UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

October 30, 2006

Dr. Craig Foltz
ATST Program Manager
National Science Foundation
Division of Astronomical Sciences
4201 Wilson Boulevard, Room 1045
Arlington, VA 22230

Subject: Draft Environmental Impact Statement (DEIS) for the Advanced Technology Solar Telescope (ATST), Haleakala, Maui, Hawaii (CEQ# 20060368)

Dear Dr. Foltz:

The U.S. Environmental Protection Agency (EPA) has reviewed the above-referenced document pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act.

The National Science Foundation (NSF) proposes to construct the Advanced Technology Solar Telescope (ATST) and support buildings within the 18.166-acre University of Hawaii Institute for Astronomy (IfA) Haleakala High Altitude Observatories (HO) site at the summit of Mount Haleakala on the Island of Maui, Hawaii. The ATST would be the world's largest optical solar telescope and would be housed in a 143-foot tall structure.

Based on our review, we have rated the DEIS as Environmental Concerns – Insufficient Information (EC-2) (see enclosed "*Summary of Rating Definitions*"). EPA recognizes the scientific importance of the ATST on Mount Haleakala and we support the decision to complete an EIS. EPA is concerned that the NSF has not fully acknowledged the significance of impacts on the affected environment and has not provided sufficient detail regarding mitigation measures in the DEIS. EPA believes there should be identification and commitment to mitigation before the adverse impact is considered reduced to a level of less significance. EPA is concerned about the negative impacts associated with locating additional structures on a site that is considered to be sacred to the Native Hawaiians. EPA is also concerned about direct impacts on Haleakala National Park (HALE); cumulative impacts due to construction and traffic; and impacts on endangered species, particularly the `ua`u (Hawaiian petrel).

The Final Environmental Impact Statement (FEIS) should include more information on the mitigation proposed for the affected environment and details of any Memorandum of Agreement (MOA) which may be implemented at a later date. EPA recommends that a conceptual mitigation plan be developed and be agreed upon by the agencies involved. EPA also

recommends that the NSF consider adopting a formal adaptive management plan to ensure implementation of mitigation measures. If an Environmental Management System (EMS) has not been implemented, EPA recommends that the NSF consider this. Mitigation measures should be included as a component of the EMS to ensure implementation and re-evaluation.

We appreciate the opportunity to review this DEIS. When the FEIS is released for public review, please send one (1) hard copy to the address above (mailcode: CED-2). If you have any questions, please contact me at (415) 972-3843 or Ann McPherson, the lead reviewer for this project. Ann can be reached at (415) 972-3545 or mcpherson.ann@epa.gov.

Sincerely,

/s/Laura Fujii for

Enrique Manzanilla, Director
Communities and Ecosystems Division

Enclosures: Summary of EPA Rating Definitions
Detailed Comments

US EPA DETAILED COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE ADVANCED TECHNOLOGY SOLAR TELESCOPE, HALEAKALA, MAUI, HAWAII, OCTOBER 30, 2006

1. Project Description

The National Science Foundation (NSF) proposes to construct the Advanced Technology Solar Telescope (ATST) within the 18.166-acre University of Hawaii Institute for Astronomy (IfA) Haleakala High Altitude Observatories (HO) site near the summit of Mount (Mt.) Haleakala on the Island of Maui, Hawaii. The ATST would be the world's largest optical solar telescope and would be housed in a 143-foot tall structure, supported by caissons extending a maximum of 20 feet down into the basalt bedrock. During the site selection process, 72 sites from around the world were evaluated. The HO was determined to be the only site capable of meeting or exceeding specified scientific criteria.

Three alternatives were considered in the Draft Environmental Impact Statement (DEIS): 1) Mees Site at the HO (Proposed Action); 2) Reber Circle at the HO; and 3) No-Action Alternative, which would mean that the ATST would not be constructed. The HO contains several existing observatories and other structures including the Air Force Maui Space Surveillance System; the Faulkes Telescope; the MAGNUM and Subaru Observatories; and the University of Hawaii's Mees Solar Observatory. The HO is located about 0.3 miles from the summit of Mt. Haleakala, which is in Haleakala National Park (HALE). The HO is not located within the perimeter of HALE, although access to the HO is through the HALE.

2. Concern about Significance of Impacts and Lack of Detailed Discussion about Mitigation

EPA is concerned that the NSF has not fully acknowledged the significance of impacts on the affected environment or included detailed discussion about mitigation within the DEIS. EPA believes that there should be identification and commitment to mitigation before the adverse impact is considered reduced to a level of less significance.

Mitigation is discussed, briefly and conceptually, in Section 4.18 (pgs. 4-78 through 4-87). However, Section 4.18 lacks details of specific mitigation measures that will be implemented. Mitigation measures are also discussed in The Archaeological Field Inspection (Xamanek Researchers, LLC, 2005) and Section 9.3.2 of the University of Hawaii IfA HO Long Range Development Plan (KC Environmental Inc., 2005). For example, the IfA maintains a program that includes "Sense of Place" training for everyone working at HO, coordination with and oversight by a cultural specialist for all construction projects, and areas set-aside for exclusive use by *Kanaka Maoli* (indigenous Hawaiian people) to practice cultural and spiritual ceremonies (pg. 3-7). Although these mitigation measures may have been implemented, EPA believes additional mitigation measures should be considered given the significant cumulative effects of the proposed ATST.

Recommendation:
EPA recommends that additional mitigation measures be considered for impacts to:

1) Native Hawaiian community
    a. Historic and cultural resources;
    b. Environmental justice;
    c. Visual resources and view plane;
2) Haleakala National Park
    a. Haleakala Crater Road – Maintenance and Section 106 compliance;
    b. Personnel for traffic control, inspection of vehicles/equipment/material for invasive species;
    c. Personnel for additional monitoring programs; and
3) Endangered species.

Recommendation:
EPA recommends that the NSF identify and commit to mitigation before the adverse impact is identified as reduced to a level of less significance. This comment is applicable to the following categories of affected environment:

a. Historical and cultural resources (See number 3)
b. Roadways and traffic (See number 4)
c. Topography, geology, and soils (See number 5)
d. Visual resources and view plane (See number 6)
e. Endangered species (See number 7)

3. Historical and Cultural Resources - National Historic Preservation Act (NHPA) - Compliance with Section 106 (3-14)

a. Mt. Haleakala/Section 106 Compliance

Haleakala is considered to be a sacred site that holds strong cultural, traditional, and religious significance to the Hawaiian people. Numerous archaeological sites have been recorded on the crest and in the crater of Mt. Haleakala. The cultural resources associated with Haleakala date back more than a thousand years and are an integral part of the Hawaiian culture, both past and present (pg. 3-6).

The NSF is required to initiate Section 106 review as a result of the National Historic Preservation Act (NHPA). The State Historic Preservation Officer (SHPO) coordinates the State's historic preservation program and consults with agencies during a Section 106 review. The NSF must also consult with all interested Native Hawaiian organizations. Informal consultations with the Native Hawaiian community were initiated in January 2005 and formal consultation meetings were held in March 2006 and May 2006. During the course of Section 106 consultations, the issue of "cultural desecration" was raised due to the excavation of material from Haleakala; the caissons which extend up to 20 feet into the basalt bedrock; and the 143-foot tall structure which would mar the view of the mountain.

We recognize the efforts to receive input from Native Hawaiian organizations regarding the proposed location and construction of the ATST. The consultations with Native Hawaiian organizations have resulted in NSF arriving at a finding of "adverse effect" to the cultural and historic resources of Haleakala, should the ATST be constructed at HO (page 3-8). NSF also arrived at a finding that the summit area of Haleakala constitutes a Traditional Cultural Property (TCP) "that is eligible for inclusion in the National Register of Historic Places (NRHP) because of its association with cultural practices or beliefs of a living community." The NSF is in the process of working with the Native Hawaiian organizations and local communities to mitigate adverse effects. NSF is hopeful that this process will culminate in a Draft Memorandum of Agreement (MOA) with the affected communities.

Recommendation:
EPA recommends that the NSF discuss and implement additional mitigation measures to address the historical and cultural resource effects of the ATST. The FEIS should discuss in detail all activities associated with compliance in conjunction with the NHPA. The FEIS should include information about the Section 106 process, consultations with the Native Hawaiians, and references to any MOA which might be implemented at a later date. EPA is supportive of an MOA to address the adverse effects of the proposed project.

Recommendation:
EPA recommends that the FEIS describe suggestions from Native Hawaiians and local communities and the ways in which the agency will respond to these concerns. Resolution strategies and mitigation plans should be discussed in detail. Mitigation measures could include funding for Hawaiian cultural educational programs, improved cultural centers, and research on sacred sites within HO.

Recommendation:
The NSF identifies the impact to historic and cultural resources as being "*Significant but Mitigable to Less Than Significant*" within the DEIS (pgs. 4-6, 7). EPA recommends the impact be identified as "*Significant*" because no agreement on the level of significance or mitigation has been reached. The terms of agreement and mitigation must be discussed and agreed upon with the Native Hawaiian communities, SHPO, and the ACHP before this issue can be resolved.

<u>b. Haleakala Crater Road/Section 106 Compliance</u>

The Haleakala Crater Road was constructed in the 1930's and is approximately 21.3 miles in length. This road has been evaluated by the National Park Service (NPS) and Historic American Engineering Record (HAER) and deemed eligible for listing in the NRHP under Criterion A and Criterion C.

Recommendation:
EPA recommends that NSF conduct Section 106 consultations with the NPS, HALE, and the SHPO.

4. Direct, Indirect, and Cumulative Impacts due to Construction and Traffic on NPS Roads

The Haleakala Crater Road (State Road 378) is a two lane highway, approximately 21.3 miles in length, with steep inclines and numerous switchback curves (at least 32). The Haleakala Crater Road is the only route to the summit of Haleakala (10,023 feet) and is one of the fastest ascending roads in the world. The road becomes an NPS owned and operated road at the entry to HALE. The State of Hawaii Department of Transportation (HDOT) conducted a 24-hour survey of traffic volume on Haleakala Crater Road in April 2003. The traffic volume totaled 1,616 vehicles in a 24-hour period (pg. 3-40). The DEIS does not specifically discuss or analyze the direct, indirect, or cumulative impacts of heavy construction vehicles or increased traffic on the park road. The DEIS discusses potential damage to the HO roadways but fails to discuss damage to the HALE roadway (pg. 4-44). The NSF identifies construction related impacts on roadways and traffic as being "*Less Than Significant*". Mitigation measures suggested by the NSF include coordinating construction-related projects and traffic with affected parties and carpooling (pg. 4-84).

Recommendation:
EPA is concerned about traffic impacts on the Haleakala Crater Road and believes that construction of the project could directly impact HALE, Haleakala bicycle tours, visitors to HALE, and workers at HO. EPA recommends that HALE complete their Draft Traffic Management Plan (pg. 3-40) and then discuss potential mitigation measures with the NSF. Road modifications may be required to accommodate heavy construction equipment and increased traffic and to ensure safety on the roadway. Operators of the Haleakala bicycle tours should also be included in these discussions. Additional signage regarding construction traffic will need to be posted.

Recommendation:
EPA recommends the impact be identified as "*Significant*" until mitigation has been discussed and agreed upon.

5. Topography, Geology and Soils - Excavation of Soils and Reconstruction of Pu`u Kolekole Cone

Construction of the ATST would require extensive excavation. The NSF plans to place excess soil at different locations in HO. One option under consideration is restoring *Pu`u Kolekole* (at Reber Circle) from its present truncated cone shape to a closely rounded natural appearance by increasing the height of the cone by approximately 24 feet. NSF asserts that this could be viewed as a beneficial impact (page 4-19) and classifies the action as having "*Less Than Significant Impact*" on the topography, geology, and soils.

During the course of Section 106 discussions, the issue of "cultural desecration" due to excavation of Haleakala's material was raised. The Native Hawaiian people may have objections to the reconstruction of the *Pu`u Kolekole* cone for cultural or spiritual reasons. HALE personnel

should also be consulted because of their expertise in geological history, restoration, public education, and stewardship.

Recommendation:
EPA recommends that the NSF consult with Native Hawaiians organizations and HALE personnel concerning the reconstruction of the *Pu`u Kolekole* cone. We recommend the FEIS describe and evaluate other soil placement alternatives.

Recommendation:
EPA questions whether the reconstructed hill will look natural and be stable, especially since there will be no internal bonding between the excavated soil and the underlying cone. Soil erosion may be an issue of concern as well.

Recommendation:
EPA recommends the level of significance be identified as "*Significant*" until a suitable plan for the removal of excavated soil is agreed upon.

6. Visual Resources and View Plane

Currently, the tallest telescope at HO is 110-feet tall and was completed in 1994. It is easily seen with the unaided eye from most areas within the Central Valley and from some windward and leeward communities. In addition, two white 50-foot domes built in 1965 are also visible from many of these areas (pg. ES-11). The NSF does not consider the visual effects of the construction of a 143-foot tall structure as significant.

The Native Hawaiians consider the construction of the ATST to be a cultural desecration of a sacred site. Specific objections from the Native Hawaiian communities include: 1) the excavation of material from Haleakala; 2) the caissons which would extend 20 feet down into the basalt bedrock and support the telescope; and 3) the construction of a 143-foot tall structure which would mar the view of the mountain. Some of the Native Hawaiians would find the foundation excavation to be a "wound" to Haleakala. Part of the cultural value of the summit area is the ability to see only mountain when viewing the summit area of Haleakala.

Recommendation:
The impact of the proposed ATST on visual resources and view plane is significant to the Native Hawaiian people. The identification of visual impacts in the FEIS should be considered "*Significant*" until there is a commitment to and description of mitigation that would result in a "*Less Than Significant"* level of impact.

7. Endangered Species

Three federal- and state-listed animal species occur in the summit area and slopes of Haleakala. These are the *`ua`a*, or Hawaiian petrel, the *nene* (Hawaiian goose), and the *`ope`ape`a* (Hawaiian hoary bat). The *`ua`u* is the only seabird that is federally listed as an endangered species. Once numerous throughout the Hawaiian Islands, the species is now confined to higher elevations, and most of the population resides within HALE boundaries. HALE biologists have been conducting regular monitoring and searches of *`ua`u* nests since 1988. The *`ua`u* reside at the Haleakala colony from February through October of each year and are absent from November through January. The birds make their nests in burrows and tend to use the same burrow year after year. Biologists report that there are *`ua`u* burrows along the perimeter and in the proximity of HO (Appendix I, page 2).

Although NSF describes adverse impacts to *'ua 'u*, construction-related impacts are identified as "*Less Than Significant Impact*" (pg. 4-12; pg 4-16). The DEIS states that construction activities could induce ground vibration that could disrupt resident avifaunal resources at HO, adversely affecting *`ua`u* nesting and fledging success (pg. 4-12); and that construction noise, vibration, or human proximity could impact the nesting habits of the *`ua`u* to the extent that they may not return to, remain in, or otherwise utilize the burrows that are inhabited each year (pg. 4-13).

Recommendation:
Given the above potential impact of the proposed ATST on the *`ua`u*, it is likely these effects could be significant. The FEIS should identify these effects as "*Significant"* until additional mitigation measures are described which would reduce the adverse effects to *"Less Than Significant."*

Recommendation:
EPA supports monitoring. We understand that the NSF has undertaken a monitoring program to minimize potential consequences of construction and to increase scientific understanding of the *`ua`u*. The NSF should work closely with biologists at HALE and the U.S. Fish and Wildlife Service (FWS) to ensure that the video surveillance does not adversely impact this endangered species.

8. Environmental Justice

The DEIS contains a very short Environmental Justice discussion regarding the potential environmental health risks to children. However, this discussion does not evaluate other potential disproportionate impacts to low-income or minority populations. Given the gradual loss of integrity of the cultural resources of Haleakala and the underlying significance of these resources to Native Hawaiians, the Proposed Action would appear to constitute a cumulative and disproportionate impact to a minority population[1].

[1] "Disproportionately high and adverse environmental effects: When determining whether environmental effects are disproportionately high and adverse, agencies are to consider the following….factors to the

Recommendation:
The FEIS should include a more thorough and detailed analysis of impacts on the Native Hawaiians, a minority population. The NSF should conduct an Environmental Justice Screening Analysis to more clearly and thoroughly bring into focus the environmental justice impacts of the Proposed Action. (See Toolkit for Assessing Allegations of Environmental Injustice. USEPA Enforcement and Compliance Assurance, EPA 300-R-04-002, November 2004).

9. Selection of Alternatives

The list of 72 sites under consideration for the ATST is located in table 1, Appendix J. This list was reduced to six sites after a preliminary evaluation. However, there is no further discussion regarding the 72 sites and the process and criteria used to evaluate or rank them as suitable sites for the ATST.

Recommendation:
The FEIS should describe the process and criteria to evaluate alternative sites. The FEIS should explain why the alternative sites do not meet the site selection criteria. If the sites were ranked, then the ranking system should be explained and the ranks should be included in table 1. Providing a description of the site selection process and criteria would lend credence to selection of the HO site as the only viable site of the 72 sites considered. For instance, the FEIS should describe why the Mauna Kea and Mauna Loa sites on the Big Island, Hawaii, were not recommended for further consideration.

Recommendation:
One of the six sites selected for further consideration (pg. 2-4) was Sacramento Peak, New Mexico (NM) which does not appear in the table 1, Appendix J. It appears that Sacramento Peak, NM site may be cross-referenced as Sunspot, NM in this table. Consistent site names should be used throughout the EIS.

10. Implementation of Adaptive Management

Adaptive management is an iterative process that requires selecting and implementing management actions, monitoring, comparing results with management and project objectives, and using feedback to make future management decisions. The process recognizes the

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extent practicable: (a) Whether there is or will be an impact on the natural or physical environment that significantly (as employed by NEPA) and adversely affects a minority population, low-income population, or Indian tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on natural or physical environment…." P. 26, Environmental Justice Guidance Under the National Environmental Policy Act, Council on Environmental Quality, 1997.

importance of continually improving management techniques through flexibility and adaptation instead of adhering rigidly to a standard set of management actions. Although adaptive management is not a new concept, it may be relatively new in its application to specific projects. As stated in a recent CEQ report, Modernizing NEPA, the effectiveness of adaptive management monitoring depends on a variety of factors including:

a) The ability to establish clear monitoring objectives;
b) Agreement on the impact thresholds being monitored;
c) The existence of a baseline or the ability to develop a baseline for the resources being monitored.
d) The ability to see the effects within an appropriate time frame after the action is taken;
e) The technical capabilities of the procedures and equipment used to identify and measure changes in the affected resources and the ability to analyze the changes;
f) The resources needed to perform the monitoring and respond to the results.

Recommendation:
EPA recommends that the NSF consider adopting a formal adaptive management plan to ensure implementation of mitigation measures and to provide flexibility to meet changing research needs. Action alternatives would incorporate the principles of adaptive management by using monitoring and evaluation to determine if management actions were achieving objectives and adjusting actions accordingly. EPA recommends that the NSF review the specific discussion on Adaptive Management in the NEPA Task Force Report to the Council on Environmental Quality on Modernizing NEPA.