls to ensure that occupational exposures to hazardous agents do not adversely affect health and safety, and acquisition of new systems.

The scoping discussions did not identify any issues related to occupational safety and health that would not be routinely addressed by OSHA rules and/or the Bio-engineering Flight.

- **AICUZ** (noise, accident potential, airfield encroachment)

The proposed action would be outside (less than) the 65 A-weighted decibel (dBA) noise level zone (documented in the current version of the Hill AFB AICUZ report). Workers would only be present when initially constructing the photovoltaic array, and during periodic maintenance visits.

The scoping discussions did not identify any issues related to aircraft accident potential or airfield encroachment.

- **Socioeconomic Resources** (local fiscal effects including employment, population projections, and schools)

Opportunities would exist for local construction workers when the proposed action is constructed. The proposed action is not expected to create additional permanent jobs at Hill AFB. The scoping discussions did not identify any issues related to population projections or schools.

1.8 Applicable Permits, Licenses, and Other Coordination Requirements

References to applicable permits and licenses are included in Section 1.5 of this document.

The proponents would coordinate with the Hill AFB hazardous materials program manager (75 CEG/CEVC) to discuss hazardous materials brought on base to construct the proposed action and to be used in maintaining the photovoltaic array.

2.0 ALTERNATIVES, INCLUDING THE PROPOSED ACTION

2.1 Introduction

This section discusses the process used to develop the alternatives, describes the alternatives, and compares (in a brief summary fashion) the alternatives and their expected effects. Finally, this section states the Air Force's preferred alternative.

2.2 Process Used to Develop the Alternatives

As discussed in Sections 1.3 and 1.4 of this document, Hill AFB intends to provide at least 400,000 kWh per year of electricity from renewable sources. The proposed photovoltaic array described in this document would initially provide approximately 439,000 kWh per year of electricity, and be expandable on the same site to an estimated 1,756,000 kWh per year.

The Hill AFB energy office investigated other technologies (see Section 2.3.3.1) for providing electricity from renewable sources and other potential locations for siting the proposed photovoltaic array (see Section 2.3.3.2).

2.3 Description of Alternatives

2.3.1 Alternative A: No Action

Under the no action alternative, the photovoltaic array would not be constructed, and electricity from renewable sources would not be provided. The 439,000 kWh per year of electricity would continue to be purchased from Rocky Mountain Power, whose primary source of electricity is from coal-fired power plants (BRAC 2007).

2.3.2 Alternative B: Proposed Action - Construct a Photovoltaic Array

The action to be constructed at this time would be a ground mounted 230 kilowatt (kW) solar powered photovoltaic array (12 photovoltaic panels), providing Hill AFB with approximately 439,000 kWh per year of electricity from renewable sources. The facility would have expansion capability up to 1 megawatt (MW), or 48 photovoltaic panels, which could ultimately provide Hill AFB with an estimated 1,756,000 kWh per year of electricity from renewable sources. This document addresses the effects of full implementation (installing 48 photovoltaic panels).

The proposed action would be located on the north side of Wardleigh Road, due west of an existing fill dirt and spoils lot (Figure 2). The proposed action, expanded to its full capability, would consist of:

- Installing up to 48 photovoltaic panels, each mounted on a steel frame embedded in concrete footings.
- Providing an inverter to convert direct current to alternating current and an electrical transformer. The inverter and the transformer would be mounted on concrete pads.

- Excavating and installing a 300-foot electrical duct to the southwest that would connect the output of the array to an existing 12,470 volt electrical distribution line running east to west along Wardleigh Road.
- Grading the site, covering it with crushed stone, erecting a six-foot high chain link security fence. The area to be disturbed by the project (if all 48 panels are eventually provided) would be approximately seven acres.

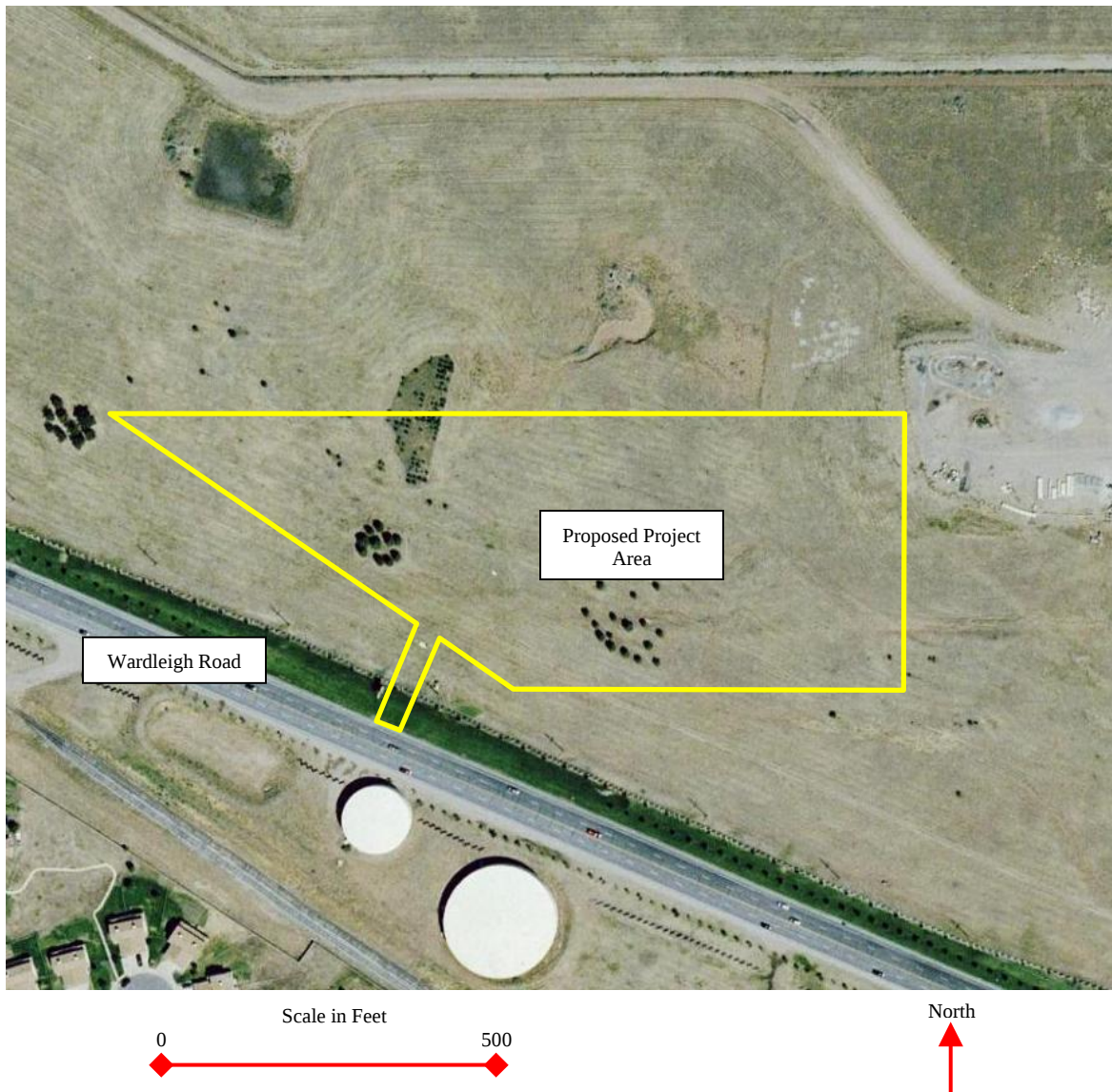


Figure 2: Area to be Occupied by the Proposed Photovoltaic Array

2.3.3 Alternatives Eliminated From Detailed Study

2.3.3.1 Other Technologies

The following four alternate technologies were considered and eliminated by the Hill AFB Energy Management Office.

- 1) Landfill Gas: Hill AFB already owns and operates the first landfill gas to energy generating facility in the Department of Defense, and the first such project constructed in Utah (Price 2007). The power plant began operating in 2005. With three generators now operating, this energy source is being used to its fullest capacity of 15,000,000 kWh per year (personal communication, Dale Scott).
- 2) Fuel Cells: Hydrogen fuel cell technology was recently studied as a demonstration project on Hill AFB. The researchers concluded this technology currently ranks very poorly on a life cycle basis, and there is no feasible application for fuel cells on Hill AFB in the foreseeable future (personal communication, Dale Scott).
- 3) Wind Power: The Department of Energy's National Renewable Energy Laboratory has classified all of Davis and Weber Counties as having poor potential related to wind power, poor being the lowest of the seven possible classifications (NREL 2003). On Hill AFB, there would be additional limitations for wind power, due to the height of towers and blades creating flight safety hazards.
- 4) Geothermal Power: The closest areas to Hill AFB with promising geothermal resources (Fleischmann 2006) are Ogden Hot Springs near the mouth of Ogden Canyon (nine miles northeast of the proposed action) and Hooper Hot Springs in Hooper (eight miles west of the proposed action).

2.3.3.2 Other Locations

Six other locations were considered but eliminated for the reasons discussed below.

- 1) An area to the south-southeast of Building 737 was eliminated because light would have reflected into pilots' eyes when using the south one-third of the runway.
- 2) Two areas to the east and west of the south gate were eliminated due to questionable electrical interconnection capability, interference with an environmental retention pond on the east side, and limited available acreage on the west side.
- 3) An area south of Wardleigh Road and west of Building 847 was eliminated due to its proximity to military housing, the necessary orientation relative to Wardleigh Road, and conflict with a proposed road extension that could occupy this area within the next 5 years.
- 4) Rooftop installations were considered on Buildings 845 and 849. Existing structures were observed to have conflicts with heating and air conditioning equipment, building vents, and other roof penetrations, making ground-based installation more feasible. The

Hill AFB Energy Management Office will work with base planners and the facility board to consider installing rooftop photovoltaic arrays in the future, as large buildings are constructed on base.

- 5) Little Mountain Test Facility was considered as a potential site for the array and eliminated due to the poor condition and lack of availability of electrical infrastructure.
- 6) Utah Test and Training Range was considered as a potential site for the array and eliminated due to the excessive distance from Hill AFB and potential degradation of electrical output due to severe dust collection on the panels.

2.4 Summary Comparison of the Activities, the Predicted Achievement of the Project Objectives and the Predicted Environmental Effects of All Alternatives

2.4.1 Summary Comparison of Project Activities

The no action alternative would be to continue the current methods and levels of operation.

Under Alternative B (proposed action) a photovoltaic array would be constructed, providing Hill AFB with approximately 439,000 kWh per year of electricity from renewable sources. The facility would have expansion capability up to 1 MW, or 48 photovoltaic panels, which could ultimately provide Hill AFB with an estimated 1,756,000 kWh per year of electricity from renewable sources.

2.4.2 Summary Comparison of Predicted Achievement of Project Objectives

Description of the Project Objective	Alternative A (No Action)	Alternative B (Proposed Action)
Initially provide at least 400,000 kWh per year of electricity	No	Yes
Have sufficient space to house all of the necessary equipment	No	Yes
Be expandable in the future up to 1,600,000 kWh per year of electricity	No	Yes
Be compatible with other Hill AFB land uses	Yes	Yes
Be protective of facilities, human health, and the environment	Yes	Yes

Table 1: Summary Comparison of Predicted Achievement of Project Objectives

2.4.3 Summary Comparison of Predicted Environmental Effects

Issue	Alternative A No Action	Alternative B Proposed Action
Air Quality	No effects	Construction equipment would create temporary emissions. Fugitive dust emissions would be mitigated. Operating the proposed action would not create air emissions.
Solid and Hazardous Waste	No effects	If contaminated soils are identified, they would be properly handled during the construction process. Solid and liquid wastes containing regulated substances would all be properly contained, stored, transported, disposed, re-used, and/or recycled. Operating the proposed action would not create solid or hazardous waste.
Biological Resources	No effects	Attempts to preserve trees could be unsuccessful. Up to 62 trees could be removed. New trees would be planted at a location approved by the Hill AFB natural resources manager in accordance with the Hill AFB tree removal and replacement plan. A small isolated artificial wetland, which is not hydrologically connected to other waters, would be eliminated. Due to its extremely small size (100 square feet) and lack of any connection to other waters, it neither provides habitat of significance, nor would mitigation be required.
Water Quality	No effects	During construction and operations, water quality would be protected by implementing stormwater management practices.

Table 2: Summary Comparison of Predicted Environmental Effects

2.5 Identification of the Preferred Alternative

Hill AFB prefers Alternative B (the proposed action).

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

Section 3 of this document discusses the existing conditions of the potentially affected environment, establishing a resource baseline against which the effects of the various alternatives can be evaluated. It presents relevant facilities and operations, environmental issues, pre-existing environmental factors, and existing cumulative effects due to human activities in the vicinity of the proposed action or the alternative locations.

Issues discussed during scoping meetings, but eliminated from detailed consideration (see Section 1.7.3) include:

- geology and surface soils (seismicity, topography, minerals, geothermal resources, land disturbance, known pre-existing contamination)
- cultural resources (archaeological, architectural, traditional cultural properties);
- occupational safety and health (physical and chemical hazards, radiation, explosives, bird and wildlife hazards to aircraft);
- AICUZ (noise, accident potential, airfield encroachment); and
- socioeconomic resources (local fiscal effects including employment, population projections, and schools).

3.2 Description of Relevant Facilities and Operations

The facilities and operations directly affected by the proposed action were identified in Section 2.3. No other relevant facilities or operations were identified.

3.3 Description of Relevant Affected Issues

3.3.1 Air Quality

Hill AFB is located in Davis and Weber Counties, Utah. Neither county is in complete attainment status with federal clean air standards (Figure 3). Nonattainment areas fail to meet national ambient air quality standards (NAAQS) for one or more of the criteria pollutants: oxides of nitrogen (NO_x), sulfur dioxide (SO₂), ozone (O₃), particulates less than 10 microns in diameter (PM-10), particulates less than 2.5 microns in diameter (PM-2.5), carbon monoxide (CO), and lead. Davis County (the county in which the proposed action lies) is currently designated as a maintenance area for ozone. Due to this designation, emission offsets are required for new sources emitting NO_x and volatile organic compounds (VOCs), which are precursors to ozone formation.

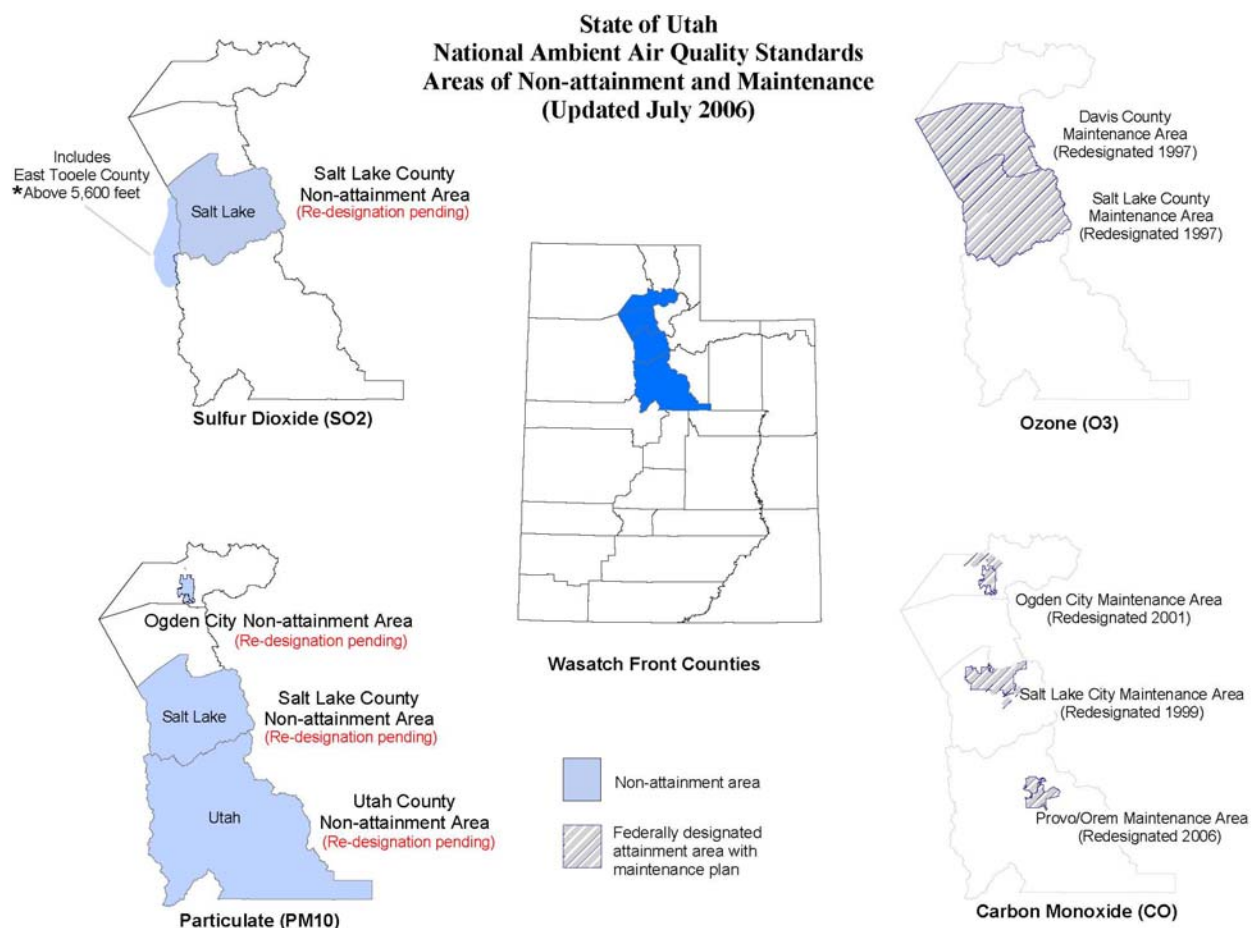


Figure 3: State of Utah National Ambient Air Quality Standards, Areas of Non-Attainment and Maintenance

The current air quality trend at Hill AFB is one of controlling emissions as Hill AFB managers implement programs to eliminate ozone-depleting substances, limit use of VOCs, switch to lower vapor pressure solvents and aircraft fuel, convert internal combustion engines from gasoline and diesel to natural gas, and improve the capture of particulates during painting and abrasive blasting operations (in compliance with the base's Title V air quality permit).

Published emission estimates are available for criteria air pollutants and hazardous air pollutants (HAPs) for Hill AFB (Hill 2007), and criteria air pollutants for Davis and Weber Counties (Division of Air Quality - DAQ 2006). The estimates, shown below in Table 3 were based on data from calendar year 2006 for Hill AFB, and for calendar year 2002 for Davis and Weber Counties.

Location	VOC	CO	NO _x	PM-10	HAP	SO _x
Hill AFB	290.47	215.42	225.80	41.61	75.75	6.40
Davis County	18,878.71	78,777.83	11,086.59	3,378.55	not reported	2,441.04
Weber County	16,184.75	62,246.82	6,933.27	2,768.36	not reported	296.89

Table 3: Baseline Criteria Pollutants and HAPs (tons/year)

3.3.2 Solid and Hazardous Wastes

In general, hazardous wastes include substances that, because of their concentration, physical, chemical, or other characteristics, may present substantial danger to public health or welfare or to the environment when released into the environment or otherwise improperly managed. Potentially hazardous and hazardous wastes generated at Hill AFB are managed as specified in the *Hill AFB Hazardous Waste Management Plan* with oversight by personnel from the Environmental Management Division and the Defense Reutilization and Marketing Office (DRMO). Hazardous wastes at Hill AFB are properly stored during characterization, and then manifested and transported off site for treatment and/or disposal.

The proposed action would create a new facility on Hill AFB. There are no existing solid or hazardous wastes being generated.

3.3.3 Biological Resources

No federal or state threatened or endangered species are known to occur on Hill AFB (Hill 2006) and no likely habitat for any such species would be disturbed by the proposed action. Two species on Utah's species of concern (SOC) list have been sighted on Hill AFB, the Long Billed Curlew and the Bobolink. Those sightings were unusual for these species and occurred during the fall migration. There are no natural wetlands or floodplains in the vicinity of the alternatives discussed in this document. The alternatives discussed in this document are located in or near developed areas on Hill AFB.

The seven acres within the boundary of the proposed action consist of a mowed grass/forb habitat with ten invasive plants and numerous native plants, along with three species of evergreen trees. Based on recent observations, the calculated range health index (RHI) for the proposed area is 0.82, the wildlife community index (WCI) is 0.36, and the floristic quality index (FQI) is 0.52. There are several Northern Pocket Gopher burrows within the boundary of the proposed action. There is a small artificial wetland approximately 100 square feet in size, currently growing cattails.

Sixty two trees exist within the footprint of the proposed action (see Table 4).

Type of Tree	Number of Trees	Value	Stem Diameter (inches)
Utah Juniper	30	\$254.00	30
Ponderosa Pine	29	\$13,355.00	187
Scotch Pine	3	\$26.00	3
Totals	62	\$13,635.00	220

Table 4: List of Existing Trees, Monetary Value, and Stem Diameter in Inches

Birds that could occupy such trees and their type of use are listed in Table 5.

Type of Bird	Feed and/or Hunt	Nest
Brewer's Blackbird	✓	✓
American Crow	✓	
American Kestrel	✓	
American Robin	✓	✓
Black-billed Magpie	✓	✓
Black-capped Chickadee	✓	✓
Brown-headed Cowbird	✓	✓
Common Raven	✓	
Dark-eyed Junco	✓	
European Starling	✓	✓
Hairy, Downy Woodpecker	✓	
House Finch	✓	✓
House Sparrow	✓	✓
Hummingbird (various)		✓
Mourning Dove	✓	✓
Northern Flicker	✓	

Type of Bird	Feed and/or Hunt	Nest
Red-tailed Hawk	✓	
Rock Dove	✓	
Swallows	✓	
Western Kingbird	✓	✓
White-crowned Sparrow	✓	

Table 5: List of Birds and Potential Use of Evergreen Trees

3.3.4 Water Quality

In areas of Hill AFB that are not heavily developed, runoff is allowed to infiltrate into the ground through overland flow or surface ditches, discharging to large unoccupied areas. In developed areas, stormwater is conveyed to 15 retention or detention ponds within Hill AFB boundaries. Stormwater from retention ponds percolates and evaporates, resulting in zero discharge. Detention ponds are checked for presence of an oil sheen prior to discharging stormwater by manually opening the outfall valves.

No surface water bodies are present within the area occupied by the proposed action. Most of the precipitation falling on this seven-acre unoccupied area would be expected to infiltrate into the ground. Based on a review of the Hill AFB *Hill AFB Stormwater Management Plan - Municipal Stormwater Permit* (Stantec 2007) and site topography, any excess runoff from this area of Hill AFB would be conveyed by storm drains to Pond 4 (a detention pond).

3.4 Description of Relevant Pre-Existing Environmental Factors

The Wasatch Front Regional Council (WFRC 2003) assessed earthquake hazards for Davis County, Utah, including the portion of Hill AFB that includes the alternatives discussed in this document. The Davis County liquefaction potential map shows this area of Hill AFB to be in the zone labeled as very low risk. The Davis County earthquake hazard map shows this area of Hill AFB to be outside of known fault zones. The Davis County landslide hazard map shows this area of Hill AFB to be outside of known landslide risk zones.

During scoping discussions and subsequent analysis, no other pre-existing environmental factors (e.g., hurricanes, tornados, floods, droughts) were identified for the proposed action.

3.5 Description of Areas Related to Cumulative Effects

For air quality, the area related to cumulative effects would include Hill AFB, Davis County, and Weber County.

For solid and hazardous wastes, the area related to cumulative effects would include Hill AFB.

For biological resources, the area related to cumulative effects would include Hill AFB.

For water quality, the area related to cumulative effects would include Hill AFB and waters downstream from the Hill AFB stormwater retention ponds.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

This section begins by presenting, in Section 4.2, the predicted attainment of project objectives for all alternatives.

Section 4.3 discusses effects to the resources that were identified for detailed analysis in Section 1.7.2, and for which existing conditions were presented in Section 3.3. For each of these resources, the following analyses are presented:

- direct, indirect, and cumulative effects of the no action alternative; and
- direct, indirect, and cumulative effects of the proposed action (Alternative B).

4.2 Predicted Attainment of Project Objectives of All Alternatives

Table 6 addresses the ability of each alternative to attain project objectives.

Description of the Project Objective	Alternative A (No Action)	Alternative B (Proposed Action)
Initially provide at least 400,000 kWh per year of electricity	No	Yes
Have sufficient space to house all of the necessary equipment	No	Yes
Be expandable in the future up to 1,600,000 kWh per year of electricity	No	Yes
Be compatible with other Hill AFB land uses	Yes	Yes
Be protective of facilities, human health, and the environment	Yes	Yes

Table 6: Predicted Attainment of Project Objectives

4.3 Predicted Effects to Relevant Affected Resources of All Alternatives

4.3.1 Predicted Effects to Air Quality

4.3.1.1 Alternative A: No Action

With respect to air quality, the no action alternative would have no direct effects, no indirect effects, and no cumulative effects.

4.3.1.2 Alternative B (Proposed Action): Construct a Photovoltaic Array

Direct Effects Due to Construction

- **Fugitive Dust:** Fugitive emissions from construction activities would be controlled according to UAC Section R307-205, *Emission Standards: Fugitive Emissions and Fugitive Dust* and the Hill AFB *Fugitive Dust Plan*. Good housekeeping practices would be used to maintain construction opacity at less than 20 percent. Haul roads would be kept wet. Any soil that is deposited on nearby paved roads by construction vehicles would be removed from the roads and either returned to the site or placed in an appropriate disposal facility.
- **Heavy Equipment:** The internal combustion engines of heavy equipment would generate emissions of VOCs, CO, NO_x, PM-10, PM-2.5, HAPs, and oxides of sulfur (SO_x). Assumptions and estimated emissions for the construction period are listed in Table 7.

Data Assumptions							
Equipment Type	Diesel Emission Factor (lbs/hr)						
	VOC (HC)	CO	NOx	PM10	HAPs	SOx	
Asphalt Paver	0.28	1.24	2.96	0.24	0.05	0.25	
Bobcat Loader	0.14	0.67	1.00	0.10	0.01	0.08	
Cable Plow	0.59	3.75	4.49	0.59	0.08	0.38	
Compressor (boring)	0.25	1.62	1.94	0.25	0.04	0.16	
Concrete Truck	0.80	3.55	8.50	0.69	0.15	0.72	
Crane	2.14	6.96	17.08	2.39	0.33	1.54	
Dump Truck	0.63	2.04	6.98	0.58	0.16	0.65	
Flat Bed Truck	0.48	1.54	5.29	0.44	0.12	0.49	
Fork Lift	0.42	2.47	1.98	0.40	0.05	0.23	
Generator	0.02	0.10	0.12	0.02	0.00	0.01	
Loader/Backhoe	0.87	4.12	6.12	0.64	0.06	0.52	
Motored Grader	0.83	2.01	5.08	0.53	0.06	0.46	
Scraper	0.33	2.31	4.03	0.58	0.13	0.42	
Track Hoe	0.91	6.65	13.75	1.84	0.26	1.19	
Vibratory Compactor	0.38	1.44	4.31	0.36	0.09	0.46	
Water Truck	1.10	3.58	12.28	1.02	0.28	1.14	
Wheeled Dozer	0.46	1.48	5.08	0.35	0.08	0.49	
Note: VOCs = Hydrocarbons and HAPs = Aldehydes							
Source: Industry Horsepower Ratings and EPA 460/3-91-02							
Construct Photovoltaic Array							
EQUIPMENT TYPE	HOURS OF OPERATION	Diesel Emissions (lbs)					
		VOC	CO	NOx	PM10	HAPs	SOx
Asphalt Paver	60	16.8	74.4	177.6	14.4	3.0	15.0
Bobcat Loader	320	44.8	214.4	320.0	32.0	3.2	25.6
Cable Plow	24	14.2	90.0	107.8	14.2	1.9	9.1
Compressor (boring)	80	20.0	129.6	155.2	20.0	3.2	12.8
Concrete Truck	80	64.0	284.0	680.0	55.2	12.0	57.6
Crane	64	137.0	445.4	1093.1	153.0	21.1	98.6
Dump Truck	80	50.4	163.2	558.4	46.4	12.8	52.0
Flat Bed Truck	20	9.6	30.8	105.8	8.8	2.4	9.8
Fork Lift	320	134.4	790.4	633.6	128.0	16.0	73.6
Generator	1600	32.0	160.0	192.0	32.0	0.0	16.0
Loader/Backhoe	80	69.6	329.6	489.6	51.2	4.8	41.6
Motored Grader	120	99.6	241.2	609.6	63.6	7.2	55.2
Scraper	80	26.4	184.8	322.4	46.4	10.4	33.6
Track Hoe	80	72.8	532.0	1100.0	147.2	20.8	95.2
Vibratory Compactor	40	15.2	57.6	172.4	14.4	3.6	18.4
Water Truck	80	88.0	286.4	982.4	81.6	22.4	91.2
Wheeled Dozer	120	55.2	177.6	609.6	42.0	9.6	58.8
TOTAL ESTIMATED EMISSIONS (lbs)		949.9	4191.4	8309.5	950.3	154.4	764.1
TOTAL ESTIMATED EMISSIONS (tons)		0.47	2.10	4.15	0.48	0.08	0.38

Source of Hours: Nicole Bulgarino, Ameresco, Inc.

Table 7: Calculated Heavy Equipment Emissions

Direct Effects Due to Operations

Based on information received during the scoping meeting held on June 2, 2008, no air emissions were identified from operating the proposed action.

If required, prior to operating the proposed action, Hill AFB air quality managers would submit notices of intent, seven day notifications, and modification requests to DAQ. Hill AFB would not be allowed to operate the facilities until DAQ concurs that federal and state requirements are being met. Hill AFB ensures conformity with the CAA by complying with Environmental Protection Agency (EPA) regulations and Utah's SIP.

Indirect Effects

During scoping and the detailed analysis, no indirect effects related to air quality were identified for the proposed action.

Cumulative Effects

- **Construction:** Construction-related air emissions would be limited to a duration of several months. Comparing the magnitude of predicted construction-related air emissions (Table 7) to existing emissions for Hill AFB, Davis and Weber Counties (Table 3), there would not be significant cumulative effects to air quality associated with constructing the proposed action.
- **Operations:** Since no operational emissions were identified for the proposed action, no cumulative effects to air quality were identified for operating the proposed action.

4.3.2 Predicted Effects to Solid and Hazardous Waste

4.3.2.1 Alternative A: No Action

With respect to solid and hazardous waste, the no action alternative would have no direct effects, no indirect effects, and no cumulative effects.

4.3.2.2 Alternative B (Proposed Action): Construct a Photovoltaic Array

Direct Effects Due to Construction

- **Waste Generation:** During the proposed construction activities, solid wastes expected to be generated would be construction debris consisting mainly of concrete, metal, and building materials. These items would be treated as uncontaminated trash and recycled when feasible. It is possible that equipment failure or a spill of fuel, lubricants, or construction-related chemicals could generate solid or hazardous wastes. In the event of a spill of regulated materials, Hill AFB environmental managers and their contractors would comply with all federal, state, and local spill reporting and cleanup requirements.
- **Waste Management:** Hill AFB personnel have specified procedures for handling construction-related solid and hazardous wastes in their engineering construction specifications. The procedures are stated in Section 01000, General Requirements, Part 1, General, Section 1.24, Environmental Protection. All solid non-hazardous waste is collected and disposed or recycled on a routine basis. Samples from suspect wastes are analyzed for hazardous vs. non-hazardous determination. The suspect waste is safely stored while analytical results are pending. Hazardous wastes are stored at sites operated in accordance with the requirements of 40 CFR 265. The regulations require the generator to characterize hazardous wastes with analyses or process knowledge. Hazardous wastes are eventually labeled, transported, treated, and disposed in accordance with federal and state regulations.

- **Excavated Soils:** If unusual odors or soil discoloration were to be observed during any excavation or trenching necessary to complete the proposed action, or if any monitoring points are encountered, remedial managers from the Hill AFB Environmental Restoration Branch (75 CEG/CEV) would be notified. Samples from suspect soils on Hill AFB would be analyzed for hazardous vs. non-hazardous determination. The suspect soils would be stored at sites operated in accordance with the requirements of 40 CFR 265 while analytical results are pending. Any soils determined to be hazardous would be eventually labeled, transported, treated, and disposed in accordance with federal and state regulations. Soil from the construction project would not be taken off base without prior 75 CEG/CEV approval.

Direct Effects Due to Operations

Based on information received during the scoping meeting held on June 2, 2008, no issues related to solid and hazardous waste were identified for operating the proposed action.

Indirect Effects

During scoping and the detailed analysis, no indirect effects related to solid and hazardous waste were identified for the proposed action.

Cumulative Effects

There are no cumulative solid or hazardous waste effects associated with the proposed action.

4.3.3 Predicted Effects to Biological Resources

4.3.3.1 Alternative A: No Action

With respect to biological resources, the no action alternative would have no direct effects, no indirect effects, and no cumulative effects.

4.3.3.2 Alternative B (Proposed Action): Construct a Photovoltaic Array

Direct Effects Due to Construction

- **Threatened or Endangered Species:** As stated in Section 3.3.3, no federal or state threatened or endangered species are known to occur on Hill AFB and no likely habitat for any such species would be disturbed by the proposed action. There are no natural wetlands or floodplains in the vicinity of the proposed action.
- **Construction:** During construction of the proposed action, some or all of the 62 trees described in Section 3.3.3 could be removed, and any birds using these trees would be displaced. The trees have a monetary value and provide an aesthetic value to the employees of Hill AFB. Grading and covering the site with gravel would eliminate forage for birds and displace several Northern Pocket Gophers. The potential for additional invasive species could increase following construction activities and

introduction of fill. Overall, the loss of habitat would not be significant, based on the small size of the proposed action and the low quality of forage and structure.

- The small isolated artificial wetland, which is not hydrologically connected to other waters, would be eliminated. Due to its extremely small size (100 square feet) and lack of any connection to other waters, it neither provides habitat of significance, nor would mitigation be required.
- **Mitigation:** The installers of the photovoltaic cells would attempt to retain as many trees as possible by not locating photovoltaic panels adjacent to the trees. However, any trees that could not be avoided, and would subsequently shade photovoltaic panels, would be removed. To mitigate the removal of the trees, new trees would be planted at a location approved by the Hill AFB natural resources manager in accordance with the Hill AFB tree removal and replacement plan (Hill 2006). The tree replacement policy is based on each tree's diameter at breast height (DBH). For example, if a tree with a DBH of 10 inches was removed, it would be replaced with 10 trees each with a one-inch DBH, or any combination of trees equivalent to the 10 inches DBH being removed.

If construction would occur during nesting season (usually April through August), an avian survey would be conducted, and an appropriate certificate of registration would be obtained to permit the taking of any protected species.

If invasive species were observed in the future gravel areas, they could be controlled by spraying herbicides in the affected areas.

Direct Effects Due to Operations

Operating the proposed action would not create any interaction with biological resources, and therefore, no effects to biological resources were identified.

Indirect Effects

During scoping and the detailed analysis, no indirect effects related to biological resources were identified for the proposed action.

Cumulative Effects

- **Construction:** Past human actions have produced a degraded habitat as measured by the indices described in Section 3.3.3. Construction of the proposed action is projected to reduce all indices to low scores, most likely near 0.20 or less. Overall, the loss of habitat would not be significant, based on the small size of the proposed action and the low quality of forage and structure. Hill AFB natural resources managers intend to mitigate the loss of any destroyed trees by planting new trees on the base. Significant cumulative effects to biological resources were not identified for the proposed action.
- **Operations:** Since no effects to biological resources were identified for operating the proposed action, no cumulative effects would exist.

4.3.4 Predicted Effects to Water Quality

4.3.4.1 Alternative A: No Action

With respect to water quality, the no action alternative would have no direct effects, no indirect effects, and no cumulative effects.

4.3.4.2 Alternative B (Proposed Action): Construct a Photovoltaic Array

Direct Effects Due to Construction

Based on the Hill AFB funding request that was prepared for the proposed action, the land area to be disturbed would be approximately seven acres in size. The proposed action would therefore be covered under Utah's general construction permit rule for stormwater compliance. Prior to initiating any construction activities, this permit must be obtained and erosion and sediment controls must be installed according to a stormwater pollution prevention plan (SWPPP). The SWPPP would specify measures to prevent soil from leaving the construction site on the wheels of construction vehicles, thereby controlling the addition of sediments to the storm drain system. The proponents would coordinate with the Hill AFB water quality manager (75CEV/CEGOC) prior to submitting an application for a Utah construction stormwater permit.

The SWPPP and Hill AFB construction specifications would require the contractor to restore the land to a non-erosive condition. All areas disturbed by excavation would be backfilled, and then either be covered by pavements, gravel, or re-planted, re-seeded, or sodded to prevent soil erosion.

Direct Effects Due to Operations

The proposed facility would be subject to Utah's general multi-sector permit rule for stormwater compliance. The *Hill AFB Stormwater Management Plan - Municipal Stormwater Permit* establishes good housekeeping measures and other best management practices to prevent contamination of runoff. Pond 4 serves as a detention pond for this area of the base, and this pond is checked for an oil sheen prior to stormwater being discharged by manually opening the outfall valve. Since the proposed action would convert seven acres of vegetation to gravel, some increase to stormwater runoff volume would be expected.

Indirect Effects

During scoping and the detailed analysis, no indirect effects related to water quality were identified for the proposed action.

Cumulative Effects

On-base and off-base water quality would be protected during and after construction activities. Hill AFB water quality managers monitor the capacity of the retention and detention ponds relative to projected inflows from the 24-hour, 100-year storm event. Pond 4 would be dredged and/or expanded to provide additional capacity if necessary, or additional stormwater facilities

would be constructed. There are no cumulative water quality effects associated with the proposed action.

5.0 LIST OF PREPARERS

Streamline Consulting, LLC

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Randal B. Klein, P.E., Project Manager

Environmental Restoration Section, 75 CEG/CEV

7274 Wardleigh Road, Hill AFB UT 84056

Kay Winn, NEPA Manager, (801) 777-0383

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Rudy Jones, Biologist, (801) 399-1858

Brandon Chard, Restoration Program Comments, (801) 775-6963

EMAssist, Inc.

7274 Wardleigh Road, Hill AFB UT 84056

Mark Kaschmitter, Air Regulatory Analysis, (801) 775-2359

6.0 LIST OF PERSONS AND AGENCIES CONSULTED

Environmental Restoration Section, 75 CEG/CEV

7274 Wardleigh Road, Hill AFB UT 84056

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Kay Winn, NEPA Project Manager, (801) 777-0383

Jaynie Hirschi, Archaeologist, (801) 775-6920

Marcus Blood, Natural Resources Manager, (801) 777-4618

Russ Lawrence, Biological Scientist, (801) 777-6972

Shannon Smith, Environmental Restoration Project Manager, (801) 775-6913

Mike Petersen, Water Quality Manager, (801) 775-6904

Glenn Palmer, Air Quality Manager, (801) 775-6918

Energy Management Office, 75 CES/CEEE

Dave Abbott, (801) 777-5944

SAIN Engineering Associates, Inc.

Dale Scott, (801) 777-3560

7.0 REFERENCES

BRAC 2007: *Utah Green House Gas Inventory*, Blue Ribbon Advisory Council on Climate Change (Utah Governor's Office), March 20, 2007.

CFR: *Code of Federal Regulations*, US Government Printing Office, Office of the Federal Register (various sections and dates).

DAQ 2006: *Division of Air Quality Annual Report for 2005*, Utah Division of Air Quality, 2006.

DAQ 2007: *State of Utah National Ambient Air Quality Standards, Areas of Non-Attainment and Maintenance (Updated July 2006)*, Utah Division of Air Quality Website, July, 2008.

Economic 2008: *Utah Labor Force: (Section 5 of the Utah Business & Economic Profile)*, Economic Development Corporation of Utah, January 31, 2008.

EPA 1991: *Nonroad Engine and Vehicle Emission Study - Report*, Table 2-07a, US Environmental Protection Agency, 1991.

EPA 1998: *National Air Pollutant Emission Trends, Procedures Document for 1900-1996*, US Environmental Protection Agency, Page 4-285, 1996.

Fleischmann 2006: *Geothermal Development Needs in Utah*, Fleischmann, Daniel J., Geothermal Energy Association, June 26, 2006.

Hill AFB: *Construction Specifications, Section 01000, General Requirements, Part 1, General, Section 1.24, Environmental Protection*, Hill AFB, UT, current version.

Hill 2006: *Integrated Natural Resources Management Plan*, Hill AFB, 2006.

Hill 2007a: *Integrated Cultural Resources Management Plan*, Hill AFB, 2007.

Hill 2007b: *2006 Annual Criteria and Toxic Pollutant Emission Inventory*, Hill AFB, April, 2007.

MRI 2006: *Background Document for Revisions to Fine Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors*, Midwest Research Institute, Project No. 110397, 2006.

NREL 2003: *Utah 50 Meter Wind Power*, National Renewable Energy Laboratory (Department of Energy), 2003.

Price 2007: *Hill Air Force Base Landfill Gas to Energy*, Price, Joe and David Abbott, GovEnergy Workshop, August 8, 2007.

Stantec 2007: *Hill AFB Stormwater Management Plan - Municipal Stormwater Permit*, Stantec Consulting, April, 2007.

WFRC 2003: *Natural Hazard Pre-Disaster Mitigation Plan, Utah's Wasatch Front*, Wasatch Front Regional Council, December 2003.

APPENDIX A

CULTURAL RESOURCES FINDING OF NO ADVERSE EFFECT



DEPARTMENT OF THE AIR FORCE
75TH CIVIL ENGINEER GROUP (AFMC)
HILL AIR FORCE BASE UTAH

9 July 2008

Dr. W. Robert James
Chief, Environmental Management Division
75th CEG/CEV
7274 Wardleigh Road
Hill Air Force Base, Utah 84056-5137

Mr. Wilson Martin
State Historic Preservation Officer
300 Rio Grande
Salt Lake City, Utah 84101

Dear Mr. Martin

Hill Air Force Base (AFB) is currently proposing to construct a photovoltaic array, providing Hill AFB with approximately 439,000 kilowatt hours per year of electricity from renewable sources. The Area of Potential Effect (APE) is approximately seven acres of property (Attachment 1, Area of Potential Effect for Proposed Photovoltaic Array). The proposed action would include installing twelve photovoltaic panels mounted on steel frames, mounting an inverter and electrical transformer on concrete pads, excavating and installing a 300 foot electrical duct to connect the array to an existing electrical distribution line, and grading the site. This is needed to support Hill AFB in its efforts to comply with the Energy Policy Act of 2005, Executive Order 13423, and the Energy Independence and Security Act of 2007, whereby each federal agency must increase the use of energy from renewable sources to achieve a minimum of 25 percent of the agency's total energy portfolio by the year 2025.

Within Hill AFB, three previous inventories have comprised cultural resources survey of 840 acres (U-91-WC-687m, U-95-WC-280p, and U-01-HL-0164m). Results from these projects include the recordation of one historic refuse dump (42Dv51) and two prehistoric isolates, all determined ineligible for listing in the National Register of Historic Places. Inventory efforts have resulted in the survey of 12.5 percent of the total area of Hill AFB. None of the previous inventories fall within the APE of the current proposed project.

Array development and associated infrastructure will encompass the entire APE of the current project. Given the lack of previous findings and the extensive development and disturbance of Hill AFB, the potential for archaeological historic properties is extremely low. However, if any archaeological resources are found during construction, ground-disturbing activities in the immediate vicinity will cease, the Hill AFB Cultural Resources Program will be notified, and the unanticipated discovery of archaeological deposits procedures shall be implemented with direction from the Hill AFB Cultural Resources Program and in accordance with the Hill AFB Integrated Cultural Resources Management Plan (Attachment 2, Unanticipated Discovery of Archaeological Deposits).

Therefore, Hill AFB has determined the proposed project will have no adverse effect to historic properties [36 CFR §800.4(d)(1)]. I request your concurrence in these determinations as specified in 36 CFR §800.

An Environmental Assessment has been prepared for the proposed photovoltaic array. If you would like a copy of this document to review, or should you or your staff have any questions about the project, please contact our archaeologist, Ms. Jaynie Hirschi, 75th CEG/CEVOR, at (801) 775-6920 or at jaynie.hirschi@hill.af.mil.

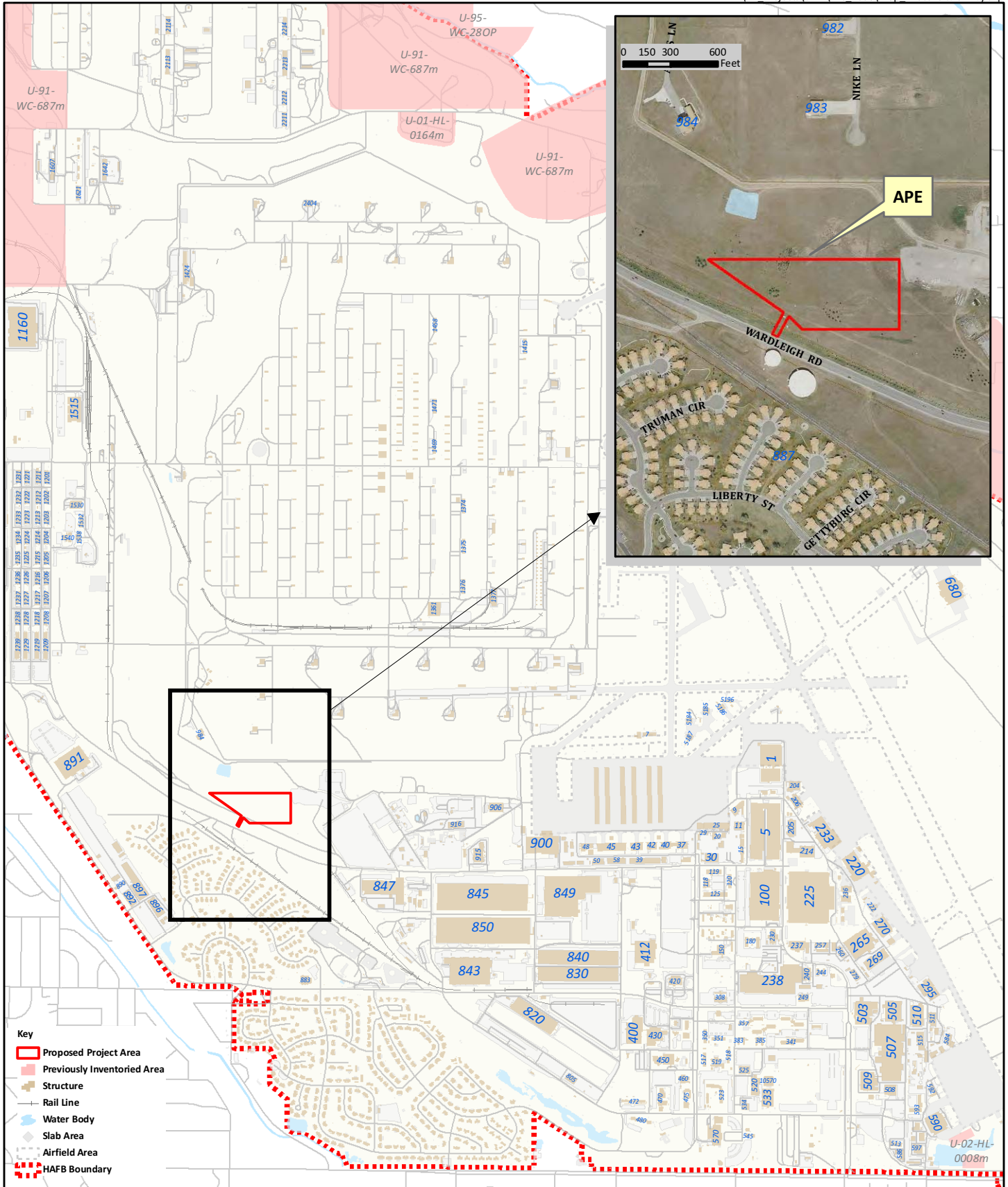
Sincerely

A handwritten signature in black ink, appearing to read "W. Robert James". The signature is fluid and cursive, with the first name "W. Robert" and last name "James" clearly distinguishable.

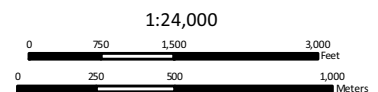
W. ROBERT JAMES, Ph.D., P.E.
Chief, Environmental Management Division
75th Civil Engineer Group

Attachments:

1. Area of Potential Effect for Proposed Photovoltaic Array
2. Unanticipated Discovery of Archaeological Deposits



Area of Potential Effects for the Proposed Photovoltaic Array Hill Air Force Base, Utah



Standard Operating Procedure

UNANTICIPATED DISCOVERY OF ARCHAEOLOGICAL DEPOSITS

APPLICABLE LAWS AND REGULATIONS

- ◆ National Historic Preservation Act
- ◆ National Environmental Policy Act
- ◆ Native American Graves Protection and Repatriation Act
- ◆ AFI 32-7065 (June 2004), *Cultural Resources Management Program*

OVERVIEW

All undertakings that disturb the ground surface have the potential to discover buried and previously unknown archaeological deposits. The accidental discoveries of archaeological deposits during an undertaking can include but are not limited to:

- ◆ Undiscovered/undocumented structural and engineering features; and
- ◆ Undiscovered/undocumented archaeological resources such as foundation remains, burials, artifacts, or other evidence of human occupation.

POLICY

When cultural resources are discovered during the construction of any undertaking or ground-disturbing activities, Hill AFB shall:

- ◆ Evaluate such deposits for NRHP eligibility.
- ◆ Treat the site as potentially eligible and avoid the site insofar as possible until an NRHP eligibility determination is made.
- ◆ Make reasonable efforts to minimize harm to the property until the Section 106 process is completed.
- ◆ **The BHPO will ensure that the provisions of NAGPRA are implemented first if any unanticipated discovery includes human remains, funerary objects, or American Indian sacred objects (see SOP #6).**

PROCEDURE

Step 1: Work shall cease in the area of the discovery (Figure 5-5). Work may continue in other areas.

- ◆ The property is to be treated as eligible and avoided until an eligibility determination is made. Hill AFB will continue to make reasonable efforts to avoid or minimize harm to

Further construction activities in the vicinity of the site will be suspended until an agreed-upon testing strategy has been carried out and sufficient data have been gathered to allow a determination of eligibility. The size of the area in which work should be stopped shall be determined in consultation with the **BHPO**.

the property until the Section 106 process is completed.

Step 2: Immediately following the discovery, the **Project Manager** shall notify the installation **BHPO**.

Step 3: The **BHPO** or a professional archaeologist shall make a field evaluation of the context of the deposit and its probable age and significance, record the findings in writing, and document with appropriate photographs and drawings.

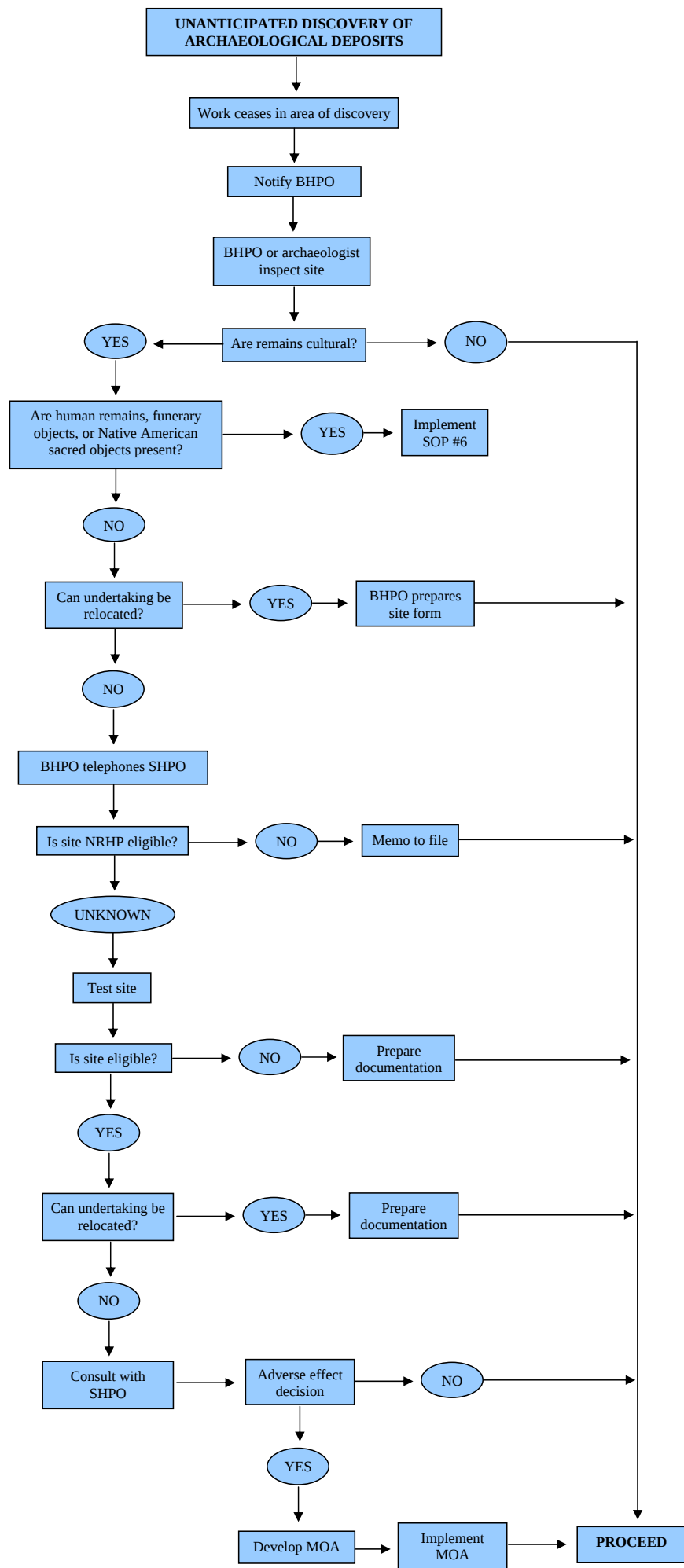
- ◆ If disturbance of the deposits is minimal and the excavation can be relocated to avoid the site, the **BHPO** will file appropriate site forms in a routine manner.
- ◆ If the excavation cannot be relocated, the **BHPO** shall notify the office of the **SHPO** to report the discovery and to initiate an expedited consultation.

The Section 106 review process is initiated at this point.

- ◆ If the deposits are determined to be ineligible for inclusion in the NRHP, then Hill AFB **BHPO** will prepare a memorandum for record and the construction may proceed.
- ◆ If the existing information is inadequate for an NRHP eligibility determination, Hill AFB **BHPO** shall develop an emergency testing plan in coordination with the SHPO.

Step 4: Hill AFB shall have qualified personnel conduct test excavations of the deposits to determine NRHP eligibility.

- ◆ Hill AFB BHPO, in consultation with the SHPO, will determine appropriate methodology for NRHP eligibility determination.
- ◆ If the SHPO and Hill AFB agree that the deposits are ineligible for inclusion in the NRHP, then work on the undertaking may proceed.
- ◆ If the deposits appear to be eligible, or Hill AFB and the SHPO cannot agree on the question of eligibility, then Hill AFB shall implement alternative actions, depending on the urgency of the proposed action.
 - Hill AFB may relocate the project to avoid the adverse effect.
 - Hill AFB may request the Keeper of the National Register to provide a determination.
 - Hill AFB may proceed with a data recovery plan under a MOA developed in coordination with the SHPO and possibly the ACHP and interested parties.
 - **Hill AFB may request comments from the ACHP and may develop and implement actions that take into account the effects of the undertaking on the property to the extent feasible and the comments of the SHPO, ACHP, and interested parties. Interim comments must be provided to Hill AFB within 48 hours; final comments must be provided within 30 days.**





State of Utah

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

Department of Community and Culture

PALMER DePAULIS
Executive Director

State History

PHILIP F. NOTARIANNI
Division Director

July 25, 2008

Jaynie Hirschi, Archaeologist
75th CEG/CEFOR
7274 Wardleigh Road
Hill Air Force Base UT 84056-5137

RE: Photovoltaic Array Project, Hill Air Force Base

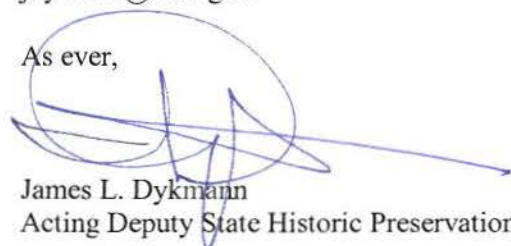
In Reply Please Refer to Case No. 08-1186

Dear Ms Hirschi:

The Utah State Historic Preservation Office received your request for our comment on the above-referenced project on July 10, 2008. From the information you provided, it appears that no cultural resources were located in the project Area of Potential Effects. We concur with your determination of **No Historic Properties Affected** for this project.

This letter serves as our comment on the determinations you have made, within the consultation process specified in §36CFR800.4. If you have questions, please contact me at (801) 533-3555 or jdykman@utah.gov.

As ever,



James L. Dykman
Acting Deputy State Historic Preservation Officer - Archaeology



UTAH STATE HISTORICAL SOCIETY
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