Final Environmental Impact Statement
for the
Restrictive Easement
Kauai, Hawaii

October 1993

U.S. Army Space and Strategic Defense Command
Environmental Office, CSSD-EN-V
P.O. Box 1500
Huntsville, AL 35807-3601
Executive Summary
EXECUTIVE SUMMARY

This Environmental Impact Statement (EIS) has been prepared in accordance with Hawaii Revised Statutes (HRS), Chapter 343, that implements Environmental Impact Rules, Title 11, Chapter 200, Hawaii Administrative Rules, Department of Health.

PROJECT DESCRIPTION

The U.S. Government proposes to acquire a restrictive easement of approximately 854 hectares (2,110 acres) on State of Hawaii and Kekaha Sugar Company land adjacent to the U.S. Navy Pacific Missile Range Facility (PMRF), Barking Sands, Kauai. The objective is to provide the protection of all persons, private property, and vehicles during Vandal launches and Strategic Target System launches conducted by the U.S. Government. The restrictive easement would give the U.S. Government the authority to restrict access to the land within the ground hazard area prior to, during, and shortly after a launch. In order to support planned launch activities, the U.S. Government is requesting the restrictive easement for a 9-year period beginning on January 1, 1994.

ALTERNATIVES

Two alternatives to the proposed action have been identified and are discussed in the EIS. They are a revision to the Memorandum of Agreement and no action. The current Memorandum of Agreement with the State of Hawaii, the Kekaha Sugar Company, and the lessee of the state land within the ground hazard area would be renewed for a 9-year period beginning in January 1994. The use of the land, time and duration of use, and clearance procedures within the ground hazard area would be the same as described under the proposed action. Under the no-action alternative the U.S. Government would not acquire a restrictive easement. This alternative assumes that the land within the restrictive easement boundary would remain in the current sugar cane and recreational uses.

Two other alternatives were identified but eliminated from further consideration. They are the Department of Defense acquisition of or trade for the land and a 1-year easement each year for 9 years. Alternatives regarding a launch location other than the PMRF and booster types other than the Polaris A3 have been addressed in the Strategic Target System EIS.

ENVIRONMENTAL CONSEQUENCES AND MITIGATIONS

Geology and Soils

No physical changes to the environment within the restrictive easement are anticipated. Establishment of the restrictive easement would limit new development, thereby maintaining the current physiographic conditions. Launch-related activities within the ground hazard area would not significantly impact geology or soil resources. No short- or long-term impacts would occur from the proposed action. Although no impacts are anticipated, the U.S. Navy would conduct a baseline survey for possible lead contamination around the Vandal launch site and perform periodic monitoring of the site.
Water Resources

No new development that would affect water resources within the restrictive easement is planned. Launch-related activities within the ground hazard area would not impact water resources. No impacts to water resources are anticipated since the implementation of the restrictive easement does not involve this resource directly or indirectly.

Air Quality

Emissions from helicopter and launch-related activities may slightly degrade local air quality, but impacts to air quality would be negligible, temporary, and not significant. Due to the intermittent and small number of sweep-and-search occurrences and launches, no change to the current attainment status in the region would occur. Launch-related impacts have been addressed in the Strategic Target System EIS.

Biological Resources

The only direct mission-related activity that would occur over the easement area with the potential for impacts would be intermittent helicopter flights to ensure clearance prior to launches. The proposed easement area would continue to be used for agricultural and public recreational purposes. Launch-related activities within the ground hazard area would not impact biological resources. Helicopter and launch noise could cause a startle effect on wildlife in the area, but no significant impacts are expected.

Cultural Resources

Land uses within the restrictive easement area and ground hazard area would remain unchanged from current purposes, and no new construction is planned under the proposed action. With the exception of the placement of warning signs throughout the easement area, no ground-disturbing activities or other activities with the potential to adversely affect significant cultural resources sites or burial grounds would take place. To ensure that there are no adverse effects on the traditional and customary rights and practices of native groups, those concerns related to program activities expressed by such groups or individuals would be addressed through consultation with the Department of Land and Natural Resources State Historic Preservation Division, the Office of Hawaiian Affairs, and Hui Malama I Na Kupuna 'O Hawai'i Nei; any required mitigation measures within the easement area and ground hazard area would be determined through that process. As a result, no significant impacts would occur. Launch-related impacts have been addressed in the Strategic Target System EIS.

Visual Resources

With the exception of signs advising the public of the existence of the ground hazard area, no new development would occur as part of the restrictive easement. Launch-related activities within the ground hazard area would not impact visual resources. The visual character of the area would be maintained, and no significant impacts would occur.
Noise

Noise from helicopters used in pre-launch support activities would intermittently increase the level of noise in the restrictive easement area, but this impact would be temporary and similar to other noise levels experienced in the region of influence. Launch-related activities within the ground hazard area would not result in significant noise impacts.

Hazardous Materials and Waste

There are no known hazardous material/waste sites within the restrictive easement boundary, and no new hazardous materials would be introduced. The ground hazard area within the PMRF will contain hazardous fuels, oxidizers, and other materials associated with the Vandal and Strategic Target System launch activities. The area within the ground hazard area may be impacted by hazardous materials as a result of an unlikely early flight termination. Hazardous wastes resulting from early flight termination would be cleared from the area in accordance with cleanup procedures described in the Strategic Target System Draft and Final EISs. No significant impacts are expected to occur.

Health and Safety

Health and safety measures would be taken to ensure that the land within the ground hazard area would be clear of the public during launches from the Kauai Test Facility and the PMRF. Clearing this area would ensure that no injuries would occur to the public in the unlikely event of an early flight termination. Impacts to health and safety would not be significant.

Infrastructure

The activities associated with the restrictive easement would not affect local utilities. For transportation, road control points would be established at the northern and southern portions of the restrictive easement boundary at Polihale State Park and at the intersection of Kao Road and Lower Saki Mānā Road. Kao Road, a county-owned road that provides access from State Highway 50 to Lower Saki Mānā Road, would not be closed. Launch-related activities within the ground hazard area would not impact infrastructure. There would be separate control points for the Vandal and Strategic Target System ground hazard areas. No significant impacts are expected to transportation due to the short total closure period of approximately 15 hours per year.

Socioeconomics

The restrictive easement is not expected to place the State of Hawaii in a disadvantageous position in lease negotiations with the Kekaha Sugar Company or other potential sugar cane producers. Lease of land within the restrictive easement for diversified crops other than sugar cane would also have negligible impacts on the agricultural value of the land or the lease rates obtained by the state. The easement is not expected to be a factor in curtailing future resort development or tourism growth on the island. Launch-related activities within the ground hazard area would not impact socioeconomics. No significant impacts are expected.
Recreation

The state park area within the restrictive easement boundary to be cleared during launch activities does not contain any developed campsites or picnicking areas. People within the easement boundary would need to move to the north end of the state park so that the area within the easement boundary would be clear from 20 minutes prior to launch until the Range Safety Officer gives clearance to reenter the area. People traveling to and from the state park would be stopped at the control points at the easement boundary during the time that area would be closed. Overall, the establishment of a restrictive easement is compatible with the use of the area as a state park because it preserves the natural, scenic, historic, and wildlife value and recreational nature of the property. Launch-related activities within the ground hazard area would not impact recreation. No significant impacts would occur.

COMPATIBILITY WITH LAND USE PLANS AND POLICIES AND LISTING OF PERMITS OR APPROVALS

The proposed project is generally compatible with the applicable Hawaii State Plan and various State Functional Plans, State Land Use Laws, the Kauai General Plan, the Waimea-Kekaha Regional Development Plan, the Hawaii Coastal Zone Management Program, and Kauai County Special Management Areas.

The only necessary approval for the proposed action is the acceptance of the Final EIS by the Hawaii Department of Land and Natural Resources and the Board of Land and Natural Resources.

UNRESOLVED ISSUES

There are no unresolved issues related to the proposed action.
# ACRONYMS AND ABBREVIATIONS

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<th>Symbol</th>
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<tr>
<td>$\mu g/m^3$</td>
<td>microgram(s) per cubic meter</td>
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<td>ac</td>
<td>acre(s)</td>
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<tr>
<td>ALISH</td>
<td>Agricultural Lands of Importance to the State of Hawaii</td>
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<tr>
<td>ARPA</td>
<td>Archaeological Resources Protection Act</td>
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<tr>
<td>BMDO</td>
<td>Ballistic Missile Defense Organization</td>
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<td>C</td>
<td>Celsius</td>
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<td>CFR</td>
<td>Code of Federal Regulations</td>
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<td>cm</td>
<td>centimeter(s)</td>
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<tr>
<td>dBA</td>
<td>A-weighted decibel level</td>
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*Restrictive Easement Final EIS*
KTF  Kauai Test Facility
m    meter(s)
mi   mile(s)
MSL  Mean Sea Level
NAAQS National Ambient Air Quality Standards
NAGPRA Native American Graves Protection and Repatriation Act
NEPA National Environmental Policy Act
NHPA National Historic Preservation Act
NOA Notice of Availability
OEOC Office of Environmental Quality Control
OHA Office of Hawaiian Affairs
PIA Primary Impact Area
PM-10 Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 microns
PMRF Pacific Missile Range Facility
ppm part(s) per million
ROI Region of Influence
USASSDC U.S. Army Space and Strategic Defense Command
USDA U.S. Department of Agriculture
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The Restrictive Easement Environmental Impact Statement (EIS) describes the proposed action and alternatives and their potential environmental consequences. This EIS is organized into the following sections:

- Program Overview
- Proposed Action and Alternatives
- Environmental Setting
- Environmental Consequences
- Relationship of the Proposed Action to Land Use Plans, Policies, and Controls for the Affected Area
- List of Preparers
- Glossary
- Consultation Comments and Responses
- Draft Environmental Impact Statement Comments and Responses
- References
- Distribution

1.1 BACKGROUND

The U.S. Navy Pacific Missile Range Facility (PMRF) is located on the west side of the Island of Kauai and encompasses approximately 779 hectares (ha) (1,925 acres [ac]). The PMRF is an important test range for U.S. Navy fleet training and test and evaluation programs and also supports research for missile defense programs from the Kauai Test Facility (KTF) located on the north portion of the PMRF. The KTF is operated by Sandia National Laboratories for the U.S. Department of Energy (DOE) as a tenant of the PMRF. The first launch from the PMRF and KTF took place from the KTF in 1962. Since 1962 the KTF has launched more than 300 missiles. With the introduction of new programs and requirements, the PMRF began to launch the Vandal, and the KTF began to launch the Strategic Target System vehicle, both of which require the clearance of the public for safety purposes from a ground hazard area on land adjacent to the facility. This area consists of Polihale State Park, land currently leased from the state, and land owned by the Kekaha Sugar Company. To date, the clearance of this land has been through a Memorandum of Agreement between the U.S. Government, the State of Hawaii, and the Kekaha Sugar Company. This Memorandum of Agreement, along with the Kekaha Sugar Company lease from the state, expires on December 31, 1993. In order to continue missile defense research, naval fleet training, and test and evaluation at the PMRF and KTF, the U.S. Government is requesting restrictive easements from the State of Hawaii and the Kekaha Sugar Company to allow clearing of the public from land adjacent to the PMRF during missile launch activities after expiration of the Memorandum of Agreement. For the purposes of this document the term "restrictive easement" covers both easements being requested from the State of Hawaii and the Kekaha Sugar Company.
The difference between the proposed restrictive easement and the existing Memorandum of Agreement is that the Memorandum of Agreement does not restrict or require U.S. Government consent for new development or land uses in the ground hazard area, and no fee (or a smaller fee for the reduced rights) is paid for use of the area by the U.S. Government. Under the proposed restrictive easement, new development would require the consent of the U.S. Government, and a fee would be paid for the rights acquired under the restrictive easement. Under both the Memorandum of Agreement and the easement, the U.S. Government has the right to exercise control over access to and use of the area covered by the respective documents during launch activities. However, since an easement conveys a more clearly established property interest during the periods it is exercised, it provides clearer authority to exercise control over the ground hazard area during launch activities to protect the public.

Under the provisions of the current Memorandum of Agreement, the U.S. Army Space and Strategic Defense Command (USASSDC) cleared the ground hazard area for the February 1993 launch of the Strategic Target System missile. As part of the continuing environmental program for this project, the USASSDC conducted environmental monitoring to verify analyses in the Strategic Target System Draft and Final EISs. These EISs were prepared to assess the environmental consequences of activities associated with the launch of the Strategic Target System from the KTF in accordance with the National Environmental Policy Act (NEPA). The environmental monitoring program involved air quality and noise monitoring; water, soil, and vegetation sampling; and marine and cultural resource surveys. All procedures to ensure the safety of the public and property as well as the environment within the ground hazard area were determined to be in place just prior to, during, and after launch.

Monitoring results for all resources indicated no significant effects from the February 26, 1993, launch of the Strategic Target System missile. Air quality results showed that no air quality standards were exceeded outside the ground hazard area, and noise levels were similar to those expected based on the modeling conducted for the Strategic Target System EIS. Water, soil, and vegetation samples showed no detectable adverse impact from hydrogen chloride from the Strategic Target System launch. Variations between pre- and post-launch chloride and pH values were within a range consistent with ambient ranges of variation. The only observable effect of the launch was temporary leaf discoloration of the kaiwe vegetation immediately adjacent to the launch pad; however, review of the area 4 months after launch showed that recovery has occurred. There were no effects to marine or cultural resources as a result of the February launch. The monitoring results confirmed that no significant impacts to the human or natural environment occurred as a result of the launch of the Strategic Target System missile. Monitoring results are available in the Environmental Monitoring Program for the 26 February 1993 Launch of the Strategic Target System, Pacific Missile Range Facility, Kauai, Hawaii (U.S. Army Space and Strategic Defense Command, 1993a).

1.2 PURPOSE OF AND NEED FOR THE ACTION

The purpose of this action is to acquire a restrictive easement for a 9-year period beginning on January 1, 1994, on land adjacent to the PMRF which would allow the U.S.
Government to clear the ground hazard area (safety zone) for missile launches out of the PMRF and KTF. The restrictive easement is required to provide protection of all persons, private property, and vehicles in the unlikely case of early flight termination. The restrictive easement is needed after December 1993, when the current Memorandum of Agreement between the U.S. Navy, Ballistic Missile Defense Organization (BMDO) (formerly known as the Strategic Defense Initiative Organization), the State of Hawaii, and the Kekaha Sugar Company, which allows clearance of this area, expires. This restrictive easement would give the U.S. Government the authority to restrict access to the state and Kekaha Sugar Company land within the ground hazard area. A copy of the draft restrictive easement provided to the state in July 1993 is in Appendix A.

The restrictive easement is needed to support missile launch activities at the PMRF and KTF. Launches requiring activation of the restrictive easement include Strategic Target System and U.S. Navy Vandal launches. The USASSDC missile launches from the KTF support research and development activities of the BMDO. For example, the Strategic Target System vehicle would launch targets to support development of national and theater missile defense programs. The U.S. Navy launches are used to support fleet training and test and evaluation programs conducted at the PMRF.

1.3 SCOPE OF THE EIS

Hawaii Revised Statutes (HRS) Chapter 343 requires that systematic consideration be given to the environmental and social consequences of an agency action. Administrative rules implementing HRS Chapter 343 are contained in Environmental Impact Rules, Title 11, Chapter 200, Hawaii Administrative Rules, Department of Health. Under HRS Chapter 343 an action must be considered in the environmental review process if the use of state or county lands or funds is involved. The use of state or county lands includes any use (title, lease, permit, easement, or license) or entitlement to those lands. Accordingly, this EIS is being prepared to analyze the environmental consequences of a proposed restrictive easement adjacent to the PMRF on State of Hawaii and Kekaha Sugar Company land. In addition to HRS Chapter 343, Article 11, Section 9, Environmental Rights, was considered in preparation of this EIS. Two alternatives to the proposed action are addressed in detail. Other alternatives that were evaluated but not considered in detail are discussed in Section 2.3.

In addition to the HRS, the Council on Environmental Quality regulations implementing the NEPA, 40 Code of Federal Regulations (CFR) 1500 to 1508, and Department of Defense (DOD) Directive 6050.1 directs that DOD officials consider environmental consequences when authorizing or approving major Federal actions. These requirements for the restrictive easement and launch activities have been previously addressed in the Strategic Target System Draft and Final EISs (U.S. Army Strategic Defense Command, 1992b;c) which are incorporated by reference into this EIS. The executive summaries of the Strategic Target System Draft and Final EISs are provided in Appendix B.

Because the proposed action (establishment of a restrictive easement) requires the use of State of Hawaii land, this EIS assesses the environmental consequences of the acquisition of the restrictive easement in accordance with Hawaii law.

Restrictive Easement Final EIS 1-3
1.3.1 ENVIRONMENTAL ANALYSIS PROCESS BACKGROUND

The context of this EIS is provided by a review of the recent Strategic Target System program environmental background. In July 1990, the U.S. Army Strategic Defense Command published an Environmental Assessment (EA) for the Strategic Target System program (U.S. Army Strategic Defense Command, 1990a). That EA covered all activities in the continental United States and Hawaii that would lead to launches of a Strategic Target System vehicle. A finding of no significant impact (FNSI) was issued in August 1990 by the U.S. Army and Navy. The FNSI was published in the Federal Register in August 1990. Following the review of all public comments, the commander of the U.S. Army Strategic Defense Command, Lt. Gen. Robert D. Hammond, decided to proceed with the Strategic Target System project in October 1990 with the requirement that additional studies be conducted in the areas of liquid-fuel transportation and the use of freon in the second-stage guidance system. The first launch was scheduled for March 1991.

On October 30, 1990, the Sierra Club sued the DOD and the U.S. Army under the NEPA (Sierra Club v. Cheney, No. 90-0761, U.S. District Court, District of Hawaii). The Sierra Club alleged that the Strategic Target System EA was inadequate and that the program required the preparation of an EIS. The State of Hawaii also sued the DOD and the U.S. Army (State of Hawaii v. Cheney, Civil No. 90-0775, U.S. District Court, District of Hawaii), alleging similar problems with the Strategic Target System EA. The two cases were consolidated, and the U.S. Department of Justice, representing the DOD and the U.S. Army, filed a motion for summary judgment in the case in March 1991. The Sierra Club also moved for a summary judgment in the case.

Although in its complaint the Sierra Club claimed multiple violations of the NEPA by the U.S. Army, the Sierra Club argued a single issue in its motion. Specifically, the Sierra Club argued that both the first- and second-stage motors of the Strategic Target System vehicle had "aged out," thus making them unsafe and unreliable. The State of Hawaii also presented arguments on a single issue, that of air quality.

On May 9, 1991, the Federal District Court, District of Hawaii, ruled that the original Strategic Target System EA was in compliance with the requirements of the NEPA in regard to its evaluation of environmental impacts in all areas except air quality. The court specifically found that the EA met the legal requirements for addressing issues associated with the Strategic Target System booster's safety and reliability.

On the issue of air quality, the court directed the U.S. Army to prepare a supplemental EA to address the effects of hydrogen chloride emissions from the Strategic Target System vehicle on the environment of Kauai and to determine whether the release of freon from the second-stage Strategic Target System booster (used to steer the vehicle) threatened a violation of the Hawaii ozone protection statute. The court specifically found that no EIS was required for Strategic Target System program activities. The court then enjoined Strategic Target System program activities on the Island of Kauai until the U.S. Army prepared the supplemental EA.

Following the court's decision, the Sierra Club asked for supplemental consideration on the issue of using remanufactured boosters as an alternative to refurbishing the Strategic
Target System boosters. A supplemental opinion was issued that the U.S. Army need not consider remanufactured boosters as an alternative because the EA established a modified arc of approximately 3,048 m (10,000 ft) as the maximum ground hazard area around the launch pad, making such an alternative immaterial to the FNSI.

On June 20, 1991, the Sierra Club appealed the case to the Ninth Circuit Court of Appeals, claiming the court erred in not requiring the U.S. Army to prepare an EIS. The Sierra Club contended that U.S. Army Regulation 200-2 (Environmental Effects of U.S. Army Actions) requires an EIS for an activity like the Strategic Target System program and that the court was incorrect in deciding the U.S. Army did not have to consider the remanufactured booster alternative.

In July 1991, the U.S. Army and Navy completed the supplemental EA (U.S. Army Strategic Defense Command, 1991). Subsequently, the U.S. Army and Navy issued a FNSI. The supplemental analysis supported the conclusion that there would be no significant effects on the Kauai environment from the release of hydrogen chloride from the Strategic Target System booster. The Hawaii ozone protection statute did not regulate the type of freon used or the activities involved in the Strategic Target System second-stage booster. At the conclusion of a 30-day public comment period, the district court dissolved the injunction, allowing Strategic Target System program activities to resume.

In September 1991, the Senate Appropriations Committee approved, as a part of the Fiscal Year (FY) 1992 DOD Appropriations Act, language that would require an EIS for Strategic Target System program activities on Kauai. This language was passed in September 1991 by the Senate. On September 16, 1991, the Director of the Strategic Defense Initiative Organization, Ambassador Henry Cooper, agreed to prepare an EIS for Strategic Target System vehicle launches from Kauai. The director cited as reasons for his decision the "importance of maintaining and enhancing a positive relationship with the citizens of Kauai and Hawaii" and "allaying public concerns." The DOD issued a Notice of Intent for a Strategic Target System EIS on November 25, 1991.

Subsequent to the Notice of Intent, Congress passed into law the FY 1992 DOD Appropriations Act which required the DOD to prepare an EIS for Strategic Target System activities on Kauai. The statutory language restricted funding for Strategic Target System activities except for the preparation of the EIS, the maintenance of safety, security, and basic condition of the Strategic Target System launch complex, and measures taken for the purpose of range safety and environmental protection. Strategic Target System activities in the continental United States were also exempt from the funding restriction. The Notice of Availability (NOA) of the Draft EIS and notice of public hearings for the EIS were published in the March 8 and March 23, 1992, Office of Environmental Quality Control Bulletin (OEQC Bulletin). A public hearing was held on March 24 and 25, 1992, in Lihue, Kauai. Approximately 160 speakers appeared at this public hearing. Over 100 exhibits were submitted by April 13, 1992, the close of the 45-day public comment period for the EIS. A significant number of these comments dealt with the issue of the temporary use of state land for safety zones and ground hazard areas in connection with Strategic Target System missile launches and the potential environmental consequences thereof.
A draft Memorandum of Agreement and draft restrictive easement were included in the Draft EIS and received specific comments. The NOA of the Final EIS was published in the May 23 and June 8, 1992, OEOC Bulletin. A Record of Decision was issued on June 22, 1992, by the Director, Strategic Defense Initiative Organization. In July 1992, the Sierra Club sued the State of Hawaii in state court to prevent the Department of Land and Natural Resources (DLNR) from signing the Memorandum of Agreement prior to preparing an EA and/or EIS under Hawaii environmental laws. The court issued a temporary restraining order against the State until an EA and/or EIS was prepared. In August 1992 the U.S. Army prepared an EA under Hawaii environmental laws as part of the application process for the Memorandum of Agreement. The Final EA’s subsequent negative declaration was signed by the Chairman of the DLNR in December 1992. In December 1992, the Sierra Club filed a motion for a Preliminary Injunction again seeking to prevent the DLNR from signing the Memorandum of Agreement, claiming that the chairman’s negative declaration determination was not legally supported by the EA accepted by the DLNR earlier that month. The court upheld the DLNR decision, denying the Sierra Club’s motion on January 25, 1993. The Sierra Club failed in its emergency appeals to the Hawaii Supreme Court.

The Memorandum of Agreement was signed by all parties becoming effective on February 9, 1993. On December 31, 1993, the Memorandum of Agreement, which allows clearance of the ground hazard area for launches out of the PMRF and KTF, among the U.S. Government, the State of Hawaii, and the Kekaha Sugar Company expires; at the same time the Kekaha Sugar Company lease for the land within the restrictive easement expires. In order to continue launch operations, the U.S. Government is requesting that a restrictive easement be placed on the land within the ground hazard area. To fulfill the environmental review process, the USAASSDC filed an EA for the proposed restrictive easement with the DLNR Division of Land Management. It was determined by the DLNR that the action would require the preparation of an EIS. This was confirmed in a Preparation Notice in the OEOC Bulletin dated June 8, 1993. A copy of the Preparation Notice is in Appendix C. In August 1993, the Sierra Club filed a motion for an injunction and Summary Judgment, claiming that the DLNR had illegally segmented its environmental analysis for the Memorandum of Agreement and proposed easement. The judge denied the motion in a ruling from the bench on August 19, 1993. The Draft Restrictive Easement EIS was prepared and filed in the OEOC Bulletin on August 8, 1993, to initiate the review process. A copy of the NOA of the Draft EIS is in Appendix C. During this review period a public information meeting regarding the proposed restrictive easement was held on September 9, 1993. Thirty-one people spoke at the meeting.

1.3.2 RELATED ENVIRONMENTAL DOCUMENTATION

This EIS incorporates by reference the following environmental documents that address launch activities at the PMRF and KTF.

- Strategic Target System (STARS) Environmental Assessment (U.S. Army Strategic Defense Command, 1990a) – Analyzed program activities for design, booster motor refurbishment and testing,
fabrication/assembly/testing, construction, flight preparation, launch/flight/data collection, and data analysis.

- **Final Supplement to the Strategic Target System (STARS) Environmental Assessment** (U.S. Army Strategic Defense Command, 1991) – Primarily analyzed air impacts of Strategic Target System activities on Kauai.

- **Draft Environmental Impact Statement for the Strategic Target System** (U.S. Army Strategic Defense Command, 1992b) – Analyzed the effects of Strategic Target System activities on Kauai.

- **Final Environmental Impact Statement for the Strategic Target System Volumes I through III** (U.S. Army Strategic Defense Command, 1992c) – Analyzed the effects of Strategic Target System activities on Kauai.

- **Final Environmental Assessment for Proposed Memorandum of Agreement Between the United States Government and the State of Hawaii to Establish a Ground Hazard Area on State Lands Adjacent to the Pacific Missile Range Facility, Kauai, Hawaii** (U.S. Army Strategic Defense Command, 1992a) – Analyzed the effects of Strategic Target System program activities within the area covered by the Memorandum of Agreement.

- **Exoatmospheric Discrimination Experiment (EDX) Environmental Assessment** (U.S. Army Strategic Defense Command, 1990b)

- **ZEST Flight Test Experiment, Kauai Test Facility, Hawaii** (Strategic Defense Initiative Organization, 1991)

- **Draft Environmental Assessment for Restricted Easement for Temporary Use of State Lands for Safety and Ground Hazard Areas for Strategic Target System and Navy Vandal Missile Launches from Kauai Test Facility at the United States Navy Pacific Missile Range Facility, Barking Sands, Kauai** (U.S. Army Space and Strategic Defense Command, 1993b)

### 1.3.3 CONSULTATION/REVIEW PROCESS

The Hawaii EIS regulations encourage public participation and view it as an integral part of the process. For this EIS, public participation included the consultation period prior to development of the Draft EIS and the review period after submittal of the Draft EIS.

The consultation process for this EIS included publication of the EIS Preparation Notice in the OEQC Bulletin. The notice was published on June 8, 1993, which started the 30-day consultation period required by the HRS. All public and interested agency or organization comments to the EIS preparation notice were responded to and included in the Draft EIS. In addition, these consultation comments were considered in the development of the Draft EIS.
The review process began on August 8, 1993, when the NOA for the Draft EIS was published in the OEQC Bulletin. This NOA initiated the 45-day review period during which the public and interested agencies or organizations had the opportunity to review the Draft EIS and submit their written comments. These comments to the Draft EIS were considered in the preparation of the Final EIS. Sections 8.0 (Consultation Comments and Responses) and 9.0 (Draft EIS Comments and Responses) of this EIS contain a reproduction of substantive comments and responses made during the consultation process and Draft EIS review process.

In addition to the Draft EIS review process, a public information meeting on the restrictive easement was held on September 9, 1993, in Waimea, Kauai. Comments received during this meeting were considered in preparation of the Final EIS. The transcript for this meeting, as provided by the DLNR, is provided in Appendix D.
2.0 Proposed Action and Alternatives
2.0 PROPOSED ACTION AND ALTERNATIVES

This section discusses the proposed action and alternatives including the no-action alternative. Alternatives that were identified and evaluated but eliminated from consideration are also addressed.

2.1 PROPOSED ACTION

The U.S. Government proposes to acquire a restrictive easement (figure 2-1) on land owned by the State of Hawaii and the Kekaha Sugar Company adjacent to the PMRF. The objective is to provide for the protection of all persons, private property, and vehicles during launches conducted by the U.S. Government. The restrictive easement would give the U.S. Government the right to clear the land within the ground hazard area (safety zone) prior to, during, and shortly after launches. In order to support planned launch activities, the U.S. Government is requesting the restrictive easement for a 9-year period starting on January 1, 1994. The U.S. Government will pay a fee for rights acquired under the restrictive easement.

2.1.1 AREA OF THE RESTRICTIVE EASEMENT

In order to launch the Vandal missile from the PMRF and the Strategic Target System missile from the KTF, the U.S. Government must, in accordance with DOD policy, be able to exclude nonparticipants from a ground hazard area. The off-base portion of the respective ground hazard areas is located within the restrictive easement boundary (figure 2-2). Missile flight safety procedures require that the public and nonessential mission personnel be excluded from the ground hazard area to protect them in the unlikely event of an early flight termination. The ground hazard area within the restrictive easement boundary would be either an arc of approximately 1,829 m (6,000 ft) for the U.S. Navy Vandal or a modified arc of approximately 3,048 m (10,000 ft) for the Strategic Target System. The modified arc is described such that the radius is approximately 3,048 m (10,000 ft) to the northeast, approximately 2,774 m (9,100 ft) to the east, and approximately 2,743 m (9,000 ft) to the south. For the purposes of this analysis, the term "ground hazard area" would include both approximate arcs, the 1,829-meter (5,000-foot) arc and the 3,048-meter (10,000-foot) modified arc.

A total of approximately 854 hectares (ha) (2,110 acres [ac]) are within the restrictive easement boundary and include approximately 28 ha (70 ac) of Polihale State Park, approximately 825 ha (2,039 ac) of land currently leased by the Kekaha Sugar Company from the State of Hawaii, and approximately 0.5 ha (1.3 ac) of land owned by the Kekaha Sugar Company (figure 2-2). There are no public buildings within the area of the restrictive easement boundary.
Restrictive Easement Boundary and Ground Hazard Area Boundaries

EXPLANATION

- Irrigation Drainage Ditch
- Approximate Ground Hazard Area Boundary
- Restrictive Easement Boundary
- Kual Test Facility
- Poheloa State Park Boundary
- Ground Hazard Area
- Strategic Target System Control Points
- Vandal Control Points

Figure 2-2

Restrictive Easement Final EIS 2-3
2.1.2 FREQUENCY AND DURATION OF THE RESTRICTIVE EASEMENT USE

Use of the restrictive easement may be exercised up to 30 times per year with the ground hazard area being cleared approximately 30 minutes for each closure to ensure that no unauthorized personnel are present. The exercise of the restrictive easement 30 times per year allows for weather, maintenance, and technical delays; therefore, the actual number of launches would be substantially less than 30. PMRF personnel may enter the ground hazard area up to 3 hours before a launch to notify any personnel of the need to leave the area so as to be clear of the ground hazard area 20 minutes prior to launch. The restrictive easement would give the PMRF control over, and the right to ensure clearance of, the ground hazard area 20 minutes before a launch. The ground hazard area would be reopened as soon as the Range Safety Officer declared the area safe. In the unlikely event that debris or other hazards exist in the ground hazard area from early flight termination, the Range Safety Officer may continue to close the hazard area until it is safe to reenter. Areas that cause no risk to the public after a flight termination would be reopened. Debris which falls in the area would be removed by the U.S. Navy or other U.S. Government agency. The authority to activate the restrictive easement would continue for a period of 9 years starting in January 1994. The U.S. Navy would notify the State of Hawaii, the Kekaha Sugar Company, and the lessee of the state land at least 7 days in advance of a launch before exercising rights under the restrictive easement.

2.1.3 CLEARANCE PROCEDURES FOR THE RESTRICTIVE EASEMENT

To minimize risk to the public in these areas, a PMRF security force on the ground and in helicopters (if necessary) would use sweep-and-search measures to ensure that, 20 minutes prior to each scheduled launch, all areas within the ground hazard area were clear of people (except mission-essential personnel). In addition, a security force would set up control points along the roads into the ground hazard area 3 hours prior to launch to monitor traffic. After the Range Safety Officer declared the area safe, the security force would give the all-clear signal, and the public would be allowed to reenter the area.

To inform the public of the restrictive easement, the U.S. Government would post warning signs at the edge of and within the restrictive easement area in previously disturbed areas. These signs would advise the public of the existence of the ground hazard area and of the closure of the area during launch activities.

2.1.4 USE OF LANDS WITHIN THE RESTRICTIVE EASEMENT

Under the proposed action the land within the restrictive easement would be limited to agricultural (e.g., growing of crops and grazing of cattle) and public recreational (Polihale State Park) uses; no new buildings or construction would be permitted without consent of the U.S. Government. The water pumps which drain the area would be operated by the lessee, and all roads and utilities would be maintained by their current or future owners. The approximate 28 ha (70 ac) of Polihale State Park within the restrictive easement would continue to be used for recreational purposes. Overall, no change in the nature of the activities currently conducted in this area are anticipated.
2.1.5 LAUNCH ACTIVITIES REQUIRING USE OF THE RESTRICTIVE EASEMENT

Launch activities requiring the use of the restrictive easement include the Strategic Target System and the Vandal. Launch activities associated with the Strategic Target System are addressed in the Federal Strategic Target System Draft and Final EISs. Vandal launches were evaluated in the cumulative impact section of the above EISs and the booster used on the Vandal was evaluated in the ZEST Flight Test Experiment EA (Strategic Defense Initiative Organization, 1991); however, to give the decision maker more information on Vandal launches, they are further addressed in this EIS.

Initially for the Strategic Target System program, 40 missile launches were planned over a 10-year period; however, current plans are for approximately 11 launches to occur over the 9-year time period of the restrictive easement with no more than 4 occurring in any 1-year period.

Vandal launches conducted by the PMRF to support naval fleet training and test and evaluation programs are launched from a rail system located at the northern section of the PMRF. The Vandal is approximately 10 to 11 m (32 to 36 ft) in length, depending on target requirements, compared to a length of 10 m (34 ft) for the Strategic Target System missile (figure 2-3). The Vandal uses a launcher elevation of up to 42° and reaches its maximum super sonic speed within 3 seconds after launch, which allows the Vandal to almost immediately be over the open water of the Pacific Ocean. Because of the use of a rail launcher at a low degree of elevation, the ground hazard area requirement is approximately 1,829 m (6,000 ft) compared to the approximate 3,048 m (10,000 ft) for the Strategic Target System. Ground hazard area clearance safety procedures for the Vandal are the same as those described in the Strategic Target System Draft and Final EISs. Seventy-two Vandal launches are planned over the 9-year period with no more than eight Vandal launches in a 1-year period.

2.2 ALTERNATIVES TO THE PROPOSED ACTION

Two alternatives to the proposed action have been identified. They are a revision to the current memorandum of agreement and no action.

2.2.1 REVISED MEMORANDUM OF AGREEMENT

Under this alternative the U.S. Government would establish a revised Memorandum of Agreement with the State of Hawaii, the Kekaha Sugar Company, and the lessee of the state land within the ground hazard area for a 9-year period beginning in January 1994. The use of the land, time and duration of use, and clearance procedures within the ground hazard area would be the same as described under the proposed action. Other terms in a revised Memorandum of Agreement would be similar to those in the existing Memorandum of Agreement with no provision for compensation, or reduced compensation, to the State or Kekaha Sugar Company and no ability of the United States to restrict development or inconsistent uses within the area covered by the Memorandum of Agreement. Also, since
Strategic Target System and Vandal Launch Vehicle Comparison

The size of the ground hazard area is dependent on many factors, including the type of booster and the area around the launch pad that can be cleared of people.

Figure 2-3

Restrictive Easement Final EIS
a Memorandum of Agreement would not grant a formal property interest, it may be more
difficult to enforce the right to clear the ground hazard area to protect the public.

2.2.2 NO-ACTION ALTERNATIVE

Under the no-action alternative, the U.S. Government would not acquire a restrictive
easement. For purpose of analysis, the no-action alternative assumes that the land within
the restrictive easement boundary would remain in the current sugar cane and recreational
uses.

2.3 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

Alternatives to the proposed action were identified and evaluated. Alternatives regarding
launch locations other than the PMRF and booster types other than the Polaris A3 have
been addressed in the Strategic Target System EIS. Alternatives considered but eliminated
from further consideration to the restrictive easement include:

- DOD acquisition of or trade for the land
- a 1-year easement each year for 9 years

The DOD acquisition of the land was eliminated because of the cost of the land and
maintenance required within the restrictive easement if the DOD could not find a lessee for
the land for agricultural use. The 1-year easement for 9 years was eliminated because of
constraints on mission requirements if a delay occurred in obtaining a new easement.
3.0 Environmental Setting
3.0 ENVIRONMENTAL SETTING

This section describes the environmental conditions within the area affected by the proposed action and alternatives. Information is provided to serve as a baseline from which to identify and evaluate environmental changes resulting from the proposed activities. Areas of concern are geology and soils, water resources, air quality, biological resources, cultural resources, visual resources, noise, hazardous materials and waste, public health and safety, infrastructure, socioeconomic, and recreation.

Regions of influence (ROI) will be defined for each affected resource and will determine the geographical area to be addressed as the environmental setting. For most resources the ROI will include the area within the restrictive easement and that portion of the ground hazard area within the PMRF. Since the Vandal ground hazard area is contained within the Strategic Target System ground hazard area, the existing environment for the Vandal ground hazard area was included in the Strategic Target System Draft and Final EISs (U.S. Army Strategic Defense Command, 1992bc). Although the restrictive easement and on-base ground hazard area constitute the ROI limits for most resources, potential impacts associated with certain issues (e.g., air quality) may transcend these limits.

3.1 GEOLoGY AND SOILS

This section briefly describes the existing geological and soil characteristics in the areas potentially affected by the restrictive easement and the ground hazard area within the PMRF. The ROI for geology and soils includes the area within the restrictive easement boundary and the ground hazard area within the PMRF.

3.1.1 TOPOGRAPHY

The ROI is situated within a lowland portion of the Kekaha coastal flat. The general area is part of what is known as the Mānā Plain which extends from Polihale State Park in the north to Waimea in the south. The restrictive easement is bounded on the north and west by sand dunes and the Pacific Ocean and on the east by steep cliffs and valleys ascending along the Mānā and Ohaiula ridges. Perennial and intermittent streams drain toward the lowland area of the Mānā Plain and to the Pacific Ocean west and northwest of the steep cliffs and valleys. The eastern portion of the restrictive easement slopes with increasing elevation from the base of the Mānā cliffs at 12 m (40 ft) mean sea level (MSL) to the top of the cliffs at 244 m (800 ft) MSL over an approximate distance of 396 m (1,300 ft). The elevation of the sand dunes located to the north and west ranges between 30 m (100 ft) and 3 m (10 ft) MSL. For the remaining portion of the restrictive easement, the elevation ranges between 12 m (40 ft) and MSL. The majority of the land within the restrictive easement is reclaimed marshland currently used for agricultural purposes and is below 12 m (40 ft) MSL.
3.1.2 GEOLOGY

Kauai is the oldest of the eight main Hawaiian Islands and consists of a single great shield volcano similar to Mauna Loa on the Island of Hawaii. Formation of Kauai was probably completed before the end of the Pliocene epoch (The Traverse Group, Inc., 1988). As a result of the intermittent nature of subsequent volcanic eruptions, many lava flows were eroded by streams and later covered by new lava flows.

The Mānā Plain is made up of a wedge of terrestrial and marine sediments overlying volcanic basement rocks that consist of the Napali Formation of the Waimea volcanic series (Botanical Consultants, 1985). The basement rock crops out at the inland edge of the plain above an elevation of about 12 m (40 ft). The volcanic basement plunges below the Mānā Plain at a dip of about 5° until, at the coast, its contact with the overlying sediments is approximately 121 m (400 ft) below sea level (Botanical Consultants, 1985).

The Mānā Plain is composed of alluvium, lagoon deposits, and beach and dune sands. On its inland edge, lagoonal deposits are earthy, overlain by younger alluvium, and probably grade into or interfinger with older alluvium. On the seaward side the deposits are mostly calcareous and probably grade into barrier beach deposits. Clay beds contain gypsum in some places (The Traverse Group, Inc., 1988).

The restrictive easement is located on an extension of the Mānā Plain which consists of brown and red terrestrial alluvium (Botanical Consultants, 1985) and flattened dunes that have little relief. The surface typically consists of fine to moderately fine reclaimed soils suited for agricultural purposes.

The fossil dunes within the area consist of fine sand, which is loose at the surface but weakly to strongly indurated (hardened) a few meters below the surface (U.S. Army Strategic Defense Command, 1992b). Typical of windblown deposits, the indurated sands are bedded as laminae several centimeters thick and contain a fine grain size and an admixture of silty sand. Clay is also part of the mixture, but it appears primarily where the dunes dissipate and are replaced by alluvium (U.S. Army Strategic Defense Command, 1992b).

Between 1964 and 1981, two earthquakes were recorded within 97 kilometers (km) (60 miles [mi]) of Kauai measuring 4.0 and 4.5 on the Richter Scale, respectively. Offshore fault movements can cause a tsunami, a high water wave. Most tsunamis that affect the Hawaiian Islands come from sources in the zone of mountain building that borders the Pacific Ocean. Some tsunamis reportedly have come in over the tops of the coconut trees on the south shore of the Hawaiian islands. A review of the Flood Insurance Rate Map prepared by the Federal Emergency Management Agency (1987) indicates that portions of the ROI are considered to be within the 100-year tsunami flood zone (figure 3-1). The area affected includes that which lies west along the PMRF boundary, inland along Nohili Ditch, and the beach area within the Poipu State Park.
EXPLANATION

- Restrictive Easement Boundary
- Pollihale State Park Boundary
- Kauai Test Facility
- Pacific Missile Range Facility
- Tsunami Inundated Area
- State Highway


Figure 3-1
3.1.3 SOILS

The U.S. Department of Agriculture (USDA) Soil Conservation Service has published a soil survey (U.S. Department of Agriculture, 1972) that includes the area within the restrictive easement and the ground hazard area within the PMRF. This area consists of alluvium, lagoon deposits, and calcareous beach and dune sands. The dominant soil within the restrictive easement area has been mapped (Figure 3-2) as the Kekaha-Nohili Association. This association, which makes up 2 percent of the Island of Kauai (U.S. Department of Agriculture, 1972), consists of well-drained and poorly drained, medium-textured to very fine soils on the Mānā coastal plain. These soils are nearly level and are developed by alluvium. Kekaha soils make up about 45 percent of the association, and Nohili soils make up 15 percent. The rest of the association is made up of fill land and Kaloko, Lualualei, and Mamala soils (U.S. Department of Agriculture, 1972). Kekaha soils consist of a dark reddish-brown, friable silty clay, clay, or extremely stony silty clay loam. The subsoil is dark reddish-brown, firm silty clay or clay. The substratum is stratified alluvium and marine clay (U.S. Department of Agriculture, 1972). Nohili soils have a surface layer of dark reddish-brown, firm clay and a subsoil of dark-brown to very dark-gray, mottled, firm clay. The substratum is a marly clay (U.S. Department of Agriculture, 1972). The soil within the ground hazard area on the PMRF consists of the Jauca Series as described in the Strategic Target System Draft EIS (U.S. Army Strategic Defense Command, 1992b; U.S. Department of Agriculture, 1972).

According to the Agricultural Lands of Importance to the State of Hawaii (ALISH) map for Kauai (Hawaii Department of Agriculture, 1977), the land within the restrictive easement is designated as Prime or Other Important Agricultural Land (Figure 3-3). Lands within the PMRF are not designated as agricultural land. Agricultural lands identified by the Hawaii Department of Agriculture (1977) are as follows:

- Prime Agricultural Land is defined as land which has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops economically when treated and managed according to modern farming methods.

- Important Agricultural Land is defined as land other than Prime or Unique Agricultural Land that is also of statewide or local importance for agricultural use.

Article XI, Section 3, of the Hawaiian Constitution states that "the state shall conserve and protect agricultural lands, promote diversified agriculture, increase agricultural self-sufficiency and assure the availability of agriculturally suitable lands. Lands identified by the state as important agricultural lands needed to fulfill the purposes above shall not be reclassified..." (Hawaii State Constitution, Article XI, Section 3).

Along the ocean margin of the restrictive easement are areas of dune land and beaches (U.S. Army Strategic Defense Command, 1992b). Dune land consists of hills and ridges of sand drifted and piled by the wind. The hills and ridges are actively shifting or are so recently fixed or stabilized that no soil horizons have developed. The sand derives
3.2 WATER RESOURCES

This section discusses both surface-water and groundwater quality. The ROI for this resource is the Mānā Plain, the nearshore ocean, and the ground hazard area on the PMRF.

3.2.1 SURFACE-WATER QUALITY

Surface water in the area of the restrictive easement on the Mānā Plain is restricted to drains, agricultural irrigation ponds, and the ocean. Within the restrictive easement boundary, the surface water and storm water runoff drain onto Kekaha Sugar Company lands and agricultural ponds below the Mānā cliffs. The Mānā plain is drained by canals that flow seaward. Typically, the water from the canals that drain from the sugar cane fields is brackish (Botanical Consultants, 1985). Surface water within the ground hazard area is addressed in the Draft and Final Strategic Target System EISs (U.S. Army Strategic Defense Command, 1992b,c).

The waters in the agricultural ponds along the Mānā cliffs generally do not meet drinking water standards for chlorides but are near neutral to slightly alkaline (U.S. Army Strategic Defense Command, 1992b). The highest chloride levels, near that of seawater, were observed in water from the Mānā Pond Wildlife Sanctuary near the north gate of the PMRF. This may be due to the infiltration of brackish to saline groundwater into the pond basin or excessive evaporation to a low surface level (U.S. Army Strategic Defense Command, 1991).

The marine waters may be affected by runoff near the mouths of the agricultural drains; however, they are considered to be clean in the ROI.

3.2.2 GROUNDWATER QUALITY

Three geological formations (bedrock, alluvium, and dunes) constitute hydraulically connected aquifers in the ROI. The bedrock (basement volcanics, primarily basalt) is highly permeable, containing brackish water that floats on seawater.

The overlying sediments act as a caprock because of their overall permeability, although individual layers, such as buried fossil coral reefs, may be as permeable as the basalt. Although the sediments are saturated, they are not exploitable as an aquifer because of unfavorable hydraulic characteristics. The groundwater in the sediments originates as
seepage from irrigation percolation and rainfall in the basalt aquifer, especially where the sediments are thin near the inner margin of the Mānā Plain. The groundwater beneath the restrictive easement increases in salinity from the base of the Mānā cliffs to the Pacific Ocean (The Traverse Group, Inc., 1988). To keep the groundwater table below the root zone of the sugar cane, thousands of feet of canals have been excavated to drain excess water from the soil. The water is then pumped into canals such as the Nohili Ditch for release into the ocean.

The dune sand aquifer along the coast consists of a lens of brackish groundwater that floats on seawater and is recharged by storm rainfall and seepage from the underlying sediments (Botanical Consultants, 1985). The nearest fresh groundwater sources are in the Napali formation at the inland edge of the coastal plain along the base of the Mānā cliffs (The Traverse Group, Inc., 1988). Groundwater in the region is generally considered to be potable at the base of the cliffs, increasing in salinity closer to the coast.

3.3 AIR QUALITY

The Federal Clean Air Act Amendments of 1990 are the most recent revision of Federal legislation to protect human health and the environment from air pollution. The principal objective of the Clean Air Act is the achievement of ambient air quality standards. The EPA has promulgated National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: carbon monoxide, nitrogen dioxide, sulfur dioxide, ozone, particulate matter (PM-10), and lead. Areas of the country are designated as in "attainment" or "nonattainment" for each pollutant. The Hawaii Department of Health has adopted state ambient air quality standards that are as strict or stricter than the NAAQS (table 3-1) (U.S. Army Strategic Defense Command, 1992b).

The ROI for air quality encompasses the proposed restrictive easement, the Mānā Plain, and the ground hazard area. This section describes the climate and existing air quality of the ROI.

3.3.1 CLIMATE AND METEOROLOGY

The climate and weather patterns of a locale influence and affect the dispersion of air pollutants and the air quality of an area. The climate of the Island of Kauai is mild and semitropical. Outstanding features are equable temperatures from day to day and from season to season, prevailing northeast trade winds, and marked variations in rainfall, locationally and seasonally. The mid-ocean location of the island and the small seasonal variation in the amount of incoming solar energy account for the even temperatures. Greater variations in temperatures are observed with elevation changes, but temperatures do not reach freezing, even in the highest parts of Kauai. The mean annual temperature on the Mānā Plain is 24° Celsius (C) (75° Fahrenheit [F]).

The northeast trade winds blow across the island most of the year but, in general, are more persistent in the summer. The diurnal land-sea breeze cycle, which is typical of coastal locations, occurs during calm weather. Strong winds, associated with low
### Table 3-1: National and Hawaii Ambient Air Quality Standards

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>National Ambient Air Quality Standard&lt;sup&gt;a&lt;/sup&gt; ppm (µg/m³)</th>
<th>Hawaii Ambient Air Quality Standard&lt;sup&gt;b&lt;/sup&gt; ppm (µg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Averaging Time</td>
<td></td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>1 hour</td>
<td>35 (40,000)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9 (10,000)</td>
</tr>
<tr>
<td></td>
<td>8 hours</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.5 (5,000)</td>
</tr>
<tr>
<td>Ozone</td>
<td>1 hour</td>
<td>0.120 (235)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.051 (100)</td>
</tr>
<tr>
<td>Nitrogen Dioxide</td>
<td>Annual</td>
<td>0.05 (100)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.035 (70)</td>
</tr>
<tr>
<td>Sulfur Dioxide</td>
<td>3 hours</td>
<td>0.05 (1,300)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.03 (80)</td>
</tr>
<tr>
<td></td>
<td>24 hours</td>
<td>0.14 (365)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.14 (365)</td>
</tr>
<tr>
<td></td>
<td>Annual</td>
<td>0.03 (80)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.03 (80)</td>
</tr>
<tr>
<td>PM-10</td>
<td>24 hours</td>
<td>150 µg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Annual</td>
<td>50 µg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>Total Particulate Matter</td>
<td>24 hours</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>150 µg/m³</td>
</tr>
<tr>
<td></td>
<td>Annual</td>
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<tr>
<td></td>
<td></td>
<td>60 µg/m³</td>
</tr>
<tr>
<td>Lead</td>
<td>Quarterly</td>
<td>1.5 µg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.5 µg/m³</td>
</tr>
</tbody>
</table>

<sup>a</sup> National standards, other than ozone and those based on annual or quarterly averages, are not to be exceeded more than once a year. Standards based on annual or quarterly averages are not to be exceeded. The ozone standard is not to be exceeded on more than an average of 1 day a year over a 3-year period.

<sup>b</sup>Hawaii standards, other than those based on annual or quarterly averages, are not to be exceeded more than once in any 12-month period. Standards based on annual or quarterly averages are not to be exceeded.


Rainfall on Kauai varies from 1,234 centimeters (cm) (486 inches [in]) at the top of Mount Waialeale, the wettest spot in the world, to about 51 cm (20 in) on the western, leeward side of the island where the proposed restrictive easement would be located. The Mānā Plain is sheltered from the predominant northeast trade winds and, therefore, is one of the most arid regions in Hawaii. Most of the annual precipitation occurs during the 7-month rainy season, October through April, with normal precipitation in January, the wettest month, about 15.2 cm (6 in); a dry-season month receives less than 2.5 cm (1 in) of rain. Relative humidity is moderate (60 percent during the day) in all seasons (U.S. Army Strategic Defense Command, 1992b).
3.3.2 REGIONAL AIR QUALITY

Air quality in the vicinity of the proposed restrictive easement is generally excellent. The only air sampling station operated by the Hawaii Department of Health on Kauai is in Lihue where total suspended and fine respirable particulate matter are monitored. The area is classified as in attainment for both national and Hawaii ambient air quality standards. (U.S. Army Strategic Defense Command, 1992b)

The principal air emission source in the proposed restrictive easement area is the result of the agricultural practice of burning sugar cane fields in the vicinity, producing periods of heavy smoke and ash. During these burn times, visibility can be reduced over a wide area that sometimes extends for several miles. The principal air emission sources at the PMRF and KTF are diesel-powered generators, aircraft, vehicles, and various types of missiles, rockets, and target drone launches (U.S. Army Strategic Defense Command, 1992b).

3.4 BIOLOGICAL RESOURCES

Biological resources include native and naturalized plants and animals and the habitats in which they occur. They include plant populations and communities, wildlife populations and their relationship to habitat, and aquatic, wetland, and riparian ecosystems. Also included are species listed as threatened or endangered by the U.S. Fish and Wildlife Service and the State of Hawaii and species under consideration for listing as threatened or endangered by these agencies.

The ROI for biological resources includes the area within the restrictive easement boundary and the ground hazard area within the PMRF in which potential impacts could occur during launch activities. Within the ROI, human activities have altered most of the natural environment. Most of the land in the restrictive easement boundary, except for Polihale State Park, is used for growing sugar cane. Although portions of Polihale State Park within the ROI support relatively undisturbed vegetation in the dunes, visitor foot traffic and off-road vehicle use have threatened this ecologically sensitive area. The characteristics of the existing conditions for the biological resources within the ground hazard area were described in the Strategic Target System EIS (U.S. Army Strategic Defense Command, 1992b).

3.4.1 VEGETATION

The vegetation in the proposed restrictive easement area is dominated by sugar cane, ruderal vegetation, and wetlands associated with agricultural ponds and drains (State of Hawaii, 1993; U.S. Army Strategic Defense Command, 1992b). The dominant vegetation within the ROI is sugar cane with ruderal vegetation, wetlands, and a mosaic of relatively undisturbed non-native and native vegetation also present.

The relatively undisturbed areas of the sand dunes, associated with the PMRF and Polihale State Park, and the cliffs within the ROI support several plant associations identified as native or non-native alien-dominated plant communities (State of Hawaii, 1993). The non-
native non-agricultural vegetation is dominated by kiawe/koa-haole scrub (U.S. Army Strategic Defense Command, 1990a; 1992b; State of Hawaii, 1993). This vegetation type is the dominant type present on the sand dunes as well as along the cliff face in the restrictive easement area. The sand dune vegetation within the ROI is a mosaic of five native plant communities (State of Hawaii, 1993) and the dominant kiawe/koa-haole scrub. All five of the native plant communities cannot be mapped at a practical and visible scale for use in this EIS; therefore, the communities are discussed briefly below:

- Aali Dry Shrubland is dominated by the indigenous shrub species aali (Dodonaea viscosa) which is known throughout the tropics.
- Pohinahina Coastal Dry Shrubland is dominated by the indigenous shrub pohinahina (Vitex rotundifolia) which is known from other coastal locations in the Pacific and Indian oceans. Within the ROI, this community cannot be mapped separately from the naupaka coastal dry shrubland (State of Hawaii, 1993).
- Naupaka Coastal Dry Shrubland is dominated by the indigenous species naupaka (Scaevola sericea), a coastal plant widespread throughout the tropical and subtropical Pacific and Indian oceans. Within the ROI, this community cannot be mapped separately from pohinahina coastal shrubland (State of Hawaii, 1993).
- Akoko Coastal Dry Shrubland is dominated by the endemic spurge species akoko (Chamaesyce celastroides) and is considered extremely rare.
- Akiaki Coastal Dry Grassland is dominated by the indigenous grass species akiaki (Sporobolus virginicus) which is known from other tropical and subtropical coastal locations.

3.4.2 WILDLIFE

Forty species of birds have been identified in the region. Six of these species are endemic to Hawaii and are Federally listed or state-listed as threatened or endangered. The remaining 34 species include 24 introduced, 4 migratory, and 6 indigenous birds. The migratory Laysan albatross (Diomedea immutabilis) is protected under the Migratory Bird Treaty Act. The ring-necked pheasant (Phasianus colchicus) is one of several non-native game birds that occur throughout the ROI. The other introduced, or exotic, species are generally common field and urban birds (U.S. Army Strategic Defense Command, 1992b; U.S. Department of Energy, 1991).

Feral dogs (Canis familiaris) and cats (Felis catus) occur in the region and prey on native and introduced species of birds (The Traverse Group, 1988). Rodents including the Polynesian black rat (Rattus exulans), Norway or brown rat (Rattus norvegicus), and the house mouse (Mus musculus domesticus) are also known to occur in the region (The Traverse Group, 1988).
3.4.3 THREATENED AND ENDANGERED SPECIES

According to the Endangered Species Act, any species which is in danger of extinction throughout all or a significant portion of its range is an endangered species. Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range is a threatened species. The State of Hawaii Department of Land and Natural Resources prepares its own list of threatened and endangered species and includes Federally listed species pursuant to HRS 195-D. The U.S. Navy also has a protected species list for the PMRF. Thirteen species of sensitive (Category 1 and 2) or Federally listed or state-listed threatened and endangered species (table 3-2) potentially occur in the proposed restrictive easement and surrounding region.

Plants

Ohai (Sesbania tomentosa) is a Category 1 Federal candidate species and has been observed north of the PMRF in Polihale State Park (U.S. Army Strategic Defense Command, 1992b). Ohai is a spreading shrub or small tree and is endemic to the Hawaiian Islands.

Pololei (Ophioglossum concinnum) (adder’s tongue fern) is also a Category 1 Federal candidate species and has been observed at the west end of the KTF and elsewhere on the PMRF (U.S. Army Strategic Defense Command, 1992b). Pololei is a small fern which is only present above ground during the winter rainy season.

Lauehu (Panicum nilhauense) is a Category 2 Federal candidate species and has been observed near Queens Pond (U.S. Army Strategic Defense Command, 1992b). Lauehu is a rare grass.

Wildlife

Alae-keokeo (Fulica americana alai) (Hawaiian coot) is a Federally listed and state-listed endangered subspecies of the American coot. It is limited to wetland habitats along agricultural drainage ditches and settling ponds and may occur in the proposed restrictive easement (U.S. Army Strategic Defense Command, 1992b). The alae-keokeo is endemic to the Hawaiian Islands and is nonmigratory.

Aeo (Himantopus mexicanus knudseni) (Hawaiian black-necked stilt) is a Federally listed and state-listed endangered subspecies of the North American black-necked stilt. Habitat for this bird includes ponds, drainage ditches, and pasture lands. The aeo is endemic to the Hawaiian Islands.

Alae-Ula (Gallinula chloropus sandvicensis) (Hawaiian Gallinule) is a Federally listed and state-listed endangered subspecies of the common North American moorhen. It is expected to occur in drains and ponds in the region since its habitat is limited to wetlands along agricultural drainage ditches and settling ponds (U.S. Army Strategic Defense Command, 1992b). The alae-ula is endemic to the Hawaiian Islands and is nonmigratory with a range limited to Kauai and Oahu.
Table 3-2: Threatened and Endangered Species in the ROI

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Federal</th>
<th>State of Hawaii</th>
<th>U.S. Navy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sesbania tomentosa</td>
<td>Ohal</td>
<td>C1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ophioglossum concinnum</td>
<td>Pololei (Adder’s tongue fern)</td>
<td>C1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penicillus niliense</td>
<td>Lau’ehu</td>
<td>C2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fulica americana alil</td>
<td>'Alae-ke'oke'o (American Hawaiian Coot)</td>
<td>E</td>
<td>E</td>
<td>P</td>
</tr>
<tr>
<td>Himantopus mexicanus knudseni</td>
<td>Ae’o (Hawaiian black-necked stilt)</td>
<td>E</td>
<td>E</td>
<td>P</td>
</tr>
<tr>
<td>Gallinula chloropus sandvicensis</td>
<td>'Alae-'ula (Hawaiian Gallinule/common moorhen)</td>
<td>E</td>
<td>E</td>
<td>P</td>
</tr>
<tr>
<td>Anas wyvilliana</td>
<td>Koloa-maoli (Hawaiian duck)</td>
<td>E</td>
<td>E</td>
<td>P</td>
</tr>
<tr>
<td>Puffinus newelli</td>
<td>A'o (Newell’s shearwater)</td>
<td>T</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td>Asio flammeus sandwichensis</td>
<td>Pueo (Hawaiian short-eared owl)</td>
<td>E</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>Lasiusus cinereus semotus</td>
<td>Hawaiian hoary bat</td>
<td>E</td>
<td>E</td>
<td>P</td>
</tr>
<tr>
<td>Monachus schauinslandi</td>
<td>Hawaiian monk seal</td>
<td>E</td>
<td>E</td>
<td>P</td>
</tr>
<tr>
<td>Chelonia mydas</td>
<td>Green sea turtle</td>
<td>T</td>
<td>E</td>
<td>P</td>
</tr>
<tr>
<td>Megaptera novaeangliae</td>
<td>Humpback whale</td>
<td>E</td>
<td>E</td>
<td>P</td>
</tr>
<tr>
<td>Diomedea immutabilis</td>
<td>Laysan albatross</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Puffinus pacificus chlororhynchus</td>
<td>Wedge-tailed shearwater</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pluvialis dominica</td>
<td>Lesser golden plover</td>
<td>P</td>
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<td></td>
</tr>
<tr>
<td>Heteroscelus incanus</td>
<td>Wandering tattler</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arenaria interpres</td>
<td>Rudy turnstone</td>
<td>P</td>
<td></td>
<td></td>
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<tr>
<td>Calidris alba</td>
<td>Sanderling</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numenius tahitiensis</td>
<td>Bristle-thighed curlew</td>
<td>P</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Legend:
C1 = Category 1 Candidate Species
C2 = Category 2 Candidate Species
E = Endangered
T = Threatened
P = Protected

Koloa-maoli (Anas wyvilliana) (Hawaiian duck) is a Federally listed and state-listed endangered species of duck which has been observed in the wetlands of the PMRF (The Traverse Group, 1988) and the ditches of Mānā (U.S. Army Strategic Defense Command, 1992b). Habitat for the koloa-maoli includes marshes, drainage ditches, and wet agricultural land. The koloa-maoli is endemic to the Hawaiian Islands with the only remaining native population on the Island of Kauai (U.S. Army Strategic Defense Command, 1992b).

Ao (Puffinus newelli) (Newell’s shearwater) is a Federally listed and state-listed threatened species of shearwater which uses the PMRF and surrounding region as a flight corridor between nesting and feeding sites. The ao comes ashore only to breed on steep, forested...

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slopes and is endemic to the Hawaiian Islands (U.S. Army Strategic Defense Command, 1992b).

Pueo (*Asio flammeus sandwichensis*) (Hawaiian short-eared owl) is a state-listed endangered species. This short-eared owl is the only endemic terrestrial bird species that occurs in the region (U.S. Army Strategic Defense Command, 1992b).

The Hawaiian hoary bat (*Lasiurus cinereus semotus*) is a Federally listed and state-listed endangered subspecies of the hoary bat common to North and South America. This bat may occur in the region but it has not been documented (U.S. Army Strategic Defense Command, 1992b).

The Hawaiian monk seal (*Monachus schausi*), Hawaii's only endemic mammal, is a Federally listed and state-listed endangered species. The green sea turtle (*Chelonia mydas*) is a Federally listed threatened species and a state-listed endangered species. The seal and the green sea turtle would occur only in the coastal areas of the ROI and the proposed restrictive easement. The humpback whale (*Megaptera novaeangliae*) would only occur offshore.

### 3.5 CULTURAL RESOURCES

Cultural resources consist of prehistoric and historic districts, sites, structures, artifacts, or any other tangible or intangible aspect of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. Cultural resources can be divided into three major categories: archaeological resources (prehistoric and historic), historic buildings and structures, and traditional resources (e.g., native Hawaiian, Japanese).

**Area of Potential Effect** – The area of potential effect (synonymous with the ROI) for cultural resources under the proposed action and all alternatives encompasses the approximate 854-hectare (2,110-acre) restrictive easement area described in Section 2.1.1 that is owned by the State of Hawaii and the Kekaha Sugar Company and the ground hazard area within the PMRF. The Federal and non-Federal land areas potentially affected by the launch activities leading to the need for this restrictive easement have been assessed in the environmental documents described in Section 1.3.2 and are hereby incorporated by reference. No further cultural resources analysis of these areas or actions is provided within this document.

**Records Search** – A thorough record search encompassing the ROI was performed in 1991 and 1992 in preparation for the analyses for the Draft and Final EISs for the Strategic Target System program at the PMRF. Repositories searched included the Bishop Museum, the U.S. Navy Pacific Division Naval Facilities Engineering Command Planning Department, and the libraries of the Hawaii Department of Land and Natural Resources, State Historic Preservation Division. Documents, maps, and photographs describing the prehistoric, historic, and traditional uses of the area were collected and reviewed at that time and have been re-examined for this EIS. Except for a request to the Hawaii Department of Land and Natural Resources, State Parks Division, for the results of any cultural resources studies
conducted within portions of the restrictive easement area since that time, no additional document search has been undertaken. Results of document reviews have been incorporated as follows under the applicable categories.

3.5.1 ARCHAEOLOGICAL RESOURCES (PREHISTORIC AND HISTORIC)

The physiography and climate of Kauai have supported a cultural resources chronology that extends into the past for nearly 2,000 years (Hawaii Department of Land and Natural Resources, 1993). Oldest in the archipelago and distinct from the other islands of Hawaii, cultural materials recovered from Kauai infer a prehistoric connection with much older cultures from the southern islands of central Polynesia (U.S. Department of Energy, 1992). The region within which the ROI is situated is known as Mānā. Throughout prehistory, large areas of the Mānā Plain were covered by the great Mānā swamp, and large inland lakes allowed natives from the village of Mānā to canoe as far south as Waiheea (Von Holt, 1985; State of Hawaii, 1993). It is believed that these wet conditions encouraged the independent invention of aquaculture on Kauai and the construction of stone and earthen ponds for the growing of staples such as taro, yam, and sweet potatoes (Kikuchi et al., 1987). After the arrival of Europeans to the island, aquaculture transitioned to agriculture through the eventual draining of the swamp and the cultivation of sugar cane and rice. The first successful sugar plantation to export from the islands was established at Koloa in 1835 (Hawaii Visitors Bureau, 1991), and by the 1930s, nearly all of the Mānā swamp had been filled to produce this crop.

Mānā is also an area specifically referred to in Hawaiian literature and oral tradition as a leina-a-ka-uhane, a place (generally cliffs or seacoast promontories) where the spirits of men, after death, plunge into eternity and are divided into one of three spiritual realms: the realm of the wandering spirits; the realm of the ancestral spirits; or the realm of the endless night (Han, et al., 1986; Fornander, 1917). Typical of native Hawaiian mortuary practices, burial sites believed to be associated with the Mānā leina-a-ka-uhane have been identified throughout the cliffs and dunes (Bennett, 1931).

A 100-percent archaeological inventory survey of the ROI has not been performed. However, surveys conducted by Thrum (1907), Bennett (1931), Kikuchi (1970), Ching (1974), Cleeland (1975), Borden (1977), Sinoto (1978), Kennedy/Jenkins Engineers (1982), Yent (1982), McMahon (1988a,b), Douglas (1990), Gonzalez et al (1990), Walker and Rosendahl (1990), Welch (1990), Yent (1991), Flores and Kachi (1992), O’Hare and Rosendahl (1993), U.S. Navy (undated), and studies by Kikuchi (1987) have identified burial sites, heiaus (temples), campsites, house sites, lithic scatters, and aquaculture ponds, any or all of which could be potentially eligible to the National Register of Historic Places (National Register); undoubtedly, many other sites remain unrecorded. Surveys by archaeologists (Yent, pers. com., 1993) from the Division of State Parks in the Poipu State Park and central ROI areas have relocated sites previously recorded by Bennett (1931) and Ching (1974). These site records are being updated to reflect expanded boundaries. New sites (typical of those described above) may also be present; however, survey results are preliminary, and work is still in progress (Yent, pers. com., 1993). Of the sites recorded within the area of the restrictive easement (Appendix E), there are currently no National Register-eligible or listed properties. The nearest National
Register-eligible site is the Nohili Dune, eligible as a traditional cultural property (Hawaii Department of Land and Natural Resources, 1992a;b;c). It is located within the ground hazard area on the PMRF. However, because of the number and dispersed location of sites located within its boundary, the entire PMRF may also qualify as National Register eligible (Hommon, pers. com., 1989).

3.5.2 HISTORIC BUILDINGS AND STRUCTURES

As described above, historically large portions of the restrictive easement area have been used for agricultural/aquacultural purposes. To ensure this land use, the area has been designated by the State and zoned by the County of Kauai specifically for this purpose. In addition, Poilihale State Park, at the northern end of the ROI, was established in 1967. Because of this, the construction of buildings and structures has been limited, and there are currently no inhabited buildings within the restrictive easement area. The only known structures are the remains of heiaus and house sites at Saki Mānā and the remnants of the railway system that once served the local sugar cane industry (Marshall, 1910; U.S. Department of Energy, 1992). These will be treated as archaeological sites for the purposes of this analysis. There are no National Register-eligible or -listed historic buildings or structures within the ROI.

3.5.3 TRADITIONAL RESOURCES

Traditional resources can include archaeological sites, burial sites, ceremonial areas, caves, mountains, water sources, trails, plant habitat or gathering areas, or any other natural area important to a culture for religious or heritage reasons. As such, most of the cultural materials identified within the ROI could also be considered traditional resources.

Traditional cultural sites, particularly cemeteries, indicate that, in addition to the native Hawaiians, numerous cultures have also peopled the Island of Kauai: Japanese, Korean, Portuguese, Chinese, and Filipino (Cleeland, 1975). Within the ROI, all of the traditional cultural materials identified to date have been associated with native Hawaiians; however, a Japanese cemetery is located nearby within the boundary of the PMRF. Cemeteries associated with each of the other cultures are located near Kekaha, Hanapepe, and Waimea. As described in Section 3.5.1, the only National Register-eligible traditional site in the area is the Nohili Dune.

3.6 VISUAL RESOURCES

Visual resources include natural and man-made features that give a particular environment its aesthetic qualities. Criteria used in the analysis of this resource include visual sensitivity, which is the degree of the public interest in a visual resource and concern over adverse changes to its quality. Visual sensitivity exists in areas where views are rare, unique, or in other ways special, such as remote or pristine environments. The ROI for visual resources includes the southern end of Poilihale State Park along the Pacific Ocean, the sugar cane fields on the Mānā Plain, the cliffs on the eastern boundary of the Mānā Plain, and the portion of the PMRF within the ground hazard area.
The physical setting of the area within the restrictive easement boundary is of coastal plain (Mānā Plain), coastal dunes, and cliffs. The majority of the terrain within this area is relatively flat, except for the coastal dunes found in Polihale State Park and the PMRF and the cliffs along the eastern boundary. The elevation within the ROI ranges from sea level to 8 m (25 ft) within the coastal plain, to coastal dunes reaching elevations of 30 m (100 ft), and then to the cliffs reaching elevations of 244 m (800 ft).

Within the restrictive easement boundary the dunes in Polihale State Park are the most outstanding features. Views from this area include the Pacific Ocean to the west and the sea cliffs of the Napali Coast to the north. The dunes have been designated by Kauai County as a Scenic Ecological Area because of their native vegetation and visibility in an otherwise flat landscape. The majority of the area within the restrictive easement boundary consists of the Mānā Plain which is used for the farming of sugar cane and, depending on the time of year, can consist of dirt fields or sugar cane in various stages of growth. Individual sugar cane fields are usually bordered by dirt roads and drainage channels. Along the eastern edge of the restrictive easement boundary are cliffs which rise from the Mānā Plain. Because most of the ROI historically has been used for agricultural purposes, little construction has taken place, and there are no public structures within the restrictive easement boundary. However, the area does have no trespassing signs in the cane fields and swimming hazard signs in Polihale State Park.

The dunes on the north end of the PMRF are the highest natural feature on the base. The dunes are covered with thick kiawe which in some places forms a closed canopy of up to 8 m (25 ft) high. The understory, when present, is made up largely of grasses. The remainder of the PMRF within the ROI consists mostly of non-native vegetation or a man-made environment of roads, mission-related buildings, and fences. Most of the PMRF is effectively screened from the public by vegetation along the eastern boundary (U.S. Army Strategic Defense Command, 1992b).

3.7 NOISE

Noise is defined as "unwelcome or unwanted" sound that is usually caused by human activity and added to the natural acoustic setting of a locale. It is further defined as sound that disrupts normal activities or that diminishes the quality of the environment. There are two types of sound sources: stationary and transient. Stationary sources are typically related to specific land uses (e.g., industrial plants); transient sources move through the environment either along established paths or randomly (railroads, roads, flight tracks, etc.). The total acoustical environment of a location is the blend of the background, or ambient, acoustics with the unwanted noise. Noise is described in terms of sound levels (figure 3-4), the measurement of which is usually performed using adjusted decibels (dBA). The ROI for noise includes the restrictive easement boundary and the on-base area of the PMRF within the ground hazard area.

The primary noise sources within the ROI are associated with the PMRF, the KTF, sugar cane production, road traffic, and recreational activities. These noise sources are imposed on the natural environment. The sounds from the natural environment come from the ocean, trees, birds, animals, and prevailing weather conditions.
<table>
<thead>
<tr>
<th>Common Outdoor Noise Levels</th>
<th>Noise Level (dBA)</th>
<th>Common Indoor Noise Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unmuffled motorcycle</td>
<td>110</td>
<td>Rock Band</td>
</tr>
<tr>
<td>Jet Flyover at 1,000 ft</td>
<td>100</td>
<td>Inside Subway Train (New York)</td>
</tr>
<tr>
<td>Gas Lawnmower at 3 ft</td>
<td>90</td>
<td>Food Blender at 3 ft</td>
</tr>
<tr>
<td>Noisy Urban Daytime</td>
<td>80</td>
<td>Garbage Disposal at 3 ft</td>
</tr>
<tr>
<td>Diesel Truck at 50 ft</td>
<td>70</td>
<td>Shouting at 3 ft</td>
</tr>
<tr>
<td>Gas Lawnmower at 100 ft</td>
<td>60</td>
<td>Vacuum Cleaner at 10 ft</td>
</tr>
<tr>
<td>Commercial Area</td>
<td>50</td>
<td>Normal Speech at 3 ft</td>
</tr>
<tr>
<td>Heavy Traffic at 300 ft</td>
<td>40</td>
<td>Large Business Office</td>
</tr>
<tr>
<td>Quiet Urban Nighttime</td>
<td>30</td>
<td>Dishwasher Next Room</td>
</tr>
<tr>
<td>Quiet Suburban Nighttime</td>
<td>20</td>
<td>Small Theater, Large Conference Room (Background)</td>
</tr>
<tr>
<td>Quiet Rural Nighttime</td>
<td>10</td>
<td>Library</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>Bedroom at Night</td>
</tr>
</tbody>
</table>


Comparative Sound Levels

Figure 3-4
Noise sources from the PMRF and the KTF include target drones, aircraft, helicopters, rocket and missile launches, and daily base operations. Noise levels on the PMRF near the runway average 75 dBA. Locations on base away from the runway are typical of a commercial area with noise levels around 65 dBA or less. Infrequent, short-term launch noise from the PMRF and KTF has come from Strategic Target System, Stryk, and ZEST launches. Noise associated with the ZEST program, which uses the same Talos booster as the Navy Vandal, was measured at 124.8 db at 221 m (725 ft) from the launch pad to 109.0 db at 907 m (2,975 ft). Table 3-3 shows noise levels monitored for the ZEST program and the Strategic Target System (U.S. Army Strategic Defense Command, 1992b).

Noise sources from sugar cane production within the restrictive easement include heavy equipment (e.g., bulldozers, cranes, and large haul trucks) used during planting and harvesting and small maintenance trucks used during the remainder of the growing season. Noise levels from a heavy truck at 15 m (50 ft) can be as high as 80 dBA (Department of the Air Force, 1987). Additional noise sources in the area include traffic traveling to Polihale State Park on the dirt road through the cane fields.

Noise sources at Polihale State Park include wave action, vehicle traffic, and off-road vehicles (e.g., four-wheel-drive vehicles, all-terrain vehicles, motorcycles) which drive on the beach and in the sand dunes. Noise levels from an unmuffled motorcycle can be as high as 110 dBA at 4.5 m (15 ft) (Department of the Air Force, 1987). Outside of the intermittent high noise sources, noise levels at Polihale State Park can be expected to be typical of a wilderness or rural environment with levels from 16 to 35 dBA (Cooper Engineers Inc., 1985).

3.8 HAZARDOUS MATERIALS AND WASTE

Hazardous materials and hazardous waste management activities within the ROI are governed by specific regulations. For the purpose of the following analysis, the term hazardous waste means those substances as defined by the Hawaii Hazardous Waste Management Act (HRS Title 19, Health Chapter 342J) as amended, and the Hawaii Solid Waste Management Control Regulations (Hawaii Code of Rules and Regulations, Title 11, Department of Health, Chapter 58) as amended. In general this includes substances that, because of quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health or welfare of the environment when released.

The relevant aspects of hazardous material and waste management include the applicable regulations and procedures for hazardous material usage and hazardous waste generation and management programs for hazardous waste contamination sites. The ROI for hazardous materials and waste includes the area within the restrictive easement boundary and the ground hazard area within the PMRF.

Within the ROI, hazardous materials are used in the production of sugar cane, including fuel, oils, hydraulic fluid, herbicides, and pesticides, and in the launch activities, including
Table 3-3: Sound Analyzer Data of September 1991 ZEST Launches and February 1993 Strategic Target System Launch

<table>
<thead>
<tr>
<th>Launch Vehicle</th>
<th>Distance m (ft)</th>
<th>Measured Average Peak (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZEST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 September 1991</td>
<td>305 (1,000)</td>
<td>122.5</td>
</tr>
<tr>
<td></td>
<td>385 (1,263)</td>
<td>119.6</td>
</tr>
<tr>
<td></td>
<td>221 (725)</td>
<td>124.8</td>
</tr>
<tr>
<td></td>
<td>907 (2,975)</td>
<td>110.5</td>
</tr>
<tr>
<td></td>
<td>427 (1,400)</td>
<td>119.5</td>
</tr>
<tr>
<td>11 September 1991</td>
<td>305 (1,000)</td>
<td>121.4</td>
</tr>
<tr>
<td></td>
<td>385 (1,263)</td>
<td>118.2</td>
</tr>
<tr>
<td></td>
<td>221 (725)</td>
<td>124.5</td>
</tr>
<tr>
<td></td>
<td>907 (2,975)</td>
<td>109.0</td>
</tr>
<tr>
<td></td>
<td>427 (1,400)</td>
<td>120.2</td>
</tr>
<tr>
<td>Strategic Target System</td>
<td>Distance m (ft)</td>
<td>Measured Average Peak (dB)</td>
</tr>
<tr>
<td>25 February 1993</td>
<td>175 (575)</td>
<td>125.3</td>
</tr>
<tr>
<td></td>
<td>244 (800)</td>
<td>123.0</td>
</tr>
<tr>
<td></td>
<td>259 (851)</td>
<td>121.8</td>
</tr>
<tr>
<td></td>
<td>372 (1,222)</td>
<td>118.2</td>
</tr>
<tr>
<td></td>
<td>483 (1,584)</td>
<td>115.3</td>
</tr>
<tr>
<td></td>
<td>3,048 (10,000)</td>
<td>97.1</td>
</tr>
<tr>
<td></td>
<td>10,668 (35,000)</td>
<td>54.0</td>
</tr>
</tbody>
</table>

Solvents, fuels, oxidizers, and oils. There is no hazardous materials usage associated with activities at Pohakule State Park. According to the Hawaii State Department of Health, there have been no known reported unauthorized releases of any hazardous materials or waste within the restrictive easement boundary (Miyasaka, pers. com., 1993). Hazardous materials and waste handling policies and procedures on the PMRF follow all regulatory requirements and have been discussed in the Strategic Target System Draft and Final EISs (U.S. Army Strategic Defense Command, 1992b; c).

3.9 HEALTH AND SAFETY

Health and safety includes those aspects and activities inherent to a project that present potential harm to human health and the regulations, policies, and procedures that minimize or eliminate that harm, including established safety measures to ensure the protection of all persons and property. The ROI encompasses the ground hazard area in which all debris from a terminated launch would fall.
Under the proposed action and alternatives, health and safety issues within the ROI include those associated with clearing the ground hazard area of persons during missile launches from the PMRF and KTF (Section 2.1.1). Any failure of the missile system that would cause debris to fall outside the ground hazard area would be detected by the Missile Flight Safety Officer who would terminate the missile flight before it could escape the hazard boundary (Sandia National Laboratories, 1988). To ensure the protection of all persons and property, safety procedures have been established and implemented. These standard operating procedures include establishing road control points and clearing the area using vehicles and helicopters (if necessary). The road control points are established 3 hours prior to launch to allow security forces to monitor traffic as it passes through the ground hazard area. At 20 minutes prior to launch the area is determined to be clear of the public to ensure that, in the unlikely event of early flight termination, no injuries or damage to persons or property would occur. After the Range Safety Officer declares the area safe, the security force gives the all-clear signal, and the public is allowed to reenter the area (U.S. Army Strategic Defense Command, 1992b,c).

3.10 INFRASTRUCTURE

Infrastructure that is affected by the restrictive easement consists of the following: electricity, water supply, and transportation. The ROI for infrastructure includes those systems within or immediately adjacent to the restrictive easement area.

3.10.1 ELECTRICITY

Commercial electricity in the ROI is supplied by both the Kauai Electric Company and the Kekaha Sugar Company. The Kekaha Sugar Company provides power to the pumps that drain the Mānā Plain, and the Kauai Electric Company supplies power to the PMRF. The Kekaha Sugar Company power line traverses the restrictive easement along the base of the Mānā cliffs supplying the drip irrigation pumps within the restrictive easement area. Commercial electricity is supplied to the PMRF along the southern boundary of the restrictive easement by the Kauai Electric Company via a 2,100-kilowatt capacity line which is ample supply for the PMRF's 1,350-kilowatt demand (U.S. Army Strategic Defense Command, 1992b).

3.10.2 WATER SUPPLY

Potable water is supplied to the area from two wells adjacent to the restrictive easement located to the north at Polihale State Park and to the south at Mānā Shaft. Both wells are located at the base of the cliffs.

Water from the Mānā Shaft well is used to supply fresh water to the PMRF and agricultural fields. The capacity of the well has a maximum sustained yield of 22.7 million liters (6 million gallons) per day. The water from the well is pumped through a 20-centimeter (8-inch) diameter water supply line that parallels the southern boundary of the restrictive easement. Water from the well at Polihale State Park is used exclusively for park visitors.
3.10.3 TRANSPORTATION

The ROI includes State Highway 50 and Kao Road which access the restrictive easement from the southwest and a dirt road (Lower Saki Mānā Road) within the restrictive easement which provides access to Polihale State Park.

State Highway 50, also referred to as Kaumuali Highway, is a main traffic artery which passes through most of the communities of the island (R.M. Towill Corporation, 1983). Highway 50 traverses almost the entire southern portion of the island from the north gate of the PMRF (on the west) to just north of Lihue (on the east).

Kao Road is designated as a county road that runs east toward Lower Saki Mānā Road. The paved road parallels the southern boundary of the restrictive easement. The county responsibility ends at the intersection with Lower Saki Mānā Road. Lower Saki Mānā Road, which becomes Polihale Road, provides access to Polihale State Park (figure 3-5) and is designated as a state road (Yamoto, pers. com., 1993). The unpaved Lower Saki Mānā Road is used by the Kekaha Sugar Company and state park visitors. The Kekaha Sugar Company maintains the road primarily for the heavy equipment needed to plant and harvest the sugar cane (Moe, pers. com., 1993).

The nearest data point for traffic count information to the restrictive easement is from bridge No. 1 located approximately 5 km (3 mi) south of the restrictive easement and just south of the main gate entrance to the PMRF. The traffic monitoring survey data from October 14 and 15, 1991, indicated a 24-hour total volume of 2,219 vehicles and a morning and afternoon peak-hour volume of 288 and 342 vehicles, respectively (Miyazono, pers. com., 1993).

3.11 SOCIOECONOMICS

Socioeconomic resources consist of several primary elements including population, employment, and income. Economic modeling studies demonstrate a linear relationship among these primary elements and secondary socioeconomic variables which, in a given community, include the demand for educational services and fire/police protection, transportation needs, property values, and the local housing market. This section represents an overview of socioeconomic conditions on the island of Kauai. It will focus on the tourism and agriculture sectors, both important to the island’s economic base in their significant contribution to employment and income.

For the purposes of this socioeconomic impact assessment, two geographic areas have been identified: Kauai is designated as the overall ROI, and census tract 409, including Kauai’s western portion, represents the Primary Impact Area (PIA). Data for census tract 408 has been included because of its proximity to the PIA and to further illustrate the western area’s unique socioeconomic characteristics (figure 3-6).
Population and Income

The Island of Kauai has experienced a steady population growth over the past decade, with an overall increase of 30 percent (table 3-4). This growth has occurred primarily in the more developed areas along the eastern coastline, while portions of the less densely populated westside have remained stable (census tract 409) or decreased in population (census tract 408). In comparison to the rest of the island, the western region is typically of lower income and more focused on agriculture and sugar cane production. The median household income within the PIA ($34,675 annually) is approximately 7 percent below county levels and 10 percent below the state level (table 3-4).

Prior to Hurricane Iniki in 1992, Kauai's population was expected to grow from 52,000 in 1990 to 65,000 by the year 2000 (Kauai County, 1992). However, hurricane-induced losses of both jobs and homes initially resulted in an estimated emigration of 8,000 to 10,000 people. It is difficult at this time to project how quickly and over what time frame these residents will return to Kauai; recovery will depend primarily upon the availability of funding for redevelopment efforts. A revised population forecast for Kauai has not been prepared by either local or state officials.

Housing

Kauai's housing market is characterized as overcrowded, costly, and in short supply. Although housing is expensive in comparison to mainland costs, the median value of owner-occupied units in Kauai County ($171,500) is 30.1 percent below the state level ($245,300). At $130,900, the westside PIA had the lowest median housing values. Westside rental rates were also typically lower than eastside rental housing (table 3-5) (Kauai Realty, 1993).

Housing is more crowded in the westside PIA, with 19 percent of all units having one or more person per room. The PIA's available housing supply is also more limited, with a very low vacancy rate for both owner (0.7 percent) and renter (2.7 percent) units. The state and Kauai rental vacancy was higher, with 5.4 percent and 4.3 percent respectively.

Hurricane Iniki has only compounded the problem of Kauai's adverse housing conditions. Of the total stock of 14,340 units, approximately 10 percent were destroyed and another 37 percent suffered major damage (Governor's Economic Recovery Committee, 1993). Due to the effects of Hurricane Iniki, rents have increased significantly because of demand from higher salaried construction workers.

Employment

Tourism and agriculture dominate the labor picture, representing 40 percent of total direct employment and, if indirect employment in dependent support sectors is considered, approximately 80 percent of Kauai's total employment (Kauai County, 1992). Government is also significant, providing a total of 3,350 jobs. Prior to the hurricane, the three largest employers were the Westin Hotel (1,140), Kauai County (877), and the PMRF (836). The Westin Hotel has remained closed since the hurricane. A date for reopening the facility is unclear at this time.
Table 3-4: Population and Income Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Population</th>
<th>Income</th>
<th>Population Density per km²</th>
<th>Median Household Income</th>
<th>Percent of Persons Below Poverty Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1980</td>
<td>1990</td>
<td>Percent Change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State of Hawaii</td>
<td>964,591</td>
<td>1,108,229</td>
<td>14.9</td>
<td>66.6</td>
<td>$38,829</td>
</tr>
<tr>
<td>ROI Kauai County</td>
<td>39,082</td>
<td>51,177</td>
<td>30.9</td>
<td>35.6</td>
<td>$37,425</td>
</tr>
<tr>
<td>PIA census tract 409</td>
<td>5,256</td>
<td>5,745</td>
<td>9.3</td>
<td>24.6</td>
<td>$34,675</td>
</tr>
<tr>
<td>Census tract 408</td>
<td>3,111</td>
<td>2,913</td>
<td>-6.4</td>
<td>9.3</td>
<td>$29,960</td>
</tr>
</tbody>
</table>


Table 3-5: Housing Characteristics

<table>
<thead>
<tr>
<th>Percent of Units Owner Occupied</th>
<th>Median Value of Owner Occupied Units</th>
<th>Median Rent for Rental Units</th>
<th>Owner Occupied</th>
<th>Renter Occupied</th>
<th>Percent of Occupied Housing Units with One or More Persons per Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>State of Hawaii</td>
<td>$245,300</td>
<td>$599</td>
<td>0.8</td>
<td>5.4</td>
<td>15.9</td>
</tr>
<tr>
<td>ROI Kauai County</td>
<td>$171,500</td>
<td>$532</td>
<td>0.7</td>
<td>4.3</td>
<td>15.9</td>
</tr>
<tr>
<td>ROI census tract 409</td>
<td>$130,900</td>
<td>N/A</td>
<td>0.7</td>
<td>2.7</td>
<td>15.9</td>
</tr>
<tr>
<td>Census tract 408</td>
<td>$148,400</td>
<td>N/A</td>
<td>0.4</td>
<td>1.1</td>
<td>17.4</td>
</tr>
</tbody>
</table>


N/A = not applicable because of sugar cane worker rental housing.

Both the recession and Hurricane Iniki have had an impact on Kauai's economic activity and tourism industry. Kauai's unemployment rate, ranging from 3.6 to 4.2 percent, was slightly higher than the state average during the 1980 to 1991 period but by 1992 had surpassed the state by several percentage points (table 3-6). In the wake of the hurricane, unemployment increased from a September 1992 level of 6 percent to approximately 17 percent just one month later. In the intervening months, unemployment has declined to a level of 13 percent (April 1993); this is primarily a result of an increased opportunity in the construction industry associated with cleanup and rebuilding activities. This level, however, is still significantly above the state average of 4.6 percent. From September to November 1992, the number of jobs in Kauai's construction industry increased from 1,350 to 2,900 (U.S. Department of Labor, 1993).

Agriculture

Although declining in importance from 95 percent of total crop production value (1980) to 87 percent (1990), the sugar industry is still the dominant economic force in Kauai agriculture. The annual total value of crops has also decreased, going from $88 million to
Table 3-6: Employment Trends, Kauai and State of Hawaii

<table>
<thead>
<tr>
<th></th>
<th>Kauai</th>
<th>State of Hawaii</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Percent Unemployed</td>
<td>Employed Labor Force</td>
</tr>
<tr>
<td>1990</td>
<td>3.6</td>
<td>27,350</td>
</tr>
<tr>
<td>1991</td>
<td>4.2</td>
<td>29,050</td>
</tr>
<tr>
<td>1992</td>
<td></td>
<td></td>
</tr>
<tr>
<td>January</td>
<td>5.4</td>
<td>28,850</td>
</tr>
<tr>
<td>February</td>
<td>5.9</td>
<td>28,450</td>
</tr>
<tr>
<td>March</td>
<td>5.3</td>
<td>28,450</td>
</tr>
<tr>
<td>April</td>
<td>5.5</td>
<td>28,100</td>
</tr>
<tr>
<td>May</td>
<td>6.3</td>
<td>28,050</td>
</tr>
<tr>
<td>June</td>
<td>7.7</td>
<td>28,350</td>
</tr>
<tr>
<td>July</td>
<td>7.0</td>
<td>28,750</td>
</tr>
<tr>
<td>August</td>
<td>5.8</td>
<td>28,850</td>
</tr>
<tr>
<td>September</td>
<td>6.0</td>
<td>28,350</td>
</tr>
<tr>
<td>October</td>
<td>16.8</td>
<td>24,700</td>
</tr>
<tr>
<td>November</td>
<td>16.1</td>
<td>25,000</td>
</tr>
<tr>
<td>December</td>
<td>13.5</td>
<td>25,250</td>
</tr>
<tr>
<td>Annual Average</td>
<td>8.4</td>
<td>27,550</td>
</tr>
<tr>
<td>1993</td>
<td></td>
<td></td>
</tr>
<tr>
<td>January</td>
<td>14.2</td>
<td>25,950</td>
</tr>
<tr>
<td>February</td>
<td>13.4</td>
<td>25,850</td>
</tr>
<tr>
<td>March</td>
<td>12.2</td>
<td>26,350</td>
</tr>
<tr>
<td>April</td>
<td>12.9</td>
<td>26,650</td>
</tr>
</tbody>
</table>


$60 million over the decade (table 3-7). Diversified crops are increasingly being planted on the island but not at a sufficient rate to compensate for the income and employment decline occurring in the Kauai sugar industry.

In part, the decline in sugar production and revenue stems from the increased supply and competition of the world market, reducing sugar prices to a near break-even profit margin of 22 cents per pound (Klemm, pers. com., 1993). Recent periods of wet weather are yet another factor in the reduction of the island sugar yield.

The restrictive easement currently being proposed is located primarily on State of Hawaii land leased to the Kekaha Sugar Company; the lease expires on December 31, 1993. The Kekaha Sugar Company is one of five major sugar producers on the island (table 3-8), employing 335 people (State of Hawaiii, 1989). With a total of approximately 3,357 ha (8,294 ac) of cane land, Kekaha is the second largest sugar company, exceeded only by the Lihue Plantation Company with approximately 4,533 ha (11,200 ac) of cane land.
Table 3-7: Value of Crops Sold on Kauai (in thousands)

<table>
<thead>
<tr>
<th></th>
<th>Unprocessed Sugar Cane</th>
<th>Taro</th>
<th>Fruits and Vegetables</th>
<th>Other/Field Crops</th>
<th>Flowers and Nursery Products</th>
<th>Total Crop Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>583,600</td>
<td>4855</td>
<td>42,073</td>
<td>4954</td>
<td>4615</td>
<td>588,107</td>
</tr>
<tr>
<td>1985</td>
<td>53,300</td>
<td>1,032</td>
<td>2,305</td>
<td>1,716</td>
<td>1,719</td>
<td>59,532</td>
</tr>
<tr>
<td>1990</td>
<td>52,400</td>
<td>1,379</td>
<td>2,836</td>
<td>1,952</td>
<td>1,856</td>
<td>60,163</td>
</tr>
</tbody>
</table>

Source: Kauai County, 1993.

Table 3-8: Average Cane Land for Kauai Sugar Companies, 1991

<table>
<thead>
<tr>
<th>Sugar Company</th>
<th>Average Cane Land in hectares (acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kakaha Sugar Company</td>
<td>3,357 (8,294)</td>
</tr>
<tr>
<td>Lihue Plantation Company</td>
<td>4,541 (11,220)</td>
</tr>
<tr>
<td>McBryde Sugar Company</td>
<td>2,839 (7,015)</td>
</tr>
<tr>
<td>Olokele Sugar Company</td>
<td>1,908 (4,716)</td>
</tr>
<tr>
<td>Gay and Robinson, Inc.</td>
<td>1,112 (2,747)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>13,758 (33,992)</strong></td>
</tr>
</tbody>
</table>


(table 3-8). Kakaha is a highly efficient sugar producer with productivity levels consistently above state and county production levels (table 3-9).

Tourism

The tourism industry represents a significant part of Kauai’s economic base, accounting for an estimated 30 percent, or 10,860, of all direct jobs. When combined with industries indirectly dependent on tourism, the sector provides about 58 percent of Kauai’s total employment. It was estimated that 2,150 hotel-related jobs were lost as a result of Hurricane Iniki. The tourism employment base is recovering but at a slower rate than was initially forecast (Governor’s Economic Recovery Committee, 1993).

During the period encompassing 1988 to 1991, Kauai’s share of the Hawaii visitor market increased slightly from approximately 11 to 12 percent. Kauai was showing strong growth in 1992 until the hurricane’s impact reduced its market share to only 3 percent (table 3-10).

As of June 1993, there are an estimated 3,500 visitor rooms available for tourists as compared to the pre-hurricane inventory of about 7,800 (Kanoho, pers. com., 1993). Historically, the primary focus of the Kauai tourism industry has been in the Poipu-Kukuiula area which accounted for 35 percent (2,731) of the island’s total 7,778 visitor rooms. The Waialua-Kapaau also had a high concentration of visitor accommodations with its 2,372 rooms representing 30 percent of Kauai’s inventory. There are only 67 visitor rooms in the Kalaheo-Waimea area, approximately 16 km (10 mi) south of the restrictive easement site,
Table 3-9: Trends in Raw Sugar Production and Productivity Levels

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Kekaha Sugar</strong></td>
<td>52,867</td>
<td>51,149</td>
<td>46,953</td>
<td>40,770</td>
<td>36,523</td>
<td>46,652</td>
</tr>
<tr>
<td>Company</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kauai County</td>
<td>227,838</td>
<td>210,887</td>
<td>200,356</td>
<td>176,470</td>
<td>137,073</td>
<td>190,624</td>
</tr>
<tr>
<td>State of Hawaii</td>
<td>928,195</td>
<td>863,614</td>
<td>819,631</td>
<td>724,100</td>
<td>652,304</td>
<td>797,568</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tons of Sugar Produced (per acre)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kekaha Sugar</td>
<td>13.21</td>
<td>12.78</td>
<td>11.81</td>
<td>11.36</td>
<td>11.53</td>
<td>12.99</td>
</tr>
<tr>
<td>Company</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kauai County</td>
<td>11.34</td>
<td>11.57</td>
<td>11.38</td>
<td>9.10</td>
<td>8.25</td>
<td>10.53</td>
</tr>
<tr>
<td>State of Hawaii</td>
<td>12.21</td>
<td>10.39</td>
<td>10.16</td>
<td>10.69</td>
<td>10.50</td>
<td>10.79</td>
</tr>
</tbody>
</table>


Table 3-10: Average Daily Visitors, Kauai and State of Hawaii

<table>
<thead>
<tr>
<th></th>
<th>Kauai</th>
<th>State of Hawaii</th>
<th>Kauai as % of State</th>
</tr>
</thead>
<tbody>
<tr>
<td>1988</td>
<td>16,400</td>
<td>141,410</td>
<td>11.6</td>
</tr>
<tr>
<td>1989</td>
<td>19,140</td>
<td>169,870</td>
<td>11.3</td>
</tr>
<tr>
<td>1990</td>
<td>18,200</td>
<td>162,070</td>
<td>11.2</td>
</tr>
<tr>
<td>1991</td>
<td>19,020</td>
<td>157,590</td>
<td>12.1</td>
</tr>
<tr>
<td>1992</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>January</td>
<td>15,440</td>
<td>155,070</td>
<td>9.9</td>
</tr>
<tr>
<td>February</td>
<td>14,680</td>
<td>154,950</td>
<td>9.5</td>
</tr>
<tr>
<td>March</td>
<td>19,260</td>
<td>171,540</td>
<td>11.2</td>
</tr>
<tr>
<td>April</td>
<td>16,160</td>
<td>139,160</td>
<td>11.6</td>
</tr>
<tr>
<td>May</td>
<td>15,740</td>
<td>135,040</td>
<td>11.7</td>
</tr>
<tr>
<td>June</td>
<td>17,760</td>
<td>163,670</td>
<td>10.9</td>
</tr>
<tr>
<td>July</td>
<td>18,750</td>
<td>165,310</td>
<td>11.3</td>
</tr>
<tr>
<td>August</td>
<td>19,630</td>
<td>163,580</td>
<td>12.0</td>
</tr>
<tr>
<td>September</td>
<td>9,860</td>
<td>136,220</td>
<td>7.2</td>
</tr>
<tr>
<td>October</td>
<td>4,160</td>
<td>137,610</td>
<td>3.0</td>
</tr>
<tr>
<td>November</td>
<td>4,320</td>
<td>150,520</td>
<td>2.9</td>
</tr>
<tr>
<td>December</td>
<td>5,850</td>
<td>165,830</td>
<td>3.4</td>
</tr>
<tr>
<td>Annual Average</td>
<td>13,460</td>
<td>153,350</td>
<td>8.8</td>
</tr>
</tbody>
</table>

consisting of cottage, bed and breakfast, and lodge visitor accommodations (table 3-11). There are no major hotel facilities in the area.

Pacific Missile Range Facility

The PMRF is the largest Federal Government employer on the island and numbers approximately 836 people among its personnel, including tenant organizations and civilian contractors. About 705 of these employees work directly for the PMRF (U.S. Army Strategic Defense Command, 1992b); the remaining are employed by the tenant organizations and civilian contractors. The PMRF workforce is composed of 112 DOD civilian personnel, 137 military personnel, and 456 contractor personnel. The PMRF also has a large number of official visitors, accounting for approximately 20,000 visitor days (U.S. Army Strategic Defense Command, 1992b). The KTF employs 14 permanent personnel and 30 to 75 transient personnel during launch operational periods (U.S. Army Strategic Defense Command, 1992b). Table 3-12 represents employment, support personnel, and annual budgets for each of the installation’s tenant organizations and civilian contractors.

The total annual expenditures for the PMRF, tenant organizations, and contractors amounted to $72.4 million in 1993. The PMRF had a FY 1993 operating budget of $50.1 million, including a payroll of $29.6 million. The average annual wage for Federal civilian and contractor personnel was approximately $34,000 and for Federal military personnel, $33,000 (U.S. Army Strategic Defense Command, 1992b). These average wages are higher than those found in other industries on the island, mainly because of the specialized skills and higher educational requirements needed for these positions.

The PMRF expenditures for FY 1991 included $5.2 million for construction projects and $5.6 million for other purchases with an increase to $26 million in construction expenditures for FY 1993. The installation has ongoing capital improvement projects for upgrades and additions to installation facilities and infrastructure. The annual capital improvement projects average about $10 to $12 million. The annual operating budget of the KTF has ranged between $0.9 and $2.5 million annually (U.S. Army Strategic Defense Command, 1992b). In addition to the expenditures by the PMRF and KTF, other installation tenant organizations and civilian contractors procure materials and services locally.

Besides providing economic benefits to the island, the PMRF has become an integral part of the local community and participates in and supports numerous activities. Some of the activities are the Waimea Town Celebration, Armed Forces Day parade, Veterans Day parade, Toys for Tots, United Way, Boy Scouts of America, Girl Scouts of America, Navy League, recycling programs, and the Federal Junior Fellowship Program.

The PMRF air operations, emergency medical team, crash fire rescue team, security, base support, and marine departments all render services to the surrounding communities. The PMRF aircraft have evacuated patients from area ships and the island of Niihau to hospitals on Kauai and from Kauai to Oahu. These aircraft have aided in search and rescue missions on the island and in the surrounding ocean, as well.
Table 3-11: Inventory of Visitor Accommodations 1992 (prior to Hurricane Iniki)

<table>
<thead>
<tr>
<th>Market Area</th>
<th>Type of Accommodation</th>
<th>Number of Properties</th>
<th>Available Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kalaheo-Waimea</td>
<td>Cottage</td>
<td>2</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>B&amp;B</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Lodge</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>5</td>
<td>67</td>
</tr>
<tr>
<td>Lihue</td>
<td>Hotel</td>
<td>5</td>
<td>1,272</td>
</tr>
<tr>
<td></td>
<td>Condo</td>
<td>4</td>
<td>364</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>2</td>
<td>51</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>11</td>
<td>1,687</td>
</tr>
<tr>
<td>Poipu-Kukuiula</td>
<td>Hotel</td>
<td>5</td>
<td>1,631</td>
</tr>
<tr>
<td></td>
<td>Condo</td>
<td>17</td>
<td>941</td>
</tr>
<tr>
<td></td>
<td>Hotel/condo</td>
<td>2</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Cottage</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>B&amp;B</td>
<td>5</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>5</td>
<td>48</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>39</td>
<td>2,731</td>
</tr>
<tr>
<td>Princeville-Hanalei</td>
<td>Hotel</td>
<td>1</td>
<td>252</td>
</tr>
<tr>
<td></td>
<td>Condo</td>
<td>13</td>
<td>412</td>
</tr>
<tr>
<td></td>
<td>Hotel/condo</td>
<td>3</td>
<td>218</td>
</tr>
<tr>
<td></td>
<td>Apt, apt/hotel</td>
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<td>4</td>
</tr>
<tr>
<td></td>
<td>Cottage</td>
<td>4</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>B&amp;B</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>28</td>
<td>521</td>
</tr>
<tr>
<td>Wailua-Kapaa</td>
<td>Hotel</td>
<td>7</td>
<td>1,601</td>
</tr>
<tr>
<td></td>
<td>Condo</td>
<td>5</td>
<td>442</td>
</tr>
<tr>
<td></td>
<td>Hotel/condo</td>
<td>4</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td>Cottage</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>B&amp;B</td>
<td>15</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Hostel</td>
<td>1</td>
<td>34</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>33</td>
<td>2,372</td>
</tr>
</tbody>
</table>

Kauai Total: 116

Available Units: 7,778


The emergency medical team has responded when needed in off-base communities. The crash fire rescue team works closely with the county fire department and otherwise supports the local community. The marine department at Port Allen aids in search and rescue operations and provides towing to stricken vessels. In the event of oil spills, the marine department is also available to assist containment and cleanup operations.

During and following Hurricane Iniki, the PMRF provided manpower, materials, transportation, and logistical support valued at approximately $287,000 to various Kauai
<table>
<thead>
<tr>
<th>Activity/Tenant</th>
<th>Employees</th>
<th>Support* Personnel</th>
<th>FY 93 Annual Budget (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEGIS</td>
<td>1</td>
<td>300</td>
<td>$6.0</td>
</tr>
<tr>
<td>Allied Signal GSD (Vandal)</td>
<td>2</td>
<td>10</td>
<td>–</td>
</tr>
<tr>
<td>Beech Aerospace</td>
<td>3</td>
<td>–</td>
<td>$0.7</td>
</tr>
<tr>
<td>Bendix/NASA</td>
<td>7</td>
<td>–</td>
<td>$1.0</td>
</tr>
<tr>
<td>HIANG 154th ACS</td>
<td>25</td>
<td>113*</td>
<td>$1.5</td>
</tr>
<tr>
<td>HIANG 298th ATCF</td>
<td>13</td>
<td>59*</td>
<td>$1.0</td>
</tr>
<tr>
<td>Marines</td>
<td>–</td>
<td>–</td>
<td>$0.3</td>
</tr>
<tr>
<td>NIST</td>
<td>4</td>
<td>–</td>
<td>$0.3</td>
</tr>
<tr>
<td>NEX</td>
<td>16</td>
<td>–</td>
<td>$1.6</td>
</tr>
<tr>
<td>NUWC</td>
<td>25</td>
<td>–</td>
<td>$2.6</td>
</tr>
<tr>
<td>PMRF</td>
<td>705</td>
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<td>$50.1</td>
</tr>
<tr>
<td>CPK*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NAVAIRWRCENWPNDIV</td>
<td>2</td>
<td>30</td>
<td>$2.0</td>
</tr>
<tr>
<td>Sandia</td>
<td>14</td>
<td>30</td>
<td>$2.4</td>
</tr>
<tr>
<td>SRS Tech</td>
<td>8</td>
<td>6*</td>
<td>$1.4</td>
</tr>
<tr>
<td>U.S. Dept. of Agriculture</td>
<td>7</td>
<td>–</td>
<td>$1.5</td>
</tr>
<tr>
<td>U.S. Dept. of Agriculture/Animal Damage Controls</td>
<td>3</td>
<td>–</td>
<td>$0.02</td>
</tr>
</tbody>
</table>

Total: 835 employees, 548 support personnel, $72.4 million

*Support personnel who work at the PMRF during selected program activities
*Training personnel
*Included in PMRF totals

disaster relief agencies and local citizens. Its military and civilian personnel assisted in removing debris from roads, provided temporary roof repairs, and supplied electrical generators and electricians to restore utilities to local communities. Moreover, the PMRF established emergency HAM radio and very high frequency communications systems for Kauai, assisted in installing numerous phones, and acquired additional trunk lines to the mainland. In the area of transportation, the PMRF flew 30,000 sorties and provided 250 vehicles for transporting disaster-relief personnel and supplies. Emergency medical support, treatment, and medical evacuation flights were also provided by the military to injured residents (Pacific Missile Range Facility, 1993).
3.12 RECREATION

Recreation includes designated areas such as state and county parks, beaches, and fishing areas. A park is defined as an area which, by reason of location, natural features, scenic beauty, or legendary, historical, or scientific interest, possesses distinctive physical, aesthetic, intellectual, creative, or social value (HRS 184-1). The ROI for recreational resources is the restrictive easement boundary and the coastline along the PMRF within the ground hazard area.

Polihale State Park – The only state or county recreation area within the ROI is the approximate 57-hectare (140-acre) Polihale State Park of which approximately 28 ha (70 ac) of the southern extent is within the restrictive easement boundary (figure 3-7). Polihale State Park is operated by the DLNR Division of State Parks. The duties of the DLNR are to preserve the park in its natural condition so far as may be consistent with its use and safety and improve it in a manner to retain to the maximum extent its natural, scenic, historic, and wildlife value for the use and enjoyment of the public (HRS 184-6).

Polihale State Park is used for swimming, shore fishing, native Hawaiian subsistence fishing, picnicking, tent camping, and trailer camping. Amenities are provided for day-use picnicking (e.g., pavilions), and there are approximately 11 developed sites for overnight camping (State of Hawaii, 1992). Over the last 5 years (fiscal years 1986 to 1991), the Division of State Parks estimated day use to average 407,800 persons per year, with approximately 1,542 permits being issued for overnight camping in 1991 (Souza, pers. com., 1993a,b). The area within the restrictive easement boundary contains no developed camp sites or picnicking areas. Access to the north area of the state park where the developed campsites and picnicking areas exist is provided by an 8-kilometer (5-mile) dirt road from Highway 50 through the cane fields and the ground hazard area (State of Hawaii, 1992).

Currently, the Division of State Parks is planning a possible expansion of Polihale State Park (figure 3-8) that would include a portion of the sugar cane fields and cliffs adjacent to the park boundary. Sugar cane production or other agricultural uses would be allowed to continue under the proposed expansion program. The purpose of the expansion is to encompass sensitive cultural resources and biological resources within the park boundary; no park development, other than interpretive trail signs, is anticipated within the proposed expansion area. Currently, there is no formal date for the possible expansion of the state park (Souza, pers. com., 1993a).

Pacific Missile Range Facility – To facilitate public access on the PMRF, the coastline (approximately 300 m [1,000 ft] wide and 13 km [8 mi] long) has been divided into three recreational areas, designated recreation areas 1, 2, and 3 (figure 3-9). Except when closed for hazardous operations, recreation area 1 is open Monday through Friday from 4:00 p.m. to 6:00 a.m., recreation area 2 is open from 6:00 p.m. to 6:00 a.m., and recreation area 3 is open 24 hours a day. All three recreation areas are open 24 hours a day on weekends and holidays. Additional closure times occasionally occur when hazardous operations are being conducted. These additional closure times average 6 days
per year for KTF operations (U.S. Army Strategic Defense Command, 1992b) near recreation area 1. Most PMRF operations take place during the times these areas are normally closed (U.S. Army Strategic Defense Command, 1992b).

Recreation area 3 was requested most frequently (52 percent of the time), followed by recreation area 1 (11 percent) and recreation area 2 (5 percent). The most popular activities at these recreation areas are surfing (41 percent), fishing (30 percent), and general beach activities (19 percent) (U.S. Army Strategic Defense Command, 1992b).
4.0 Environmental Consequences
4.0 ENVIRONMENTAL CONSEQUENCES

This section presents the results of the analysis of the potential environmental effects of implementing the proposed action and alternatives, including the no-action alternative. Changes to the natural and human environments that may result from the proposed action and alternatives were evaluated relative to the existing environment as described in Section 3.0. In considering the significance of potential effects, this EIS addresses the sum of effects on the quality of the environment and has evaluated the overall cumulative effects of the action. In determining whether the proposed action and alternatives may have a significant effect on the environment, this EIS considered every phase of the action, the expected consequences, both primary and secondary, and the cumulative as well as the short- and long-term effects of the action. The potential for significant environmental consequences was evaluated utilizing the significance criteria as defined in Title 11 Hawaii Department of Health Chapter 200, Environmental Impact Statement Rules, Subchapter 6, "Determination of Significance."

The potential expansion of Polihale State Park may contribute to cumulative environmental impacts. The possible expansion would include a portion of the sugar cane fields and cliffs adjacent to the park boundary (figure 3-8). Sugar cane production or other agricultural uses would be allowed to continue under the possible expansion program. The purpose of the expansion is to encompass sensitive cultural resources and biological resources within the park boundary. No park development other than interpretive trail signs is anticipated within the expansion area. Although no formal date for expansion of the state park has been given, the potential for cumulative effects with the proposed action and alternatives is analyzed in this EIS.

Cumulative impacts associated with launch activity from the PMRF and KTF (e.g., Vandal and Strategic Target System) have been addressed in the Draft and Final Strategic Target System EISs (U.S. Army Strategic Defense Command, 1992b; c). The results of these analyses indicated no significant cumulative impacts would occur due to launch activities because the launches are discrete events, occur infrequently, and are of short duration, and no significant effects on the environment of past launches have been identified.

Environmental monitoring was conducted before, during, and after the February 26, 1993, Strategic Target System launch to verify impact analyses presented in the Strategic Target System Draft and Final EISs (U.S. Army Strategic Defense Command, 1992b; c). The monitoring results (U.S. Army Space and Strategic Defense Command, 1993a) for all resources indicated no significant effects from the launch of the Strategic Target System missile. The only observable effect of the launch was temporary leaf discoloration of the kiauwe vegetation immediately adjacent to the launch pad. A review of the area 4 months after the launch showed that recovery of the vegetation had occurred. The monitoring results (U.S. Army Space and Strategic Defense Command, 1993a) confirmed that no significant impacts to the human or natural environment occurred as a result of the launch of the Strategic Target System missile. The analysis and conclusions from the Strategic Target System Draft and Final EISs are incorporated here by reference. No significant impact to any of the enumerated resource areas is anticipated.
4.1 GEOLOGY AND SOILS

This section describes the potential impacts within the restrictive easement boundary and the ground hazard area within the PMRF as a result of the proposed action and alternatives with respect to geology and soils.

4.1.1 PROPOSED ACTION

Under the proposed action no physical changes to the environment within the restrictive easement are anticipated. Establishment of the restrictive easement would limit new development which would maintain the current physiographic conditions. No short-term or long-term impacts would occur from the proposed action with respect to the geology and soils. The Vandal launch activities within the ROI would not impact the geology or soil resources. Analysis conducted for the Talos booster (same as Vandal booster) at the KTF indicated that no significant impacts would occur to soils from emitted lead (Strategic Defense Initiative Organization, 1991). The Strategic Target System EISs determined there would be no significant impact on geology and soils resulting from the Strategic Target System launches (U.S. Army Strategic Defense Command, 1992b;c).

4.1.2 REVISED MEMORANDUM OF AGREEMENT

The impacts under this alternative would be similar to those of the proposed action.

4.1.3 NO-ACTION ALTERNATIVE

Under the no-action alternative, use of the area would be unchanged; therefore, no effects to geological resources would occur.

4.1.4 CUMULATIVE IMPACTS

The possible expansion of Polihale State Park does not involve any construction other than interpretive trail signs; therefore, cumulative impacts to geology and soil resources would not occur in conjunction with implementation of the restrictive easement. In addition, no cumulative impacts due to launch activities would occur (U.S. Army Strategic Defense Command, 1992b;c).

4.1.5 MITIGATION MEASURES

Although no significant impacts to soils from lead are anticipated from Vandal activities, the U.S. Navy would conduct a baseline survey for possible lead contamination around the Vandal launch site and perform periodic monitoring to assess the potential impacts from all launches from the launch site.

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4.2 WATER RESOURCES

This section describes the potential impacts to water resources within the restrictive easement and the ground hazard area on the PMRF that could occur from the proposed action and alternatives.

4.2.1 PROPOSED ACTION

Under the proposed action, no new development that would affect water resources within the restrictive easement is planned. No impacts to water resources are anticipated under the proposed action since the effect of implementing the restrictive easement does not involve the resource directly or indirectly. The Vandal launch activities within the ROI would not impact the water resources. Analysis conducted for the Talos booster (same as Vandal booster) at the KTF indicated that no significant impacts would occur from emitted lead (Strategic Defense Initiative Organization, 1991). No significant impacts would occur to water resources as a result of the Strategic Target System launches (U.S. Army Strategic Defense Command, 1992b,c).

4.2.2 REVISED MEMORANDUM OF AGREEMENT

The impact under this alternative would be similar to that of the proposed action.

4.2.3 NO-ACTION ALTERNATIVE

Under the no-action alternative the area would remain unchanged, and there would be no effects on water resources.

4.2.4 CUMULATIVE IMPACTS

The possible expansion of Polihale State Park does not involve any development of the land other than interpretive trail signs; therefore, no cumulative impacts to water resources in conjunction with the restrictive easement would occur. In addition, no cumulative impacts due to launch activities would occur (U.S. Army Strategic Defense Command, 1992b,c).

4.2.5 MITIGATION MEASURES

Because no significant impacts would occur, no mitigation measures are required for water resources.
4.3 AIR QUALITY

The air quality analytical approach involved evaluating the potential impacts of proposed activities on regional air quality. Miscellaneous sweep-and-search vehicles, helicopters, and Strategic Target System and Vandal missile launches would periodically emit combustion emissions which could affect air quality standards.

4.3.1 PROPOSED ACTION

Emissions from restrictive easement support activities may slightly degrade local air quality, but impacts would be negligible and temporary and not significant.

Sweep-and-search activities to minimize risk to the public would occur up to 30 times per year, and helicopters would be used only if necessary. Due to the intermittent and small number of sweep-and-search occurrences, impacts are not expected to be significant since the proposed action activities would not cause the national or the Hawaiian ambient air quality standards to be exceeded.

Launches of the Vandal missile would emit less combustion emissions than the Strategic Target System, except for lead and carbon dioxide (table 4-1). Analyses conducted for the ZEST program at the KTF which used the same Talos boosters as the Vandal concluded that launch activity would have no significant impact on air quality and would not affect the attainment status for Kauai (Strategic Defense Initiative Organization, 1991). In addition, cumulative analyses conducted in the Strategic Target System Draft EIS concluded that no significant impacts would occur from the missile launch activities at the PMRF and KTF. Overall, no significant air quality impacts would occur from the launch of Vandal or the Strategic Target System missile (U.S. Army Strategic Defense Command, 1992b; c).

4.3.2 REVISED MEMORANDUM OF AGREEMENT

The impacts under this alternative would be the same as those discussed in Section 4.3.1.

4.3.3 NO-ACTION ALTERNATIVE

Under the no-action alternative, no restrictive easement would be established, and the area would remain unchanged from its current conditions described in Section 3.3; therefore, no additional impacts to air quality would occur.

4.3.4 CUMULATIVE IMPACTS

Because the possible park expansion does not involve any increase in activities or new development, no cumulative impacts would occur in conjunction with the proposed action.
Table 4-1: Combustive Emission Products from Vandal and Strategic Target System Boosters

<table>
<thead>
<tr>
<th>Combustion Product</th>
<th>Vandal/Talos kg (lb)</th>
<th>First-stage Strategic Target System kg (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Oxide</td>
<td>0</td>
<td>3,558.80 (7,845.67)</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>412.32 (909)</td>
<td>2,355.86 (5,193.70)</td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>415.95 (917)</td>
<td>211.34 (465.91)</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>19.50 (43)</td>
<td>219.83 (484.63)</td>
</tr>
<tr>
<td>Hydrogen Chloride</td>
<td>0</td>
<td>1,576.55 (3,475.64)</td>
</tr>
<tr>
<td>Lead</td>
<td>19.50 (43)</td>
<td>0</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>150.14 (331)</td>
<td>894.42 (1,971.82)</td>
</tr>
<tr>
<td>Water</td>
<td>121.56 (268)</td>
<td>598.16 (1,318.70)</td>
</tr>
<tr>
<td>Chlorine</td>
<td>0</td>
<td>19.81 (43.68)</td>
</tr>
<tr>
<td>Total</td>
<td>1,138.98 (2,511)</td>
<td>9,434.77 (20,800)</td>
</tr>
</tbody>
</table>

or alternatives. No cumulative effects due to launch activities would occur (U.S. Army Strategic Defense Command, 1992b,c).

4.3.5 MITIGATION MEASURES

The potential adverse impacts to air quality are not significant; therefore, no mitigation measures would be required.

4.4 BIOLOGICAL RESOURCES

The biological resources analytical approach involved evaluating the potential impact of the proposed activities on vegetation and wildlife, including threatened and endangered species. Biological resources could potentially be affected by alteration or loss of vegetation and disturbance of wildlife. Impacts are assessed by comparing project characteristics and activities to known locations of sensitive biological resources.

4.4.1 PROPOSED ACTION

The proposed action consists of acquiring approximately 854 ha (2,110 ac) of off-base land adjacent to the PMRF as a restrictive easement. Conditions of the restrictive easement would limit development in the area for 9 years. The only direct mission activity which would occur over the restrictive easement area with the potential for impacts would be intermittent helicopter flights to ensure clearance prior to launches. The proposed restrictive easement would continue to be used for agricultural and public recreational purposes. Helicopter noise could cause a startle effect on wildlife in the area, but no

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significant impacts are expected. The proposed restrictive easement would not cause any impacts to vegetation. The implementation of the proposed restrictive easement would not cause any impacts to the wetlands present in the ROI, which are classified as man-made, artificial wetlands. Potential impacts on biological resources due to Vandal launches are similar to those evaluated in the Strategic Target System EIS (U.S. Army Strategic Defense Command, 1992b,c). Based on that analysis, no significant impacts would occur.

4.4.2 REVISED MEMORANDUM OF AGREEMENT

The impacts under this alternative would be the same as those discussed in Section 4.4.1.

4.4.3 NO-ACTION ALTERNATIVE

Under the no-action alternative, no restrictive easement would be established, and the area would remain unchanged from its current conditions described in Section 3.4; therefore, no impacts to biological resources would occur.

4.4.4 CUMULATIVE IMPACTS

No cumulative impacts would occur as a result of the proposed action or alternatives. Expansion of the park would also protect biological resources. Currently, the Division of State Parks is planning for the expansion of Polihale State Park to the east of its current boundary. No new development is anticipated except for interpretive trail signs. This expansion would result in positive cumulative impacts to biological resources through the protection of additional habitat along with the wildlife which use it. Cumulative impacts due to the Vandal launches were considered as part of the cumulative impact evaluation in the Strategic Target System EIS (U.S. Army Strategic Defense Command, 1992b,c). No significant cumulative impacts would occur.

4.4.5 MITIGATION MEASURES

No significant impacts to vegetation and wildlife, including threatened and endangered species, would occur; therefore, no mitigation measures would be required.

4.5 CULTURAL RESOURCES

Numerous laws and regulations require that possible effects to cultural resources be considered during the planning and execution of Federal undertakings, including effects on properties not owned or controlled by the Federal agency. These laws and regulations stipulate a process of compliance, define the responsibilities of the agency proposing the action, and prescribe the relationships among other involved agencies (e.g., the State Historic Preservation Office and the Advisory Council on Historic Preservation). Although there are others, the primary laws that pertain to the treatment of cultural resources are
the National Historic Preservation Act (NHPA) (especially sections 106, 110, and 111), the 
Archaeological Resources Protection Act (ARPA), the American Indian Religious Freedom 
Act, and the Native American Graves Protection and Repatriation Act (NAGPRA). Because 
activities described in this EIS have the potential to affect land owned by the State of 
Hawaii and the Kekaha Sugar Company, state and county laws and guidelines are also 
applicable and include HRS chapters 343, 344, and 6E (amended); Hawaii Act 306 (State 
Burials Law); the Hawaii State Functional Plan for Historic Preservation; and Chapter 8 of 
the Kauai County Code.

Only those cultural resources determined to be potentially significant under legislation are 
subject to protection from adverse impacts resulting from the proposed action or its 
alternatives. To be considered significant, cultural resources must meet one or more of 
the criteria established by the State of Hawaii and/or the National Park Service that would 
make that resource eligible for inclusion in the Hawaii Register of Historic Places or the 
National Register. The term "eligible for inclusion" includes both properties formally 
determined as such (by consensus of the Hawaii State Historic Preservation Division or the 
Secretary of the Interior) and all other properties that meet the listing criteria. Therefore, 
sites not yet evaluated are considered potentially eligible and, as such, are afforded the 
same regulatory consideration as formally nominated properties. Whether prehistoric, 
historic, or traditional, significant cultural resources are referred to as "historic properties."

An undertaking is considered to have an effect on a historic property when it may alter 
characteristics of the property that may qualify the property for inclusion in the National 
Register. An effect is considered to be adverse when it diminishes the integrity of the 
property's location, design, setting, materials, workmanship, feeling, or association. 
Adverse effects on historic properties include but are not limited to:

(1) Physical destruction, damage, or alteration of all or part of the property

(2) Isolation of the property from or alteration of the character of the property's 
setting when that character contributes to the property's 
qualification for the National Register

(3) Introduction of visual, audible, or atmospheric elements that are out of 
character with the property or alter its setting

(4) Neglect of a property resulting in its deterioration or destruction

(5) Transfer, lease, or sale of the property (36 CFR 800.9(b))

Potential adverse effects to historic properties were assessed by (1) determining the areas 
that would be affected (ROI), (2) identifying the nature and potential significance of the 
resources within the ROI, and (3) assessing the effects that the undertaking would have on 
any significant resources. Pursuant to the Section 106 of the National Historic 
Preservation Act, consultation with the Hawaii State Historic Preservation Officer has been 
conducted for the ROI (U.S. Army Strategic Defense Command, 1992b;c) as mandated by 
HRS Chapter 6E (Hawaii State Historic Preservation process). Consultation with the
Hawaii State Historic Preservation Officer would be continued for issues regarding cultural resources within the ROI.

4.5.1 PROPOSED ACTION

As described in Section 3.5, it is evident that the entire Mānā area, including the ROI, is sensitive for prehistoric, historic, and traditional resources, including burials. Although some of these resources may eventually qualify, currently there are no properties within the restrictive easement area that are listed or eligible for listing on the Hawaii Register or National Register.

The sole intent of the proposed action is to allow the U.S. Government to acquire a restrictive easement on approximately 854 ha (2,110 ac) of land owned by the State of Hawaii and the Kekaha Sugar Company for the protection of persons and property during missile launches conducted from the PMRF and KTF. Land uses within the ROI would remain unchanged from current agricultural, grazing, and public recreational purposes, and no new construction is planned under the proposed action. With the exception of the placement of warning signs throughout the restrictive easement area, no ground-disturbing activities or other activities that could have the potential to adversely affect significant cultural resources sites or burials would take place. To ensure that there are no adverse effects on the traditional and customary rights and practices of native groups, any concerns related to program activities expressed by such groups or individuals would be addressed through consultation with the DLNR State Historic Preservation Officer, OHA, and the Hui Malama I Na Kupuna 'O Hawai'i Nei; any required mitigation measures within the restrictive easement area would be determined through that process. As a result, no significant impacts to cultural resources would occur.

Since the Vandal ground hazard area is included within the Strategic Target System ground hazard area evaluated in the Strategic Target System EIIs, the potential for impacts due to launch activities is the same as discussed in that document (U.S. Army Strategic Defense Command, 1992b,c). With the implementation of the mitigations outlined in the Strategic Target System EIS, no significant impacts would occur within the ground hazard area.

4.5.2 REVISED MEMORANDUM OF AGREEMENT

Under this alternative the existing Memorandum of Agreement that currently covers ROI clearance procedures would be revised and extended for 9 years. All activities and potential effects would be identical to those described above under the proposed action; therefore, no significant impacts to cultural resources would occur.

4.5.3 NO-ACTION ALTERNATIVE

Under the no-action alternative, no restrictive easement would be acquired, existing land uses would remain unchanged, and no impacts to cultural resources would occur.

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4.5.4 CUMULATIVE IMPACTS

The only additional project identified with the potential to affect the area encompassed by the ROI is the possible expansion of the Polihale State Park. Sugar cane production would be allowed to continue and no development, other than the installation of interpretive trail signs, would occur. Because the primary purpose of the expansion of the park is to protect sensitive biological and cultural resources, positive benefits to cultural resources from implementation of this project would occur, and no adverse cumulative impacts would be expected. The analyses in the Strategic Target System Draft and Final EISs (U.S. Army Strategic Defense Command, 1992b,c) indicate there are no cumulative impacts on cultural resources.

4.5.5 MITIGATION MEASURES

Specifics regarding the method of placement and location of the warning signs within the ROI have not been finalized. As soon as details are available, they will be coordinated with the DLNR, Hawaii State Historic Preservation Office, to ensure the protection of any sensitive cultural resource sites. If cultural materials, particularly burials, are unexpectedly encountered during installation of the signs, activities would cease in the immediate area, and a qualified archaeologist would be notified. Subsequent actions would comply with the NAGPRA, Hawaii Act 306, and HRS Chapter 6E.

4.6 VISUAL RESOURCES

Impacts to visual resources would occur if any unique or visually sensitive areas within the ROI would be negatively affected or if a human element is introduced into a pristine area.

4.6.1 PROPOSED ACTION

Under the proposed action, establishment of the restrictive easement would limit new development and allow the current visual character of the area to be maintained. The installation of signs advising the public of the existence of the ground hazard area would be similar to other no-trespassing signs in the cane fields and swimming hazard signs in Polihale State Park. There would be no construction of new facilities associated with the Vandal program which could impact visual resources. Overall, no significant impacts from the proposed action would occur to visual resources. The potential impacts of launch activities associated with the Strategic Target System are not significant (U.S. Army Strategic Defense Command, 1992b,c).

4.6.2 REVISED MEMORANDUM OF AGREEMENT

Impacts under the Revised Memorandum of Agreement would be similar to those of the proposed action.
4.6.3 NO-ACTION ALTERNATIVE

Under the no-action alternative there would be no establishment of a restrictive easement; the visual character of the area would remain unchanged. No impacts due to launch activities would occur (U.S. Army Strategic Defense Command, 1992b; c).

4.6.4 CUMULATIVE IMPACTS

Expansion of Polihale State Park in combination with the proposed action or the alternatives would not contribute to any cumulative visual impacts because no new development is proposed for these actions. No cumulative impacts due to launch activities would occur (U.S. Army Strategic Defense Command, 1992b; c).

4.6.5 MITIGATION MEASURES

Because no significant impacts would occur, no mitigation measures are required for visual resources.

4.7 NOISE

Environmental impact analysis related to noise includes the potential effects on the local human and animal populations. Miscellaneous sweep-and-search vehicles, helicopters, and Strategic Target System and Vandal launches would be periodic sources of noise.

4.7.1 PROPOSED ACTION

The primary noise source from restrictive easement activities would be from the use of helicopters in sweep-and-search procedures to ensure that the ground hazard area is clear of the public prior to launch. The type of helicopters used during these activities could generate noise levels of approximately 80 dBA at 152 m (500 ft) to 81 dBA at 610 m (2,000 ft). These noise levels would be intermittent and similar to other noise levels experienced in the ROI from all-terrain vehicles at Polihale State Park and heavy trucks in the sugar cane fields. Because the noise levels from the helicopters would be intermittent in nature and similar to other high noise levels experienced in the region, no significant impacts would occur. Impacts to biological resources from helicopter noise are addressed in Section 4.4.

Noise levels monitored from the ZEST program, which uses the same Talos booster as the Vandal, are similar to those monitored for the Strategic Target System (Section 3.7). The Talos booster creates a sonic boom which would be directed toward the front of the booster (Department of the Air Force, 1990) downrange over the ocean. The ZEST program (Strategic Defense Initiative Organization, 1991) and the Strategic Target System program (U.S. Army Strategic Defense Command, 1992b; c) were determined not to have
significant impacts due to noise. Therefore, no significant impact from Vandal or Strategic Target System launches on the noise environment is expected.

4.7.2 REVISED MEMORANDUM OF AGREEMENT

The impacts under this alternative would be the same as those discussed in Section 4.7.1.

4.7.3 NO-ACTION ALTERNATIVE

Under the no-action alternative, no restrictive easement would be established, and the area would remain unchanged from its current conditions as described in Section 3.7. Therefore, no significant noise impacts would occur.

4.7.4 CUMULATIVE IMPACTS

No cumulative impacts are expected to occur as a result of the possible expansion of Polihale State Park. In addition, no cumulative impacts due to launch activities would occur (U.S. Army Strategic Defense Command, 1992b:c).

4.7.5 MITIGATION MEASURES

No adverse noise impacts are expected to occur; therefore, no mitigation measures would be required.

4.8 HAZARDOUS MATERIALS AND WASTE

This section describes the potential impacts from hazardous materials and waste that could occur from the proposed action and alternatives within the restrictive easement and the ground hazard area within the PMRF. Proposed activities that could cause effects related to hazardous materials and waste during launch activities are described in this section. Potential hazardous material and waste effects due to the Strategic Target System launch activities were analyzed in the Strategic Target System Draft and Final EISs (U.S. Army Strategic Defense Command, 1992b:c).

4.8.1 PROPOSED ACTION

Under the proposed action there are no related impacts to hazardous materials and/or waste. No known hazardous waste sites exist within the restrictive easement boundary. The ground hazard area within the PMRF will contain hazardous fuel, oxidizers, and other materials associated with the Vandal and Strategic Target System launch activities. The use and handling of hazardous material associated with the Strategic Target System have been addressed in the Strategic Target System Draft and Final EISs (U.S. Army Strategic
Defense Command, 1992b,c), and Vandal-related activities would follow similar procedures. The area within the ground hazard area may be impacted by hazardous waste as a result of an unlikely early flight termination. Hazardous waste resulting from early flight termination would be cleared from the area in accordance with the cleanup procedures described in the Strategic Target Systems Draft and Final EISs (U.S. Army Strategic Defense Command, 1992b,c).

4.8.2 REVISED MEMORANDUM OF AGREEMENT

The impacts under this alternative are the same as those for the proposed action.

4.8.3 NO-ACTION ALTERNATIVE

Under the no-action alternative there would be no impacts involving hazardous materials and waste.

4.8.4 CUMULATIVE IMPACTS

The possible expansion of Polihale State Park does not involve any hazardous materials or waste. No cumulative impacts would occur from the possible expansion of the adjacent Polihale State Park. No cumulative hazardous material-related impacts associated with launch activities would occur (U.S. Army Strategic Defense Command, 1992b,c).

4.8.5 MITIGATION MEASURES

Because no significant impacts would occur, no mitigation measures are required for hazardous materials and waste.

4.9 HEALTH AND SAFETY

Potential impacts to public health and safety could occur if appropriate safety measures are not taken to protect all persons, private property, and vehicles within the ground hazard area.

4.9.1 PROPOSED ACTION

Under the proposed action, safety measures would be taken as in previous launches to ensure that the land within the ground hazard area would be clear of the public during launches from the PMRF and KTF. Clearing procedures would include establishing road control points 3 hours prior to launch and clearing the area using vehicles, boats, and helicopters (if necessary). Clearing this area would ensure that no injuries would occur to the public in the unlikely event of an early flight termination. In addition, safety
procedures identified in the Strategic Target System Draft and Final EISs (U.S. Army Strategic Defense Command, 1992b;c), such as having fire crews on stand by during launch, would be implemented. Overall no significant impacts to public health and safety would occur.

4.9.2 REVISED MEMORANDUM OF AGREEMENT

Impacts under the revised Memorandum of Agreement would be similar to those of the proposed action.

4.9.3 NO-ACTION ALTERNATIVE

Under the no-action alternative there would be no establishment of a restrictive easement, and established safety procedures at the PMRF and KTF would continue to be followed; therefore, there would be no impacts to public health and safety.

4.9.4 CUMULATIVE IMPACTS

No health and safety issues are related to the possible expansion of Polihale State Park; therefore, the park expansion would not contribute to any cumulative impacts in conjunction with the proposed action or alternatives. No cumulative impacts on health and safety due to launch activities would occur (U.S. Army Strategic Defense Command, 1992b;c).

4.9.5 MITIGATION MEASURES

Because no significant impacts would occur, no mitigation measures are required for public health and safety.

4.10 INFRASTRUCTURE

Electricity and water supply lines do not traverse the restrictive easement and would not be affected. Proposed activities that could affect infrastructure, transportation access in particular, would primarily occur during the time the restrictive easement would be cleared during launch activities at the PMRF. Potential impacts could occur if the clearing activity affects established transportation routes to and from Polihale State Park. Potential impacts of the Strategic Target System launch activities on infrastructure are analyzed in the Strategic Target System Draft and Final EISs (U.S. Army Strategic Defense Command, 1992b;c).
4.10.1 PROPOSED ACTION

Under the proposed action, access to the Polihale State Park would be temporarily denied. Clearing procedures would include establishing road control points at both the northern and southern portions of the restrictive easement ground hazard area boundary at Polihale State Park and at the intersection of Lio Road and State Highway 50, respectively. Road control points would be at the intersection of Kao Road, a county road, and Lower Saki Mānā Road and at Saki Mānā and Cane Top roads (figure 2-2). This area would be reopened after launch as soon as the Range Safety Officer declared the area safe. Kao Road would not be closed. Because the access roads in the ROI would be closed a total of only approximately 15 hours per year and persons entering or exiting the area would be delayed for only a short period (approximately 30 minutes), no significant impacts would result.

4.10.2 REVISED MEMORANDUM OF AGREEMENT

Under the revised Memorandum of Agreement, impacts to transportation would be the same as under the proposed action.

4.10.3 NO-ACTION ALTERNATIVE

Under the no-action alternative the use of the area within the proposed restrictive easement would continue without new restrictions, and there would be no effects to transportation.

4.10.4 CUMULATIVE IMPACTS

The possible expansion of Polihale State Park is to include sensitive biological and cultural resources within the park boundary. No additional development of park facilities or roads is anticipated; therefore, no cumulative impacts to transportation would occur in combination with the proposed action or alternatives. The launch activities for the Strategic Target System and Vandal launch activities would not have cumulative impacts on infrastructure (U.S. Army Strategic Defense Command, 1992b,c).

4.10.5 MITIGATION MEASURES

Because no significant impacts would occur, no mitigation measures are required for transportation resources.

4.11 SOCIOECONOMICS

Impacts to socioeconomic resources could occur if proposed activities substantially affected the socioeconomic welfare of the community or state. Major population changes,

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resulting in adverse effects to public facilities, could also be classified as a significant impact to socioeconomic resources. This analysis addresses the economic effects resulting from the opportunity cost associated with the limitations imposed under the proposed 9-year restrictive easement. The impact analysis specifically focuses on any potential impacts to Kauai’s key economic sectors, tourism and agriculture.

4.11.1 PROPOSED ACTION

Historically, the impacts of restricted use in the ground hazard area have had negligible effects on Kekaha Sugar Company’s production because the 7-day advance notice allows sufficient time to plan the majority of work around most launch events. However, occasionally it has been necessary to evacuate workers involved in day-to-day planting, harvesting, irrigation, and weed control, resulting in lost work time (Moe, pers. com., 1993). As launch activities generally have not impacted sugar cane production, the restrictive easement would not be disadvantageous in lease negotiations between the state and sugar cane producers.

The state’s leasing of restrictive easement land to diversified producers of crops other than sugar cane would also have negligible impacts on the land’s agricultural lease value. Soils in the restrictive easement area are capable of growing most major crops currently produced on Kauai but are not conducive to high production of pineapples (University of Hawaii, 1967).

Depending upon the individual planting and harvesting requirements, the effect of the restrictive easement on diversified crops may vary. Flower/nursery and vegetable crops, for example, may be more time-sensitive to launch-related delays during harvest periods.

The state may be required to lease this State of Hawaii property to small, labor-intensive agricultural producers if a single tenant cannot be obtained. Smaller tenants, however, would not have the advantage of scheduling work outside of the ground hazard area during launch events. The small tenants also would likely be required to operate the drainage pump system to maintain agricultural production.

The restricted access to Polihale State Park required during launch activities would neither impact Kauai’s tourism industry nor any park revenues associated with camping activities. Easement restrictions preventing resort development and other building construction in the ground hazard area would support Kauai’s land use plans for the area. As discussed in Section 3.1.1, the island’s western portion has not historically been a major attraction for resort development because of locational and other limitations. Major portions of the restrictive easement area are also flood prone but are maintained in an arable condition by the drain and pump system. The soils are not conducive to large-scale construction because of the high water table. Therefore, the restrictive easement would not be a factor in curtailing the island’s resort development or future tourism growth. Section 4.12 discusses in detail any potential effects from the action on recreational resources.

The approximately 11,332-hectare (28,000-acre) Kekaha Sugar Plantation generates approximately $100,000 in property tax revenue to Kauai County, of which industrial
property tax represents a significant portion (Moe, pers. com., 1993). It is estimated that the approximate 825-hectare (2,039-acre) restrictive easement agricultural land generates approximately $14,000 in property tax revenue. The restrictive easement would not adversely affect Kauai County’s tax revenue base.

The 9-year restrictive easement would generate revenue for the state. Because the state land within the restrictive easement area is an asset of the Ceded Land Trust, 30 percent of the revenue would be paid to the Department of Hawaiian Home Lands and 20 percent to the Office of Hawaiian Affairs.

4.11.2 REVISED MEMORANDUM OF AGREEMENT

The impacts under this alternative would be the same as those discussed in Section 4.11.1, with the exception that no payment, or a reduced amount from that of the restrictive easement, would be made to the State and Kekaha Sugar Company.

4.11.3 NO-ACTION ALTERNATIVE

Under the no-action alternative, there would be no establishment of the restrictive easement. The potential loss of the activities associated with the easement could decrease the requirements for PMRF and KTF personnel to support mission activities, which may have an adverse impact on Kauai’s economy; this could also limit the PMRF’s ability to support fleet training and test and evaluation activities and place the PMRF’s existence in jeopardy. Land adjacent to the PMRF would be available for lease under agricultural land use designations, as guided by the state and the county.

4.11.4 CUMULATIVE IMPACTS

No cumulative impacts would occur as a result of the proposed restrictive easement.

4.11.5 MITIGATION MEASURES

No significant impacts have been identified, and no mitigation measures are proposed.

4.12 RECREATION

Proposed activities that could affect recreation would occur primarily during the time the restrictive easement and Vandal ground hazard area would be cleared for launches. Potential impacts could occur if the activity conflicts with established recreational uses, substantially reduces the use of the area, or conflicts with the ability of the DLNR to preserve park areas.
4.12.1 PROPOSED ACTION

Under the proposed action, use of the southern end (approximately 28 ha [70 ac]) of Polihale State Park would be interrupted 20 minutes prior to launch. Interruptions would occur up to 30 times per year and would include access to and from the state park along the 8-kilometer (5-mile) dirt road which starts at Highway 50 within the ground hazard area. This area would be reopened after launch as soon as the Range Safety Officer declares the area safe.

The state park area within the restrictive easement boundary to be cleared during launch activities does not contain any developed campsites or picnicking areas. People within the restrictive easement boundary would be notified 3 hours prior to launch that they would need to move to the north end of the state park so that the area within the restrictive easement boundary would be clear 20 minutes prior to launch. People traveling to and from the state park would be stopped at the control points at the restrictive easement boundary during the time the area is closed. No significant impacts to recreational resources would occur because the total closure time for the southern end of the state park would be approximately 15 hours per year (30 closures of approximately 30 minutes each), no persons within the developed camping or picnicking areas would be affected, and people entering and exiting the park would only be delayed during the short closure period. Overall, establishment of a restrictive easement is compatible with the use of the area as a state park because it preserves the natural, scenic, historic, and wildlife value and recreational nature of the property.

Impacts to recreational areas along the PMRF coastline for Strategic Target System, Vandal, and other related activities which would limit access to the base were addressed in the Strategic Target System Draft and Final EISs, which concluded that no significant impact would occur to this recreational area (U.S. Army Strategic Defense Command, 1992b;c).

4.12.2 REVISED MEMORANDUM OF AGREEMENT

Under the revised Memorandum of Agreement alternative, impacts to recreational resources would be similar to those of the proposed action.

4.12.3 NO-ACTION ALTERNATIVE

Under the no-action alternative there would be no change to recreational resources at Polihale State Park.

4.12.4 CUMULATIVE IMPACTS

The Division of State Parks is planning for the expansion of Polihale State Park to the east of its current boundary. Under the possible expansion, no new development is anticipated except for interpretive trail signs; therefore, the proposed action or revised Memorandum
of Agreement alternative would not affect any possible expansion of the state park. The impacts of the use of the expansion area within the restrictive easement (figure 3-8) would be similar to those of the proposed action; therefore, no significant impacts are expected.

Under the no-action alternative there would be no change to the possible park expansion area; therefore, no cumulative impacts would occur. Launch activities as analyzed in the Strategic Target System EISs would have no cumulative impacts (U.S. Army Strategic Defense Command, 1992b:c).

4.12.5 MITIGATION MEASURES

Because no significant impacts would occur, no mitigation measures are required for recreational resources.

4.13 PROBABLE ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

The proposed action would involve acquiring a restrictive easement that would limit development in the area adjacent to the PMRF. This action would have few adverse environmental effects.

An unavoidable short-term effect would be the temporary closure of the southern portion of Polihale State Park and the access roads leading to the park. Closure of this area would occur up to 30 times per year for 30 minutes for each launch. However, because total closure time would only be approximately 15 hours a year, and use of the north end of the park outside of the restrictive easement boundary would still be available, impacts to recreational uses would not be significant (Section 4.12). Impacts from launches on PMRF recreational resources were addressed in the Strategic Target System Draft and Final EISs, and impacts were found not to be significant (U.S. Army Strategic Defense Command, 1992b:c).

Other unavoidable effects would be the noise from helicopters used to clear the ground hazard area and launch activities that may startle biological resources and may disturb people at Polihale State Park. The impacts from these sources would be short-term and would not be significant (sections 4.4 and 4.7).

4.14 RELATIONSHIP BETWEEN SHORT-TERM USES OF HUMANITY’S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Conditions of the restrictive easement would limit use of land to agricultural and recreational uses. Although the land is currently used for these activities, the limiting of agricultural facility development such as sugar cane processing plants or housing for agricultural employees would not affect the long-term productivity of the area during the
9-year period the restrictive easement is in effect. The launching of the Strategic Target System and Vandal missiles does not eliminate any option for future use of the environment.

4.15 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

Under the proposed action there would be limited use of irretrievable resources (e.g., fuel and labor) and no significant impact to natural or cultural resources. Because the restrictive easement would only be for a 9-year period and would maintain the land in the current agricultural and recreational uses, the action would not irreversibly curtail the range of potential uses of the environment.

4.16 SUMMARY OF UNRESOLVED ISSUES

There are no unresolved issues related to the proposed action and alternatives.
5.0 Relationship of the Proposed Action to Land Use Plans, Policies, and Controls for the Affected Area
5.0 RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS, POLICIES, AND CONTROLS FOR THE AFFECTED AREA

This section presents a discussion on relevant state and county plans, policies, and controls which affect the proposed action and alternatives. Federal plans, policies, and controls for these types of activities were addressed in the Strategic Target System Draft and Final EISs (U.S. Army Strategic Defense Command 1992b; c). Objectives and policies of the Hawaii State Plan are discussed first, followed by a review of the State Functional Plans and applicable provisions of the State Land Use Law. The relevant sections of the Kauai County General Plan are then discussed. Finally, the applicability of the Coastal Zone Management Act and the Kauai County Special Management Areas are addressed.

5.1 HAWAII STATE PLAN

The Hawaii State Plan (HRS Chapter 226) serves as a guide for future long-term development of the state. It includes: goals, objectives, policies, and priorities for the state; a basis for determining priorities and allocating limited resources; improvement of coordination between Federal, state, and county plans, policies, programs, projects, and regulatory activities; and a process of coordination of state and county activities. In addition to the Hawaii State Plan, 14 functional plans have been developed which set forth the policies, statewide guidelines, and priorities within specific fields of activities (State of Hawaii, 1991a). In this section, Hawaii State Plan objectives and policies relevant to the proposed project are presented and discussed.

- SEC. 226-7 Objectives and Policies for the Economy-Agriculture
  (a)(1) "Continued viability in Hawaii's sugar cane and pineapple industries."
  (b)(6) "Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs."

Proposed Action – Currently, most of the land within the proposed restrictive easement, with the exception of Polihale State Park, is used for growing sugar cane. Conditions of the restrictive easement would require that the land continue to be used for agriculture. This would assure the availability of agriculturally suitable land within the region and would not affect the sugar cane industry; therefore, the proposed project would be compatible with the policies for economy-agriculture.

Revised Memorandum of Agreement – Impacts from this alternative would be similar to those of the proposed action.

No-action Alternative – Under the no-action alternative there would be no change to the current agricultural use of the region.
SEC.226-9 Objectives and Policies for the Economy-Federal Expenditures
(b)(1) "Encourage the sustained flow of federal expenditures in Hawaii that generates long-term government employment."
(b)(2) "Promote Hawaii’s supportive role in national defense."
(b)(3) "Promote the development of federally supported activities in Hawaii that respect statewide economic concerns, are sensitive to community needs, and minimize adverse impacts on Hawaii’s environment."

Proposed Action – The proposed project would allow for the continued launches of missiles from the PMRF and KTF that require clearance of an off-base ground hazard area. These activities would provide Federal expenditures to the PMRF. This mission could increase long-term Federal Government employment associated with the PMRF and KTF on the Island of Kauai. In addition, establishment of the restrictive easement would allow for continued launches out of the PMRF and KTF which are an integral part of the continued development of the national defense program. Because conditions of the restrictive easement would limit development which would preserve the current sugar cane fields and open nature of the land, no adverse impacts to Hawaii’s environment would occur. Previous environmental documentation (U.S. Army Strategic Defense Command, 1992b; Strategic Defense Initiative Organization, 1991) determined that launch activities from the PMRF and KTF would have no significant adverse impacts on Hawaii’s environment.

Revised Memorandum of Agreement – Impacts from this alternative would be similar to those of the proposed action.

No-action Alternative – Under the no-action alternative, there would be no establishment of the restrictive easement. The potential loss of the activities associated with the easement could decrease the amount of Federal expenditures on the Island of Kauai and the number of personnel required at the PMRF to support mission activities. This would conflict with the Hawaii State Plan for continued long-term Government employment and expenditures. In addition, the no-action alternative would limit research data obtained during launching activities which are used to support the continued development of the national defense program. The no-action alternative would continue to preserve Hawaii’s physical environment.

SEC.226-11 Objectives and Policies for the Physical Environment-Land-Based, Shoreline, and Marine Resources
(a)(2) "Effective protection of Hawaii’s unique and fragile environmental resources."
(b)(6) "Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii."

Proposed Action – Under the proposed action, the establishment of the restrictive easement would limit new development and would keep the area in its current condition. Launches of the Vandal missile would be similar to other launch programs such as the Strategic Target System and ZEST, both of which were determined to have few adverse effects on the environment (U.S. Army Strategic Defense Command, 1992b; Strategic Defense Initiative Organization, 1991); therefore, no significant impacts to Hawaii’s unique
and fragile environment, rare or endangered plant and animal species, or native habitat would occur.

Revised Memorandum of Agreement – Impacts from this alternative would be similar to those of the proposed action.

No-action Alternative – Under the no-action alternative there would be no establishment of a restrictive easement and the land within the region would continue in the current agricultural and recreational uses. There would be no change to the environment in the region.

- SEC.226-23 Objectives and Policies for Socio-Cultural Advancement-Leisure (b)(5) “Ensure opportunities for everyone to use and enjoy Hawaii’s recreational resources.”

Proposed Action – The establishment of the restrictive easement would limit access to Polihale State Park during launch activities and would require people at the park within the ground hazard area to move to the north end of the park during these activities. However, because the use of the restrictive easement would only close access to the park for 15 hours a year, it would not prohibit people from enjoying the recreational use of the area during the remainder of the year; therefore, the restrictive easement would be compatible with the objectives of socio-cultural advancement-leisure.

Impacts to recreational resources along the PMRF coastline for Vandal and other launch programs which would limit access to the base were addressed in the Strategic Target System Draft and Final EISs, which concluded that no significant impacts would occur to this recreational area (U.S. Army Strategic Defense Command, 1992b,c).

Revised Memorandum of Agreement – Impacts from this alternative would be similar to those of the proposed action.

No-action Alternative – Under the no-action alternative there would be no establishment of the restrictive easement and no change to the recreational availability of the area.

- SEC.226-26 Objectives and Policies for Socio-Cultural Advancement-Public Safety (a)(1) “Assurance of public safety and adequate protection of life and property for all people.”

Proposed Action – Under the proposed action, establishment of the restrictive easement would allow for clearance of the public from the ground hazard area where the debris from a missile would fall from an unlikely early flight termination. The clearance of the ground hazard area would provide the adequate protection of life and property for all people.

Revised Memorandum of Agreement – Impacts under this alternative would be similar to those of the proposed action.
No-action Alternative – Under the no-action alternative there would be no establishment of a restrictive easement, and established safety procedures at the PMRF and KTF would continue to be followed; therefore, there would be no hazard to public safety.

5.2 STATE FUNCTIONAL PLANS

The Hawaii State Plan directs appropriate state agencies to prepare functional plans for their respective program areas. Fourteen State Functional Plans serve as the primary implementing vehicle for the goals, objectives, and policies of the Hawaii State Plan. The major theme of the functional plans focuses on the promotion of a balanced growth approach in the use of the state’s limited resources. This recognizes the need for economic development while preserving the environment and multi-cultural lifestyle throughout the state (State of Hawaii, 1991b). The following State Functional Plans are directly applicable to the proposed action.

5.2.1 STATE AGRICULTURAL FUNCTIONAL PLAN

The State Agricultural Functional Plan sets forth the policies, programs, and projects for implementing the agricultural and agriculture-related objectives, policies, and priority guidelines contained in the Hawaii State Plan. For agriculture, the two fundamental objectives to be achieved are (1) continued viability of Hawaii’s sugar and pineapple industries and (2) continued growth and development of diversified agriculture throughout the state. The mission of the State Agricultural Functional Plan is ultimately to increase the overall level of agricultural development in Hawaii, in accordance with the two fundamental objectives listed (State of Hawaii, 1991d).

Proposed Action – The land within the proposed restrictive easement, with the exception of Polihale State Park, is used for growing sugar cane. Conditions of the restrictive easement would require that the land continue to be used for agriculture. This would allow the land to continue in sugar cane or any other type of agricultural crop; therefore, the proposed action would be compatible with the objectives of the State Agricultural Functional Plan.

Revised Memorandum of Agreement – Impacts from this alternative would be similar to those of the proposed action.

No-action Alternative – Under the no-action alternative there would be no establishment of a restrictive easement, and the current agricultural uses in the area would remain unchanged.

5.2.2 STATE CONSERVATION LANDS FUNCTIONAL PLAN

The objective of the State Conservation Lands Functional Plan is to provide for a management program allowing for judicious use of the state’s natural resources balanced with the need to protect these resources to varying degrees. The plan defines and
attempts to address areas of statewide concern including watersheds, terrestrial habitat, natural areas, water quality, sensitive areas, and scenic, historic, and cultural sites. Specifically, the plan deals with the protection of rare and endangered species and habitats (State of Hawaii, 1991b).

Proposed Action – Under the proposed action the conditions of the restrictive easement would limit new development and would preserve the agriculture and open nature of the area. Therefore, the proposed restrictive easement would protect the endangered species and habitats, natural areas, scenic, historic, and cultural sites, and other important resources in the area.

Launches of the Vandal missile would be similar to other launch programs such as the Strategic Target System and ZEST, both of which were determined to have no permanent or long-term adverse effects on the environment (U.S. Army Strategic Defense Command, 1992bc; Strategic Defense Initiative Organization, 1991); therefore, proposed launches would not significantly impact endangered species and habitats; natural areas; scenic, historic, and cultural sites; and other important resources.

Revised Memorandum of Agreement – Impacts from this alternative would be similar to those of the proposed action.

No-action Alternative – Under the no-action alternative, there would be no establishment of a restrictive easement, and the current natural resources in the area would remain unchanged.

5.2.3 STATE RECREATION FUNCTIONAL PLAN

The objectives of the State Recreation Functional Plan are to (1) assess the present and potential supply of and demand for recreation resources; (2) guide state and county agencies in acquiring or protecting lands of recreational value; (3) provide adequate recreation facilities and programs; and (4) assure public access to recreation areas. The State Recreation Functional Plan is divided into ocean and shoreline recreation; mauka, urban, and other recreation opportunities; public access to the shoreline and mauka recreation areas; resource conservation and management; management of recreation programs, facilities, and areas; and wetland protection and management (State of Hawaii, 1991c).

Proposed Action – The establishment of the restrictive easement would limit access to Polihale State Park for approximately 15 hours a year (30 closures of approximately 30 minutes each) during missile launches and would require people at the southern end of the park within the ground hazard area to move to the northern end during these activities. Access into the park along the dirt road would be denied 20 minutes prior to launch until the Range Safety Officer declared the area safe. Because access to the park would only be limited for a short period of time and no significant impact to public access would occur, the proposed restrictive easement would be compatible with the objectives of the State Recreation Functional Plan.
Impacts to recreational resources along the PMRF coastline for Strategic Target System, Vandal, and other related activities, which would limit access to the base, were addressed in the Strategic Target System Draft and Final EISs, which concluded that no significant impact would occur to this recreational area (U.S. Army Strategic Defense Command, 1992b;c).

Revised Memorandum of Agreement – Impacts from this alternative would be similar to those of the proposed action.

No-action Alternative – Under the no-action alternative, there would be no establishment of a restrictive easement; therefore, there would be no change to the current recreational activities at Polihale State Park.

5.3 STATE LAND USE LAW

Land use in the State of Hawaii is regulated by HRS Chapter 205 and Title 15, Subtitle 3, Chapter 15, Hawaii Administrative Rules. Land use in Hawaii is classified into four categories: urban, rural, agricultural, and conservation.

The area within the restrictive easement is classified agricultural and conservation by the state for planning purposes (figure 5-1). The agricultural district includes lands for the cultivation of crops, aquaculture, raising livestock, wind farming, forestry, agriculture support activities, and land with significant potential for agriculture uses. Golf courses and golf-related activities may also be included in the district, provided the land is not in the highest productivity categories (A or B) of the Land Study Bureau’s detailed classification system. The agricultural land within the restrictive easement that is currently used for the development of sugar cane has a productivity rating of A and B (University of Hawaii, 1967).

Conservation lands include areas necessary for protecting watersheds, scenic and historic areas, parks, wilderness, forest reserves, open space, recreational areas, habitats of endemic plants, fish and wildlife, and all submerged lands seaward of the shoreline. The conservation district also includes lands subject to flooding and soil erosion. The conservation land within the restrictive easement is currently occupied by Polihale State Park and the PMRF.

Proposed Action – For the state-designated agricultural lands, the conditions of the proposed restrictive easement would limit the use of the land to agriculture. These conditions would preserve the open-space nature of the current sugar cane fields and would be compatible with the state agricultural classification of the area.

Polihale State Park is within a State of Hawaii conservation district. Establishment of the restrictive easement is compatible with the use of the area as a state park because it preserves the open space and recreational nature of the property. Vandal launches would be similar to the Strategic Target System and ZEST launches and would not affect land use designations.
State Land Use Designations within the Restrictive Easement Boundary

EXPLANATION

--- --- Irrigation Drainage Ditch

--- Restrictive Easement Boundary

--- --- Kauai Test Facility

--- --- Pacific Missile Range Facility

Conservation Use

Agricultural Use

State Highway


Figure 5-1

Restrictive Easement Final EIS 5-7
Revised Memorandum of Agreement – Impacts under this alternative would be similar to those of the proposed action.

No-action Alternative – Under the no-action alternative there would be no change to the state land use designations in the area.

5.4 KAUAI GENERAL PLAN/WAIMEA-KEKAHA REGIONAL DEVELOPMENT PLAN

The Kauai General Plan was established to guide the planned growth of the county. As a refinement of the county General Plan, the Waimea-Kekaha Regional Development Plan (Ordinance No. 325) has retained and expanded the goals of the General Plan. The objective of the Waimea-Kekaha Regional Development Plan is to implement, by establishment of development plans, general land use maps, zoning maps, and design criteria, the intent and purpose of the adopted Kauai General Plan and to amend certain portions of that plan to recognize more detailed information and more precise community goals and objectives (Belt Collins and Associates, Ltd., 1977).

The Waimea-Kekaha Regional Plan and Kauai General Plan zoned the land within the restrictive easement as open and agricultural (figure 5-2). The land occupied by Polihale State Park and the PMRF is designated by the state as conservation and is outside the zoning jurisdiction of the county.

Proposed Action – Establishment of the restrictive easement would allow continued open and agricultural use of the land as designated for this area in the county and regional plans; therefore, the project is compatible with the county and regional plans' goals and objectives.

Revised Memorandum of Agreement – Impacts from this alternative would be similar to those of the proposed action.

No-action Alternative – Under the no-action alternative there would be no change to the county or regional zoning in the area.

5.5 HAWAII COASTAL ZONE MANAGEMENT PROGRAM

The Hawaii Coastal Zone Management Program (HRS Chapter 205A), which is administered by the DLNR, regulates public and private uses in the coastal zone. The objectives and policies of the program consist of providing recreational resources; protecting historic and scenic resources and the coastal ecosystem; providing economic uses; reducing coastal hazards; and managing development in the coastal zone (State of Hawaii, 1985).

Proposed Action – The establishment of an area adjacent to the PMRF to allow for the clearance of a ground hazard area has been found to be consistent with the Hawaii Coastal
Zone Management Program (U.S. Army Strategic Defense Command, 1992a) in the following documents:

- Strategic Target System Environmental Assessment (U.S. Army Strategic Defense Command, 1990a)
- Draft Environmental Impact Statement for the Strategic Target System (U.S. Army Strategic Defense Command, 1992b)
- Final Environmental Assessment for the Proposed Memorandum of Agreement Between the United States Government and the State of Hawaii to Establish a Ground Hazard Area on State Lands Adjacent to the Pacific Missile Range Facility, Kauai, Hawaii (U.S. Army Strategic Defense Command, 1992a)

Revised Memorandum of Agreement – The revised Memorandum of Agreement would be a similar action as the restrictive easement and, therefore, would be consistent with the Hawaii Coastal Zone Management Program.

No-action Alternative – Under the no-action alternative there would be no effects on the coastal zone.

5.6 SPECIAL MANAGEMENT AREA USE PERMIT

The Coastal Zone Management Program designates special management areas in the coastal zone which are subject to special controls on development. These areas extend inland from the shoreline and are established by the county planning commission or by the county council. The special management area is a designated area inland to the extent necessary to control shorelands, the uses of which have a direct and significant impact on the coastal waters. The County of Kauai has established guidelines (County of Kauai, undated) for the review of developments proposed for the special management areas (figure 5-3). Any development within the special management area requires a special management area permit.

Proposed Action – Under the special management area guidelines, a permit is required for any development within the designated areas. Because no development is required for the proposed restrictive easement, no special management area permit is required.

Revised Memorandum of Agreement – Impacts from this alternative would be similar to those of the proposed action.

No-action Alternative – Under the no-action alternative there would be no activities within the special management area.
5.7 NECESSARY APPROVALS FOR THE ACTION

The only necessary approval for the proposed action and alternatives is the acceptance of the Final EIS by the Hawaii DLNR and the Board of Land and Natural Resources.

The DLNR is responsible for all conservation zoned lands (e.g., Polihale State Park) and administers the Conservation District Use application process on activities on these lands. However, as part of the environmental litigation conducted for the Strategic Target System (State of Hawaii v. Cheney, Civil No. 90-0775, U.S. District Court, District of Hawaii) it was determined that the Federal Government is exempt from a State of Hawaii Conservation District Use Permit.
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6.0 LIST OF PREPARERS

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7.0 Glossary
7.0 GLOSSARY

Advisory Council on Historic Preservation – A 19-member body appointed, in part, by the President of the United States to advise the President and Congress, to coordinate the actions of Federal agencies on matters relating to historic preservation, to comment on the effects of such actions on historic and archaeological cultural resources, and to perform other duties as required by law (Public Law 89-655; 16 United States Code 470). The advisory council is responsible for implementing the National Historic Preservation Act.

Alluvium – A general term for clay, silt, sand, gravel, or similar unconsolidated material deposited during comparatively recent geologic time by a stream or other body of running water as a sorted or semi-sorted sediment in the bed of the stream or on its floodplain or delta or as a cone or fan at the base of a maintained slope.

Ambient air quality standards – Legal limitations on pollutant concentration levels allowed to occur in the ambient air established by the U.S. Environmental Protection Agency or state agencies. Primary ambient air quality standards are designed to protect public health with an adequate margin of safety. Secondary ambient air quality standards are designed to protect public welfare-related values including property, materials, and plant and animal life.

Aquifer – A subsurface formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield economical quantities of water to wells and springs.

Archaeology – A scientific approach to the study of human ecology, cultural history, prehistory, and cultural processes, emphasizing systematic interpretation of material remains.

Artifact – Any thing or item that owes its shape, form, or placement to human activity. In archaeological studies, the term is applied to portable objects (e.g., tools and the byproducts of their manufacture).

Attainment area – A geographic area in which the quality of the air meets or exceeds Federal air pollution standards.

Azimuth – A distance in angular degrees in a clockwise direction from the north point.

Basement rock – Rock generally with complex structure beneath the dominantly sedimentary rocks.

Brackish – Slightly salty; term applied to waters whose saline content is intermediate between that of streams and sea water.

Calcareous – Containing calcium carbonate.
Carbon dioxide (CO$_2$) – A colorless, odorless, incombustible gas which is a product of respiration, combustion, fermentation, decomposition, and other processes and is always present in the atmosphere.

Carbon monoxide (CO) – A colorless, odorless gas which is a byproduct of the incomplete combustion of organic fuels.

Chronology – The science of arranging time in periods and ascertaining the dates and historical order of past events.

Cultural resource component – A location or element within a settlement/subsistence system. Archaeological sites may contain several components that reflect the use of the locality by different groups in different time periods.

Direct effects – Effects that are immediate consequences of program activities; in economics, the initial increase in employment and income resulting from program employment and material purchases before the indirect effects of these changes are measured.

Direct impact – Effects resulting solely from program implementation.

District (National Register of Historic Places) – A designation of a geographically defined area (urban or rural) possessing a significant concentration, linkage, or continuity of sites, structures, or objects united by past events (theme) or aesthetically by plan of physical development.

Easement – A right or privilege (agreement) that a person or organization may have over another’s property; an interest in land owned by another that entitles the holder of the easement to a specific limited use.

Effects – A change in an attribute. Effects include those that result from program attributes acting on the resource attribute (direct effect); those that do not result directly from the action or from the attributes of other resources acting on the attribute being studied (indirect effect); those that result from attributes of other programs or other attributes that change because of other programs (cumulative effect); and those that result from natural causes (e.g., seasonal change).

Endangered species – A species that is threatened with extinction throughout all or a significant portion of its range.

Endemic – Plants or animals that are native or limited to a certain region.

Explosive safety quantity-distance (ESQD) – The quantity of explosives material and distance separation relationships providing defined types of protection. These relationships are based on levels of risk considered acceptable for the stipulated exposures.

Exotic – That which is not native to an area.
Feature (archaeology) – Nonportable portion of an archaeological site. This includes facilities such as fire pits, storage pits, stone circles, or foundations.

Federal candidate species – Taxa placed in Federal categories 1 and 2 by the U.S. Fish and Wildlife Service; candidates for possible addition to the List of Endangered and Threatened Species.

Ground hazard area – The land area contained in a modified approximately 3,048-meter (10,000-foot) maximum arc within which all debris from a terminated launch will fall. The arc for a Strategic Target System launch is described such that the radius is approximately 3,048 m (10,000 ft) to the northeast, 2,774 m (9,100 ft) to the east, and 2,743 m (9,000 ft) to the south. For the Vandal launch, the arc is 1,829 m (6,000 ft).

Hazardous material – Generally, a substance or mixture of substances that has the capability to either cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; it may pose a threat or substantial present or potential risk to human health or the environment. Use of these materials is regulated by the Department of Transportation, the Occupational Safety and Health Administration, and the Superfund Amendments Reauthorization Act.

Home Lands – Land set aside for the state to lease residential, farm, and pastoral homestead lots for $1 per year to native Hawaiians. This is required based on the Hawaiian Homes Commission Act passed by Congress in 1921.

Hydrazine – A colorless, fuming, corrosive, hygroscopic (moisture absorbing) liquid used in jet and rocket fuels.

Hydrology – The science dealing with the properties, distribution, and circulation of water on the surface of the land and in the soil and underlying rocks.

Indirect employment – Employment resulting from the purchases of workers who are directly working on a specified program. Also includes any subsequent employment arising from the increase in purchases in the area.

Indurated – Rendered hard.

Lamina – Unit layer or sheet of a sediment in which the stratification planes are one centimeter or less apart. Laminae need not be parallel to bedding.

Lithified – The conversion of a newly deposited sediment into an indurated rock.

Loam – A soil composed of a mixture of clay, silt, sand, and organic matter.

Mitigation – The method or action to reduce or eliminate an adverse environmental impact.
National Register-eligible property – A property that has been determined eligible for
National Register listing by the Secretary of the Interior or one that has not yet gone
through the formal eligibility determination process but which meets the National
Register criteria for section review purposes. An eligible property is treated as if it
were already listed.

National Register of Historic Places – The Federal inventory of known historic properties
worthy of preservation. The National Register of Historic Places is administered by
the National Park Service on behalf of the Secretary of the Interior. National
Register listings include buildings, structures, sites, objects, and districts possessing
historic, architectural, engineering, archaeological, or cultural significance.
Properties listed are not limited to those of national significance; most are
significant primarily at the regional, state, or local level.

Native vegetation – Plant life that occurs naturally in an area without agricultural or
cultivational efforts.

Paleontological resources – Fossilized organic remains from past geological periods.

Particulate matter, fine respirable – Finely divided solids or liquids less than 10 microns in
diameter which, when inhaled, remain lodged in the lungs and contribute to adverse
health effects.

Particulate matter, total suspended – Finely divided solids or liquids ranging from about 0.1
to 50 microns in diameter which comprise the bulk of the particulate matter mass in
the atmosphere.

Payload – Any nonnuclear and possibly propulsive object or objects, weighing up to
272 kilograms (600 pounds), which are carried above the Strategic Target System
third stage.

pH – A measure of the acidity or alkalinity of a solution, numerically equal to 7 for neutral
solutions, increasing with increasing alkalinity and decreasing with increasing
acidity.

Prehistoric – The period of time before written records and before Europeans entered an
area.

Safety easement – A recorded right of use by the United States over property of the State
of Hawaii to limit exposure to safety hazards.

Sampling – The selection of a portion of a study area or population, the analysis of which
is intended to permit generalization of the entire population. In archaeology,
samples are often used to reduce the amount of land area covered in a survey or
the number of artifacts analyzed from a site. Statistical sampling is generally
preferred since it is possible to specify the bias or probability of error in the results,
but judgmental or intuitive samples are sometimes used.
Shield volcano – A broad, gently sloping volcanic cone of flat domical shape, usually several tens of hundreds of square miles in extent, built chiefly of overlapping and interfingerling basaltic lava flows.

Site (archaeology) – Any location where human beings have altered the terrain or have discarded artifacts.

Species – A taxonomic category ranking immediately below a genus and including closely related, morphologically similar individuals which actually or potentially interbreed.

Subspecies – A geographically defined grouping of local populations which differs taxonomically from similar subdivisions of species.

Surface collection – Systematic mapping and removal of artifacts from a site by means not involving excavation.

Threatened species – Plant and wildlife species likely to become endangered in the foreseeable future.

Tsunami – A great sea wave produced by a submarine earthquake or volcanic eruption; commonly misnamed tidal wave.

Understory – A layer of vegetation growing near the ground and beneath the canopy of a taller layer.

Unique and sensitive habitats – Areas that are especially important to regional wildlife populations or protected species that have other important biological characteristics (e.g., wintering habitats, nesting areas, and wetlands).

Wetlands – Areas that are inundated or saturated with surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil, including swamps, marshes, bogs, and similar areas.
8.0 Consultation Comments and Responses
8.0 CONSULTATION COMMENTS AND RESPONSES

The EIS Preparation Notice for the U.S. Army Proposed Easement Over State Land for Safety and Ground Hazard Areas for the Strategic Target System and Navy Vandal Missile Launches at the Pacific Missile Range Facility was published in the OECC Bulletin by the Office of Environmental Quality Control on 8 June 1993. In addition, representatives of the USASDC met, or had previously met, with representatives of numerous public agencies and community organizations in regard to this and other related environmental documents. The agencies, organizations, and individuals that were asked to comment are listed below. Those that responded in writing are identified with an asterisk next to their names. Copies of correspondence with commentors are reproduced in this chapter.

FEDERAL AGENCIES

National Marine Fisheries Pacific Area Office
U.S. Fish and Wildlife Service Office of Endangered Species
U.S. Environmental Protection Agency, Region IX
Environmental Protection Agency, Pacific Islands Contact Office
Department of the Interior, U.S. Geological Survey
U.S. Army Space and Strategic Defense Command
Pacific Missile Range Facility
Naval Air Warfare Center Weapons Division
Pacific Division, Naval Facilities Engineering Command
U.S. Coast Guard
Department of Energy, Albuquerque Operations Office
U.S. Army Support Command Hawaii
U.S. Army Corps of Engineers, Pacific Ocean Division
Department of the Army — Judge Advocate General
Sandia National Laboratories
Department of Energy, Pacific Area Support Office
Sandia National Laboratories, Kauai Test Facility
U.S. Fish and Wildlife Service, Pacific Islands Office
U.S. Department of Agriculture, Soil Conservation Service

STATE AGENCIES

Department of Business Economics Development and Tourism, State Energy Office
Hawaii Department of Accounting and General Services
Hawaii Department of Business and Economic Development, State Energy Office
Hawaii Department of Land and Natural Resources, Division of State Parks
Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife
Hawaii Department of Health, Department of Solid and Hazardous Waste
Hawaii Department of Health, Environmental Management Division
Hawaii Department of Defense
Hawaii Department of Agriculture
Hawaii Department of Aquatic Resources
Hawaii Office of State Planning
Department of Hawaiian Home Lands
Hawaii Office of Hawaiian Affairs
Hawaii Department of Land and Natural Resources, Division of Land Management
Hawaii Office of Environmental Quality Control
Hawaii Coastal Zone Management Program, Office of State Planning
Hawaii Department of Transportation
Hawaii Department of Land and Natural Resources, State Historic Preservation Division
Hawaii Department of Finance, Real Property Assessment Division

COUNTY AGENCIES

County of Kauai, Office of Economic Development, Office of the Mayor
County of Kauai, Planning Department
County of Kauai, Department of Public Works
County of Kauai, Department of Water Supply

COMMUNITY ORGANIZATIONS AND PRIVATE CITIZENS

Hawaiian Sugar Planters' Association
Michael Jones*
Kauai Economic Development Board
Native Hawaiian Legal Corporation*
Sierra Club Legal Defense Fund, Inc.*
University of Hawaii, Environmental Center
Marian Silver*
Sierra Club*
Coalition Against Star-Wars on Kauai
University of Hawaii, Water Resources Research Center
Section 8.0
Comment Response Letters

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Dear Ms. McCrey:

I was pleased to see in the June 8 GEJC Bulletin that an EIS is being prepared for the proposed restricted easement associated with launches of the Strategic Target System (STARS) and Vandal missiles from the Pacific Missile Range Facility (PMRF) on Kauai. The comments below concern missile reliability, adequacy of the ground hazard areas (GHA's) and air quality impacts of these missile launches. I am also enclosing a copy of my letter of Sept. 22, 1992 to William Pasy concerning the draft Environmental Assessment (EA) for the Memorandum of Agreement (MOA) for STARS launches. Direct comparison of the predicted hydrogen chloride (HCl) concentrations at the boundary of the GHA with the Hawaii guideline was not done either in the STARS EIS or in the EA for the MOA. This comparison should be included in the EIS being prepared.

1) reliability of the STARS booster: Neither the State of Hawaii EA for the MOA for STARS launches nor the STARS EIS provide realistic estimates for the probability of an individual launch failure or for the probability of a failure in the whole series of planned launches. (The system reliability estimate of 97% in the STARS EIS is based upon the assumption of 100% reliability for the first and second stage rocket motors and for the thrust vector control system.) Realistic reliability estimates should be included in the EIS being prepared. In particular, the Dec. 12, 1992 report on Polaris and Minuteman I reliability to David Wright, senior scientist at Union of Concerned Scientists, should be evaluated. Also, the three SDI launches in October of 1992 that required flight termination (as reported in the Nov. 9, 1992 issue of Aviation Week and Space Technology) should be evaluated to obtain an estimate of failure rates for recent SDI launches.

2) reliability of Vandal: The July 1991 EA for EST Flight Test Experiments claims that, between 1977 and February of 1991, there were 390 successful flights and 8 failures in the Vandal program. Data from Vandal launch attempts since February of 1991 should be provided and an estimate of the Vandal reliability given. An estimate should also be made for the probability of no Vandal failures in the 72 launches anticipated during the next years that the restricted easement would be in effect. Note that a reliability of 96% implies that the probability on no failures in 72 launches is only 0.23.

3) adequacy of the STARS GHA: A detailed analysis of the adequacy of the GHA for a launch which goes off-course should be done. In particular, scale drawings should be provided indicating where debris from an off-course flight would hit the surface for flights terminated at 15, 23, and 30 seconds after liftoff. These times are relevant because apparently an off-course flight must be terminated within 15 seconds to keep debris within the GHA, an off-course Arias launch from Cape Canaveral on Aug. 20, 1991 was terminated at 23 seconds, and a Polaris first stage motor failed after 31.2 seconds in a static firing test at China Lake on March 6, 1991. Two particularly important cases to examine are those in which the flight takes a course either toward Kilauea or to the southeast toward the town of Leilani. It should be noted that the Aug. 20, 1991 Arias launch went off-course by about 90 degrees because the wrong computer program was loaded into the missile's guidance system.

4) adequacy of the Vandal GHA: Scale drawings should be provided indicating where debris from past Vandal launch failures hit the surface. This is particularly important for the failures in which some components broke up.

5) HCI concentrations from STARS launches: The 8-hour average values of the predicted HCI concentrations at the boundary of the GHA should be compared to the Hawaii HCI guideline. As I indicated in my Sept. 22, 1992 letter to William Pasy, document 226 in the Administrative Record for the STARS EIS indicates that the Hawaii HCI guideline will be exceeded at the boundary of the GHA both for a normal launch and for a launch which is terminated on the launch pad.

6) air quality monitoring data for Feb. 26, 1993 STARS launch: The air quality monitoring data collected before, during, and after the first STARS launch should be evaluated in the EIS. Part of this evaluation should include a comparison with the predictions of the REEDS computer model used for the STARS EIS and with that of the DIFDIF model, which was used for STARS launches in the July 1992 EA for the Kauai Test Facility (KTF). This evaluation should also include a review by the Hawaii Dept. of Health. In response to one of my comments on the draft EA for the MOA, I received the following answer in a Dec. 2, 1992 letter signed by William Pasy:

"As part of the Record of Decision, air samples will be collected by the Army during the first demonstration launch to validate the accuracy of the models and to compare compliance with federal and state standards. The Clean Air Branch will continue to work with the Army and will likewise review the results of this monitoring and require whatever is necessary to ensure public health and safety."

7) clean up of test area (from Vandal launches): Item 7 of the MOA which is currently in effect for STARS and Vandal launches contains the statement, 'The Navy will remove contamination caused by liquid propellant (JP-10) and solid propellants solid propellants (sic) (octrocellulose/nitrocellulose, cellulose acetate -
Dear Mr. Paly:

I have already submitted comments (dated Sept. 5, 1992) on the draft Environmental Assessment for the proposed Memorandum of Agreement (MOA) concerning the ground hazard area for Strategic Target System (STARS) launches from the Pacific Missile Range Facility on Kauai. This letter contains some additional comments based upon my examination of the Administrative Record (AR) for the STARS H5, which I saw for the first time today. Based upon this review and other STARS information, I think that the State of Hawaii is not justified in signing the MOA until more information is provided and more evaluation is done.

One of the serious deficiencies in the AR for the STARS EIS is that several documents are missing. In some cases a single sheet of paper with the initials "TBD" is the only thing in the notebook where the document should be. In other cases only the first page of the document is present. For example, documents 249 and 250 have only the cover page present. These are NASA technical memoranda which are cited in the STARS EIS as evidence that the REDEM computer model calculations of hydrogen chloride and carbon monoxide concentrations agree with data. How can one evaluate this claim if the document is missing from the AR?

Document 228 contains a memo plus a copy of the REDEM computer printout for the calculation of hydrogen chloride concentrations. There are handwritten notes on some of the pages which exceed the 60-minute average values calculated by the program to 8-hour average values. The Hawaii guideline for exposure to hydrogen chloride is an 8-hour average value of 0.025 ppm. The calculated concentrations at the boundary of the ground hazard area (1,000 meters from the launch pad) in document 238 are 0.04 ppm for a normal launch and 0.028 ppm for the case of a configuration resulting from an early flight termination. These 8-hour average values were not included in Table 4-3 of the STARS H5 and are both lower than the Hawaii guideline.

A handwritten note on the page for the configuration scenario states that the Hawaii guideline "could be exceeded up to 11,000 m". I reported this information to Tyler Sugihara in the Clean Air Branch of the Hawaii Dept. of Health this afternoon. I had talked to him in July about these air quality issues and hoped that he would do an evaluation of this new information in the AR. He told me that he had been instructed not to comment upon or to do further work on STARS issues and that any comments should be directed to the Attorney General's office.

In conclusion, the State of Hawaii should insist that the documents missing from the AR for the STARS EIS be provided and be made available for public examination. Once all of these documents are available, independent evaluation of air quality impacts, particularly the results of the REDEM computer calculations, needs to be

Sincerely,

Michael Jones
Physicist Dept.
Univ. of Hawaii
2305 Correa Road
Honolulu, Hawaii 96822

Copies to:
U.S. Army Space and Strategic Defense Command
Hawaii Office of Environmental Quality Control
Hawaii Dept. of Health

Sept. 22, 1992
Based upon the data in document 228 of the AR, people at the boundary of the ground hazard area will be exposed to hydrogen chloride concentrations greater than the Hawaii guidelines. Therefore, it would appear that the State of Hawaii should re-evaluate the size of the ground hazard area before signing the MOA.

Michael Jones
Physics Dept.
Univ. of Hawaii
2505 Correa Road
Honolulu, Hawaii 96822

copies to: Sierra Club Legal Defense Fund
Randy Young, Attorney General's office
Sen. Mike McCartney

Environmental and Engineering Office

Mr. Michael Jones
Physics Department
University of Hawaii
2505 Correa Road
Honolulu, Hi 96822

July 23, 1993

Dear Mr. Jones:

Thank you for your comments on the Restrictive Easement Environmental Impact Statement (EIS) Preparation Notice. Your comments have been considered and, where relevant, will be addressed in the Draft EIS. As a part of the consultation process, the U.S. Army Space and Strategic Defense Command is responding in this letter to your individual, relevant comments.

Comment 1: Reliability of the Strategic Target System booster

Response 1: A thorough examination of the Strategic Target System booster reliability has already been addressed in previous environmental documents which are incorporated by reference in the EIS for the restrictive easement. Further, this analysis has withstand legal challenges in both Federal and state courts. The analyses and data included in the previous environmental documents and their administrative records are as clear and complete as possible, without disclosing classified information, and provide sufficient information and context to support an informed decision concerning booster safety issues.

Comment 2: Reliability of Vandal

Response 2: The reliability of the Talos booster, which is the same booster used for the Vandal rocket, has been addressed in a previous environmental document (ESEST Flight Test Experiment Environmental Assessment) which has been adopted by reference in the Restrictive Easement EIS. The Vandal program has had 390 successful flights and 8 failures between July and February 1991. An early problem associated with four of the failures has been corrected. The other failures were associated with booster break-up and missing nozzle retaining rings. The establishment of the Vandal ground hazard area would protect the public in the unlikely event of flight termination. It should be kept in mind that an unsuccessful launch does not imply that it created a hazard to health and safety or the environment.
Comment 3: Adequacy of the Strategic Target System ground hazard area

Response 3: The analysis from previous federal environmental documents (Strategic Target System EA and EIS) demonstrates that the procedures and systems are in place at the PMRF to ensure that all harmful debris can be contained within the ground hazard area established for the Strategic Target System, regardless of whether any anomaly in a Strategic Target System flight may occur and regardless of the direction in which a flight might begin to veer off its intended course. The flight safety officer maintains control over the missile at all times and knows where debris would fall at any given moment that a flight would be terminated. By continuously monitoring the predicted debris impact area while a missile is in flight, the flight safety officer can ensure that harmful debris will not fall on any land outside the ground hazard area. Each launch site is unique with respect to the kind of ground hazard area required to protect human health and safety. The Strategic Target System ground hazard area was established to take into account the physical location of the launch pad, its proximity to the ocean, and the potential for damage on land areas at various stages in the launch.

Comment 4: Adequacy of the Vandal ground hazard area

Response 4: While the same general answer provided above for the Strategic Target System ground hazard area applies equally to the Vandal ground hazard area, the Army would like to point out that the analysis of past launches and launch failures can provide useful data about missile performance but does not by itself determine a ground hazard area. Ground hazard areas can be larger or smaller depending on the type of missile and the degree to which a missile is allowed to vary from its intended flight path before it must be terminated. In other words, missile performance is only one factor in determining a ground hazard area, but once a ground hazard area is established, it defines precisely the bounds within which flight termination must and will be executed.

Comment 5: HCl concentrations from Strategic Target System launches

Response 5: Air quality issues were adequately addressed by the U.S. Government in the Supplement to the Environmental Assessments for the Strategic Target System and the subsequent EIS. The Hawaii HCl guideline is not expected to be exceeded by a Strategic Target System launch or launch failure. This assumption was validated by the results from monitoring of HCl levels following the February 26, 1993, Strategic Target System launch. The monitoring report will be finalized shortly and will be available for review.

Comment 6: Air quality monitoring data for February 26, 1993, Strategic Target System launch

Response 6: The monitoring report will be finalized shortly and will be available for review. Monitoring results indicated that all emission concentrations were below applicable standards at the boundary of the Strategic Target System ground hazard area which is the first publicly exposed area. The monitoring report will include evaluation of previous modeling conducted for the Strategic Target System booster. The results of the monitoring report are referenced in the Restrictive Easement EIS.

Comment 7: Cleanup of lead from Vandal launches

Response 7: The intent of Paragraph 7 in the Memorandum of Agreement was to ensure that any debris or releases caused by a launch failure impacting the ground hazard area would be cleaned up and removed as quickly as possible. It was not intended to apply to routine emissions from launches, nor was it intended that such routine emissions would be characterized as "releases" for purposes of reporting requirements under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Comment 8: Reporting of lead releases from Vandal launches

Response 8: See previous response with respect to reportability of lead emissions.

The point of contact is Linda Finch, Attention: CSSD-EN-V, Post Office Box 1509, Huntsville, Alabama 35807-3801.

Sincerely,

[Signature]

Lieutenant Colonel, U.S. Army
Strategic Targets Product Manager
Ms. McLeroy,

June 26, 93

After following the progress in a dubious word, of the STARS program here on Kauai; I am writing in the interest of perhaps 10% of the population. I know who will not take time to write. I am requesting that the EIS be completed for the early planning of the arms areas for STARS program. At least may you follow the required proper steps to proceed prior to lifting off these burdens missiles into our environment. Please, if you will, address the issues directly; perhaps it is through this method the true risks and potential impacts will be revealed. Thank you, Marianne Silver

Ms. Marianne Silver
P.O. Box 442
Lewistown, MT 59457

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-1500

July 23, 1993

Environmental and Engineering Office

Ms. Marianne Silver
P.O. Box 442
Lewistown, MT 59457

Dear Ms. Silver:

Thank you for your comment on the Restrictive Easement Environmental Statement (EIS) Preparation Notice. The Army intends to complete the EIS for the restrictive easement.

The point of contact is Linda Nehr, Attention: CSSD-EI-V, Post Office Box 1500, Huntsville, Alabama 35807-1500.

Sincerely,

[Signature]

Lieutenant Colonel, U.S. Army
Strategic Targets Product Manager
Department of Land and Natural Resources
EIS Plan for Strategic Target System NGA
July 8, 1993, p. 2

(2) EIS must jointly discuss any future lease of State-owned lands within and adjacent to the GHA that are now under lease to Kekaha Sugar Co.

State-owned lands adjacent to PMRF and within and adjacent to the GHA are now under lease to Kekaha Sugar Co. for sugar cultivation. The decision of whether or not to continue sugar cultivation on these lands, or to use these lands for other, possibly more remunerative uses, will in any event require full compliance with Chapter 243, because issuance of a lease to any party is an "action" triggering the requirements of that chapter. The question of the future use of these lands is intimately tied to the proposed GHA agreement, and one issue cannot be addressed without consideration of the other. To treat one but not the other would be improperly segment what is, in reality, a single decision process. Accordingly, the EIS must address in full the possible renewal of the Kekaha Sugar lease, as well as alternative uses for these lands, other than sugar cultivation, including the socioeconomic effect, see Polokai Homeowners Cooperative Ass'n v. Cobb, 63 Haw. 453 (1981), of the various uses on DHHL and GHA in light of the various levels of revenues that could be available under each alternative.

(3) Ownership of public roads

The proposed action would permit the United States to close certain public roads within the GHA. The State of Hawaii may not have jurisdiction over certain of those roads or possess the authority to agree to their closure, and it appears instead that at least one of the affected roads is under the jurisdiction of the County of Kauai. See generally, Legislative Reference Bureau, Roads in Lieu: An Analysis of the State-County Jurisdictional Dispute (1989); see also Act 115, Gen. Op. 86-15 (June 10, 1986). If so, the State has no authority to enter into an agreement that purports to authorize closure of these roads.

This jurisdictional issue is particularly relevant with respect to the access road from the end of the Kaumakai Highway and/or Kau Road northward to Polihale State Park and other connecting roads in the immediate vicinity. Indeed, a sign at the intersection of the Kaumakai Highway and Lio Road indicates that the road to Polihale State Park northward of this intersection is not under State jurisdiction. This road appears to fall within the category of "roads, alleys, streets, ways, lanes, bikeways, and bridges in the State, open, laid out, or built by the government" and are thus "public highways" under § 264.1(a), H.R.S. Accordingly, because not all roads in question are "State highways, which are all those under the jurisdiction of the department of transportation," § 264-
Similarly, the County of Maui would be an additional accepting authority for the EIS under § 343-5(c), H.R.S.

(5) Effect on State-owned submerged lands

The State Defendants in *Hawaiian Club v. Battle*, Civil No. 92-2507-07, 1st Circuit Court, have specifically denied "that the GIA includes submerged lands." State Defendants' Answer to Verified Complaint for Declaratory and Injunctive Relief Filed July 23, 1992, p. 17 at 9. This is a physical impossibility, as submerged lands lie directly seaward of Polihale State Park and directly seaward of PMRF itself. Clearly, execution of any agreement with the United States that facilitates closure of the GIA will adversely impact submerged lands located seaward of Polihale State Park and PMRF. These submerged lands are owned by the State of Hawaii and are assets of the State of Hawaii, and are assets of the § 5(f) Ceded Lands.

The EIS must address all the effects of the proposed action to public use of all such submerged lands. The EIS should also describe the legal authority of the US to impose limitations on public access to such submerged lands, including the terms of any agreements or informal understandings between the US and the State.

(6) The EIS must show how the proposed action is consistent with State law regarding use of parks.

The proposed action appears to be inconsistent with the legislative command that "[t]he department of land and natural resources shall preserve the parks and parkways in the state park system in their natural condition so far as may be consistent with public use and safety, and improve them in such manner as to enhance their use and enjoyment...". § 184-4, H.R.S. (emphasis added). Furthermore, § 184-3, which prescribes DLNR's special powers with respect to the state parks system, makes no provision for the public use of parks for public use for non-park purposes in the state parks system, for the benefit of the public, or for the benefit of the public as a whole.

The proposed action is thus of considerable precedent significance, as it assumes the authority in DLNR to use public parks for non-park purposes in the state parks system, without express legislative authority and in contravention of the Department's statutory obligations. An EIS is necessary to discuss the consistency of the proposed action with DLNR's obligations under Chapter 184.
(7) Reliability of rocket boosters

The State cannot reasonably evaluate the adverse impacts of the proposed action until it has accurate information as to the reliability of the rocket boosters to be used in the project. Recent failures of old Minuteman rockets fired from Vandenberg AFB indicate that serious questions exist as to the reliability and safety of old reconditioned rockets. Such information must be disclosed to the State and to the public through the EIS process.

(8) Enforcement of State Law

As the State discovered in State of Hawaii v. Cheney, consolidated with Sierra Club v. Cheney, U.S. District Court for the District of Hawaii, Civ. No. 88-0775 HBF, the State of Hawaii cannot enforce State law against the United States because of federal sovereign immunity. The State has no legal authority to waive, delegate, or abdicate its police powers over State-owned lands by entering into any agreement that fails to ensure the full enforceability of State law. Furthermore, it would be a breach of the State's trust responsibilities under § 5(f) of the Hawaii Admission Act and Art. XI, § 1, and Art. XII, § 3, of the Hawaii Constitution to enter into any agreement with the United States that fails to include an explicit waiver of federal sovereign immunity with respect to all activities undertaken on State-owned lands, including an explicit recognition by the United States that it is liable for any monetary penalties that may be imposed under State law. Accordingly, the EIS should disclose the full terms of any proposed agreement between the State and the US and should fully disclose any impairment in the State's ability to enforce its laws against its tenant in the event the United States fails to comply with State law.

(9) Effect on traditional and customary rights and practices

The EIS should describe Hawaiian traditional and customary use of the land to be affected by the proposed action, and must describe measures that will mitigate or eliminate adverse impacts.

Very truly yours,

Carl C. Christenson

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1190
HUNTSVILLE, ALABAMA 35803-1190

Environmental and Engineering Office

Mr. Carl C. Christenson
Native Hawaiian Legal Corp.
1164 Bishop Street, Suite 1205
Honolulu, HI 96813

Dear Mr. Christenson:

Thank you for your comments on the Restrictive Easement Environmental Impact Statement (EIS) preparation notice. Your comments have been considered and, where relevant, will be addressed in the Draft EIS. At this point of the consultation process, the U.S. Army Space and Strategic Defense Command is responding to your individual, relevant comments.

Comment 1: Effect on revenue from adjacent state-owned land

Response 1: In accordance with the significance criteria outlined in Title 11 Chapter 200 Hawaii Administrative Rules, the EIS will address the potential for the proposed action to “substantially affect the economic or social welfare of the community or state.” State, county, and local plans of anticipated continued agricultural and/or recreational use of the affected lands. The proposed action is consistent with this continued agricultural and recreational use. There is no indication that more intensive uses are reasonably anticipated. The EIS needs only to address reasonable alternatives and reasonably foreseeable impacts.

Comment 2: The EIS must jointly discuss any future lease of state-owned lands within and adjacent to the ground hazard area that are now under lease to the Kekaha Sugar Company.

Response 2: In the case of the proposed restrictive easement, the applicant is the U.S. Government. The Army, as applicant, is required to examine reasonable alternatives to its proposed action. Any alternatives to the lease of the land currently cultivated for sugar production by the Kekaha Sugar Company, for other than agricultural purposes, would require a change in State and local land use plans and policies. There is no indication that any such change is anticipated. Consequently, the evaluation of more intensive uses or development of the current agricultural use would be too conjectural for a meaningful analysis or comparison. If, in the future, there is a proposed change in the land's lease status, environmental analysis and documentation should be prepared by the applicant who proposes to alter or renew the lease.
Comment 3: Ownership of public roads
Response 3: Within the restrictive easement the State of Hawaii has jurisdiction over the roads that would be subject to closure under the proposed agreement.

Comment 4: County of Kauai as additional "accepting authority"
Response 4: There are no county roads within the restrictive easement boundary; therefore, county approval of the EIS is not required.

Comment 5: Effect on state-owned submerged lands
Response 5: The restrictive easement does not include any state-owned submerged lands. However, the U.S. Coast Guard has established a permanent safety zone in the waters near the PMRF to protect the public and property from hazards related to Strategic Target System launches from the PMRF. (57 FR 44507)

Comment 6: The EIS must show how the proposed action is consistent with state law regarding use of parks.
Response 6: Pursuant to Hawaii Revised Statutes section 171-3, the Department of Land and Natural Resources is vested with broad authority over state parks ("the department shall also manage and administer the state parks..."), Section 184-6 provides that "the department shall preserve the parks and parkways in the state park system in their natural condition so far as may be consistent with their use and safety..." DLNR has promulgated administrative rules implementing Chapter 184. Hawaii Administrative Rules section 13-146-6 provides that the Land Board can issue or its authorized representative may "close or restrict the public use of all or any portion of state parks when necessary for the...safety and welfare of persons or property."

Comment 7: Reliability of rocket boosters
Response 7: A thorough examination of Strategic Target System booster reliability has already been addressed in previous environmental documents (STRATEGIC Target Systems [STARS] Environmental Assessment 1990, Draft Environmental Impact Statement for the Strategic Target System 1991, Final Environmental Impact Statement for the Strategic Target System, 1992). While Strategic Target System booster reliability has been determined to be extremely high, the establishment of a ground hazard area through the restrictive easement is intended to protect the public in the unlikely event of a launch failure or other launch-related accident.

The Vandal program, Navy-wide, has had 300 successful flights and 8 failures between 1977 and February 1991. An early problem associated with four of the failures has been corrected. The other failures were associated with booster break-up and missing nozzle retaining rings. The establishment of the Vandal ground hazard area would protect the public in the unlikely event of flight termination.

Comment 8: Enforcement of state law
Response 8: The restrictive easement affects neither existing Federal sovereign immunity nor state police powers over state-owned lands. It only allows the United States the property right described in the easement to exercise exclusive control over access to the ground hazard area during specified periods of time surrounding launch activities. Existing Federal law concerning Federal responsibility for damage caused by Federal activities is unaffected by the easement as is any right the state may have to seek monetary penalties under state law.

Comment 9: Effects on traditional and customary rights and practices
Response 9: With respect to traditional and customary practices, such as subsistence fishing, the Army has addressed these issues in previous environmental documents. In the case of religious practices, the PMRF maintains a policy of accommodating these activities to the maximum extent practicable. The EIS will analyze whether any additional potential impacts arise from those already addressed in previous environmental documents would result from the restrictive easement on state-owned lands.

The point of contact is Linda Navin, Attention: CSSD-EN-V, Post Office Box 1500, Huntsville, Alabama 35807-3801.

Sincerely,

[Signature]

Lieutenant Colonel, U.S. Army
Strategic Targets Product Manager
Ms. Linda McCrery
Department of Land and Natural Resources
Post Office Box 621
Honolulu, Hawaii 96810

Re: Comments on EIS Preparation Notice for U.S. Army Proposed Easement Over State Land For Safety and Ground Hazard Areas at Pacific Missile Range Facility, Kaua'i

Dear Ms. McCrery:

On behalf of Sierra Club and 1000 Friends of Kaua'i, the Sierra Club Legal Defense Fund submits the following comments on the Environmental Impact Statement ("EIS") Preparation Notice for the U.S. Army Space and Strategic Defense Command's proposed easement over state lands adjacent to the Pacific Missile Range Facility ("PMRF"), Kaua'i, for use as a ground hazard area.

As you know, the purpose of comments on a preparation notice is to assist your agency and the applicant in properly establishing the scope and depth of coverage of a Draft EIS. Therefore, our comments focus on these scoping issues, and we will not address here the factual concerns regarding specific resource questions that will undoubtedly arise after issuance of the Draft EIS ("DEIS").

As an initial matter, we formally request that the Department of Land and Natural Resources ("DLNR") extend the public comment period an additional 30 days because the preparation notice published in the June 8, 1993 DLNR bulletin is completely misleading as to the actual scope of the proposed action. This concern is explained further below.

Ms. Linda McCrery
July 8, 1993

Page 2

1. The EIS Preparation Notice Inadequately Describes The Proposed Action.

One of the most fundamental requirements of a preparation notice and draft EIS is that they must accurately describe the proposed project. H.A.R. § 12-200-11(c). Here, this critical step has not been properly completed. Indeed, the action proposed in the draft restricted easement is a radical departure from the proposed action described in the DLNR bulletin.

The draft proposed easement is not limited to the launches of STARS/VANDAL missiles. To the contrary, the purpose for which the Army may put the proposed easement are entirely unlimited -- it is a carte blanche for the Army to use these state lands as it pleases.

The version of the draft "Grant of Easement" attached as Appendix C to the Army's federal Draft EIS does not even mention STARS or VANDAL. The easement refers only in the most general terms to:

the launching, tracking, and collection of data associated with guided missile, satellite, and space vehicle research, development, evaluation and military training programs.

There is no express or implied provision in the Grant of Easement that restricts the use of state lands to impacts from the STARS/VANDAL launches. The Army appears to have in mind a significantly broader program -- covering unspecified missiles, satellites, and "vehicles." If this is true, then the preparation notice must describe those proposed activities. Otherwise, it is impossible for the public (or for DLNR) to determine the potential impacts.

As it currently stands, the preparation notice misleadingly mentions the STARS/VANDAL launches. It does so in a way that implies these will be the only activities covered by the easement. This is entirely inconsistent with the scope described in the easement. (The description of the proposed action in the Draft EA (June 8, 1993) is also not consistent with the Grant of Easement.)

In short, the public is not being given accurate information about the true nature of the proposed action: is the easement to cover only STARS and VANDAL launches or will the easement be for any activities at PMRF that require a ground hazard area on state lands up to 10,000?

[Signature]
This distinction is critical and not merely semantical. If the easement is open-ended, then the range of potential environmental impacts that must be discussed is substantially broader that the preparation notice indicates. If the easement is limited to STARS and VANDAL, then it must be written clearly to restrict it to these activities.

Due to this patent contradiction, the preparation notice misleading the public. DLNR must therefore reissue the preparation notice, clearly stating the nature of the action, provide promptly to the public a copy of the proposed easement, and notice a new 30-Day public comment period.

(There also appears to be considerable confusion between DLNR and the Army as to what exactly is the proposed action. After repeated inquiries about the easement, we received completely contradictory responses from the agency and the applicant. According to DLNR, it does not have "any more recent draft of the proposed easement document than what is contained in the Federal Environmental Impact Statement prepared in 1992." Yet, according to the Army, there is a more recent copy of the proposed easement (which we did not receive until today). Did DLNR -- the accepting agency -- even have a copy of the current version of the proposed action? How could the public have been accurately informed about the proposed action when it was not provided a copy?)

2. The DEIS Must Cover All Proposed STARS/VANDAL Launches, Including Those Planned Prior To 1994.

The very issuance of the preparation notice means that the accepting agency, DLNR, has determined that the proposed action may have a significant impact on the environment, necessitating an EIS.

As DLNR knows, in conducting an environmental review under NEPA, it must analyze connected, related, cumulative actions, not simply the action segmented as the applicant or agency would like. Thus, the DEIS, however, must cover all STARS/VANDAL launches, not just those scheduled to take place under the proposed easement (1994 and beyond). Therefore, both the February 26, 1993 launch and the scheduled August 1993 launch must be analyzed in the DEIS. In addition, any VANDAL launches that have taken, or will take, place prior to 1994 must be included within the scope of this DEIS.

Moreover, NEPA and its regulations require that the DEIS must be prepared prior to proposed actions. Thus, it must be prepared prior to the scheduled August 1993 launch. If that is not possible, then this STARS launch and any VANDAL launches must be delayed until the final EIS is complete and accepted.

3. The DEIS Must Properly Cover Issues Related To the "Surrounding Environment" That Have Been Consistently Ignored By The Army In The Past.

Past environmental documentation prepared for the missile launches, including both the federal EIS and the State's EA, have failed to consider adequately the impacts of the launches on the surrounding environment, including but not limited to the area included in the proposed easement. The DEIS must fully consider the following issues, basing its analysis on the significance criteria contained in H.R.S. Section 33:

a. Native Hawaiian Rights. The impact of the STARS launches, upon native Hawaiian cultural, subsistence and religious customs, practices and beliefs and upon sovereign Hawaiian claims to the ceded public lands and Hawaiian Homestead lands in the ahu'au'a of Waimāna must be addressed.

b. Native Hawaiian Subsistence Fishing. The executive orders that designated lands at PPRF for use by the military guaranteed that the public would have access to the shore for the purpose of fishing, except on portions used for bombing, and then only while activities are in progress or about to commence. The illegal infringement of fishing rights due to closures of the base for launches allowed by the proposed easement must be addressed in the DEIS.

c. Land Use. The launch program may significantly restrict potential uses of ceded lands and Department of Hawaiian Homes lands adjacent to PPRF. The economic impacts of restrictions on the use of these lands must be discussed. In addition, the entire ahu'au'a of Waimāna is composed of Crown Land and the Native Hawaiian people have identified this ahu'au'a as ideal for inclusion in a sovereign land base. The impacts of the use of lands adjacent to PPRF for a ground hazard area must be discussed in the context of Hawaiian sovereignty and land rights.

d. Protected Species. Launches under the proposed easement may affect rare, threatened and endangered flora and fauna, both terrestrial and marine, present within the ground hazard area and in areas adjacent to it. There is a high potential for fire should an early launch termination be necessary, or if a catastrophic launch failure takes place; endangered species may also be impacted by hazardous waste and debris. The DEIS must fully analyze the impacts of the proposed easement on rare.
threatened and endangered species present within and adjacent to the ground hazard area, including an analysis of the impacts of fire and hazardous materials.

e. Hazardous Materials and Wastes. Previous environmental documentation prepared for the STARS launches has indicated soils within the ground hazard area may be contaminated by hazardous wastes, requiring that they be handled as hazardous waste and disposed of. The DEIS must address the potential contamination of sensitive biological and archaeological resources in the ground hazard area by hazardous waste, and the necessity for removal and disposal of these resources.

f. Fire. The impacts of fires associated with launches under the proposed easement must be fully analyzed. In addition to impacting vegetation (discussed above), fire may impact or chemically alter cultural deposits. Mitigation measures proposed to protect cultural deposits from fire may harm endangered plants, and may endanger resources far outside the ground hazard area. In addition, fires resulting from launches may necessitate continued closure of access roads to Polihale State Park, endangering public health and safety.

g. Air Quality. Prior analysis by the Army has revealed that "normal" STARS launches will violate state air quality guidelines beyond the 10,000 foot perimeter of the ground hazard area. The Army's calculations also indicate that early launch termination may lead to exceedance of state guidelines as much as 35,000 feet downwind of the launch site. The DEIS must fully address the impacts of the STARS and any other proposed activities on air quality, and should contain a full analysis of the monitoring results from the February 1993 STARS launch, comparing those results with the predicted emissions for that launch.

h. Rocket Reliability. The reliability of the missiles to be fired from PRF are directly linked to the likelihood of significant impacts to the ground hazard area and surrounding lands. The DEIS must include an accurate assessment of the actual reliability of all missiles to be fired from PRF under the proposed easement. The DEIS should also include an analysis of the reliability of similar missile launching programs, including the Minuteman I, and analyze the likelihood of a launch failure such as that which occurred at Vandenberg Air Force Base on June 16.

Closures. The impacts of closure of the lands within the ground hazard area, including half of Polihale State Park, must be fully analyzed. This analysis should examine the February 1993 STARS launch in detail, in which clearing

activities improperly began three days prior to the actual launch. Should a similar pattern be followed for all thirty launches allowed under the proposed easement, visitors use of Polihale State Park would be disrupted for 90 days out of the year.

j. Kwajalein. The DEIS must examine the impacts of missile launches from PRF on the environment and inhabitants of Kwajalein Atoll. This analysis should include secondary impacts, such as the impacts from expanded activities at Kwajalein needed to support the launches proposed under the easement.

4. The DEIS Must Consider Reasonable Alternatives To The Proposed Action.

An essential purpose of scoping is to ensure that the DEIS appropriately covers the range of reasonable alternatives to the proposed action. There is no indication in the preparation notice as to the alternatives being considered by the agency or applicant. Accordingly, we propose that the following alternatives be thoroughly addressed:

a. No-Action. We anticipate that the agency/applicant will address the alternative of not undertaking the proposed easement. However, we emphasize that the analysis of this alternative must be comprehensive and sincere, and not the usual cursory, pro forma approach. Particularly given the restrictions on land use of the proposed easement, the no-action alternative will not only have no negative environmental impacts, but will also allow new beneficial uses of the 1700 acres of state lands within the proposed ground hazard area. The environmental and cultural benefits of these uses must be assessed.

b. Small Hazard Arc Only. The option of creating only a 6000-foot hazard arc (instead of the 10,000 arc) must be considered. Assuming for the moment that the easement is intended to cover only WAOIL and STARS launches, then this would allow the applicant the opportunity for partial fulfillment of the proposed program. While we do not in any way endorse this option, we believe that it is a "reasonable alternative" in NEPA parlance that must be examined.

c. Reduced Launches. The draft easement contains no limitations on the types, number, or frequency of launches from PRF. If this is actually the proposed project, then once the specifics of that proposal are specified, then the agency/applicant must choose a reduced level of activity for evaluation in the DEIS.
Ms. Linda McCroy
July 8, 1993

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b. Alternative Launch Sites. The DEIS must analyze alternative launch sites for the STARS/THAAD and any other proposed programs. Potential alternative sites include Vandenberg Air Force Base in Lompoc, California.

c. Reduced Term of Easement. Given the likelihood of reduced future budgets of the Department of Defense for the SDI, it may be highly imprudent for the State to enter into a nine-year easement. The alternative of shorter easements (which could be covered by the same NEPA documents, if properly done) must be considered. What is the justification for anything but a year-to-year easement? The DEIS must analyze this alternative so that the agency can be fully informed about the impact of the proposals to enter into an easement with the Army.

Conclusion

We appreciate this opportunity to provide comments on the preparation notice. We reiterate our request for an additional 30-day public comment period due to the inadequate description of the true nature of the proposed action in the OEDC bulletin. Moreover, pursuant to NEPA, we also request your written response to our questions and concerns prior to your proceeding with the DEIS.

Very truly yours,

[Signature]

cc: Linda Uih
U.S. Army Space and Strategic Defense Command
Post Office Box 1500
Huntsville, Alabama 35807-1500

Ms. Denise E. Artolini
Sierra Club Legal Defense Fund, Inc.
212 Merchant Street, Suite 202
Honolulu, HI 96813

July 23, 1993

DEPARTMENT OF THE ARMY
U.S. Army Space and Strategic Defense Command
Post Office Box 1500
Huntsville, Alabama 35807-1500

Environmental and
Engineering Office

Ms. Denise E. Artolini
Sierra Club Legal Defense Fund, Inc.
212 Merchant Street, Suite 202
Honolulu, HI 96813

Dear Ms. Artolini:

Thank you for your comments on the Restrictive Easement Environmental Impact Statement (EIS) Preparation Notice. Your comments have been considered and, where relevant, will be addressed in the Draft EIS. As a part of the consultation process, the U.S. Army Space and Strategic Defense Command is responding in this letter to your individual, relevant comments.

Comment 1: The EIS Preparation Notice inadequately describes the proposed action.
Response 1: The EIS Preparation Notice accurately describes the proposed action. The restrictive easement in its final form will be consistent with the Preparation Notice. Its precise terms and wording are subject to further negotiation between the U.S. Government, the State of Hawaii, and the Kahe Power Company. However, the restrictive easement is intended to cover clearance of a hazardous area for Strategic Target System and Vandal launches only, and the final version of the easement will reflect this intent.

Comment 2: The Draft EIS must cover all proposed Strategic Target System/Vandal launches, including those planned prior to 1994.
Response 2: The proposed action under consideration in the EIS is a restrictive easement for a 5-year period of time commencing on January 1, 1994. Launches prior to the easement taking effect have already been analyzed for their potential environmental impacts in previous environmental impact analysis documents. The EIS for the restrictive easement will address conflicts, related, and cumulative actions during this 5-year period covered by the easement. The Sierra Club Legal Defense Fund unsuccessfully raised this issue in State Court prior to the February 26, 1993 launch.

Comment 3: The Draft EIS must properly cover issues related to the “Surrounding Environment” that have been consistently ignored by the Army in the past.
Response 3: Previous environmental analyses and resulting documents prepared by the Army have ultimately met all requirements placed on them by the applicable statutes and regulations. The EIS for the Strategic Target System contains a
particularly thorough examination of the affected environment, covering every resource identified under National Environmental Policy Act and Council on Environmental Quality regulations. Specifically, the Strategic Target System EIS addressed all of the following issues: cultural, historical, and archaeological resources; fishing: land use; biological resources (including protected species); hazardous materials and waste; the potential for fire and the impacts from it; air quality; missile reliability; and closure issues.

With respect to native Hawaiian rights, where they are recognized by government and law, such as subsistence fishing, the Army has addressed them in its environmental documents. In the case of religious practices, the PMRF maintains a policy of accommodating these activities to the maximum extent practicable. As was stated in the Strategic Target System EIS, while the Army is not unaware of other Hawaiian rights claims, such as a sovereign land base, those issues were and are outside the scope of the environmental impact assessment process.

Potential impacts to the Kulahein Aerial from the Strategic Target System have been addressed in the Strategic Target System EIS and the EIS and Draft SEIS for the U.S. Army Kulahein Aerial. The Kulahein Aerial is not part of the proposed restrictive easement, which is the subject of the EIS being prepared.

The EIS for the restrictive easement will incorporate reference previous environmental analyses where appropriate and will reflect additional analyses where necessary to support the proposed action.

Comment 4: The Draft EIS must consider reasonable alternatives to the proposed action.

Response 4: The EIS for the restrictive easement will address the no-action alternative. It will also address the alternative of revising the existing LDA as a procedure to ensure protection of the public through the clearance of a ground hazard area during launches. Alternatives to the launch areas themselves have already been addressed in other environmental documents. Reducing the size of the ground hazard area to a 6,000-foot arc makes it more difficult to protect the public in the event of early flight termination or other accident involving Strategic Target System launches. Consequently, it is not considered to be a reasonable alternative. Alternative launch sites were considered in the Federal EA and EIS prepared for the Strategic Target System program, which are incorporated by reference in the EIS for the restrictive easement. As noted in the response to Comment 1, listed previously, the final version of the restrictive easement will include limits on the number of Strategic Target System and Vandal launches to conform to the Preparation Notice for this EIS.

The U.S. Government has tried to identify alternative means of ensuring public safety during missile launches at the PMRF. Currently, the U.S. Government is unaware of alternatives to the established and required safety precautions made possible by the restrictive easement or a document with similar provisions, such as a MOA, that would provide for public safety at an acceptable level. The alternative of a reduced term or year-to-year easement was considered by the United States and was not carried forward because a requirement to renew the easement each year could constrain mission requirements.

The point of contact is Linda Ninh, Attention: CSSD-EN-V, Post Office Box 1500, Huntsville, Alabama 35807-3801.

Sincerely,

[Signature]

JEFFREY L. SCHNEEWEIS
Lieutenant Colonel, U.S. Army
Strategic Targets Product Manager
In writing addressing the entry on page 10 of the June 9, 1993, DoD Bulletin, regarding the U.S. Army proposed assessment over state land for safety and ground hazard areas for the Strategic Target Systems and Navy Vendel missile launchers at the Pacific Missile Range Facility.

In formulating an Environmental Impact Statement for this proposed action, I ask that at least the following concerns be addressed:

1. The use of native Hawaiian lands without consultation or compensation to the people whose land is being used.
2. The known history of failure in clearing the ground hazard areas of human beings. Please include a comprehensive security overview.
3. The cultural, economic, and ecological impacts of continued militarization of private land.
4. The failures to abide by the Memorandum of Agreement during the February, 1993 launch window.
5. The entire spectrum of potential impacts to tourism that can result with thirty closures of a state park over the next several years.
6. An overview of the social and environmental history of Kauai, Aloha; both in its entirety and regarding specific islands such as Kauai. In such an overview, please chart the decline or ascent of social, political, cultural, and environmental forces as militarization has become more and more a part of those islands' lives.

July 8, 1993

To:
Mr. Keith Ahue
Department of Land and Natural Resources
Fax # 685-570-4011

Mr. Brian Choy
Office of Environmental Control
Fax # 685-562-4524

Aloha Gentleman:

I write addressing the entry on page 10 of the June 9, 1993, DoD Bulletin, regarding the U.S. Army proposed assessment over state land for safety and ground hazard areas for the Strategic Target Systems and Navy Vendel missile launchers at the Pacific Missile Range Facility.

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Environmental and Engineering Office

Ms. Suzanne Mainelli
Pacific Basin Vice-President
Sierra Club, Hawai'i Chapter
P.O. Box 1172
Hilo, HI 96714

Dear Ms. Mainelli:

Thank you for your comments on the Restrictive Easement Environmental Impact Statement (EIS) Preparation Notice. Some of your concerns have been previously addressed in earlier environmental documents and some of the comments do not appear to be within the scope of this document but, where relevant, they will be addressed in the Draft EIS.

The point of contact is Linda Niimi, Attention: CSSD-EN-V, Post Office Box 1500, Huntsville, Alabama 35807-3801.

Sincerely,

[Signature]

Jeffrey C. Schafftle
Lieutenant Colonel, U.S. Army
Strategic Targets Product Manager
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9.0 Draft Environmental Impact Statement Comments and Responses
9.0 DRAFT ENVIRONMENTAL IMPACT STATEMENT
COMMENTS AND RESPONSES

The NOA for the Draft EIS for the U.S. Army Proposed Easement Over State Land for Safety and Ground Hazard Areas for the Strategic Target System and Navy Vandal Missile Launches at the Pacific Missile Range Facility was published in the OEQC Bulletin by the Office of Environmental Quality Control on 8 August 1993. The agencies, organizations, and individuals that were asked to comment are listed below. Those that responded in writing are identified with an asterisk next to their names. Copies of correspondence with comments are reproduced in this chapter.

FEDERAL AGENCIES

National Marine Fisheries Pacific Area Office
U.S. Fish and Wildlife Service Office of Endangered Species
U.S. Environmental Protection Agency, Region IX
Environmental Protection Agency, Pacific Islands Contact Office
Department of the Interior, U.S. Geological Survey*
U.S. Army Space and Strategic Defense Command
Pacific Missile Range Facility
Naval Air Warfare Center Weapons Division
Pacific Division, Naval Facilities Engineering Command
U.S. Coast Guard
Department of Energy, Albuquerque Operations Office
U.S. Army Support Command Hawaii
U.S. Army Corps of Engineers, Pacific Ocean Division*
Department of the Army - Judge Advocate General
Sandia National Laboratories
Department of Energy, Pacific Area Support Office
Sandia National Laboratories, Kauai Test Facility
U.S. Fish and Wildlife Service, Pacific Islands Office
U.S. Department of Agriculture, Soil Conservation Service*
Ballistic Missile Defense Organization
Army Environmental Office
Department of the Army, Office of the Chief Legislative Liaison
Department of the Army, Office of the Chief of Public Affairs
Deputy Director for Environmental, Office of Director of Installations and Facilities

Department of the Navy
Environment, Safety and Occupational Health (OP-45)
NASA White Sands Test Facility*
Chief of Naval Operations
Headquarters U.S. Army Pacific
U.S. Army Kwajalein Atoll, Range Safety Office
Commander, Naval Base Pearl Harbor
Commander, Pacific Division, Naval Facilities Engineering Command
U.S. Department of Justice
U.S. Department of the Interior
Department of State
National Security Council
Arms Control and Disarmament Agency, Office of Public Affairs
United States Environmental Protection Agency, Region IX
Pacific Islands Administrator, Department of the Interior
Senator Daniel K. Inouye
Senator Daniel Akaka
Representative Neil Abercrombie
Representative Patsy Mink

STATE AGENCIES

Department of Business, Economic Development and Tourism*
Hawaii Department of Accounting and General Services*
Hawaii Department of Business and Economic Development, State Energy Office
Hawaii Department of Land and Natural Resources, Division of State Parks
Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife*
Hawaii Department of Health, Department of Solid and Hazardous Waste
Hawaii Department of Health, Environmental Management Division
Hawaii Department of Defense
Hawaii Department of Agriculture
Hawaii Department of Aquatic Resources*
Hawaii Housing Finance and Development Corporation*
Hawaii Office of State Planning
Department of Hawaiian Home Lands*
Hawaii Office of Hawaiian Affairs
Hawaii Department of Land and Natural Resources, Division of Land Management
Hawaii Office of Environmental Quality Control*
Hawaii Department of Transportation
Hawaii Department of Land and Natural Resources, State Historic Preservation Division*
Hawaii Department of Finance, Real Property Assessment Division
State of Hawaii Civil Defense
District Office of State Senator Daniel Akaka
Hawaii Department of Education*
State Archives
University of Hawaii Marine Program
Governor John Waihee
Senator James Aki
Senator Lehua Fernandes Salling
Senator Rick Read
Representative Ezra Kanoho
Representative Bertha Kawakami
Representative Paula Ishii-Morikami

Restrictive Easement Final EIS
COUNTY AGENCIES

County of Kauai, Office of Economic Development, Office of the Mayor
County of Kauai, Planning Department
County of Kauai, Department of Public Works
County of Kauai, Department of Water
City & County of Honolulu
Ron Kouchi, Kauai County Council
Kalpo Asing, Kauai County Council
Jesse Fukushima, Vice Chairman, Kauai County Council
James Tehada, Council Chairman, Kauai County Council
Jerome Hew, Kauai County Council
Mayor Joann Yumura
Randal Valenciano, Kauai County Council
Maxine Correa, Kauai County Council
Maurice Munichka, Kauai County Council
Kauai County Council

COMMUNITY ORGANIZATIONS AND PRIVATE CITIZENS

Michael Jones
Native Hawaiian Legal Corporation
Sierra Club Legal Defense Fund, Inc.
University of Hawaii, Environmental Center
Mariann Silver
Sierra Club
Coalition Against Star-Wars on Kauai
University of Hawaii, Water Resources Research Center
American Lung Association
1000 Friends of Kauai
Responsible Citizens for Responsible Government
Honolulu Star Bulletin
Honolulu Advertiser
Sun Press
Hawaiian Electric Company
The Garden Island Newspaper
Teledyne Brown Engineering
Randy R. Chinen
Melvin K. Dean
Tom Hughes
The Chamber of Commerce of Hawaii
West Kauai Business & Professional Assn., Owen Moe/Calvin Shirai
Thomas Nizo
Scott A. Zenger
Robert Inouye
David S. Nekomoto
Averiet Soto*
Richard M. Irwin*
Robert R. Valencia Sr.*
Loretta Lopez*
Emalia Kanahele*
Keala Schmidt*
Fernando Com poc*
Christine Nonaka*
Russell Ruiz*
Micheal Castillo*
Manuel L. Cabral*
Benjamin Domingo Jr.*
Fernando Bran Jr.*
Turk Tokita*
Paul T. Akama*
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Comment Response Letters

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August 17, 1993

Mr. W. Mason Young
Department of Land and Natural Resources
P.O. Box 921
Honolulu, Hawaii 96809

Dear Mr. Young:

The Department of Business, Economic Development & Tourism is pleased to submit the enclosed comments on the Draft Environmental Impact Statement for the Pacific Missile Range Facility Easement Over State Land for Safety and Ground Hazard Areas for STARS and Navy Vandenberg Missile Launches.

The comments were provided by the Land Use Commission.

Questions regarding these comments may be directed to Esther Ueda, LUC Executive Officer at 887-3826.

Thank you for the opportunity to comment.

Sincerely,

Muui Hahneman

Enclosure

cc: Ms. Linda Nish

August 16, 1993

SUBJECT: Director's Referral 93-23-B Draft Environmental Impact Statement for the Pacific Missile Range Facility Easement Over State Land for Safety and Ground Hazard Areas for STARS and Navy Vandenberg Missile Launches

We have reviewed the subject Draft EIS and confirm that the proposed restrictive easement to be acquired by the U.S. Government which contains approximately 2,110 acres and is identified as Tax Map Key: 1-2-02: portion of 1, 15 and portion of 24 is within the State Land Use Districts as follows:

THK: 1-2-02: por. 1 State Land Use Agricultural District
1-2-02: 15
THK: 1-2-02: por. 24 State Land Use Conservation District

Additionally, Section 5.3 on page 5-6 of the Draft EIS should be corrected to state that land use in Hawaii is regulated by HRS Chapter 205 and Title 15, Subtitle 3, Chapter 15, Hawaii Administrative Rules (HAR).

We have no further comments to offer at this time.

EUI: LRAth
Mr. Muli Hanuman
Department of Business, Economic Development & Tourism
Post Office Box 2359
Honolulu, HI 96804

Dear Mr. Hanuman:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your letter of August 17, 1993, confirming that the proposed restrictive easement is within the State Land Use Districts as follows:

Tax Map Key: 1-2-02: por. 1 State Land Use Agricultural District
1-2-02: 15
1-2-02: por. 24 State Land Use Conservation District

In accordance with your other comment regarding the statutes that regulate land use in Hawaii, we have modified Section 5.3 of the Final EIS to reflect your comment.

We appreciate your time and effort in reviewing the document.

Sincerely,

Thomas E. Deussen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

Mr. W. Mason Young
State of Hawaii
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Young:

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement for the Pacific Missile Range Facility Easement, Kauai (the K-2 Agency). The following comments are:

a. The work does not involve waters of the U.S.; therefore, an EA permit will not be required.

b. The flood hazard information provided on page 3-2 and Figure 3-1 is correct.

Sincerely,

Kirk Cheung, P.E.
Director of Engineering

Copies Furnished:

Ms. Linda Nish
U.S. Army Space and Strategic Defense Command
P.O. Box 1500
Huntsville, Alabama 35807-1500

Office of Environmental Quality Control
State of Hawaii
220 South King Street, 4th Floor
Honolulu, Hawaii 96813
Dear Mr. Cheung:

Subject: Draft Environmental Impact Statement for Proposed Restrictive easement

Thank you for your letter of August 20, 1993, indicating that the proposed action does not require a Department of the Army permit and that the flood hazard information provided in the Draft Environmental Impact Statement on page 3-2 and in figure 3-1 is correct.

We appreciate your time and effort in reviewing the document.

Sincerely,

Thomas E. Dieter
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

United States Department of the Interior

Geological Survey
Water Resources Division
477 Ala Moana Blvd., Suite 415
Honolulu, HI 96813

August 20, 1993

Mr. H. Hanon Young
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Young:

Subject: Draft Environmental Impact Statement (DEIS) for the Pacific Missile Range Facility Easement Over State Land for Safety and Ground Hazard Areas for STARS and Navy Vandal Missile Launchers.

We are in receipt of the subject DEIS. We regret that due to prior commitments, we are unable to review the subject DEIS by the September 22nd deadline.

As requested, we are returning the DEIS to your office for your future use.

Sincerely,

William Meyer
District Chief

Enclosure

cc: Ms. Linda Steh
U.S. Army Space and Strategic Defense Command
P.O. Box 1500
Huntsville, AL 35807-1500

State of Hawaii
Office of Environmental Quality Control
220 South King Street
Fourth Floor
Honolulu, Hawaii 96813
Mr. William Meyer  
U.S. Department of the Interior  
Geological Survey  
State Water Resources Division  
677 Ala Moana Boulevard, Suite 415  
Honolulu, HI 96813  

Dear Mr. Meyer:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your letter of August 20, 1993, indicating that because of prior commitments, your office will be unable to review the Draft Environmental Impact Statement for the restrictive easement by the September 22, 1993, deadline.

Sincerely,

[Signature]  
Thomas W. Doern  
Lieutenant Colonel, U.S. Army  
Product Manager, Strategic Targets

Department of Land and Natural Resources  
P.O. Box 921  
Honolulu, Hawaii 96809  

Attention: W. Mason Young  

Dear Mr. Young:

Subject: Draft EIS for the Pacific Missile Range Facility Easement Over State Land for Safety and Ground Hazard Areas for STARS and Navy Vandu Missile Launches.  
Island of Kauai, District of Waimea  
Tax Map Key Numbers: 1-2-02; Par. 1, 15 and Par. 24  

We wish to inform you that we have no comments to offer on the subject Draft Environmental Impact Statement (DEIS).  

Thank you for the opportunity to review the document.

Sincerely,

[Signature]  
Maurice H. Kaya  
Energy Program Administrator

[Handwritten note]  
MNH.klalas91

[Handwritten note]  
CS: Office of Environmental Quality Control  
U.S. Army Space and Strategic Defense Command
Environmental and Engineering Office

Mr. Maurice H. Kaya
Department of Business, Economic Development & Tourism
Energy Division
335 Merchants Street, Room 110
Honolulu, HI 96813

Dear Mr. Kaya:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your letter of August 25, 1993, indicating that you have no comments on the Draft Environmental Impact Statement for the proposed restrictive easement.

We appreciate your time and effort in reviewing the document.

Sincerely,

Thomas E. Green
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

Environmental and Engineering Office

Department of Land and Natural Resources
Attn: Mr. W. Mason Young
P. O. Box 411
Honolulu, HI 96809

Subject: Review of Draft Restrictive Easement Environmental Impact Statement (EIS), Kauai, Hawaii

The NASA White Sands Test Facility reviewed the Draft EIS and does not have any comments on its contents.

Richard A. Colonna
Manager

CC:
State of Hawaii
Office of Environmental Quality Control
220 South King Street
Fourth Floor
Honolulu, HI 86813

U.S. Army Space and Strategic Defense Command
Attn: CSSD-EN-Y/Ms. Linda Hing
P. O. Box 1500
Huntsville, AL 35807-1500
25 August 1993

Dept. of Land and Natural Resources
Attention: W. Mason Young
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Young:


1) STARS reliability: The actual reliabilities of the Polaris 1st and 2nd stages are still being withheld from public scrutiny. David Wright's Dec. 1992 report on Polaris and Minuteman I reliabilities should be evaluated and the Minuteman failure at Vandenberg Air Force Base on 15 June 1993 should be examined.

2) Vandal reliability: The Vandal launch record since February of 1991 should be summarized so that one can evaluate the failure rate for recent launches. Document 411 of the STARS EIS Administrative Record indicates two failures in 18 Vandal launches at the Pacific Missile Range Facility (PMRF) from 1989 through March of 1991.

3) Adequacy of the STARS ground hazard area (GHA): Because there have been only two STARS flights, it is important to examine recent launch failures (e.g. the 20 Aug. 1991 Aries failure at Cape Canaveral and the 15 June 1993 Minuteman I failure at Vandenberg) and to consider the consequences of a similar STARS failure at PMRF. No detailed information about the Aries failure has been made available despite repeated requests. According to newspaper accounts, the Minuteman failure at Vandenberg caused a brush fire which burned 400 acres on and 600 acres off the base. A similar STARS failure could also produce fires that might trap people in the northern half of Polihele State Park. Even if no large-scale brush fires started, large chunks of burning debris might block the only road to the park, which goes through the GHA.

4) Vandal GHA: Response 4 on page 8-10 agrees that 'analysis of past launches and launch failures can provide useful data.' It is precisely this data from past Vandal failures that should be provided in the EIS. In particular, the final EIS should contain scale drawings indicating where debris from the two Vandal failures (on 3 March 1989 and 7 March 1991) hit the ground so that one can judge the adequacy of the Vandal GHA.
31 HCl concentrations from STARS: Response 5 on page 8-10 asserts, "The Hawaii HCl guideline is not expected to be exceeded by a Strategic Target System launch or launch failure." This statement contradicts document 228 of the STARS EIS Administrative Record, which indicates that REEDM predictions at the boundary of the GHA exceed the Hawaii 8-hour average HCl guideline of 0.025 ppm. (See the Sept. 22, 1992 letter to William Day on page 8-7.) The 11 Jan. 1993 affidavit of George M. Mathews, Senior Air Quality Specialist at Advanced Sciences, Inc., reviews the computer calculations done for the STARS EIS and admits that the REEDM predictions exceed the Hawaii HCl guideline. Page 10 of this affidavit contains the following explicit statement:

"REEDM, version 7.03, results indicated the potential for an exceedance of the Hawaii 8-hour exposure guideline for hydrogen chloride, 0.025 ppm, within 1,000 m downwind of the launch site as a result of a normal launch and within 36,000 m downwind as a result of an early flight termination."

This affidavit further notes that the Army's conclusion that the 10,000 ft radius GHA was sufficient was based on the use of the 1-hour Short-Term Public Emergency Guidance Level (SPEGL) of 1 ppm, which was not predicted to be exceeded. The final EIS should explicitly state that the REEDM predictions exceed the Hawaii HCl guideline and that the Army has chosen a different standard to assess the significance of HCl emissions.

61 Reporting lead releases from Vandal and STARS launches: Response 7 on page 8-11 to my comments about lead releases states that it was not intended "that such routine emissions would be characterized as 'releases for purposes of reporting requirements under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).'' This statement seems to contradict assertions made regarding other launches at PMRF that produced lead in the exhaust. For example, page 3-5 of the Environmental Assessment for ZEST (which used the same Talos booster as Vandal) contains the following statements about the 48 pounds of lead emitted by the Talos booster:

"Lead is a controlled pollutant under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)." This statement requires that the total lead release exceeds one pound it must be reported. Lead releases for ZEST launches will be reported to the National Response Center (NRC), the State of Hawaii, and local response centers.

The STARS DEIS points out that Terrier, Talos, and Nike rockets release reportable quantities of lead. Page 3-44 contains the following statement:

"KTF has notified the National Response Center as required by the regulations whenever total lead releases have exceeded 0.4 kg (1 lb). KTF personnel have complied with all of the notification requirements and will continue to comply with respect to reportable quantities released from future launches."

In addition to Vandal launches, it also seems that STARS launches will release reportable quantities of lead even though lead is not an exhaust product of the STARS booster. A 24 January 1992 Sandia letter from Eric J. Schindewolf to Lt. Col. A. C. Manguso of the Army Strategic Defense Command (document 247 of the STARS EIS Administrative Record) points out that the cutting charges for STARS flight termination and stage separation contain over 4 pounds of lead. This letter further states, "It is SNL's understanding that the appropriate quantity will have to be reported as being released to the environment for each STARS I or STARS II launch, similar to the current practice for other launches at KTF which have lead content."

Therefore, the final EIS should examine whether lead releases from previous launches at KTF and PMRF have been reported and indicate what State of Hawaii agencies will receive reports of lead releases from future STARS and Vandal launches.

71 Impacts of lead release: Sections 4.1, 4.2, and 4.3 cite the ZEST Environmental Assessment as the basis for the conclusion that the lead emitted by Vandal launches would have no significant impact on geology and soils, water resources, and air quality. The important difference is that there were only two ZEST launches but 72 Vandal launches are planned. Even if one accepts the conclusion (see page 3-6 of the ZEST EA) that 'two normal ZEST launches are not expected to materially affect lead in soil levels', one must still evaluate the impact of 72 Vandal launches on lead levels in the soil. Soil samples should be taken near the Vandal launch site to determine the current lead levels. If these levels are already significantly higher than background levels, as is the case near some of the KTF launch sites, the final EIS should evaluate whether an additional 72 launches might raise the levels high enough that remediation measures are necessary.

81 Noise levels in Table 3-3: No numerical values are given in the column labeled 'Measured Average Peak' and the values in the 'Calculated Peak' column appear to be values measured for the 25 Feb. STARS launch.

91 Missing figure 3-9. This figure is referenced on page 3-33 but is missing from the document.

101 Impacts of previous launches: The discussion of cumulative impacts on page 4-1 ends with the assertion "...no effects on the environment of past launches have been identified." This apparently ignores the elevated levels of lead observed in soil samples taken near some KTF launch sites, as documented in Appendix H.1 of the July 1992 KTF Environmental Assessment. Three soil samples near one of the sites had lead levels of 270, 107, and 220 mg/kg respectively. The background samples taken at Kekaha and Hana had lead levels of 9.1 and 11 mg/kg respectively and the
background sample taken at an unspecified location at PBMR, which was described as being "away from both launch areas and roads," had a lead level less than 1.0 mg/kg. It therefore seems likely that the high lead levels observed near some KTF launch sites are due to emissions from past launchers.

11) Vandal launch products: The quantities of Vandal combustion products given in Table 4-1 are about 10% lower than those in the July 1992 KTF Environmental Assessment. Which values are correct?

12) Air quality monitoring for the 1st STARS launch: The 2 July 1993 report on the Environmental Monitoring Program for the 26 Feb. 1993 STARS launch indicates that air quality monitors were located at one site (AEB) within the GHA and one site (AEB - South) at the GHA boundary. The Nov. 1991 proposed monitoring protocol (document 354 of the STARS EIS Administrative Record) specified two sites within the GHA and four sites at the GHA boundary. The AEB monitors were 44 m from the launch pad, but the closest distance for which TRUP and REEMD predictions are given is 1000 m so qualitative comparisons of AEB results with these predictions are not very meaningful. The REEMD predictions at the GHA boundary were for a site downstream of the launch pad and for a wind speed of 1.0 m/s. According to the data in Appendix K of the U.S. Army Environmental Hygiene Agency (USAHEA) report (Attachment III), the wind speeds at both 50 ft and 100 ft elevations exceeded 1.0 m/s. The wind directions at the time of the launch plane were northwest at 50 ft and west at 100 ft. The description of the motion of the launch plume on page 5-2 indicates that the plume "reflected off the ground, initially traveling toward the east, rising into the lower levels of the atmosphere where the low-level winds transported the plume to the west of land." Therefore, the GHA-South monitors were not directly downwind so these results cannot be compared quantitatively with the TRUPF and REEMD predictions.

13) DIFOUT computer model: The DIFOUT computer model was used to calculate concentrations of STARS emissions for the July 1992 KTF Environmental Assessment. This model can calculate concentrations as close as 100 m to the launch pad, which approximates conditions at the AEB site much better than the TRUPF and REEMD values at 1000 m. In addition, nitrogen dioxide concentrations were calculated using DIFOUT; these calculated values should be compared with the observed values.

14) AEB carbon monoxide monitoring results: The plot of the CO concentration (fig. 4) in USAHEA report (Attachment III) is very peculiar. It is hard to understand how the CO concentration could peak for a duration of over one 10-second interval 2 minutes and 30 seconds after the launch. The concentrations of the other gases monitored show the expected sharp rise at launch time and remain above the background level for times ranging from 90 to 300 seconds. It is also surprising that the maximum CO concentration is so small compared to the increase observed for carbon dioxide because the Polaris 1st stage is expected to emit ten times more CO than carbon dioxide.

15) AEB hydrogen chloride monitoring results: The plateau at the maximum HCl concentration in fig. 5 is indicative of saturation of this monitor. It is surprising that this saturation occurs at 47 ppm because the nominal maximum reading is 50 ppm. It is noted in Appendix C that the HCl data from Interscan monitor 86122 were not reliable but the data in fig. 5 seem to come from Interscan monitor 86122. Apparently the USAHEA HCl monitors are believed to give reliable peak values (see pages D-4 and D-3 in Appendix D) of 77 to 80 ppm. However, the Interscan monitor 86122 in Table 10. Because this data were used to compute average HCl concentrations in Table 10. It is not clear how these averages appear to be reliable. In particular, the more reliable value for the instantaneous maximum HCl concentration appears to be at 82 ppm, not 55 ppm as given in Table 10.

16) Methodology for calculating average HCl concentrations: The USAHEA report apparently uses a methodology to calculate 30-min and 60-min average HCl concentrations (see Table 10) that is different from that used in the Supplement to the STARS EA and in the STARS EIS. On page 3-4 of the Supplement, the average concentrations are assumed to have a power law behavior. This assumed behavior implies 8-hour average concentrations which are 0.57 times the 30-min average value and 0.66 times the 60-min average value. With this methodology, the highest 30-min average HCl concentration in Table 10 implies an 8-hour average value of 1.7 ppm, which greatly exceeds the desirable HCl guideline of 0.025 ppm. The final EIS should contain a discussion of these different methodologies.

17) Reliability of GHA-South monitoring data: One cannot judge the reliability of the monitoring data because plots of concentrations versus time are not given in the USAHEA report. It is especially important to provide these plots because it is stated in Appendix C that peaks observed between 10:04 and 10:05 A.M. are unreliable due to power outages.

18) GHA-South hydrogen chloride monitoring data: According to the information on page 1-7 of Appendix I of the USAHEA report, the only HCl monitor recorded a concentration of -2.0 ppm between 9:36 and 10:04 A.M. It is unclear what a negative concentration means, but the last line on page 1-7 states: "Pump had quit sometime during the sampling run." Therefore, it is dubious that there is any reliable HCl data at the GHA-South site on 26 Feb.

19) Soil sampling data: The numerical values of chloride concentrations on page 3-4 are given in units of mg/kg but the units for these quantities in Attachment IV are mg/l.
201 vegetation sampling results: The high correlation ratio of 12 is for site 5-15, not
5-12 as stated on page 3-8.

211 cause of increase in chloride concentrations: Attachment IV indicates that 87% of
the soil samples taken showed increased chloride concentrations after the 26 Feb, 1993
STARS launch. The wide range of variability of the chloride concentrations makes it
difficult to determine the cause of the observed increases. The most likely explanation
is that both natural phenomena and HCI emissions from the STARS launch are responsible.
The observation of an increase in the chloride concentration at site 5-3 in the vegetation
sample taken from discolored leaves (20 mg/l compared to 3 mg/l for the vegetation
sample taken on 18 Feb.) suggests that STARS HCI emissions are at least partly
responsible. Section 4 of Attachment IV concludes: "While the numerical data do not
provide conclusive evidence as to the cause of the leaf discoloration, one plausible
explanation is that these plants may have been affected by the rocket exhaust because
of their close proximity to the launch pad." Additional monitoring and/or mitigation
measures should be considered for future STARS launches.

Sincerely,

Michael Jones
Physics Dept.
Univ. of Hawaii
2505 Correa Road
Honoulu, Hawaii 96822

copies to: State of Hawaii Office of Environmental Quality Control
U. S. Army Space and Strategic Defense Command
State of Hawaii Dept. of Health

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1900
HUNTSVILLE, ALABAMA 35801-1900

Environmental and Engineering Office

Mr. Michael Jones
Physics Department
University of Hawaii
2505 Correa Road
Honolulu, HI 96822

Dear Mr. Jones:

Subject: Draft Environmental Impact Statement for Proposed Defensive System

Thank you for your comments of August 28, 1993, on the Draft Environmental Impact Statement (DEIS). As a part of the public comment process, the U.S. Army Space
and Strategic Defense Command is responding in this letter to your comments. Your
comments and these responses will be included in the Final DEIS.

Comment 1: Strategic Target System reliability

Response 1: The U.S. Army is aware of the view that the Strategic Target System
reliability is lower than the 97-percent figure used in the Federal Draft and Final DEIS U.S. Army Strategic Defense Command, 1992.a. Most notably, Dr. David Wright, a Senior Staff Scientist with the Union of
Concerned Scientists, at the request of the Sierra Club Legal Defense Fund, conducted a review in December 1992 of the Sandia National Laboratories
(SNL) reliability analysis of the Strategic Target System launch vehicle. He
concluded that, since the SNL analysis assumed 100-percent reliability for
some of the major components of the Strategic Target System, namely the
first- and second-stage boosters, actual reliability is lower than the SNL
estimate. Using the SNL analysis, augmented by his own estimates of the
first- and second-stage booster reliability based on the number of failures and
successes of the Polaris booster, he postulated an overall reliability in the low
90-percent range. However, he noted that this figure did not take into
account the aging process of the Polaris booster and concluded that the
launch history of the refurbished Minuteman I missile was a more reliable
way to evaluate the reliability of the refurbished Polaris booster. He
analyzed a 75- to 82-percent reliability for the Minuteman I booster, based

The U.S. Army acknowledges that the SNL analysis relied on an assumption
of 100-percent reliability for the first- and second-stage Polaris boosters,
and thus its analysis was a best-case assessment. While the U.S. Army is
restricted from providing the actual reliability estimates for the Polaris first-
and second-stage boosters because these figures remain classified, the U.S. Army maintains that their reliability is extremely high. The analysis in Volume II of the Strategic Target System Final EIS on page 2-20 (U.S. Army Strategic Defense Command, 1982) notes that the calculation of a 97-
percent overall system reliability combines both key and non-key flight components and that "the reliability of key flight components (such as the
flight termination system) is far greater than 97 percent." Also as noted on
page 2-20, failure of many of the components would impact the ability of the
U.S. Army to obtain desired test results but would have no impact on the
safety of the launch vehicle or require termination so as to affect the
ground hazard area (GHA). For example, the failure of a telemetry link may
cause a gap in data collection but not necessarily a booster termination.
The U.S. Army maintains that direct comparison with refurbished
Minuteman I launch success rates is not appropriate. The booster systems
are not comparable, and a comprehensive evaluation of Polaris stages 1 and
2 was conducted prior to developing the reliability evaluation for the
Strategic Target System.

Comment 2: Vandal reliability

Response 2: The Vandal program, Navy-wide, has had 390 successful flights and 8
with four of the failures has been corrected. The other failures were
associated with booster break-up and missing nozzle retaining rings. The
missiles that exhibited the booster breakup anomaly are part of a specific
lot (lot J 13) of the Vandal booster inventory. The Navy will not use
boosters from this lot in the future. The problem associated with the
missing retaining rings has been corrected by inspecting for the rings during
booster refurbishment. No repeat of this failure has occurred (Strategic
launches have occurred, with no failures occurring during the boost phase
that would affect the GHA.

Comment 3: Adequacy of the Strategic Target System GHA

Response 3: The analysis from previous Federal environmental documents (Strategic
Target System Environmental Assessment (EIA) and EIS) demonstrates that
the procedures and systems in place at the Pacific Missile Range Facility
(PMRF) will ensure that all harmful debris can be contained within the GHA
established for the Strategic Target System, regardless of when an anomaly
in a Strategic Target System flight might occur and regardless of the
direction in which a flight might begin to veer off its intended course. In
addition, each launch site and launch vehicle are unique with respect to the
kind of GHA required to protect human health and safety. The Strategic
Target System GHA was established to take into account the physical
location of the launch pad, its proximity to the ocean, and the potential for
damage on land at various stages of the launch.

Comment 4: Vandal GHA

Response 4: The safety analysis used to establish the GHA for the Strategic Target
System is the same for Vandal and virtually every rocket or missile launched
from the PMRF and the Naval Test Facility (NRF). The unparalleled safety
record of launches from these facilities confirms that these analyses and
procedures for protecting public health and safety are adequate. The
analysis for Vandal includes both successful flights and flight failures over a
14-year period, providing ample data for assessing the adequacy of the
Vandal GHA. The GHA established for Vandal ensures that all debris is
contained within it, regardless of when an anomaly in a Vandal flight might
occur and regardless of the direction in which a flight might begin to veer
off its intended course.

Comment 5: Hydrogen chloride HClB concentrations from Strategic Target System

Response 5: All quality issues were exhaustively examined in the Supplement to the
Environmental Assessment for the Strategic Target System and the
subsequent EIS. Rocket Exhaust Emission Dispersion Model (REEDM) model
shows the potential for exceeding the HCl guideline beyond the
GHA under certain meteorological conditions. However, as discussed in the
text, the appropriate health-based standard is the Short-term Public
Emergency Guidance Level (SPLEG), which modeling shows will not be
exceeded at the boundary of the GHA. In instances of HCl emissions, the
Hawaii Clean Air Branch refers to the American Conference of
Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) for
occupational workplace settings, which is a ceiling limit of 5 ppm (2.5
mg/m3). TLVs refer to airborne concentrations of substances and represent
conditions under which it is believed that nearly all workers may be
repeatedly exposed for a normal 8-hour workday and a 40-hour workweek
without adverse effects. A TLV/STEL is a time-weighted average
concentration for a normal 8-hour workday and a 40-hour workweek, to
which nearly all workers may be repeatedly exposed, day after day, without
adverse effects. A TLV-Ceiling Limit (TLV-C) is a concentration that should
not be exceeded during any part of the work exposure (American
Conference of Governmental Industrial Hygienists, 1990). The State of
Hawaii Clean Air Branch interprets the ACGIH TLV-C for HCl, 5 ppm, to be
an 8-hour time-weighted average. Furthermore, to provide health and
safety protection to sensitive members of the public, the Clean Air Branch
enforces a safety factor of 200 to the ACGIH TLV. The resulting public
exposure guideline used by the Hawaii Clean Air Branch is an 8-hour time-
weighted average of 0.025 ppm (AAI, 1991; Sugiwara, 1991b). This is a
reference value to which concentrations for shorter (or longer) exposures
can be normalized and compared, and it does not mean that an individual
will be exposed to a chemical for 8 hours.

It is important to understand that the exposure evaluation criteria developed by
the ACGIH and other agencies serve as guidelines for occupational
exposures, not regulatory standards for determining lines between safe and
dangerous ambient concentrations. The ACGIH strongly discourages the
use of its published exposure values for other than industrial hygiene
practices (American Conference of Governmental Industrial Hygienists, 1990). The United States continues to maintain that the SPECO provides the appropriate standard to determine a health-based risk from HCl short-term exposure.

Comment 6: Reporting lead releases from Vandal and Strategic Target System launches
Response 6: With respect to lead reporting for Vandal launches, the reportable quantity established for lead in a final rule published in the June 30, 1993, Federal Register, is 10 pounds. The U.S. Navy will conduct a baseline survey for possible lead contamination around the Vandal launch site and conduct periodic monitoring to assess the potential impacts from all launches from that launch site. In the meantime, the U.S. Navy is in the process of evaluating the requirement to report lead releases under the Comprehensive Environmental Response, Compensation, and Liability Act for missile launches and, if necessary, the best means to report such releases.

The 4 pounds of lead found in the cutting charges for the flight termination system and stage separation for the Strategic Target System vehicle are below the reportable quantity.

Comment 7: Impacts of lead release
Response 7: The U.S. Navy will conduct a baseline survey for possible lead contamination around the Vandal launch site and conduct periodic monitoring to assess the potential impacts from all launches from that launch site.

Comment 8: Noise level in table 3-3
Response 8: The values in the "Calculated Peak" column for the 26 February Strategic Target System launch refer to the measured values derived after recalibrating the monitoring equipment after the launch. As such, they are more appropriately referred to as a "measured average peak." To avoid confusion, these values have been placed in the "Measured Average Peak" column in the Final EIS and the "Calculated Peak" column has been eliminated for both ZEST launches and the Strategic Target System launch.

Comment 9: Missing figure 3-9
Response 9: Figure 3-9 has been added to the Final EIS.

Comment 10: Impacts of previous launches
Response 10: The levels of lead in soil observed at some sites on the KTF are probably due in some measure to past launch activities at the KTF. The assertion on page 4-1 of the Draft EIS that "no effects on the environment of past launches have been identified" should have stated "no significant effects on the environment..." Lead levels above background in the soil at the KTF are not considered significant because they are well below Federal standards for actionable levels.

Comment 11: Vandal launch products
Response 11: The value in the RestRICTIVE Easement Draft EIS was for combustion products. The value in the July 1992 KTF EA was for total propellant weight. Therefore, the values in these documents were not inconsistent. In addition, see the response to Comment 6.

Comment 12: Air quality monitoring for the first Strategic Target System launch
Response 12: The protocol used during the Strategic Target System launch was developed by the U.S. Army Environmental Hygiene Agency (USAEHIA) in consultation with the State of Hawaii Department of Health Clean Air Branch. The air monitoring sites in the 1991 proposed protocol were not used in the February 1993 Strategic Target System launch because that protocol was revised in July 1992. This revision was made in consultation with the State of Hawaii Department of Health Clean Air Branch. Only two monitoring sites were provided in the revised protocol, with background monitoring performed at four potential sites. The reason for changing to two monitoring sites was to obtain more stringent and appropriate real-time monitoring. The 1019 proposed protocol required industrial hygiene monitoring equipment which yields a less informative composite result. In comparison, the advantage of real-time direct monitors is that they provided a time history of the emissions from the Strategic Target System missile launch. Further consultation was conducted with the Clean Air Branch on the resultant monitoring report during June 1993 as the report was being prepared. A copy of the final monitoring report was provided to the Hawaii Department of Health Clean Air Branch on August 17, 1993.

The monitoring sites chosen for the boundary of the GHA, according to the revised protocol, was determined by the prevailing meteorological conditions, including wind direction and speed, determined the morning of the first launch. In the event of an easterly component of the surface winds, as was the case on the day of the launch, emissions are transported over the ocean. Under those conditions, the mobile site would be located at the south end of the GHA, where the greatest concentration of nonessential mission personnel would be located.

The winds on the day of the launch were typical for the area, with wind direction varying by elevation. Given that there is rarely, if ever, a continuous wind direction for all elevations, there is no point that can be said to be completely downwind. The air sampling results should be taken for what they are, a measurement taken for one launch on a typical wind pattern day. The statement in the USAEHIA Report that "no appreciable pattern day. The statement in the USAEHIA Report that "no appreciable pollution-specific concentrations were measured at the GHA-S monitoring pollution-specific concentrations were measured at the GHA-S monitoring location during the STARS FTU1 launch" is accurate. Because the wind pattern on the morning of the FTU1 launch was different than those modeled in the REED model, it was not assumed that a direct quantitative comparison could be made.
Comment 13: DIFOUT computer model

Response 12: Air quality issues associated with the launches themselves have been thoroughly addressed in prior Federal environmental documents, and the potential impacts were found to be not significant. Since there are no human receptors outside of enclosed buildings at a distance up to 1,000 meters from the launch site, there is no purpose served by performing the comparison between DIFOUT, TRIPUF, and REEDM models.

Comment 14: AEB carbon monoxide monitoring results

Response 14: Air quality issues associated with the launches themselves have been thoroughly addressed in prior Federal environmental documents, and the potential impacts were found to be not significant. The equipment was calibrated before and after the launch and was in good working order. The calibrated instrument recorded the data reported in the monitoring report. We cannot speculate on the "peculiar behavior" you describe.

Comment 15: AEB HCl monitoring results

Response 15: The plateau in figure 5 is not a saturated concentration of 43.5 ppm. The monitor 86923 was pre- and post-calibrated with 40.2 ppm gas. This monitor response was set at 80 millivolts on the precalibration scan, which is 80 percent of the 100 millivolt fullscale of the monitor. On the post- calibration scan, the monitor response was again 80 millivolts (80 percent) for the 40.2 ppm gas. Also, the monitor was checked to see if the span had enough gain left to reach a fullscale response. This is the procedure recommended by the U.S. Environmental Protection Agency (EPA) for setting the span on a monitor. From these calibrations, the plateau is a valid peak that the monitor reached and maintained for approximately 100 seconds.

In your comment you stated, "It is noted in Appendix C that the HCl data from the samplers at the site were not reliable but the data in fig. 5 seem to come from one of the monitors 86923." The meaning of this statement is not clear. Two HCl monitors were run at the AEB site, monitors 86182 and 86923. The data logger channel recording monitor 86182 malfunctioned during the launch. A millivolt measurement for monitor 86182 during the launch was recorded on the data logger at approximately 2.4 times the fullscale millivolts of monitor 86182. The monitor 86923 was recalibrated at the AEB site.

Comment 16: Methodology for calculating average HCl concentrations

Response 16: The air concentration data collected at the KTF during the month of February 1993, were obtained by ambient air monitoring equipment. The USEPA is not sure of the applicability of the power law to ambient air monitoring data. Normally, modeled concentration data are subjected to conversion factors to estimate concentrations beyond the modeled averaging period. These are dependent upon the nature of the existing source, either continuous or instantaneous. At this time, the USEPA is coordinating with the U.S. EPA to determine the applicability of the power law to air monitoring data.

Comment 17: Reliability of GHA-South monitoring data

Response 17: The monitors at the GHA-South perimeter site continuously measured below analytical detection limit background data. The peaks recorded between 10:04 and 10:05 were considered unreliable due to a power interruption. Also, a number of the monitors showed concurrent positive and negative peaks.

On some of the monitors the peaks varied positive to negative to positive a number of times over this timeframe.

Comment 18: GHA-South HCl monitoring data

Response 18: The comment states that "it is doubtful that there is any reliable HCl data at the GHA-South site on 26 Feb." While it is true that the pump stopped sometime during the sampling run of monitor 86924, there was valid data at the GHA-South perimeter site on February 26, 1993. From monitor 86181 was not included in Appendix I for the June 9, 1993, USEPA Monitoring Report. This dataset is for the GHA monitor 86181 is enclosed.

Comment 19: Soil sampling data

Response 19: The numerical values for chloride concentration for soil on page 3.8 are given in the correct unit of measurement, mg/kg. The values for soil concentrations in Attachment IV should have been noted as also being measured in mg/kg. The mg/l reference in Attachment IV is intended only for water and vegetation samples.

Comment 20: Vegetation sampling results

Response 20: The comment is correct in stating that the high correlation rate of 12 is for site 5-15, not 5-12.
Comment 21: Cause of increase in chloride concentrations.

Response 21: This comment regarding elevated chloride concentrations on vegetation samples states that the "most likely explanation is that both natural phenomena and HCl emissions from the STARS launch are responsible." This statement is consistent with the Army's findings.

Sincerely,

[Signature]

Thomas E. Diessel
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

Enclosure

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**MONITOR CALIBRATION AND SAMPLING DATA**

Manufacturer: Interscan
Model: 4360SP
SN: 85181

Range: 50 PPM
Fullscale Output: 100 MV
Output/Unit: 0.5 PPM/MV

Operation Principle: Electrochemical sensor

Calibration Equipment: Tylan mass flow controller SN. 7121026

Span Gases: Hydrogen chloride - 40.2 PPM (+/-5%) and zero air

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**Background 22 Feb. 1993 at GHS Site**

06:51:00 to 07:58:00 - 0.0 PPM
Zero Drift (0%) - Span Drift (14%) of full scale

**Aborted Launch 24 Feb. 1993 at AEB Site**

07:33:53 to 08:48:30 - 0.0 PPM
08:48:30 to 09:04:40 - Three Peaks 12.5/13/12 PPM
08:48:40 to 09:01:00 - 0.0 PPM

**Launch 26 Feb. 1993 at GHS Site**

09:38:00 to 10:04:00 - 0 PPM
10:04:00 to 10:05:00 - Peaked to 1.5 PPM
10:05:00 to 10:58:00 - 0 PPM
Zero Drift (0%) - Span Drift (1-2%) of full scale
MEMO TO: Mr. W. Kason Young, Administrator  
Land Management Division, DLNR  

FROM: Charles T. Toguchi, Superintendent  
Department of Education  

SUBJECT: Draft Environmental Impact Statement for Restrictive Easement  
Pacific Missile Range Facility  
TMI 1-2-51, Portion 1, 15 and 24  

We have reviewed the subject Draft Environmental Impact Statement and have no comments to make at this time.  
Thank you for the opportunity to respond.  

cc: A. Suga, OBS  
S. Akita, KDO  
L. Ninh, U.S. APSDC  

Environmental and Engineering Office  

Mr. Charles T. Toguchi, Superintendent  
Department of Education  
State of Hawaii  
Post Office Box 2360  
Honolulu, HI 96813  

October 8, 1993  

Dear Mr. Toguchi:  

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement  

Thank you for your letter of August 30, 1993, indicating that you have no comments on the Draft Environmental Impact Statement for the proposed restrictive easement.  

We appreciate your time and effort in reviewing the document.  

Sincerely,  

[Signature]  

Thomas E. Duesen  
Lieutenant Colonel, U.S. Army  
Product Manager, Strategic Targets  

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER
Mr. V. Haam Young  
Division of Land Management  
Department of Land and Natural Resources  
P.O. Box 821  
Honolulu, HI 96809

Dear Mr. Young,

Subject: Draft Restrictive Easement Environmental Impact Statement  
Pacific Missile Range Facility, Waimalu, Kauai

We have reviewed the Draft Environmental Impact Statement (DEIS) and have no major concerns at this time. We appreciate the opportunity to review the DEIS. Should you have any questions, please do not hesitate to call Mike Tulah at (808) 541-2606.

Sincerely,

[Signature]

State Conservationist

cc: Linda Hirh, U.S. Army Space and Strategic Defense Command,  
C350-SW-Y, P.O. Box 1500, Huntsville, AL 35807-1500  
State of Hawaii, Office of Environmental Quality Control,  
210 South King Street, Fourth Floor, Honolulu, HI 96813  
Laurie Ho, District Conservationist, Hilo Field Office

“State Conservation”  
To lead the way in helping our customers conserve, restore, and enhance Hawaii’s natural resources through efficient service of the highest quality.”
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Attention: Mr. W. Mason Young

Gentlemen:

Subject: Pacific Missile Range Facility Easement
Mauna, Kauai, Hawaii
Draft EIS

Thank you for the opportunity to review the subject document. We have no comments to offer.

If there are any questions, please have your staff contact Mr. Ralph Yukumoto of the Planning Branch at 586-0488.

Very truly yours,

Gordon Matsuzaka
State Public Works Engineer

CC:

U.S. Army Space and Strategic Defense Command
September 3, 1993

Mr. Mason Young
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Young:

Subject: Pacific Missile Range Facility Easement over State Land for Safety and Ground Hazard Areas for Stars and Navy Vandal Missile Launches, Kauai

Thank you for the opportunity to review the subject draft environmental impact statement. We do not have any comments to offer.

Sincerely,

Brian J. Choy
Director

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35801-1500

Environmental and Engineering Office

Mr. Brian J. Choy
Office of Environmental Quality Control
State of Hawaii
320 South King Street, Fourth Floor
Honolulu, HI 96813

Dear Mr. Choy:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your letter of September 3, 1993, indicating that you have no comments on the Draft Environmental Impact Statement for the proposed restrictive easement.

We appreciate your time and effort in reviewing the document.

Sincerely,

Thomas E. Dusen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

c: U.S. Army Space and Strategic Defense Command
W. Mason Young
Department of Land and Natural Resources
Box 621
Honolulu, HI 96822

Dear Mr. Young:

This responds to the Draft EIS for the Pacific Missile Range Facility Easement Over State Lands.

We have no comments.

Sincerely,

[Signature]

Michael G. Buck
Administrator

CC: OEOC
U.S. Army Space and Strategic Defense Command

Mr. Michael G. Buck, Administrator
Department of Land and Natural Resources
Division of Forestry and Wildlife
State of Hawaii
1151 Punchbowl Street
Honolulu, HI 96813

Dear Mr. Buck:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your letter of September 9, 1993, indicating that you have no comments on the Draft Environmental Impact Statement for the proposed restrictive easement.

We appreciate your time and effort in reviewing the document.

Sincerely,

[Signature]

Thomas E. Desen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
Testimony
September 9, 1993

The Chamber’s Military Affairs Council favors state approval of an easement next to Pacific Missile Range Facility for use during missile launches on the range. Approval of this safety arc is vital to PMRF’s survival as both a ground-based launch site and more importantly, as a maritime range for training Navy ships. Without the easement, the entire Naval establishment’s continued presence in the state could be at risk, resulting in huge job loss on both Kauai and Oahu.

The military will pay market rent for the leased land, with portions of the money going to native Hawaiians. The easement will be used no more than 30 times annually, probably less than 15 times. For beachgoers, it closes the access road for only 30 minutes, and affects no camping and picnic areas at Poipu State Park. It does not include any Hawaiian Home Lands.

The launches are a low-level research aspect of our national leaders’ efforts to protect the American people by developing a way to shoot down hostile missiles. The Israelis were saved by similar technology when Saddam Hussein fired SCUD missiles at them. Such threats are of major concern because arms sales to third world nations are on the rise.

As proven a year ago during Hurricane Iniki, PMRF is a caring neighbor that greatly enriches both the economy and social fabric of Kauai. We respectfully support the state’s approval of the easement and thank you for the opportunity to comment.

Environmental and Engineering Office

Military Affairs Council
The Chamber of Commerce of Hawaii
735 Bishop Street
Honolulu, HI 96813

Dear Military Affairs Council:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your letter of September 9, 1993, regarding the Draft Environmental Impact Statement for the proposed restrictive easement.

We appreciate your time and effort in reviewing the document.

Sincerely,

[Signature]
Thomas E. Osborn
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

Environmental and Engineering Office

Raymond L. Chuan, Ph.D.
Coalition Against Star-Wars on Kauai
P.O. Box 1183
Hawai'i, HI 96714

Dear Dr. Chuan,

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your comments of September 9, 1993, on the Draft Environmental Impact Statement (EIS). As a part of the public comment process, the U.S. Army Space and Strategic Defense Command is responding in this letter to your comments. Your comments and these responses will be included in the Final EIS.

Comment 1: Draft grant of easement

Response 1: The comment does not distinguish between the activities that will take place within the restrictive easement and the programs that such an easement will support. The easement language clearly states that the purpose of the easement is to allow ground hazard areas to be cleared for missile launches to protect public health and safety. If the Pacific Missile Range Facility is able to launch these vehicles, then it will be to support such activities as military training programs and the collection of data associated with guided missiles. Besides the launches themselves, however, the rest of the program activities take place outside the restrictive easement area. Thus, while various statements are made by the U.S. Government about the purpose of and need for the restrictive easement, these statements should not be confused with the precise nature of the proposed action, which is limited to ground clearing activities in association with Strategic Target System and Vandal launches.

Comment 2: Legal responsibility of the State of Hawaii

Response 2: It is inappropriate for the U.S. Government to comment on the State of Hawaii's legal responsibility. The State Department of Land and Natural Resources, which serves as the reviewing agency for the Restrictive Easement EIS, will have the opportunity to evaluate this comment.

Comment 3: Park closures

Response 3: The comment indicates that the primary impact on the use of Pa'ihale State Park is caused by denial of access. It also indicates that activities such as camping will be difficult to plan and may have to be "abruptly abandoned at the last minute." The nature of the restrictive easement, the analyses in the associated EIS, and the experience of the two Strategic Target System launches in 1993 do not support this conclusion. The facts are:

- The restrictive easement area does not include any of the permitted picnicking and camping areas. Campers can request, receive, and use camping permits regardless of when launches are scheduled.
- A portion of the access road to Pa'ihale State Park is within the restrictive easement area. However, this portion of the road remains open for people leaving and entering Pa'ihale State Park until just 20 minutes before a launch and until the Missile Flight Safety Officer declares the area safe, usually a total of 30 minutes. This delay is temporary and infrequent; it should not cause anyone to have to "abandon" their camping plans.
- During the first Strategic Target System launch that occurred on the morning of Friday, February 26, 1993, three surfers were delayed from leaving Pa'ihale State Park for approximately 25 minutes; no campers were affected.
- During the second Strategic Target System launch that occurred at 12:01 a.m. on Wednesday, August 25, 1993, no campers were delayed from entering or leaving Pa'ihale State Park during the temporary closure of the access road.

Sincerely,

Thomas E. Driscoll
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
West Kauai Business & Professional Assn.
P.O. Box 903, Waimea, Kauai, Hawaii 96796 Telephone 1808-338-9257

Sept 8, 1993

The Honorable Senator Daniel K. Inouye
United States Senate
720 Hart Senate Office Building
Washington, D.C. 20510

Dear Senator Inouye,

The West Kauai Business & Professional Association (WKBA) would like to express our support for operations at the Pacific Missile Range Facility (PMRF). We ask for your assistance in keeping this vital installation open.

The unique characteristics of open ocean-4 dimensional training make PMRF one of the most advanced and dedicated military training installations. To forgo such training would be detrimental to the nation, to the personnel sworn to protect it, and to our allies.

WKBA hopes alternative or additional uses can be found for PMRF's unsurpassed capabilities whether military, scientific or otherwise.

With Kekaha and Waimea being the closest towns to PMRF, WKBA is very much concerned about the devastating effects the closure would have on the economy not only for the west side but also for the residual effects it will have throughout the State of Hawaii.

WKBA realizes the difficulties associated with military reductions. We ask that Congress look at the military advantages PMRF has to offer and also the economic conditions that would prevail if closure occurs.

Thank you for your consideration and offer any help we may provide.

Sincerely,

Calvin Shiota
Project Director
West Kauai Main Street

Owen Moe
President
West Kauai Business & Professional Association

Environmental and Engineering Office

West Kauai Business and Professional Assn.
P.O. Box 903
Waimea, Kauai, Hi 96796

October 8, 1993

Dear Mr. Shirai and Mr. Moe,

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your written comments handed in at the public information meeting in Waimea on September 9, 1993, regarding the Draft Environmental Impact Statement for the proposed restrictive easement.

Your comments regarding the impacts of the no-action alternative are reflected in Section 4.11.3 of the Final EIS.

Sincerely,

[Signature]

Thomas E. Diesen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
CONSENT ON RESTRICTED EASEMENT EIS

The restricted easement on Stata and Kekaha Sugar Co. land adjacent to the Pacific Missile Range Facility would allow the U.S. Government to clear the land prior to, during and shortly after launch. The restricted easement is for a 5 year period from Jan. 1, 1994.

No physical changes to the environment within the restricted easement are anticipated. The establishment of the restricted easement would limit new development, therefore maintaining the present appearance. I concur that the restricted easement will not impact geology or soil resources.

No new construction is planned under the proposal action, except for placement of permanent warning signs throughout the easement area, no ground disturbing activities with the potential to adversely affect cultural resources would take place. To ensure that there are no adverse effects on the traditional and customary rights & practices of native groups, the State Historic Preservation Officers, GHA and the Kaniakapuu O Hahala Nui would be consulted. Any effects within the easement area would be avoided through the consultation process therefore. I agree no significant impacts would occur.

The restricted easement will not impact the classification of the lands involved. The lands are classified conservation and agriculture. The easement is not expected to limit agriculture activity in the area. Therefore, I concur the launch related activities within the GHA will not impact the socioeconomic of the area.

The state park area within the restricted easement boundary would be cleared during launch activities. No campsites of parking areas are located in this area (from the restricted easement boundary). People will be cleared prior to, during, and shortly after launch. Since the restricted easement will be exercised up to 30 times per year, I support the statement no significant impact would occur.

I feel the restricted easement EIS addressed all the issues and concerns and I concur that the restricted easement will not have a significant impact on the environment.

THOMAS KIZO
P.O. BOX 64
MAKAWELI, HI 96759

Environmental and Engineering Office

Thomas Kizo
P.O. Box 64
Makaweli, HI 96759

Dear Mr. Kizo:

Subject: Draft Environmental Impact Statement for Proposed Restricive Easement

Thank you for your written comments handed in at the public information meeting in Waimea on September 5, 1993, regarding the Draft Environmental Impact Statement for the proposed restrictive easement.

The U.S. Government concurs with your assessment that no significant impacts will occur to the environment as a result of the proposed action. We appreciate your time and effort in reviewing the document.

Sincerely,

Thomas E. Orten
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
COMMENT ON RESTRICTED EASEMENT EIS

The restricted easement on State and Island Sugar Co. land adjacent to the Pacific Missile Range Facility would allow the U.S. Government to clear the land prior to, during and shortly after launch. The restricted easement is for a 9 year period from Jan. 1, 1994.

No physical changes to the environment within the restricted easement are anticipated. The establishment of the restricted easement would limit new development, therefore maintaining the present appearance. I concur that the restricted easement will not impact geology or soil resources.

No new construction is planned under the proposal action, except for placement of permanent warning signs throughout the easement area, no ground disturbing activities with the potential to adversely affect cultural resources would take place. To ensure that there are no adverse effects on the traditional and customary rights & practices of native groups, the State Historic Preservation Officers, DMA and the Hui 'Imaikalani Na Kahu o Hawai'i Nei would be consulted. Any effects within the easement area would be avoided through the consultation process therefore, I agree no significant impacts would occur.

The restricted easement will not impact the classification of the lands involved. The lands are classified conservation and agriculture. The easement is not expected to limit agriculture activity in the area. Therefore, I concur the impact related activities within the DMA will not impact the socioeconomic of the area.

The state area within the restricted easement boundary would be cleared during launch activities. No impacts of picnicking areas are located in this area (from the restricted easement boundary). People will be cleared prior to, during, and shortly after launch. Since the restricted easement will be exercised up to 20 times per year, I support the statement no significant impact would occur.

I feel the restricted easement EIS addressed all the issues and concerns and I concur that the restricted easement will not have a significant impact on the environment.

October 8, 1993

Environmental and Engineering Office

Scott A. Zenger
P.O. Box 1208
Kahana, Hi 96741

Dear Mr. Zenger:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your written comments handed in at the public information meeting in Waimea on September 9, 1993, regarding the Draft Environmental Impact Statement for the proposed restrictive easement.

The U.S. Government concurs with your assessment that no significant impacts will occur to the environment as a result of the proposed action. We appreciate your time and effort in reviewing the document.

Sincerely,

Thomas L. Diessl
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
COMMENTS ON DRAFT RESTRICTED EASEMENT EIS

ENVIRONMENTAL CONSEQUENCES

Geology and Soils: I concur that this restricted easement will not impact the geology or soil resources because no physical changes to the environment within the restricted easement are anticipated.

Air Quality: I agree that the local air quality may be degraded slightly due to helicopter and launch related activities, but this impact would be temporary and not significant.

Biological Resources: I concur that launch related activities over the easement area will not impact biological resources. Helicopter and other launch related noise could startle the wildlife in the area, but this impact would only be temporary.

Cultural Resources: I concur that this action will have no significant impact on archaeological, cultural and historical resources because no new construction is planned for this proposed action.

Hazardous: I agree that any launch related noise would be temporary and will not result in significant noise impacts.

Hazardous Materials/Waste: I concur with the determination that no hazardous materials would be introduced into the restricted easement area; therefore, no significant impacts are expected to occur.

Social/Economic: I agree that this proposed action will not impact the socioeconomic of the area within the restricted easement because any launch related activity would be temporary and infrequent.

Recreation: I concur that the launch related activities within the ground hazard area (GHA) will not have a significant impact on recreational use because no campsites or picnicking areas are located in this area. The closing of the GHA will be temporary and not an inconvenience.

I have read the draft restricted easement EIS and I concur that this proposed action will have no significant impact on the environment within the restricted easement because it is a relatively minor use of the easement of up to be done for

Robert Inouye
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-1500

October 8, 1993

Environmental and Engineering Office

Robert Inouye
2639 Aikakea Street
Lihue, HI 96766

Dear Mr. Inouye:

Subject: Draft Environmental Impact Statement for Proposed Restricted Easement

Thank you for your written comments handed in at the public information meeting in Waimea on September 9, 1993, regarding the Draft Environmental Impact Statement for the proposed restrictive easement.

The U.S. Government concurs with your assessment that no significant impacts will occur to the environment as a result of the proposed action. We appreciate your time and effort in reviewing the document.

Sincerely,

Thomas E. Diosen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
Averiet Soto
P.O. Box 809
Lawai, HI 96765

PMRF Grant of Easement Testimony

September 9, 1993

Eighteen months ago many of us went through a similar public hearing on the STARS issue. At that time many expressed concerns over the negative economic impact STARS would have on Kauai's tourism industry if an accident occurred.

Little did anyone know that six months later INIKI would roar over Kauai and in five hours change all our lives. In its wake, INIKI left Kauai's tourism industry in shambles. Today, Kauai's unemployment figures are still in double digits with many people in dire straits. Over the past year, hotels and businesses have struggled to get back on their feet. Those that have survived are now waiting for the tourist to decide Hawaii is close enough to come back to. It is a sad state of affairs when so much of the Island's economy is based on one industry. And who's to say we'll see the next hurricane or other natural disaster.

In contrast, during this period, PMRF continued to employ all 600 workers, assisted with recovery efforts and has conducted training and T&E operations virtually without skipping a beat.

Over the last 30 years, PMRF has enjoyed broad community support. But community support alone cannot keep a base open. PMRF must be able to perform its missions and do it better than anyone else can. We all need to seriously consider the impacts of PMRF not being here.

The approval of the easement being considered tonight is crucial to helping PMRF continue its mission. Without it, PMRF is virtually doomed. While some would like nothing better, I don't believe most westsiders appreciate that viewpoint.

Issues have been raised regarding negative environmental and cultural impacts caused by programs at PMRF. Records to date show that no significant negative impacts have occurred while conducting operations. PMRF personnel have been and will continue to be sensitive to environmental and cultural issues at the base. We all have a stake in preserving Kauai for future generations. The stewardship of the lands at PMRF could not be in better hands.

The closure of roads into Polihale for twenty minutes is not a long time by any measure. The easement will also ensure that the affected lands remain as they are. In today's world of rapid development, that is a welcomed relief.

I wholeheartedly support this easement and encourage the State of Hawaii to approve it there by sending a clear message, which has not always been the case, to our elected officials, the military, the project sponsors, and the residents of Kauai that you are a responsible and cooperative partner in PMRF's and Kauai's future.
September 9, 1993

Department of Land and Natural Resources
P.O. Box 921
Honolulu, HI 96809

Re: Draft Restrictive Easement Environmental Impact Statement (EIS)

Dear sir,

My comments for the official record:

I strongly endorse the proposed restrictive easement because it will allow PMRF to continue its mission of fleet training and test and evaluation programs vital to the Nation's defense. Without this easement, PMRF will die on the vine. And make no mistake...... PMRF would not be able to attract new programs which are vital to maintain the base on a strong, financially competitive footing. PMRF needs customers just like any other business. To get these customers, range capabilities and cost must be attractive to National users or they will go elsewhere.

This is not a STARS environmental issue - the courts have repeatedly ruled the Army's EIS is complete, valid, and adequately addressed all environmental issues. Unsuccessful in their frivolous legal attempts to block the STARS launches, these so-called friends of Kauli are now hiding behind the sovereignty movement. While the small minority opposed to PMRF and its programs are gleefully plotting its demise, the actual results of a base closure are sobering. The loss of 800 jobs at PMRF are of little concern to the army band of protesters, but those who value a decent job and work hard for a living would be devastated. The Westsiders would face loss of jobs, reduced standards of living, sons and daughters would not get that college education, and home ownership would remain only a dream. Don't we have enough unemployment on Kauai? The Sierra Club will say it's not their fault, no fault,...... why...... they are merely protesting the rocket launches at PMRF - it's the politically correct....... fun thing to do, and PMRF would certainly not close if the missiles went away...... what possible harm could it cause?? Think again Mr. Freemaans! ...... are you listening Mr. Marinelli?? ...... Stop your nonsense and take a hard look at what you are trying to do to people's lives! And let me ask you Rev. Patterson, how can you possibly be helping sovereignty if your irresponsible and lawless actions lead to the closure of PMRF and unemployment for the 150 employees with Hawaiian blood?

If you want to protest something take a look at the County's new dump. The EIS for that is supposedly over 10 years old! How can something that old apply to solid waste management practice today? Do you remember any public hearings or protests? Are your rules different because you need somewhere to put your trash?

The protesters who endlessly expose their hysterical anti-PMRF agenda, would cut the heart out of the Nation's military if they had their way. Make no mistake, the Sierra Club, the so-called 1000 Friends, and the Responsible Citizens for Responsible Government seek to close PMRF. They would turn it into a flower farm or render it incapable of carrying out its mission by opposing this easement. The Marinelli's,

Environmental and Engineering Office

Averyet Soto
P.O. Box 809
Lawai, HI 96765

Dear Mr. Soto:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your written comments handed in at the public information meeting in Waiman on September 3, 1993, regarding the Draft Environmental Impact Statement for the proposed restrictive easement.

Your comments regarding the impacts of the no-action alternative are reflected in Section 4.1.3 of the Final EIS.

Sincerely,

[Signature]

Thomas E. Dessen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
Freeman's, and Patterson's of this world care little for effects that a PMRF closure would have for the Westsiders.

I would like to ask those opposed to this restrictive easement, why they are opposed to development of defensive systems?... would they prefer to have their military sons and daughters unprotected and defenseless against to some dictator's ballistic weapons? If this easement is not allowed and the ballistic missile defense research allowed to go forward at PMRF, you will strip the military of their defensive ability. Any rational, clear-thinking person realizes that the only reason we enjoy peace now is because we carry a big defensive stick.

Missile is the PMRF's middle name, and missiles they do well... as evidenced by a proven track record of hundreds of successful and safely launch for 30 years - long before most of the protesters moved here from California.

This easement is necessary for two simple reason public safety. It's as simple as that. It's not a STARS issue, it's an environmental issue, and it's not a sovereignty issue. Without it the Westside and Kauai will suffer economically and socially.

Respectfully submitted,

Richard M. Irwin
MCPO Richard M. Irwin, USN, (Ret.)
Lawai, Kauai, Hawaii

CC: State of Hawaii, Office of Environmental Quality Control
U.S. Army Space and Strategic Defense Command

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
MUNTSVILLE, ALABAMA 35902-2001

October 8, 1993

Environmental and Engineering Office

MCPO Richard M. Irwin, USN, (Ret.)
3661 Aleo Street
Lawai, Kauai, HI 96765

Dear Mr. Irwin:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your written comments handed in at the public information meeting in Wainee on September 28, 1993, regarding the Draft Environmental Impact Statement for the proposed restrictive easement.

Your comments regarding the impacts of the no-action alternative are reflected in Section 4.11.3 of the Final EIS.

Sincerely,

Thomas E. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
U.S. Army Space and Strategic Defense Command
P.O. Box 1900
Huntsville, Alabama 35807-1900

Attn: Linda Nish

Re: Draft EIS of easement over state land, island of Kauai

I am a long time resident that actually uses the Polihale beach area, unlike a few vocal protesters that I have heard who couldn't find Polihale with a map. I am very close to retirement and plan to use the best sites beaches rather extensively in the near future.

There is absolutely no reason for me, or anyone else to be concerned, let alone worried, about the issue of sharing the use of the land specified in the EIS. The minor inconvenience to me is to walk closer to the area during launches is insignificant compared to the potential problems that could occur if this project is stopped. Additionally, the U.S. government is willing to pay for the occasional use of the area which would be a definite positive for the state and our community as well. This sounds like a win-win situation to me.

As far as public safety and the environment is concerned, I know the public will be adequately protected during launch operations and I also know that should a missile actually experience problems and land in the safety area, an unlikely event, no permanent damage to the land will occur.

It seems to me that all that everyone has to gain and nothing to lose by this project. The benefits for the United States Serge Office, the NPS and the State of Hawaii, the State of Hawaii's infrastructure and environment for Kauai, and the federal money to the state and local budget for the environment.

As a card carrying, tax paying citizen of the great state of Hawaii, United States of America, and a user of the Polihale beaches including Malaekahana, I stand solidly in support of this project.

Bob Valencia
P.O. Box 723
Kokahili, HI 96750

Dear Mr. Valencia:

Subject: Draft Environmental Impact Statement for Proposed Restricted Easement

Thank you for your written comments handed in at the public information meeting in Walaua on September 9, 1993, regarding the Draft Environmental Impact Statement for the proposed restricted easement.

The U.S. Government concurs with your assessment that no significant impacts to recreational resources or public health and safety will occur as a result of the proposed action. Your comments regarding the impacts of the no-action alternative are reflected in Section 4.11.3 of the Final EIS.

Sincerely,

[Signature]

Thomas E. Jansen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
RESTRICTED EASEMENT EIS

I have reviewed the restricted easement EIS and I concur with the findings that there will be no significant impact to the environment.

No construction is planned in the easement; therefore, I concur that this action will have no impact to archaeological, cultural, or historic resources.

I concur that the road closure which occurs up to 20 times a year will not affect the camping and picnicking areas of Polihale state park.

Sincerely,

1. Loretta Lopez
   Makawili, HI 96769

2. Emalie Kanakele
   Eleele, HI 96784

3. Kaela Schmidt
   P.O. Box 281
   Makawili, HI 96769

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1504
HUNTSVILLE, ALABAMA 35801-1504

October 8, 1993

Loretta Lopez
Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Dear Ms. Lopez:

Thank you for your written comments handed in at the public information meeting in Waiman on September 9, 1993, regarding the Draft Environmental Impact Statement for the proposed restrictive easement.

The U.S. Government concurs with your assessment that no significant impacts will occur to the environment as a result of the proposed action. We appreciate your time and effort in reviewing the document.

Sincerely,

Thomas E. Deason
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
Environmental and Engineering Office

Emaia Kanahele
c/o Keala Schmidt
P.O. Box 281
Makaweli, HI 96769

Dear Ms. Kanahele:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your written comments handed in at the public information meeting in Waiman on September 9, 1993, regarding the Draft Environmental Impact Statement for the proposed restrictive easement.

The U.S. Government concurs with your assessment that no significant impacts will occur to the environment as a result of the proposed action. We appreciate your time and effort in reviewing the document.

Sincerely,
Thomas E. Dietz
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

Environmental and Engineering Office

Keala Schmidt
P.O. Box 281
Makaweli, HI 96769

Dear Ms. Schmidt:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your written comments handed in at the public information meeting in Waiman on September 9, 1993, regarding the Draft Environmental Impact Statement for the proposed restrictive easement.

The U.S. Government concurs with your assessment that no significant impacts will occur to the environment as a result of the proposed action. We appreciate your time and effort in reviewing the document.

Sincerely,
Thomas E. Dietz
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
RESTRICTED EASEMENT EIS

I have reviewed the restricted easement EIS and concur with the findings that there will be no significant impact to the environment.

No construction is planned in the easement; therefore, I concur that this action will have no impact to archeological, cultural, or historic resources.

I concur that the road closure which occurs up to 30 times a year will not affect the camping and picnicking areas of Palihale state park.

Sincerely,

[Signature]
A. Indro, Comoc
P.O. Box 596
Lauui, Hawaii, HI 96765

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-1500

October 8, 1993

Environmental and Engineering Office

Fernando Comoc
P.O. Box 596
Lauui, Hawaii, HI 96765

Dear Mr. Comoc:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your written comments handed in at the public information meeting in Waimea on September 9, 1993, regarding the Draft Environmental Impact Statement for the proposed restrictive easement.

The U.S. Government concurs with your assessment that no significant impacts will occur to the environment as a result of the proposed action. We appreciate your time and effort in reviewing the document.

Sincerely,

[Signature]
Thomas E. Davis
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
RESTRICTED EASEMENT EIS

I have reviewed the restricted easement EIS and I concur with the findings that there will be no significant impact to the environment.

No construction is planned in the easements; therefore, I concur that this action will have no impact to archaeological, cultural, or historic resources.

I concur that the road closure which occurs up to 20 times a year will not affect the camping and picnicking areas of Pothole State Park.

Sincerely,

[Signature]

P.O. Box 451
Hanapepe, HI 96716

Environmental and Engineering Office

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-1500

October 8, 1993

Christine Nenkka
P.O. Box 451
Hanapepe, HI 96716

Dear Ms. Nonaka:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your written comments handed in at the public information meeting in Waimea on September 9, 1993, regarding the Draft Environmental Impact Statement for the proposed restrictive easement.

The U.S. Government concurs with your assessment that no significant impacts will occur to the environment as a result of the proposed action. We appreciate your time and effort in reviewing the document.

Sincerely,

[Signature]

Thomas E. Diesen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
RESTRICTED EASEMENT EIS

I have reviewed the restricted easement EIS and I concur with the findings that there will be no significant impact to the environment.

No construction is planned in the easement; therefore, I concur that this action will have no impact to archaeological, cultural, or historic resources.

I concur that the road closure which occurs up to 20 times a year will not affect the canoeing and picnicking areas of Polihele State Park.

Sincerely,

Michael Castillo

Environmental and Engineering Office

Russell Rule
P.O. Box 989
Kekaha, HI 96752

Dear Mr. Rule:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your written comments handed in at the public information meeting in Waihee on September 2, 1993, regarding the Draft Environmental Impact Statement for the proposed restrictive easement.

The U.S. Government concurs with your assessment that no significant impacts will occur to the environment as a result of the proposed action. We appreciate your time and effort in reviewing the document.

Sincerely,

Thomas E. Dossen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35802-3021

October 8, 1993

Environmental and Engineering Office

Michael Castillo
P.O. Box 385
Waimea, HI 96796

Dear Mr. Castillo:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your written comments handed in at the public information meeting in Waimea on September 9, 1993, regarding the Draft Environmental Impact Statement for the proposed restrictive easement.

The U.S. Government concurs with your assessment that no significant impacts will occur to the environment as a result of the proposed action. We appreciate your time and effort in reviewing the document.

Sincerely,

Thomas E. Dilson
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

RESTRICTED EASEMENT EIS

I have reviewed the restricted easement EIS and I concur with the findings that there will be no significant impact to the environment.

No construction is planned in the easement; therefore, I concur that this action will have no impact to archaeological, cultural, or historic resources.

I concur that the road closure which occurs up to 30 times a year will not affect the camping and picnicking areas of Polihale State Park.

Sincerely,

1. [Signature]
2. [Signature]
3. [Signature]
Environmental and Engineering Office

Manuel L. Cabral
P.O. Box 282
Haapape, Hi 96716

Dear Mr. Cabral:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your written comments handed in at the public information meeting in Waima on September 9, 1993, regarding the Draft Environmental Impact Statement for the proposed restrictive easement.

The U.S. Government concurs with your assessment that no significant impacts will occur to the environment as a result of the proposed action. We appreciate your time and effort in reviewing the document.

Sincerely,

Thomas E. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

---

Environmental and Engineering Office

Benjamin Domingo Jr.
P.O. Box 112
Kakaako, Hi 96752

Dear Mr. Domingo:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your written comments handed in at the public information meeting in Waima on September 9, 1993, regarding the Draft Environmental Impact Statement for the proposed restrictive easement.

The U.S. Government concurs with your assessment that no significant impacts will occur to the environment as a result of the proposed action. We appreciate your time and effort in reviewing the document.

Sincerely,

Thomas E. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
PETITION TO THE STATE OF HAWAII LAND BOARD

I support the proposed nine-year easement that would give the Pacific Missile Range Facility occasional use of lands adjacent to the base during missile launching operations for a maximum of four Strategic Target System launches and eight Vandal launches per year. Without this easement, PMRF would be unable to fulfill its mission as a fleet training/test and evaluation missile range. The easement would be exercised a maximum of thirty times per year, which allows for weather, maintenance and technical delays. During the exercising of the easement access to a portion of Polihale State Park and sugar cane fields adjacent to the base would be interrupted for a maximum of three hours.

While these closures may at times create small and temporary inconveniences to park users, the benefits of PMRF to the surrounding community, the economy of the island and to national defense out weigh the small impacts from the proposed easement. In addition, The Navy is providing market-value compensation for the use of these lands. PMRF has been a good neighbor to the people of Kauai, and we in turn take this opportunity to support PMRF in obtaining this very important easement.

Sincerely,

Thomas E. Dressen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
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<td>P.O. Box 118, Kekaha, HI 96752</td>
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<td>Frank H. Helle</td>
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<td>Russ Wortman</td>
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**Notes:**
- The table contains contact information for various individuals in Kekaha, including names, signatures, and addresses.
- The addresses range from PO Box numbers to Kekaha street addresses.
- Some names are repeated, indicating multiple entries for the same individual or similar information.
- The table is well-organized, with clear headings for each column.
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### Signature Columns
- Signature
- Name
- Address

### Address Columns
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- 456 Other St.
- 789 New Ave.
- 101 Park Rd.
- 202 Garden Ln.
- 303 Union Ave.
- 404 Maple St.
- 505 Oak St.
- 606 Pine St.
- 707 Maple Ave.
- 808 Oak Rd.
- 909 Pine Ave.
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<td>SIMONS B. SIMONS</td>
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|           | Bruce K.       | 3555 Kane St, Kulp | 6744 68th St, 64-
|           | Steve B.       | 3200 Kane St, Kulp  |
|           | Bob W.         | 3400 Kane St, Kulp  |
|           | Ted L.         | 3773 Kane St, Konab  |
|           | Ray H.         | 3400 Kane St, Konab  |
|           | Bill E.        | 3533 Kane St, Konab  |
|           | Bill L.        | 3533 Kane St, Konab  |
|           | Michael S.     | Box 277, Konab  |
|           | Steve K.       | P.O. Box 1247, Konab  |
|           | Steven W.      | Box 1247, Konab  |
|           | John L.        | 60-60 44th St, 38C  |

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David S. Nekomoto  
P.O. Box 123  
Lawai, HI 96765

Dear Mr. Nekomoto:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for the petition handed in at the public information meeting in Wai`anae on September 9, 1993, regarding the Draft Environmental Impact Statement for the proposed restrictive easement.

The U.S. Government concurs with the assessment of the 660 residents of Kauai who signed the petition that no significant impacts to recreational impacts will occur as a result of the proposed action. The comments regarding the impacts of the no-action alternative are reflected in Section 4.11.3 of the Final EIS.

Sincerely,

Thomas E. Demen  
Lieutenant Colonel, U.S. Army  
Product Manager, Strategic Targets

DEPARTMENT OF WATER  
WATER RESOURCES DIVISION  
P.O. Box 421  
Honolulu, HI 96810

Mr. W. Keon Young  
Department of Land and Natural Resources  
P.O. Box 421  
Honolulu, HI 96810

Re: Draft EIS for the Pacific Missile Range Facility Easement over State Land for Safety and Ground Hazard Areas for STARS and Navy Vandal Missile Launches, Kauai

We reviewed the Draft EIS for the subject project and have no comments to offer.

Thank you for the opportunity to comment.

Sincerely,

Jarenehia M. Kaluna  
Acting Manager and Chief Engineer  
WHRD
Environmental and Engineering Office

Mr. Jeremiah M. Kaluna
Acting Manager and Chief Engineer
Department of Water
County of Kauai
P.O. Box 1706
Lihue, HI 96766

Dear Mr. Kaluna:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your letter of September 10, 1993, indicating that you have no comments on the Draft Environmental Impact Statement for the proposed restrictive easement.

We appreciate your time and effort in reviewing the document.

Sincerely,

Thomas E. Dressen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

TO
Brian Cho, Director
Office of Environmental Quality Counsel

FROM
Kohu Akana, Chairperson and
State Historic Preservation Officer

SUBJECT
Draft EIS for the PMRF Easement over State Land for Safety and Ground Hazard Areas for STARS and Navy Vandal Missile Launches Historic Preservation Review & National Historic Preservation Act Compliance TSMK: 1-3-02; sec. 1, 15 and par. 21
Mangilao, Guam

We have reviewed the above document. It should be clearly stated in the document that no 1974 archaeological survey was conducted in the ROI (2110 acres). Small portions of the area have been recently surveyed by DLNR State Parks (Carpenter and Yon, pers. comm. August 1993). However, it is presumed that no physical action will occur in this area. Therefore, since it is an easement, we cannot that the ROI will have "no effect" on significant historic sites.

We do have some minor comments and concerns with this document. We do have concerns with the preservation issue. No map was provided on the location of these sites. Since they will be permanent, we need to know what type of construction will take place. Along with information on the design of this sign.

The summary on the archaeological research conducted to date, should be updated and include the following: Cleveland 1974, Cabrera 1976, Stewer 1978, Kishio 1978, Kishio/Inaba 1982, Yuen 1981, McShane 1982a, b, Gonzalez et al. 1990, Walker, Kalima & Rosenblum 1990, Welch 1990a, b, U.S. Navy (d) draft Flores and Kauhi 1992 and O'Hare & Rosenblum 1993. Appendix D-1 should be updated to include current State of Hawaii inventory site numbers 6017, 6018, 6019, 6022, 6024 and 724. We are unsure of the correlation of the temporary numbers listed in the table with these numbers.

If you have any questions please call Nancy McShane at 587-0026

NM and

c Linda Ninh, U.S. Army Space and SDC
Mr. Kaahumanu Ahue
Chairperson and State Historic Preservation Officer
Department of Land and Natural Resources
State Historic Preservation Division
33 South King Street, 6th Floor
Honolulu, HI 96813

Dear Mr. Ahue:

Subject: Draft Environmental Impact Statement for Proposed Restricted Egagersement

Thank you for your comments of September 10, 1993, on the Draft Environmental Impact Statement (EIS). As a part of the public comment process, the U.S. Army Space and Strategic Defense Command is responding to this letter to your comments. Your comments and these responses will be included in the Final EIS.

Comment 1: It should be clearly stated in the document that no 100-percent archaeological survey has been conducted in the region of influence (ROI) (2,110 acres).

Response 1: The text of the document has been changed to reflect this suggested addition.

Comment 2: We do have concerns with the permanent signs. No map was provided on the location of these signs. Since they will be permanent, we need to know what type of construction will be used, along with information on the design of the signs.

Response 2: The text of the document has been changed. The text now reads, "Specifics regarding the method of placement and location of warning signs within the ROI have not been finalized. As soon as details are available, they will be coordinated with the DLNR, Hawaii State Historic Preservation Office, to ensure the protection of any sensitive cultural resource sites.''

Comment 3: The summary on the archaeological research conducted to date should be updated to include the following: Cleland 1974, Bordeau 1976, Sinato...


Response 3: The text and Appendix D of the document have been changed to reflect these suggested additions. Appendix D has been relocated in the final document and is now Appendix E.

Sincerely,

[Signature]
Thomas E. Drezen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
M. K. DEAN - Hawaii

F.O. Box 82 - Lawai, Hawaii 96765
TEL: (808) 332-8431 FAX: (808)
5/13/93

W. H. Young
Dept. of Land & Natural Resources
P.O. Box 821
Honolulu, HI 96809

Dear Mr. Young:

My wife and I wish to be counted among those who support the Navy Base being allowed to use the surrounding space as requested for the rocket launches on Kauai. We realize the importance of the tests for our potential safety in times of war stress. In addition we want to do everything possible to ensure that the Navy Base will remain on Kauai for helping to keep our Island alive in this time of severe economic stress.

Sincerely,

[Signature]

Melvin K. Dean

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 4083
HUNTSVILLE, ALABAMA 35801-4083

October 8, 1993

Environmental & Engineering Office

Mr. Melvin K. Dean
P.O. Box 82
Lawai, HI 96765

Dear Mr. Dean:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Basemnt

Thank you for your letter of September 13, 1993, regarding the Draft Environmental Impact Statement for the proposed restricted area.

We appreciate your time and effort in reviewing the document.

Sincerely,

[Signature]

Thomas E. Green, Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
14 September 1993

Department of Land and Natural Resources
P.O. Box 631
Hawaii, Hawaii 96809

Attention: M. Mason Young

Subject: RESTRICTIVE EASEMENT

Dear Mr. Young:

I support the Restrictive Easement required for missile launches by the Pacific Missile Range Facility and its various users.

As mentioned by the majority of speakers at the public information meeting held on 09 September 1993, without this easement, most of the operations would be cancelled which would then make PMRF an incredible candidate for future base closure considerations. Over 900 individuals would lose their jobs which would definitely be devastating to our local and state’s economy.

Many of the individuals with technical expertise would not be able to obtain employment in Hawaii for the same amount of pay.

I am currently employed by a Government Contractor at PMRF. Our contract with the Government expires at the end of the month. However, we are currently on the site. However, this situation still poses a stressful environment not knowing what this new company will decide to do with the workforce later down the road.

Since Hurricane Iniki hit our island, my life as well as other people here, has been nothing but stress. My family and I had to move out of our damaged rental apartment and move in with my Mother-in-law for about a year.

However, my father made me an offer I couldn’t refuse. Since his home was totally destroyed by the hurricane, he gave me the opportunity to build a two-story house in place of the damaged home which has just been completed this past August.

I used his insurance settlement and I borrowed the remaining funds required to complete the total cost of this project. Many stressful times occurred during this rebuilding process.

Now with the possibility of no restrictive easement or even transferring the STARs launches to California, you would see a domino effect of other operations being redirected to other activities. This would inevitably mean the end of PMRF.

Sincerely,

[Signature]

[Address]

Restrictive Easement
14 September 1993
Page 2

Can you imagine the reaction on my father’s face when I tell him I cannot make my monthly payments and may be forced to sell the house? This would definitely be the ultimate stress of stress situations.

So you can see why I support this restrictive easement. This benefit is not only for my family and myself but for the island of Kauai and the entire State of Hawaii.

Mahalo for allowing myself to express my opinions on the subject matter. May God’s blessings be with you during this stressful decision making process.

COPY: U.S. Army Space and Strategic Defense Command
Acting: Linda Nash
P.O. Box 1500
Huntsville, Alabama 35807-1500

Office of Environmental Quality Control
220 South King Street, Suite 400
Hawaii, Hawaii 96813
Mr. W. Mason Young
Dept. of Land & Natural Resources
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Young:

Re: Testimony in favor of the request of PNRF on their EIS draft application
for a Land Use Agreement for an
restrictive easement at Nave, Kauai, HI.

I hereby submit my testimony in favor of the request of Pacific
Missile Range Facility's request for a restrictive easement at Nave for
reasons of safety for the public when missiles are launched from the
base.

P.M.R.F. has been rated 97% accident free on their launches, which is
as safe as you can get. Yet, there is nothing on this earth that is
100% guaranteed to be fail safe. To the best of my knowledge there
has never been an accident at this base caused by missile misfiring.

As to pollution, there is no evidence of any pollution in the area
from the multitudes of launches of various types of missiles from this
base over the past 20 years or more of missile launches.

One of the main missions of PNRF or Pacific Missile Range Facility
has been the firing of test missiles far into the Pacific Range and
they are accomplishing this mission with a 100% efficiency and safety.

PNRF is the only high tech industry on Kauai at this time and they
employ more than 750 workers at this base making it the largest
employer on Kauai at this moment.

I urge the members of the Land Board to support PNRF draft EIS
application for the creation of a restrictive easement at Nave, Kauai,
Hawaii.

Your favorable consideration is respectfully solicited.

Sincerely,

Thomas E. Drew
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
Environmental and Engineering Office

Mr. Burk Tatsa
2784 Pikake Street
Lihue, HI 96766

Dear Mr. Tatsa:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your letter of September 16, 1993, indicating your support for the proposed restrictive easement.

Sincerely,

Thomas E. Dress
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

Mr. W. Macon Young
Dept. of Land & Natural Resources
P. O. Box 421
Hono'lulu, HI 96809

Dear Mr. Young:

I hereby submit my testimony in favor of the request of Pacific Missile Range Facility's request for a restrictive easement at Kame for reasons of safety for the public when missiles are launched from the base.

P.M.R.F. has a good record of safety on their launches, having a rated safety factor of 99% to 97%. There has never been an accident at this base caused by missile misfiring as their safety factor is 100%. I don't believe that you can get a better record than that.

The base at P.M.R.F. serves as an active participant in the yearly International Pacific Rim Nations joint training and maneuvers for air, land, water and underwater exercises and curtailting or halting the mission of the base would cripple the entire complex.

There is no evidence at the missile launching site or at any site on the base of any pollution or harm done to any flora or fauna despite the many launches in the decades of missile launches.

I urge the members of the Land Board to approve the request for a restrictive easement at Kame, Kau'i, Hawaii.

Respectfully yours,

Paul T. Akana
2609 Pikake St.
Lihue, HI 96766
September 17, 1993

Department of Land and Natural Resources
Attn: W. Mason Young
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Young:

This is just a brief note since I realize you have a large amount of data to consider in connection with easement for the Pacific Missile Range Facility.

I am just an ordinary American citizen with no relationship to PMRF except empathy for the people there who have been subject to harassment for years by a miniscule group who are determined to shut the base down.

If the continuing easement is denied to PMRF this would be bad for Kauai but also it would be a devastating disaster for the defense and security of the United States.

I will include a copy of a letter I had recently in the Garden Island newspaper which I would appreciate your including in your important deliberations.

Sincerely yours,

Tom Hughes

cc: U.S. Army Space and Strategic Defense Command
Office of Environmental Quality Control
Says article misleading on moving STARS tests

To The Forum:

I was disappointed with the news story about the General Accounting Office on the front page of The Garden Island (Sept. 10).

This news story was a curious combination of fact with fiction which seems to be a perverted purpose of the future report of the GAO. The report is a misleading attempt to obtain millions of dollars by launching a series of "Star Wars" tests from California rather than from the PAVEP at Kauai. The article quotes a selected source saying "the tests would ... cause less damage to Hawaii's pristine environmental if they were launched from the mainland Air Force base."

The whole story and emphasis here is intentionally attempting to undermine the military testing program at PAVEP. It seems the source of the entire segment of the population and media which expects the worst outcome for our environment. The factual evidence is quite the contrary.

Anyone who has been reading the recent newspaper coverage knows that the large majority of people on Kauai and the government support the mission of PAVEP including its work on systems to defend against ballistic missile attack. Two highly successful launches have shown the few doom and gloom predictions that have misplaced emotional.

The article correctly states that the GAO report was "requested by Rep. John Conyers, D-Mich. It did not add the further information that the PAVEP's staff member Elizabeth Freeman has been working on new systems to defend against ballistic missile attack. Two highly successful launches have shown that the system is ready to be deployed.

The article mentions that the GAO report was "requested by Rep. John Conyers, D-Mich." It did not add the further information that the PAVEP's staff member Elizabeth Freeman has been working on new systems to defend against ballistic missile attack. Two highly successful launches have shown that the system is ready to be deployed.

In a continuing misrepresentation of the facts, your news article says "On Sierra Club Legal Defense Fund found several flaws against the Army in an attempt to block further tests at PAVEP." Why not write the facts? The Sierra Club can't come forward with a single legal flaw against the Army, and the Environmental Impact Statement, and test is an attempt to get the Clinton Administration to abuse an executive order ending the research on defensive missile systems which STARs is a part. The emphasis here is on "test" laws, not "test" laws. There have been two successful launches since the Sierra lawyer lost the lawsuit in 1991, and the writer of the misleading article is still writing in 1991. Notice how easy it is to lose focus on the facts when you want to make a point. The Sierra Club's lawsuit has been a failure since the judge ruled against the Sierra Club in 1991. The Sierra Club has been a failure since the judge ruled against the Sierra Club in 1991.

The essay on the same page seems to put a proper headline: "ewaukee show support at PAVEP hearing." It covers the public information hearing by the State of Hawaii's Department of Land and Natural Resources, held in Waukeen. The story could have been improved with emphasis on the hearings. Only 30 people spoke against PAVEP at the meeting while many people were supportive of the test. This incidentally included a large number of native Hawaiians who realize that the U.S. Navy is very helpful in properly protecting their sacred acres.

The professional "environmental group," which I'll call them in this space since they go by several names, went to Washington in a desperate attempt to quash it. The "Star Wars" bill passed by the Senate defense committee in late March. The focus today is on the bill. It is not on the "Star Wars" bill. It is on the "Star Wars" bill. It is on the "Star Wars" bill. It is on the "Star Wars" bill.

The environmental group's efforts are aimed at preventing any announcement of the test. In an attempt to block further tests at PAVEP, they have misled the public by misrepresenting the facts. This misrepresentation is not new. The Sierra Club has been doing it for years.

The Sierra Club's lawsuit is a failure. The Sierra Club has been a failure since the judge ruled against the Sierra Club in 1991. The Sierra Club has been a failure since the judge ruled against the Sierra Club in 1991. The Sierra Club has been a failure since the judge ruled against the Sierra Club in 1991. The Sierra Club has been a failure since the judge ruled against the Sierra Club in 1991.

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September 26, 1993

TO:  Mr. W. Mason Young  
     Department of Land and Natural Resources

FROM:  Joseph K. Conant  
        Executive Director

SUBJECT: Draft EIS for the Pacific Missile Range Facility Easement Over State Land

Thank you for the opportunity to review the subject draft EIS. We have no comments to offer.

cc:  GEQC  
     Ms. Linda Minh, U.S. Army Space and Strategic Defense

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-1500

Environmental and Engineering Office

Mr. Joseph K. Conant, Executive Director  
Department of Budget and Finance  
Housing Finance and Development Corporation  
State of Hawaii  
677 Duerka Street, Suite 300  
Honolulu, HI 96813

Dear Mr. Conant:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your letter of September 20, 1993, indicating that you have no comments on the Draft Environmental Impact Statement for the proposed restrictive easement.

We appreciate your time and effort in reviewing the document.

Sincerely,

Thomas E. Iuliano  
Lieutenant Colonel, U.S. Army  
Product Manager, Strategic Targets
Mr. Jason Young, Land Management Division
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Young:

Subject: Draft Restrictive Easement Over State Land for Safety and Ground Hazard Areas for STARs and Navy Vandal Missile Launches, Kauai, Hawaii. The proposed easement agreement would restrict the use and development of the 2.11 acres of state lands for nine (9) years. The U.S. Military would have to consent in writing before any new building or structure is constructed in the easement area. People would be evacuated and kept out of the area up to 30 times each year, from three hours before a scheduled launch and could be kept out of the area as long as necessary until the U.S. Military declares it is safe.

The use of these state public lands, and for the risk and inconvenience caused to the public by the proposed project, the U.S. Military should pay a fair price for the easement as determined through the appraisal process specified in Chapter 171-17(d), Hawaii Revised Statutes.

Thank you for the opportunity to review and comment. Should you have any questions, please feel free to call Ken Henderson of our Planning Office at 594-3838.

Warmest aloha,

Kapili Drake, Chairman
Hawaiian Homes Commission

Mr. Hoapili L. Drake, Chairman
Department of Hawaiian Home Lands
State of Hawaii
P.O. Box 1879
Honolulu, HI 96805

Dear Mr. Drake:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your comments of September 20, 1993, on the Draft Environmental Impact Statement (EIS). As part of the public comment process, the U.S. Army Space and Strategic Defense Command is responding in this letter to your comments. Your comments and these responses will be included in the Final EIS.

Comment 1: Description of proposed easement
Response 1: Your comment provides an adequate description of the proposed action.
Comment 2: Compensatory to the State for the restrictive easement
Response 2: The U.S. Government agrees that a fair price should be paid for the restrictive easement based on the use of public lands as determined through the appraisal process specified in Chapter 171-17(d), Hawaii Revised Statutes.

Sincerely,

Thomas E. Dreesen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

G00:BC:JG:hy/3003A
cc: DOD
   V. S. Army, SSDC
September 21, 1993

Department of Land and Natural Resources
P.O. Box 621
Honolulu, HI 96809
ATTN: W. Mason Young

RE: Comments on the Draft Restrictive Easement
    Environmental Impact Statement, Kauai, Hawaii

Dear Mr. Young:

I am writing to formally request that the newly published Government Accounting
Office (GAO) report on the STARS program be included as part of the comments on
the proposed PMRF Easement over State Land for Safety and Ground Hazard Areas
for STARS and Navy Vandenberg Missile Launches. I further request that
Congressman Conyers’ follow up letter to Les Aspin concerning the results of the
GAO investigation be included as part of your review. Both documents are
available directly through Congressman Conyers’ office.

I believe that the GAO report will corroborate citizen’s beliefs that the Army
deliberately misled the American public in the preparation of the STARS EIS. If
indeed various information in the STARS EIS has been shown to be suspect and
overly fanciful (as indicated by the GAO report), a serious shadow of doubt is
thus cast on all information contained therein. As the Hawaii State EIS on the
restrictive easement at PMRF relies heavily on the facts and conclusions presented
in the Army’s STARS EIS, the new evidence uncovered by the GAO questioning the
reliability and veracity of the Army’s position may very well render your document
moot.

At this point (post GAO report), to justify inclusion of state lands (actually
Hawaiian ceded lands) into the proposed hazard arc for PMRF, an entirely new

P.S. I would like to point out that contrary to statements in your EIS (paragraph 2,
page 8-30), specific environmental and socio-cultural effects of the STARS program
on the indigenous Marshallese people residing on Diego in the Kwajalein Atoll
were not addressed in the Draft SEIS for the US Army Kwajalein Atoll. I am
continually dismayed that socio-cultural impacts of US missile testing programs
including obvious human rights abuses to indigenous peoples are not included in

Responsible Citizens for Responsible Government

Independent review of all data will have to take place. In light of the results of the
Congressional investigation, continuing to base the State’s position on the
restrictive easement on information derived from the biased and suspect STARS
EIS can only be construed as collusion between the state and the military to dupe
the citizens of Hawaii.

Furthermore, at a time when the highly sensitive issue of Hawaiian self-
determination has focused awareness on the mismanagement of their ceded lands,
it is astonishing to think that the State is considering further constraining
Hawaiian ceded lands by virtue of the restrictive easement at PMRF. Granting this
lease on the “merits” of a project (STARS) that has now been shown to be
“unnecessary” and “deliberately misleading” is a slap in the face of the Hawaiian
people and all taxing citizens as well. By willingly relinquishing Hawaiian
‘ceded’ lands currently in use as a state park and as agricultural property
cultivated by Kekaha Sugar to accommodate an Army program which may very
well become a national disgrace is adding insult to injury.

We strongly oppose the Restrictive Easement over State Land for the Ground
Hazard Areas for PMRF. Thank you for this opportunity to comment.

Sincerely,

[Signature]

Elizabeth Freeman
Director, Responsible Citizens for Responsible Government and Pacific Peace Trust

P.O. Box 1440 Honolulu, Hawaii 96814 Phone: (808) 826-9005 Fax: (808) 826-3243
Responsible Citizens for Responsible Government

the "scope" of US Army Impact Statements. Perhaps it is convenient to exclude these issues from designated US Army studies; however, sidestepping human rights abuses does not bode well for the soul of our nation.

Additionally, I am including two articles. One is entitled VAFB Missile in State of Shock. Let this article be a reminder of the fact that a Minuteman I Missile (similar aging characteristics to STARS) recently exploded at Vandenberg Air Force Base igniting a brush fire which burned 600 acres outside the ground hazard area. The article quotes Valerie Arruda, spokeswoman with the Space and Missiles Center at Norton Air Force Base in San Bernardino, as admitting in reference to the 28 year old Minuteman I that "aging phenomenon is not understood." Citizens feel the military can't have it both ways: the Army says that aging STARS missiles are reliable. Ms. Arruda admits "aging is not understood."

The second article is from Defense Week. It states that plans are afoot to launch Minuteman I missiles from Barking Sands.
Aerospace Daily

May 21, 1992

Martin Marietta wins competition to convert Minuteman IIs

Martin Marietta has received a $50 million Air Force contract to convert three Minuteman II ICBMs into target vehicles and launch them in support of Defense Department test programs.

The company, which has been a major contractor for Minuteman IIs, said the contract will contribute to the company's continued growth. The contract is expected to be awarded in the next few weeks.

Martin Marietta will use the Minuteman IIIs to simulate target conditions for the Air Force's Nuclear Test Range at Nellis Air Force Base in Nevada. The company has been working on the project for several months.

Martin Marietta plans to convert three Minuteman II ICBMs into target vehicles and launch them in support of Defense Department test programs. The company has been working on the project for several months and expects to complete the conversion in the next few weeks.

This is an important win for our company and our customers, said John D. Egan, president of Martin Marietta. It is a testament to our ability to provide world-class defense solutions to our customers.

Kazakhstan accepts START treaty conditions

The governments of Kazakhstan and the United States have reached agreement on the START treaty's implementation. The agreement includes a provision that allows Kazakhstan to retain one ICBM and one submarine-launched ballistic missile for up to 10 years after the treaty enters into force.

This is an important step forward in the process of reducing nuclear arsenals, said Kazakhstan's foreign minister. It demonstrates the commitment of both governments to the goals of the START treaty.

The agreement includes a provision that allows Kazakhstan to retain one ICBM and one submarine-launched ballistic missile for up to 10 years after the treaty enters into force. This is an important step forward in the process of reducing nuclear arsenals, said Kazakhstan's foreign minister. It demonstrates the commitment of both governments to the goals of the START treaty.

Environmental and Engineering Offices

Ms. Elizabeth Freeman

To: Ms. Freeman

From: [Redacted]

Subject: Draft Environmental Impact Statement for Proposed Restorative Action

Thank you for your comments on the Draft Environmental Impact Statement. We appreciate your feedback and will consider your comments in preparing the Final EIS.

Comment 1: Government Accounting Office GAO report

Response 1: The GAO report concluded that the proposed action is consistent with the approved environmental impact statement. The findings of the report are consistent with the Final EIS.

Comment 2: Strategic Target System EIS

Response 2: It is unclear from your comment whether you believe the GAO report is consistent with the Final EIS. The GAO report concluded that the proposed action is consistent with the approved environmental impact statement. The findings of the report are consistent with the Final EIS.
details the same shortcomings of other booster and launch locations as does the Strategic Target System EIS in terms of degraded missions, degraded test data, impacts to cost and schedule, and treaty compliance problems.

The Ballistic Missile Defense Organization (BMDO) has objected to Congressman John Conyers' statement that the BMDO has "misled" the public and Congress concerning alternative launch sites and boosters. Treaty compliance, mission requirements, and cost were considered in selecting the Strategic Target System launch vehicle. That decision made sense at the time based on availability of boosters. To further support optimum use of the Strategic Target System vehicle, it was specifically exempted from the provisions of the Strategic Arms Reduction Treaty (START). No other launch vehicle is similarly exempted from the START and, consequently, would be restricted in its uses. The use of the Kauai Test Facility at the Pacific Missile Range Facility (PMRF) was thoroughly evaluated in an Environmental Assessment and an EIS completed in 1990 and 1992, respectively. Other sites were evaluated as a preliminary step in this process, and the decision to propose the PMRF as the launch site was based on its location with respect to the U.S. Army Kwajalein Atoll, the Strategic Target System launch vehicle performance capabilities, and treaty considerations. The exhaustive environmental studies of potential impacts of Strategic Target System launches from Kauai indicated that there would be no significant environmental impacts. These findings were supported by monitoring of the effects of the first Strategic Target System launch.

Comment 3: Hawaiian ceded lands within the restrictive easement

Response 3: The granting of the restrictive easement would not constrain current and future planned uses of the State lands within it, i.e., agriculture and recreation. As Section 9.0 of the Restrictive Easement EIS details, the proposed action is generally compatible with the applicable Hawaiian State Plan and various State Functional Plans, State Land Use Laws, the Kauai General Plan, the Waihee-Kaheia Regional Development Plan, the Hawaii Coastal Management Program, and Kauai County Special Management Areas. In addition, comments by the Kauai County Council Chairman, speaking as a private citizen at a recent public information meeting, indicate that the open space areas stipulated by these plans were intentionally designed to create a buffer zone for the PMRF and that the PMRF and its operations were and are considered an integral part of the land use plans for that area. At this same meeting, the vast majority of citizens, including people of Hawaiian descent, who live near and frequently use the state lands within the restrictive easement area for recreational purposes spoke favorably about the merits of the proposed action and the non-significance of the potential impacts.

Sincerely,

Thomas E. Vasselin
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
21 Sept. 1993

Dept. of Land and Natural Resources
Attention: W. Hason Young
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Young:

Here are some additional comments concerning the Draft Restrictive Easement Environmental Impact Statement. These comments supplement those I submitted on 28 August 1993.

Today I received a FAX from Vandenberg Air Force Base in California which contained the diagram and printed information on the first attached figure. The diagram indicates where debris from the Minuteman I (MM I) launch failure on 15 June 1993 hit the ground. Based upon the scale indicated on the diagram, the intact 2nd and 3rd stages of the missile and the payload hit the ground about 5440 feet from the launch pad (which is indicated as LP-01). The cluster of debris near this location is attributed to the explosion of the 2nd and 3rd stages of the missile upon impact.

The second attached figure is Figure 2-2 from the Draft Restrictive Easement EIS with the MM I debris dispersion diagram, reduced to approximately the same scale, in the upper left corner. One can see from comparing these diagrams that the cluster of debris associated with the impact of the 2nd and 3rd MM I stages is at a distance from the launch pad comparable to that of the road to Pohakuloa State Park. Therefore, it would seem that a similar STARS launch failure could produce debris and fires that could block this road and thereby cut off access to the park.

Based upon this information, I believe that the Restrictive Easement EIS should examine in detail the 15 June 1993 MM I failure and assess the consequences of a similar STARS failure.

Sincerely,

Michael Jones
Physics Dept.
Univ. of Hawaii
2635 Correa Road
Honolulu, Hawaii 96822

copies to: State of Hawaii Office of Environmental Quality Control
U.S. Army Space and Strategic Defense Command
DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-2001
October 8, 1993

Environmental and
Engineering Office

Mr. Michael Jones
Physics Department
University of Hawaii
2505 Correa Road
Honolulu, HI 96822

Dear Mr. Jones:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your comments of September 21, 1993, on the Draft Environmental Impact Statement (EIS). As a part of the public comment process, the U.S. Army Space and Strategic Defense Command is responding to your comment. Your comment and this response will be included in the final EIS.

Comment 1: Minuteman I failure at Vandenberg Air Force Base

Response 1: The size and shape of a missile debris pattern for a flight termination and the associated ground hazard area are dependent on many factors, including the type of payload, wind and weather conditions, the type of launch (e.g., rail launch versus vertical launch), missile trajectory, and missile performance capabilities. Therefore, a comparison of debris patterns from a Minuteman I flight termination to the Strategic Target System program on Kauai is inappropriate because they are not comparable events.

Even so, the analysis conducted for the Strategic Target System EIS acknowledged the potential for closure of the main access road to Polihale State Park. If an event occurs that makes it necessary to temporarily maintain closure of portions of the ground hazard area beyond that required for a nominal launch, the U.S. Government will respond any portion not immediately necessary for safety-related purposes. For example, if a portion of Polihale or Lower Wai'anae roads needed to be avoided for several hours, there are numerous detours that would be available using the network of canehaul roads that cross the entire area. Thus, an inadvertent closure from an unlikely flight termination would not result in
indefinite closures of the entire ground hazard area, nor would it likely result in a total loss of access to the State park. In any case, every effort would be made to minimize any inconvenience to park users.

Sincerely,

Thomas E. Diesen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

September 22, 1993

Department of Land and Natural Resources
P.O. Box 421
Honolulu, Hawaii 96809

U.S. Army Space and Strategic Defense Command
P.O. Box 1500
Huntsville, Alabama 35807-1500

Office of Environmental Quality Control
220 South King Street
Honolulu, Hawaii 96813

Re: Draft EIS for the Pacific Missile Range Facility
Easement Over State Land for Safety and Ground
Hazard Areas for STARS and Navy Vandal Missile
Launches

Gentlemen:

Comments on the subject Draft EIS are as follows:

1. Rent

The DEIS states that a fee will be paid by the United States for the rights to be acquired by it under the agreement. DEIS, at 1-2, 1-1. The draft "Grant of Easement" contained in Appendix A of the DEIS fails to specify the amount of rent to be charged, however. This must be disclosed.

2. Compliance with State Law

As was demonstrated in Sierra Club v. Patt, Civ. No. 92-2597-07, the State of Hawaii and its agencies have a duty to ensure compliance with all applicable state laws before entering into an agreement to take any disposition of public lands, even if the United States could interpose the defense of sovereign immunity to avoid compliance with Hawaii law with regard to those of its activities which are conducted on Federally controlled lands. Accordingly, the parties to the proposed easement agreement must ensure that they are in full compliance with all applicable state laws, including but not limited to those relating to the disposition of public lands (Chapter 171, Hawaii Revised Statutes) and conservation district use permits (Chapter
3. Inaccuracy of "Environmental Analysis Process Background"

The section of the DEIS entitled Environmental Analysis Process Background, DEIS at 1-292, is inaccurate in that it describes in detail the federal court litigation in which the program has been involved but entirely omits the related litigation in state court. This deficiency should be corrected.

4. Advance Notification of Proposed Launch Events

The DEIS, at 3-4, states that "[t]he U.S. Navy would notify the State of Hawaii, the Kahaluu Sugar Company, and the lessee of the state land at least 7 days prior to launch before exercising rights under the restrictive easement." The draft Grant of Easement merely provides, however, that "[t]he United States will attempt to notify the Kahaluu Sugar Company at least seven (7) calendar days prior to each scheduled launch requiring the exercise of the above rights." Id., ¶ 3. The Grant of Easement must be amended to require actual (not merely "attempted") notice to the State.

5. Procedures for Assuring Clearance of the GHA

The DEIS states, id. at 2-4, that PNPF personnel may begin to notify park users of the need to vacate the GHA three hours prior to launch, although actual clearance of the area need only occur 20 minutes prior to launch. See also draft Grant of Easement, ¶ 2. Neither document explains whether the United States can require park users to vacate the GHA at any time during that three hour interval but prior to the 20-minute clearance requirement. Are park users to be subject to involuntary removal at any time prior to the 20-minute clearance time?

6. Alternatives to the Proposed Action

The DEIS fails to consider the possibility of moving the Vandal launch site to a more southern position within the PNPF, an action that would move the limits of the 6000 ft Vandal GHA a similar distance to the south and that would eliminate the need to impose use restrictions on Polihale State Park during Vandal launches. Elimination of Vandal launches as a source of park closures would substantially lessen the impact of the proposed action on the park users. The DEIS should discuss this alternative to the proposed action. Cost considerations should not be used to justify the failure to address this alternative, because the current Vandal launch site was apparently constructed without consideration of the need to obtain a GHA easement. To the extent Vandal launches took place prior to execution of the recent Memorandum of Agreement now permitting closure of State lands, any closure of State lands that may have occurred was without legal basis and cannot justify the continued unnecessary imposition of such restrictions.

7. Dimensions of the GHA

Figure 2-3 of the DEIS states that the GHA for the Strategic Target System is 10,000 ft in radius, while the GHA for the much larger Titan IV rocket is only 8,000 ft in radius. The DEIS should explain the reason for the substantial difference in the GHA requirement proposed here.
8. Ownership of Lower Saki Nana Road

The DEIS, at J-32, states that "Lower Saki Nana Road, which becomes Polihale Road, provides access to Polihale State Park ... and is designated as a state road." No citation to supporting documentation is provided for the claim that this is a state road, however. As noted in my letter of July 9, 1993, reproduced as pages 9-14 to 9-15 of the DEIS, the Legislative Reference Bureau's study of the controversial issue of state versus county ownership of roads, *Roads in Hawaii*, did not identify the subject road as a state road. Accordingly, the DEIS should be amended to identify the authority for this statement. If it cannot be demonstrated that Lower Saki Nana Road is in fact a state road, the issues relating to the County of Kauai raised in my earlier letter must be addressed.

9. Socioeconomics of the Proposed Action

The DEIS, at 4-15, recognizes that Lahainui Sugar may not continue to lease State lands within the GHA and that sugar cultivation might therefore be replaced by "small, labor-intensive agricultural producers" who would be more significantly impacted by closure of the GHA. Accordingly, while it may not be unreasonable to believe that "the restrictive easement would not be disadvantageous to the State in lease negotiations between the State and sugar cane producers," the DEIS's claim that "[the State's] leasing of restrictive easement land to diversified producers of crops other than sugar cane would also have negligible impacts on the land's agricultural lease value" is in direct conflict with the limited without foundation and is in direct conflict with the limited information on the issue that is presented in the DEIS (indicating that small farmers would be more significantly impacted than sugar cultivation). The DEIS should be modified to include the data and authority, if any, that support this wholly conclusory statement.

10. Application of the Grant of Easement to the United States' "Assigns"

The draft Grant of Easement is stated to be a conveyance to "the UNITED STATES and its assigns," yet § 9 of the draft Grant of Easement the United States accepts responsibility under the Federal Tort Claims Act only for "any act of omission of the UNITED STATES[.]" The Grant of Easement must be modified to ensure that the United States agrees to indemnify the State of Hawaii for injuries resulting from the acts of any of its agents, property as licensees or agents of the United States but whose actions would not necessarily be compensable under the FTCA.

11. Ambiguity Regarding the Scope of Activities to be Conducted Under the Proposed Grant of Easement

Although the DEIS addresses only the impact of SST and Vandal launches, the draft Grant of Easement does not limit the use of the easement to those launchers, but instead would allow use of the easement to those activities involved with the launching, tracking and collection of data associated with guided missile, satellite and aerial vehicle research, development and evaluation, and military training programs. If activities beyond the SST and Vandal launches described in the DEIS are contemplated, they must be described in full. If as such activities are contemplated, the Grant of Easement should be worded so as to limit the activities which could result in closure of the GHA to those described in the DEIS. Given the United States' demonstrated unwillingness to comply with state law, see *United States v. Chinn*, an overbroad grant of easement could deprive Hawaii's citizens of the opportunity to ensure that no additional uses of the GHA are imposed without full review and compliance with applicable state laws, as the United States could evade citizen suits under state law by again raising the bar of sovereign immunity.

Very truly yours,

CARL C. CHRISTENSEN
Staff Attorney
Environmental and Engineering Office

Mr. Carl C. Christensen
Native Hawaiian Legal Corporation
1164 Bishop Street, Suite 1205
Honolulu, HI 96813

Dear Mr. Christensen:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your comments of September 22, 1993, on the Draft Environmental Impact Statement (EIS). As a part of the public comment process, the U.S. Army Space and Strategic Defense Command is responding in this letter to your comments. Your comments and these responses will be included in the final EIS.

Comment 1: Rent
Response 1: The amount of compensation for the restrictive easement will be disclosed, and when a final amount is agreed to by the U.S. Government and the State of Hawaii. The amount of compensation will be based on accepted appraisal and valuation criteria and practices.

Comment 2: Compliance with State law
Response 2: The U.S. Government intends to observe all applicable State laws. As part of the environmental litigation conducted for the Strategic Target System (State of Hawaii v. Cheney, Civil No. 90-0775, U.S. District Court, District of Hawaii), it was determined that the U.S. Government is exempt from a State of Hawaii Conservation District Use Permit.

Comment 3: Inaccuracy of "Environmental Analysis Process Background"
Response 3: Information on related State court litigation has been added to this section.

Comment 4: Notification of proposed launch activities
Response 4: The final version of the easement will require notification at least 7 days in advance of a launch activity and will include a requirement to notify any lessee of lands within the ground hazard area (GHA).

Comment 5: Procedures for assuring clearance of the GHA
Response 5: The EIS assumes lawful, prudent behavior. If people are asked to leave an area so as to be outside of the GHA 20 minutes prior to a launch in order to protect their own safety, it is reasonable to assume that they would act in their own best interest. The only case in which involuntary removal prior to the 20-minute clearance requirement would be considered is if a person indicated an intent not to leave the area as requested. Keep in mind, however, that none of the designated camping or picnicking areas are located within the area to be cleared and that park users are free to enjoy the majority of Polihale State Park unabated before, during, and after ground clearing activities.

Comment 6: Alternative to the proposed action
Response 6: Moving the Vandelay launch site southward so that the GHA would not include any portion of Polihale State Park would require a new launch spot in the Nahili Ditch area. It would not, however, eliminate the need to close the access road to Polihale State Park for Vandelay launches. It also would not eliminate the need for a restrictive easement. Thus, it is not truly an alternative to the proposed action. In addition, the activities associated with the construction of a new launch pad would undoubtedly have a greater potential environmental impact than infrequent, temporary clearing of seldom-used portions of the undeveloped southern end of Polihale State Park.

Comment 7: Dimensions of the GHA
Response 7: The size and shape of a GHA are dependent on many factors, including the type of payload, the location of businesses, residences, and transportation routes; wind and weather patterns; geographical and topographical considerations; the type of launch (e.g., rail launch versus vertical launch from a stand; missile trajectory, and missile performance capabilities. The note at the bottom of figure 2-3 references the fact that the size of a GHA is dependent on many factors and that the size of the missile is only one such factor.

Comment 8: Ownership of Lower Saki Nana Road
Response 8: The citation for Lower Saki Nana Road's designation as a State road has been provided in the final EIS.

Comment 9: Socioeconomics of the proposed action
Response 9: The overriding factors in evaluating the impact of the restrictive easement on potential agricultural activities are the frequency and duration of clearing events. Because the clearing events will be infrequent and of temporary duration, they are not expected to have a significant impact, even if the type of agriculture being practiced were to be smaller and more labor intensive. The State will take into account the effect of the easement on alternative agricultural uses.
Mr. W. Mason Young
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Young:

Draft Environmental Impact Statement (EIS)
Pacific Missile Range Facility
Easement Over State Land for Safety and Ground Hazard Areas for
STARS and Navy Vandal Missile Launches
Waima, Kauai

The United States Government proposes to purchase a restrictive easement which
would authorize them to exercise exclusive control for limited periods of time over certain
state lands adjacent to Pacific Missile Range Facility (PMRF) launch sites. This restrictive
easement is for the establishment of a safety zone from which all unauthorized persons
would be excluded just prior to and during actual launch operations. For Strategic Target
Systems (STS) launches, the safety zone extends out 6,000 feet from the launch pad. The
restrictive easement would be exercised a maximum of 30 times per year for a nine-year
period of time ending in 2002. This would include no more than four launches per year for
the STS and up to eight Navy Vandal launches per year. In order to accommodate weather,
maintenance, and technical delays, the easement allows for limited backup use of the
easement for each scheduled launch. U.S. Government personnel may enter the safety zone
up to three hours before the launch to post signs and give notice to any personnel within
the safety zone of their need to leave at a specified time due to an impending launch.
Roads leading into the safety zone may be cleared and persons may be prohibited from
entering the safety zone in order to verify 20 minutes before launch that the safety zone is
clear. The safety zone will be reopened following a launch as soon as the Range Safety
Officer declares the area safe.

The Environmental Center has reviewed the document with the assistance of
Marshall Mock, Physical Science/Kauai Community College; James Morrow, Public Health;
Michael Jones, Physics; Henry Gee and Yu-Si Fok, Water Resource Research Center; and
Andrew Tomlinson of the Environmental Center.

An Equal Opportunity/Affirmative Action Institution
Mr. W. Mason Young  
September 22, 1993  
Page 2

General Comments

In general, we find that the document does not meet the content requirements for a Draft EIS as prescribed by Chapter 343, Hawaii Revised Statutes (HRS) and Title 11-200-17 of the Hawaii Administrative Rules (HAR) for the Department of Health. It is difficult to determine the potential cumulative environmental impacts of the proposed action, including the launching of Vandal and STS rockets, due to the general nature of the document's discussion. While the areas of potential cumulative impact are mentioned in the document, the specific information needed to render an informed decision concerning the existence and significance of the impacts is only referenced to the Draft and Final EIS of the STS. The current draft of the EIS for the proposed restrictive easement states that:

Cumulative impacts associated with launch activity from PMRF and KTF (Kauai Test Facility) (e.g., Vandal and Strategic Target System) have been addressed in the Draft and Final Strategic Target System EISs (U.S. Army Strategic Defense Command, 1993)(a). The results of these studies indicate that significant cumulative impacts would occur due to launch activities because the launches are discrete events, occur infrequently, and are of short duration, and no effects on the environment of past launches have been identified (p. 4-1).

Moreover, the document states,

The monitoring results (U.S. Army Space and Strategic Defense Command, 1993(a)) confirmed that no significant impacts to the human or natural environment occurred as a result of the launch of the Strategic Target System missile. The analysis and conclusions from the Strategic Target System Draft and Final EISs are incorporated by reference. No significant impact to any of the enumerated resource areas is anticipated (p. 4-1).

Chapter 343, HRS, and Title 11-200-17 stipulate that, "care shall be taken to concentrate on important issues and to ensure that the statement remains an essentially self-contained document, capable of being understood by the reader without the need for undue cross-reference." Clearly, the reliance on cross-referenced material in the Draft and Final EISs for the STS does not fulfill the intent of Chapter 343 and Title 11-200-17, and the Final EIS should include all pertinent information related to the cumulative impacts of the proposed actions.

In addition, there appear to be potentially significant environmental impacts from the proposed launches that are not addressed either in the Draft EIS for the proposed easement or in the EISs for the STS. These are questions concerning the reliability of the rocket systems, the impacts on archaeology and cultural resources, impacts to biology, reliability of the monitoring process and the determination of significance for the release of hazardous substances like lead and Hydrogen chloride.

Start and Vandal Reliability

The document fails to adequately discuss the reliability of STARS and Vandal rocket and the potential impact of an early termination on the proposed easement. The Final EIS needs to include a summary of the launch record and failures of the various rocket systems including the two Vandal failures at the PMRF, the Minuteman I failure at Vandenberg Air Force Base in 1993, and any failures of the Polaris rocket system. The Final EIS needs to include a discussion of how an early termination or a launch accident could potentially affect all existing environmental conditions in the easement or Ground Hazard Area (GHA).

Emergency Response and the Impacts from Fire

Could an early termination of a STARS or Vandal launch trigger a brush fire similar to the one at Vandenberg Air Force Base that destroyed 1000 acres? What would be the cumulative impact of a large brush fire to the environment on Kauai? Specifically, what is the potential impact of a large brush fire on endangered native species of flora and fauna found in the vicinity? What is the potential impact to the cultural resources of the area including archaeology and recreational areas?

The Draft EIS fails to outline the fire prevention and emergency response system of the PMRF. The Final EIS needs to describe the contingency plans to contain a major accident or fire at the PMRF and the surrounding area. For example, the Mokule Military Reservation on Oahu includes helicopter response from Barber's Point for containment of brush fires. What are the plans at the PMRF for emergency response?

Cultural Resources and Archaeology

The Draft EIS also fails to adequately describe the cultural resources and archaeology existing in the easement area. Again, reference is made to the EISs for the STS, but the actual information is not provided. The Final EIS needs to include a full archaeological survey and inventory so that an accurate assessment of the proposed actions, including missile launches, can be assessed. As stated in the Draft EIS, the area includes many historical sites which are potentially eligible for inclusion on the National Register of Historic Places under the National Historic Preservation Act (NHPA). These include the
burial remains at the Nohili Dan. Will these sites be preserved if they are found to be significant? And, according to the Draft EIS, the entire PMRF may be eligible for inclusion on the National Register. Clearly, as specified under the terms of the Section 106 review process of the NHPA, the cultural and historic properties within the proposed easement must be evaluated.

Hazardous Emissions: Lead

The Draft EIS states that no cumulative impacts to air quality or soils would occur from the proposed actions (Section 4.1.1, 4.3.1). However, the Draft EIS indicates that a single Vandall launch would release 43 pounds of lead and that a STARS launch would also release small amounts into the environment. While the Draft EIS states that this is not significant, the document fails to discuss the cumulative impacts of lead releases from all 72 Vandall launches and the 11 STARS launches. This is important as tests of soil samples taken from areas surrounding the KTP that indicated there were elevated levels of lead in the soils following launch activities as compared to background samples. Will lead levels become elevated in the soils following all 83 Vandall and STARS launches? How far from the launch area will lead levels become elevated? Could sensitive endangered species of flora and fauna be affected by potentially elevated levels of lead in the soils? What data indicates that elevated lead levels will not negatively affect native flora and fauna?

Air Quality Monitoring

The conclusion that no significant impact to the air quality of the GHA would occur from the launch activities appears to be based on the results of the monitoring program conducted during the first two STARS launches in 1993. The Final EIS should include at least a full discussion of the monitoring report and include a discussion of the sampling process, relevant data, and a discussion of the data analysis so that an assessment can be rendered concerning the reliability of the monitoring program and its results.

Our reviewers have noted many problems in the monitoring process and its conclusions including irregular patterns and concentrations of Carbon monoxide following launches. While the launch of a Polaris missile is predicted to release 10 times more Carbon monoxide than Carbon dioxide the monitoring results showed that it only produced small amounts of Carbon monoxide in comparison to Carbon dioxide. In addition, the GHA-South monitor recorded a negative concentration of 2.0 for Hydrogen chloride (HCl) and the report states, “Pump had quit sometime during the sampling run” (page 17).
Environmental and Engineering Office

Ms. Jacqueline N. Miller
Environmental Center
University of Hawaii at Manoa
Crawford 317
2550 Campus Road
Honolulu, HI 96822

Dear Ms. Miller:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Exclusion

Thank you for your comments of September 22, 1993, on the Draft Environmental Impact Statement (EIS). As a part of the public comment process, the U.S. Army Space and Strategic Defense Command is responding in this letter to your comments. Your comments and these responses will be included in the Final EIS.

Comment 1: General comments

Response 1: The practice is to incorporate previous environmental documents by reference at Title 11-200-13 of the Hawaii Administrative Rules. In the case of the Federal Environmental Assessment (EA), Supplemental EAs, and Draft and Final EISs, although these documents were not formally “accepted” by a State agency, they were reviewed by and commented on by the State. In addition, they were incorporated by reference in the EA prepared under the Hawaii Environmental Policy Act (HEPA) for a Memorandum of Agreement to allow the United States to clear ground hazard areas (GHAs) for its launches for a 1-year period of time, ending December 31, 1993. This accomplished the major purpose of the Chapter 11-200 rules to ensure that environmental concerns are given appropriate consideration in decision making. *The Federal environmental documents have been available for public review. These documents can be found in the public libraries on Kauai and at other locations on Oahu.*

The stipulation referred to in the general comments of your letter regarding the “essentially self-contained” requirement for an EIS is not found in Title 11-200-17 but rather is found in Title 11-200-19. This subsection also says the “preparer shall make every effort to convey the required information succinctly” (emphasis added) in a form easily understood, both by members of the public and by decision makers, giving attention to the substance of the information conveyed rather than to the particular form, or length, or detail of the statement.” This subsection also says, “Data and analyses in a statement shall be commensurate with the importance of the impact, and less important material may be summarized, consolidated, or simply referenced” (emphasis added). Finally, the subsection says, “Statements shall indicate at appropriate points in the text any underlying studies, reports, and other information obtained and considered in preparing the statement…” The U.S. Government believes the Restrictive Exclusion EIS satisfies the HEPA and its implementing regulations.

Comment 2: Strategic Target System and Vandal reliability

Response 2: The U.S. Army is aware of the view that the Strategic Target System reliability is lower than the 97-percent figure used in the Federal Draft and Final EIS (U.S. Army Strategic Defense Command, 1992b). Most notably, Dr. David Wright, a Senior Staff Scientist with the Union of Concerned Scientists, at the request of the Sierra Club Legal Defense Fund, conducted a review in December 1992 of the Sandia National Laboratories (SNL) reliability analysis of the Strategic Target System launch vehicle. He concluded that, since the SNL analysis assumed 100-percent reliability for some of the major components of the Strategic Target System, namely the first- and second-stage boosters, actual reliability is lower than the SNL estimate. Using the SNL analysis, augmented by his own estimates of the first- and second-stage booster reliability based on the number of flights and failures of the Polaris booster, he postulated an overall reliability in the law 90-percent range. However, he noted that this figure did not take into account the aging process of the Polaris booster and concluded that the launch history of the refurbished Minuteman I missile was a more realistic way to evaluate the reliability of the refurbished Polaris booster. He calculated a 75- to 82-percent reliability for the Minuteman I booster, based on 12 Minuteman I launches between 1985 and 1992.

The U.S. Army acknowledges that the SNL analysis relied on an assumption of 100-percent reliability for the first- and second-stage Polaris boosters, and thus its analysis was a best-case assessment. While the U.S. Army is restricted from providing the actual reliability estimates for the Polaris first- and second-stage boosters because these figures remain classified, the U.S. Army maintains that their reliability is extremely high. The analysis in Volume I of the Strategic Targets System Final EIS on page 2-20 (U.S. Army Strategic Defense Command, 1992) notes that the calculation of a 97-percent overall system reliability combines both key and non-key flight components and that the reliability of key flight components (such as the flight termination system) is far greater than 97 percent. Also noted on page 2-20, failure of many of the components would impact the ability of the U.S. Army to obtain desired test results but would have no impact on the safety of the launch vehicle or require termination so as to affect the GHA. For example, the failure of a telemetry link may cause a gap in data collection but not necessarily a booster termination. The U.S. Army maintains that direct comparison with refurbished Minuteman I launch success rates is not appropriate. The booster systems are not comparable, and a comprehensive evaluation of Polaris stages 1 and 2 as conducted prior to developing the reliability evaluation for the Strategic Target System.
The Vandal program, Navy wide, has had 390 successful flights and 8 failures between 1977 and February 1991. An early problem associated with four of the failures has been corrected. The other failures were associated with booster breakup and missing nozzle retaining rings. The missiles that exhibited the booster breakup anomaly are part of a specific lot (lot 11) of the Vandal booster inventory. The Navy will not use boosters from this lot in the future. The problem associated with the missing retaining rings has been corrected by inspecting for the rings during booster refurbishment. No repeat of this failure has occurred (Strategic Defense Initiative Organization, 1991). Since February 1991, 27 Vandal launches have occurred, with no failures occurring during the boost phase that would affect the GHA.

Response 3: The Strategic Target System Draft EIS discusses the potential for combustion of surrounding vegetation from both nominal flights and early flight termination, as well as the use of fire crews and other fire prevention and suppression measures to mitigate potential impacts (Section 4.4, Biological Resources, Draft EIS Strategic Target System). It also discusses the potential for impacts to cultural resources from fire and proposed mitigation measures (Section 4.5, Cultural Resources, Draft EIS Strategic Target System). These measures were committed to in the Record of Decision for the Strategic Target System, including installation of a portable blast deflector shield, spraying of vegetation near the launch pad with water to reduce the risk of ignition, and using spray nozzles during fire suppression activities rather than a directed stream to avoid erosion and to prevent possible destruction or exposure of cultural resources that may be present in the dunes.

The Pacific Missile Range Facility takes all necessary precautions to both prevent and quickly suppress any potential fires. For example, during both Strategic Target System launches in 1993, emergency response crews were stationed on the ground and in the air to respond to any contingencies, including fire.

Response 4: For cultural resource and archaeological issues related to the launches, the Strategic Target System EIS should be reviewed. As stated in the Restricative Easement Draft EIS, pursuant to the National Historic Preservation Act, consultation with the Hawaii State Historic Preservation Division was conducted for the region of influence which includes the ground hazard area as a part of preparing the Strategic Target System EIS. The State Historic Preservation Division also reviewed the restrictive easement EIS and has issued a finding of "no effect" for the proposed action.

Comment 5: Hazardous emissions: lead.

Response 5: The U.S. Navy will conduct a baseline survey for possible lead contamination around the Vandal launch site and conduct periodic monitoring to assess the potential impacts from all launches from that launch site.

Comment 6: Air quality monitoring

Response 6: The protocol used during the Strategic Target System launch was developed by the U.S. Army Environmental Hygiene Agency (AEHA) in consultation with the State of Hawaii Department of Health's Clean Air Branch. The six monitoring sites in the 1991 proposed protocol were not used in the February 1993 Strategic Target System launch because that proposed protocol was revised in July 1992. This revision was done in consultation with the State of Hawaii Department of Health's Clean Air Branch. Only two monitoring sites were provided in the revised protocol, with background monitoring performed at four potential sites. The reason for changing to two monitoring sites was to obtain more stringent and appropriate real-time monitoring. The 1991 proposed protocol required industrial hygiene monitoring equipment which yields a less informative composite result. In comparison, the advantage of real-time direct monitors is that they provide a time history of the emissions from the Strategic Target System missile launch. Further consultation was conducted with the Clean Air Branch on the revised monitoring report during June 1993 as the report was being prepared. A copy of the final monitoring report was provided to the Hawaii Department of Health Clean Air Branch on August 17, 1993.

The monitoring site chosen for the boundary of the GHA, according to the revised protocol, was determined by the prevailing meteorological conditions, including wind direction and speed, determined the morning of the first launch. In the event of an early component of the surface winds, as was the case on the day of the launch, emissions are transported over the ocean. Under those conditions, the protocol states that the mobile site would be located at the south end of the GHA, where the greatest concentration of nonessential mission personnel would be located.

Monitors used in February did not malfunction during the launch. Complete data were collected during the morning of the launch at the site next to the launch pad and at the southern perimeter site. All data, including that collected prior to and the morning of the launch, were validated prior to public release.

Comment 7: Conclusion

Response 7: As discussed in the above responses, the Restricative Easement EIS possesses more than adequate detail and makes appropriate use of documents incorporated by reference. The monitoring results for air quality for the first Strategic Target System launch are not the primary source of the conclusions in the Restricative Easement EIS. Finally, the Strategic Target
September 22, 1993

Ms. Linda McCrerey
Department of Land and Natural Resources
Post Office Box 231
Honolulu, Hawai‘i 96820

Re: Comments on Draft EIS for Pacific Missile Range Facility Easement Over State Land for Safety and Ground Hazard Areas For STARS and Vandal Launches

Dear Ms. McCrerey:

The Sierra Club Legal Defense Fund, on behalf of Sierra Club and 1000 Friends of Kaua‘i, submits the following comments on the Draft Environmental Impact Statement ("DEIS") prepared by the U.S. Army for the "Pacific Missile Range Facility Easement Over State Lands," notice of which was published in the August 6, 1993 OESC Bulletin.

We are deeply disappointed. Given the knowledge gained by the Army over the past four years about the depth and scope of the public's concerns about this project, it is disheartening to see yet another cursory treatment of the important environmental and social impacts posed by the Army's request to use over 2000 acres of public lands over the next nine years for STARS, Vandal, and possibly other, missile launches.

Yet again, the Army is failing to comply with the requirements of the Hawai‘i Environmental Policy Act ("HEPA"), H.R.S. Chapter 343. The overwhelming impression one has after reviewing the Army's response to comments on the Draft EIS is that public concerns are being shunted aside as quickly as possible. The final EIS will likely be nothing more than a self-serving recitation of benefits and a rationalization of the proposed action.
rather than a thorough discussion of “adverse effects and available alternatives” that will enlighten decisionmakers and the public as to the environmental consequences of the proposed action. H.A.R. § 11-200-14.

Can the Department of Land and Natural Resources (DLNR), or the Board, make a truly informed decision about whether to enter into the proposed Easement for the next nine years on the basis of the statement as it is currently developing? The answer, unfortunately, is “no.”

Compendiously, DLNR has taken the wise step of requiring an EIS for the proposed Easement. However, DLNR must now be vigilant to ensure that it receives an EIS that satisfies HEPA. Unless the Final EIS shows substantial improvement from this draft, we believe that the Board will not have sufficient information on which to render an enlightened and reasoned determination regarding the very significant proposal before it. As set forth in detail below, our concerns about the adequacy of the DEIS include the following areas:

1. the improper focus of the DEIS on the impacts of the land use agreement — the Easement — rather than on the impacts of the action allowed by that agreement — the STARS and Vandal launches;

2. the failure to disclose the actual environmental impacts of past STARS and Vandal launches;

3. the continuing failure of the Army to disclose the actual reliability data for the STARS (as well as the Vandal) missile and how it affects analysis of the environmental impacts;

4. the implications for users of the closures of state lands, including Polihale State Park;

5. the inconsistency of the proposed action with state land use policies and plans;

6. the lack of discussion and analysis of hazardous air emissions (particularly lead and hydrogen chloride);

7. the potential for environmental, and health and safety impacts, resulting from hazardous materials and wastes resulting from launches;

8. the risk of fires and resultant impacts to natural resources;

9. the impacts to plants and other biological resources in and near the ground hazard area from the launches;

10. the effects of the launches on cultural resources and Native Hawaiian beneficiary rights;

11. the inadequate treatment of alternatives to the proposed land use agreement; and

12. the failure to discuss the use of public funds for the proposed action.

Before discussing each of these concerns in detail, we have several general observations. First, DLNR should be fully aware of the requirements of HEPA with respect to the content of draft EISs. The statement must “fully declare the environmental implications of the proposed action and shall discuss all relevant and feasible consequences of the action.” H.A.R. § 11-200-14. As explained below, this overarching requirement has not been satisfied by the DEIS prepared by the Army.

Moreover, the statement “must include reasonable opposing views, if any, on significant environmental issues raised by the proposal.” Id. In other words, the discussion in the statement must be balanced — giving equal time to contrary views in the text, not just burying the response to comments in the appendices as the Army has done in the DEIS. HEPA makes clear that the statement itself should be not be one-sided, as the DEIS is now. It should be neutral, fact-based, and disclose the varying viewpoints that exist on the issues. The weighing of values and impacts is to be made by the decisionmaking authority (here, DLNR or the Board), not usurped by the applicant or its consultants.

In addition, we believe that the DEIS does not comply with HEPA because it places undue reliance on cross-references to outside documents. The DEIS chronically refers to the federal EIS and other documents as a substitute for discussing the substance of the issue. This heavily burdens the decisionmakers and the public, who must then go through the exercise of finding the reference, reading the reference, evaluating its accuracy and completeness, and then figuring out how it fits into the DEIS discussion.

At best, extensive cross-references by the Army reflect a lackadaisical approach to the applicant’s responsibilities under HEPA. At worst, it precludes the reader from gaining a full appreciation of the facts. HEPA’s regulations prohibit this type
of analytical punting that is evident in the DEIS. The regulations provide that the agency must "ensure that the statement remains an essentially self-contained document, capable of being understood by the reader without the need for undue cross-reference." H.A.R. § 11-200-19 (emphasis added). The DEIS fails this minimal test.

Lastly, we have continuing concerns regarding the proper description of the proposed action. In our first comments, we pointed out that, as written, the Easement would allow launches of vehicles other than STARS and Vandal missiles. In response, the Army stated that the Easement would be revised to limit allowable launches to those two missiles. A revised copy of that easement should have been included in the DEIS, but was not. If the proposed action has changed, the Army must disclose that information. (Under the NEPA regulations, the "phasing and timing" of the proposed action must be disclosed in the draft EIS. H.A.R. § 11-200-17(e)(5).) Indeed, the DEIS continues to be ambiguous on this issue. See DEIS, 1-3 ("Launches requiring activation of the restrictive easement include Strategic Target System and U.S. Navy Vandal launches."); also id. at 2-5 ("Launches conducted by the U.S. Government"); 4-1 ("Launches conducted by the U.S. Government"); and id. ("Launches conducted by the U.S. Government").)

Critical questions about the scope of this project continue to be unanswered: Has the Army committed to limiting the Easement to STARS and Vandal missiles? If so, this must be documented, not asserted. See DEIS at 2-5 ("current plans"). Has the number of launches really been reduced (which also has never been convincingly documented)? If so, why does the proposed Easement allow so many launch windows? Until these fundamental questions are publicly answered, the environmental review process should not move forward. The Army's apparent rush to finish the environmental review process is no excuse for skipping lightly over these basic issues.

A final note. We were particularly surprised that the Army neglected to mention the litigation by the Sierra Club and 1000 Friends of Kauai and the Environmental Analysis Process Background. The last paragraph on page 1-5 cites the fact that the EA was prepared only after a lawsuit was brought to force NEPA compliance. By no stretch of the imagination did the Army prepare the EA "as part of the application process for the Memorandum of Agreement." This revisionist history is convenient, but inaccurate and misleading.

With these general concerns as background, we turn now to the twelve specific areas of concern outlined above.

Ms. Linda McCready
September 22, 1993
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I.
The DEIS Improperly Focuses on the Land Use Agreement Rather Than the Impacts of the Actions that It Will Allow

In the DEIS, the Army puts the issue of the potential risks to State lands from the launches and instead focuses on the effects of the restrictions built into the proposed Easement. The impacts associated with the launches are addressed bith the in one sentence: "Cumulative impacts associated with launch activity from the PMRF and KTP (e.g., Vandal and Strategic Target System) have been addressed in the Draft and Final [STARS] EIS." DEIS, at 401.

Aside from being a gross and inappropriate cross-reference on this important issue, this statement totally ignores potential episodic impacts, i.e., those likely to happen as a result of a failed launch (see Section 2, infra). Each sub-section of Section 4 thereafter is merely a tautological incantation of "no effect," without analysis, or void of substance as to be meaningless.

The proper focus of the EIS is on the impacts to State lands from the proposed action, which necessarily includes the actual activities that are allowed by the action. DLNR should not allow the Army to so lightly deal with the on-the-ground impact of the launches.

II.
The DEIS Fails to Disclose the Actual Impacts of the Two STARS Launches on Past Years of Vandal Launches

There is no detailed or meaningful discussion in the DEIS of the actual environmental impacts of the past two STARS launches. In Section 4, where such analysis should be included explicitly (not simply referenced, the most we are told is that there were "no significant effects," yet then we are told that the area "showed recovery was occurring." DEIS, at 419. Simply referring to the monitoring study is not sufficient. As explained earlier, the DEIS must be "self-contained," not merely an index to other documents.

Furthermore, the DEIS fails to mention any monitoring results from the August 1992 STARS launch. What was monitored? What were the results? This information is highly germane, but is not ever mentioned. This glaring error undermines the integrity of the entire document.
III.

MISSILE RELIABILITY

To understand the environmental and public health implications of the proposed easement, the DEIS must evaluate the different scenarios for the infliction of environmental injury from the STARS/Vandal launches. Unfortunately, the DEIS ignores, instead of discusses, a critical factor in determining the potential for such injury: missile reliability.

Reliability is a key issue because, in the event of a catastrophic launch (the probability of which is much higher than estimated by the State or the Army), there will indisputably be significant adverse affects on the precious natural resources within the Ground Hazard Area ("GHA"), as well as on public health and safety outside the GHA.

The lands and resources within the GHA are threatened by the launches solely and directly as a consequence of the proposed easement, which would make these available for the STARS and Vandal launches. Without the easement, the launches would not occur and the risks would not be posed. Thus, the DEIS must thoroughly discuss the potential impacts of a failed or terminated launch.

The GHA is, by definition — the zone of danger determined by the U.S. military to be necessary to minimize public exposure to the possibly severe impacts of the STARS/Vandal launches. The record provides undisputed evidence that the risk of a catastrophic launch is much higher than estimated by the State or the Army and launch is substantially larger that the 10,000 feet GHA. For DUR to understand the true risks to public lands posed by the easement, it must understand the basis for the Army's reliability estimates for both the STARS and Vandal missiles.

A.

STARS MISSILE UNRELIABILITY

The issue of missile unreliability was raised in a number of scoping comments, but nonetheless was not adequately addressed in the DEIS. Six comments of Dr. Michael Jones, Sierra Club Legal Defense Fund, and Native Hawaiian Legal Corporation. Easement DEIS at 8-4, 8-14 and 8-22.

Dr. Jones commented that neither the State of Hawai'i nor the STARS EIS provide realistic estimates for the probability of a failure in the whole series of planned launches. Realistic reliability estimates should be included in the EIS being prepared. In particular, the report on Polaris and Minuteman I reliability by David Wright should be evaluated.

The response to Dr. Jones from Lt. Col. Schreppel of the U.S. Army Space and Strategic Defense Command dated July 25, 1993 is both misleading and inaccurate. It states:

A thorough examination of Strategic Target System booster reliability has already been addressed in previous environmental documents which are incorporated by reference in the EIS for the restrictive easement. Further, this analysis has withstood legal challenges in both Federal and state courts. The analyses and data included in the previous environmental documents and their administrative record are as clear and complete as is possible, without disclosing classified information in context to support an informed decision concerning booster safety issues. DEIS at 8-9.

Although the STARS launches have been the subject of litigation over the past three years, no court has passed judgment on the adequacy of the Army's reliability analysis. On the adequacy of the Army's reliability analysis, Dr. Jones did not have before him at the time of his decision the information in the Administrative Record that reveals the Army's reliability on an assumption of 100% reliability for key components of the STARS missile. Judge Erika's decision for key components of the STARS missile.

None of the state court judges who considered the motions in the state lawsuit rendered any specific (or even general) opinion on the reliability issue. We challenge the Army to quote any court opinion on this specific issue.
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The fatal flaw in the Army's reliability analysis is that it has failed to disclose sufficient data on the STARS missile so that an accurate assessment of this critical issue can be made both by the decision makers considering whether to sign the easement and by the public.

The federal STARS EIS, upon which the states DEIS relies, repeatedly quotes an overall STARS "system" reliability figure of 97% and claims that the reliability of individual "components" of the missile is much higher. However, it is only through highly improper assumptions that the Army derives both the 97% reliability of the "STARS system" and the reliability of the "STARS components."

For example, the Army made the extraordinary critical assumption that key flight components -- the two Polaris A-3 boosters -- are 100% reliable. Unfortunately, as described below, not only is this technologically impossible, but experience with these components is to the contrary. Overall, the Army's estimate is inaccurate and leads to a false confidence about the future performance of this missile.

The Army then presents reliability figures for the STARS system -- that is, the integrated missile, consisting of its three booster stages, the payload, and related components. These system reliability figures were derived from a report written by Sandia National Laboratories entitled "Strategic Target System (STARS) Predicted Mission Reliability for Flight Test Unit 1 (FTU-1)" (hereinafter "Sandia Memo"). Federal EIS Administrative Record ("Federal EIS A.R.") 69 at 1. The Sandia Memo calculates overall system reliability at 97%. However, because the actual reliability figures for the Polaris A-3 boosters are classified, the reliability values for the Polaris A-3 boosters are classified, "the reliability values for the Polaris A-3 boosters are not included" by Sandia in the estimate of system reliability. See id. (emphasis in original). The Sandia Memo clearly states:

Thus the reliability prediction must be seen as a best case prediction, assuming the reliability of the excluded components is 1.0.

See id. (emphasis added).

DLHR must understand the serious implications of this statement. The Sandia Memo itself explains the import: "These numbers do not include the reliability impact of the first stage/second stage motors and components of the Polaris Thrust Vector Control System." See id. (emphasis in original). However, these are precisely the reliability figures that one must have to understand whether the "system" will function as intended.

Indeed, the "1.0" -- or 100% -- reliability assumption is a technological impossibility. Not surprisingly, the Sandia Memo warns: "This study is a prediction, not an assessment." Federal EIS A.R. 69 at 15. In fact, the Sandia Memo contains only a prediction of the reliability of those electrical and mechanical components least likely to fail. Not only does it fail to analyze the reliability of the major components, it says nothing about how reliably the missiles system will work together.

As the Sandia Memo makes clear, the system reliability figures used by the Army are "best case predictions" and simply assume away the reliability problems caused by the first and second stage Polaris boosters, two of the most critical components in determining how the missile will launch and fly over Kauai. The purpose of an EIS is to examine not only "best case," but "worst case" scenarios. Thus, the Army's reliability analysis is essentially meaningless.

Moreover, it is not a sufficient response from the applicant that the information is "classified." Even if the Army is prevented from releasing complete Polaris reliability specifications, such relevant information relating to Polaris flights and flight safety is available in the public record. This information should be analyzed and a more realistic reliability estimate provided. Under HAPA, a DEIS must include all "information necessary to permit an evaluation of potential environmental impacts by commenting agencies and the public." H.A.R. § 11-200-17(e).

Even though the Army refuses to disclose the Polaris reliability information on the basis that it is classified, the opinion of many rocket experts, as well as limited public information about these boosters, demonstrates that if more realistic reliability figures for these two major components were included -- as they should be -- in the overall system reliability figure, that figure would be substantially lower than 97%.

The Polaris motors -- which the Army assumed were 100% reliable -- have been in existence since the 1960s. Although the Army claims they are being "refurbished to original specifications," that assertion has not been proven.

Most importantly, even if the Polaris boosters have perfectly been refurbished to meet their original design capabilities, that figure was only 79.9%. See H.A.R., at 0012d. But, rather than using the more realistic figures, the Army simply assumed that reliability of these critical components will be 100%. See Federal EIS A.R. 69 at 1-2.
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Even using the same methodology employed by the Sandia Neos, with which we do not agree, the actual system reliability is thus much lower than reported by the Army. Taking into account the known actual flight information for the Polaris A-3 booster, the system reliability figure is only 92.81.

However, even this more realistic estimate is inflated due to "other limitations of the analysis," as explained in the attached "Technical Review of Strategic Target System (STARS) Predicted Mission Reliability for Flight Test Unit - 1 (FTU-1)" by K.C. Abbott and B.M. Flomman (Sandia National Laboratories) by DR. David Wright (hereinafter "Technical Review") (Attachment "A") hereeto. See also Second Affidavit of DR. David Wright (Attachment "B") hereeto.

Most importantly, because the STARS missile system has never undergone a full flight testing program, the true reliability of the rocket system is essentially unknown. The fact that two STARS launches have been conducted without apparent difficulties does not alter the potential for a catastrophic failure in a future launch. Two flights is far too small a number on which to base a reliability analysis, and also too few to reveal possible problems with booster refurbishment, propellant aging or other problems associated with the Polaris boosters.

In the absence of long-term flight testing for the STARS missile, it is instructive to look at the real-life experience with recently refurbished Minuteman I missiles, which were of the same vintage as the Polaris boosters used for the STARS program.

During launches occurring between January 1, 1985 and December 1, 1992, the Minuteman I experienced three failures in twelve reported launches -- two of which were destroyed after being launched -- yielding a reliability figure of between 75% and 81%. See Tidwell, "Reliability," at 8.

If these same test data were applied to the STARS missile program, it would result in approximately one failure every four to five launches. Id. As Dr. Wright concludes:

the implications of the assumed level of reliability are important for making policy judgments. . . . If the actual reliability is 21%, which may be a more realistic assessment, there would be a greater than 50% chance of failure by the fourth launch.

Id., at 5-6 (emphasis in original).

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Notably, Dr. Wright prepared his analysis in December 1992. Six months later, a Minuteman I launched exploded after launch from Vandenberg Air Force Base in California. The missile veered off course and had to be destroyed eight seconds after launch. According to press accounts, "The blast hurled chunks of flaming debris toward the ground, igniting a 1,000 acre brush fire that sent residents of nearby Cassalia into a voluntary evacuation." Santa Barbara News-Press, September 17, 1993. A-1, and related articles, Attachment "C" hereeto. The problem is thought to have been a mechanical or electrical malfunction in the guidance system, but the military was eventually unable to determine the precise cause of the missile's failure, stating that the missile may have been "in kind of a shock." Id., p. 5. The Minuteman was 28 years old, and according to a spokesperson with the Space & Missiles Systems Center at Norton Air Force Base: "The aging phenomenon is not understood." Id. The Army must explain why the same catastrophic event would not happen on Kauai. If it did happen, what are the environmental consequences?

If this June 1993 launch is included in Dr. Wright's analysis, the reliability of the Minuteman I between January 1, 1985 and the present drops to between 69% and 73%.

The implications of Dr. Wright's analysis, and the shortcomings of the reliability figures presented in the STARS EIS, must be reviewed adequately in the final version of the Easement EIS. The Army's response on this issue is that prior environmental documents have adequately analyzed this issue, relying in large part on the STARS EIS. Yet that is the very document which presents an extremely misleading picture of STARS reliability.

NEPA prohibits this type of reliance on prior EISs. As N.H.R. § 11-200-13(b) directs: "Agencies shall not, without considerable pre-examination and comparison, use past determinations and previous EIS's to apply to the action at hand, the action for which the determinations is sought shall be thoroughly reviewed prior to the use of previous determinations and previously accepted EISs." There is no indication in the EIS that this new, thorough review of the issues has occurred.

B. Vandal Missile Reliability

Dr. Michael Jones raises the issue of Vandal missile reliability in his June 15, 1993 scoping comments. As he explained: "Data from Vandal launches since February of 1991 should be provided and an estimate of the Vandal reliability
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given. An estimate should also be made for the probability of no Vandal failures in the 72 launches anticipated during the nine years that the restricted easement would be in effect.” Easement DEIS at 4-4. We wholeheartedly agree with Dr. Jonas’ concerns, and find the Army’s response disconcerting and inadequate.

According to Lt. Col. Shepple, the reliability of the Talos booster used for the Vandal missile was addressed in the East Flight Test Experiment Environmental Assessment (“E**** EA”). He also states that “[t]he establishment of the Vandal Ground Hazard area would protect the public in the unlikely event of flight termination.”

Although the E**** EA does provide data on the number of successful flights prior to February 1991, no data on subsequent flights is provided. Indeed, the E**** EA reveals that there were eight failures prior to Feb. 1991, three of which resulted from booster break-up due to “undetermined” causes.

Moreover, the E**** EA does not address the debris pattern associated with the reported breakup of several of the targets, nor the operation of the range safety system. What debris resulted? What were its impacts? What type of clean-up occurred and when?

Attachment “a” to these comments is a piece of debris located by recreational users at Pohinaha State Park. Is this the result of a Vandal or other launch at PMRF? What other debris has been recorded or collected, and what have the impacts been?

All of this information is particularly important in view of the destruct delay built into the Vandal. According to the E**** EA, the Talos booster burns for less than six seconds, at which time it attains a speed of approximately Mach 2. However, “The Vandal Missile Targets,” a review of Vandal prepared by PMRF, states that the destruct system will be delayed for 0.5-4.0 seconds after launch to ensure that inadvertent destruct does not occur. Thus no destruct capability is available while the booster is in operation. In other words, if the Talos booster for Vandal misbehaves at any time during its operation, the Army will not terminate the launch. What are the environmental risks of such a lack of destruct capability? The DEIS fails to address this critical issue.

Lastly, under what authority has the Navy been launching Vandal missiles from PMRF for the last several years (prior to the MOA)? How many launches have occurred and how has the Navy monitored the environmental impacts of these launches? These key questions must be answered in detail.

IV.

INADEQUATE ANALYSIS OF CLOSURES OF POHINAHU STATE PARK AND INCONSISTENCY WITH STATE LAND USE PLANS AND POLICIES

The importance of public access to shoreline areas in the State of Hawaii cannot be overemphasized. Hawaii's beaches, ocean, and magnificent coastal areas are an integral part of life for residents, and the primary attraction for our tourist population. Recognizing the importance of the public's right of access to the shoreline, beaches, and recreation areas in Hawaii, the Legislature has made consistent efforts to improve the public's right of access:

The legislature finds that miles of shorelines, waters, and inland recreational areas under the jurisdiction of the State are inaccessible to the public . . . . that the population of the islands is increasing while the presently accessible beach, shoreline, and inland recreational areas remain fixed; and that the absence of public access to Hawaii's shorelines and inland recreational areas constitutes an infringement upon the fundamental right of free movement in public space and access to and use of coastal recreation areas.

H.R.S. § 115-1 (emphasis added). To further this fundamental right, the Hawaii Legislature has "guaranteed the right of public access to the sea, shorelines, and inland recreational areas, and transit along the shorelines . . . ." Id.

By repeatedly closing the Park and preventing public access to this unique shoreline area, the State and the military will violate this fundamental state policy. Nevertheless, the Army's DEIS gives short shrift to these concerns, minimizing the length of closures and the impact on recreational activities. Much more is required to comply with NEPA. This section will describe the true impacts of the closures, and will set forth the deficiencies in the DEIS.
A. Inadequate Analysis of Closures

The proposed easement requires the military to forcibly evacuate civilians from hundreds of acres of state land adjacent to the PDDP before, during, and after the launches of STARS and Vandal missiles. The hazards areas for these launches slices through the heart of Polihale State Park -- including the spectacular white sand beach adjacent to the Na-pali wilderness. Under the easement, nearly half of the Park would be closed to the public. In addition, the only access road into that Park falls within the GHA and would also be closed.

The DEIS attempts to trivialize the potential impacts to public use from closure of these state lands. However, the Army's simplistic approach of counting the minutes or hours under a "best case scenario" grossly underestimates the true impact to public use and does not address the earlier concerns of both individual commenters and the DLNR itself over these impacts on public access. Before discussing the impacts in more detail, it is important to describe the beautiful and unique resources that will be kept from public use as a result of beach closures, which the KEI ignores.

Polihale State Park has, without doubt, one of Hawaii's most spectacular beaches. John R.K. Clark, the definitive authority on Polihale's beaches, described it as: "One of the longest continuous sand beaches in Hawaii." John R.K. Clark, *Sand Beaches of Kauai and Na Pali* 49 (1990). The beach averages over 300 feet wide during the summer, comprises massive sand dunes 50 to 100 feet high at Wainiha Point, and is backed by the scenic cliffs of the Na-pali Coast. Clark adds, "In the midst of this extensive dune complex are Polihale's famous Parking Sands," which have great historical and cultural significance.

The Park offers numerous amenities and is used for a wide variety of recreational uses, including fishing, boating, swimming, surfing, sunbathing, picnicking, hiking, cultural site observation, nature photography, and as a sanctuary. According to the 1990-1991 DLNR report to the Governor, there were 417,000 "recreation visits" to Polihale State Park in Fiscal Year 1990-1991 alone.

The Park's uniqueness arises not only from its natural beauty and cultural significance, but also from its physical location. The Park is at the "end of the highway" and serves as the only western gateway to the famous Na-pali Coast. This location presents unique opportunities and constraints. The Park is frequently visited as a pick up point for kayakers who land in the Park after completing the Na-pali Coast trip.

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Knowledgeable local residents have estimated that thousands of people use the Park for this purpose each year, including mainland tour groups (such as the National Sierra Club).

In an affidavit filed in *Sierra Club v. Paty*, Civil No. 92-2579-07 (First Circuit Court, State of Hawaii), Miguel Dionisio Godinez, Sierra Club Kauai Group Outing Committee Chair and a partner in Kayak Kauai Outfitters, explains that the natural resources of the Na-pali have enormous value to the people of Kauai. As Mr. Godinez's affidavit makes clear, these resources are an important asset to Kauai's visitor industry, particularly because the increase in demand for kayaking in this area has been "phenomenal" recently.

As Mr. Godinez explains, Polihale "serves as an essential termination landing for . . . kayaking tours and other kayakers that paddle from the north shore along the Na-Pali Coast." Id., ¶ 10 (emphasis added). The importance of the Park for recreation was further emphasized in the Affidavit of Ms. Suzanne Marinelli, Mr. Raymond Chuan and Mr. Charles E. Jetty. (Attachment "A," "B," and "C," respectively).

There can be no dispute, therefore, that Polihale State Park is a very popular recreational park and a precious state resource. Given the importance of this resource, even "short" or "transitory" encroachments -- let alone the significant closures posed by the launch program -- will significantly affect recreational use. Nevertheless, the KEI completely ignores the importance of the Park to the people of Kauai, and to those who may have traveled many thousands of miles for a "once-in-a-lifetime" kayaking trip up the world-famous Na-pali Coast.

The DEIS is also seriously misleading both as to the likely extent of the closures and the impacts on recreational uses of the Park. For each STARS and Vandal launch, the GHA is to be "verified clear" at least 20 minutes prior to each launch. However, PDDP personnel will begin to escort park visitors from Polihale as early as three hours prior to launch, with the roads to Polihale closed at least 30 minutes before each launch. Launch delays due to logistical problems are likely to significantly increase these delays.

In fact, during the first two STARS launches alone, eyewitnesses have reported that Park closures have been longer than the 15 hours per year the Army estimates for the entire STARS and Vandal programs. For example, the first launch was originally scheduled for the morning of February 12, 1993. However, DLNR officials apparently blocked the highway into the Park prior to 2:00 p.m. the previous day, and forcibly evicted
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numerous visitors to the Park by that time. The Park apparently remained closed until the next morning.

Next ensued a substantial delay, reportedly due to technical difficulties, until the launch finally occurred. During this time period, the impending launches undoubtedly were a substantial deterrent to those who wished to use the Park for recreational purposes. Finally, three hours before the launch (which finally occurred on February 26, 1993), security personnel began informing visitors to leave immediately. Therefore, the effective time of Park closure on this day was at least three hours, not the 20 or 30 minutes reported in the EIS.

The EIS should reveal the actual time of closure during prior launches, and the actual launch delays, incurred during both the February and August launches, as the basis for its Park closure estimates, rather than fictional numbers which have no basis in reality. (Moreover, the EIS should discuss the impact on recreational users of the closure themselves, such as the dogs, searchlights, and helicopters used during the STARS launch this year.)

Under normal launch conditions (i.e., absent a catastrophic launch that shut down the Park for an indefinite period), this is significantly higher than that disclosed by the Army's DEIS.

The impact of closures, however, cannot be considered solely in terms of the minutes or hours of disruption of each day of public use. A single day of closure is significant to a visitor who is able to visit the Park only on that particular day or whose trip requires careful scheduling.

Given that potential visitors to the area will be notified of a closure only once they arrive at the Park, the notification will occur only a maximum of three hours in advance of launch, and that driving to Polihale Park from Lihue takes over one hour, even "short" closures can have a significant "chilling" effect on recreational use by residents and tourists alike. Moreover, the poor notice procedure is likely to be highly annoying to visitors who travel a long distance to the Park, only to be told they must leave.

The Army's proposal to instruct visitors to the Park to move to the "north end of the State park" is impractical at best -- and irresponsible at worst -- for at least two reasons. First, there should be any delay to the launch, these unsuspecting visitors could be stranded in that end of the Park for an indefinite period. Second, there is a serious risk that a

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Moreover, the impact of an unexpected, unannounced closure to a visitor who has planned for months or years and perhaps spent thousands of dollars for a trip to the Na-pali coast cannot be underestimated. The EIS should fully disclose these impacts and, at a minimum, the Army should take every step possible to minimize them.

Furthermore, even though the Army claims the closures are of "short duration, they will be disturbingly frequent. The State proposes to allow the military to evacuate and close the Park and other state lands up to 10 times per year, meaning two and a half closures per month.

Given the 30 possible launch attempts and the likelihood that launches will be delayed by technical difficulties, while sightings during the winter and spring, or other unanticipated events, there is likely to be a launch attempt and Park closure every one to two weeks during some periods.

In sum, under normal launch conditions, these chronic closures of the Park undoubtedly would be detrimental to Kaua'i's residents and tourist industry and would clearly be significant.

Finally, (as described in more detail in section III supra,) not all launches will be "successful." Over the life of the program, it is more likely than not that at least one STARS missile will be aborted shortly after launch, causing fiery debris and hazardous propellant to rain onto the Park.

Under this scenario the duration of the closures are in fact apparently unlimited because closure of the Park would be at the Army's discretion: "The ground hazard area will be reopened as soon as the Range Safety Officer declares the area safe." However, if "debris or other hazards exist in the ground hazard area from early termination, the Range Safety Officer may continue to close the area until it is safe to reopen." DEIS, at 2-5 (emphasis added).

Thus, the Army apparently will claim unlimited control over state lands in the GHA or part of them for the days, weeks, or months that it would take to clean up the hazardous debris.

This specter of unlimited closure of a portion of Polihale State Park, and possibly all road access to the Park, and numerous closures of the Park at the sole discretion of the U.S. military, is highly significant. Yet, the EIS fails to

terminated launch may result in a rapidly spreading fire, putting these visitors in grave peril.
adequately disclose to the public this substantial disruption to public park lands.

Commenters are not alone in their conclusion that the closure of Polihale State Park would be significant. This conclusion was shared both by DLNR and the State of Hawai’i Office of Hawaiian Affairs (“OHA”). In its comments on the Army’s EIS, OHA explained that the beach closures resulting from the STARS launches alone were significant:

It should be remembered that beach activities are the primary recreational activity of both the general public and the tourist population of Kaua‘i. The 22 miles of public beach along Kaua‘i’s eastern coast is small compared to the public and commercial demand for beach related activities. Therefore, the restriction of even 1 percent of the beach is significant and the socioeconomics consequences of the additional demand on other beach areas, should be discussed.


This finding of significance by OHA was echoed by DLNR itself in its earlier comments to the Army’s federal EIS:

According to the DEIS, the impacts of the [STARS] missile launch activities on access to Polihale Beach Park and (PNDP) beaches would be equal to 60 minutes per year, with the potential for an additional eighty minutes per year to accommodate weather, maintenance, and technical delays, in which the area would be verified clear. We believe this underestimates the actual impact of launching operations on public use and access. If you add the time required for clearance activities preceding each launch, the impacts become more pronounced (3 hours/launch X 4 launches per year = 720 minutes per year).

We are still quite concerned over the potential impact of launch/flight activities on public access to Polihale State Park and shoreline areas adjacent to [PNDP]. We question the reported closure/clearance periods and estimated launch delays (20 minutes respectively). A more thorough/systematic discussion of launch/flight activities, including clearance activities, potential delays, and the exact areas to be affected should be conducted.

Moreover, these launch/flight/closure activities must be discussed in light of their cumulative/comprehensive impact on public use of the affected areas. (Emphasis added).

After making these comments, how can DLNR accept as adequate the cursory review in the DEIS?

It is important to note that these very serious concerns arose out of only four planned launches per year, as opposed to the fifteen launches currently under discussion. Nevertheless, despite these critical comments, the Army’s DEIS continues to ignore the serious impacts caused by the closures of Polihale Park. It refuses to acknowledge the importance of this recreational area, fails to discuss the realistic likelihood of delays, and instead obfuscates the issue by using the completely misleading and unrealistic 30 minute period in which the area is “all clear.”

V.
THE PROPOSED EASEMENT IS INCONSISTENT WITH STATE POLICY AND PLANNING GUIDELINES

The DEIS’s “analysis” of the proposed easement’s consistency with State policy and planning guidelines (see § 4.12.1 and Ch. 5) is cursory, incomplete, misleading, and completely one-sided, in violation of NEPA. In essence, the DEIS takes the ridiculous position that closing a beautiful and unique state Park to the public, and instead using it as the area designated to absorb the brunt of fiery and hazardous debris from failed missile launches is an acceptable, beneficial use of the Park.

The Army’s position is not only directly contrary to the public’s concept of appropriate uses of a fragile and valuable Park, it violates the laws and expressed policies of the State of Hawai‘i. In reaching a contrary conclusion, the Army simply ignores virtually every relevant aspect of state law and policy. This section will attempt to summarize a few of the many state
laves and policies that are contrary to the Army's proposed action and that have not already been addressed in other sections of these comments. In order to comply with HEPA, the EIS must address all of these issues described below.

First, the Army has refused to comply with state law and the earlier decision of the Board of Land and Natural Resources ("BLNR") that a Conservation District Use Permit ("CDUP") be obtained for the proposed use of state lands. BLNR's decision on Waimanalo was voluntary. However, BLNR has no power to simply grant the procedures required by statute and regulation.

Contrary to the Army's assertion in its comments, Sierra Club v. Chinery, Civil No. 90-0775, U.S. District Court, District of Hawaii, does not allow the State to ignore its own laws by selling the Army the right to use state land in the conservation district without obtaining a CDUP (62 H.R.S. §187-417 H.A.R. §13-2-19). Indeed, given the military's refusal to comply with state law even when using state land, it would be a breach of the State's trust responsibilities for it to enter into this agreement without requiring the United States to waive sovereign immunity, and comply with all applicable state laws.

Moreover, the CDUP process is at the heart of protecting Hawaii's many fragile and valuable state lands in the conservation district. The Army's refusal to submit to this permitting process even though it is requesting that this important state policy. In short, the EIS must address these important issues, and explain (if it can) why refusing to comply with fundamental state law, which the Hawaii Legislature has determined is necessary to ensure proper management of lands in the conservation district, can possibly be consistent with State law.

The proposed easement is also inconsistent with BLNR's statutory obligation to preserve and maintain state parks. BLNR shall preserve the parks and parkways in the state park system in their natural condition so far as may be consistent with their use and safety, and improve them in such manner as values for the use and enjoyment of the public." H.R. § 184-6, and by shutting down Polihale State Park, excluding the public, and subjecting the natural resources of the park to a very significant risk of harm, the proposed easement violates this statutory mandate.

This unprecedented use of state park lands is contrary to a wide array of expressed state policies as well. Instead of addressing these policies in good faith, the EIS merely provides a conclusory, one-sided assessment which ignores every significant policy contrary to the proposed action.

Among the state policies plaintiffs believe are contrary to the proposed action, and which should be fully addressed by the EIS, are the policies to: (1) "promote increased accessibility and improvement of land for public recreation and education purposes" (H.R.S. § 226-13(b)(9)(emphasis added)); (2) "rural compatible relationships among activities, facilities, agriculture and natural resources" (H.R.S. § 226-11(b)(8)); (3) achieve "the objectives of Hawaii's scenic assets, natural beauty and multifarious" (emphasis added)); (4) "protect those special areas... that are an heritage" (H.R.S. § 226-11(b)(4); and (5) "encourage activities and air quality levels to enhance the health and well-being of Hawaii's people." (H.R.S. § 226-13(b)(4)).

VI.

HAZARDOUS AIR EMISSIONS

A. STARS Launch Impacts

The Air Emission EIS does not adequately address the potential impacts of the STARS launch from hazardous air emissions, both launch. While the impacts are significant in either instance, a terminated launch could have particularly devastating effects.

To predict concentrations of toxic gases following a STARS launch, the Air used computer models, referred to as "tenp" and "reem," the model results presented by the Army in the STARS series of emission predictions -- none of which acre, and none of which in fact vary by a factor of over 100. See Affidavits of Dr. Michael Jones, Attachments "G" and "H" hereeto.

Dr. Jones, a physicist, has carefully analyzed the results of this air quality modeling, but found that
one cannot confidently assess the air quality impacts associated with the STARS launches until additional information is provided and a more comprehensive evaluation is performed.

Thus, it is impossible for the public, or the State, to verify that the emissions estimates produced by the Army's air quality models are accurate and that emission levels will in fact not be even higher than the high levels predicted.

The Environmental Monitoring Program conducted by the Army for the February 24, 1993 STARS launch has unfortunately not clarified the situation, due to flaws in the monitoring program design that result in differences in distance and location of monitors from the launch pad as compared to the model assumptions, poor monitor performance, and inconsistencies in calculating average concentrations.

For example, only two air quality monitoring stations were in operation at the time of the launch, instead of the six stations that were originally proposed by the U.S. Army Environmental Hygiene Agency in 1991. See EIS A.R. 194 at 10. Only one of these monitors was at the GHA boundary, and it was not directly downwind due to shifting winds. See Dr. Jones' comments on the Easement DEIS dated 28 August 1993, Nos. 12 - 21. We concur that the issues Dr. Jones discusses should be fully addressed in the Easement FEIS.

Leaving the suspect environmental monitoring aside, the Army's own emissions predictions clearly show that the State's guidelines for HCl exposure (9-hour average value of .07 ppm; see Aff., Exh. 8) will be exceeded by the GHA during all flights, and far beyond it in the case of an early flight termination.

Both the TRPF and REEDM models predict that the 8-hour average emissions produced by the STARS launches on Kauai will exceed the State of Hawaii's guidelines at HCl far beyond the boundaries of the 10,000 foot-radius of the GHA currently proposed. The REEDM model, which is considered by the Army to be a lower estimate of the concentrations associated with a STARS launch, predicts that the State guidelines will be exceeded at a distance of approximately 5000 meters (16,400 feet) from the launch pad.

In short, although the State and Army state that the GHA itself is "considered essential to safeguard the safety, health and welfare of persons not directly associated with the launch and operation," it is clearly inadequate to protect the public from the toxic emissions produced by the STARS missile launches. The Army's cursory treatment of this issue in the DEIS, relying solely on the flawed and incomplete analysis in the STARS EIS, is wholly inadequate. The Easement EIS must address the modeling inconsistencies between the Army's various environmental studies, compare these with the Environmental Monitoring Program results, and present a realistic estimate of the emissions associated with the STARS launches.
VII. HAZARDOUS MATERIALS AND WASTE

A. Risk of Hazardous Materials Within GHA

The Army's own analysis, presented in the Draft and Final STARS EIS, has demonstrated that flight termination can result in debris, including propellants, impacting the ground hazard area. The toxicity of these materials is such that soil, vegetation, cultural deposits and any other materials (or wildlife) with which they come into contact will be harmed, and may have to be disposed of as hazardous waste.

The Easement DEIS fails to take this issue seriously, and includes no analysis of the potential impacts to the area covered by the proposed easement. The DEIS states:

The ground hazard area within the PMRF will contain hazardous fuel, oxidizers, and other materials associated with the Vandal and Strategic Target System launch activities. . . The area within the ground hazard area may be impacted by hazardous materials as a result of an unlikely flight termination. Hazardous materials resulting from early flight termination would be cleared from the area in accordance with the cleanup procedures described in the Strategic Target System Draft and Final EIS.

Easement DEIS at 4-11 and 4-12. The section concludes with the comment that "severely no significant impacts would occur, no mitigation measures are required for hazardous materials and wastes." Id. at 4-12.

Given the sensitivity of the resources within the GHA, and the potential catastrophic impact to those resources from flight termination, such a conclusion is inexplicable. The Final EIS HAZUS analyzes the impacts associated with hazardous wastes and materials, and considers alternatives and mitigation to reduce those impacts.

B. Inadequate Ground Hazard Area

In addition, the GHA itself is demonstrably too small to contain the falling debris, meaning there is an even greater risk of fire and contamination will occur. (A primary function of the GHA is to contain "any hazardous materials, including burning propellant, toxic fuels, and other burning, hazardous debris.

The Army has consistently stated that the GHA will contain all debris following an early flight termination. Unfortunately, however, a careful review of the record indicates that the adequacy of the GHA in this regard is directly dependent on when the missile's flight is terminated, and that the State and the Army have failed to properly evaluate this critical factor. See Affidavits of Dr. Michael Jones (Attachments "2" and "10").

Dr. Jones, a high energy physicist, explains that if a missile were to "pitch back" toward Kauai, flight termination must occur within 21.5 seconds into flight to contain debris within the 10,000-foot GHA. This contradicts the State's understanding that the flight safety officer "has from 2.18 to 20 seconds after the launch to terminate the flight, and keep the debris pattern within the GHA," Id., ¶ 14 (emphasis added).

If the flight safety officer waited until 20 seconds into flight, the debris would, in fact, be thrown over 27,000 feet from the launch site. Id., Exh. E (emphasis added). However, there is no guarantee that flight termination will occur even within 20 seconds. For example, evaluation of a failed Arias missile launch in Florida revealed that the flight safety officer did not issue the destruct signal until 23 seconds into flight.

As Dr. Jones notes:

If a STARS launch were to fail in the same way, the center of mass of debris would impact the ground 3.3 miles from the launch pad. Thus, debris impact area would include the town of Kekaha if the launch were to go off-course to the southeast.

Id., ¶ 15.

Finally, a review of the record demonstrates that a failed launch will create serious risks for the public in yet another way, due to the lack of adequate evacuation plans. Although the 10,000-foot GHA would be evacuated prior to a launch, there is no indication that the Army or the State has considered evacuation of persons outside that area should toxic gases, fire, or debris spread beyond that line.
The Army has indicated that the public will be evacuated from only the southern portion of Polihale State Park and will be able to remain in the northern part of the Park during launches. Even at 4-17. However, in the likely event of fire spreading beyond the hazard area, or debris being thrown beyond it, evacuation in the northern portion of the Park may prove impossible, because the southern portion of the Park has the only road access to the rest of the Park.

This hazard exists even in the event of the need to evacuate after or during a normal launch, but becomes critical with a failed launch:

Park users remaining in the northern portion of Polihale State Park will be unable to obtain medical assistance should they require it, due to the closure of the single park access road, which crosses the GHA. Thus Mr. Pats' [comment]... "In the unlikely event that an accident occurs, adequate medical facilities are available" will not apply. This becomes an acute concern if there is an early launch termination, as spills of hazardous materials and fires may necessitate continued closure of the road. Such an event would effectively trap and possibly threaten the members of the public.

Affidavit of Suzanne Marinelli, ¶ 15, Attachment "G" hereto.

This inadequate evacuation plan may lead to citizens being trapped in dangerous conditions, including in the event of fire and the presence of hazardous materials. There can be no question that the lack of an adequate evacuation plan may cause significant impacts on human health.

In short, the hazard area designated in the EIS has not been demonstrated to be insufficient, and it is likely that the risk of harm to human health and the environment beyond that area has been underestimated. It is imperative that the PEIS fully examine these issues, so that the State and the public can weigh the risks associated with the proposed EIS.
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Be to allow the fire to burn itself out. Federal EIS, Volume I, at 2-15 – 2-16.

However, this “mitigation measure” would be devastating to rare and state and federally listed endangered Hawaiian plants, as well as to the globally imperilled native vegetation communities that occur at Polihale (see Section 1). In short, the proposed mitigation measures present a Hobson’s choice of destroying significant cultural resources, or rare, threatened, or endangered plants: there is no fire-suppression method that will avoid significant impacts to all important resources.

Moreover, the Affidavit of William Sager (Attachment “12” hereto) makes clear that there is likely to be no effective way to stop a fire caused by the missile debris raining down over Polihale State Park. Mr. Sager has twenty years in wildland firefighting experience as a professional forester employed by the State of Hawai‘i.

Based on his experience, Mr. Sager notes that, if conditions were dry and windy, as frequently occurs at Polihale State Park, “there could be an instantaneous ignition of hundreds of spot fires on the Mohili Dunes and in Polihale State Park” and in the adjacent sugar cane fields. Sager Aff., ¶ 1-9 (emphasis added).

Even more problematic, because of the heavy fuel loading and ignitability of many of the plant species in the area, in dry windy conditions “the spot fires would quickly burn together to form a configuration that could approach a full-fledged fire storm,” rendering impossible to attack spot fires. Id., ¶ 11-12. Such fires would obviously devastate the fragile vegetation described above, and might also result in the burning of subsurface cultural materials. Id., ¶ 12.

The scenario suggested by Mr. Sager is not speculative or far-fetched. The Minuteman I launch failure at Vandenberg Air Force Base on June 15, 1993 caused a 1000 acre brush fire, over half of which burned on land outside both the GHA and the base. See Attachment “3” hereto. Similar events on Kaua‘i could devastate both the fragile vegetation and cultural resources, and could spread far outside the lands designated to receive those impacts. The Easement EIS must consider the impacts of fire on the GHA and the resources within it, and on the resources surrounding the GHA.

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IX.

EFFECTS ON RARE AND ENDANGERED PLANTS

The DEIS does not adequately discuss the effects of the STARS and Vandal launches on rare and endangered plants, both within and outside of the Ground Hazard Area. It is important to understand that, unlike people, plants (and cultural resources) cannot simply be evacuated during the launches. Nor are these resources replaceable. They are fragile and unique. The proposed easement, which is a prerequisite to the launch, puts them at risk.

The DEIS fails to acknowledge that the GHA in no way protects resources within the GHA from the risks of rocket launches. At most, the easement can promise to mitigate impacts to these resources. However, the DEIS does not discuss either the potential impacts of failed launches nor the adequacy of the proposed mitigation on rare and endangered plants in the affected area.

The vegetation at the Mohili Dunes and Polihale State Park is extremely significant in terms of species rarity and endemism. Approximately 90 percent of Kaua‘i’s native plants and animals are found nowhere else in the world. Kaua‘i — the oldest of the main Hawaiian islands — harbors a remarkable flora that is rich in endemic (unique) species of plants and associated animals.

The Hawaiian Islands have experienced more species extinctions and endangments than anywhere else in the country. For example, nearly 75 percent of the nation’s historically documented plant and bird extinctions are from Hawai‘i. Literally dozens of Hawaiian plants are currently being added to the list of threatened and endangered species. On a larger scale, 90 percent of the dry forest and half of the rain forest originally covering the islands have been destroyed.

With such an “extinction crisis” occurring in Hawai‘i today, scientists are looking beyond protecting individual species and are focusing on habitat and on native communities. Native communities are “multi-faceted examples of species evolution, representing webs of interrelationships between plants and animals that evolved in relative isolation over millions of years.” Wood Aff., ¶ 11, Attachment “11” hereto.

Native coastal communities in Kaua‘i are particularly rare and valuable because there are so few remaining examples of these communities left on the islands. The coastal zone, by definition, encompasses a relatively narrow belt around each of
As a consequence, any native coastal vegetation and communities remaining today are extremely important with regard to maintaining biological diversity, and preventing and avoiding species extinctions.

The vegetation at Mokoli Dunes and Polihale State Park represents a rare native coastal dune system, few of which remain in any of the Hawaiian Islands. The Mokoli-Polihale dune complex is a refuge for candidate and endangered species of plants and native communities, some of which are found nowhere else in the world.

The only known example of the *Chamaesyce caestroides* complex is found at Polihale State Park. The community occurs at the northern end of the GHA and is at significant risk from the STARS launches because of potential fires, human disturbance, and introduced species of plants, which are aggressive and compete with native species. See Wood Aff.

Ken Wood, one of Hawai'i's premier field botanists, who specializes in rare and endangered plants, notes that, as a unit, the *Chamaesyce caestroides* complex is rarer than its native plant and animal components individually. Wood Aff., ¶ 10.

In addition, the only currently known population in the world of *Panicum vilhamae* is located within the GHA. This candidate endangered species was previously thought to be extinct. Wood, ¶ 14. This extremely rare native grass is classified by the U.S. Fish and Wildlife Service as a species of concern and was only recently discovered at Polihale State Park in a botanical survey in 1992. Prior to this recent and significant discovery, *P. vilhamae* was known only from the island of Kaua'i. Id.

On December 14, 1992, biologist Wood personally surveyed Polihale State Park and noted only 14 individuals of *P. vilhamae*. Id., ¶ 16. Loss or even one individual of this extremely rare and endangered species would be significant. The entire population could be wiped out by an Army jeep searching the dunes for civilians. The EIS must explore such risks to species and communities posed by the proposed launch.

The endangered `ohai (*Sebastes tennentii*) is also found in Polihale State Park and vicinity. Id., ¶ 12. This plant is a
except through reference to the STARS EIS. The latter does not address impacts to P. nilhaunae, to the Chamaecrista columnae community, nor to the endangered plants to north of the ULA.

In addition, the DEIS states that "potential impacts on biological resources due to Vandal launches are similar to those evaluated in the STARS EIS... Based on that analysis, no significant impacts will occur." DEIS at 4-6. This ignores both the much greater frequency and total number of Vandal launches, and the differences in exhaust composition between the STARS and Vandal missiles. The lead emissions associated with the Vandal are of particular concern. The final EIS must fully analyze the impacts of both launches on the flora at Polihale.

\section{X. CULTURAL RESOURCES}

The STARS and Vandal launches will take place in an area with extensive and significant cultural resources, yet the STARS EIS and the Easement DEIS fail to recognize the importance of these areas and the potentially devastating impacts of a launch failure.

The Mokihana Dunes have been determined culturally significant and potentially eligible for inclusion in the National Register of Historic Places. The Army acknowledged in its Draft EIS that archaeological surveys by Bennett, published in 1991, record the presence of burials and cairns extending between Dillingham Sand and into Polihale State Park, with numerous artifacts present in the sand. Army EIS, at 7-18.

The Army's EIS states: "Key U.S. Navy facilities planning staff at Pearl Harbor and PMRF have indicated that there could be considerable potential for the inadvertent disturbance of burials and archaeological materials during ground-disturbing operations at PMRF... Archaeologists and sources within the Hawaiian community have given similar indications." Id., at 3-34 (emphasis added). Because the dune complex extends into Polihale State Park, these concerns also apply to ground-disturbing operations within the southern portion of the Park.

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The Army's EIS further states: "Current information indicates that burials within the PMRF can occur virtually anywhere within the installation. Hawaiian oral tradition and traditional burial patterns also indicate that the dunes and adjoining sandy areas can be considered to be an area of high sensitivity with the potential for containing human remains." Id. (emphasis added).

The presence of at least one burial at the Park has been documented by State archaeologists, and preliminary surveys carried out by archaeologists from the Division of State Parks have confirmed the location of a number of the sites that Bennett identified and the presence of cultural materials in the Dunes within the Park.

In short, both the U.S. Army and the State's Historic Preservation Division believe the dunes to be a significant historic site and the potential for disturbance of the dunes and surrounding areas is substantial. The potential for disturbance is exacerbated by fires, firefighting activities, and the potential for relocating soil contaminated by hazardous materials. There is no question that using these lands as a ground hazard area may have significant effects on these precious cultural resources.

The Easement DEIS states that "adverse effects on the traditional and customary rights and practices of native groups" will be addressed through consultation with the State Historic Preservation Officer, Office of Hawaiian Affairs, and the Hui Kalani i Na Kapuna "O Hawai'i Mei, and that required mitigation would be determined through the same process. The DEIS states "As a result, no significant impacts would occur within the ground hazard area." Easement DEIS at 48.

Although the consultative process described in the DEIS is important, it in no way ensures that no significant impacts will occur. Fires, hazardous wastes and burning debris can completely destroy cultural resources, and no amount of after-the-fact consultation or mitigation can alter that fact. The missile launch area may also destroy less tangible aspects of Polihale which are nonetheless very important to Native Hawaiians, including the sacred spirit of the dunes.

Moreover, the DEIS does not address the potential loss of revenues to Native Hawaiians from the land use restrictions placed for the 9-year period on the 2,000 acres of ceded lands in the GIA.

The ground hazard area includes over 1,000 acres of ceded lands held in trust by the State of Hawai'i and currently under
Inadequate Treatment of Alternatives

The alternatives analyzed by the Army in the DEIS are insufficient. Other than the standard "no action" alternative, the Army chose an alternative called "Revised Memorandum of Agreement." There are several flaws with this alternatives analysis.

First, the Army assumes that the MOA would have "no provision for compensation." DEIS, at 2-5. This is odd as the MOA does recite that it was given with consideration. Only after Sierra Club's lawsuit was filed did it come to light that no consideration was provided to the State for the Army's one-year of use of State lands. The fact that there was no compensation is not an inherent feature of the MOA. Rather, it appears as though the Army chose to compare the proposed Easement to a no-compensation MOA simply to make the proposed action appear favorable.

Second, the alternatives that should have been considered, as mentioned in our comments on the Preparation Notices, include: (a) reduced number of launches; (b) alternative launch sites; and (c) reduced term of easement. By failing to consider these alternatives, the Army is taking a "take it or leave it" attitude, giving the state no flexibility in its decision making process. These are many reasonable alternatives. (In particular, as discussed in the next Section, launches from Vandenberg instead of PWD should be analyzed.)

Third, these alternatives are even more reasonable when viewed in terms of the significant questions being raised about the validity and effectiveness of the STAR WARS Program and the budget cuts likely to occur in the STARS program in the future.

The entire "STAR WARS" program is one gaining only increasing disfavor in Washington, D.C. See Attachments "14" and "15" hereto.

NEPA regulations require the draft EIS to contain "any known alternatives for the action." H.A.R. § 11-200-17(f). Alternatives that "could feasibly attain the objectives of the action -- even though more costly -- shall be described and explained as to why there were rejected." Id.

NEPA further requests:

A rigorous exploration and objective evaluation of the environmental impacts of all reasonable alternative actions, particularly those that might enhance environmental quality or avoid or reduce some or all of the adverse environmental benefits, costs, and risks shall be included in the agency review process in order not to prematurely foreclose options which might enhance environmental quality or have less detrimental effects. Id.

Specifically, DEISs should consider alternatives even if they require "actions of a significantly different nature which would provide similar benefits with different environmental impacts." "[T]he analysis shall be sufficiently detailed to allow the comparative evaluation of the environmental benefits, costs, and risks of the proposed action and each reasonable alternative." H.A.R. § 11-200-17(f).

Unfortunately, the DEIS analysis of alternatives falls all of these criteria.

The DEIS fails to discuss the use of public funds for the proposed action and reasonable alternatives.

NEPA requires that EISs discuss the use of public funds for the proposed action. H.A.R. § 11-300-17(e)(4). Here, the Army's DEIS should have addressed: (1) the amount of compensation to be provided to the State under the easement; and (2) the use of U.S. taxpayer's funds for the STARs and Vandals launch programs.

The latter issue is of particular import because the U.S. General Accounting Office will be releasing a report within the next few days that addresses this very issue. Attachment "12"
Ms. Linda McCrerey  
September 22, 1993  
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Here is an article on the GAO report, reporting that  
"Congressional investigators have concluded the Pentagon could  
save millions of dollars by launching a series of 'Star Wars'  
tests from California rather than from the Pacific Missile Test  
Range on Kauai.'" Moreover, Congresswoman Patsey Mink has made it  
clear that the G.A.O. report will be important to how Congress  
views this entire issue.

The EIS must discuss these issues directly and in detail.

CONCLUSION

In conclusion, the Draft EIS does not comply with NEPA.  
Setting aside the prefatory sections and the appendices, the Army  
devotes only 20 pages to "Environmental Consequences," and many  
of this is cursory, with cross references ad nauseum. D.J.M.R.  
deserves, and should require, more from the applicant. We  
request that the Final EIS address the twelve major issues  
outlined above.

In addition:

1. We request that D.J.M.R accept supplemental public comment  
on the issues covered by the interim report by the General  
Accounting Office. As that report is not yet released, the  
information contained therein cannot be discussed in comments at  
this time. However, based upon what we know of the scope of the  
report, it is likely to be highly germane to the State's  
consideration of this projects and its environmental impacts.  
Thus, we ask that D.J.M.R extend the comment period through October  
15, 1993, and notify all commenters and the public of this  
extension for this purpose.

2. We also request specific information regarding the  
procedures by which the Army's request for an easement will be  
considered by the Department and/or Board of the Land and Natural  
Resources. Will the easement be considered at a public meeting.  
If so, when? Will there be opportunity for public testimony on  
the proposed action?

Ms. Linda McCrerey  
September 22, 1993  
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We look forward to receiving a copy of the final EIS.

Very truly yours,

[Signature]

Attachments "1" - "12"

cc: Linda Mink  
U.S. Army Space and Strategic Defense Command  
Post Office Box 1508  
Huntsville, Alabama 35807-3801
LIST OF ATTACHMENTS

1. Affidavit of Dr. David C. Wright (Dec. 1992)
2. Affidavit of Dr. David C. Wright (Jan. 1993)
3. News clippings on Vandenberg Minuteman I Explosion
4. Missile Debris Recovered from Polihale State Park (will be hand-delivered to DLBR; reproduction not possible)
5. Affidavit of Miguel Dionisio Godinez
6. Affidavit of Susanne Marinelli
7. Affidavit of Dr. Raymond L. Chuan
8. Affidavit of Charles E. Jetty
10. Affidavit of Dr. Michael D. Jones (Jan. 1992)
11. Affidavit of Kenneth R. Wood
12. Affidavit of William H. Sager
IN THE CIRCUIT COURT OF THE FIRST CIRCUIT  
STATE OF HAWAII  

SIERRA CLUB, a California non-  
profit corporation; 1000 FRIENDS  
of KAUAI, a Hawaii non-profit  
corporation,  

Plaintiffs,  

vs.  

WILLIAM W. PATY, JR., in his  
capacity as Director of the  
Department of Land and Natural  
Resources and Chair of the  
Board of Land and Natural  
Resources; BOARD OF LAND AND  
NATURAL RESOURCES, STATE OF  
HAWAI; DEPARTMENT OF LAND AND  
NATURAL RESOURCES, STATE OF  
HAWAI;  

Defendants.  

AFFIDAVIT OF Dr. DAVID C. WRIGHT  

STATE OF CALIFORNIA  
COUNTY OF SAN DIEGO  

Dr. DAVID C. WRIGHT, having been first duly sworn,  
deposes on oath and says that:  

1. He makes this Affidavit in support of Plaintiffs'  
Notion For Summary Judgment And/Or for A Preliminary Or Permanent  
Injunction.  

2. Affiant holds a Ph.D. and an M.S. in Physics from  
Cornell University, and an M.S. in Physics from the University of  
Wisconsin.  

3. Affiant is a Senior Staff Scientist with Union of  
Concerned Scientists in Cambridge, Massachusetts and a Visiting  
Scholar in the Program for Defense and Arms Control Studies at  
the Massachusetts Institute of Technology. Affiant is the author  
and co-author of numerous papers in the fields of physics and  
international security, and has given numerous addresses on  
issues relating to defense, arms control and the Strategic  
Defense Initiative. A copy of Affiant's curriculum vitae is  
attached hereto as Exhibit "A" and incorporated herein by  
reference.  

4. Affiant is familiar with the Strategic Target  
System ("STARS") program, and has reviewed the final  
Environmental Impact Statement ("EIS") prepared by the Army for  
that program. Affiant has, at the request of the Sierra Club  
Legal Defense Fund ("SCLDF"), also reviewed the Sandia National  
Laboratories document "Strategic Target System (STARS) Predicted  
Mission Reliability for Flight Test Unit - 2 (FTU-1)." This  
document was written by K. C. Abbott and R. W. Plovman and  
referred to hereinafter as the "Abbott/Plovman analysis" or  
"paper," and attached hereto as Exhibit "B."  

5. The Abbott/Plovman paper is contained within the  
EIS Administrative Record at Tab 69, and is understood to form  
the basis for the reliability figure of 97% for the STARS missile  
stated in the EIS, and relied upon by the State in its  
Environmental Assessment for the proposed Memorandum of  
Agreement.  

6. A true and complete copy of Affiant's analysis of  

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the Abbott/Plowman paper is attached hereto as Exhibit "C" and incorporated herein by reference. A summary of Affiant's findings are contained herein.

7. It is Affiant's expert opinion that the Abbott/Plowman analysis does not support a reliability figure of 97% for the STARS Vehicle as stated in the EIS. Furthermore, Affiant finds that the Abbott/Plowman analysis should not be used as the basis for policy decisions concerning the STARS missile, and that a realistic estimate should be prepared for the reliability of the system. Affiant notes that the implications of the assumed level of reliability are particularly important when making policy judgments, and finds that a reliability of 52%, as he has calculated for the Minuteman I ("MMI") and which he believes may be a more accurate assessment for the STARS boosters, produces a greater than 50% chance of failure by the end of the fourth launch.

8. Affiant notes that the reliability value for a relatively young tested missile may be between 90% and 95%, but notes that the STARS missile has never flown before and key components are over 25 years old. As a result he concludes that the actual reliability of the STARS missile is likely to be lower, but is at present unknown. Affiant finds it impossible to accurately assess the reliability of the STARS missile in the absence of flight testing, and recommends comparison with similar, operational missiles such as the MMI missiles.

9. Affiant examined the success and failure rate of the MMI, which are of a similar age as the Polaris boosters used as major components of the STARS missile, and that have been similarly refurbished and employed as test launchers. His analysis of the twelve launch attempts of the MMI made between January 1, 1985 and December 1, 1992 reveals a reliability figure between 75% and 82%.

10. Affiant finds that the Abbott/Plowman analysis has important limitations and as a result should not be used as the basis for policy decisions. The Abbott/Plowman report states that the reliability of several key systems of the STARS vehicle is classified, and the reliability prediction is done assuming 100% reliability for these components. These systems include the first and second stage rocket motors, which are expected to be a major reliability concern for the STARS missiles. Other important components, which an earlier study had identified as the source of reliability concerns, are also excluded from the calculation or assumed to have a 100% reliability.

11. The Abbott/Plowman analysis examines the reliability of electrical subsystems in much greater detail than some of the key mechanical subsystems. This is of particular concern because many of the key mechanical sub-systems are over 25 years old. The analysis relies on engineering judgments for failure rates of the components and is not based on flight or laboratory testing of the STARS system. He notes that as result the applicability of the Abbott/Plowman analysis to STARS cannot be known.
12. Affiant has augmented the Abbott/Plowman analysis by including a realistic estimate for the reliability of the first- and second-stage Polaris rockets, which were assumed to be 100% in the analysis. This estimate is based on actual flights of the Polaris missile, and when incorporated in the Abbott/Plowman analysis, gives a reliability figure for the complete SARS missile of 92.4%. Affiant notes that due to other limitations in the analysis this figure is still expected to overestimate reliability. He also notes that figures in this range are not expected for a missile that has not undergone an adequate number of test flights.

Further affiant sayeth naught.

[Signature]

David C. Wright

Subscribed and sworn before me
This 21st day of December 1993

[Signature]
Notary Public, State of California

My commission expires: March 30, 1995

David C. Wright

Uns of Concerned Scientists
25 Church Street
Cambridge, MA 02238
617-347-3133

Education
Cornell University (8/78-8/83)
M.S. (Physics) 1981
Ph.D. (Physics) 1983

University of Wisconsin-Madison (9/74-5/76, 9/77-8/78)
B.A. with honors 1976
M.S. (Physics) 1978

Miami University, Oxford, OH (8/72-8/74)

Current Position
Senior Staff Scientist, Union of Concerned Scientists (1992- ), and Visiting Scholar, Program for Defense and Arms Control Studies, MIT (1992- ).

Previous Positions
Senior Research Analyst, Federation of American Scientists (9/90-12/91).

SSRC-MacArthur Fellow, Center for Science and International Affairs, Kennedy School of Government, Harvard University, and Adjunct Fellow, Center for International Studies, Massachusetts Institute of Technology (1989-8/90).

Research Fellow, Physics Department, Cornell University (8/77-8/82)
Research Fellow, Physics Department, Univ. of Pennsylvania (8/85-8/87)
Research Fellow, Physics Department, Ohio State University (8/88-8/89)

Awards
Wisconsin Alumni Research Foundation (WARF) Fellowship (1977)
Phi Beta Kappa (1976)
Alumni Scholarship (1974)
Joseph P. Corder Physics Award (1973)
Alumni Scholarship (1972)

EXHIBIT A
Physics Publications


International Security Publications


Unpublished Reports


Selected Talks on Security Issues


"Earth Penetrating Warheads," HarvardMGU Technical Working Group, Center for Science and International Affairs, Harvard University, 12/09.

"Comprehensive Test Ban TBLMs and a Ban on Flight Testing" (with L. Grenouil), Center for Energy and Environmental Studies, Princeton University, 12/09.


"Nuclear Test Ban: The United States' Position," Conference for Arts and Sciences, Amherst College, Amherst, Massachusetts, May 6, 1990.


Briefing to Congress on SDI with Richard Garwin, Matthew Bunn, and Peter Claren, 1310A Longworth House Office Building, 3/10/91.

"Depleted-Tritium SLEMs: A Technical Assessment and Arms Control Possibilities," Department of Engineering and Public Policy, Carnegie Mellon University, 5/2/91.

"OPALS: A Technical Assessment of the New SDI Proposals," Third International Summer School on Science and World Affairs, Moscow, 7/12/01.

Briefing to Congress on SDI with Kevin Knoblock, 1310A Longworth House Office Building, 5/3/92.

"The Development of Ballistic Missiles in Asia," Fourth International Summer School on Science and World Affairs, Fudan University, Shanghai, PRC, 7/22/92.

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Strategic Target System (STARS) Predicted Mission Reliability for Flight Test Unit - 1 (FTU-1)

Mr. Abbott and Mr. Plovan, 7/22

Dear Mr. Abbott and Mr. Plovan,

Per your verbal request of July 3, 1990, we have developed a STARS FTU-1 mission reliability prediction. Per your letter request of August 27, 1990, we are providing, under separate cover, a general discussion of typical failures which may occur and the expected impact on missile behavior.

The mission reliability prediction for STARS FTU-1 in this report is unclassified, since the reliability values for Polaris stages 1 and 2, and Polaris Kappa subunits are not included. Also, reliability data for a portion of the Polaris threat vector control (TVC) subsystem has not been included in this prediction, due to non-availability of data from Lockheed Missiles and Space Company and the U.S. Navy Strategic Systems Program Office (SP-271). Thus the reliability prediction must be seen as a best case prediction, assuming the reliability of the excluded components is 1.0. The classified annex contains the classified mission reliability prediction.

**Summarized Results**

Reliability values are provided below for each stage of operation, based on the operating time for the components in each stage. Mission reliability is typically derived from major assembly failure rates and mission duration, using the exponential distribution. However, for one-shot devices, failure probabilities are translated into mission reliability values. These numbers do not include the reliability impact of the first stage/second stage boosters and components of the TVC system.

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EXHIBIT A
MISCELLANEOUS:
First Stage (FS) Mission Reliability .......... 0.9968
Second Stage (SS) Mission Reliability .... 0.9960
Third Stage (TS) Mission Reliability ....... 0.9977
Stare Mission Reliability .................. 0.9766

SYSTEM DESCRIPTION
Overview. STARS is a three-stage solid propellant guided missile, which utilizes new components developed for STARS and selected components from the retired Polaris A3 fleet ballistic missile. STARS augments Minuteman I systems that are being used for developmental tests of the SS system. It will be launched from the Kaui Test Facility, carrying a 600-pound payload. The impact point will be in the broad ocean area near the Kauai island.

First Stage (FS) Composition. The STARS FS uses a solid rocket motor of Polaris A3 vintage. A glass blanket wrap modification has been necessary to alleviate aging problems associated with nitroplasticizer migration and its deteriorating effect on motor case insulation. The wrap is approximately 24 inches in width and is located about 43 inches above the base of the motor. The modification was performed by Arrowjet Strategic Propulsion Company and has been demonstrated by one successful static test firing. The remainder of the FS contains the hydraulic thrust Vector Control (TVC) Assembly, consisting of a hydraulics power distribution package, a hydraulic system battery, and four hydraulic actuator packages: the MAV7 FS Destruct Arming and Firing (AFF) system, including dual channel C1444 detonators and flexible linear shaped charge (FLSC); FS ignition dual detonators, manufactured by Special Devices, Inc.; and the FS/Second Stage dual separation detonators, also the C1444, other mechanical components, such as fasteners, bolts, and conduits are contained in the FS aeroballistic shell.

Second Stage (SS) Composition. The SS motor is also of Polaris A3 vintage. It, too, exhibited aging problems that resulted in modifications to the FS. Early in the service life of the A3 motor, potting material liquefication in the forward dome of the motor became a problem. A potting containment device was developed to ensure that the hazardous potting material exudate, containing nitroglycerin, did not contaminate the propellant grain. However, with time, the potting liquefication problem led to motor forward dome burnthrough failure, necessitating a repeating procedure. Since the institution of the repeating procedure by Hercules, Inc., six motors have been repeated and two successfully static fired with no evidence of motor dome or case insulation erosion. All STARS SS motors will be repeated. Other components of the STARS SS are the liquid injection TVC, consisting of four injection valves, a manifold, a freon tank, a gas-generator and igniter, a hot gas relief valve, and a freon flowmeter; missile vibration sensors, the MA172 Destruct AFF, with dual C1444 detonators and FLSC; SS dual igniters; dual SS/Third Stage separation detonators; and dual SS retro motors with igniters.

Third Stage (TS) Composition. The TS motor is the ORBUS I solid rocket motor, developed by United Technologies Chemical Systems. The motor is thrust vectored by an electromechanical TVC system, with two independent channels for pitch and yaw correction. The TVC system includes two electric motors, gearing and linkages, and an electronics housing that contains circuitry for pitch and yaw activation. The TVC system receives its power from a thermal battery that is equal to the. Other major components of the TS are the Attitude Control System (ACS), including a gas manifold, four valve blocks located at intervals around the exterior of the TS, and a gas servo valve that regulates gas flow to the valve blocks; a TS destruct system with dual C1444 detonators and FLSC; nose fairing release detonators (C1444a); payload release mechanism, including explosive bolt; and the TS dodecahedron structure which contains the entire missile electronics, including telemetry, guidance, control, and navigation. Major assemblies within the dodecahedron structure are the SMARTAC V computer, the Inertial Measurement Unit (IMU), dual PCM Encoders, dual B-Band transmitters, C-Band radar transponder, the MA172 Telemetry Junction Box, the MA172 Fiber-Optic Transmitter, the MA171 and MA171 Destruct packages, the Command Receiver/Control Decoder, the MA180 Electronic Power Distribution Package, the MA166 AAF Assembly, the MA173 AAF sequence, the rate gyro, the MA173 Junction Box, the MA172 System Junction Box, the MA174 ACS Electronics Box, and the MA173 TVC Servo Amplifier.
Overview of STARR System Operation. (Refer to Figure 1) To better understand the STARR system operation, some of the major functions of STARR are covered below:

- **BANDAC** V and the AIF Sequencer algorithms handle most of the mission's critical timing events.
- The IMU generates thrust g-force data and guidance feedback, used by BANDAC for stage separation and next stage motor ignition.
- The TVC for first, second, and third stages is controlled by BANDAC software algorithms, with g-force and roll data feedback from the IMU.
- Flight telemetry to the ground is accomplished by the telemetry junction to PCM to 8-band transmitter path.
- Ground-to-missile communications is handled by a tone signal receiver/decoder circuit and is used only for the destruct signal and the third stage ignition enable.
- The electronics power distribution assembly (EPA) and electronics battery provide power to all third stage electronics.

Before the mission begins, the first stage hydraulics battery is initiated through the aft umbilical. The mission begins with the motor ignition signal being sent through the aft umbilical (times 0 seconds). Figure 1 shows the block diagram for the STARR system. After the first stage ignition signal is received, the BANDAC V timer and guidance algorithms start operating. The first ignition fiducial and launch instant signals are set at the X-Axis acceleration is greater than 30 g. BANDAC V controls the lift-off roll using its internal algorithms and the time from lift-off (times 1.14 - 1.18 seconds). After ignition, BANDAC V controls the first stage pitch using control signals to the 8-band servos or feedback from the IMU. BANDAC V uses the data after lift-off and software algorithms to derive the correct control signals. BANDAC V begins pitch control based on time from lift-off and information about the trajectory from the IMU (times 2.24 seconds).

If the IMU indicates a 78 motor thrust greater than 0.55g between 65 and 35 seconds from lift-off, the AIF Sequencer will enable the 78 motor for ignition. The AIF Sequencer will fire through the AIF system, which then amplifies these control signals to drive the detonators. The AIF Sequencer next initiates the hot gas generator after the IMU detects that thrust is below 0.55g (times 59 seconds). The AIF Sequencer causes 78/85 separation and 85 motor ignition when the IMU indicates the thrust is below 1.30g. BANDAC V, using the IMU, software algorithms, 78/85 servos, and the TVC injector valves, guides the missile during the second stage. The BANDAC V and AIF Sequencer monitor the 85 thrust between 103 and 113 seconds from lift-off. The IMU does not observe thrust above 4g for at least two seconds during this time period. BANDAC V and the AIF Sequencer will terminate the mission. The AIF Sequencer continues to monitor thrust through the IMU after 118 seconds from lift-off. When the thrust is less than 0.5g, the 78 motors are ignited and 10-20 milliseconds later, the AIF Sequencer initiates 85/85 separation. BANDAC V turns on the payload expander one second after the AIF Sequencer indicates 85/85 separation. At approximately 140 seconds after lift-off, the BANDAC V, ACS, and IMU are used for attitude maneuvers by controlling the ACS gas valves. The nose fairing is ejected at 160 seconds after lift-off by control signals from the BANDAC V and the AIF Sequencer through the Mild Detonating Fuse (MDF) material. During this time, ACS and BANDAC V control the attitude maneuvers by using feedback data from the IMU. Also during this time, USAFA will determine mission abort criteria by evaluating the PCM data being sent to the ground station through the telemetry junction. If the mission is to continue, USAFA will send the enable tone signal through the receiver/decoder circuit to the AIF Sequencer, if the US motor enable signal is present when the AIF Sequencer is ready to initiate the US TVA battery, a signal to start is sent through the ACS system to initiate the battery (times 593.88). The payload expander is turned off by BANDAC V before third stage ignition.

The AIF Sequencer sends the US motor ignition signal if the US TVA battery voltage is nominal and the US motor enable signal from ground is still present. The BANDAC V then controls US guidance through the US TVA system, with trajectory feedback from the TVC unit. BANDAC V uses the data after lift-off and software algorithms to derive the correct control signals. BANDAC V begins pitch control based on time from lift-off and IMU data. BANDAC V and ACS control the second ACS maneuver before the payload is released. Ground control receives the flight telemetry for these maneuvers through the PCM and 8-band transmitters. Shortly after the second ACS maneuver, the BANDAC V and AIF Sequencer fire the four explosive bolts to release the payload (times 708.38). The third ACS maneuver moves the US out of the payload's path. Finally, the AIF Sequencer fires the US retur to back the US away from the payload.
MISSION RELIABILITY DEFINITION

Mission Reliability for STARS is defined as the probability that the STARS Flight Test Unit-1 (FTU-1) system will perform its intended mission within the missile system design environment, given all subsystems are functional prior to launch. For purposes of these reliability calculations, the STARS mission begins with first-stage ignition signal transmission to the vehicle and ends with reentry vehicle ejection from the third-stage. The STARS FTU-1 Mission Guidelines, Navigation, and Control (GNC) Timeline, dated July 24, 1990, provides operational times for the missile and its stages.

The mission includes successful (1) first-stage ignition, (2) second-stage ignition, (3) third-stage ignition, (4) TVC operation, (5) separation, (6) ignition of retro-fire motors, (7) third-stage Altitude Control System (ACS) operation, (8) ascent shroud jettison, (9) third-stage ignition, (10) TVC operation, and (11) ignition of retro-fire motor. The mission reliability calculation does not include pre-launch monitoring equipment or primary source of external power.

The following STARS components or subsystems do not contribute to mission reliability, unless noted in the following paragraphs:

- Radar Transponder (located on third stage),
- Shock and Vibration Sensors (all stages),
- Flight Termination System (all stages),
- Ground-Based Telemetry Subsystem.

The following STARS components contribute to STARS prelaunch unreliability, in that an unvented functioning of these components could cause a mission failure:

- Premature operation of Flight Termination System,
- Premature operation of first and second stage separation apparatus, in absence of normal initiation,
- Premature ignition of second and third stage retro-rockets, in absence of normal initiation,
- Premature ignition of first, 2nd, and 3rd stage igniters or propellant, in absence of confirmation by environmental sensing device(s), and transmission of electrical power to the appropriate igniter initiator.

Missions short, while the missile is still on the launch pad, has not been considered in the mission reliability model. For example, failure of the electronics or hydraulics batteries to charge immediately before launch is not considered a mission failure, rather a mission abort failure.

Data Sources: Four general categories of data sources were used in this study.

- For most of the TS electronic subassemblies, piece part data was available from drawings. Thus MIL-STD-217E, "parts count" technique was used to build the subassembly failure rates. The technique assumes a "mood launch" environment and uses part quality factors based on part selection, as identified on the drawings.
- Vendor-supplied data was used for several TS electronics subassemblies, such as the IMU. Vendor data was also used for Initiator failure rates, and battery failure rates.
- Data provided by STARS contractors at Design Review meetings was also used to generate estimates of subassembly failure rates.
- The Polaris A3 Data Book, dated October 21, 1965, was used to generate information on F8/88 assemblies for which failure rate data was required. In the classified annex to this report, the Polaris A3 Data Book was used as an estimation source for F8/88 motor reliabilities and F8/88 TVC failure rates.

PROOFS: In developing the reliability prediction, the following steps were taken:

- A data search was undertaken in the Sandia National Laboratories Technical Library to determine what Polaris A3 reliability data might be available. This search pinpointed the Polaris A3 Data Book as a source of prediction information.
- Schematics, drawings, and block diagrams were sought from Division 7525 which gave parts data and functional relationships.
- Reliability modeling was based on the STARS system interaction, as shown in the schematics.
The reliability mathematical equations were based on the reliability model. Parts data and subassembly data were "plugged into" the model to generate a system failure rate.

Based on mission operating times for the various STARS assemblies, a weighted failure rate value was generated for each assembly. The weighted failure rates for each assembly were then added together serially to obtain the STARS mission reliability.

ASSUMPTIONS AND LIMITATIONS OF THE STUDY

Assumptions

- It is assumed that all STARS circuits are functioning properly prior to launch, as verified by pre-launch check-out.
- Data sources used, though in some cases dated, are assumed applicable to the STARS hardware.
- Most electronics failure rates were obtained from MIL-HDBK-217F, "Reliability Prediction of Electronic Equipment." The handbook assumes a constant failure rate model for part failure rates. It is assumed that failure rates from vendor data are also based on constant failure rates. Thus, infant mortality and wearout failure mechanisms are not reflected in these data.
- The design is assumed qualified to meet mission requirements and capable of functioning properly in all normal mission environments.
- One-channel failure mechanisms are assumed to be independent.

Limitations

- This study is a prediction, not an assessment.
- The prediction is not based on flight or laboratory testing of the STARS system.
- The STARS mission times are derived from the PTU-1 timeline provided by Division 9113.
TABLE 1

STARS MISSION RELIABILITY

STARS mission reliability consists of reliability predictions for each of the three stages. Since the STARS model for the three stages is a series model, mission reliability is simply the product of the stage reliability values. Figure 2 shows the block diagram used for computation of STARS mission reliability.

First Stage (F1) Reliability Prediction = 0.9988
Second Stage (S2) Reliability Prediction = 0.9960
Third Stage (S3) Reliability Prediction = 0.9937

TABLE 2

Failure rates or failure probabilities are listed below for STARS components. Failure rates are in units of failures per million hours. For single-shot (S/S) devices, a failure probability is given. Failure rates were obtained from calculations in Table 3, using MIL-STD-217E. Other failure rates/probabilities were obtained from vendor data.

<table>
<thead>
<tr>
<th>Component/System Name</th>
<th>Failure Rate</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>BANDAC V BATTERY</td>
<td>10,000,000</td>
<td>J1</td>
</tr>
<tr>
<td>ELECTRONICS DISTRIBUTION (NA180)</td>
<td>1,000,000</td>
<td>J3</td>
</tr>
<tr>
<td>RACK GYRO</td>
<td>1,000,000</td>
<td>J3</td>
</tr>
<tr>
<td>RADAR TRANSPONDER (C BAND)</td>
<td>1,000,000</td>
<td>J5</td>
</tr>
<tr>
<td>FLOWMETER</td>
<td>600,000</td>
<td>J5</td>
</tr>
<tr>
<td>BANDAC V</td>
<td>1,133,869</td>
<td>J7</td>
</tr>
<tr>
<td>RECEIVER/DECODER</td>
<td>1,000,000</td>
<td>J8</td>
</tr>
<tr>
<td>A &amp; F RACK (NA170)</td>
<td>630</td>
<td>J9</td>
</tr>
<tr>
<td>A &amp; F SYSTEM (NA174)</td>
<td>325</td>
<td>J10</td>
</tr>
<tr>
<td>SYSTEM JUNCTION (NA173)</td>
<td>233,825</td>
<td>J11</td>
</tr>
<tr>
<td>S4 MOTOR PRESSURE SENSOR</td>
<td>100,000</td>
<td>J13</td>
</tr>
<tr>
<td>S4 TVC</td>
<td>5,100,000</td>
<td>J13</td>
</tr>
<tr>
<td>S4/5 SERVO AMPL. (NA173)</td>
<td>640,000</td>
<td>J15</td>
</tr>
<tr>
<td>S4 SERVO POWER (NA174)</td>
<td>100,000</td>
<td>J15</td>
</tr>
<tr>
<td>FIBER OPTIC EXTR (NA175)</td>
<td>350,000</td>
<td>J16</td>
</tr>
<tr>
<td>SIGNAL CONDITIONER</td>
<td>312</td>
<td>J17</td>
</tr>
<tr>
<td>TELEMETRY JUNCTION (NA179)</td>
<td>600,346</td>
<td>J16</td>
</tr>
<tr>
<td>S3 TVC/JUNCTION</td>
<td>10,000,000</td>
<td>J19</td>
</tr>
<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J20</td>
</tr>
<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J21</td>
</tr>
<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J22</td>
</tr>
<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J23</td>
</tr>
<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J24</td>
</tr>
<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J25</td>
</tr>
<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J26</td>
</tr>
<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J27</td>
</tr>
<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J28</td>
</tr>
<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J29</td>
</tr>
<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J30</td>
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<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J31</td>
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<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J32</td>
</tr>
<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J33</td>
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<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J34</td>
</tr>
<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J35</td>
</tr>
<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J36</td>
</tr>
<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J37</td>
</tr>
<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J38</td>
</tr>
<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J39</td>
</tr>
<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J40</td>
</tr>
<tr>
<td>S3 IGNITION</td>
<td>0.001 (0/S)</td>
<td>J41</td>
</tr>
</tbody>
</table>
Reliability Concerns

There may be concern with using low voltage initiators in the STARS system, due to their susceptibility to electrostatic discharge (ESD) and lightning strikes. However, vendor supplied data indicates the initiators have been qualified to an ESD level of 30,000 Volts DC, from a 500 picofarad capacitor through a 50 Ohm resistor. These test conditions are in accordance with Ganda Specification (GS) 302-365, which requires pin-to-pin and pin-to-case measurements.

The payload plate uses one or more "rectangular cross-section" springs with square ends to jettison the payload from the third stage. Mechanical design principles suggest that springs with a rectangular cross-sectional area should only be used when space limitations exist, since these springs are highly stressed. The preferred spring is the normal circular cross-section spring.

Service Life Evaluation (SLE) data generated by Lockheed Missiles and Space Company in the late 1970s indicated several problem areas with Polaris A3 components.

- The Feb 1978 SLE Report indicated that several AS TVC Gas Generators exhibited possible separation at the propellant-to-insulation bond line in the head cap area, during PV78 inspection of 32 missiles.

- During this same period, an "Alarm Condition" existed on the SS Hot Gas Relief Valve. LMGC also recommended additional testing of the fluid injector valves for the SS.

- Finally, in a Dec 1978 SLE Report, a SS rocket motor failed during testing, exhibiting leaks in three areas around the nozzle plug.

Division 7525 is aware of these reported problems and, with the assistance of LMGC and other vendors, has undertaken a rework and recertification program to ensure that the SS motor and TVC components meet STARS performance requirements.

Figure 1

**FIRST STAGE RELIABILITY DIAGRAM**

![Diagram of first stage reliability](image)

FIRST STAGE TIMES: 0 SECONDS TO 61.159 SECONDS

**FIRST-STAGE (FS) RELIABILITY PREDICTION**

The reliability equations for the FS are presented below, based on the reliability model in Figure 1.

**COMMON CONTROL COMPONENTS**

**PART 21**

Time Active: 0 seconds to 61.159 seconds

Hours Active = T = 0.01607 hours

**FAILURE RATE EQUATION (PART 21)**

GRL = 114.3264 * 6.2857 * 104 * 11.41 * 4 * 15 * 16 + 37 + 21 + 12 + 21 + 12 + 303.13 failures per million hours

**FR INITIATION**

**PART 21**

**RELIABILITY (PART 21)**

Q(1) = 0.9990

**PART 21**

**RELIABILITY (PART 21)**

Q(1) = 0.9995
PART 41
Time Active: 0 seconds to 61.109 seconds
Hours Active = t4 = 0.01607 hours

FAILURE RATE EQUATION (PART 41):
Q4 = 326(327-321)
   = 2,996 failures per million hours

FS RELIABILITY
Reliability = e^{-Q4*10^4} = Q4(T) = Q4(T) = Q4(T)
            = 0.9994 * 0.9990 = 0.9985 = 0.9999

FS RELIABILITY
Reliability = 0.9999

SECOND STAGE TIME: 61.109 SECONDS TO 140.09 SECONDS

SECOND STAGE (FS) RELIABILITY PREDICTION

The reliability calculations for the FS are shown below, based on the reliability model in Figure 4.

CONDOR CONTROL COMPONENTS
PART 41
Time Active: 61.109 seconds to 140.09 seconds
Hours Active = t4 = 0.01607 hours

FAILURE RATE EQUATION (PART 41):
Q4 = 326(327-321)
   = 32,626.50 failures per million hours

FS RELIABILITY
Q4(T) = 0.9985
RELIABILITY EQUATION (PART 3):

\[ Q_3(T) = J_34 \]
\[ = 0.9993 \]

PART 4:

Time Active: 61.109 seconds to 140.09 seconds
Hours Active = \( t_4 = 0.02194 \) hours

FAILURE RATE EQUATION (PART 4):

\[ G_4 = J_26 \cdot 0.0028 \cdot J_36 \cdot J_37 \]
\[ = 600 \text{ failures per million hours} \]

RELIABILITY EQUATION (PART 5):

\[ Q_5(T) = J_32 \]
\[ = 0.9990 \]

PART 6:

RELIABILITY

\[ \text{Reliability} = e^{-(Q_1 \cdot 0.41) \cdot (Q_2(T) \cdot Q_3(T) \cdot (Q_4(T)^2) \cdot (Q_5(T))^2)} \]
\[ = Q_1(T) \cdot Q_2(T) \cdot Q_3(T) \cdot Q_4(T) \cdot Q_5(T) \]
\[ = 0.9993 \times 0.9993 \times 0.9993 \times 0.9993 = 0.9990 \]

Reliability = 0.9990

THIRD STAGE RELIABILITY DIAGRAM

```
J1 J1 J2 J3 J4 J5 J6
J6 J3 J10 J11 J14 J15
J18 J19 J24 J25 J26 J27
J21 J22 J23 J24 J26 J27
J24 J30 J38 J39 J42 J43
J36 J37 J38 J39 J42 J43
J30 J31
```

THIRD STAGE TIME: 140.09 SECONDS TO 748.38 SECONDS

THIRD STAGE (TS) RELIABILITY PREDICTION

The reliability equations for the TS are presented below, based on the reliability model of figure 5.

CUMULATIVE CONTROL COMPONENTS

PART 4:

Time Active: 140.09 seconds to 748.38 seconds
Hours Active = \( t_4 = 0.16497 \) hours

FAILURE RATE EQUATION (PART 4):

\[ G_4 = J_10 \cdot 0.03 + 0.24 \cdot 0.27 + J_5 \cdot J_9 + J_{10} + J_{11} + 0.16 \cdot 0.17 \cdot 0.18 \cdot 0.03 + 0.03 \]
\[ = 25.130.03 \text{ failures per million hours} \]

NORMAL FAILING RELIABLE

PART 5:

RELIABILITY EQUATION (PART 5):

\[ Q_5(T) = J_{36} \]
\[ = 0.9985 \]
TOTAL: RE LIABILIT Y

= G1(T) * G2(T) * G3(T) * G4(T) * G5(T) * G6(T) * G7(T) * G8(T) 
= 0.8997 * 0.9995 * 0.9996 * 0.9990 * 0.9990 * 0.9998 * 0.9996 * 0.9998 

Re liability = 0.8287

**PART 31**

**RELIABILITY EQUATION (PART 31):**

G3(T) = 0.0415

**TIME:**

Time Active: 168.94 seconds to 748.98 seconds

Hours Active - t2 = 0.1419 hours

**FAILURE RATE EQUATION (PART 4):**

G4(T) = 330

= 20.81 failures per million hours

**PART 31**

**RELIABILITY EQUATION (PART 31):**

G3(T) = 0.0323

**PART 41**

**TIME:**

Time Active: 590.02 seconds to 638.01 seconds

Hours Active - t6 = 0.04134 hours

**FAILURE RATE EQUATION (PART 41):**

G6 = 0.01134 * 0.013

= 13,499 failures per million hours

**PART 71**

**RELIABILITY EQUATION (PART 71):**

G7 = 0.0000

**PART 31**

**TIME:**

Time Active: 587.36 seconds to 628.33 seconds

Hours Active - t6 = 0.04133 hours

**FAILURE RATE EQUATION (PART 31):**

G8 = 0.0000

= 360903 failures per million hours
### Table 3

**Failure Rate Table**

<table>
<thead>
<tr>
<th>Hydraullic Power Distribution System Failure Rate</th>
<th>(Failures per million hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Switch</strong></td>
<td>2.000.000</td>
</tr>
<tr>
<td><strong>Resist-RHR</strong></td>
<td>1.250</td>
</tr>
<tr>
<td><strong>Diode</strong></td>
<td>0.215</td>
</tr>
<tr>
<td><strong>Connector,Circuit</strong></td>
<td>1.390</td>
</tr>
<tr>
<td><strong>Connector,PCB</strong></td>
<td>0.680</td>
</tr>
</tbody>
</table>

**Total Failure Rate = 1.044.444**

---

**NYSE Sequencer Failure Rate = 5.131**

**Memory Board**

<table>
<thead>
<tr>
<th>Description</th>
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<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>Memory Board</td>
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<tr>
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<tr>
<td>Memory Board</td>
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</tr>
<tr>
<td>Memory Board</td>
<td>1.290</td>
<td>1.0</td>
</tr>
<tr>
<td>Memory Board</td>
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<td>14.0</td>
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**Memory Board Total Failure Rate = 31.943**

**CPU Board**

<table>
<thead>
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</tr>
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<tbody>
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</tr>
<tr>
<td>CPU Board</td>
<td>5.400</td>
<td>1.0</td>
</tr>
<tr>
<td>CPU Board</td>
<td>0.420</td>
<td>16.0</td>
</tr>
<tr>
<td>CPU Board</td>
<td>3.110</td>
<td>1.0</td>
</tr>
<tr>
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<td>0.215</td>
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<tr>
<td>CPU Board</td>
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<tr>
<td>CPU Board</td>
<td>0.177</td>
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</tr>
<tr>
<td>CPU Board</td>
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<td>1.0</td>
</tr>
<tr>
<td>CPU Board</td>
<td>0.660</td>
<td>1.0</td>
</tr>
<tr>
<td>CPU Board</td>
<td>1.290</td>
<td>1.0</td>
</tr>
<tr>
<td>CPU Board</td>
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<td>2.0</td>
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**CPU Board Total Failure Rate = 32.332**

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**Summary**

Failure rates for the NYSE Sequencer were derived from parts lists, schematics, and MIL-HDBK-217E. Failure rates for two hybrid components were obtained from the vendor.
<table>
<thead>
<tr>
<th>Description</th>
<th>Failure Rate</th>
<th>Total Fail Rate</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>(X 10^-6 Erat)</td>
<td>(X 10^-6 Erat)</td>
</tr>
<tr>
<td></td>
<td>Quantity</td>
<td>Total Fail Rate</td>
</tr>
<tr>
<td>DL011/843</td>
<td>0.315</td>
<td>0.430</td>
</tr>
<tr>
<td>Resist-AX</td>
<td>0.162</td>
<td>9.720</td>
</tr>
<tr>
<td>Resist-RX</td>
<td>6.000</td>
<td>6.000</td>
</tr>
<tr>
<td>Cap-CXR</td>
<td>0.420</td>
<td>2.940</td>
</tr>
<tr>
<td>8U220A</td>
<td>4.929</td>
<td>3.597</td>
</tr>
<tr>
<td>8R160/883</td>
<td>172.000</td>
<td>172.000</td>
</tr>
<tr>
<td>8R244/823</td>
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<td>1.904</td>
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**Retro Board**

<table>
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</thead>
<tbody>
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<td>(X 10^-6 Erat)</td>
<td>(X 10^-6 Erat)</td>
</tr>
<tr>
<td></td>
<td>Quantity</td>
<td>Total Fail Rate</td>
</tr>
<tr>
<td>Resistor-22</td>
<td>5.400</td>
<td>5.400</td>
</tr>
<tr>
<td>Resistor-64</td>
<td>1.850</td>
<td>11.700</td>
</tr>
<tr>
<td>Resistor-91</td>
<td>1.850</td>
<td>4.400</td>
</tr>
<tr>
<td>Resistor-82</td>
<td>0.420</td>
<td>0.420</td>
</tr>
<tr>
<td>Connector-Cir</td>
<td>1.390</td>
<td>1.390</td>
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<tr>
<td>Connector-PCH</td>
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<tr>
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**A & F Board**

<table>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td></td>
<td>Quantity</td>
<td>Total Fail Rate</td>
</tr>
<tr>
<td>Resistor-22</td>
<td>5.400</td>
<td>5.400</td>
</tr>
<tr>
<td>Resistor-64</td>
<td>1.850</td>
<td>11.700</td>
</tr>
<tr>
<td>Resistor-91</td>
<td>1.850</td>
<td>4.400</td>
</tr>
<tr>
<td>Subtotal</td>
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<td>0.00018</td>
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<td>Connector-Cir</td>
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<td>1.390</td>
</tr>
<tr>
<td>Connector-PCH</td>
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<td>0.640</td>
</tr>
<tr>
<td>A &amp; F Board Sub.</td>
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<tr>
<td>A &amp; F Board</td>
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**Decode Board**

<table>
<thead>
<tr>
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<th>Failure Rate</th>
<th>Total Fail Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(X 10^-6 Erat)</td>
<td>(X 10^-6 Erat)</td>
</tr>
<tr>
<td></td>
<td>Quantity</td>
<td>Total Fail Rate</td>
</tr>
<tr>
<td>K01S8/69/3/67</td>
<td>1.007</td>
<td>1.007</td>
</tr>
<tr>
<td>K01S8/69/3/69</td>
<td>172.000</td>
<td>172.000</td>
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<tr>
<td>K05A10/41/4/3</td>
<td>0.779</td>
<td>0.779</td>
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<tr>
<td>ULM20032</td>
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</tr>
<tr>
<td>Connector-Cir</td>
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<tr>
<td>Connector-PCH</td>
<td>0.640</td>
<td>0.640</td>
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<tr>
<td>Decode Board Failure Rate</td>
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<td>1,018.879</td>
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</table>

**ARFTEDING AND FIRING SYSTEM (ARAS)**
The Arming and Firing system provides the required charge for the detonator. Therefore, this unit is comprised of power transistors and resistors. The sequencer controls which channel is active. The Arming and Firing system is a redundant system, and channels A and B have identical parts.

**A & F System Failure Rate = 0.226**
TVC SERVO AMPLIFIER POWER (MAINT.
MIL-HDBK-217E and the parts count method were used to calculate the failure rates for the TVC servo amplifier power. This unit provides regulated voltages to the F7/8S TVC servo amplifier unit.

<table>
<thead>
<tr>
<th>Description</th>
<th>Failure Rate</th>
<th>Quantity</th>
<th>Total Fail Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1105-11-8MCO</td>
<td>2.10E-12</td>
<td>1.0</td>
<td>2.10E-12</td>
</tr>
<tr>
<td>D102A4412/8S</td>
<td>1.007</td>
<td>7.0</td>
<td>7.004</td>
</tr>
<tr>
<td>Resist-RCR</td>
<td>0.011</td>
<td>3.0</td>
<td>0.034</td>
</tr>
<tr>
<td>Connector,Cir</td>
<td>1.090</td>
<td>1.0</td>
<td>1.090</td>
</tr>
<tr>
<td>Cap.--CR</td>
<td>0.040</td>
<td>3.0</td>
<td>1.040</td>
</tr>
</tbody>
</table>

TVC SERVO AMP Power Failure Rate = 2.10E-12

ATTITUDE CONTROL SYSTEM ELECTRONICS (MAINT.
The ACS electronics contain parallel or redundant circuits to increase reliability. MIL-HDBK-217E was used to calculate the failure rates indicated below.

<table>
<thead>
<tr>
<th>Description</th>
<th>Failure Rate</th>
<th>Quantity</th>
<th>Total Fail Rate</th>
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</thead>
<tbody>
<tr>
<td>Resist-RCR</td>
<td>0.011</td>
<td>2.0</td>
<td>0.023</td>
</tr>
<tr>
<td>Cap.--CR</td>
<td>0.000</td>
<td>2.0</td>
<td>0.000</td>
</tr>
<tr>
<td>HUX3669P/8S</td>
<td>1.007</td>
<td>3.0</td>
<td>1.014</td>
</tr>
<tr>
<td>Connector,Cir</td>
<td>1.090</td>
<td>3.0</td>
<td>1.090</td>
</tr>
<tr>
<td>Redun Channel</td>
<td>-</td>
<td>1.0</td>
<td>-0.000</td>
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ACS Electronics Failure Rate = 8.25E-11

Redundant Channel AM

<table>
<thead>
<tr>
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<tr>
<td>D09766087</td>
<td>1.000</td>
<td>4.0</td>
<td>4.000</td>
</tr>
<tr>
<td>QD1006F</td>
<td>5.000</td>
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<td>5.000</td>
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<tr>
<td>C1A0506D</td>
<td>0.011</td>
<td>1.0</td>
<td>0.011</td>
</tr>
<tr>
<td>H9040A/8S</td>
<td>172.000</td>
<td>1.0</td>
<td>172.000</td>
</tr>
<tr>
<td>Resist-RCR</td>
<td>0.011</td>
<td>3.0</td>
<td>0.034</td>
</tr>
<tr>
<td>Cap.--CR</td>
<td>0.040</td>
<td>4.0</td>
<td>0.040</td>
</tr>
</tbody>
</table>
| Channel subtotal P.R. = 241.100

Redundant Channel Failure Rate = -0
The 78/68 TVC servo amplifier is used to control the guidance of the first two stages of VAX3. As the name indicates, this unit amplifies the control signals received from the EADAC V. The reliability calculation was achieved by dividing the unit into logical parts (parts 1-7) and functions as indicated below.

### Table 1: Failure Rate

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
<th>Failure Rate</th>
<th>Total Fail Rate</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Part 1</td>
<td>701.965</td>
<td>701.965</td>
</tr>
<tr>
<td>2</td>
<td>Part 2</td>
<td>76.784</td>
<td>151.557</td>
</tr>
<tr>
<td>3</td>
<td>Part 3</td>
<td>1,387.131</td>
<td>1,476.121</td>
</tr>
<tr>
<td>4</td>
<td>Part 4</td>
<td>697.406</td>
<td>697.406</td>
</tr>
<tr>
<td>5</td>
<td>Part 5</td>
<td>710.417</td>
<td>710.417</td>
</tr>
<tr>
<td>6</td>
<td>Part 6</td>
<td>1,053.359</td>
<td>1,053.359</td>
</tr>
<tr>
<td>7</td>
<td>Part 7</td>
<td>1,404.725</td>
<td>1,404.725</td>
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</tbody>
</table>

### Table 2: Failure Rate - Part 1

<table>
<thead>
<tr>
<th>Description</th>
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<tbody>
<tr>
<td>78/68 TVC Servo Amp</td>
<td>92.102</td>
<td>92.102</td>
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</table>

### Table 3: Failure Rate - Part 2

<table>
<thead>
<tr>
<th>Description</th>
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<tbody>
<tr>
<td>AD1448/883</td>
<td>0.943</td>
<td>12.000</td>
</tr>
<tr>
<td>Resist-RCH</td>
<td>0.011</td>
<td>2.000</td>
</tr>
<tr>
<td>Resist-RDH</td>
<td>0.613</td>
<td>15.600</td>
</tr>
<tr>
<td>Resist-RDG</td>
<td>1.850</td>
<td>15.440</td>
</tr>
<tr>
<td>Cap-CXX</td>
<td>0.430</td>
<td>1.800</td>
</tr>
<tr>
<td>OP-09AY/183</td>
<td>0.243</td>
<td>1.720</td>
</tr>
<tr>
<td>IN32322AMINTX</td>
<td>0.043</td>
<td>0.323</td>
</tr>
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<td>RC1010D-44-RC883</td>
<td>1.481</td>
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### Table 4: Failure Rate - Part 3

<table>
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<td>DI077AKX</td>
<td>1.940</td>
<td>1.940</td>
</tr>
<tr>
<td>IS0102</td>
<td>171.000</td>
<td>1,376.000</td>
</tr>
<tr>
<td>Resist-RCH</td>
<td>0.011</td>
<td>0.011</td>
</tr>
<tr>
<td>Cap-CXX</td>
<td>0.430</td>
<td>1.800</td>
</tr>
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### Table 5: Failure Rate - Part 4

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<tbody>
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<td>1.940</td>
</tr>
<tr>
<td>IS0102</td>
<td>171.000</td>
<td>1,376.000</td>
</tr>
<tr>
<td>Resist-RCH</td>
<td>0.011</td>
<td>0.011</td>
</tr>
<tr>
<td>Cap-CXX</td>
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<td>1.800</td>
</tr>
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### Table 6: Failure Rate - Part 5

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</tr>
</thead>
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<td>Is0103</td>
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<td>1,376.000</td>
</tr>
<tr>
<td>Resist-RCH</td>
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<td>0.011</td>
</tr>
<tr>
<td>Resist-RDG</td>
<td>0.613</td>
<td>9.600</td>
</tr>
<tr>
<td>Cap-CXX</td>
<td>0.430</td>
<td>3.000</td>
</tr>
<tr>
<td>OP-09AY/183</td>
<td>0.243</td>
<td>1.720</td>
</tr>
<tr>
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### Table 7: Failure Rate - Part 6

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</thead>
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<td>1.940</td>
</tr>
<tr>
<td>Is0103</td>
<td>171.000</td>
<td>1,376.000</td>
</tr>
<tr>
<td>Resist-RCH</td>
<td>0.011</td>
<td>0.011</td>
</tr>
<tr>
<td>Resit-RDG</td>
<td>0.613</td>
<td>9.600</td>
</tr>
<tr>
<td>Cap-CXX</td>
<td>0.430</td>
<td>3.000</td>
</tr>
<tr>
<td>OP-09AY/183</td>
<td>0.243</td>
<td>1.720</td>
</tr>
<tr>
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</tr>
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### Table 8: Failure Rate - Part 7

<table>
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</tr>
</thead>
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<td>Di077ak</td>
<td>1.940</td>
<td>1.940</td>
</tr>
<tr>
<td>Is0103</td>
<td>171.000</td>
<td>1,376.000</td>
</tr>
<tr>
<td>Resist-RCH</td>
<td>0.011</td>
<td>0.011</td>
</tr>
<tr>
<td>Resit-RDG</td>
<td>0.613</td>
<td>9.600</td>
</tr>
<tr>
<td>Cap-CXX</td>
<td>0.430</td>
<td>3.000</td>
</tr>
<tr>
<td>OP-09AY/183</td>
<td>0.243</td>
<td>1.720</td>
</tr>
<tr>
<td>Part 7 Failure Rate =</td>
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<td>1,376.000</td>
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</table>
### Switchover Board Failure Rate Table

<table>
<thead>
<tr>
<th>Description</th>
<th>Failure Rate (x 10^6 Real)</th>
<th>Total Fail Rate (x 10^6 Real)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cap.-CCR</td>
<td>0.420</td>
<td>1.0</td>
</tr>
<tr>
<td>Current</td>
<td>0.640</td>
<td>1.0</td>
</tr>
<tr>
<td>Resist.-CCR</td>
<td>0.011</td>
<td>6.0</td>
</tr>
<tr>
<td>Resist.-BIR</td>
<td>1.950</td>
<td>2.0</td>
</tr>
<tr>
<td>Resist.-BNC</td>
<td>0.163</td>
<td>2.0</td>
</tr>
<tr>
<td>LVA456A</td>
<td>0.385</td>
<td>2.0</td>
</tr>
<tr>
<td>8K5/493</td>
<td>172.000</td>
<td>1.0</td>
</tr>
<tr>
<td>1H7F-131</td>
<td>29.000</td>
<td>1.0</td>
</tr>
<tr>
<td>2N2920/2ANXT</td>
<td>0.042</td>
<td>2.0</td>
</tr>
<tr>
<td>1N3070/2ANXT</td>
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<td>1.0</td>
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</table>

Switchover Board Failure Rate = 207.442

### 10 VDC to Servo Amp Board Failure Rate Table

<table>
<thead>
<tr>
<th>Description</th>
<th>Failure Rate (x 10^6 Real)</th>
<th>Total Fail Rate (x 10^6 Real)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resist.-CCR</td>
<td>0.011</td>
<td>4.0</td>
</tr>
<tr>
<td>Cap.-CCR</td>
<td>0.420</td>
<td>1.0</td>
</tr>
<tr>
<td>895/493</td>
<td>172.000</td>
<td>1.0</td>
</tr>
<tr>
<td>CD4049B</td>
<td>0.953</td>
<td>2.0</td>
</tr>
<tr>
<td>2N2907/2ANXT</td>
<td>0.042</td>
<td>1.0</td>
</tr>
<tr>
<td>2N2920/2ANXT</td>
<td>0.042</td>
<td>1.0</td>
</tr>
<tr>
<td>CD4049B</td>
<td>0.953</td>
<td>1.0</td>
</tr>
</tbody>
</table>

30 VDC to Servo Amp Board Failure Rate = 249.348

### Flowmeter Board Failure Rate Table

<table>
<thead>
<tr>
<th>Description</th>
<th>Failure Rate (x 10^6 Real)</th>
<th>Total Fail Rate (x 10^6 Real)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resist.-CCR</td>
<td>0.011</td>
<td>12.0</td>
</tr>
<tr>
<td>Resist.-BNC</td>
<td>0.163</td>
<td>2.0</td>
</tr>
<tr>
<td>CAP.-CCR</td>
<td>0.420</td>
<td>12.0</td>
</tr>
<tr>
<td>VQ1054P</td>
<td>54.000</td>
<td>2.0</td>
</tr>
<tr>
<td>895/493</td>
<td>172.000</td>
<td>3.0</td>
</tr>
<tr>
<td>CD4049B</td>
<td>0.953</td>
<td>7.0</td>
</tr>
<tr>
<td>LVA456A</td>
<td>0.385</td>
<td>2.0</td>
</tr>
<tr>
<td>CD4049B</td>
<td>0.953</td>
<td>1.0</td>
</tr>
<tr>
<td>2N2920/2ANXT</td>
<td>0.042</td>
<td>1.0</td>
</tr>
<tr>
<td>1N3070/2ANXT</td>
<td>0.042</td>
<td>1.0</td>
</tr>
<tr>
<td>CD4049B</td>
<td>0.953</td>
<td>1.0</td>
</tr>
<tr>
<td>CD4049B</td>
<td>0.953</td>
<td>4.0</td>
</tr>
<tr>
<td>8K5/493</td>
<td>172.000</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Flowmeter Board Failure Rate = 820.301

### Telemetry Junction Table

The Telemetry Junction is used for circuit connections and is a common point for many of the other electronic units. This unit's reliability is basically the reliability of the connector and internal connections as indicated in the following table:

<table>
<thead>
<tr>
<th>Description</th>
<th>Failure Rate (x 10^6 Real)</th>
<th>Total Fail Rate (x 10^6 Real)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R07704</td>
<td>45.085</td>
<td>1.0</td>
</tr>
<tr>
<td>R07703</td>
<td>56.786</td>
<td>1.0</td>
</tr>
<tr>
<td>R07702</td>
<td>58.891</td>
<td>1.0</td>
</tr>
<tr>
<td>R07701</td>
<td>59.686</td>
<td>1.0</td>
</tr>
<tr>
<td>R07699</td>
<td>65.821</td>
<td>1.0</td>
</tr>
<tr>
<td>R07698</td>
<td>61.624</td>
<td>1.0</td>
</tr>
<tr>
<td>R07684</td>
<td>194.217</td>
<td>1.0</td>
</tr>
<tr>
<td>R07500</td>
<td>40.926</td>
<td>1.0</td>
</tr>
<tr>
<td>R07501</td>
<td>50.508</td>
<td>1.0</td>
</tr>
</tbody>
</table>

TM Junction Failure Rate = 680.348
### SANDAC V

Failure rates for the SANDAC V were obtained from the STP/GOLO report, dated August 12, 1988. The failure rate for the MIL-STD-1553B board was obtained from MIL-STD-217E. Failure rates for the two bus hybrids were obtained from DDC (vendor) for missile launch environment.

<table>
<thead>
<tr>
<th>Description</th>
<th>Failure Rate</th>
<th>Total Fail Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Module</td>
<td>155.472</td>
<td>465.410</td>
</tr>
<tr>
<td>Utility Module</td>
<td>203.455</td>
<td>203.455</td>
</tr>
<tr>
<td>System Module</td>
<td>309.045</td>
<td>309.045</td>
</tr>
<tr>
<td>MIL-STD-1553B</td>
<td>154.972</td>
<td>154.972</td>
</tr>
<tr>
<td><strong>Sandac V Failure Rate</strong> =</td>
<td><strong>1,136.845</strong></td>
<td></td>
</tr>
</tbody>
</table>

### MIL-STD-1553B Mod.

<table>
<thead>
<tr>
<th>Description</th>
<th>Failure Rate</th>
<th>Total Fail Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector, Optics</td>
<td>0.100</td>
<td>0.200</td>
</tr>
<tr>
<td>Cap.-CER</td>
<td>0.120</td>
<td>0.240</td>
</tr>
<tr>
<td>Resistor-R1</td>
<td>2.400</td>
<td>7.200</td>
</tr>
<tr>
<td>Resistor-R2</td>
<td>1.930</td>
<td>3.860</td>
</tr>
<tr>
<td><strong>Fiber Optics Transmitter Failure Rate =</strong></td>
<td><strong>25.818</strong></td>
<td></td>
</tr>
</tbody>
</table>
REFERENCES


2. Polaroid 41 Data Book (ML), Report Number LNSD-80825, Lockheed Missiles and Space Division, October 11, 1986, Sunnyvale, California. (This document is Classified).

3. Predicted Probability of Failure Depending on Normal Trajectory Due to Mismatch Failure and Human Error, C. W. Colinas, August 12, 1988, Division 7222, Sandia National Laboratories, Albuquerque, NM.


7. STARS Fuselage Timeline, John White, July 26, 1990, Division 7222, Sandia National Laboratories, Albuquerque, NM.

8. STARS Armadiage Operation, T. L. Downey, October 2, 1989, Division 7222, Sandia National Laboratories, Albuquerque, NM.

9. STARS Flight Test Unit Trajectory, D. L. Otke, April 9, 1990, Division 7222, Sandia National Laboratories, Albuquerque, NM.


RWP 7222

December 16, 1992


Dr. David Wright, Deputy Staff Scientist
Union of Concerned Scientists

Summary

At the request of the Sierra Club Legal Defense Fund, I have reviewed the Sandia National Laboratories' document "Strategic Target System (STARS) Predicted Mission Reliability for Flight Test Unit - 1 (FTU-1)" by R.C. Abbott and R.W. Fowman, dated October 1, 1990. In reviewing the Abbott/Fowman analysis, I have focused on the methodology used for the risk assessment, the comprehensiveness, consistency and general quality of the implementation of the methodology, and the reliability and applicability of the results to the STARS system.

From my review, I conclude that the Abbott/Fowman analysis does not support a reliability figure of 97% for the STARS vehicle as stated in the Environmental Impact Statement (EIS). Indeed, even the authors of the report clearly do not intend it to do so, stating that their "reliability prediction must be seen as a best case prediction." A major limitation of the analysis is that reliability estimates for several of the key components are classified, and not assumed by the authors to be 100%, which is clearly unrealistic. As a result of my review, I have concluded that the Abbott/Fowman analysis should not be used as the basis for policy decisions concerning the STARS program.

Augmenting the Abbott/Fowman analysis simply by including estimates for the failure rates of the first- and second-stage rocket motors leads to a reliability estimate in the low 90% range. However, because of other limitations of the Abbott/Fowman analysis, this figure is still expected to be an overestimate of the actual reliability of the STARS booster.


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To compare the STARS case to a missile system for which operational data exists, I have examined the success and failure rate of the Minuteman I missiles that have been used to launch test payloads in the eight year period between 1989 and 1991. These missiles are roughly the same age as the Polaris missiles, and have been similarly refurbished for use as test launchers. This data gives a reliability for the missile of not greater than 92%. This figure may be closer to the what can be expected for the reliability of the STARS booster.

The implications of these reliability figures are important. With an overall missile reliability of 92.6%, there will be a greater than 50% probability of at least one missile failure within three years, at the assumed launch rate of four per year. If the actual reliability is 82% as suggested by the launching of the refurbished Minuteman I missiles, there would be a greater than 50% chance of failure within the first year of STARS launches.

---


Dr. David Wright, Senior Staff Scientist
Union of Concerned Scientists

Section I. Introduction

While Abbott and Flowman use a fairly standard method of reliability analysis, the analysis has some important limitations. In particular, the analysis leading to the 97% reliability figure quoted in the EIS assumes perfect reliability of some of the major components, thereby significantly overstating the actual reliability that can be expected for the system; the analysis relies on using engineering estimates for failure rates of the components instead of actual test data, so that the applicability of the results to the STARS booster cannot be known; the implementation of the analysis is not complete, since it does not include some of the failure modes that are known to have been problems in the past; and the analysis focuses heavily on electrical systems rather than mechanical systems, even though most of the electrical systems of the Polaris A3 have been replaced while many of the mechanical systems are original to the Polaris and therefore 25 years old.

As a result of these considerations, which are discussed in more detail below, the reliability figure resulting from the Abbott/Flowman analysis should not be used as the basis for policy decisions.

Indeed, Abbott and Flowman clearly state in the report that "the reliability prediction must be seen as a best case prediction." Moreover, they state that "the prediction is not based on flight or laboratory testing of the STARS system," and the reliability figures for most electronics components are based on constant failure rates assumed by the vendors, and were not subjected to independent acceptance testing. As a result, the authors state that the analysis is a "prediction, not an assessment" of the reliability of the STARS vehicle, meaning that it relies on engineering estimates or "typical" reliability figures for missile components but is not based on data directly applicable to the STARS booster; thus its applicability to the particular case of the STARS system is unknown, and cannot be known in the absence of component testing and integrated flight testing of the STARS vehicle.

---

1Abbott and Flowman, p. 1.
2Abbott and Flowman, p. 10.
3Abbott and Flowman, p. 10.
Section II. Discussion of Key Limitations of Analysis

In this section I discuss in greater detail several of the limitations of the analysis mentioned above.

1. The report states that the reliability of several key systems of the STARS vehicle is classified, and the reliability prediction is done assuming 100% reliability for these components, which is clearly unrealistic. Two of these systems—the first and second stage rocket motors—are expected to be a major reliability concern for these missiles. In section III below I give estimates for the motor reliabilities based on actual flight histories of the Polaris missile, and use these estimates to calculate a better overall estimate of the STARS reliability.

2. The authors mention in the report that an evaluation in the late 1970s indicated several problems areas with Polaris A3 components, presumably introducing effects of aging, and they list the particular components that raised concern. Despite the fact these components are known to have a reliability concern, none of them are included in the Abbott/Plowman reliability prediction that results in the 97% figure. These components are:

- the Second Stage TVC Gas Generators—these are not listed as separate components in the analysis and are presumably considered part of the TVC system, which is assumed to have a reliability of 100% in the unclassified analysis;
- the Second Stage Hot Gas Relief Valve—this is not listed as a component in the analysis, and therefore is not included in the reliability prediction;
- the Second Stage Rocket Motor—this is assumed to have a reliability of 100% in the unclassified analysis.

3. The analysis breaks the missile down into subsystems and their components. Reliabilities are then estimated for the component, and are combined to give a prediction for the overall reliability. The process of breaking the missile into components, however, is not done uniformly for all subsystems. For example, the electrical components are analyzed in great detail. Sixteen of the 38 pages of the unclassified report are devoted to analyzing various electrical systems down to the level of individual resistors and capacitors. However:

- Many of the important failure modes are mechanical, not electric. This fact is explicitly important for the STARS booster since most of the electronics in the Polaris have been replaced and are therefore new, while most of the mechanical subsystems are the original ones from the Polaris and are therefore over 25 years old.

- While the reliabilities of the electrical subsystems are estimated from the reliabilities of the components, this method is not used to estimate reliabilities of the key mechanical subsystems. For example, the process of stage separation consists of a sequence of events that must occur successfully for separation to occur, yet this process is not broken down to the component level, but is merely assigned a single "one-shot" failure probability. As a result, this number is not derived from reliability estimates for the components. Moreover, since the system has not been flight tested, this number is also not based on data from tests of the full subsystem. As a result, the Abbott/Plowman analysis gives no justification for the assumed 98.89% reliability figure for stage separation.

4. The reliability estimates used in the analysis are engineering assumptions, and therefore their relevance to the actual reliability of the STARS system cannot be known. The authors state that "the prediction is not based on flight or laboratory testing of the STARS system," and the reliability figures for most electronic components are based on constant failure rates assumed by the vendor, and were not subjected to independent acceptance testing. Moreover, even though individual components may operate successfully, integration flight tests are required to estimate the reliability of the components working together as a system. These first developmental launches are scheduled to take place from Kauai.

5. The authors state that the analysis assumes that pre-launch checks can verify that all circuits in the missile are "functioning properly prior to launch." However, as discussed below, the January 20, 1992 launch failure of a refurbished Minuteman I missile shows that this assumption is not justified since the missile failed to ignite when the launch command was given.

Section III. More Realistic Estimate of STARS Reliability

In this section, I augment the Abbott/Plowman analysis to give a more realistic estimate of STARS reliability. I emphasize that the estimates given here are quite uncertain. The actual reliability of the booster is unknown before a test program is conducted.

I augment the Abbott/Plowman analysis simply by including a realistic estimate for the reliability of the first- and second-stage Polaris rocket motors, which are assumed by Abbott and Plowman to be 100% in the analysis. The reliability figures are based on the results of the actual launches of the Polaris missile (see appendix A), and lead to the following results.

---

1Abbot and Plowman, p. 10.
2Abbot and Plowman, p. 10.
Using data on Polaris A3 flights for failures attributable to motor failures:

<table>
<thead>
<tr>
<th>Stage</th>
<th>No. of Flights</th>
<th>No. of Failures</th>
<th>Motor Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>203</td>
<td>2-5</td>
<td>0.971 - 0.990</td>
</tr>
<tr>
<td>Stage 2</td>
<td>203</td>
<td>4</td>
<td>0.980</td>
</tr>
</tbody>
</table>

Multiplying the motor reliability figures for the stages gives a combined motor reliability for the two rocket motors in the range 0.956 to 0.970.

Using data on failures attributable to motor failures from the full Polaris flight program (A1, A2, and A3) to include a considerably larger number of flights gives:

<table>
<thead>
<tr>
<th>Stage</th>
<th>No. of Flights</th>
<th>No. of Failures</th>
<th>Motor Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>486</td>
<td>10-17</td>
<td>0.965 - 0.979</td>
</tr>
<tr>
<td>Stage 2</td>
<td>486</td>
<td>13-17</td>
<td>0.965 - 0.973</td>
</tr>
</tbody>
</table>

Multiplying the motor reliability figures for the stages gives a combined motor reliability for the two rocket motors in the range 0.931 to 0.952.

To include these reliability estimates in the Abbot/Plowman analysis, the Abbot/Plowman total reliability prediction of 0.976 must be multiplied by the combined motor reliability estimate. Using the highest reliability figure above of 0.970 gives a total reliability estimate of 0.947. Using a more reasonable estimate of combined motor reliability of 0.95, which is in the middle of the range of estimates above, gives an overall reliability of 0.938.

Several points should be noted:

1. Since the tables above include only failures resulting from two possible failure modes of the motors, they represent an overestimate of the motor reliability.

2. Since including estimates of the motor reliabilities addresses only one of the limitations in the analysis discussed in the previous section, the resulting total reliability estimates are still expected to overestimate the actual reliability.

3. A standard figure often assumed for the reliability of a relatively young missile that has completed its test program is in the range 0.90 to 0.95, in rough agreement with these figures. However, it is important to note that reliability figures in this range are not expected before the missile has undergone an adequate number of test flights. Moreover, they may not be applicable to an aging missile that has been refurbished.

Section IV. A Historical Test Case: Comparison with Reliability of Refurbished Minuteman I Missiles

In order to understand what the actual operational reliability of the Polaris booster might be, it is instructive to consider the example of the Minuteman I (MMI) launch vehicle. MMI missiles are of the same vintage as the Polaris: production began in 1962 and the last MMI was retired in March 1973. Just as the Polaris missiles are being refurbished for use in the STARS program, MMI missiles have been refurbished to be used as launch vehicles for experimental payloads. Thus the case of the MMI should provide a good analog for the STARS case.

In the eight-year period from January 1, 1983 through December 1, 1992 for which I have data, there were twelve MMI launch attempts. For each, I have attempted to determine whether the launch was a success or failure, where a failure includes missiles that do not launch at all, or missiles that failed catastrophically or were destroyed on command by a range safety officer. While I have been unable to determine the status of all these launches, the information I have allows limits to be put on the MMI reliability.

Of the twelve launch attempts, three are known to have failed. These are the January 20, 1987 and October 24, 1990 attempts, which were destroyed by a range safety officer after they began to malfunction, and the January 20, 1992 attempt, in which a malfunction caused the first stage motor to fail to ignite.

Thus for this eight-year time frame, the actual operational launch reliability was at least 90% of 10, or 0.9, and perhaps lower since I have not been able to confirm that all the other launches were successful. If the January 20, 1992 is not included, the reliability is 9 of 11, or 0.82.

Section V. Implications of Reliability Estimates for Expected Failure Rates

The implications of the assumed level of reliability are important for making policy judgments, as illustrated by the graph shown below. The graph plots the probability of missile failure against the number of launches, for four values of overall missile reliability (which are denoted by the value of R on the plot). Each launch is marked by a star on the plot. The STARS launch schedule assumes four launches per year, each vertical line denotes one year.

With a realistic estimate of overall missile reliability of 95.8%, there will be a greater than 50% probability of at least one failure within 10 launches. Assuming a test schedule of four launches per year, this means that there would be a greater than 50% chance of

*The launch data were obtained from Jeffrey Gerber in the Base Historical Office at Vandenberg Air Force Base (personal communication, 12/14/92). The launch dates were 3/22/85, 3/17/86, 6/20/87, 9/1/87, 1/18/88, 2/14/90, 1/26/91, 5/1/91, 6/25/91, 12/2/92, 2/12/92, and 10/2/92.
Seeing a failure by the third year of STARS launches. If the actual reliability is 97%, which may be a more realistic estimate, there would be a greater than 50% chance of failure by the fourth launch, or by the end of the first year of launches.

The table below shows the expected number of missile failures during the full set of 40 launches assumed for the program. Note that even a 97% reliability figure would result in at least 1 expected failure. If the reliability figure were actually 92% as may be suggested by the recent launch history of refurbished Minuteman I missiles, there would be 7 expected failures in the full launch series.

<table>
<thead>
<tr>
<th>Overall Missile Reliability</th>
<th>Expected number of failures in 40 launches</th>
</tr>
</thead>
<tbody>
<tr>
<td>97%</td>
<td>1</td>
</tr>
<tr>
<td>92.8%</td>
<td>3</td>
</tr>
<tr>
<td>91%</td>
<td>7</td>
</tr>
</tbody>
</table>
Table 3-7. Solid Rocket Motor Case/Nozzle Failure History

<table>
<thead>
<tr>
<th>PROGRAM</th>
<th>STAGE*</th>
<th>NO. TESTS</th>
<th>CASE/NOZZLE (FUSILIER)</th>
<th>FUSILIER (FAILURE)</th>
<th>FUSILIER (FAILURE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLARIS A3</td>
<td>#1</td>
<td>186</td>
<td>112F</td>
<td>1.16 (150)</td>
<td></td>
</tr>
<tr>
<td>POLARIS A3</td>
<td>#2</td>
<td>186</td>
<td>0</td>
<td>2.51 (150)</td>
<td></td>
</tr>
<tr>
<td>POLARIS A3</td>
<td>#3</td>
<td>186</td>
<td>0</td>
<td>1.91 (150)</td>
<td></td>
</tr>
<tr>
<td>POLARIS A3</td>
<td>#4</td>
<td>186</td>
<td>0</td>
<td>1.39 (150)</td>
<td></td>
</tr>
<tr>
<td>POLARIS A2</td>
<td>#5</td>
<td>150</td>
<td>1 (5)</td>
<td>1.77</td>
<td></td>
</tr>
<tr>
<td>POLARIS A2</td>
<td>#6</td>
<td>150</td>
<td>0</td>
<td>1.77</td>
<td></td>
</tr>
<tr>
<td>LEUCEMIA</td>
<td>#5</td>
<td>67</td>
<td>0</td>
<td>1.64</td>
<td></td>
</tr>
<tr>
<td>TITAN</td>
<td>#1</td>
<td>26</td>
<td>0</td>
<td>1.39</td>
<td></td>
</tr>
<tr>
<td>DEEM</td>
<td>#2</td>
<td>26</td>
<td>0</td>
<td>1.39</td>
<td></td>
</tr>
<tr>
<td>CASTOR IV</td>
<td>#2</td>
<td>26</td>
<td>1</td>
<td>1.46</td>
<td></td>
</tr>
<tr>
<td>CASTOR IV</td>
<td>#3</td>
<td>26</td>
<td>1</td>
<td>1.46</td>
<td></td>
</tr>
<tr>
<td>CASTOR IV</td>
<td>#4</td>
<td>26</td>
<td>1</td>
<td>1.46</td>
<td></td>
</tr>
<tr>
<td>CASTOR IV</td>
<td>#5</td>
<td>26</td>
<td>1</td>
<td>1.46</td>
<td></td>
</tr>
</tbody>
</table>

Attachment 2

Based on the data from Table 3-7, the historical probability of failure for solid rocket motors is approximately 1 in 57 motor flights or about 1.7 x 10^-2. If the additional possible case/nozzle failures are included, this increases to about 2.9 x 10^-2. (The foregoing solid rocket motor failure history data has been informally documented in a briefing [21].)

The adjustment of the historical solid rocket motor failure probability for application to the Space Shuttle SRBs was an engineering judgment involving the Space Shuttle Range Safety Ad Hoc Committee [7]. It was realized that the 'learning curve' for solid rocket motor technology has resulted in more reliable motors. Since the historical data includes motors developed 10 to 20 years ago, it was decided that a reduction in the failure probability estimate was warranted for the Space Shuttle.
IN THE CIRCUIT COURT OF THE FIRST CIRCUIT  
STATE OF HAWAI'I

SIERRA CLUB, a California non-profit corporation; 1000 FRIENDS OF KAUA'I, a Hawaii non-profit corporation,  
Plaintiffs,  

vs.  
WILLIAM W. PATY, JR., in his capacity as Director of the Department of Land and Natural Resources and Chair of the Board of Land and Natural Resources; BOARD OF LAND AND NATURAL RESOURCES, STATE OF HAWAI'I; DEPARTMENT OF LAND AND NATURAL RESOURCES, STATE OF HAWAI'I;  
Defendants.

AFFIDAVIT OF DR. DAVID C. WRIGHT

STATE OF DISTRICT OF COLUMBIA  
COUNTY OF  

DR. DAVID C. WRIGHT, having been first duly sworn, deposes on oath and says that:

1. He makes this Affidavit in support of Plaintiffs' Motion for a Preliminary Injunction.

2. Affiant is a physicist currently employed as a Senior Staff Scientist with the Union of Concerned Scientists in Cambridge, Massachusetts, and is a Visiting Scholar in the Program for Defense and Arms Control Studies at the Massachusetts Institute of Technology.

3. Affiant's background and familiarity with the Strategic Target System ("STARS") program are further described in a previous affidavit, attached to Plaintiff's Motion for Preliminary Injunction as Exhibit 15. That affidavit, and its exhibits "A" through "C", are incorporated herein by reference.

4. Exhibit C of Affiant's previous affidavit consists of his technical review (referred to hereinafter as the "technical review") of a document entitled "Strategic Target System (STARS) Predicted Mission Reliability for Flight Test Unit 1 (FTU-1)." This document, which was written by K. C. Abbott and R. W. Plovan, and is referred to hereinafter as the "Abbott/Plovan analysis" or "paper," was attached to Affiant's previous affidavit as Exhibit B.

5. The Abbott/Plovan analysis is understood by Affiant to form the basis for the reliability figure of 97% for the STARS missile stated in the Army's Environmental Impact Statement ("EIS"), and relied upon by the State in its Environmental Assessment for the proposed Memorandum of Agreement.

6. As explained in his earlier Affidavit, it is Affiant's expert opinion that the Abbott/Plovan analysis does not support a reliability figure of 97% for the STARS vehicle as stated in the EIS. Furthermore, Affiant finds that the Abbott/Plovan analysis should not be used as the basis for policy decisions concerning the STARS missile, and that a realistic estimate should be prepared for the reliability of the system. Affiant has produced reliability estimates in his
technical review which are, in his expert opinion, more realistic than the 97% figure derived by Abbott and Plowman.

7. It is Affiant's understanding that the Army has stated that Affiant has failed in his technical review to correlate the motor reliability figures he derives with the mission reliability methodology used in the Abbott Plowman analysis, and that the Army has thus concluded that "the relevance of his figures and the weight to attach to them is far from clear." It is Affiant's further understanding that the Army considers his analysis of Minuteman I ("MMI") and Polaris booster histories to be "not instructive."

8. It is Affiant's expert opinion that his figures are relevant because they are derived from actual data, and when substituted for the unrealistic 100% reliability figures used in the unclassified version of the Abbott/Plowman analysis they result in more realistic estimates of the actual missile reliability. In the beginning of Section III of his technical review, Affiant states that the Polaris motor reliability figures he has derived from historical evidence of actual Polaris flights have been inserted into the Abbott/Plowman analysis, replacing the 100% reliability figures used by Abbott and Plowman for first and second stage motor reliability. On page 4 of his technical review Affiant explains how this is accomplished, stating that "the Abbott/Plowman total reliability prediction of .9766 must be multiplied by the combined motor reliability estimate." Affiant gives values for the combined motor reliability estimate on page 4, which in the language of the Abbott/Plowman analysis is equal to the product of \( \text{exp}(1.27+t1) \) and \( \text{exp}(1.72+t2) \). As Affiant states on page 4 of his technical review, when this is done it gives an overall missile reliability of .928. As Affiant cautioned, however, in Sections I and II of his technical review, the Abbott/Plowman analysis contains serious limitations, in addition to the use of 100% reliability for the first and second stages. As a result, it is Affiant's expert opinion that policy decisions should not rely on the Abbott/Plowman analysis, even if augmented by actual Polaris flight data.

9. The Army has no actual flight test data for the STARS missile, due to the fact that it has never been flown. Thus the Army cannot establish the relevance of the theoretical Abbott/Plowman analysis to the actual STARS program, because it lacks actual performance data. As a result, the most relevant information that can be used in making an appraisal of the performance that can be expected of the STARS missile comes from past flights of similar systems. Flights of the MMI are especially relevant because it is a missile of similar vintage that has undergone similar refurbishment, and was also used as a test vehicle for the flights used to estimate its reliability. As a result, the history of the MMI is very relevant to the expected actual, as opposed to theoretical, behavior of the STARS missile. As stated in Affiant's prior affidavit and detailed in his technical review, the actual reliability of the MMI, in a series of flights between January 1985 and December 1992, was not
greater than 82%.

10. Affiant reiterates his finding, contained in his prior Affidavit, that the implications of reliability figures are crucial when making policy judgments. It is Affiant's understanding that the design goal with respect to the STARS missile reliability was 90%. Affiant notes that it is not known if this goal has been met, because no flights have yet taken place; in addition, his comparisons with the THI indicate that the 90% goal may not be achieved. However, Affiant calculates that even if the goal of 90% reliability is met, there is a greater than 50% probability of a missile failure by the seventh launch. Affiant has found that a reliability of 82%, as he has calculated for the THI and which he believes may be a more accurate assessment for the STARS boosters, produces a greater than 50% chance of failure by the end of the fourth launch.

Further Affiant sayeth naught.

David C. Wright

SUBSCRIBED AND SWORN BEFORE ME
THIS 14TH DAY OF JANUARY 1993

Vanessa Y. Brescia
Notary Public, State of District of Columbia.
My commission expires:
Minuteman destroyed

Smoke rises from a brush fire at Vandenberg Air Force Base caused by debris from a missile destroyed when it strayed off course Tuesday. The Minuteman I missile was destroyed seconds after the 10:30 a.m. launch, causing several brush fires that threatened the town of Oxnard, Calif., north of the launch site. The Air Force routinely test fires missiles and launches space boosters from the central California coastal base.
Minuteman

Continued from Page 8

On a windy day, Whicker said, it was determined. The base was being checked out for security.

The primary concern, both said, was the possibility of deterring other missile threats in the area. The base was under way and could be monitored.

Despite the spectacular nature of the explosion, which gave public officials hundreds of feet, "You're in more danger driving to work than watching a missile launch from Vandenberg," Burt said.

Minuteman 1 missile destroyed after launch

Fires flare up as debris rains down

Casmalla residents wait, watch for flames
Officials say fire posed no health risks at Casmalia

Casmalia

Guidance glitch blamed in failure

September 17, 1993

Missile

Continent-wide panic was caused after a missile was launched from Vandenberg Air Force Base. The missile detoured from its flight path and the safety crew was unable to stop it. The missile hit a house near the base, injuring several people. The cause of the accident was later found to be a guidance glitch. An investigation is currently underway to determine the cause of the malfunction.

September 17, 1993

VAFB missile in 'state of shock'

Guidance glitch blamed in failure

By Mark E. Hester

A guidance glitch was reported after a missile was launched from Vandenberg Air Force Base. The missile detoured from its flight path and the safety crew was unable to stop it. The missile hit a house near the base, injuring several people. The cause of the accident was later found to be a guidance glitch. An investigation is currently underway to determine the cause of the malfunction.
Hand-Delivered

Ms. Linda McCready
Department of Land and Natural Resources
Kahanamoku Building
1151 Punchbowl Street
Honolulu, HI 96813

Re: Comments on Draft EIS for Pacific Missile Range Facility Establishment Over State Land for Safety and Ground Hazard Areas for STARS and Navy Vandal Launches

Dear Ms. McCready:

Enclosed please find Attachment "A" to Sierra Club's and 1000 Friends of Kauai's Comments on Draft EIS for Pacific Missile Range Facility Establishment Over State Land for Safety and Ground Hazard Areas for STARS and Navy Vandal Launches, post-marked on September 22, 1993.

Very truly yours,

[Signature]

cc: Linda Ninh
U.S. Army Space and Strategic Defense Command
Post Office Box 1500
Huntsville, Alabama 35807-1500
IN THE CIRCUIT COURT OF THE FIRST CIRCUIT
STATE OF HAWAII

SIERRA CLUB, a California non-profit corporation; 1000 FRIENDS OF KAUA'I, a Hawaii non-profit corporation,

Plaintiffs,

vs.

WILLIAM W. PATY, JR., in his capacity as Director of the Department of Land and Natural Resources and Chair of the Board of Land and Natural Resources; BOARD OF LAND AND NATURAL RESOURCES, STATE OF HAWAII; DEPARTMENT OF LAND AND NATURAL RESOURCES, STATE OF HAWAII,

Defendants.

Affidavit of Miguel Dionisio Godinez

STATE OF HAWAII
CITY AND COUNTY OF HONOLULU

MIGUEL DIONISIO GODINEZ, having been first duly sworn, deposes on oath and says that:

1. He makes this Affidavit in support of Plaintiffs' Motion for Summary Judgment and/or for Preliminary or Permanent Injunction.


3. Affiant has been a member of the Sierra Club since 1986. He is also the Chair of the Sierra Club Kaua'i Group's Outings Committee. The Committee organizes and conducts hikes, snorkeling trips, camping and other outdoor activities on Kaua'i, which are open to Sierra Club members and the general public, including visitors to the Island.

4. Affiant is a partner of Kayak Kauai Outfitters, a limited partnership established in 1991. Prior to 1991, Affiant owned his own company and ran guided kayaking trips on Kaua'i.

5. Kayak Kauai offers a wide variety of services to the public, including guided kayaking trips, kayaking-camping trips and kayak rentals. Kayak Kauai maintains two outlets: one in Hanalei and the second in Kapa'a. An average of 50 customers a day patronize Kayak Kauai, including residents of Kaua'i, as well as visitors from the other Hawaiian islands, United States mainland and foreign countries.

6. Affiant personally and professionally uses and enjoys Polihale State Park and vicinity, which are included in the Ground Hazard Area ("GHA") for the Strategic Target System ("STARS") and Vandal missile launches from the Pacific Missile Range Facility.

7. Affiant personally uses Polihale State Park for ocean-related activities, such as swimming, surfing and boogie-boarding. Affiant also engages in hiking, nature exploration, birding and whale-watching at the Park. Affiant notes that the natural resources at Polihale State Park are a significant
resource, which are of enormous value to the people of Kaua'i. Furthermore, these resources are significant because they are an important asset to Kaua'i's visitor industry.

8. In his capacity as Sierra Club Kaua'i Group Outings Chair, Affiant has conducted group activities at Polihale State Park, including hiking and nature exploration. The National Sierra Club also utilizes Polihale State Park as a termination landing for two kayaking trips along Na Pali Coast per season. Sierra Club members travel from the United States mainland and other locations to participate in these annual Na Pali Coast tours.

9. In his professional capacity as owner of Kayak Kauai, Affiant organizes and conducts 1-day kayaking tours along the 15-mile rugged and remote Na Pali Coast, which is directly north of Polihale State Park. Kayak Kauai guides and clients paddle from Ha'ena County Beach Park, located on the north shore of Kaua'i, along Na Pali Coast to the sand dunes of Polihale. On most days during the summer, the winds and currents favor the journey along Na Pali Coast. However, due to high seas and rough surf during the fall, winter and spring, Na Pali Coast tours are only offered between May through September. Kayakers explore the paddle sea caves and reef areas along Na Pali Coast. After breaking for lunch at Hōlōlani, which is roughly two-thirds of the way to Polihale State Park from Ha'ena, kayakers continue paddling along Na Pali Coast. By 4:30 p.m. kayakers arrive at

Polihale State Park, where vehicles are waiting to transport paddlers, kayaks and gear back to Ha'ena.

10. Polihale State Park serves as an essential termination landing for Affiant's kayaking tours and other kayakers that paddle from the north shore along Na Pali Coast. There are two commercial operations that offer such 1-day kayaking tours along the Coast: Kayak Kauai Outfitters and Outfitters Kauai. Polihale State Park is, generally, a safe landing for kayakers during the summer. Telephones are available in the event of medical needs and emergencies, and picking up paddlers, kayaks and gear is facilitated by access to and from the park.

11. In the last few years, Affiant has seen a phenomenal rise in the demand for kayaking along Na Pali Coast. Although business was disrupted by Hurricane 'Iniki, Affiant hopes to accommodate the increasing demand in kayaking and related services on Kaua'i. He envisions Kayak Kaua'i expanding its services by offering the Na Pali Coast tour two times a day, everyday of the week, with the number of clients eventually increasing to 500-700 per month from May through September. At present, Kayak Kaua'i offers the 1-day Na Pali Coast tours once a day, three times a week, from May through September. Each tour averages between 6 and 12 clients per tour. In 1991, 375 people paddled Na Pali Coast with Kayak Kaua'i.

12. Affiant's personal enjoyment and recreational, spiritual and economic interests will be harmed by the evacuation
and closure of Polihale State Park and state roads for the purpose of establishing a GHA for STARS and Vandals missile launches at Barking Sands. Specifically, Affiant’s recreational use and enjoyment of the Park would be disrupted by the evacuations and closure. Affiant’s wilderness and spiritual experience at Polihale State Park would be impaired in the event of a missile launch, Park evacuation or Park closure.

13. Affiant states that Sierra Club members could also be adversely affected by the use of Polihale State Park as a GHA for missile launches and Park closure. Evacuation and closure of the Polihale State Park and vicinity would disrupt any Sierra Club Group outings and events that were being conducted at the time, including National Sierra Club camping trips in the Park. Unannounced (to the public) evacuations and closures of the Park would also make it difficult to schedule and plan Club outings.

14. Affiant’s professional and economic interests would also be significantly and adversely affected by the establishment of a GHA and subsequent Park evacuations and closures. In the event of an emergency, denied access to the landing and emergency transportation vehicles at Polihale State Park could be detrimental. Launch delays and extended Park closure would also strain incoming kayakers after the day’s paddle along Na Pali Coast.

15. Potential safety risks and impacts of missile launches, Park closures and delays in Park access could significantly impair the wilderness experience of Kayak Kauai clients. The spirit of the day could be dampened, if not erased, by such risks and the roar of missile launches. At the very least, Park closures and delays would be inconvenient for Kayak Kauai and its clients. An already long day could be made longer, and clients could miss airline flight connections, which may be difficult to reschedule.

16. Affiant states that the Park closures, missile launches and related inconvenience will cost him financially in the long-term. The number of tours that Kayak Kauai can now run along Na Pali Coast is already limited because of seasonal ocean conditions. Additional restrictions and limitations to conducting these tours will cause economic harm to Affiant and his partners. Kayak Kauai’s multi-day camping tours, which utilize Polihale State Park as an essential landing and pick-up location, would also be significantly and adversely affected by Park evacuations and closures.

17. Affiant believes that closure of Polihale State Park and the road leading into the Park would likely be for more than 20 minutes per launch, simply because it would take longer than 20 minutes to notify and evacuate Park users, including kayakers and campers who are with a significant amount of gear. Affiant also believes that, although the State’s proposed Memorandum of Agreement with the United States Navy to establish the GHA is only until the end of 1993, it will likely be continued for at least another 9 years. Affiant believes this to
be so, because the STARS Program on Kaua‘i is described by the United States Army and others as a 10-year one.

18. Affiant's personal and economic interests would be harmed in the event of an accident, early flight termination or fire, that resulted in the destruction of natural resources and facilities at Polihale State Park. Such destruction could be of a permanent nature, and the significant natural and cultural resources at Polihale are irreplaceable.

19. Affiant believes that the State does not discuss the significant, long-term and cumulative impacts of using Polihale State Park, state roads and other state land as a GHA for STARS and Vandal missile launches. Affiant believes that the full impacts of establishing the GHA should be assessed, and particular attention should be paid to Kaua‘i's people, as recreational users of the Park, and to the natural resources at Polihale and their significance to the visitor industry.

Further, Affiant seyeth naught.

[Signature]
Miguel Dionisio Godines

Subscribed and sworn to before me this 16th day of December, 1992.

[Signature]
Notary Public, State of Hawaii

My commission expires: 7-7-93

Attachment 6
IN THE CIRCUIT COURT OF THE FIRST CIRCUIT
STATE OF HAWAI'I

SIERRA CLUB, a California non-profit corporation; 1000 FRIENDS
OF KAUA'I, a Hawaii non-profit corporation,

Plaintiffs,

vs.

WILLIAM W. PATY, JR., in his capacity as Director of the
Department of Land and Natural Resources and Chair of the
Board of Land and Natural Resources; BOARD OF LAND AND
NATURAL RESOURCES, STATE OF HAWAI'I; DEPARTMENT OF LAND
AND NATURAL RESOURCES,
STATE OF HAWAI'I,

Defendants.

AFFIDAVIT OF SUZANNE MARINELLI

STATE OF HAWAI'I
COUNTY OF KAUA'I

SUZANNE MARINELLI, having been first duly sworn, deposes on oath and says that:

1. She makes this Affidavit in support of Plaintiff's
Motion For Summary Judgment And/OR For Preliminary Or Permanent
Injunction.

2. Affiant resides at 5-5537 Kuhio Highway in
Hanaelei, Hawaii.

3. She is the Pacific Vice President of the National
Sierra Club and the Chair of the Kaua‘i Group of the Sierra Club
Hawai‘i Chapter. She has been a member of the Sierra Club since
1987.

4. Affiant personally uses and enjoys the state-owned
lands at issue in this lawsuit, including Polihale State Park,
for a variety of recreational purposes. Affiant has been
visiting the Park since 1984, as often as four times a year.
While there, she engages in a variety of recreational activities,
including but not limited to walking, hiking, picnicking,
exploration and nature observation. In addition, Affiant has
taken, and intends to continue to take, family, friends, and
visitors to Polihale State Park to share with them the natural
and cultural history of the area. Affiant intends to return to
the Park and the surrounding state lands in the area of the
Pacific Missile Range Facility ("PMRF") periodically in the
future.

5. Affiant has also used, and would like to be able
to continue to use, the southern portion of the Park on a semi-
regular basis as an access route to pick up kayakers who land at
the Park's northern border, which is the regular terminus
point for Nā Pali Coast commercial and private kayaking tours.
Affiant estimates thousands of people each year use the Park for
this purpose.
6. As Chair of the Kaua‘i Group of the Sierra Club, Affiant has personal knowledge that many members of the Sierra Club use Polihale State Park and the surrounding state lands for a variety of recreational purposes, including but not limited to swimming, picnicking, exploration, hiking, kayaking and nature and wildlife observation and photography. In fact, the National Sierra Club annually sponsors week-long kayaking tours of the Na Pali Coast, which bring people from all around the country to this area and through Polihale State Park.

7. Affiant states that the Sierra Club and Affiant personally have been involved in monitoring the actions of the state, county and federal government with respect to the project on Kaua‘i known as the "STARS Project" since June 1990. The STARS Project is a program by the United States Army ("the Army") to launch missiles from the Kauai Test Facility, located on the Pacific Missile Range Facility at Barking Sands, Kaua‘i. Sierra Club’s activities with respect to this project have included investigation, public education, legislative monitoring, advocacy and litigation. In 1991, Affiant was appointed by Senator Daniel Akaka to serve as one of the Citizen Reviewer for the STARS Project. The purpose of appointing Citizen Reviewers was to enhance citizen monitoring of the STARS Project and the Army's Environmental Impact Statement ("EIS"). Affiant and other Reviewers met with Strategic Defense Initiative Organization and Army representatives several times to discuss a full range of concerns. Both Citizen Reviewers and military personnel presented materials and speakers to provide additional information to the group as a whole.

8. Affiant has reviewed and commented on the Environmental Assessment prepared by the State of Hawai‘i for the proposed Memorandum of Agreement ("MOA") with the U.S. Navy and Kekaha Sugar Company (which leases state land adjacent to PHRF) that would allow the Army's use of state owned lands, including but not limited to Polihale State Park and the adjacent state highway leading to the Park.

9. The proposed use of state lands, including Polihale State Park, pursuant to the MOA directly and adversely affects Affiant’s economic, aesthetic, recreational, and environmental interests described above. The proposed use of state lands, including Polihale State Park, pursuant to the MOA additionally directly and adversely affects the interests of Sierra Club and its members. The MOA allows many acres of state lands to be used as the Army's Ground Hazard Area ("GHA") during the launches of missiles from PHRF. When launches are aborted, lands within the GHA will be subject to falling debris, exploding propellant and toxic gases. Even when launches are not aborted, the area within the hazard zone is subject to toxic gases and extremely loud noise. The state lands that will be affected include valuable and sensitive ecosystems, popular recreational areas, rare and endangered species, Hawaiian burial and archaeological sites. Furthermore, the closure of the state lands to public use during the launches -- even if the closure is
"temporary" or of "short duration" -- is completely incompatible with the purposes of Polihale State Park. Evacuation and closure of the Park will disrupt public access to these areas, will discourage and chill public use of the Park (tourists and residents alike) and will subject users to harassment from Army personnel seeking to "clear" the Park during launches.

10. Affiant states that the Environmental Assessment prepared by the State with respect to this proposed use of state lands is woefully inadequate in its assessment of the impacts to these lands and to the public's use of Polihale State Park. Affiant further states that defendants have failed to analyze adequately the impacts, and have failed to respond to public concerns. Affiant believes that, contrary to the State's conclusion, these impacts will be significant and, therefore, a full EIS is warranted.

11. The State's glaring lack of analysis and inadequate response to public concerns is reflected in the responses made to Affiant's comments on the EA (MOA-FEA at 310). In response to comment #1, Mr. William Paty, in his capacity as Director of the Department of Land and Natural Resources and Chair of the Board of Land and Natural Resources) refers to pages 2-5 and 3-19 of the federal EIS when describing the lack of significant restriction of access by the public to state recreational lands. Page 3-19 of the EIS clearly states the Army's conclusion that "the area would be verified clear for a total of less than one day each year over a 10 year period."

This contrasts markedly with Mr. Paty's response to Affiant's comment #6 (MOA-FEA at 312), where he states that public access to a portion of the Park and cane lands within the GHA will be unencumbered "except for 105 hours per year." Affiant notes that 105 hours per year is not equivalent to "less than one day."

12. Affiant further finds that equating individual closures with days per year severely underestimates the impact on the public. Page 2-5 of the final EIS, referred to by Mr. Paty in his response, states that PMRF personnel will begin to escort people from the Park "no later than 1.5 hours prior to launch." (emphasis added). The MOA includes a condition allowing the Navy to enter the GHA and notify people of the need to leave the area up to three hours before launch, effectively disrupting public use of the Park for an entire day. The EIS describes up to 30 possible closure periods to account for delays due to weather or other obstacles, including the presence of endangered humpback whales. A disruption of use of three hours' duration on up to 30 separate occasions is in the Affiant's view very significant.

13. Affiant finds that the lack of advance public notification of Park closures presents both a hardship and a possible hazard. In response to Affiant's concerns over public notification procedures for launch windows, Mr. Paty states that the State will be notified 7 days in advance of each closure event, but does indicate that the public will receive any notification. From her examination of the record, Affiant believes the only notification that the public will receive of a
closure is from PRMF personnel when they begin clearing the GHA. Under the terms of the MOA, these personnel will be allowed into the GHA a maximum of 3 hours prior to a launch.

14. Unannounced closures of Polihale State Park will significantly disrupt kayakers and other boaters seeking to land at the Park. The Na Pali Coast is a wilderness area with no services or medical facilities. Polihale State Park provides the first possible vehicle access to the coast south of the popular Na Pali Coast. Many boaters require assistance from persons on shore in order to execute safe landings, and may be either unable to land or risk injury via unassisted landings, should a closure prevent persons from reaching the Park via road, or disrupt the careful scheduling of "landing rendezvous."

15. Boaters and other Park users remaining in the northern portion of Polihale State Park will be unable to obtain medical assistance should they require it, due to closure of the single park access road, which crosses the GHA. Thus Mr. Paty's response to #4, that "in the unlikely event that an accident occurs, adequate medical facilities are available" will not apply. This becomes an acute concern if there is an early launch termination, as spills of hazardous material and fires may necessitate continued closure of the road. Such an event would effectively trap and possibly threaten members of the public.

16. Affiant's concerns over the possible impacts of closure of Polihale State Park are heightened in the aftermath of Hurricane 'Iniki. Fortunately, as the Army’s study of the effect of Hurricane 'Iniki concludes (MOA-FEA at 40), damage to the park was minimal, and in stark contrast to the severe damage found elsewhere on Kaua'i. Many other parks and natural areas formerly frequented by the Affiant are now heavily damaged, and in many cases, completely inaccessible. Lightly impacted areas, such as Polihale, have thus gained even more importance as recreational destinations, and any closure of Polihale is thus even more significant now than before the Hurricane.

17. According to the latest figures available to the Affiant, published in the Department of Land and Natural Resources 1990-1991 Report to the Governor, there were 482,000 visits to Polihale State Park in fiscal year 1990-1991. Based on her own visits to the Park, her involvement with the Sierra Club, and her experience working within the visitor industry for at least the past 2 years, Affiant estimates a majority of these visitors to Polihale prior to Hurricane 'Iniki were tourists.

18. Affiant believes that the economic impacts of the closure of one of the most popular and least damaged Parks on Kaua'i will be more significant than the benefits that the State suggests may result from the "viewing audience" that could be attracted to a STARS launch, as has been suggested by Mr. Paty (MOA-FEA at 311). Affiant further notes that no references or citations are given by Mr. Paty in making his statement regarding the possible economic benefits of STARS launches, and finds that all impacts were never analyzed in either the State EA or federal EIS.
19. In summary, Affiant finds that there are 
significant impacts associated with the use of state lands for a 
STARS GHA as proposed under the MOA, and that those impacts 
include hardship and possible hazard to the public as a result of 
the closure of those lands. Affiant further finds that the EA 
prepared by the State has failed to address adequately those 
impacts, and calls for the State to assess independently the 
impacts associated with the use of state lands as proposed in the 
MOA, and fully disclose these impacts in an EIS.

Further, Affiant sayeth naught.

SUBSIGNED

[Signature]

Notary Public, State of Hawaii
My commission expires: 7-7-19

Attachment 7
IN THE CIRCUIT COURT OF THE FIRST CIRCUIT  
STATE OF HAWAI'I

SIERRA CLUB, a California non-profit corporation; 1000 FRIENDS OF KAUAI, a Hawaii non-profit corporation,  
Plaintiffs,  

VS.  
WILLIAM W. PATY, JR., in his capacity as Director of the Department of Land and Natural Resources and Chair of the Board of Land and Natural Resources; BOARD OF LAND AND NATURAL RESOURCES, STATE OF HAWAI'I; DEPARTMENT OF LAND AND NATURAL RESOURCES, STATE OF HAWAI'I,  
Defendants.

Civil No. 92-2597-07 (Injunctions)

AFFIDAVIT OF RAYMOND L. CHUAN; EXHIBITS "A" AND "B"

AFFIDAVIT OF DR. RAYMOND L. CHUAN

STATE OF HAWAI'I

KAAI COUNTY

SS.

DR. RAYMOND L. CHUAN, having been first duly sworn, deposes on oath and says that:

1. He makes this Affidavit in support of Plaintiffs' Motion For Summary Judgment And/or For A Preliminary Or Permanent Injunction.

2. He is a resident of Kauai and a scientist who received a Doctorate of Philosophy degree from the California Institute of Technology in aeronautics and physics in 1993. He owns a business, Pentosmetics, in Costa Mesa, California, and has published numerous articles over the last 35 years in the fields of atmospheric science, aerosol technology, air quality and physics.

3. He is a founding member of the Coalition Against Star Wars ("the Coalition") on Kauai, which was formed in June 1992 to oppose the launching of unsafe 25-year-old Polaris missiles from Kauai. The Coalition is an umbrella organization for several environmental, Kanaka Maoli (Native Hawaiian) rights and peace activist groups in the State of Hawaii.

4. Affiant states that the Coalition or Affiant personally have been involved in monitoring the actions of the state, county, and federal governments with respect to the project on Kauai known as the "STARS Program" since May 1990.

5. Affiant has reviewed the State's environmental assessment ("EA") for the use of state lands as a ground hazard area ("GHA") for the proposed STARS and Vandals launches. On September 1, 1992, Affiant provided written comments to the Department of Land and Natural Resources on the EA prepared for the proposed Memorandum of Agreement ("MOA") among the United States Navy ("the Navy"), DLNR, and Kekaha Sugar Company (which leases land from the State of Hawaii). A copy of Affiant's comments are attached hereto as Exhibit "A" and are incorporated herein by reference.

6. This proposed MOA allows the Navy unilaterally to close 76 acres of Polihale State Park, nearby state lands and the public access route to the Park on at least 19 days per year for
the STARS and Vandal missile launches. Affiant believes that the State has failed to comply with the Hawaii Environmental Policy Act because, among other things, it has failed to adequately consider the opinions of experts and State agencies in making its finding of no significant impact, as contained within the EA. Affiant raised this issue in his comments on the EA (see Exhibit A, 13) but the State’s response failed to address his concerns (HDA-FEA at 178). Affiant has also expressed his concerns on this issue in a letter to the Office of the Attorney General, which is attached hereto as Exhibit "5" and incorporated herein by reference.

7. Affiant has reviewed, analyzed and commented on the environmental documentation prepared by the Army for the STARS program, including the federal Environmental Assessment ("EA"), Supplemental EA, and federal Environmental Impact Statement ("EIS"). Based on his review and analysis of the record, affiant believes that the launches pose a serious hazard to state-owned land within the ("GHA"), including Polihale State Park.

8. In his capacity as co-chair of the Coalition, Affiant has sought clarification regarding the "pre-consultation" that DLNR states it has undertaken with other State agencies. Affiant believes that the State’s own experts at the Department of Health ("DOH") have not been adequately consulted regarding the potential impacts of the STARS launches on the lands within the GHA.

9. The Draft EA prepared by the State is dated August 7, 1992 and states that the DLNR consulted with the DOH in the preparation of its EA. Affiant contacted the director’s office of the DOH on August 11, 1992 to inquire regarding its consultation with the DLNR over the EA. His call was referred to Mr. Art Bauchman of the Environmental Planning Office, who was not aware that any consultation with DOH had taken place prior to the release of the EA. Affiant received a facsimile communication from Mr. Bauchman on August 19 confirming the lack of any correspondence from the Environmental Planning Office at the DOH to the DLNR regarding the EA, and stating that the EA itself had just been received.

10. Dr. John C. Lewin, director of DOH, submitted comments on the EA to the DLNR on September 23, 1992 (HDA-FEA at 20). In those comments, Dr. Lewin states that the DOH has no comments to offer beyond those which were made to the Army's Final and Draft Impact Statements, dated September 26, 1990 and April 21, 1992, which he attaches (HDA-FEA at 21 and 22). In his comments of April 21, 1992 Dr. Lewin states, for example, "A serious concern exists as to the devastating impact..." (emphasis added.) In his conversation with Mr. Bauchman of the DLNR’s Environmental Planning Office on August 13, 1992 and with Mr. Mike Miyakei of the Hazardous Waste Branch of the DOH on August 18, 1992, Affiant found that neither individual
could concur that the concerns raised in Dr. Levin's letter of April 21, 1992 had been addressed.

11. Affiant personally uses and enjoys the state-owned lands that are at issue in the lawsuit, including Polihale State Park, several times a year. Affiant and his wife enjoy walking in the unique dune ecosystem at Polihale State Park and swin and camp at the beach within the Park. Affiant also takes visitors to Polihale State Park for walks, swimming, and other recreational activities. Affiant plans to continue generally using and enjoying Polihale State Park and would be directly affected by the MOA, the subsequent closure of the Park and public access route to the Park, and the State's failure to prepare a full and adequate EIS for the MOA.

12. Affiant states that the effect of Park closure on members of the public is significant and has not been properly addressed in the EA. As the Affiant stressed in his comments on the MOA-GRA (Exhibit A, ¶ 4) the only advance warning the public will receive of an impending launch will be the announcement of a 30-day launch window by the Navy, which administers the Pacific Missile Range Facility from which the launches will take place. The DLNR has indicated to the Affiant that it will not actively notify the public of a planned launch, and that it would be necessary to call the DLNR, on a daily basis if needed, to inquire if a closure is planned (Exhibit A, ¶ 4). This situation will make it all but impossible for the public to visit the Park without the possibility that a sudden closure will be announced.

13. The impacts associated with closure of Polihale State Park have not been adequately addressed by the State in its EA, despite concerns raised by both the public and State Park staff. In comments to Mr. Mason Young, Land Management Administrator, on the State's EA (MOA-FEA at 27), Mr. Ralston Nagata, State Parks Administrator states: "We would need to work with launch administrators to maximize opportunity for public notice, particularly park goers with camp signs within the ground hazard area." However, in response to comments by the Affiant on this same subject (MOA-FEA at 177), Mr. W. W. Paty, Director of the DLNR, states that (p. 3) "Permit issuance for camping purposes is not a factor in clearance of the GHA. The area affected by the GHA is south of the designated camping area for which permits are issued. There will be no disruption to camp sites located in the area for which permits are issued ..."

14. Affiant states that the MOA, for which the EA has been prepared, does not adequately address other significant concerns raised by DLNR's own staff. The MOA incorporated in the EA does not include a detailed mitigation plan, as requested by Ralston Nagata, State Parks Administrator, in his comments on the EA (MOA-FEA at 27). Mr. Nagata states "Please also incorporate into the MOA the concerns provided to you dated May 20, 1992 calling for a detailed mitigation plan." Affiant notes that concerns regarding the MOA have also been raised by Mr. Maurice Matsuzaki, Enforcement Chief for the DLNR, in comments on the Draft MOA written June 8, 1992 to Mr. Mason Young, Land
Management Administrator (HOA-FEA at 24). Mr. Matsuzaki raises concerns regarding cleanup of debris following a failed launch, and hazards (immediate or long term) that are associated with this activity. Affiant finds that the HOA incorporated in the EA does not include a mitigation plan or clarify Mr. Mason’s concerns, and that the EA has not addressed how that HOA may be modified.

15. In summary, the potential impacts from the STARS launches to State lands included in the GHA, and subject to the HOA, are significant, and have not been adequately assessed by the State in its EA. Furthermore, the concerns of the State’s own experts and land managers on issues of critical importance have not been adequately considered by the State in preparing its EA. As a result, the State’s negative declaration is faulty, and a full and adequate EIS should be prepared that properly analyzes and addresses all significant potential impacts.

Further, Affiant sayeth naught.

[Signature]

Raymond L. Chi
an

September 1, 1992

Department of Land and Natural Resources
P. O. Box 621
Honolulu, HI 96809

Attention: William Pay


Dear Mr. Pay:

The following are my comments on the subject Draft Environmental Assessment (DEA):

1. The DEA does not comply with the requirements of Administrative Rules, Title 11, Chapter 200, Subchapter 6, 11-200-9(c).

1.1 Whereas the DEA claims to have consulted certain agencies of the state, in fact the DLNR did not consult these agencies prior to the preparation of the DEA.

1.2 The DLNR failed to consult the following agencies, as required by the Office of Environmental Quality Control under its "Pre-assessment Consultation List":

- University of Hawaii Environmental Center
- American Lung Association
- County of Kauai, Planning Department
- County of Kauai, Department of Public Works
- County of Kauai, Department of Water Supply
- County of Kauai, Office of Economic Development
- Hawaii Audubon Society

1.3 Most importantly, the parties directly affected by the proposed action have not been consulted. Under 11-200-9(c), the following is required: "In the assessment process, the agency shall consult with other agencies having jurisdiction or expertise as well as citizen groups and individuals." Surely individuals who make use of
Polihale State Park are directly and substantially affected by the proposed action. I, as an individual who uses and enjoys Polihale State Park, am specifically affected; and I demand that I should be consulted under provisions of 11-200-90(a).

1-4. HAR 11-200-10 (3) requires "summary description of the affected environment, including suitable and adequate location and the maps." The DEA does not provide such a map. The "map" that is provided has no scale and the notations are illegible. A user of Polihale State Park would not be able to identify from the "map" the precise location of the boundary of the proposed Ground Hazard Area.

2. The DEA fails to recognize that the primary and immediate impact of the proposed MOA is the denial of use and enjoyment of Polihale State Park by the public. It thus fails to comply with HAR 11-200-12(b):

- (2) Curtails the range of beneficial use of the environment;
- (4) Substantially affects the economic or social welfare of the community or State;
- (5) Substantially affects public health;
- (7) Involves a substantial degradation of environmental quality;
- (10) Adversely affects air or water quality or ambient noise levels; or
- (11) Affects an environmentally sensitive area such as a flood plain, tsunami zone, erosion prone area, geologically hazardous land, estuary, fresh water, or coastal waters.

3. HAR 11-200-13(c) states, "Agencies shall not, without considerable pre-examination and comparison, use past determinations and previous EISs to apply to the action at hand. The action for which a determination is sought shall be thoroughly reviewed prior to the use of previous determinations and previously accepted EISs."

The DEA fails to evaluate the adequacy of the Army's response, in its Final EIS, to comments by various experts and State agencies to the Draft EIS. With few exceptions, these responses assert that the Army's conclusions are incorrect. The Draft EIS that generated the comments in the first place (Example: the door to the Department of Health, letter from Dr. John Lohr to the Army, dated April 21, 1992) regarding "a serious concern exists as to the devastating impact an early termination..." would have on the surrounding environment and human health. The DEA does not address the effects these dispersed chemicals would have on the environment and the risks posed to human health. It also does not fully cover what the discharges actions will be taken to clean up the chemical contaminants and to handle the disposal of the contaminated hazardous waste."

My contacts with Mr. Art Haubanks of the Office of Environmental Planning of the DOE and with Mr. Mike Miyashita of the Hazardous Waste Branch reveal that neither could assure that the issues raised by Dr. Lewin had been properly addressed by the Army in its Final EIS.

Another example: Comments from Harold Harumoto of the Office of State Planning. In his letter to the Army of April 15, 1992, regarding CDM consistency, were not addressed as all in the Final EIS. Mr. Harumoto also noted in an earlier letter (dated October 2, 1990) that a CDM would be required by the DLNR. There is no mention of a CDM in any of the DLNR's deliberations.

Further examples of comments not adequately addressed:

- John Harrison, UH Environmental Center, 4-13-92 (cited as WR 496 in FEIS)
- Michael Jones, UH Physics Dept., 3-7-92 (VFR)
- Tom Norris, Moss Landing Marine Laboratories, (WR 328)
- Marjorie Ziegler, Hawaii Audubon Society, 4-13-92 (WR 328)
- Clifford Arinaga, Attorney, 4-13-92 (WR 337)

There are many, many more; the above are but a sample of the more significant comments by experts.

4. The DLNR has not realistically assessed the consequences of the closing of Polihale Park as presented in the proposed MOA. It is quite impossible to clear the part of the Polihale Park within the so-called Ground Hazard Area in twenty minutes. It requires much longer than twenty minutes for a normal person, without motorized vehicles, to go from the beach near Nokomis Point, for example, over the sand dunes back to where his car is parked. Likewise, it would take a security personnel of foot much longer than twenty minutes to look for persons on the beach; and it would require many such personnel to cover the affected area. Assuming the launch hour is definitely set (which is highly unlikely given the nature of missile launches) it would probably take at least two hours prior to the launch to close the access to the park and look for and evacuate people. Even this is not a likely scenario, since the Navy has said that it would not directly notify the public of a launch, except possibly a 24-hour window. The proposed MOA obliges the Navy only to notify the DLNR, DOT and Kekaha Sugar. The DLNR has told the public, through telephone inquiries with its Public Information Office, that it would not actively notify the public of a planned launch, but that the public would have to call the DLNR for such information, if any, on a daily basis if necessary. All this places the public in an untenable situation in trying to plan for a visit to Polihale Park. The process of modification as currently explained to the public in effect closes the Park for a month at a time for all but those who live very near Polihale Park.
In summary, the DLNR Draft Environmental Assessment as submitted on August 7, 1992, is so defective, as described in part above, that it should be withdrawn; and a new one submitted that will fully comply with all applicable statutes and rules.

Sincerely yours,

Raymond L. Chinn, PhD

CC: Sierra Club Legal Defense Fund
Mr. Brian Choy, OEQC
Dr. John Lewin, DOH
Mr. Harold Masumoto, ODP
Dr. John Harrison, UH Environmental Center
Mayor JoAnn Yabumura, County of Kauai

COALITION AGAINST STAR-WARS ON KAUAI
P.O. Box 1183
Hanaaii, HI 96714
808-873-6814, Fax 808-826-1115

September 10, 1992

Mr. Randall Young
Office of the Attorney General
Fax 587-2999

Dear Mr. Young:

We wish to protest the withholding of information by the DLNR in connection with its recently released Draft Environmental Assessment on the proposed Memorandum of Agreement with the U.S. government for the use of Polihale State Park as part of a missile launch complex.

1. HRS 343.3 specifically states that "All statements and other documents prepared under this chapter shall be made available for inspection by the public during established office hours."

2. The Hawaii Uniform Information Practice Act also mandates that the public have access to information relating the government activities.

3. The Coalition first requested information relating to the Pre-assessment Consultation process as required by Administrative Rule 11.200.90(C) on August 17, 1992. In a letter to Mr. Mason Young of the DLNR, a copy of which is attached herewith. This letter has not been acknowledged by Mr. Young.

4. Repeated calls to Mr. Young's office finally resulted in my contacting Mr. Gary Martin of the DLNR who advised me that our request had to be cleared by your office, on the premise that there is pending litigation relating to the EA process. We wish to call to your attention the fact that the DLNR Draft Environmental Assessment is published, and is in the public domain. Further, there is no litigation on the subject EA; the Sierra Club Legal Defense Fund suit has to do with the need for an EA, not the contents thereof.

5. We have serious questions regarding the pre-consultation with eight state agencies claimed to have been consulted by the DLNR. Our letters to the eight agencies for information relating to the pre-consultation have met with only one response, that from the State Office of Historical Preservation, which only evaded the question by referring the matter to your office. However, we have had some luck in contacting some personnel in the Department of Health who concurred that the concerns raised by Dr. Lewin on safety issues had not been adequately addressed by the Final EIS of the Army. Thus the DLNR could have reached the conclusion in its Draft EA that it found no impact on public health and safety.

Mr. Art Basham of the Environmental Planning
Office of the Department of Health, whom I was able to contact by phone on August 13, 1992, was not aware of any consultation from the DLNR prior to the letter's Draft EA release. In fact, the only awareness in the DOH of the existence of a DLNR EA came only on August 19, 1992, twelve days after the submission of the EA, as indicated by the attached copy of a faxed letter I received from Mr. Bauckham. Please note that Mr. Bauckham states parenthetically that the letter attached to his fax was the "only other correspondence that we have," (referring to the other extant letter in the DOH file which was a letter from the DOH to the Army on April 21, 1992 repeating essentially the same concerns after the DOH had reviewed the Army's Draft EIS.)

6. Our appeal to Ms Hanalie of the DLNR, during a telephone conversation at about 1400 hr on August 17, 1992, to expedite the release of the information to us was met simply with the statement that "The DLNR has met all the requirements of HRS 343", which clearly is not a true statement, since the DLNR has not complied with 343-3.

7. In our judgement, the extremely haste with which the DLNR prepared the Draft Environmental Assessment, and its total dependence on reference to the Army's EIS (which clearly does not comply with Administrative Rule 11-200-12(e)), do not lend confidence in the veracity and adequacy of the Draft EA. It is therefore especially important that the public be provided with all the necessary supporting information relating to the preparation of this published document.

Anything your office can do to ensure the public's right to information in this matter will be greatly appreciated. In view of our fairly consistent experience of not receiving any response to, or even the acknowledgement of the receipt of our communications to the DLNR, it would improve the image one has of the responsiveness of the government if we could be favored with a timely response in this instance.

Thank you for your attention.

Sincerely yours,

Raymond L. Chun, PhD
Co-chair
Coalition Against Star-Wars on Kauai

Attachment 8

Attach. Letter to Young, 8-17-92
Bauckham letter of 8-19-92

cc: SCLDF (w/o attachm.)
Ms Hanalie (w/o attachm.)
3. Affiant has been a member of the Sierra Club since approximately 1987. Affiant is a member of the Sierra Club’s statewide Executive Committee and of the Sierra Club Kaua’i Group’s Executive Committee. Affiant is also Chair of the Kaua’i Group’s Fundraising Committee. For years, Affiant has enjoyed participating in the Sierra Club’s hikes, outings, social meetings and conservation-related activities.

4. For the past 6 years, Affiant has been self-employed as a free-lance photographer. Affiant’s jobs include weddings and advertising assignments. His jobs focus on cultural and outdoor activities, such as fishing, hiking and camping, and include nature, scenic and travel photography on Kaua’i.

5. Affiant personally uses Polihale State Park several times a year. When Affiant goes to Polihale State Park, he swims, sunbathes, hikes, sight-sees, picnics and uses the Park’s camping facilities. Affiant also engages in personal photography at Polihale State Park.

6. Affiant takes visitors to Polihale State Park, who also participate in swimming, sunbathing, hiking, sight-seeing, picnicking, camping and photography.

7. Affiant enjoys all of the beach and ocean-related activities described above at Polihale State Park and intends to continue doing so, in the future, on a regular basis. Affiant also intends to begin kayaking off Na Pali Coast, which is directly north of Polihale State Park, and plans to use the Park as a landing area. Affiant also intends to increase his use of
Polihele State Park's camping facilities, because he recently invested in camping gear.

8. In a professional capacity, Affiant intends to expand into the production of travel-related stories and articles on Kaua'i for general publication and publication in visitor-oriented magazines. Affiant intends to include Polihele State Park in such stories and articles related to travel in Hawai'i, outdoor activities, nature and culture.

9. Affiant's interests in continuing to use and enjoy these beaches are adversely affected by the State's proposed Memorandum of Agreement and the missile launches from the Pacific Missile Range Facility, which will result in the evacuation and closing of Polihele State Park. Affiant's interests will also be harmed if an accident (including fire) occurred that destroyed or significantly modified the Park.

10. Affiant's personal well-being and enjoyment of Kaua'i depend, in part, on the accessibility of Polihele State Park to the public and on safe conditions at the Park.

11. Affiant's profession also depends, in part, on the availability and use of Polihele State Park and on the Park's significant natural resources, including native plants, animals and ecosystems, scenic vistas and ocean views.

Further, Affiant sayeth naught.
IN THE CIRCUIT COURT OF THE FIRST CIRCUIT
STATE OF HAWAII

SIERRA CLUB, a California non-profit corporation; 1000 FRIENDS OF KAUA'I, a Hawaii non-profit corporation,
Plaintiffs,

vs.

WILLIAM W. PATY, JR., in his capacity as Director of the Department of Land and Natural Resources and Chair of the Board of Land and Natural Resources; BOARD OF LAND AND NATURAL RESOURCES, STATE OF HAWAII; DEPARTMENT OF LAND AND NATURAL RESOURCES STATE OF HAWAII,
Defendants.

Civil No. 92-2397-07
(Injunctions)

AFFIDAVIT OF DR. MICHAEL D. JONES;
EXHIBITS "A" THROUGH "E"

Attachment 9

AFFIDAVIT OF DR. MICHAEL D. JONES

STATE OF HAWAII
CITY AND COUNTY OF HONOLULU

SS.

MICHAEL D. JONES, having been first duly sworn, deposes on oath and says that:

1. He makes this affidavit in support of Plaintiffs Motion for Summary Judgment And or Preliminary Or Permanent Injunction.

2. Affiant received a B.A. in Physics from Northwestern University in 1968 and a Ph.D. in Physics from the University of Chicago in 1974.

3. Affiant is currently employed as an Associate Researcher in the University of Hawaii High Energy Physics Group.

EXHIBIT II
He has been teaching and conducting research at the University of Hawaii since 1976. Affiant submits this Affidavit in his personal capacity and not as a representative of the University.

4. Affiant has been involved in experimental high energy physics research at Lawrence Berkeley Lab in California, at Argonne National Lab and at Fermilab in Illinois.

5. In addition to his research activities, Affiant has taught various graduate and undergraduate physics courses and interdisciplinary courses at the University of Hawaii at Manoa.

6. Affiant has reviewed the State of Hawaii's Environmental Assessment ("EA") for the use of State lands as a Ground Hazard Area ("GHA") for the Strategic Target System ("STARS") missile launches and Vandal missile launches from the Island of Kauai. He has also reviewed and commented on the following documents prepared by the US Army for the STARS launches: the EA, the supplemental EA, the Draft and Final Environmental Impact Statements ("EIS"), and the EIS Administrative Record ("EIS AR").

7. Affiant is an expert in experimental high energy physics, and has done mathematical modeling for high energy physics experiments.

8. Affiant believes that the State of Hawaii's EA is inadequate in at least two very important respects. First, the EA fails to adequately evaluate results of computer calculations of concentrations of hydrogen chloride ("HCl"). Second, the EA fails to analyze comprehensively the adequacy of the 10,000 foot-radius GHA. Both of these issues have serious implications for public health and safety, as well as for the natural environment, but neither have been addressed adequately by the State in its EA, or by the Army in its EIS (on which the State wholly relies).

9. Affiant has analyzed the results of air quality modeling performed by the Army for the STARS launches which is relied upon by the State in its EA. He has also calculated where the center of mass of the debris from a terminated launch would land. It is his expert opinion that the 10,000 foot radius GHA proposed by the State and the Army for the STARS launches is insufficient to insure the public will not be exposed to levels of HCl that exceed the State guidelines and may be insufficient to contain all debris from a terminated launch.

10. Affiant has analyzed the results of the air quality modeling performed by the Army to determine concentrations of HCl and carbon monoxide ("CO") resulting from STARS launches and has found those results to vary widely. Despite repeated attempts over the last one and one-half years, he has been unable to obtain information that adequately explains the differences between the REEDM and TRUUF models employed by the Army, and between different versions of REEDM. This critical information is completely omitted from the State's EA and is not provided in sufficient detail in the associated federal documents. Based on his analysis of the modeling performed, Affiant states that one cannot confidently assess the air quality impacts associated with the STARS launches until additional
information is provided and a more comprehensive evaluation is performed. A summary of Affiant's attempts to obtain clarification of the emission calculations and modeling results is attached hereto as Exhibit "A" and incorporated herein by reference.

11. Both the TRPUF and REEDM models predict that the 8-hour average HCl emissions produced by the STARS launches on Kaua'i will exceed the State of Hawai'i guidelines for HCl far beyond the boundaries of the 10,000 foot-radius CWA currently proposed. The REEDM model, which is considered by the Army to be a better estimate of the emission concentrations associated with a STARS launch, predicts the State guideline will be exceeded 16,000 feet downwind in the case of an early flight termination.

12. The State of Hawai'i's exposure guideline for HCl is 0.025 parts per million ("ppm"). Reference to the State's guideline is made in the Army's EIS, and also in a memorandum in the EIS AR. This memorandum is attached hereto as Exhibit "B." Exceedance of the State's guideline of 0.025 ppm is clearly shown in a computer printout of the REEDM model results, which are incorporated in the EIS AR. That document is attached hereto as Exhibit "C." Data from Exhibit C demonstrates that, in the case of a normal flight, the exposure guidelines would be exceeded at a distance of approximately 5000 meters (16,400 feet) from the launch pad. Data from Exhibit C also demonstrates that, in the case of early flight termination, the State of Hawai'i exposure guideline of 0.025 ppm could be exceeded at a distance of up to 11,000 meters (36,000 feet) from the launch pad. As a result, the CWA of 10,000 feet (3049 meters) proposed by the US Army and adopted by the State is not large enough to insure the public will not be exposed to levels of HCl that exceed the State guidelines.

13. In addition to reviewing the air quality issue, Affiant has calculated the path that the center of mass would follow in the case of a terminated launch. Affiant has concluded that it is possible that not all missile debris will be contained within the proposed CWA. Using data contained in the EIS AR at TAB 175, the relevant portions of which are attached hereto as Exhibit "D," Affiant has calculated the center of mass of debris after an explosion of the STARS missile. An explanation of his calculations and a summary of his findings are attached hereto as Exhibit "E" and incorporated herein by reference.

14. Affiant has found that statements in the State's reply to his comments on the EA (H0A-FEA at 122) overestimate the time available to activate the flight termination system and contain all debris within the CWA. Affiant's calculations show that, if the missile control system malfunctions and pitches the missile back toward Kaua'i, the missile flight will have to be terminated within 15 seconds if the center of mass of the debris is to be contained within the CWA. This does not insure that all debris will be contained within the CWA, but only that the center of mass of the debris pattern will be within the CWA. Affiant's findings confirm a statement in the Army's EIS for the scenario
where the missile pitches back toward the island that indicates flight termination must occur within 15.1 seconds into flight to contain debris within the GHA. This contradicts William H. Pety's response to the Affiant's comments on the EA (MOA-SEA at 123), which states that the flight safety officer has from 2.18 seconds (when pitch over should occur) until 20 seconds after the launch to terminate the flight, and keep the debris pattern within the GHA. The actual amount of time available for the flight safety officer to terminate the flight is a critical factor in assuring public safety on Kaua'i.

15. In Exhibit E, Affiant discusses the launch failure of an Aries rocket from Cape Canaveral on August 20, 1991. Although the Aries rocket motor performed properly, the wrong program had been loaded into the guidance control computer resulting in the rocket going about 50 degrees off course. The flight safety officer issued the destruct signal 22 seconds into the flight. Affiant's calculations indicate that, if a STARS launch were to fail in the same way, the center of mass of debris would impact the ground 0.3 miles from the launch pad. Thus, the debris impact area would include the town of Kekaha if the launch were to go off-course to the southeast.

16. Key documents were missing from the EIS AR when the State's Draft EA was written, preventing an effective evaluation of impact of the STARS launches by either the State of Hawaii or members of the public. In some instances only a single sheet of paper with the initials "TPD" was included, and in other cases only the first page of significant documents was included. The absence of this information has effectively made a thorough analysis of the impacts of the STARS launches by either the State of Hawaii or members of the public an impossibility.

17. In summary, Affiant's analysis shows the size of the GHA to be inadequate to assure that members of the public will be safe from both toxic gasses and debris following a STARS launch. Affiant has also found that the adequacy of the models and calculations used to estimate the dispersion of emissions and debris cannot be fully assessed due to incomplete data. Affiant states that the State must assess and disclose the adequacy of the GHA in a full and adequate EIS prior to entering into any MOA for the use of State lands in conjunction with the STARS launches.

Further affiant sayeth not.

Michael D. Jones

Subscribed and sworn to before me this 24th day of November, 1992.

Maria K. Kosuke
Notary Public, State of Hawaii
My commission expires: 3/14/96
Dec. 6, 1992

STARS AIR QUALITY ISSUES

The presentation of the calculations of the concentrations of hydrogen chloride and carbon monoxide resulting from STARS launches has been confusing and inadequate since the original STARS EA. The original EA gave no quantitative results for carbon monoxide; the hydrogen chloride results were based on the TRPUP computer model and only wind speeds above 1.3 meters per second were considered. The TRPUP results in the Supplement to the STARS EA predicted that the concentration of hydrogen chloride at the boundary of the launch hazard area (LHA) would be 110 parts per trillion (p.p.t) for a wind speed of 0.46 meters per second and 32 times the Hawaii guideline for a wind speed of 1.58 m/sec. For a wind speed of 0.46 m/sec, TRPUP also predicted that the carbon monoxide concentration at the LHA would be several times the Hawaii Ambient Air Quality Standard. The Supplement to the STARS EA also presented results from the REEDM computer model but for a wind speed of 2.0 m/sec. The hydrogen chloride concentrations predicted by REEDM were lower than the corresponding TRPUP values by as much as a factor of 100 but it was difficult to judge why the predictions were so different because the models assumed different wind speeds and little detailed information was given about either model. In my July 23, 1991 comments on the EA Supplement and my Dec. 17, 1991 comments during the scoping process for the STARS EIS, I suggested that it was important to compare these two models for the same wind speed and to cite evidence to support the contention in the EA Supplement that REEDM "is believed to predict more reliable and valid field concentrations."

The Draft EIS for STARS gave results from TRPUP (wind speed of 1.6 m/sec only) and REEDM (wind speed of 1.0 m/sec) to direct comparison was very difficult due to different wind speeds. In addition, 8-hour average values were not included in the Draft EIS so there was no direct comparison with the Hawaii guideline. The hydrogen chloride concentrations predicted by REEDM were higher (in some cases by as much as a factor of 9) than those given in the EA Supplement. In response to my comments (TPR-3) on this difference, the final EIS claimed that the difference was due to the use of REEDM version 7.02 for the EIS whereas REEDM version 1.02 had been used for the EA Supplement. However, the REEDM results in Tables 4-3 and 4-5 of the draft EIS referred to REEDM v. 7.03. In my May 25, 1992 comments on the final EIS I pointed out this inconsistency and the differences between the predictions of the different REEDM versions and between TRPUP and REEDM made it even more important to compare these models for the same wind speed and to provide detailed evidence supporting the choice of REEDM as the preferred model.

In July of 1992, I talked to Tyler Sugihara in the Hawaii Dept. of Health about these calculations. He said he was not aware of the differences in the REEDM predictions in the EA Supplement and in the EIS. On July 22, I faxed him tables 4-3 and 4-5 from the Draft EIS, the comments I had submitted, and the responses to them. The July 27 letter to me from Bruce Anderson, Deputy Director for Environmental Health, suggested that I call George Mathews, the air quality expert at Advanced Sciences. Inc. I called Mr. Mathews and left a message for him to call me. He did not return my call so Mr. Sugihara agreed to call him. On Aug. 3, Mr. Sugihara told me that Mr. Mathews told him that he had been advised by legal counsel of his company not to talk to me.

On Sept. 3, 1992, I submitted my comments on the State of Hawaii's draft EA for its Memorandum of Agreement for STARS. I suggested that the draft was inadequate because there was no detailed evaluation of the predicted hydrogen chloride and carbon monoxide concentrations. A few days after submitting these comments, I learned that I was a copy of the Administrative Record for the STARS EIS was on Oahu at the Attorney General's office. I arranged to look at this record on Sept. 22. Document 226 in this Record clearly indicates that REEDM predicts that the 8-hour average hydrogen chloride concentrations will exceed the Hawaii guideline. Documents 249 and 230, which were claimed to provide evidence to confirm the validity of REEDM had only their cover pages present. I reported these findings to Mr. Sugihara. He told me he had been instructed not to comment or do further work on STARS issues. I wrote a letter to [tied Sept. 22, 1992 to William Patti reporting this information and suggesting that all documents in the STARS Administrative Record needed to be made available and that a re-evaluation of the size of the ground hazard area needed to be done before the State signed the Memorandum of Agreement for STARS.

On Nov. 17, 1992, I was informed by Deputy Attorney General Randall Y. K. Young that documents which had been missing from the STARS Administrative Record were available. I arranged to view them on Nov. 24. Document 230 is a NASA Technical Memorandum from July 1986 which compares hydrogen chloride emissions from launches of the Space Shuttle with predictions from REEDM. It does not say which version of REEDM was used.

Michael Jones
Dept. of Physics and Astronomy
Univ of Hawaii
2505 Correa Road
Honolulu, Hawaii 96822
CONTACT REPORT

PROJECT TITLE: STARS EA Supplement
SUBJECT: State of Hawaii's Comments to Draft
ASU CONTACTS: George Mathew, ASU - San Diego
DATE OF CONTACT: 7/91
CONTACT: Tyler Sugihara, Staff Engineer, Clean Air Branch, Ph: 808-543-5200

A response letter has been drafted so ASU is waiting signature, and will be faxed when ready. Hawaii's comments relate to two issues:

1. Selection of HCl Exposure Guideline.

   Although Hawaii agrees that the ACGIH threshold limit value (TLV), 5 ppm, was not developed for ambient, public-exposure circumstances, this is the basic guideline which the State will use to evaluate the STARS project. The State will accept no adverse health effects, not even nose and throat irritation, which can be anticipated at exposure levels of 3 ppm. In order to protect the health of all segments of the population, young and old as well as healthy adult male workers, Hawaii introduces a safety factor of 200. This makes the public exposure guideline 0.025 ppm. However, Hawaii interprets the ACGIH TLV to be an 8-hour time weighted average (TWA) rather than the ceiling limit interpretation (TWA-C) which I have been using. This TWA of 0.025 ppm would be the exposure guideline at the public access boundary, i.e., the Launch Hazard Area Boundary (2000 m).

   Hawaii resolution disagrees with the use of the NIOSH IDLH level, because the HCl concentrations would occur over a wide area from which a person could not evacuate within 30 minutes.

   Hawaii wants 8-hr concentrations to be calculated from a 1-hour concentration (using the power law, multiply the 1-hour concentration by 0.7 to obtain the 8-hour concentration). I discussed using a 0.5-hour concentration to obtain an 8-hour concentration by the same methodology (multiply by -0.07), since our TRIPUF plumes have been 30-minute averages.

   If the modeling can be shown to be overly conservative, then such a discussion would have to be presented to allow Hawaii some latitude in applying its conservative guidelines.

2. Monitoring.

   On account of shifting wind conditions in other situations, Hawaii has had difficulty monitoring maximum ambient concentrations. Instead of placing monitors at locations to try to capture the maximum ground cloud drift, Hawaii recommends establishing monitors at locations of potential public exposure levels, at a fence line, for example, or at the LHA boundary, or toward the population center. The monitoring section should be improved.

TO: STARS EA Supplement File
FROM: George Mathew
DATE: August 16, 1991

SUBJECT: Additional REEDM Run at 1 m/s Wind Speed

At ASU's request, ACTA, Inc. at Vandenberg AFB (contact person: Ken Conley, phone: 805-883-0434) conducted additional air dispersion modeling a STARS missile launch with REEDM. The results are the computer printouts dated 6/12/91.

Because a few modifications to REEDM, version 1.02, have been introduced since the original STARS runs, 13 July 1990, Mr. Conley provided several printouts.

1. The original meteorological data file [POLARS1] assembled from actual field data on 22/23 June 1978 at Kauai Test Facility. The met file was then modified, at ASU's request, to simulate the lowest wind speed that REEDM can model, 1 m/s. All other met parameters remained the same.

2. The printout of the original, 13 July 1990, run of [POLARS1] normal launch.

3. The printout of the modified REEDM, version 7.03, run of the original [POLARS1] met input file. This was an over water simulation of normal launch and configuration event.

   Even though the launch vehicle is listed Titan 34D, Polaris input parameters were used. These parameters are itemized in the hand-written attachment to the 13 August 1991 printouts.

   One evident difference in the version 7.03 run is higher HCl concentration closer to the pad. Beyond the range of maximum concentration found in the original run, the concentration of pollutants are not very different. In any case, the order of magnitude is the same.

4. The two printouts of the REEDM, version 7.03, run of the 22/23 June 1978 met data with the hypothetical 1 m/s wind speed profile. The overland run is analogous to the [POLARS1] run in 1990, from which the data for the Supplement was provided. The over water run is analogous to the [POLARS1] run in 1990.

   In 1990, [POLARS1] was shifted 180° to simulate an over land dispersion; this was [POLARS1]. So, in these 1991 runs, the output of the bearing from pad (degrees) is meaningless.
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**Footnotes:**
- Footnote 1
- Footnote 2
- Footnote 3
**Sandia National Laboratories**
Albuquerque, New Mexico 87185

**Subj:** Final Trajectory for the STARS FTU-1 Flight Test (FTU-1 9105.101)

**Introduction**
The final trajectory simulation for the STARS FTU-1 flight test has been completed. This simulation reflects the final mass property summary (ref. 1), propulsion data (ref. 2, 3, and 4), aerodynamic coefficients (ref. 5), and a suitable design. The purpose of this report is to document the final trajectory, and in present the plots and tables necessary to update the flight safety data package previously in Volume 3 of ref. 6. To differentiate this trajectory from previous simulations, an identifier FTU-1 9105.101 is being placed on all data pertaining to it. The final trajectory was generated on the AD100 flight simulator by personnel from Division 5315.

The results for nominal trajectories for the spent, first, and second stages; the nose and body; and the payload are included. The predicted impact dispersion for each of these stages is shown. Off-nominal trajectories representing a flight path that is high, low, left, and right of the nominal are also included.

**Discussion**
The STARS vehicle will be launched from Pad 42 located at the Kauai Test Facility, Barking Sands, Kauai. The nominal sequence of events is given in Table 1. A more detailed sequence of events pertaining to the missile guidance and control functions is presented in Table 2, which has been prepared by Dr. H. D. 32. The expected 30 variations in time among each event are also presented in Table 2. The times for launch delay and payload separation are variable, and will be governed by how quickly the vehicle can achieve altitude and control system gets the vehicle reacquired to the required pointing angles. The third-stage ignition time, and consequently burned, will also vary, and will be determined by the total energy delivered by the first two stages. If more energy than predicted is delivered during stages 1 and 2, the third-stage ignition time will occur later than the nominal time presented, or conversely, if less energy is delivered, the third-stage ignition time will occur earlier than the nominal time.

Several tables presenting the trajectory in the different formats requested by the ranges and other program participants are included with this report. In addition, all of the tabular data are also provided on a 3.5 inch high density floppy diskette (IBM PC format) that is included with this package. These files are in a compressed format generated using the PKZIP software program. The FTU1READ.ME file on the disk lists the names of the files and a description of the contents of each file along with instructions for extracting the files.

The nominal trajectory data are presented in tabular form in Tables III through VI. Table

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<th>Altitude (ft)</th>
<th>Initial (deg)</th>
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<th>Distance (mi)</th>
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**EXHIBIT 0**
Dec. 16. 1992

STARS GROUND HAZARD AREA CONSIDERATIONS

Using data given in Table III of document 175 (July 29, 1991) Lab memo on the Final Trajectory for the STARS FTU-1 Flight Test, Administrative Record for the STARS EIS, I have calculated the mass of the debris from a terminated launch that would hit the surface of the Earth. The data was available when I examined the Administrative record on Sept. 22, 1992. The first time I saw any of these data was on Nov. 24, 1992; a few pages were still missing at that time. On Dec. 4, 1992, I received copies of parts of this document (except for the missing pages) that I requested on Nov. 24. The missing pages were made available to me on Dec. 15. The velocity components given on the first page of Table VI (which had not been available before Dec. 15) are inconsistent with the velocities given in Tables I, IIA, and IV. These Tables should be checked and corrected, and it should be stated which velocity components were used for the calculations done for the EIS. For my calculation, I assumed that the center of mass of the debris moves along the trajectory it would have if it were in a vacuum so that effects due to air resistance and wind have been ignored.

The table below summarizes the results of this calculation. The first four columns are taken from Table III of document 175 except that the ground range has been converted to feet from nautical miles using 1 naut. mile = 6076.115 feet.

<table>
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<th>Time (sec)</th>
<th>Altitude (feet)</th>
<th>Velocity (ft/sec)</th>
<th>Ground Range (feet)</th>
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The additional range is the distance in the horizontal plane that the center of mass will move between the time the flight is terminated by opening the rocket and time when the debris reaches the surface. The final ground range is the sum of the additional range and the ground range at the time of the explosion. (This assumes that the trajectory in the horizontal plane is a straight line before the explosion, which is a good approximation for the first 30 seconds of the flight.) The final ground range represents the distance from the launch pad about which the debris pattern will be centered.

For a flight where the rocket motor performs as planned but the thrust vector control system pitches it back toward Kauai instead of westward, the rocket would have to be exploded within 15 seconds of the launch to keep the center of mass of the debris within the ground hazard area whose radius is 10,000 feet. This does not assure that all debris will fall within the ground hazard area but only that the center of the debris pattern will be within the ground hazard area. The STARS Draft EIS examined the scenario where the rocket pitches back toward Kauai and asserted (see page 4-53 of the Draft EIS) that "the vehicle's flight could be terminated up to 15.1 seconds into the flight and debris would still not exceed the ground hazard area." The Dec. 2, 1992 letter to me from William Payt asserts that the flight safety officer "has from 2.18" seconds when pitch over should occur until 20 seconds after launch to terminate the flight, and keep the debris pattern within the GHA." My calculation in the table above and the statement on page 4-53 of the Draft EIS indicates that this is incorrect for the scenario

where the rocket pitches back toward Kauai.

In my comments on the STARS Draft and Final EIS and in my Sept. 3, 1992 letter to William Payt, I suggested that it was important to re-evaluate the ground hazard area for STARS in light of the Aug. 20, 1991 Arius launch failure from Cape Canaveral. (Even though the Arius booster is different from the STARS booster, I believe this Arius failure is relevant to STARS because it is planned to use the Arius for the EDX launches on Kauai with the same ground hazard area and because human intervention is required to terminate the flight.) In this Arius launch, the rocket motor performed as expected but the wrong program had been loaded into the guidance computer. The rocket was 23 seconds into the flight. The flight safety officer issued the destruct signal and the rocket was terminated 33 seconds into the flight. My calculation in the table above indicates that the center of mass of the debris would hit the surface 8.3 miles from the launch pad if a similar incident were to occur for a STARS launch. The debris impact area from such an incident would include the town of Kekaha if the launch were to go off-course to the southeast.

The last case I consider is for a flight termination 30 seconds after launch. This might be relevant for a failure of the first stage rocket motor similar to that which occurred in the static test firing on March 6, 1991 and which is described in document 241 of the STARS Administrative Record. The table above, the center of mass of the debris for a launch terminated at 30 seconds would hit the surface 19.6 miles from the launch pad. This debris impact area would include the north end of the island of Kauai if the launch were to go off-course toward Nihau.

Michael Jones
Dept. of Physics and Astronomy
Univ. of Hawaii
2505 Correa Road
Honolulu, Hawaii 96822
IN THE CIRCUIT COURT OF THE FIRST CIRCUIT

STATE OF HAWAII

SIERRA CLUB, a California
non-profit corporation; 1000
FRIENDS OF KAUAI, a Hawaii
non-profit corporation,

Plaintiffs,

vs.

WILLIAM W. PATY, JR., in his
capacity as Director of the
Department of Land and
Natural Resources and Chair
of the Board of Land and
Natural Resources: BOARD OF
LAND AND NATURAL RESOURCES,
STATE OF HAWAII; DEPARTMENT
OF LAND AND NATURAL RESOURCES
STATE OF HAWAII,

Defendants.

Civil No. 97-2597-07
{Injunctions}

AFFIDAVIT OF
DR. MICHAEL D. JONES;
EXHIBITS "A" and "B"

AFFIDAVIT OF DR. MICHAEL D. JONES

STATE OF HAWAII

CITY AND COUNTY OF HONOLULU

MICHAELO D. JONES, having been first duly sworn, deposes
on oath and says that:

1. He makes this affidavit in support of Plaintiffs

Motion for A Preliminary Injunction.

2. Affiant is a physicist employed as an Associate
Researcher in the University of Hawaii High Energy Physics Group,
and has been teaching and conducting research at the University
of Hawaii since 1976. Affiant submits this Affidavit in his
personal capacity and not as a representative of the University.

3. Affiant's background and familiarity with the
Strategic Target System ("STARS") program are further described
In a previous affidavit, attached to Plaintiff's Motion for Preliminary Injunction as Exhibit 11. That affidavit, and its exhibits "A" through "E", are incorporated herein by reference.

4. As explained in his earlier affidavit, Affiant believes that the State of Hawai'i's EA is inadequate in at least two very important respects. First, the EA fails to evaluate adequately results of computer calculations of concentrations of hydrogen chloride ("HCl"). Second, the EA fails to analyze comprehensively the adequacy of the 10,000 foot-radius Ground Hazard Area ("GHA"). Both of these issues have serious implications for public health and safety, as well as for the natural environment, but neither have been addressed adequately by the State in its EA, or by the Army in its EIS (on which the State wholly relies).

5. It is Affiant's understanding that the Army has stated that Affiant "raises no air quality concerns that have not been previously addressed," and refers to the analysis presented in its Draft Environmental Impact Statement ("D/EIS") to support this statement.

6. As stated in his prior affidavit, Affiant has analyzed the results of the air quality modeling performed by the Army to determine concentrations of HCl and carbon monoxide resulting from STARS launches and has found those results to vary widely. The Army's air quality modeling results have been published over an extended period, beginning in 1990 with its environmental assessment ("EA"), and including a supplemental EA and an EIS. These modeling results have varied substantially over time. The supplemental EA predicted HCl concentrations at the edge of the GHA following a normal launch would be .016 parts per million ("ppm"), measured as a 60-minute average, and .007 ppm as an eight-hour average. The Handbook guideline for HCl exposure, referred to in the Supplemental EA, is an eight-hour time weighted average of .025 ppm, and the predicted concentration was thus well below the State's guideline.

7. Subsequent to the Army's release of its supplemental EA, the Army agreed to comply with certain restrictions on STARS launches, apparently at the request of the State of Hawai'i Department of Health's Air Quality Division. These restrictions are outlined in the attached memorandum from Lt. General Robert Hammond, attached hereto as Exhibit "A", and included the following: that no STARS launches occur in the rain, and that the first STARS launch not occur when the wind speed is less than one meter per second.

8. Subsequently, the Army produced its EIS, which contained a new analysis of emissions concentrations following a STARS launch. The eight-hour weighted average for HCl, the measurement which could be compared to the State of Hawai'i's guideline of .025 ppm, is not listed within the EIS, but the calculation of the eight-hour average is contained in the EIS Administrative Record. These calculations are attached to Affiant's prior Affidavit as exhibit C.

9. The HCl concentration predictions in the Draft EIS are over six times higher than those in the Supplemental EA. For a normal launch the eight-hour average at the edge of the GHA is
In the case of an early flight termination, these calculations predict that the State of Hawaii guideline will be exceeded out to 36,000 feet from the launch pad, far beyond the 10,000 foot-radius GHA. Affiant notes, however, that despite the dramatic increase in predicted HCl concentrations, the previous restrictions on when to launch the STARS missile are absent from the Strategic Defense Initiative Organization's ("SDIO") June 1992 Record of Decision.

10. As he has detailed in Exhibit A of his prior Affidavit, Affiant has tried repeatedly to bring to the attention of the State the fact that the State of Hawaii's HCl guideline will be exceeded. Affiant detailed this fact in supplemental comments on the State's HOA-EA, submitted to the Department of Land and Natural Resources on September 22, 1992. A true and complete copy of those supplemental comments are attached hereto and incorporated herein as Exhibit "B". Affiant has received no reply to his supplemental comments from any State of Hawaii department or official.

11. It is Affiant's understanding that the Army has stated that it "has fully responded" to concerns regarding the inadequacy of the GHA to contain dangerous debris in the case of a catastrophic booster failure, and that it has "shown that the ballistic momentum of the missile in flight is such that any debris from early flight termination would either fall within the GHA . . . or it would fall into the broad ocean area." It is Affiant's further understanding that the Army relies on its own EIS, the State's HOA-EA, and document 242 and page 20 of document 332 from the STARS EIS Administrative Record ("AR") in making this statement.

12. Affiant has fully reviewed the EIS and the HOA-EA, and has found that the analysis therein does not support the Army's conclusion. Affiant has also reviewed document 242 and page 20 of document 332 from the EIS AR and finds that neither contains any discussion of debris containment within the GHA.

13. As Affiant stated in his prior Affidavit, and detailed in Exhibit E of that Affidavit, a critical factor in determining whether or not all debris is contained within the GHA is the amount of time it takes the flight safety officer to terminate the flight. The flight safety officer's access to reliable data, and the time taken to interpret these data and make the decision to terminate is not adequately analyzed. It is Affiant's expert opinion that an analysis of the adequacy of the STARS GHA should be conducted using actual data, including the response of the flight safety officer. Because no STARS missiles have ever been flown, this analysis should include an examination of recent flight terminations of missiles with comparable GHAs.

14. It is Affiant's expert opinion that the pattern of debris dispersion following a failed Aries launch, which took place in Florida on August 20, 1991, would provide a meaningful comparison with the debris dispersion following a similar STARS launch failure. Aries launches have been proposed at the Pacific Missile Range Facility ("PMRF"), the GHA for the Aries at PMRF is equal in size to that proposed for the STARS launches, and in
both cases the range safety officer's judgment is required to terminate a launch that goes off course.

14. Affiant has requested detailed information regarding the dispersion of debris following the Aries flight termination, both in his comments on the STARS EIS, and in three subsequent letters to the SDOI. Affiant has received no detailed information, and has been informed that the Aries failure is not relevant to the STARS launches. Affiant was also told that "the causes of the Aries failure are well known and have been, and continue to be, examined within the Strategic Target Systems Program." Affiant notes, however, that in response to an October 20, 1992, Freedom of Information Act request for more information about the Aries failure, submitted by the Sierra Club Legal Defense Fund at Affiant's request, the Army responded that "other than the information contained in the Strategic Target Systems Environmental Impact Statement, we have no documents concerning the August 20, 1991 Aries launch failure."

15. The limited information provided by the SDOI in response to Affiant's requests has included the fact the flight safety officer waited until 21 seconds into the flight to terminate the flight "because of a belief that the missile would correct to its proper trajectory." As stated by Affiant in his earlier Affidavit, and reviewed in detail in Exhibit E of that Affidavit, Affiant's calculations show that if the STARS missile was terminated 21 seconds after launch, the center of mass of the debris would impact over 44,000 feet from the launch pad. If the STARS flight safety officer made a similar decision for a launch

where the missile pitched toward the southeast, debris could impact the town of Kekaha.

Further affiant sayeth not.

Subscribed and sworn to before me this 27th day of January, 1993

Michael D. Jones
Notary Public, State of Hawaii
My commission expires: 3/1/96
DEPARTMENT OF THE ARMY  
Pentagon, Washington, D.C. 20310  
August 21, 1991

CSRD-ER

MEMORANDUM FOR Deputy Commander, U.S. Army Strategic Defense Command, ATTN: STAR-ER-BPM, P.O. Box 1500, Huntsville, AL 35807-1500

SUBJECT: Strategic Target System (STARS) Program Supplemental Environmental Assessment

1. You are hereby notified that all required environmental analysis and documentation for the subject program have been completed. During the thirty-day public comment period no issues were raised which were not adequately addressed in either the supplement or the Environmental Assessment. However, at the request of the State of Hawaii Department of Health, Air Quality Division, STARS launches will occur with the following three restrictions:
   a. No launch will occur in the rain.
   b. The first launch will not occur when the wind speed is less than one meter per second.
   c. The emissions monitoring plan for the first launch will be coordinated with the Air Quality Division.

2. After careful consideration and review of the public comments, and in keeping with the national policy goals supported by the President and Congress, I have decided that you may resume activities for your program once the Federal District Court of Hawaii has lifted the injunction.

3. Point of contact for this action is Mr. Randy Gellin at (205) 525-1294.

ROBERT D. HAINES  
Executive General, USA  
Commanding

Sept. 22, 1992

Dear Mr. Paty:

I have already submitted comments dated Sept. 5, 1992 on the draft Environmental Assessment for the proposed Memorandum of Agreement (MOA) concerning the ground hazard area for Strategic Target System (STARS) launches from the Pacific Missile Range Facility on Kauai. This letter contains some additional comments based upon my examination of the Administrative Record (AR) for the STARS EIS, which I saw for the first time today. Based upon this review and other STARS information, I think that the State of Hawaii is not justified in signing the MOA until more information is provided and more evaluation is done.

One of the serious deficiencies in the AR for the STARS EIS is that several documents are missing. In some cases a single sheet of paper with the initials TBD is the only thing in the notebook where the document should be. In other cases only the first page of the document is present. For example, documents 249 and 250 have only the cover page present. These are NASA technical memoranda which are cited in the STARS EIS as evidence that the REEDM computer model calculations are not in context with the calculations of hydrogen chloride and carbon monoxide concentrations agree with data. How can one evaluate this claim if the document is missing from the AR?

Document 228 contains a memo plus a copy of the REEDM computer printout for the calculation of hydrogen chloride concentrations. There are handwritten notes on some of the pages which convert the 60-minute average values calculated by the program to 6-hour average values. The Hawaii guideline for public exposure to hydrogen chloride is an 8-hour average value of 0.025 ppm. The calculated concentrations at the boundary of the ground hazard area (3,000 meters from the launch pad) in document 228 are 0.043 ppm for a normal launch and 0.208 ppm for the case of a conflagration resulting from an early flight termination. These 8-hour average values were not included in Table 4-3 of the STARS EIS and are both larger than the Hawaii guideline. A hand-written note on the page for the conflagration scenario states that the Hawaii guideline "could be exceeded up to 11,000 m." I reported this information to Tyler Sugihara in the Clean Air Branch of the Hawaii Dep. of Health this afternoon. I had talked to him in July about these air quality issues and hoped that he would do an evaluation of this new information in the AR. He told me that he had been instructed not to comment upon it or to do further work on STARS issues and that my comments should be directed to the Attorney General's office.

In conclusion, the State of Hawaii should insist that the documents missing from the AR for the STARS EIS be provided and be made available for public examination. Once all of these documents are available, independent evaluation of air quality impacts, particularly the results of the REEDM computer calculations, needs to be

EXHIBIT B
IN THE CIRCUIT COURT OF THE FIRST CIRCUIT
STATE OF HAWAI'I

SIERRA CLUB, a California non-profit corporation; 1000 FRIENDS OF KAUAI, a Hawaii non-profit corporation,
Plaintiffs,

vs.
WILLIAM W. PATY, JR., in his capacity as Director of the Department of Land and Natural Resources and Chair of the Board of Land and Natural Resources; BOARD OF LAND AND NATURE RESOURCES, STATE OF HAWAI'I; DEPARTMENT OF LAND AND NATURAL RESOURCES, STATE OF HAWAI'I,
Defendants.

Civil No. 92-2597-07
(Injunctions)

AFFIDAVIT OF KENNETH R. WOOD

AFFIDAVIT OF KENNETH R. WOOD

STATE OF HAWAI'I
CITY AND COUNTY OF HONOLULU

KENNETH R. WOOD, having been first duly sworn, deposes on oath and says that:

1. He makes this Affidavit in support of Plaintiffs' Motion for Summary Judgment And/or For A Preliminary Or Permanent Injunction.

2. Affiant resides at 4774 Ali'i Road in Hanapepe, Hawai'i.

3. Affiant is currently employed with the National Tropical Botanical Garden in Lawa'i, Kaua'i, and with the Hawai'i Plant Conservation Center as a Field Botanist. He is also Grove Farm Company's Head Arborist, and his principal responsibility is to care for the Company's historic trees. In addition, Affiant is a private botanical consultant and has contracted with government agencies and private organizations.

4. Affiant has over 20 years of experience working with plants in general and 10 years of experience working with the native Hawaiian flora specifically. His area of specialization is rough-terrain field botany, and he has botanized areas never before surveyed and areas not surveyed in recent decades. Affiant and his colleagues discovered 12 new tawa of Hawaiian plants on Kaua'i in the last 3 years, including what may be a new genus in the Hawaiian flora. They also rediscovered several species of plants previously thought to be extinct.

5. In his capacity as Field Botanist for the Garden and Center since 1989, Affiant has surveyed native plant populations and communities throughout the Hawaiian Islands, including native coastal ecosystems. Affiant's responsibilities as Field Botanist include collecting and preparing vouchers for plant specimens, and documenting information on the location, population status, threats and management recommendations for these plants. Affiant's work focuses on rare, threatened and endangered plants and native communities of plants and animals.
He collects seeds and cuttings of rare, threatened and endangered Hawaiian plants for scientific research and propagation by botanical gardens. He also pollinates some of these plants in the wild, whose pollinators are no longer extant.

6. As a result of Affiant's field work, consulting and continued interest in the native Hawaiian flora, he is familiar with the status of native Hawaiian plants and communities on Kaua'i. He has personally surveyed the vegetation on the Moli'i Dunes and at Polihale State Park approximately 12 times in the last 3 years. Affiant's most recent survey of the Moli'i Dunes and Polihale State Park was conducted on December 14, 1992.

7. Affiant has reviewed portions of the State of Hawai'i's Environmental Assessment for the use of state lands as a Ground Hazard Area ("GHA") for the Strategic Target System ("STARS") and Vandal missile launches. It is his expert opinion that the State's use of the Moli'i Dunes and Polihale State Park as a GHA could significantly and adversely affect rare and endangered plants and native communities in the GHA and vicinity. Adverse impacts to native anasises could also be expected when the native vegetation is disturbed.

8. It is also Affiant's expert opinion that the native plants and communities on the Moli'i Dunes and in Polihale State Park are significant, unique and irreplaceable natural and cultural resources.

9. Affiant states that the coastal zone in Hawai'i occupies a relatively narrow belt around each island. Native coastal communities are rare today. Many have been lost or degraded by human-related activities, including land development, recreation, fire and the introduction of non-native species. Coastal shrublands dominated by native plants other than naupaka (Scaevola sericea), may be remnant native communities, particularly in undeveloped remote areas, such as Moli'i and Polihale.

10. A unique native coastal community, the Chamaesyce celastroides Coastal Dry Shrubland, is known only from Polihale State Park, although there is historical evidence that this community-type was previously more widespread. The total currently known extent of this unique community-type is only 5 to 10 acres. As a unit, the Chamaesyce celastroides community is rarer than its individual native plant and animal components.

11. Because of their great isolation and considerable age, the Hawaiian Islands harbor a unique and remarkable flora with a higher degree of endemism than any comparable area in the world. Native communities are multi-faceted examples of species evolution, representing webs of interrelationships between plants and animals that evolved in relative isolation over millions of years. Hawai'i's remaining native communities must be protected. Maintaining native communities, such as the Chamaesyce celastroides Coastal Dry Shrubland at Polihale, may be the best hope in preventing further species extinctions in Hawai'i.

12. In addition to the Chamaesyce celastroides.
community at Poipu State Park, at least three rare and endangered Hawaiian plants are found within the GHA. The endangered ‘ohi‘a (Sobania sommeri) is found within the GHA on the Ho‘ihi Dunes, in the Park and inland at Kana.

13. The largest currently known population of _Ophioglossum continuum_, is located at the Pacific Missile Range Facility ("PMRF"). This fern, which is a candidate endangered species, is found within the GHA at the Kaua‘i Test Facility, farther south in PMRF, and north of PMRF in Poipu State Park.

14. The extremely rare and endangered _Panicum nilhauense_ was discovered in Poipu State Park in 1992. _P. nilhauense_ was previously thought to be extinct; it is a candidate for listing. It is known only from the island of Ni‘ihau and was last collected there in 1949. The current status of the Ni‘ihau population is unknown, and it may have been destroyed by decades of extensive grazing. The population of _P. nilhauense_ at Poipu State Park is within the GHA and represents the only currently known population of this species in the world. _P. nilhauense_ occurs with the co-dominant native ‘ilima (Sida fallax) and ‘a‘ali‘i (Erodostoma viscosum). On December 14, 1992, Affiant surveyed the vegetation at Poipu State Park and documented only 21 individuals of _P. nilhauense_. Affiant also noted a native coastal vine community dominated by the morning glory, _Ipomoea pes-caprae_ in Poipu State Park.

15. Affiant states that at the mouth of Na‘ale‘ele Gulch and northeast of Kapa‘ula He‘eia above Poipu State Park, there are populations of the endangered dwarf ilīlua (Milksia hawaii) and endangered _Schiedea anakamna_.

16. Introduced kiawe (Prosopis pallida) trees and understory alien species of grasses are found on the Ho‘ihi Dunes and in Poipu State Park. Sugarcane (Saccharum officinarum) is planted inland on the Kaua‘i Plain, which is included in the GHA. These non-native elements threaten native plants and animals by competing for space and essential resources. Native plants and communities in the GHA and vicinity are also threatened by fire, human-related disturbances, off-road vehicles and erosion.

17. As a field botanist, Affiant has witnessed species extinctions caused by the misdirected pursuits of man. Affiant believes that the use of Ho‘ihi Dunes and Poipu State Park as a GHA for STARS and Vandal missile launches increases the risk of extinctions of rare and endangered Hawaiian plants and the loss of native communities in the GHA and vicinity. In the event of an explosion at the Kaua‘i Test Facility or an early flight termination, burning missile debris and fuels could reach the ground and start fires. This could mean the loss of these endangered plants and communities forever. Such fires could destroy the only known occurrence of the _Chamaesyce gelastroides_ Coastal Dry Shrubland, the last known population of _Panicum nilhauense_ and other native plants and communities in the area.

18. The _Chamaesyce gelastroides_ Coastal Dry Shrubland and endangered plants at Ho‘ihi and Poipu are surrounded by kiawe. Along with this area being one of the driest locations on
Kaua'i (averaging <10 inches of rainfall annually), the presence of kiawe increases the likelihood of fires and the destruction of native plants and communities in the GHA.

19. Native plants and communities in the GHA are also threatened by fire-fighting activities, such as ground-breaking and the use of tractors, trucks and high-powered nozzles. Noising fires could cause damage to cultural resources, such as Hawaiian burials in the Mokihiki Dunes. Moreover, allowing the fire to burn could result in total destruction of rare and endangered plants and native communities in the GHA and vicinity. Fires also favor certain introduced and aggressive plants, which could replace native species. Natural and cultural resources in the GHA could also be harmed by the removal of soils contaminated with liquid propellants.

20. Affiant believes that in its Environmental Assessment, the State does not adequately discuss the importance of these resources and the potential significant impacts of establishing the GHA for missile launches, including the increased risk of fires. Furthermore, the use of Mokihiki Dunes and Polihale State Park as a GHA for the STARS and Vandenberg missile launches may significantly and adversely affect unique and irreplaceable native plants and communities, including endangered species. A thorough assessment of the resources and impacts should be disclosed in a comprehensive Environmental Impact Statement.

Further, Affiant sayeth naught.

[Signature]

[Beckey Public, State of Hawaii]

Subscribed and sworn to before me this 7th day of December, 1992.

[Signature]

My commission expires: [Signature]

[Printed Name]

[Title]

[Hearing Officer]

[Date]
IN THE CIRCUIT COURT OF THE FIRST CIRCUIT
STATE OF HAWAII

SIERRA CLUB, a California non-
profit corporation; 1000 FRIENDS
OF KAUA'I, a Hawaii non-profit
corporation,

Plaintiffs,

vs.

WILLIAM H. PATY, JR., in his
capacity as Director of the
Department of Land and Natural
Resources and Chair of the
Board of Land and Natural
Resources; BOARD OF LAND AND
NATURAL RESOURCES, STATE OF
HAWAII; DEPARTMENT OF LAND AND
NATURAL RESOURCES, STATE OF
HAWAII,

Defendants.

Civil No. 92-2597-07
(Injunctions)

AFFIDAVIT OF
WILLIAM H. SAGER

STATE OF HAWAII
CITY AND COUNTY OF HONOLULU

WILLIAM H. SAGER, having been first duly sworn, deposes.
on oath and says that:

1. He makes this Affidavit in support of Plaintiffs' Motion For Summary Judgment And/Or For A Preliminary or Permanent
Injunction.

2. Affiant has a B.S. degree (1956) in Forest Management from Oregon State University.
3. Affiant is currently employed as a private consultant in the field of forestry management, including fire management, and in computer systems design.

4. Affiant was trained by the United States Forest Service in fire behavior and fire-fighting strategy. He has 20 years experience in wildland fire fighting on the United States mainland and in the Hawaiian Islands. From 1956 to 1965, Affiant was employed by the Forest Service as a Forester. He was responsible for timber management at the district level and was dispatched several times each year to participate in supervision of fire-fighting operations in Oregon, Washington, Idaho and Montana. Affiant was also "red-carded" (certified) as a Sector Boss, who is responsible for supervising three 10-man fire crews.

5. From 1967 to 1971, Affiant was employed by the Hawaii Department of Land and Natural Resources Division of Forestry, as Assistant Maui District Forester. His duties included management planning for all districts, supervision and training of field crews, and training of volunteer wildland firefighting teams. Affiant also served as Crew Boss on fires in other districts.

6. In 1972, Affiant was promoted to the position of State Protection Forester for the Division of Forestry. His responsibilities as State Protection Forester included fire management planning, wildland fire training, and development of the Statewide Fire Plan. When dispatched to fires, Affiant functioned as Plans Chief, advising the Fire Boss as to what fire behavior to expect, how to best respond to the fires, and how to best achieve fire control. Affiant also taught wildland fire-fighting, including fire behavior, to county, state, and federal agencies involved in fire-fighting in Hawaii.

7. In Affiant's 20 years of employment as a Forester for the State of Hawaii, he fought fires on all of the main Hawaiian Islands except Lanai and Kaho'olawe, including fires on the west side of Kauai. Affiant is familiar with the physical nature and vegetation at Nohili Dunes and in Polihale State Park.

8. Affiant has reviewed the State of Hawaii's Environmental Assessment ("EA") for the use of state lands as a Ground Hazard Area ("GHA") for the Strategic Target System ("STARS") missile launches and Vandal missile launches at the Pacific Missile Range Facility ("PMRF") on Kauai. Affiant believes that fires in the GHA could result from an explosion at the launch pad or early flight termination. The federal Draft Environmental Impact Statement, which has been incorporated into the EA, states that a rain of burning debris could be expected to fall within the GHA in the event of early flight termination. It is Affiant's expert opinion that if this happened, and if conditions were dry and windy (which is frequently the case at Nohili), there could be an instantaneous ignition of hundreds of spot fires on the Nohili Dunes and in Polihale State Park. Depending on how widely the burning debris was distributed, fires could also be set in adjacent sugarcane fields as well.

9. Affiant understands that, in the event of an
explosion at the Kaua‘i Test Facility launch pad or early flight termination, burning missile debris, solid fuel and liquid fuel (on those missions carrying liquid propellant payloads) could reach the ground and start fires. The Army claims that such a scattering would occur within its established 10,000-foot GHA for STARS launches and within the 6000-foot GHA for Vandal launches. The two GHAs include portions of the Mokoli‘i Dunes, Polihale State Park, state roadways and state-owned lands at Mana leased to Kokua Sugar Company.

10. Affiant states that the vegetation in the Mokoli‘i Dunes and Polihale State Park is made up of a very flashy, light fuel (grass), which ignites readily and burns quickly, and a heavy fuel loading of native kahia (Prosopis pallida) trees, which burn long and hot. Numerous spot fires would quickly burn together to form a configuration that could approach a fully-fledged fire storm. Because of the intensity of the fires, a direct attack on the individual spot fires would be impossible. This means that the affected area could be totally involved in fires.

11. An indirect attack on such fires would entail the construction of fire breaks wide enough so that the fires burn to the breaks, but do not jump over the breaks. This approach to fighting such a fire at Mokoli‘i and Polihale assures that at least a D9 tractor and two 10-man crews trained in wildland firefighting would be in position and ready to respond on the Polihale flank of the fire. In reality, no one would be stationed within the GHA or beyond it toward Polihale, and if an early flight termination occurred, no one could reach the remote Polihale flank of the fire without passing through the fire area.

12. In the event of several simultaneous spot fires, Affiant expects that the entire vegetation from beach to sugarcane fields would burn. If the wind was favorable to push the fire upland toward Polihale, the fire would extend in a flanking movement across the Dunes toward Polihale. If fire personnel could reach the Polihale flank, a fire might be brought under control with hose lines and D9 bulldozers. However, with dry windy conditions and in situations with literally hundreds of spot fires starting simultaneously, the spot fires would burn together and all of the vegetation within the impact area would be totally involved in fire within 20 minutes. The head of the fire could move as quickly as 2 miles per hour given dry conditions and 15-knot winds. The flanks of the fire would be expected to expand to the sides at up to a half mile per hour.

The forested vegetation would be totally involved in fire within approximately an hour and a half.

13. Affiant also states that such a fire could also result in the burning of several feet of organic soil, causing damage not only to the vegetation, but to sub-surface cultural materials. In Affiant's experience fighting a fire at Pa‘au‘au on the island of Kaua‘i (with fuel loads similar to those at Mokoli‘i and Polihale), he observed fire burning 3 feet deep in the organic litter.
14. Following such a fire at Kohl's and Polihale, wind erosion resulting from the loss of protective vegetative cover would devastate the Kohl's Dunes. Arid conditions would make revegetating the Dunes difficult. Any seeding of the Dunes would probably be done with alien (non-native) grasses, which are known to grow quickly and survive in dry sites. If revegetation is successful, the non-native grasses would likely outcompete any surviving propagules of rare and endangered species in the area.

15. It is also Affiant's expert opinion that the State's EA does not adequately address: (a) the likelihood of such a fire scenario described above (the worst-case scenario); (b) the necessary fire-fighting capabilities to contain such a dune and cane fire; and (c) the fire-fighting capabilities by the United States military for fires set in the GHA and vicinity, in the event of an explosion at the launch pad or early flight termination.

16. The use of a portable blast deflector, clearing of dead brush around the launch pad at the Kaualii Test Facility, spraying of vegetation adjacent to the launch pad, and the presence of fire crews should prevent fires from occurring at Kohl's Dunes and Polihale State Park during a normal launch. However, the possibility of controlling a fire resulting from an explosion at the launch pad or an early flight termination is not addressed in the State's EA. The use of water pumps mounted on all-terrain vehicles would be the most effective way of controlling the fire flanks, however, the effects of this type of fire-fighting on the Dunes are not addressed in the EA, and the use of such equipment is not even considered.

17. It is Affiant's understanding that the fire-fighting capability at PMRF consists of crash rescue equipment and structural fire-fighting equipment. He is not aware of any off-road fire-fighting capabilities or the availability of the types of fire hose line used to lay wetted lines.

18. Affiant states that the State Historic Preservation Officer has indicated that the best mitigation for historic site protection, in the case where the vegetation on the Kohl's Dunes should ignite, may be to allow a fire to burn itself out. However, the State has not discussed this possibility and its potential significant impacts to resources in the area.

19. It is Affiant's expert opinion that given the worst-case scenario of dry windy conditions and a rain of burning missile debris and fuel, the only viable response would be to allow the fire to burn through the Dunes and try to stop it before it reached the cliffs. The effects of such an extensive fire should be thoroughly evaluated in a full Environmental Impact Statement.

20. Affiant states that the risks of fire and destruction of resources and property increase with the number of launches. Although the State's Memorandum of Agreement with the United States military to establish the GHA would only be in effect for 1993, the STARS Program is a 10-year one. The State's EA does not adequately discuss the cumulative impacts of fires
over the long-term. The State also fails to include in its EA all relevant information relating to Vandal, EDX, and possibly other launches requiring the establishment of a GHA, so Affiant is unable to comment specifically on the increased risk of fires and damage to resources and property at PHRF and within the GHA. Experience shows that in the case of repeated fires in a given area, each successive fire destroys two-thirds of the surviving vegetation. Three hot kia'ele fires on the slopes above Kaunakakai on Moloka'i have left the area barren.

21. It is fundamental that when fires are spotting over the line and cannot be controlled, crews must get out of the way. If an aggressive fire team entered a fire area in an attempt to control individual spot fires during the initial fire build up, they could very easily be trapped and killed. Both the fire planning and the fire effects addressed in this EA are totally unrealistic.

Further, Affiant sayeth naught.

[Signature]

Subscribed and sworn to before me this 10th day of December 1999.  January, 1993

[Signature]

Notary Public, State of Hawai'i

My commission expires: 11-18-93
Missing the Target:
SDI in the 1990s

by David C. Wright

David C. Wright is a research analyst with the Union of Concerned Scientists. He was previously a research analyst for the Federation of American Scientists, a visiting scholar at the Center for International Studies at the University of Maryland, and a SSRC-MacArthur Fellow at Harvard University's Center for Science and International Affairs. He holds a PhD in Physics from Cornell University.

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### Executive Summary

In response to the dramatic world events of recent months and years, the Bush administration and some in Congress have sought to redirect the Strategic Defense Initiative (SDI) away from defense against large missile attacks by the former Soviet Union toward defense against more limited missile threats. The threats have been defined either as accidental or unauthorized launches from the former Soviet Union, or as potential strikes by Third World countries such as Iraq or Libya. Motivated in part by a surge of concern about Iraqi missile attacks on Israel and Saudi Arabia in the Gulf War, the US Congress greatly increased funding for SDI in Fiscal year 1992 and approved a bipartisan proposal to develop a "limited SDI system.

In light of SDI's new mission and heightened profile, the Union of Concerned Scientists has taken a fresh look at the SDI debate. This reevaluation includes an assessment of the threats, SDI is intended to address, the feasibility of reducing those threats through missile defense, the costs of the proposed systems, and alternatives to SDI.

Our analysis leads to four main conclusions. First, the threat to the United States from ballistic missiles is far smaller now than during the Cold War and should continue to decrease with planned reductions in the former Soviet arms. Second, there is no Third World country with both the technical capability and hostile intent to threaten the United States with ballistic missiles, and so such a threat is likely to emerge for at least a decade and probably longer. Third, many of the most difficult technical problems that plagued earlier proposed SDI systems have not been resolved, thus calling into question the ability of SDI to provide a reliable defense even against limited missile threats. And fourth, investing scarce dollars and intellectual capital in SDI diverts resources away from more effective security measures, such as reducing nuclear arsenals worldwide and preventing nuclear and ballistic missile proliferation. These findings are detailed below.

**MAJOR FINDINGS**

- With the disappearance of hostility between the United States and the former Soviet republics and the reduction of the alert levels of their nuclear forces, the threat of missile attack on the United States is lower today than it has been for over a quarter century. This threat will further decrease with planned reductions in US, Russian, and other nuclear arsenals.

- There continues to be a small danger of accidental or unauthorized launches against the United States from former Soviet republics, but SDI can do nothing to reduce this danger in the near term, when it is likely to be most serious. Over time, the threat can be reduced to a near negligible level by other means than SDI, such as taking weapons off alert, separating the warheads from the delivery vehicles, and dismantling and destroying warheads and delivery systems. Improved control procedures and destruct-after-launch mechanisms are additional options that should be fully studied.

- Since no country other than those in the Commonwealth of Independent States (CIS) could launch an attack on the United States with more than a few missiles, there is no rationale for an SDI system at large.
as that proposed either by Congress (the Limited Defense System) or by the Bush administration (GPALS).

- No Third World country hostile to the United States currently possesses the capability of launching a missile attack on the United States or is likely to acquire that capability until well into the next century. Any Third World missile threat in the near term will involve short-range missiles directed against US allies and troops abroad. Such threats justify research and development of theater missile defense (TMD), but not deployment of an SDI system designed to protect the United States.

- If an adversary were determined to attack the United States with nuclear weapons, ballistic missiles would be only one of several possible means of doing so, and probably one of the least likely. In this circumstance, deployment of an SDI system might do little more than shift the threat from one delivery mode to another, such as ships or aircraft, without reducing the overall likelihood of attack.

- If an adversary chose to attack with missiles, it could employ countermeasures to foil the SDI defense, using technologies that are simple compared to the technologies required to build the missiles themselves. Even in the absence of countermeasures, a defense system could be vulnerable to hidden errors or limitations in its own computer software. In either case, the defense could be rendered partially or wholly ineffective. Both problems were illustrated in the performance of the Patriot missile system during the Gulf War.

- Since a deliberate attack on the United States would most likely be a terrorist-style strike on cities using nuclear or biological weapons, the proper criterion for assessing the effectiveness of an SDI system is that it be able to stop all incoming warheads. Because of the inability to test the system under realistic conditions, however, US leaders may never have full confidence in its ability to intercept even a single ballistic missile.

SDI'S DIRECT AND INDIRECT COSTS

The price of deploying even a limited missile defense of the United States is very high and must be weighed against the limited role SDI could play in reducing military threats. Surprisingly, the very large direct costs of SDI have been virtually ignored in recent congressional debates. The sum of the Strategic Defense Initiative Organization's projected annual budgets for 1993 through 2005 is $5 billion (FY 1992 dollars), over and above the $30 billion spent from 1982 to 1992. The cost of a ground-based SDI system deployed at just one site—enough to protect the entire country—is estimated by the Congressional Budget Office to be more than $16 billion through 2003, not including operations and maintenance and possible cost overruns. The cost of the full-space and ground-based GPALS system proposed by the Bush administration is officially estimated to be about $50 billion, but would approach $100 billion if operations and maintenance and possible cost overruns are considered.

There has been even less debate on the indirect costs of proceeding with an accelerated SDI program. These costs include impacts on relations with the former Soviet republics, efforts to reduce world nuclear arsenals to very low levels, efforts to block nuclear proliferation, and spending for other programs.

The future of the Anti-Ballistic Missile (ABM) Treaty must be considered because of its continued importance to the strategic posture of both the United States and the nuclear-armed members of the Commonwealth of Independent States. The most direct and effective means of protecting US security in the long term is to negotiate deep and irreversible reductions in the nuclear arsenals of the former Soviet republics. The ABM Treaty is still needed to create a stable and predictable environment for such reductions to take place.

Moreover, should both the United States and Russia deploy limited missile defenses, the result could be to block efforts to restrict or reduce the arsenals of other nuclear-armed countries such as China. In addition, any Third World countries may view the deployment of an SDI system (especially a global, space-based system) as an effort to expand US global military dominance. This perception could complicate efforts to renew the Non-Proliferation Treaty (NPT), which allows for the spread of nuclear weapons to states that are currently largely ignored. SDI diverts money, attention, and commitment from those far more promising solutions and thus undercuts, rather than enhances, US security.

CONCLUSIONS AND RECOMMENDATIONS

SDI should not be the basis of US security policy. Major technical problems with missile defense remain unsolved. More important, current and projected missile threats to the United States do not justify a rush to deploy defenses, but rather argue for a range of options that are today largely ignored. SDI diverts money, attention, and commitment from those far more promising solutions and thus undercuts, rather than enhances, US security.

These conclusions and the emboldened analysis lead to the following recommendations:

- SDI's mission should not be defending against accidental or unauthorized strikes on the United States from the former Soviet republics. This danger can be addressed more effectively and much sooner by means other than missile defenses.

- Congress should not commit to deploying any form of missile defense now. Potential Third World missile threats do not justify the very large expenditures and diversion of resources that deployment of an SDI system would require. Continuing research and development, but not deployment, of strategic missile defenses will provide an adequate hedge against any threats that might emerge in the future.
The SDI program should be redirected away from near-term deployment and its funding should be reduced accordingly. A recent study by the Congressional Budget Office found that a robust research and development program could be funded at $13 billion in FY 1993. The SDI budget should be reduced to this level or less.

Congress should formulate more explicit criteria for SDI deployment. Congress's requirement that defenses be "cost effective" and "operationally effective" should be clarified. At a minimum, Congress should require that no SDI system be considered for deployment unless it meets the following criteria: First, it should not be susceptible to countermoves of technical sophistication comparable to or less than that of ballistic missiles themselves. Second, it should be amenable to full testing under realistic operating conditions to verify reliability. And third, it should not be susceptible to circumvention by alternate means of delivery readily available to potential adversaries of the United States. The United States should not abandon the ABM Treaty, but should begin discussions with the former Soviet republics to clarify its terms. These discussions, which could take place in a forum such as the Standing Consultative Commission, should lead to the formulation of guidelines to distinguish theater missile defenses from strategic missile defenses and to define the types and roles of permitted space-based sensors.

Theater missile defense (TMD) should be removed from the SDI program and put back into the hands of the armed services. Theater missile defense poses different technical problems and has different missions than strategic defense and consequently does not properly fall within an organization whose primary focus is strategic defense. TMD should be under the control of the armed services because it would be integrally linked to their theater operations and is related to their work in other areas, such as theater air defense.

Congress should exercise greater oversight of the SDI program. Congress should conduct a full investigation of allegations of mismanagement and waste in SDI and should impose more stringent oversight if evidence supports these allegations. In addition, oversight should be strengthened to ensure that the direction of the SDI program is consistent with that mandated by Congress.

Congress should mandate a full investigation of the performance of the Patriot anti-missile system in the Gulf War. The perception that the Patriot was successful in destroying a large fraction of Scud warheads in the Gulf War contributed to the resurgence of support for SDI, but evidence now suggests that Patriot's performance fell far short of early reports. It is essential that all information regarding Patriot's performance be provided to independent investigators to determine what lessons, if any, may be drawn for SDI.

Recommendations for Missile Defense Research

Direct SDI toward exploring basic technologies but not producing complex or systems for deployment. Developing components and systems now, in the absence of a clear threat justifying deployment, tends to lock in current technology and hinder development of new technology that may be more effective.

Conduct research, development, and testing of strategic defense technologies within the bounds of the traditional interpretation of the ABM Treaty. Detailed studies of the SDI program have concluded that all of the outstanding technical issues related to achieving the feasibility of SDI concepts can be addressed within the ABM Treaty as traditionally interpreted.

Focus the R&D program on the key unresolved problems that underlie missile defenses. These problems include the susceptibility of the interceptors to countermeasures and the reliability of computer software. They must be resolved before large expenditures for developing defense components and systems for deployment can be justified.

ALTERNATIVES TO SDI

Restricting SDI to basic research and development does not mean ignoring existing and potential nuclear threats to the United States. On the contrary, the Union of Concerned Scientists recommends an active program to reduce these threats, as described in a recent report, "A Program for World Nuclear Security," by Jonathan D. Cass and Kurt Vandeford. Some of the key elements of this approach and other measures are summarized below.

Measures to Prevent the Spread and Use of Nuclear Weapons

- Reduce the threat from the Commonwealth of Independent States by negotiating deep cuts in nuclear arsenals, removing the remaining weapons from alert, and separating the warheads from the delivery systems. Provide additional resources for dismantling weapons, removed from the arsenal and disposing of the fission material.

- Strengthen the Nuclear Non-Proliferation Treaty (NPT) and help to assure its renewal by making a stronger commitment to deep cuts in nuclear weapons and negotiating an end to the testing of nuclear weapons.

- Strengthen the LAEM and update and strengthen nuclear safeguards based on the lessons from the Iraqi nuclear program. Sanctum the use of go-anywhere LAEM inspections, which have only been used in Iraq and increase funding for them. Require that all sales of nuclear technology be reported to the IAEA with stiff penalties for non-compliance.


- Promulgate and ratify the Chemical Weapons Convention with strong verification measures.

Measures to Control the Spread and Use of Delivery Systems

- Work with Russia and other nuclear powers to install direct-after-launch mechanisms on all ballistic missiles.

- Negotiate restrictions on flight testing of ballistic missiles, possibly beginning at a regional level or by extending the Intermediate-Range Nuclear Forces (INF) Treaty to a global level.

- Strengthen the Missile Technology Control Regime (MTCR) and expand its membership.

- Restrict the transfer of delivery systems other than missiles, such as long-range attack aircraft. In cooperation with other major arms suppliers, reduce arms sales and transfers of all kinds to the developing world.

- Link economic aid programs to restrictions on military programs in the recipient countries.
Introduction

Events of the past few years have radically changed the public's perception of military threats facing the United States. The Cold War fear of a massive nuclear attack by the Soviet Union has been replaced by new concerns over nuclear and ballistic missile proliferation, regional conflicts, and political instability in the former Communist bloc.

In this atmosphere, the Strategic Defense Initiative (SDI) has found new life. Originally conceived by President Ronald Reagan as a near-perfect defensive shield against Soviet ballistic missiles, the program was in decline under the Bush administration until early 1991, when its mission shifted to defending against warheads limited missile threats. These threats have been defined either as accidental or unauthorized launches from the former Soviet Union, or as potential strikes by Third World countries such as Iraq or Libya.

Motivated in part by Israeli missile attacks on Israel and Saudi Arabia in the Gulf War, the US Congress greatly increased funding for SDI in FY 1992 and approved a bipartisan proposal to "develop for deployment" a limited SDI system.

In stark contrast to earlier debates over SDI, this proposal passed with a majority of discussion within Congress and the broader policy community. Yet there are many issues that should be discussed and resolved before a final commitment to a defense deployment is made. In the interest of meeting this need, the Union of Concerned Scientists has taken a fresh look at the case for and against the "new" SDI. This examination includes an assessment of the threats SDI is intended to address, the feasibility of reducing those threats through missile defense, the cost of the proposed defense systems, and alternatives to SDI. This report discusses the results of this appraisal.

The first section of the report describes the several shifts and turns of the SDI program over its nine-year history, and demonstrates that although the systems proposed for deployment by the end of this decade are billed as a "new" SDI, they really contain many of the same elements as previous proposals. The second section discusses the two major missile threats to the United States, arguing that although the possibility of accidental or unauthorized attacks from the former Soviet Union is a serious concern, the chance of such an attack is very small and declining. On the other hand, there is a Third World country with both the technical capability and hostile intent to threaten the United States with ballistic missiles, and such a threat is likely to emerge for at least 10 to 15 years. The third section argues that even if a Third World missile threat eventually emerges, an SDI system using current and foreseeable technology would be of only limited utility in reducing this threat, especially in the absence of serious programs to counter other possible avenues of attack.

The fourth section discusses some of the important tradeoffs to be considered—such as the cost and the impact on prospects for deep nuclear arms reductions—that further diminish the attractiveness of an SDI deployment. The report concludes with a set of recommendations that would provide a far less expensive and more effective way for the United States to cope with existing and potential missile threats.

The Continuing Evolution of SDI

The decision by the United States to direct SDI toward limited missile attacks is the latest in a series of changes in the program's mission. When President Reagan first announced the program in March 1983, his aim was to protect the US public from a large-scale nuclear attack launched by the Soviet Union and eventually render nuclear weapons "impotent and obsolete." By 1987, this mission, which would have required a system reliable and effective enough to defend cities, was implicitly dropped as unrealistic and the focus shifted to protecting US nuclear forces from a disarming first strike. With the end of the Cold War and the reduced Soviet threat, however, congressional support for SDI began to wane, and by 1991, the annual SDI budget had been reduced to less than $3 billion, down from its peak of over $14 billion in 1990.

GPALS

In early 1991, SDI's focus shifted once again with the Bush administration's proposal to deploy a system called Global Protection Against Limited Strikes (GPALS). The goal of this system was defending the United States, its allies, and troops overseas from "limited missile attacks"—either accidental or unauthorized launches from the republics of the former Soviet Union, or intentional attacks from other countries that have long-range ballistic missiles now or might have them in the future. Since a limited intentional attack would be a strategic-style strike on cities, SDI's priority once again became proliferation defense.

The GPALS system proposed by the Strategic Defense Initiative Organization (SDIO) in April 1991 retained much from earlier plans, with the biggest change the budget still devoted to what was previously referred to as the "Phase I defense." GPALS was conceived as a global missile defense consisting of:

- 1,000 space-based "brilliant Pebbles" interceptors intended to intercept missiles launched from anywhere around the world;
- 750 to 1,000 ground-based interceptors based at 5-7 sites (several in the continental United States and one each in Alaska and Hawaii) to defend the United States against long-range ballistic missiles, and
- theater missile defenses against shorter-range ballistic missile attacks on US allies and forces overseas.

As the numbers suggest, the system would still be quite large, as previously it was sized to stop a simultaneous attack by up to 200 warheads (the number on a single Soviet Typhoon-class ballistic missile submarine). Besides the large number of interceptors involved, a key feature of GPALS is that it would deploy interceptors in space. It would also require substantial investments, or more likely, complete abandonment of the 1972 Anti-Ballistic Missile (ABM) Treaty between the United States and the former Soviet Union. This treaty prohibits all space-based defense and restricts ground-based defenses to 100 or fewer interceptors at a single site.

In the wake of the Patriot anti-missile system's perceived success against Scud missiles in the Gulf War, the seemingly growing threat of "countercatatally" Third World leaders, and political turmoil in the
Table 1. SDI budget and budget request for FY 1992 and FY 1993, showing selected programs (dollars in millions).

<table>
<thead>
<tr>
<th>Program</th>
<th>FY 1992 (Appropriated)</th>
<th>FY 1993 (Requested)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brilliant Pebbles</td>
<td>$130</td>
<td>$449</td>
</tr>
<tr>
<td>Brilliant Eyes</td>
<td>114</td>
<td>218</td>
</tr>
<tr>
<td>Ground-Based Radar (strategic)</td>
<td>38</td>
<td>89</td>
</tr>
<tr>
<td>Ground-Based Interceptor</td>
<td>172</td>
<td>159</td>
</tr>
<tr>
<td>Ground Surveillance and Tracking System</td>
<td>118</td>
<td>90</td>
</tr>
<tr>
<td>Exo/Stratospheric Interceptor</td>
<td>80</td>
<td>50</td>
</tr>
<tr>
<td>Other Programs</td>
<td>2373</td>
<td>3300</td>
</tr>
<tr>
<td>Subtotal</td>
<td>3287</td>
<td>4585</td>
</tr>
<tr>
<td>Theater</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thaad</td>
<td>100</td>
<td>243</td>
</tr>
<tr>
<td>Eriot</td>
<td>160</td>
<td>129</td>
</tr>
<tr>
<td>Patriot</td>
<td>135</td>
<td>109</td>
</tr>
<tr>
<td>Arrow</td>
<td>60</td>
<td>58</td>
</tr>
<tr>
<td>Ground-Based Radar</td>
<td>44</td>
<td>133</td>
</tr>
<tr>
<td>Patriot Prowess</td>
<td>25</td>
<td>63</td>
</tr>
<tr>
<td>Other Programs</td>
<td>324</td>
<td>333</td>
</tr>
<tr>
<td>Subtotal</td>
<td>838</td>
<td>1000</td>
</tr>
<tr>
<td>Total</td>
<td>4146</td>
<td>5425</td>
</tr>
</tbody>
</table>


Soviet Union, SDI's new mission (though not its emphasis on space-based defenses) struck a responsive chord among some members of Congress. In May 1991, Senators Warner, Cohen, and Lugar proposed deployment of a modified GPALS system, later known as the Limited Defense System, that included 700 to 1200 ground-based interceptors at 5 to 7 sites but allowed only for development and testing of space-based interceptors. Their plan called for amending the ABM Treaty within two years to remove the legal barrier to deploying such a system. This proposal was subsequently joined and somewhat modified by Senator Nunn and transformed into the plan adopted by Congress.

THE MISSILE DEFENSE ACT

In November 1991, Congress passed the Missile Defense Act, which not only awarded SDI a large increase in funding but placed the United States on an accelerated schedule toward deploying a limited defense system.

This decision was taken with only a day and a half of floor debate and no hearings in the Senate, and with no floor debate or hearings at all in the House of Representatives. As part of a compromise worked out to ensure majority support, the act pushed into the future some of the more controversial aspects of GPALS, particularly its space-based interceptors, and fastened the issue of amending or abrogating the ABM Treaty by calling for a ground-based, ABM Treaty-compliant system "as the initial step toward" deployment of the full Warner-Cohen-Lugar system.

Nevertheless, the act represents a radical departure from previous congressional decisions on SDI since it makes deployment, rather than just research, an explicit goal of the program and sets a target deployment date of 1996. According to the act, the overall objectives are, first, to deploy ground-based interceptors at one or an adequate number of sites and space-based sensors capable of providing "a highly effective defense" of the United States against a limited attack second, to maintain strategic stability; and third, to provide a "highly effective" theater missile defense (TMD) for US allies and troops. As a first step, the act mandates development for deployment "by the earliest date allowed by the availability of appropriate technology or by Fiscal Year 1996" of a "cost-effective, operationally effective, and ABM Treaty compliant" SDI system consisting of 100 interceptors based at a single site. The act calls for continued research and development (R&D) on brilliant pebbles but no "initial" deployment of them.

In addition to focusing the SDI program on development, the act increased the SDI budget to $4.1 billion for FY 1992, a 34 percent increase over the previous year. (See Table 1.3) The SDI budget proposed by President Bush for FY 1993 is $5.4 billion, which, if approved, would be a 32 percent increase over FY 1992 and a 75 percent increase over FY 1991. Such increases are all the more remarkable considering that defense spending overall is declining.

A major purpose of the Missile Defense Act was to direct SDI away from space-based defenses. However, the SDO has recently come under fire from some members of Congress and the military for taking steps that appear to support development of space-based sensors and interceptors at the expense of the land-based systems emphasized in the act. For example, SDO has eliminated funding for one of the two ground-based interceptors it was developing and plans to
halt development in FY 1994 of a ground-based 'pop-up' sensor that was to have been part of the initial ABM Treaty-compliant SDI system. Instead, the largest request in the FY 1993 SDI budget was for space-based interceptors (brilliant pebbles) and space-based sensors (ballistic eyes). In addition, the SDIO has yet to produce the Operational Requirements Document (ORD) that reflects Congress's new direction, also creating concern that SDI's orientation has not fundamentally changed. That impasse was strengthened by a March 1992 Defense Department report to Congress strongly implying that brilliant pebbles is being considered as an integral part of a future SDI deployment.2

YELTSIN'S PROPOSAL FOR A JOINT SDI SYSTEM

Since the Missile Defense Act passed, a new wrinkle in the debate over SDI was introduced by Russian President Boris Yeltsin. In late January 1992, as part of his "new political vision," Yeltsin called for the United States and Russia to work jointly on a global SDI system. An aide later clarified that Yeltsin ruled out the deployment of space-based interceptors and that the focus would probably be a system of more effective theater missile defense systems and space-based sensors. However, aside from an interest in discussing SDI issues, a firm position has not emerged. A number of statements by Yeltsin and his aides suggest that in the absence of a joint program to develop and deploy defenses Yeltsin will insist on continued observance of the ABM Treaty, implying that Russia would still see a unilateral US SDI system as a threat to its interests.3 This position creates a dilemma for the Bush administration, since it will eventually force the United States to either accept Russia as an ally and grant it access to US military technology or risk creating tensions with the Russian government by proceeding with a unilateral SDI deployment.

Yeltsin's announcement appears to be motivated in part by the desire for a joint program with the United States that would both symbolize the new, cooperative relationship between the two countries and provide jobs for Russian weapon scientists. He may also be concerned about potential ballistic missile threats from countries in the Middle East, which is closer to Russia than to the United States. But to the extent his proposal is intended to allow Russia to share global military preeminence with the United States, it is sure to be raised by the US government. The Bush administration would like Yeltsin's blessing for SDI and thus continue discussions about limited joint activities, such as the sharing of early-warning data. But a full partnership in developing and deploying an SDI system is a remote possibility at best.

Ballistic Missile Threats

Congress's support for a limited SDI system reflects in part the public's profound uneasiness regarding the rapid pace and unpredictable nature of global political change. With the vanishing of the Soviet military threat, the public's fears have shifted to new threats that seem to be growing. Americans perceive such threats as political instability and ethnic conflicts within the former Communist bloc, the proliferation of nuclear weapons and ballistic missile technology, and the growth of military powers in regions such as the Middle East. While these dangers are real, however, SDI is not an appropriate response to them.

THE REMNANT SOVIET THREAT

For the foreseeable future, the only serious missile threat in the United States will be one of accidental or unauthorized launches from the former Soviet Union, now the Commonwealth of Independent States.40 This threat, however, is currently declining and will most likely continue to decline. Any increases in the number of warheads resulting from political instability is more than outweighed by other factors that tend to reduce this risk, particularly the current absence of leadership between the United States and Russia, the lowering of the alert level of nuclear forces, and continuing reductions in the numbers of weapons in the Russian arsenal. Additional measures (described in the next section) should further reduce the risk or eliminate it entirely.

Much of the concern over "loose axes" in the wake of the Soviet breakup has centered on strategic nuclear weapons, which are considered to be relatively secure and under strict control, but on the very short-range tactical nuclear weapons, such as nuclear artillery shells. The tactical weapons are currently being transferred to storage in Russia from the other republics—a process due to be completed by July 1992—but in any event these weapons cannot pose a direct threat to the United States.

The danger of an accidental or unauthorized missile launch against the United States, on the other hand, is in some ways more serious, and in other ways less serious, than commonly perceived. It is more serious in the sense that such a strike might well involve a very large number of weapons—far more than a limited SDI system could stop. For example, in 1980 a faulty computer chip in the US warning system generated false warning of a massive Soviet attack. The resulting confusion led to delays in reaching a proper evaluation and a nuclear alert was declared.41 While elaborate procedures exist for validating warning of a threat, in a time of crisis such a situation could increase the probability that a large attack might be launched. In addition, because CIS missile forces are organized in squadrons and larger units, a breach of authority could lead to the launch of many missiles as easily as a single one.42

At the same time, the absence of tensions today, coupled with the elaborate command and control structure inherited by the Commonwealth of Independent States from the Soviet Union, makes the probability of accidental or unauthorized launches of any size extremely small. The Soviet Union took great pains to ensure that no weapons could be launched without explicit authorization from the top leadership. In fact, the Soviet obsession with central control created a system that is in some ways more secure than
the US system. For example, all CIS strategic nuclear missiles are equipped with locks known as Foreign Access Units (FAl)s that prevent their launch without the receipt of the proper codes from the leadership.16 US submarine-launched ballistic missiles, in contrast, do not have FAls. Moreover, the codes to unlock CIS weapons must be released jointly by civilians and military leaders and transmitted in launch crews over communication links that are established only in time of crisis by order of the political leadership. While the political turmoil that has accompanied the breakup of the Soviet Union, these strict procedures are still in place, and indeed US officials have repeatedly gone out of their way to express confidence in the security of the CIS strategic weapons.

Since the probability of accidental or unauthorized launches increases with the rising alert levels of the forces, recent steps by the United States and the Commonwealth of Independent States to take large numbers of nuclear weapons off active duty alert makes such launches less likely. Nevertheless, the concern remains that control of strategic weapons could erode in the future, particularly in the non-Russian republics. Continued strategic arms reductions could greatly reduce this risk if they led to the consolidation of all strategic weapons within Russia. Whatever residual danger remains from weapons based in Russia could then be dealt with by other measures described in the next section.

THIRD WORLD MISSILE THREATS

Iraq's use of Scud missiles in the Gulf War has heightened the public's concern about the spread of ballistic missiles to the developing world. While some concerns are not so justified, there is a good deal of confusion about the nature of the threat in the United States. US officials have contributed to this confusion by citing statistics of the number of countries that now possess or may soon acquire ballistic missiles. Such missiles are largely irrelevant to the debate over SDI, however, as they include US allies, friends or neutral countries, and countries with only short-range missiles that cannot reach the United States.

The problem of missile proliferation has been further complicated by those US officials whose statements have implied that the number of ballistic missile states is increasing rapidly.17 These statements have been used to bolster support for SDI, leading to complaints that the Pentagon is engaging in "threat inflation."18

In reality, about 25 countries currently possess ballistic missiles, but most of these are short-range Scud missiles received from the Soviet Union in the 1970s. Outside the developed world, only China, India, Israel, and Saudi Arabia have missiles with ranges greater than 500 km, and of these only China's can reach the United States. (See Table 2.)

The short range of existing Third World missiles means that the only missile threat in the near term will be to US allies and troops abroad, and not to the United States itself. Defending against these missiles is the purpose of theater missile defense systems such as the Patriot and does not require an SDI system. In fact, the two types of defense have much different missions and technical requirements. In that an SDI system is intended to defend populated areas against an aggressive or terrorist-style attack, whereas a theater missile defense system is focused mainly to protect military assets as part of a broader theater air defense strategy.

No developing country presently has both the technological capability and the intent to threaten the United States with large-range ballistic missiles. To the extent developing countries are seeking ballistic missiles,

<table>
<thead>
<tr>
<th>Country</th>
<th>Missile Type</th>
<th>Range (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>DF-2</td>
<td>1200</td>
</tr>
<tr>
<td>India</td>
<td>Agni-2</td>
<td>800</td>
</tr>
<tr>
<td>Israel</td>
<td>Jericho</td>
<td>120</td>
</tr>
<tr>
<td>Israel</td>
<td>Elon</td>
<td>150</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>Shabab and Badr</td>
<td>800</td>
</tr>
</tbody>
</table>

it is largely in response to regional conflicts and tensions, not to a perceived threat from the United States.

Moreover, the severe technical difficulty of building intercontinental-range ballistic missiles will make these countries for at least a decade and probably much longer, a judgement shared by the US government's own intelligence analysis. Virtually all of the developing countries have little indigenous technical capability and cannot produce even short-range missiles. Even those countries, such as North Korea, that currently produce short-range missiles face very large technical barriers to producing long-range missiles. (See appendix.) India, which has a relatively strong technology base and large numbers of scientists trained in the West, has over two decades to develop a space-launch vehicle that would have intercontinental range if used as a ballistic missile, even with the benefit of considerable Western technical assistance.

There is a legitimate concern that Third World countries could receive assistance in developing long-range missiles from former Soviet military scientists, although international efforts are being made to reduce this risk. Even then, however, progress toward deploying a workable missile would be limited by the technology base and manufacturing capabilities of the country. Another concern is that a Third World country could buy a space-launch booster from a former Soviet republic and convert it to a long-range ballistic missile. It is unlikely, however, that Russia or any other former republic would agree to sell long-range missile technology to a potentially hostile country that might use the technology against itself. Moreover, the former republics will be highly sensitive to objections from Western governments, upon which they depend for economic assistance.

In any event, the United States would not be taken by surprise by clandestine development or acquisition of ballistic missiles. A series of flight tests is required for developing missiles, gaining operational experience with them, verifying their reliability, and monitoring the effects of aging. The high booster plume generated by missiles is highly observable and would be detected by the Defense Support Program (DSP) satellites that were credited with observing and giving predawn trajectory information on all Soviet launches during the Gulf War. Moreover, those ballistic missiles available in the developing world would not use advanced fuels or materials; they would be too large to be mobile or easily hidden. For example, the Polar Space Launch Vehicle (PSLV) being developed by India, which could travel intercontinental distances if used as a ballistic missile, is three times as heavy and twice as long as the US MX missile. As a result, the deployment sites of these missiles would so doubt be known from surveillance, leaving open the possibility that they could be destroyed by preemptive air strikes.

The relatively limited damage from Soviet bombers during the Gulf War shows that ballistic missiles are only a serious threat if they are tipped with nuclear, perhaps biological, weapons. Thus, in addition to acquiring a long-range missile, a Third World country would have to acquire a nuclear or biological warhead that could be delivered by the missile. This represents an additional barrier to acquiring a usable weapon. Of the countries that Senator John McCain has listed as states that threaten world peace—Afghanistan, Cuba, Iran, Iraq, Libya, North Korea, Syria, and Vietnam—only North Korea and Iraq are believed to have relatively advanced programs for producing nuclear weapons. Iraq's missiles, nuclear, and chemical facilities are being dismantled under order of the UN Security Council. North Korea is a signatory to the Non-Proliferation Treaty and is negotiating to submit to inspection of its nuclear facilities by the International Atomic Energy Agency (IAEA), but it is too early to tell if it is negotiating in good faith.

China represents a special case, as it is the only developing country with both nuclear weapons and long-range missiles that could reach the United States. It possesses about ten intercontinental ballistic missiles (ICBM) and two to three dozen submarine-launched ballistic missiles (SLBM). China has had this capability for many years, however, and few observers believe it poses a significant threat to the United States. For China, the premier adversary has been, and probably will remain, Russia. Little is known about the Chinese system for ensuring the safety and security of missiles, but even so, accidental or unauthorized launch is far more likely to be directed at Russia than at the United States.
The Role of SDI

Although, as we have seen, the probability of a missile attack on the United States in the foreseeable future is extremely small—much smaller than at any time in the last 25 years—any potential threat involving nuclear weapons should be a matter of serious concern. SDI is not the answer to solving this threat; however, for two main reasons.

First, there are better ways of reducing the dangers of accidental or unauthorized launching from the former Soviet Union (and China) than deploying an SDI system. And second, an SDI system is unlikely to reduce significantly the risk of deliberate attack on the United States by Third World countries, both because of the problems of countermeasures and software reliability, which could greatly reduce the defense's effectiveness, and because there are many other possible methods of delivery which SDI would do nothing to stop.

Reducing the Remnant Soviet Threat

An SDI system would not be an effective means of dealing with the threat of accidental or unauthorized launching from the former Soviet Union. For one thing, even on an accelerated schedule an SDI system could not be deployed for at least several years and thus could offer no protection in the near term. Moreover, as the dangers from the Soviet threat in the former Soviet republics are likely to be greatest in addition, a limited SDI system could not defend against the large number of missiles, which is likely to occur as the launch of a few.

Moreover, other measures might reduce the threat more effectively than an SDI system and would be employed more quickly and at much less cost. Four measures deserve attention:

1. The United States should work with all countries having nuclear weapons to improve safety procedures and ensure that modern PALS and other delivery devices are installed on all warheads. An important first step would be to install PALS on US SLBMs.

2. Recent US and USSR decisions to lower the alert level of portions of their nuclear forces have reduced the missile threat to both countries, but further steps should be taken in this direction. Additional weapons should be taken off alert, and additional areas should be created to prevent their inadvertent or unauthorized use. For example, separating nuclear warheads from their delivery vehicles and storing them separately would place a verifiable barrier to accidental or unauthorized launch. This practice has a clear precedent: in the late 1940s and early 1950s, US nuclear warheads were placed in onsite custody during peacetime.

3. Negotiating deep reductions in US and USSR nuclear arsenals and making such cuts irreversible as possible by destroying warheads and delivery vehicles that have been removed would greatly reduce the nuclear threat to the United States over the long term. It is especially important to pursue such reductions now, given the uncertain future of the young democratic governments in the former Soviet republics. Inevitably, as we see, deploying an SDI system may prevent such deep reductions.

4. DeMMs—after-launch mechanisms could be designed so that any missile launched accidentally or without authorization could be destroyed. Such weapons are routinely used in missile test flights to abort test launches; similar mechanisms could be installed to destroy warheads after boost phase. Destroying missiles in this way is much more reliable than relying on interceptors and could be used to terminate a large-scale accidental launch.

Reducing Potential Third World Threats

With appropriate measures such as those described above, the threat of accidental or unauthorized launching from the former Soviet Union can be reduced to an extremely low level or eliminated entirely. Since this is the only potential source of a large-scale missile attack on the United States, reducing it to a level of SDI greatly reduces the size of the defense system to be considered for deployment. Both GEPAs and the Limited Defense System proposed by Congress are too large for any potential Third World missile threat.

Regardless of the size of the SDI system, however, several issues must be considered in assessing its value against Third World threats. We must be aware of the lessons that the United States can learn from any potential attacker with overwhelming (even nuclear) retaliatory capability. How likely is it that Third World countries would choose to attack the United States with ballistic missiles when others are available? And how effective would SDI be against ballistic missile attacks?

Are Some Third World Countries "Non-nuclear"?

Les Aspin, chief of the House Armed Services Committee, and others have raised the concern that some hostile developing countries may not be deterred from attacking the United States by the threat of massive retaliation. Some have cited this prospect to support deployment of a limited SDI system, arguing that defenses will be the only recourse if efforts to stop ballistic missile proliferation fail. This view represents a striking departure from previous US policy, however, in that throughout the Cold War the United States relied on deterrence by threat of retaliation to discourage aggression by the Soviet Union. Is there evidence that deterrence will not work against much smaller Third World countries?

Some claim to see such evidence in the seemingly irrational actions taken by Iraq before and during the Persian Gulf confrontation. But a closer examination of the events leading up to and during the war does not support the view that Iraq was undeterred. In several cases the deterrent threat was unclear or simply absent. For example, President Saddam Hussein was undeterred from invading Kuwait at least in part because US officials failed to give clear warning of how the United States would respond. In addition, his subsequent decision to launch conventionally armed Scud missiles against Israel and Saudi Arabia was legal under the circumstances, for two reasons. First, Iraq was already being bombed exclusively by allied aircraft and had little to lose by launching Scuds. Second, attacking Israel could have had a larger payoff if it had provoked the United States to respond, thereby undermining the Arab coalition arrayed against Iraq.

Moreover, at two crucial junctures Hussein appeared to have been deterred from escalating the conflict, although the point is difficult to prove. His decision to stop Iraqi forces at the Saudi border early in the conflict suggests that he may have been deterred by the initial deployment of US troops there, which, though small, signaled an unambiguous US commitment to defend Saudi Arabia. In addition, Hussein (or his...
military commanders) may have been deterred from using chemical weapons against Israel and allied troops for fear of retaliation, including possible nuclear retaliation by Israel. The evidence concerning whether Iraq had delivered chemical warheads for the Scud or not, but it is known that Iraq had chemical artillery shells that were never used.

Even if a "musterable" country were to somehow trigger the launch of a nuclear weapon in a multimissile attack, it is unclear whether the delivery of a nuclear weapon that could not be guarded against by air defenses or other protection systems, the spread of nuclear or biological weapons, or delivery vehicles.

Alternate Means of Delivery

The availability of alternate means of delivery of nuclear and other weapons greatly limits SDI's potential role in reducing the threat of attacks by developing countries. It is worth recalling that the United States and Soviet Union did not have intermediate-range ballistic missiles until 1960. Yet there was no doubt that any nuclear weapon could be delivered by other means (especially bombers). More recently, it is reported that the Iraqi government, before it had developed intermediate-range ballistic missiles, attempted to purchase from the Soviet Union.

Even if intermediate-range ballistic missiles begin to appear in Third World arsenals, there is a strong reason why they would not be the preferred means of delivering a nuclear attack on the United States. A ballistic missile launch is highly visible from space, providing clear warning of the attack and pinpointing the country of origin; thus, neutral forces would be able to launch several interceptors against each incoming warhead to eliminate the threat of interception. As former Chair of the Joint Chiefs of Staff General David Jones stated, a "terroristic" or "terroristic" threat to the United States delivery of a nuclear weapon is more likely to be done by an aircraft or a ship sailing into one or another harbor of the United States or the United States armed forces stationed in the Gulf War, coupled with analysis of possible countermeasures, software reliability problems, and the drawbacks of space-based defense suggest this will be far from easy.

Lessons from the Patriot

Mounting evidence indicates that only a small number of Scud warheads were destroyed by Patriot interceptors during the Gulf War.

Although the US Army initially claimed near-perfect performance, assessments of the Patriot's success rate have been lowered several times, and a former Patriot expert reports a high degree of confidence that only about 10 Scud warheads out of 50 fired by Iraq were destroyed. This)

EFFECTIVENESS OF SDI

If a country nevertheless chose to attack the United States using small number of ballistic missiles, how effective would an SDI system be in intercepting such an attack? Despite the obvious deficiencies of a system that it could be effectively used for the purpose of intercepting several thousand warheads, the United States military has been working to develop a system that could be effectively used for intercepting several thousand warheads, the United States military has been working to develop a system that could be used for this purpose. The system has been so successful that it is now being considered for deployment.

Supporters of the Patriot have nevertheless argued that the Patriot was of significant value because it helped to boost allied and Israeli morale and helped keep Israel out of the war. While this may be true, the lesson cannot be generalized to SDI for the simple reason that the Scuds were armed with conventional warheads that could cause only limited damage to urban areas. If one or two nuclear warheads had landed in either Israel or Saudi Arabia, however, there would have been no question of a nuclear weapon.

Although the particular problems of the Patriot are no doubt unique to that system, they are illustrative of the problems that can be expected to plague any SDI system. Two such problems are discussed below.

Countermeasures

One of the lessons from the Patriot experience in the Gulf War is that countermeasures, even simple ones, can be effective as long as they can be detected by SDI with a target having unexpected characteristics. For example, the deployment of ICBMs by the Soviet Union caused the deployment of interceptors against each incoming warhead to increase the probability of interception. As the same time, however, since the system would be detecting cities rather than military installations, the proper standard for measuring its effectiveness is that it be able to stop all incoming warheads. The system was constrained by the Patriot system in the Gulf War, coupled with analysis of possible countermeasures, software reliability problems, and the drawbacks of space-based defense, suggest this will be far from easy.
Software errors and BMC*

Software errors have long been identified as a key obstacle to building an effective SDF system. In the Patriot's case, software errors kept interceptors from being launched against the Scuds that hit the Al Khobar Marine barracks in Saudi Arabia. This failure was not the result of undersized design or testing, but rather an unforeseen occurrence that revealed itself only during unusual operating conditions. One of the Army investigators described it as "an anomaly that never showed up in thousands of hours of testing." In addition, a software error (later corrected) appears to have been responsible for several Patriot explosions into the ground in both Israel and Saudi Arabia.

An SDF system would be far more complex than Patriot and thus even more prone to software errors. The process of coordinating and managing the diverse elements of a defense system—such as sensors, ground control stations, and interceptors—is known as battle management/interoperability, control, and communications (BMIC). The core of SDF's BMIC system would be the computer software, which according to a recent GAO study would be "the most complex of any military or civilian software developed and implemented to date." Although critical to the performance of the defense, it has been characterized by the General Accounting Office as the least understood and potentially most difficult phase of the SDF system.

The problem of BMIC reliability cannot be eliminated merely through improved methods of generating computer software, nor can it be resolved entirely through testing. System designers cannot imagine every contingency, nor can they predict what kinds of threats a defense system will face. Whereas most other military systems can be tested extensively before they are used in battle, missile defense systems are expected to be tested under realistic conditions. For instance, tests are expensive since they require the launch of both ballistic missiles and interceptors, with the result that the system's performance can be assessed under only a narrow range of attack conditions and against only a few representative target types. In addition, the great complexity of the system makes it virtually impossible to anticipate and exhaustively check how the thousands of different components will interact and what the consequences of such interactions might be. Problems such as this may prevent US leaders from ever having full confidence in the ability of the defense system to intercept even a single ballistic missile.

Space-Based Interceptors

The problem of countermass and software reliability apply both to the space-based Limited Defense System proposed by Congress and to the space-based components of the GMD System. Space-based interceptors have additional drawbacks, however.

The original motivation for placing interceptors in space was to position them near missile launch sites so that the missiles could be intercepted during their boost phase, before they could deploy warheads or multiple warheads. Some of the difficulties of space-based interceptors of Soviet ICBMs are less severe against a Third World threat. For example, developing countries are unlikely to require fast-flying missile boosters that would burn out at altitudes too low to be intercepted from space.

On the other hand, several problems remain. Since space-based interceptors orbit the earth, they must be placed in a high orbit above the globe to ensure that there will be at least a short time between the production of a missile and its launch. As a result of this "sensitivity" problem, many interceptors are required to defend against even a limited missile threat. The GMD System, for example, assumes a constellation of 1000 high-flying interceptors. Even so, the system is susceptible to being locally overwhelmed by an adversary launching multiple missiles from roughly the same direction at the same time. Allowing this problem would require increasing the spatial density of space-based interceptors, but this would lead to a small increase in the total number of interceptors, thus driving up the cost of the system.

Brilliant Pebbles were originally designed to intercept missiles during their boost phase. If additional interceptors were added to allow them to attack targets after boost burnout, then theoretically the relatively long midcourse phase would allow time for multiple intercept attempts. However, the other types of interceptors, brilliant pebbles could be overwhelmed by dozens during midcourse phase. And as they searched for interceptors, brilliant pebbles would be weakened as they flew through the atmosphere at altitudes below about 100 kilometers, and the debris would render the atmosphere over which the debris would begin to be swept away by the atmosphere.

Atmospheric shielding of brilliant pebbles' sensors also means that brilliant pebbles would not be effective against most theater-range missiles, even though the SDF could hope to intercept them. Short-range missiles at the 300 km range are for the time being an effective and operationally effective cutoff range used by Iraq could be flown on a slightly depressed trajectory below 100 km altitude and yet would still remain in a range of over 700 km. Depressed trajectories are an option for longer-range missiles but lead to a disproportionately greater range penalty. If, rather than deploying the trajectory so much, a country deployed enough to defeat brilliant pebbles in midcourse phase, much longer ranges would not be possible. For example, the booster of the 2800 km-range Chinese DF-3 missile purchased by Saudi Arabia could be flown at an altitude of slightly higher than 100 km. If the rocket's trajectory is depressed only enough to ensure that booster burnout occurs below an altitude of 100 km and the missile then deploys simple small deft in the atmosphere, then the range of the DF-3 would be reduced only by a few hundred kilometers. This countermeasure is especially effective for longer-range missiles since they have shorter burn times and burn out at lower altitudes than ICBMs.

CRITERIA FOR DEPLOYMENT

Considering the many obstacles confronting deployment of a working SDF system, it is important to establish clear performance criteria for determining when such deployment should be considered. Two earlier criteria for deploying an SDF system—that it must be survivable and not effective at the earliest—were formulated in the context of a large Soviet threat and were intended to avoid a system that would provoke a Soviet expansion of its arsenal or would decade crisis stability by presenting a vulnerable target for a first strike. Both criteria assumed the adversary had resources comparable to those of the United States and are probably not relevant in other situations.

No suitable replacements for these criteria have been proposed, however. The Missile Defense Agency has set a goal of deploying a "nearly effective" and "operationally effective"
defense without further defining either criterion. Before proceeding with deployment, Congress should clarify this issue. In light of the foregoing discussion of countermeasures, software reliability, and alternate means of delivery, three relevant criteria are:

• No SDI system should be deployed if it would be susceptible to countermeasures of technical sophistication comparable to the missile carrying them.

• No SDI system should be deployed if its components and software cannot be fully tested under realistic conditions and against a wide range of potential threats.

• No SDI system should be deployed if it would be susceptible to circumvention by alternate means of delivery of equal or greater likelihood and potential effectiveness than ballistic missiles, or to the absence of a broader program to address such means of delivery.

Given the present state of technology and understanding of these problems, it is unlikely that any SDI system will be able to meet these criteria in the foreseeable future.

Direct and Indirect Costs of SDI

The limited role SDI can play in reducing missile threats to the United States must be weighted against its substantial costs. These costs include not only the direct monetary costs, but also the diversion of technical and human resources from other programs such as efforts to stop proliferation and to stabilize the fledgling democracies of the Commonwealth of Independent States.

SDI supporters argue that deploying missile defenses is a prudent response to a future of uncertain risks when methods of stemming the spread of missile and nuclear weapons cannot be guaranteed. Others suggest that the United States should do whatever it can to defend itself. However, buying any type of insurance requires a comparison between a realistic assessment of the risks and the costs involved. While the desire to have defenses against any possible attack is natural one, the probability of an attack on the United States using ballistic missiles must be weighed against the sustainability and cost of an effective level of defense. Comparison for some tax dollars by both civilian needs and other military systems sharpens the debate over this assessment.

DIRECT COSTS

Surprisingly, the very large direct costs of SDI have been virtually ignored in recent policy debate. The smallest SDI system now being discussed—a single-site ABM Treaty-compliant system based at Grand Forks, North Dakota—could provide only partial coverage of the continental United States, leaving the coasts, and thus most of the US population, unprotected. Still, the Congressional Budget Office (CBO) estimates the acquisition costs of this system would be nearly $118 billion through 1997 and more than $36 billion through 2003* (all costs are given in fiscal year 1992 dollars, except where noted). In addition, operations and maintenance (O&M) costs would probably add several billion dollars over that period.

As with any major military procurement program, actual costs are likely to be considerably higher because of cost overruns. Recent studies have shown that actual acquisition costs for weapons programs have averaged about 50 percent higher than estimates made at an early stage of development.* If a similar cost increase applied to the SDI system, the total cost of the single-site system would be more than $150 billion. Since sites other than Grand Forks would require considerably more construction and site preparation, a decision to deploy at any different site would be still more expensive.

The SDIO estimates that the total cost of the GFPA system would be $142 billion (in FY 1988 dollars), including $10 billion for theater missile defense, $12 billion for a single-site ground-based system, and $110 billion for a space-based system with 1000 brilliant killers. In 1992 dollars, that comes to roughly $500 billion. In addition, a CBO study based on SDIO figures estimates O&M costs of $8 billion for a ground-based system over 18 years and nearly $6 billion for the space-based portion, raising the total to roughly $56 billion. Of course, overruns in procurement reach 50 percent, the total cost could be roughly $90 billion. Although the SDIO disagrees with some of the cost estimates cited above, the sum of its projected annual budgets for 1993 through 2003 is $88 billion.*
A truly effective defense of the United States would require defenses against missiles other than ballistic missiles (e.g., ships, airplanes, and low-flying cruise missiles), whose additional costs must also be considered. Just as US leaders decided that it was more important to serve as a defense against both types of intercontinental ballistic missiles (ICBMs) than to invest in a missile defense when other means of delivery exist, so too might the same be true of the United States. The Pentagon, however, has decided not to invest in a missile defense when other means of delivery exist. Yet, in contrast to the philosophy being given to SDI, the Pentagon has decided last year that because of the high costs of acquisition and operation, it would not complete the over-the-horizon (OTH-3) radar network for detecting airborne and cruise missiles. This would make it impossible to protect against these two types of missiles, and the United States would invest in only one of two possible systems, and then only during business hours (9 am to 5 pm, Monday through Friday).

The use of funds by SDIO has been called into question by recent congressional investigations into allegations of mismanagement and waste. Although these investigations are still under way, the concerns raised raise some important questions about the future of SDI. In the next two years, the budget for the FY 1993 budget would be a 32 percent increase over the FY 1992 budget, which was in turn 34 percent increase over the budget for the previous year. Increases in this magnitude are difficult for any program to absorb efficiently.

INDIRECT COSTS

Direct monetary costs are not the only potential costs to the United States of proceeding with an accelerated SDI program. The deployment of an SDI system could have important effects on relations with the former Soviet republics, efforts to reduce CFE, and efforts to ensure renewal of the Nuclear Non-Proliferation Treaty. It could also draw resources away from other programs.

Stability, Deep Cuts, and the ABM Treaty

Even if missile defenses are motivated by possible missile threats from the developing world, the future of the ABM Treaty must be considered because of its continued importance to the strategic relationship between the United States, the former Soviet republics, and other nuclear powers. The best means of increasing US security in both the near and long term is to negotiate very deep and verifiable cuts in nuclear weapons in the former Soviet republics, and the ABM Treaty is still needed to create a stable and predictable environment for such cuts to take place.

During the Cold War, one of the strongest arguments against building strategic missile defenses was that it would undermine strategic stability in two ways. First, it would lead to a wasteful offensive-defensive arms race without increasing the security of either side. And second, it would create incentives to launch a preemptive strike during a crisis, since one to place a defense system would be more effective against a retaliation than against a first strike. The ABM Treaty represented a recognition by both countries of these concerns.

With the demise of the Soviet Union and the economic crisis in the former republics, the threat of strategic instability is much reduced. Some SDI proponents argue that the treaty should be modified to allow deployment of limited defenses (as stated in the Missile Defense Act).

Following either course could have serious consequences, however. In the first place, the ABM Treaty provides a basis for a reduction of strategic missiles in Russia. Some analysts suggest that the chances of a military-banked takeover of the Russian government within two years may be as high as 50 percent. Should such a takeover occur, the absence of limitations on strategic defenses could lead to precisely the sort of strategic instability the ABM Treaty was intended to avoid. Furthermore, a unilateral move to deploy an SDI defense could indirectly increase the danger of a hard-line takeover by strengthening the hand of conservative elements within the Russian military.

Even in the absence of a return to authoritarian rule in Russia, a move to deploy an SDI system would hinder or block efforts to reduce US and CIS arsenals down to very low levels. Feeling the prospect of a US defense system consisting of 300 to 1000 ground-based interceptors and perhaps as many as 1000 to 2000 space-based interceptors, Russian military leaders may be strongly disinclined to agree to reduce the number of strategic weapons below several thousand and may resist the transfer of weapons production facilities to civilian use. The result could be to freeze in high nuclear weapons levels for years to come.

In addition to concerns about its impact on relations with the former Soviet republics, the United States should consider carefully what effect a decision to deploy an SDI system might have on efforts to limit other nuclear threats. For example, while a system of several hundred ground-based interceptors might be able to limit other nuclear threats, the total cost of deploying such a system might be prohibitive. Some SDI proponents argue that the treaty should be modified to allow deployment of limited defenses (as stated in the Missile Defense Act).

DIVERSION OF RESOURCES

Deployment of an SDI system would not only be costly for the United States, it would also divert attention and scarce resources from other security priorities. Some recent decisions of the Bush administration and Congress contrast sharply with the emphasis being given to SDI:

- Congress and the administration have dragged their feet on helping the former Soviet republics stabilize their economies and eliminate their nuclear weapons. It is unclear that after the United States spent
trillions of dollars over the decades to deter the use of Soviet nuclear weapons, greater emphasis is not being given to technical and monetary assistance to destroy them. The $400 million that Congress earmarked for this purpose is less than one percent of the amount authorized for SDI for FY 1992, yet dismantling former Soviet nuclear weapons is a far more direct and effective way to reduce the nuclear threat to the United States.

* The present opportunity to strengthen the UN's role in maintaining world peace is in danger of being squandered because the United States and other countries have failed to pay past dues. The United States currently owes the United Nations $300 million, more than one-seventh of the FY 1993 SDI budget request. Last December, then-Secretary General Javier Perez de Cuellar said, "It is a great irony that the United Nations is on the brink of insolvency at the very time the world community has entrusted the organization with new and unprecedented responsibilities."

* Despite its obvious importance, the UN Special Commission set up to dismantle Iraq's nuclear, biological, and chemical weapons programs is running out of money and has to reuse “a skeleton crew” of expertise, according to deputy chief Robert O'Neill. The United States has not pushed to increase the resources of the Commission.

* Even though the spread of nuclear and biological weapons poses a serious threat to international security, non-proliferation efforts continue to be undermined by the Bush administration. For example, the administration recently allowed commercial military sales to Pakistan, exploiting a loophole in legislation intended to cut off US military aid because of Pakistan's nuclear weapon program.

**Conclusions and Recommendations**

The SDI program has been redirected toward development of a new set of guidance and new types of weapons. The US government has devoted considerable efforts to these technical problems that have plagued it in the past. An assessment of the tradeoff between the costs and potential benefits of deploying an SDI system should take the following into account:

* With the disappearance of hostility between the United States and the former Soviet republics and the reduction of the alert levels of their nuclear forces, the threat of missile attack on the United States is lower today than it has been for over a quarter century. This threat will further decrease with phased reductions in US, Russian, and other nuclear arsenals.

* SDI can do nothing to reduce the risk of accidental or unauthorized missile launches from the former Soviet republics in the near term, when the risk will probably be greatest. Over time, the risk can be reduced to a near negligible level by measures other than SDI, such as implementing further arms reductions, taking all remaining weapons off alert, and separating warheads from the missiles themselves. Improved command and control procedures and destruction after-launch mechanisms could also be effective and should be fully studied. Since no country other than the United States has nuclear weapons, the Commonwealth of Independent States could also launch a large missile attack on the United States, there is no rationale for an SDI system as large as that proposed either by Congress (the Limited Defense System) or by the Bush administration (GAPAS).

* No country hostile to the United States currently possesses the capability of launching a missile attack on the United States or is likely to acquire that capability until well into the next century. Rather, the potential missile threats to US interests in the near term will be short-range missile attacks against allies and troops abroad. These threats justify research and development on Theater Missile Defense, but not on an SDI system.

* If a future nuclear-armed adversary were to make it abundantly clear that it had developed an SDI capable of withstanding US defenses, ballistic missiles would be used only as a last resort, and probably only in the last minute. Consequently, deployment of an SDI system might do little more than shift the threat from one delivery mode to another, without decreasing the overall probability of attack.

* If an attack were delivered by missiles, countermoves using relatively simple technologies could greatly diminish the effectiveness of the defense. Hidden or limited in the computer software that runs the SDI system could render it partially or entirely ineffective. Both problems were illustrated by the performance of the Patriot anti-missile system during the Gulf War.

* A limited nuclear missile attack against the United States would be a terrorist-style attack on cities, implying that the proper policies to assess the effectiveness of an SDI system is if it is able to stop all incoming warheads. The problems of countermeasures, software reliability, and the inability to test the system under realistic conditions suggest that US leaders may never be confident that this level of reliability and effectiveness was achieved.
In sum, SDI should not be the basis of US security policy. Current and projected missile threats to the United States do not justify a rush to deploy defenses. On the contrary, they argue for a range of responses that are today largely ignored. SDI diverts money, attention, and commitment from those far more promising measures.

**GENERAL RECOMMENDATIONS**

- SDI's missions should not be defending against accidental or unauthorized strikes on the United States from the former Soviet republics. This danger can be addressed more effectively and much sooner by means other than missile defenses.

- Congress should not commit to deploying any form of missile defense now. Potential Third World missile threats do not justify the very large expenditures and diversion of resources that deployment of an SDI system would require. Continuing research and development, but not deployment, of strategic missile defenses will provide an adequate hedge against any threat that might emerge in the future.

- The SDI program should be redirected away from one-term deployment and its funding should be reduced accordingly. A recent study by the Congressional Budget Office found that a robust research and development program could be funded at $2.3 billion in FY 1995. The SDI budget should be reduced to this level or less.

- Congress should formulate more explicit criteria for SDI deployment. Congress's requirement that defenses be "cost effective" and "operationally effective" should be clarified. At a minimum, Congress should require that no SDI system be considered for deployment unless it meets the following criteria: First, it should not be susceptible to countermeasures of technical sophistication comparable to that of ballistic missiles themselves. Second, it should be demonstrated to full testing under realistic conditions to verify reliability. And, third, it should not be susceptible to circumstances by alternate means of delivery already available to potential adversaries of the United States.

- The United States should not abandon the ABM Treaty, but should begin discussions with the former Soviet republics to clarify its terms. These discussions, which could take place in a forum such as the Strategic Security Cooperation Commission, should lead to the formulation of guidelines to distinguish theater missile defense from strategic missile defenses and to define the types and roles of permitted space-based sensors.

- Theater missile defense (TMD) should be removed from the SDI program and put back into the hands of the armed services. Theater missile defense poses different technical problems and has different missions than strategic defense and consequently, does not form a full SDI system. This systems whose primary focus is strategic defense, TMD should be considered the control of the armed services because it would be centrally linked to their theater operations and should be related to their work in other areas, such as theater air defense.

- Congress should exercise greater oversight of the SDI program. Congress should conduct full investigations of allegations of missmanagement and waste in SDI and should impose more stringent oversight if evidence supports those allegations. In addition, oversight should be strengthened to ensure that the direction of the SDI program is consistent with that as mandated by Congress.

- Congress should mandate a full investigation of the performance of the Patriot anti-missile system in the Gulf War. The perception that the Patriot was successful in destroying a large fraction of Scud warheads in the Gulf War contributed to the resurgence of support for SDI, but evidence now suggests that Patriot's performance fell far short of early reports. It is essential to all information regarding Patriot's performance be provided to independent investigators to determine what lessons, if any, may be drawn for SDI.

**RECOMMENDATIONS FOR MISSILE DEFENSE RESEARCH**

- Direct SDI toward exploiting basic technologies but not producing components or systems for deployment. Developing components and systems now, in the absence of a clear threat justifying deployment, tends to lock in current technology and hinder development of new technology that may be more effective.

- Conduct research, development, and testing of strategic defense technologies within the bounds of the traditional interpretation of the ABM Treaty. Detailed studies of the SDI program have concluded that all of the outstanding technical issues relating to the feasibility of SDI concepts can be addressed within the ABM Treaty interpretation.

- Focus the R&D program on the key untested problems that underlie missile defense. These problems include the susceptibility of the interceptors to countermeasures and the reliability of computer software. They must be resolved before the large expenditures for developing defense components and systems for deployment can be justified.

**ALTERNATIVES TO SDI**

Reducing SDI to basic research and development does not mean ignoring existing and potential nuclear threats to the United States. On the contrary, the Union of Concerned Scientists recommends an active program to reduce these threats, as described in a recent report, *A Program for Total Nuclear Security*, by Jonathan Dasa and Kent Ombly. Some of the key elements of this approach and other measures are summarized below.

**Measures to Prevent the Spread and Use of Nuclear Weapons**

- Reduce the threat from the Commonwealth of Independent States by negotiating deep cuts in nuclear arsenals, removing the remaining weapons from alert, and separating the warheads from the delivery systems. Provide additional resources for destroying warheads removed from the arsenal and disposing of the fissile material.

- Strengthen the Non-Proliferation Treaty (NPT) and help to assure its renewal by making a stronger commitment to deep cuts in nuclear weapons and negotiating an end to the testing of nuclear weapons.

- Strengthen the IAEA and update and strengthen nuclear safeguards based on the lessons from the Iraq nuclear program. Sustain the use of intrusive inspections, which have only been used in Iraq, and increase funding for them. Require that all sales of nuclear technology be reported to the IAEA with stiff penalties for non-compliance.

Appendix: Barriers to Building
Long-Range Ballistic Missiles

Designing and constructing a workable intercontinental-range ballistic missile is in some ways more difficult than designing and constructing a nuclear bomb. The most serious technical obstacles involve the need for advanced structural materials and sophisticated guidance systems and the overall complexity of the missile system.

A ballistic missile's range depends on the speed it has attained when it engulfs the burnout. The "burnout speed," in turn, is sensitive to the amount of dead (nonfuel) weight of the missile. For example, a relatively crude missile, like the Scud, which has a deadweight of around 25 percent, would have one-third the range of a modern missile of the same size, which would have a deadweight of about 10 percent. The principal difference lies in the quality of materials used. A long-range missile requires greater structural strength than a theater-range missile to withstand the higher stresses from moving through the atmosphere at higher speeds and to support its greater weight. Without advanced materials that are strong yet light, this greater strength will come at the cost of greater deadweight, which makes sustaining the high burnout speeds required for intermediate distances difficult.

The guidance system that steers the missile during its powered flight is complex and requires exacting design and construction to avoid large missile inaccuracies. Missile inaccuracies arise from two main sources: atmospheric effects during reentry, and errors in the guidance system, both of which become increasingly important with range. For example, if the Scud's guidance system were responsible for half of that missile's one-kilometer inaccuracy, a comparable guidance system on an ICBM would cause an inaccuracy of 10 to 20 km.

Finally, even if the individual parts of a missile can be developed, integrating them into a workable system is extremely difficult. The space-launch vehicle being designed by Brazil, for example, has over 70,000 separate components. The catastrophic flight-test failures of recent US missile programs illustrate the difficulty of successfully constructing such complex systems, even with considerable experience.
Notes

1. In stating GPALS, SDIO assumes that the 200 warheads are targeted such that they can be engaged by interception from only one or two of the SDI sites. However, against a strike spread out over the United States, GPALS would be able to engage a considerably larger number of warheads.


10. Although the threat of intentional attack has disappeared with the end of the Cold War, it could reappear if there were a return to hard-line rule in Russia. Any intentional attack would presumably be large enough to overwhelm a limited SDI system, however, thus making this possibility irrelevant to the present SDI debate.


13. See, for example, Bruce Blair, Testimony to the House Armed Services Committee, 31 July, 1991; Bruce and Kendall, "Accidental Nuclear War?"

14. At a joint DeDDSTO briefing on GPALS on 12 February 1991, Stephen Hadley stated that 18 countries currently had ballistic missile capability and that number would rise to about 24 by the year 2000. Admiral Thomas Brooks, Chief of Naval Operations, testified before the House Armed Services Committee on Intelligence issues on 7 March 1991 that by the year 2000, at least 15 Third World countries are expected to have acquired TBMG (tactical ballistic missiles). In a speech to the Ambassado Association of New York on 22 May 1994, CIA Director William Webster stated that by the year 2000 as many as 15 countries could be producing their own ballistic missiles. Craig Stel, Webster's speech writer, later clarified that these 15 countries are worldwide, not just in the developing world.


19. Former CIA Director William Webster, 18 May 1989: "To some extent, data concerning the status of missile development programs is less difficult to track than nuclear weapons development. New missile systems must be tested thoroughly and in the open while much of the work involved in the development of nuclear weapons is more easily concealed in labs."

20. Steve Fifer discusses the relative effectiveness of nuclear, biological, chemical, and conventional high-explosive warheads in "Ballistic Missiles and Weapons of Mass Destruction," International Security 14 (Summer 1990), p. 5. This analysis suggests that both chemical and conventional warheads are of less danger to urban populations than nuclear and biological weapons.


22. This suggestion was raised recently by Russian Foreign Minister Andrei Kozyrev at the UN conference on disarmament, quoted in Tax, 12 February 1992, reported in FBIS-SOV-92-030, 13 February 1992, p. 2.

23. These mechanisms could be designed to act as a type of PAL which destroyed the missile after launch unless the proper code was given by the central authorities. Opponents of post-launch control have often raised concerns about the security of such a system, which might allow US missiles to be sabotaged. For a discussion of how a system could be designed to avert these concerns, see Thomas Friedman, "Stopping Accidents After They've Happened," Bulletin of the Atomic Scientists 44 (November 1993), p. 39, and "Aborting Unauthorized Launches of Nuclear-Armed Missiles Through Post-Launch Destruction," Science and Global Security 2 (November 1990), p. 1. C 3I missiles contain post-launch destruct mechanisms that would be activated automatically by the missile if it sensed it was malfunctioning, but they cannot be activated from the ground (Paul Forreigh, Moscow Institute of Physics and Technology, private communication).
27. The FY 1992 budget for the US Air Defense Initiative was cut from the administration request of $3.27 billion to $3.16 billion—a figure 25 times smaller than the SII budget (Faith in the Pentagon, 21 November 1991, p. 3).
34. Ibid., p. 23.
38. Even if the interceptors were used by a sensor such as GSTS, the sensors would remain unexplained against SLBMs or ICMBs on trajectories that are deployed somewhat below their standard minimum-energy path. See Liebold Groenland and David C. Wright, "Limits on the Coverage of a Treaty-Compliant ABM System," Physics Today (April 1992), p. 3.
40. Military Space, 12 August 1991, p. 7. SDI would use advanced technologies, many of which are in the early stages of development, which may make them more susceptible to cost growth.
43. CBO, "Budgetary Impact."
47. A 1990 RAND Corporation study shows that the presence of defenses can destabilize the transition to low arsenals (Glenn A. Krant and David E. Thaler, "First Strike Stability and Strategic Defense" (Santa Monica, CA: RAND, 1990), Report R-918-AF).
Announced a decade ago, the Strategic Defense Initiative is now entering its fourth oscillation. President Clinton has abandoned, and so far accepted, a Star Wars that is largely focused on ground-based defenses against tactical and theater-range ballistic missiles.

With the end of the Cold War, the defense sector has undergone some of the most profound changes in recent history, perhaps as little as 10 years after the Cold War began. The new strategic defense environment, like the economic, is a world of expectations and possibilities, for which once moved ahead through a steady stream of events, strategic defense has continued and moved back and forth over the years.

Even so, strategic defense remains one of the central elements of the American view of global security. And though the space-based elements of Star Wars have been de-emphasized, they have not been eliminated.

During the Cold War, SDI was the premise for the creation of an implicitly nuclear arms control agreement. Today, SDI is the premise for the creation of a new kind of arms control agreement. The need for a new kind of arms control agreement is clear, and SDI is the starting point for such a new kind of arms control. (continued on page 3)
IN MEMORIAM
Physicist Bernard F. Field and Biochemist Bobbi Holley, two of America's leading scientists and long-standing supporters of the Federation, died in February.

Bernard T. Field
Field, a founder of FAS, who helped steer Fermi develop the atomic bomb, died in 1982. "I was involved in the original sin, and I have spent a large part of the rest of my life atonizing." Indeed, Field was directly and vocally supportive of arms control agreements, opposed to clear aspects of the arms buildup in the 1980s, and coincided with scientists who believed that they should involve themselves in public policy.

In 1979, FAS awarded Field its annual public service award, calling him "the ultimate advocate of arms control matters." In a statement to be read at the March 31 memorial service in Cambridge, Co-chairman Frank von Hippel and President Joseph S. Stumpf said:

"Bernard Field was immediately charming, often irreverent and always, above all, dedicated to his work. His role at Los Alamos placed heavy burdens of moral responsibility upon him, butField would not raise issues that he could not fulfill.

Field retired from MIT two years ago after a distinguished teaching career and a half-century of leadership in arms control. He died of cancer at the age of 73. He is survived by his wife, Emily, two daughters, and three grandchildren.

Robert W. Holley
Holley, a key figure in the FBI for over 30 years, died in February.

The inscription on the certificate reads:
"The fundamental building block of life is DNA, the genetic code of life, and the DNA of DNA has been determined. This is the first molecule for which the structure is known."

In 1973, the FAS took part in the "research and education of DNA.

The FAS earned its 1993 annual public service award for its work on the "DNA of Life" project, which aimed to educate the public about the importance of DNA.

And What About Arms Control?
Notwithstanding the fact that America and Russia will, for the foreseeable future, retain large numbers of strategic offensive forces aimed at each other, reductions in nuclear forces now underway on both sides conform to the original logic of the ABM Treaty. Further reductions in offensive forces require more limitation on anti-ballistic missile systems and mandating definitions of treaty-compliant anti-ballistic missile systems.

The Bush Administration encouraged the Russians in negotiations aimed at lowering or eliminating strategic nuclear forces. The Clinton Administration should pursue a course and focus on more realistic limitations.

Some Better Spent Elsewhere
We have very little to show for the $3 billion spent on SDI over the past ten years. And we have even less to show for spending another $3 billion on the program over the next eight years. Only two countries remain for spending any amount. They are the Soviet Union and China.

In 1993, the SDI program was taken on by the National Security Agency (NSA) and the Defense Advanced Research Projects Agency (DARPA), which funded the program through the late 1990s. The program was ultimately canceled in 1999.

Will It Work?
Intense testing and real-world ballistic missiles poses the same questions in systems effectiveness and those faced by strategic defense. The experience of the 1980s, when the American Thor and Scud systems were deployed, demonstrated the need to test such systems in a real-world environment.

Paradoxically, SDI has been at the forefront of developing cooperative instruments with the Soviet response complex. This was the era in which the Bush Administration's vision of building an "endgame" in the arms race had been on the table. The Clinton Administration should build on this experience, taking it one step further and using a different direction. And it should greatly expand the scope of arms reduction efforts, including the current negotiations.

Eisenhower called the Cold War "the battle of life". The SDI program, with its focus on anti-ballistic missile systems, has been insignificant and not worth pursuing.

—John F. Hiltz
RECONCILING THE HISTORY, DISCOUNTING THE CLAIMS

Since President Reagan first unveiled his Strategic Defense Initiative on 23 March 1983, the program has been beset by shibboleth goals and uncertain plans. The press has seen a steady drumbeat of change, but the reality is that the SDI has not made significant progress. The program's goals have shifted repeatedly, and it has yet to demonstrate any tangible results.

Each new phase was marked by less ambitious performance goals that were to be met by lesser technical standards. The latest official position is that the SDI is now moving towards deployment, but it remains unclear how and when this might happen.

The Magic Peace Shield

At its peak, SDI was seen as a perfect defense against a very large missile strike by the Soviets. The press once estimated that it would result in the destruction of any large-scale attack. However, there is no evidence that SDI would be able to achieve this goal.

The system was based on the idea of a missile defense in space, which would intercept incoming missiles before they reached their targets. However, the reality is that this is not possible with current technology.

The system was also supposed to be able to detect and neutralize multiple threats, but this has not been achieved. The system has been unable to detect or neutralize any threats, and the tests have been notoriously unsuccessful.

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of anti-missile systems would be degraded by the effects of counterfeiting from real targets, and the ability of the computer would be compromised.

**Flaws In Scuds Create Inevitable Demons**

ICBM and ICBM interceptors were the key to successful defense against Scud missiles. The interceptors were designed to intercept Scuds in mid-air, but they were not capable of distinguishing Scuds from other types of missiles. This led to the development of countermeasures, such as the use of decoy satellites. Despite these efforts, the interceptors were not able to effectively intercept Scuds, as the decoy satellites were able to fool the interceptors.

**Surgical Precision-Locking In Software**

The software that controlled the interceptors was complex and difficult to develop. The software was designed to make the interceptors more effective at intercepting Scuds. However, this complexity also made it easier for the Scuds to adapt to countermeasures. The software was also vulnerable to hacking, which could allow the Scuds to circumvent the interceptors.

**Campaign Against Launchers Had Chilling Effect**

The campaign against Scud launchers had a chilling effect on the ability of the interceptors to intercept Scuds. The interceptors were designed to intercept Scuds in mid-air, but they were not capable of distinguishing Scuds from other types of missiles. This led to the development of countermeasures, such as the use of decoy satellites. Despite these efforts, the interceptors were not able to effectively intercept Scuds, as the decoy satellites were able to fool the interceptors.

**Extended Range Interceptor (ERINT)**

ERINT was a system designed to intercept Scuds at a longer range, which could not be reached by the existing interceptors. The system was designed to intercept Scuds in mid-air, but it was not able to distinguish Scuds from other types of missiles. This led to the development of countermeasures, such as the use of decoy satellites. Despite these efforts, the interceptors were not able to effectively intercept Scuds, as the decoy satellites were able to fool the interceptors.
The theater High Altitude Area Defense (THAAD) system will be capable of engaging targets at distances of up to 200 kilometers, at altitudes of up to 180 kilometers.

The THAAD, the last-layer interceptor missile, will be larger than either Patriot or ERINT, though smaller than the Arrow. ERINT will be the second layer interceptor in the system. As with the Theater High Altitude Area Defense (THAAD) system, the Arrow THAAD will use an infrared homing kill vehicle.

Initial testing of this concept was completed in 1990 with a test fire consuming through 10th, unlike ERINT, which will take advantage of existing infrastructure. The larger THAAD will require an alert and the system, greatly increasing the overall cost of the system.

The Arrow (Arrow) is a medium-range, anti-ballistic missile interceptor designed for defense against ballistic missiles with ranges up to 1,000 kilometers. It is intended for use in the public area over almost every front line of the Arrow system. However, it was found that the two-stage attack with THAAD would not have introduced homing guidance (as with THAAD) and an explosive warhead with a maximum range would also be an issue.

A range of technical problems has developed. The system's radar has an inadequate area acquisition and cannot detect and engage numerous targets. And many elements need to be monitored. The first three tests of this interceptor failed, with only the fourth, in February, finally succeeding. Although the project is jointly financed by America and Israel, both governments have stated that they have no plans to launch the system, saying that each thinks the other should shoulder the costs.

Ground-based Interceptor (GBI)
SDI plans include continued work on a ground-based missile system that would intercept missiles in the mid-course phase of flight, before they begin to reenter the atmosphere. This effort includes research on the THAAD system, which extends the approach used in the Theater High Altitude Area Defense (THAAD) system, in 1984, and the Enhanced Air-launched Decoy System (ERINT), which incorporated a much smaller and lighter kill vehicle.

The relative paucity among these three generations of interceptors is indicated by the mass of the kill vehicle, which dropped from 1,000 kilograms for the Arrow, 1,000 kilograms for THAAD, to less than 200 kilograms in ERINT, to about 25 kilograms with GBI.

Computer development of the operational Ground-Based Interceptor Experiment (GBIE), a much more sophisticated version of the ERINT, was awarded in mid-1992. Under these plans, testing of the GBIE was to begin in 1995, with deployment expected in the second half of the 1990s.

A large contract for the construction of the system has been awarded to the Boeing Company by the Defense Advanced Research Projects Agency (DARPA), the Defense Advanced Research Projects Agency (DARPA), the Department of Defense, and the Department of the Army.

Boost-Phase Sensors (BSS) and FEWS
Early detection of missile launches can significantly improve the performance of defenses against both tactical and ballistic missile. During the 1990s, SDIO spent several hundred million dollars on the development of the Booster Surveillance and Tracking System (BSTS).

When the advanced sensor requirements for BSTS were eliminated in 1990, the program took back to the Air Force. Recent studies have found that FEWS (Free-Wavefeelfung System (FWS)) to reflect improved early warning of missile attack and enhanced intelligence collection and verification capabilities. In its present form, it uses an expanding grid of electromagnetic (EM) sensors to detect the presence of the target missile defense. But, as the conclusion of the Defense Support Program warning satellite during the Desert Storm, the United States had clearly demonstrated the broad capability of the FEWS sensors to track, track, and confirm the capability of the FWS.

High-Corner Sensors (HCS/CTAP) and Brilliant Eye
When the SDI program first began, there was considerable optimism that sensitive optical sensors could detect the presence of Mach 10 target interceptors, and destroy the system to enable the attack to be launched and to be found.

On the other hand, the widespread deployment of laser-electromagnetic sensors and the development of a variety of laser-electromagnetic sensors to detect the presence of the target missile defense. But, as the conclusion of the Defense Support Program warning satellite during the Desert Storm, the United States had clearly demonstrated the broad capability of the FEWS sensors to track, track, and confirm the capability of the FWS.

The first category can be adequately addressed with no change to the current sensor suite.

The second category, a detection of warheads using a variety of these sensors and lasers, is not only the current technology available, but also the capability to detect the presence of the target missile defense. But, as the conclusion of the Defense Support Program warning satellite during the Desert Storm, the United States had clearly demonstrated the broad capability of the FEWS sensors to track, track, and confirm the capability of the FWS.

The third category includes the detection of warheads using a variety of these sensors and lasers, is not only the current technology available, but also the capability to detect the presence of the target missile defense. But, as the conclusion of the Defense Support Program warning satellite during the Desert Storm, the United States had clearly demonstrated the broad capability of the FEWS sensors to track, track, and confirm the capability of the FWS.

The fourth category is not only the current technology available, but also the capability to detect the presence of the target missile defense. But, as the conclusion of the Defense Support Program warning satellite during the Desert Storm, the United States had clearly demonstrated the broad capability of the FEWS sensors to track, track, and confirm the capability of the FWS.

The fifth category is not only the current technology available, but also the capability to detect the presence of the target missile defense. But, as the conclusion of the Defense Support Program warning satellite during the Desert Storm, the United States had clearly demonstrated the broad capability of the FEWS sensors to track, track, and confirm the capability of the FWS.

The sixth category is not only the current technology available, but also the capability to detect the presence of the target missile defense. But, as the conclusion of the Defense Support Program warning satellite during the Desert Storm, the United States had clearly demonstrated the broad capability of the FEWS sensors to track, track, and confirm the capability of the FWS. The success of the United States in defending against ballistic missiles would depend on the ability of the United States to detect the presence of the target missile defense. But, as the conclusion of the Defense Support Program warning satellite during the Desert Storm, the United States had clearly demonstrated the broad capability of the FEWS sensors to track, track, and confirm the capability of the FWS.
FRIDAY
September 10, 1993

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GAO: Move STARS to Vandenberg

BY CHUCK HAGAN
WASHINGTON, D.C.,
Congress is considering a bill that would change plans to move the National Aeronautics and Space Administration's STARS (Stratospheric Transport Aircraft for Research and Study) from its current location at Edwards Air Force Base in California to Vandenberg Air Force Base in California.

The Senate version of the bill, approved on Tuesday, calls for the move of the STARS to Vandenberg by 1995. The STARS is a fleet of five aircraft that are used for research and development purposes by the National Aeronautics and Space Administration.

The House version of the bill also calls for the move of the STARS to Vandenberg, but it specifies that the move should occur by 1996.

The move of the STARS to Vandenberg is intended to reduce costs and improve access to the Vandenberg range, which is used for missile testing.

The move of the STARS to Vandenberg has been opposed by some members of Congress who fear that it will decrease the availability of the range for other users.

GAO:

The General Accounting Office has been asked to study the feasibility of moving the STARS to Vandenberg.

The GAO report is expected to be completed in the near future.

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9-221
House of Representatives

POLARIS MISSILE LAUNCH FROM THE ISLAND OF KAUA'I

REMARKS BY REPRESENTATIVE PATSY T. MINK

The SPEAKER pro tempore. Under a previous order of the House, the gentleman from Hawaii (Ms. Mink) is recognized for 10 minutes.

Ms. MIKIMIKI of Hawaii. Mr. Speaker: The SPEAKER pro tempore.

The SPEAKER pro tempore. The SPEAKER pro tempore is recognized for 10 minutes.

Ms. MIKIMIKI of Hawaii. Mr. Speaker: I am pleased to inform the House that this evening marks the beginning of the Polaris Missile launch program.

The Polaris missile, developed in the 1950s, is a medium-range intercontinental ballistic missile. It was designed to carry multiple nuclear warheads and was a major component of the United States' nuclear deterrent strategy.

However, the launch program has faced challenges and controversies. The Polaris missile program was cancelled in the 1970s due to cost overruns and technical difficulties. Nevertheless, its legacy in Hawaii is significant, having played a crucial role in the nation's defense strategy.

I would like to take this opportunity to recognize the contributions of our military personnel and the sacrifices they have made in the defense of our nation. Their dedication and commitment to our country are truly commendable.

As we celebrate the launch of the Polaris missile, let us also remember the families and loved ones of our military personnel. Their support and sacrifice are essential to the success of our military operations.

Moreover, this occasion serves as a reminder of the importance of maintaining a strong defense posture. It is through the continued support of our armed forces that we can ensure the security and prosperity of our nation.

I thank the SPEAKER pro tempore for recognizing me this evening. I look forward to the continued progress of our military and the contributions of our armed forces.

Mr. Speaker: The SPEAKER pro tempore.

The SPEAKER pro tempore. The SPEAKER pro tempore is recognized for 10 minutes.

Ms. MIKIMIKI of Hawaii. Mr. Speaker: As the Polaris missile launch program progresses, let us remember the sacrifices made by our military personnel and the families they support. Their commitment and dedication are an inspiration to all of us.

The Polaris missile launch program is not without its challenges. There have been concerns regarding the environmental impact and safety of the program. However, the Department of Defense has assured us that safety protocols are in place to minimize any potential risks.

I would like to express my appreciation to the Department of Defense for their efforts in ensuring the successful launch of the Polaris missile. Their commitment to safety and security is commendable.

As we celebrate this milestone, let us also recognize the contributions of our military personnel and the sacrifices they have made in the defense of our nation.

In conclusion, the Polaris missile launch program is a significant accomplishment for our nation. It is a testament to our military's capabilities and our commitment to maintaining a strong defense posture.

I thank the SPEAKER pro tempore for recognizing me this evening. I look forward to the continued progress of our military and the contributions of our armed forces.
DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-1500
October 8, 1993

Environmental and Engineering Office

Ms. Donna Antolini
Sierra Club Legal Defense Fund
212 Market Street, Suite 202
Honolulu, HI 96813

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your comments of September 22, 1993, on the Draft Environmental Impact Statement (EIS). As a part of the public comment process, the U.S. Army Space and Strategic Defense Command (USASDS) is responding to this letter to your comments. Your comments and these responses will be included in the Final EIS.

General Comments: Pages 1 through 4.

Response to General Comments:

- The proposed action has not changed and involves only Strategic Target System and Vandal launches. As noted in the response to comments to the Preparation Notice contained in the Draft EIS, the easement will reflect this limited scope.

- While the Draft EIS statement that "current plans" are to launch fewer Strategic Target System missiles than previously indicated is accurate, the easement permits up to four launches per year of the Strategic Target System missile to provide for future planning flexibility.

The text of Section 1.3.1 of the Final EIS has been revised to include a summary of the litigation in State court.

Comment 1: The Draft EIS improperly focuses on the land use agreement rather than the impacts of the actions that it will allow.

Response 1: The EIS properly focuses on the proposed action of a restrictive easement and also includes an analysis of indirect and cumulative impacts. The purpose of the environmental impact assessment process is not to paralyze legitimate government activities but to provide information to decision makers prior to making decisions. The decision to proceed with Strategic Target System launches was made after careful consideration of a variety of factors, as allowed by the National Environmental Policy Act, including extensive environmental documentation. The Sierra Club, the State, and other interested parties had ample opportunity to participate in and comment on that decision process. This decision does not require revocation as the Sierra Club asserts. The decision under review for which environmental analysis is required is whether or not to grant a restrictive easement for ground clearing activities.

Comment 2: The Draft EIS fails to disclose the actual impacts of the two Strategic Target System launches or past years of Vandal launches.

Response 2: The Draft EIS (and Final) refers to the preparation of an environmental monitoring report for the first Strategic Target System launch in February of 1993. Sampling results from the August launch are not available at this time. The February monitoring results are consistent with the conclusions of the Strategic Target System EIS that Strategic Target System launches would not result in significant environmental impacts. The fact that the Draft EIS states that an area of disturbed vegetation near the launch pad as a result of the first launch is recovering is not inconsistent. A temporary leaf discoloration in a very small area occurred. This potential effect was predicted in the Strategic Target System EIS and was determined to be not significant since the effect was of short duration. Environmental monitoring of the same nature is not conducted for the Vandal launches from the Pacific Missile Range Facility (PMRF). However, as noted above, there is no discernible impact within the easement area from the years of Vandal launches. The Navy will conduct a baseline survey for possible lead contamination around the Vandal launch site and conduct periodic monitoring to assess the impact of all launches from that launch site.

The practice of incorporating previous environmental documents by reference is established in Title 11-200-13 of the Hawaii Administrative Rules. In the case of the Federal Environmental Assessment (EA), Supplemental EA, and Draft and Final EISs, although these documents were not formally "accepted" by a State agency, they were reviewed by and commented on by the State. In addition, they were incorporated by reference in the EA prepared under the Hawaii Environmental Policy Act (HEPA) for a Memorandum of Agreement to allow the United States to clear ground hazard areas (GHAs) for its launches for a 1-year period of time, ending December 31, 1993. This accomplished the major purpose of the Chapter 11-200 rules to "ensure that environmental concerns are given appropriate consideration in decision making..." The federal environmental documents have been available for public review. These documents can be found in public libraries on Oahu and at other locations on Oahu.

The stipulation referred to in the general comments of your letter regarding the "essentially self-contained" requirement for an EIS is not found in Title 11-200-17 but rather is found in Title 11-200-18. This subsection also says the "preparers shall make every effort to convey the required information succinctly..." (emphasis added) in a form easily understood, both by members of the public and by public decision makers, giving attention to the substance of the information conveyed rather than to the particular
Comment 3: Missile reliability

Response 3: The U.S. Government reiterates its previous response that a thorough examination of the Strategic Target System booster reliability has been addressed in previous environmental documents which are incorporated by reference in the EIS for the restricted area. The analyses and data included in the previous environmental documents and their administrative records are as clear and complete as is possible without disclosing classified information and provide sufficient information and context to support an informed decision concerning booster safety issues. With respect to the Strategic Target System for first and second-stage motors, the propellant aging process has been studied extensively, and the knowledge obtained supports the U.S. Government's reliability assessment. In addition, more than adequate measures have been developed and implemented to ensure refurbishment of the motors to original specifications. Even so, the analysis of potential environmental impacts in the Strategic Target System EIS did not ignore the possibility of a missile failure. Several potential failure scenarios were analyzed, including the effects of a missile termination over the GHA. These impacts were analyzed, and a decision to proceed with the Strategic Target System was made. During the two successful launches of the Strategic Target System that have taken place to date, the Army has observed nothing from a technical or operational perspective that would alter its reliability assessment.

The U.S. Army is aware of the view that the Strategic Target System reliability is lower than the 97 percent figure used in the Federal Draft and Final EISs (U.S. Army Strategic Defense Command, 1992c). Most notably, Dr. David Wright, a Senior Staff Scientist with the Union of Concerned Scientists at the request of the Sierra Club Legal Defense Fund, conducted a review in December 1992 of the Sandia National Laboratories (SNL) reliability analysis of the Strategic Target System launch vehicle. He concluded that, since the SNL analysis assumed 100-percent reliability for some of the major components of the Strategic Target System, namely the first- and second-stage boosters, actual reliability is lower than the SNL estimate. Using the SNL analysis, augmented by his own estimates of the first- and second-stage booster reliability based on the number of flights and failures of the Polaris booster, he posits an overall reliability in the low 90-percent range. However, he noted that this figure did not take into account the aging process of the Polaris booster and concluded that the launch history of the refurbished Minuteman I missiles was more realistic way to evaluate the reliability of the refurbished Polaris booster. He calculated a 75- to 82-percent reliability for the Minuteman I booster, based on 50 Minuteman I launches between 1985 and 1992.

The U.S. Army acknowledges that the SNL analysis relied on an assumption of 100-percent reliability for the first- and second-stage Polaris boosters, and thus its analysis was a best-case assessment. While the U.S. Army is restricted from providing the actual reliability estimates for the Polaris first- and second-stage boosters because these figures remain classified, the U.S. Army maintains that their reliability is extremely high. The analysis in Volume I of the Strategic Target System Final EIS on page 3-20 (U.S. Army Strategic Defense Command, 1992c) notes that the calculation of a 97-percent overall system reliability combines both key and non-key light components and that the reliability of key light components such as the flight termination system is far greater than 97 percent. Also as noted on page 3-20, failure of any of the components would impact the ability of the U.S. Army to obtain desired test results but would not have an impact on the safety of the launch vehicle or require termination so as to affect the GHA. For example, the failure of a telemetry link may cause a gap in data collection but not necessarily a booster termination. The U.S. Army maintains that direct comparison with refurbished Minuteman I launch success rates is not appropriate. The booster systems are not comparable, and a comprehensive evaluation of the first and second-stage launchers was conducted prior to developing the reliability evaluation for the Strategic Target System.
seconds to such a degree that it could pose a threat to anyone on land. Dynamic forces inherent in such a turn would cause the missile to break up before reaching that point.

The Vandal program, Navy-wide, has had 300 successful flights and 8 failures between 1977 and February 1991. An early problem associated with four of the failures has been corrected. The other failures were associated with booster break-up and missing nozzle retaining rings. The missiles that exhibited the booster breakup anomaly are part of a specific lot (Lot 11) of the Vandal booster inventory. The Navy will not use boosters from this lot in the future. The problem associated with the missing nozzle retaining rings has been corrected by installing the rings during booster refurbishment. No report of this failure has occurred (Strategic Defense Initiative Organization, 1991). Since February 1991, 37 Vandal launches have occurred, with no failures occurring during the boost phase that would affect the GHA.

Prior to the Memorandum of Agreement (MOA), the Vandal missiles were launched by informal agreement, consistent with the PMRF's longstanding mission. Not only have these launches been carried out without incident, but also prior to the launching of Strategic Target System missiles, these launches were virtually unnoticed by the public and were of little inconvenience to anyone. Apart from the greater awareness of these launches that has occurred over the past few years, the U.S. Government has no reason to believe that these launches will have any more noticeable impact on public activities than they have in the past.

Comment 4: Adequate analysis of closures of Polihale State Park and inconsistency with state land use plans and policies.

Response 4: The U.S. Government understands the importance of access to shoreline and recreational areas on Kauai. That is why the PMRF maintains recreation areas on the base and provides ample, open public access to these shoreline areas for fishing, surfing, and general beach activities. The analysis of closures of Polihale State Park and/or access to it, the comment assumes that all launches will occur at times of substantial park usage, ingress, and egress. However, some launches will occur at times that will interfere with virtually no one's use or access to the park, as was the case with the August 25, 1993, launch that occurred at 12:01 a.m. In addition, the August 25 launch was originally scheduled for 5 days earlier but was deliberately rescheduled so it would not interfere with a State Holiday and, ostensibly, greater use of the park than normal. The comment also assumes that the access road to Polihale State Park would remain closed indefinitely during a launch delay. During the February 26 launch of the Strategic Target System missile, for example, during a 2-hour delay in the launch countdown, the road was reopened until 20 minutes before the rescheduled launch time. Under the terms of the restrictive easement, this would have counted as two closures against the 30 allowed per year and is consistent with the analysis in the restrictive easement RIS regarding closure impacts. What the first two launches of the Strategic Target System vehicle actually demonstrate is the U.S. Government's commitment to minimizing as much as possible any loss of recreational opportunities, which it believes to be consistent with the spirit and letter of the proposed restrictive easement. Obviously, the willingness of park patrons to comply with notification to leave the GHA at least 20 minutes before a launch could determine whether the United States would need to exclude those patrons earlier in the 3-hour notification period to ensure that the GHA is verified clear 20 minutes prior to a launch.

The comment also implies that activities such as camping and kayak trips that are planned well in advance may have to be abandoned as the last minute because of ground clearing activities. The nature of the restrictive easement, the analysis in the associated RIS, and the experience of the two Strategic Target System launches in 1993 do not support this conclusion. The facts are:

- The restrictive easement area does not include any of the permitted picnicking and camping areas. Campers can request, receive, and use camping permits regardless of when launch activities are scheduled.
- A portion of the access road to Polihale State Park is within the restrictive easement area. However, this portion of the road remains open for people leaving and entering Polihale State Park until just 20 minutes before a launch and until the Missile Flight Safety Officer declares the area safe, usually a total of 30 minutes. This delay is temporary and intermittent; it should not cause anyone to have to "abandon" their plans.
- During the first Strategic Target System launch that occurred on the morning of Friday, February 26, 1993, three surfers were delayed from leaving Polihale State Park for approximately 25 minutes; no campers were affected.
- During the second Strategic Target System launch that occurred at 12:01 a.m. on Wednesday, August 25, 1993, no park users were delayed from entering or leaving Polihale State Park during the temporary closure of the access road.

Given the ability to schedule launches to minimize their impacts on recreational use and the U.S. Government's commitment to maintaining as much access to the shoreline as possible, both on and off the base, the U.S. Government stands by its analysis of the impacts from launch-associated closures.

The point raised by the Sierra Club regarding the impacts from flight termination assumes that if a flight termination occurs that it occurs immediately after takeoff. It assumes that all the directions in which a missile might veer off course, that it would head for Polihale State Park. It assumes that potential fire suppression and debris recovery operations would result in an indefinite closure of the entire GHA. Finally, it assumes that the U.S. Government has no interest in claiming "unlimited control over state lands in the GHA." The U.S. Government has no plan or desire to take up occupation of State lands. The U.S. Government's sole purpose...
in seeking a restrictive easement is to ensure public health and safety during planned Strategic Target System and Vandal missile launches. If an event occurs that makes it necessary to temporarily maintain closure of portions of the GHA beyond that required for a nominal launch, the U.S. Government will reopen any portion not immediately necessary for safety-related purposes. For example, if a portion of Pohakale or Lover Saki Ma'ana roads needed to be avoided for several hours, there are numerous detours that would be available using the network of cane haul roads that cross the entire area. Thus, an inadvertent closure from an unlikely light termination would not result in indefinite closures of the entire GHA, and every effort would be made to minimize any inconvenience to park users. The U.S. Government stands by its commitment to maintain access to the shorelines on the west side of Kauai to the maximum extent possible for the enjoyment of all citizens.

Comment 5: The proposed easement is inconsistent with State policy and planning guidelines.

Response 5: A historical perspective about land use planning for the Waikea-Kekaha area (see comments of Jimmy Tahoda provided in Appendix O of the Final EIS) indicates that the lands adjacent to the PURF were purposefully left relatively undeveloped to provide a buffer zone for its operations. The comment does not acknowledge that there are three primary land uses in the area: timber, recreation, and agriculture which have historically tied to coexist in harmony and that the Navy’s presence substantially predates the existence of the park. If the effect of the restrictive easement were to “shut down” Pohakale State Park, as the comment asserts, then it would not be compatible with current uses. There is no indication, however, that the restrictive easement would result in anything more than temporary, intermittent closures that might inconvenience a small number of people. This inconvenience should not be significant enough to jeopardize the granting of a restrictive easement that would enable the U.S. Navy to continue its mission. This allowance for inconvenience to enable compatible land uses is the same principle by which Kekaha Sugar Company is allowed to temporarily impede access to the state park during harvesting and burning activities to protect public safety while it carries out its mission. By the standard which the comment would like to impose, all sugar cane production adjacent to Pohakale State Park should cease because of these temporary interferences with the wholly uninterested use of Pohakale State Park. The United States recognizes the existence of areas comprising land uses in the GHA and has attempted to properly evaluate and implement ways to ensure the compatibility of these uses.

Comment 6: Hazardous air emissions

Response 6: The protocol used during the Strategic Target System launch was developed by the U.S. Army Environmental Hygiene Agency (AEHA) in consultation with the State of Hawaii Department of Health’s Clean Air Branch. The six monitoring sites in the 1991 proposed protocol were not used in the February 1993 Strategic Target System launch because that protocol was revised in July 1993. This revision was done in consultation with the State of Hawaii Department of Health’s Clean Air Branch. Only two monitoring sites were provided in the revised protocol, with background monitoring performed at four potential sites. The reason for changing to two monitoring sites was to obtain more stringent and appropriate real-time monitoring. The 1991 proposed protocol required industrial hygiene monitoring equipment which yields a less informative composite result. In comparison, the advantage of real-time direct monitors is that they provide a time history of the emissions from the Strategic Target System missile launch. Further consultation was conducted with the Clean Air Branch on the resultant monitoring report during June 1993 as the report was being prepared. A copy of the final monitoring report was provided to the Hawaii Department of Health Clean Air Branch on August 17, 1993.

The monitoring site chosen for the boundary of the GHA, according to the revised protocol, was determined by the prevailing meteorological conditions, including wind direction and speed, determined the morning of the first launch. In the event of an entirely component of the surface winds, as was the case on the day of the launch, emissions are transported over the ocean. Under those conditions, the protocol states that the mobile site would be located at the south end of the GHA, where the greatest concentration of nonessential mission personnel would be located.

Monsieur used in February did not malfunction during the launch. Complete data were collected during the morning of the launch at the site near the launch pad and at the southern perimeter site. All data, including that collected prior to and the morning of the launch, were validated prior to public release.

Air quality issues were exhaustively examined in the Supplement to the Environmental Assessment for the Strategic Target System and the subsequent EIS, Rocket Exhaust Emission Dispersion Model (REDAM) modeling does show the potential for exceeding the HCL guideline beyond the GHA under certain meteorological conditions. However, as discussed in the EIS, the appropriate health-based standard is the Short-term Public Emergency Guidance Level (SPLEG) which modeling shows will not be exceeded at the boundary of the GHA. In instances of HCL emissions, the Hawaii Clean Air Branch refers to the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) for occupational workplace settings, which is a ceiling limit of 3 ppm (1.9 mg/m^3). TLVs refer to airborne concentrations and represent conditions under which it is believed that nearly all workers may be repeatedly exposed for a normal 8-hour workday and a 40-hour workweek without adverse effect. A TLV-TWA is a time-weighted average concentration for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect. A TLV Ceiling Limit (TLV-C) is a concentration that should not be exceeded during any part of the work exposure (American Conference of Governmental Industrial Hygienists, 1990). The State of Hawaii Clean Air Branch interprets the ACGIH TLV-C for HCL, 5 ppm, to be an 8-hour time-weighted average. Furthermore, to provide health and
safety protection to sensitive members of the public, the Clean Air Branch applies a safety factor of 200 to the ACGIH TLV. The resulting public exposure guideline used by the Hawaii Clean Air Branch is an 8-hour time-weighted average of 0.035 ppm (IARC, 1991; Suhara, 1991b). This is a reference value to which concentrations for shorter or longer exposures can be normalized and compared, and it does not mean that an individual will be exposed to a chemical for 8 hours.

It is important to understand that the exposure evaluation criteria developed by the ACGIH and other agencies serve as guidelines for occupational exposures, not regulatory standards for determining the safe and dangerous ambient concentrations. The ACGIH strongly discourages the use of its published exposure values for other than industrial hygiene practices (American Conference of Governmental Industrial Hygienists, 1990). The United States continues to maintain that the SPEGL provides the appropriate standard to determine a health-based risk from HCI short-term exposure.

With respect to lead reporting for Vandal launches, the reportable quantity established for lead in a final rule published in the June 30, 1993, Federal Register, is 10 pounds. The U.S. Navy will conduct a baseline survey for possible lead contamination around the Vandal launch site and conduct periodic monitoring to assess the potential impacts from all launches from that launch site. In the meantime, the U.S. Navy is in the process of evaluating the requirement to report lead releases under the Comprehensive Environmental Response, Compensation, and Liability Act for missile launches and, if necessary, the best means to report such releases.

Comment 7: Hazardous material and wastes
Response 7: In the event of a flight termination, liquid propellant, if any, and some of the solid propellant will burn before reaching the earth's surface. Should some of the unburned solid propellant reach the land rather than the water, one of two things will occur. If the propellant is burning, it will convert to ash. If it is not burning, it will come to rest on the surface of the ground. In either case, the ash or chunks of unburned propellant will be removed in accordance with the cleanup procedures described in the Strategic Target System EIS, which essentially involves plowing it up off the ground. Assuming this removal is conducted in a timely manner, there is no reason to believe that significant, let alone catastrophic, impacts will occur.

As far as the adequacy of the GHA to contain debris from an early flight termination, the comment assumes that flight termination is based on preflight mission planning, rather than active tracking of the flight's progress and prediction of instantaneous impact points in real time. The missile flight safety officer maintains positive control over the missile at all times and continuously monitors the flight trajectory in relation to the predicted impact area for debris. If the missile approaches an unsafe trajectory, the flight will be terminated.

Evacuation of persons outside the GHA will not be necessary due to the adequacy of the GHA to contain debris and the availability of fire suppression equipment and crews to contain potential impacts. In addition, it is highly unlikely that patrons of Pohukana State Park would be trapped given the network of canyons and roads that exist in addition to the main access road. Even the main road would be reopened after a flight termination unless it were directly blocked by fire or debris. In the remote event of an emergency requiring access to Pohukana State Park, however, the PMRP has helicopters and four-wheel drive vehicles on hand during launches that could reach the park via the beach.

Comment 8: The risk of fires
Response 8: The comment posits the potential for a "full-bosh fire storm" to develop in the GHA based on conditions similar to those that occurred at Vandenberg Air Force Base earlier this year. As a result of an early flight termination of a Minuteman missile. However, the conditions surrounding the PMRP are not comparable, particularly in terms of the types and amounts of vegetation, topography, humidity, and wind patterns. There are also numerous natural fire breaks and man-made fire breaks as a result of sugar cane cultivation that make such a scenario highly improbably. The U.S. Government also knows of no conditions under which a flight is terminated that could result in the "instantaneous ignition of hundreds of spot fires." as speculated in the comment.

The potential for a conflict between protecting biological resources and cultural resources has already been acknowledged, and mitigation measures have been developed in consultation with appropriate federal and state agencies. The intent of fire suppression procedures in the GHA is to contain fires quickly with as little ground disturbance as possible. For example, where fire hoses are used, mitigation measures call for using a spray nozzle rather than a directed stream to minimize potential erosional impacts.

Comment 9: Effects on rare and endangered plants
Response 9: The Effects on Rare and Endangered Species Catalogue contains the potential impacts on all rare and endangered species within the region of influence. The U.S. Government agrees with the Sierra Club that most of these species have been adversely affected by human-related activities along the canoe, such as off-road vehicles and trampling by humans. However, on the west side of Kauai, these impacts are observed mostly in Pohukana State Park as the result of park uses, not military operations. The U.S. Government has demonstrated great care in its conduct of launch operations to minimize the maximum extent possible any deleterious effects on rare species including the transplantation of the ornamental species Ophioglossum vulgatum. In terms of ground clearing activities, the U.S. Government also looks for the most benign means available. For example, foot patrols and helicopters, rather than ground vehicles, would be used to sweep any areas containing sensitive vegetation.
The U.S. Government has reviewed available literature and evaluated the potential for impacts on vegetation due to lead emissions. The U.S. Government has determined from this review that no significant impacts will occur.

Comment 10: Cultural resources

Response 10: As stated in previous environmental documents, the area within the restrictive easement contains sensitive cultural resources. However, in compliance with the Section 106 review and in accordance with procedures as established in 36 CFR 800, "Protection of Historic Properties" of the National Historic Preservation Act of 1966, the USACE, Department of Energy, and SHL have previously consulted with the Hawaii State Historic Preservation Division and the Advisory Council on Historic Preservation to establish and implement measures to eliminate significant impacts to cultural resources that could result from construction and launch-related activities to the Strategic Target System project on Kauai. Following its review of the Restrictive Easement EIS, the State Historic Preservation Division (SHLD) 1993 agreed that there would be "no effect" on significant historic properties within the easement area.

The U.S. Government does not anticipate any loss of revenues to Native Hawaiians from the restrictive easement. The fee to the State of Hawaii in compensation for the restrictive easement will be based on sound appraisal practices. The comment that the restrictive easement will "prevent the State from conveying these lands in a higher use" contradicts other comments regarding consistency with land use plans. The land is designated agricultural, and it is considered a beneficial aspect of the restrictive easement that would encourage this continued use.

Comment 11: Inadequate treatment of alternatives

Response 11: Whether or not the Revised MOA alternative includes compensation, the environmental impacts would be the same. However, if the Revised MOA alternative were to be selected, the U.S. Government would be willing to consider compensation.

With regard to the alternatives of reduced numbers of launches or a reduced term of easement, neither of them would feasibly attain the objectives of the proposed action nor would they provide similar benefits. These alternatives were also addressed in the U.S. Government's letter to the Sierra Club for its comments on the Preparation Notice.

No reasonable alternative to the Vandal launch site exists. To understand this statement it is important to understand how the Vandal and the PMRF are utilized for training and test and evaluation in Hawaii. The PMRF are utilized for Navy training and test and evaluation facility for the fleet stationed at Pearl Harbor. As a test and evaluation facility, the range is used to test Navy vessels to ensure that they can perform and operate in accordance with their specifications and the potential demands of the war, meaning the vessel's captain and crew. The Vandal target is but one of an inventory of targets which are available to users of the range for training and testing and evaluation. However, the Vandal target is currently the only target in the inventory which can simulate a real-world low-altitude supersonic threat. This unique ability of the Vandal target, and the overall training, testing and evaluation program of which it is a part, is critical to ensure that the ships and the people who operate them are able to defend against actual, versus simulated, low-altitude supersonic threats. Each Navy ship, whether Aegis-equipped or not, must participate in this type of actual supersonic engagement in order to complete its anti-air warfare training and readiness requirements to remain available for use by the Pacific Fleet.

If ships were not able to complete their testing and qualification requirements at the PMRF, the testing program support personnel and equipment would have to deploy to another range at a cost between $750,000 and $1,000,000. A ship would have to steam for 21 days to use another range off the coast of California, and the Aegis program office has indicated that the cost for fuel alone would be approximately $400,000. Based on five ships scheduled for next calendar year to conduct qualification testing at the PMRF, the cost of relocating the Vandal launching and tracking capability to another installation is estimated by the Aegis program office as costing from 15 to 27 million. Furthermore, as a result, the PMRF would lose approximately 35.5 million in funds, and the local economy would lose approximately 92.5 million in revenue for the Aegis personnel that travel to the PMRF and Kauai to support this program. Similar cost impacts might be expected to occur on an annual basis.

Consequently, removing the Vandal launches proposed for the PMRF to an alternate launch site is not considered a reasonable alternative.

Alternative launch locations for the Strategic Target System were considered in the Federal EIS. The analysis in that document clearly describes why other launch locations, including Vandenberg Air Force Base, were eliminated from further consideration. In addition, our initial review of the GAO report indicates that its findings are consistent in terms of the alternatives eliminated from further consideration. The GAO report details the same shortcomings of other booster and launch locations as does the Strategic Target System EIS in terms of degraded missions, degraded test data, impacts to cost and schedule, and treaty compliance problems.

Comment 12: The Draft EIS fails to discuss the use of public funds for the proposed action and reasonable alternatives.

Response 12: Compensation paid by the U.S. Government to the State of Hawaii is not a "use" of state public funds. Under the terms of the restrictive easement, the State will be a recipient of funds, not a user. The provision in section 11-200-17(a)(4) that refers to the use of public funds relates to the
statutory provision in HRS Section 343-5(11) which specifies the use of
State or county funds as requiring environmental analysis. With regard to
the GAO report, please see the response above.

Sincerely,

Thomas E. Deason
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

SIERRA CLUB LEGAL
DEFENSE FUND, INC.

September 24, 1993

BY HAND DELIVERY

Ms. Linda McCreary
Department of Land and Natural Resources
POST OFFICE Box 621
Honolulu, Hawai’i 96809

Re: Supplemental Comments on Draft EIS for
PUEB Estuaries Over State lands

Dear Ms. McCreary:

As indicated in our September 22, 1993 comments, the U.S. General Accounting Office ("GAO") has recently completed its investigation of the cost and need for the Kaua‘i STARS program. The GAO report was first released in Washington, D.C. yesterday, and copies were available in Hawai‘i only today.

We requested an extension of the comment period for the specific purpose of providing this information to the Department of Land and Natural Resources.

Accordingly, please find enclosed:

1. Cover Letter to Secretary of Defense Les Aspin from the Honorable John Conyers, Jr. forwarding the GAO report;

2. GAO Report on the Kaua‘i STARS program; and

Ms. Linda Hecree
September 24, 1993

All of this information is relevant to DLNR's review of the Draft and Final EIS, particularly with respect to compliance with H. A.R. § 11-200-17(b)(4).

In Representative Conyers' words, "[t]he GAO report demonstrates that we can safely eliminate this program," because

(1) "[t]here is no longer a need for these test missiles,

(2) "[t]he program will cost almost $50 million to launch test targets that could have been launched for as little as $3.5 million each"; and

(3) "Star Wars officials apparently misled the public and the Congress on the existence of acceptable alternatives to launching these missiles from Hawaii."

Would DLNR be exercising wise stewardship of state lands to lease over 2000 acres to the Army for the next nine years as a "hazard impact zone to support this controversial, costly, and obsolete program?"

We look forward to your response.

Enclosures

cc: Linda Hecree
U.S. Army Space and Strategic Defense Command
Post Office Box 1500
Huntsville, Alabama 35807-1500

The Honorable Les Aspin
Secretary of Defense
The Pentagon
Washington, D.C. 20301

September 17, 1993

Congress of the United States
House of Representatives

Dear Mr. Secretary:

I am forwarding to you a new report from the General Accounting Office that demonstrates that there is little need to continue a costly and controversial Star Wars test program.

The Strategic Target System (STARS), which began in 1985 and has already cost some $183 million, uses refurbished Polaris missiles to launch simulated Soviet warheads that serve as targets to test weapons for the now-defunct Global Protection Against Limited Strikes system of the Reagan and Bush Administrations. In keeping with President Clinton's call to "eliminate the obsolete" in our government, we can save over $160 million by cancelling this unneeded system.

The GAO report demonstrates that we can safely eliminate this program:

- There is no longer a need for these test missiles;
- The program will cost almost $50 million to launch test targets that could have been launched for as little as $3.5 million each; and
- Star Wars officials apparently misled the public and the Congress on the existence of acceptable alternatives to launching these test missiles from Hawaii.

Eliminating the Obsolete

The STARS program, which was initiated in 1985 when the threat was thought to be a massive attack from the Soviet Union, is now obsolete. The administration at that time was in a rush to deploy a Star Wars system, and there was a shortage of missiles that could be used as test vehicles. This is no longer the case.
Further, the systems the STARS targets were intended to test have been canceled or delayed. In the 1992 Environmental Impact Statement for STARS, officials claimed the system was "vital to the development of key GPALS components." However, GPALS has now been canceled, and other proposed Star Wars components -- the Ground-Based Surveillance and Tracking System, the ground-based interceptor and the endo-atmospheric interceptor -- have now been canceled or reduced to basic research programs. Furthermore, the congressional requirement to deploy a national missile defense system by 1996 has been rescinded, eliminating one of the main justifications for the STARS program.

Finally, since the GAO completed its report, the Department's Bottom-Up Review of ballistic missile defenses explicitly rejected options to deploy a system in the United States. Rather, according to published reports, the Department has decided to proceed with only a "National Missile Defense Technology Program" which would "preserve a minimal capability in the key technologies" and would continue the Brilliant Eyes or an equally effective alternative "as a technology program." With these changes there is no need to continue the STARS program.

Excessive Cost for Minimal Gain

The GAO report also shows that we can save over $160 million if we cancel the obsolete STARS program:

<table>
<thead>
<tr>
<th>Development, FY 1985-1993</th>
<th>$187.1 million</th>
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<tbody>
<tr>
<td>FY 1994 Request</td>
<td>27.0 million</td>
</tr>
<tr>
<td>Total Annual Operational Cost FY 1995-98 ($520M/yr.)</td>
<td>80.0 million</td>
</tr>
<tr>
<td>Launch Costs, FY 1995-98</td>
<td></td>
</tr>
<tr>
<td>(5 launches @ $10.20)</td>
<td>$51.5 million</td>
</tr>
<tr>
<td>TOTAL COST FY 1985-98</td>
<td>$144.6 million</td>
</tr>
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</table>

As you know, the original plan to launch 40 STARS missions was canceled last year. With the cancellation of the National Missile Defense system and the elimination of the need for six STARS missions for planned integration testing of that system, current plans only call for seven STARS launches of refurbished Polaris missiles with target payloads -- at $49.2 million per launch.

Although we have already spent $183.1 million for just two launches of questionable value, cancellation would save $161.5 million (the 1994-98 expenditures). We should stop throwing good money after bad.

Honorable Les Aspin
September 17, 1993
Page Three

Facts Claim

I am deeply troubled by the inaccurate statements by DOD officials that urgent national security needs could only be satisfied by firing these test missiles from the Hawaiian island of Kauai. As GAO found, in fact, all the primary objectives of the 3 planned tests they reviewed could be met from alternative sites.

In response to substantial citizen opposition to the proposed launches of large test rockets from Kauai, the Strategic Defense Command claimed that:

"Alternatives to the proposed action were identified and systematically evaluated...Alternative launch sites to the KTF [Kauai Test Facility] were considered and alternative boosters to the Strategic Target System were considered as well as combinations of both...no other launch site could be found that met all the criteria...Thus the Strategic Target System vehicle launched from the KTF is the only reasonable option." (Environmental Impact Statement for the Strategic Target System, February 1992, pp. 2-34 to 2-37.)

On June 22, 1992, then-SDI Director Henry Cooper decided, based on this evaluation, that the SDI program would use the Kauai Test Facility for launching STARS because "the alternative sites and launch vehicles...did not meet operational and safety criteria or because they were excluded by treaty limitations." (see GAO Report, p. 17.)

In contrast, GAO investigators discovered that, according to SDI program officials, there are, in fact, other acceptable and less costly alternatives to the Kauai launches. Specifically, the second STARS test, launched on August 23, could have been fired from a Minuteman III from Vandenberg Air Force Base in California at a savings of over $1.3 million. GAO similarly concluded that other missions using STARS rockets could be launched from Vandenberg, or from Wallops Island, Virginia, or the Eastern Test Range, Florida. Other possible launchers include a Minuteman II, a Trident C4, or a Firebird missile.

I am requesting an explanation of how these clearly misleading statements could have been made. How, for example, could the SDI Director say that no reasonable alternative existed, while at the same time secretly preparing a plan to launch the second mission from Vandenberg?
Honorable Les Aspin
September 17, 1993
Page Four

Finally, I am troubled by the GAO findings that Sandia National Laboratory in New Mexico still has 55 engineers and technicians on the STARS payroll at a cost of $34.1 million a year. Are we really paying $256,000 per engineer, to respond to hypothetical “amoreas” that might occur in future STARS missions?

I am also requesting a report on how the Department intends to end the wasteful spending at Sandia for this unnecessary capability.

Please have your staff contact Joseph Cirincione, Deputy Subcommittee Staff Director at (202) 514-5147 to arrange a briefing on these issues by September 30, 1993. I look forward to working with you to streamline and improve the management of this program.

Sincerely,

[Signature]

Legislation and National Security Subcommittee

Enclosure

c: Honorable Ronald V. Dellums
    Honorable John P. Murtha
    Honorable Sam Nunn
    Honorable Daniel Inouye

Background

STARS is a small program managed by the U.S. Army Space and Strategic Defense Command (1994). It began in 1985 in response to concerns that the supply of surplus Minuteman I boosters used to launch targets and other experiments on intercontinental ballistic missile (ICBM) flight trajectories in support of the Strategic Defense Initiative. It was initiated by 1996, and launched Sandia National Laboratories, a Department of Energy laboratory, to develop an alternative launch vehicle using surplus Polaris boosters. Two STARS booster configurations (STARS I and STARS II) have been developed. The first STARS flight, a hardware checkout flight, was successfully launched in February 1993.

Results in Brief

STARS will have spent about $8.1 million on the STARS program through fiscal year 1993. About $27 million is budgeted for fiscal year 1994. Beginning in fiscal year 1995 when the program becomes operational, project offices that use STARS to launch experiments on STARS II will pay the estimated $6.8 million for launch and $10.8 million for each STARS II launch. In addition to this funding, the STARS project office estimates that it will spend an additional $17 million to $20 million a year to operate the program.

[Signature]

For the Strategic Defense Initiative Organization.
Expenses related to a failed launch would be related primarily to cleaning vehicle debris and the effects of any associated fires in the ground hazard area. They would not appear to be extensive, but no cost estimate has been made. NASA officials have taken actions to contain debris from a failed launch within an established hazard area.

Twelve more Titan launches from KSC are scheduled through fiscal year 2000—one a year except for two in fiscal years 1995 and 1996 and none in fiscal year 1997. The primary objectives of mission 2 could have been achieved from another location, and the primary objectives of missions 3, 4, 5, and 7 could be achieved from other locations. However, some mission delays and performance degredation would be expected, as well as additional costs for constructing alternative launch sites. Project officials have not seriously studied whether alternative launch sites for mission 8 exist. Missions 8 through 13, which are scheduled to begin in 1998, are system integration tests. Because specific objectives of these tests have not been defined, we could not assess whether alternative launch sites exist.

STARS Program

STARS I consists of refurbished Polars first and second stages and a commercially procured Orbiter third stage. STARS I can deploy single or multiple payloads, but the payloads cannot be deployed in a manner that simulates boosting. To meet this specific need, Sandia developed an Operations and Deployment Experiments Simulator (ODS) post-boost vehicle. When added to the three-stage STARS, the configuration is designated STARS II. (See figs. 1 and 4 for photographs of the STARS I booster and the ODS structural test unit.)

Footnotes:

1 Titan I was successfully launched on August 28, 1993.

2 Postboost vehicle also referred to as a "bus," is the portion of a rocket payload that carries multiple modules and which has the maneuvering capability to independently target and deliver its final trajectory toward a target.

Figure 1: STARS I Booster

Source: JSC.
The launch facility is located on Kauai (see figs. 3 and 4). The booster's range, about 2,600 miles, is about the same as the distance from Kauai to Kwajalein Atoll in the Marshall Islands, the intended destination. Kwajalein, where testing and other tracking devices are located (see fig. 5), is one of the designated test ranges under the Anti-Ballistic Missile Treaty. The other, White Sands Missile Range, is inadequate for the types of tests planned for Kauai.
RUOC's plans for launches at Kwaj through fiscal year 2003 and the possibility of meeting their primary objectives if launched from other sites, such as Vandenberg, are shown in table 1. All trials launch through the first quarter of fiscal year 1998 will support efforts related to the development of technology for the planned national missile defense system, primarily the Brilliant Eyes sensor and the ground-based radar. However, data gathered during some experiments will be used to support theater missile defense development. Beginning in fiscal year 1998, trials will support national missile defense system integration tests. If the schedule for developing a national missile defense system slips, requirements for both-launched targets could also slip.

Table 1: STARS Mission Schedule and Feasibility of Achieving Primary Test Objectives at Alternative Launch Sites

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<td>Ground chase</td>
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</tbody>
</table>

* Launched in Feb 1993

STARS Program Cost

The STARS program consists of two phases—development and operational. The development phase is expected to cost $183.1 million through fiscal year 1993. About $27 million is requested for fiscal year 1994. The operational phase will begin in 1995, and its annual program expenditures are estimated to be in the $17 million to $20 million range. In addition, two project offices will pay an estimated $5.7 million and $11.5 million to launch experiments on STARS I and II boosters, respectively.
Development Phase Costs

NASA will have spent $192.5 million to develop STARS by the end of fiscal year 1990 (see table 3). Sandia, with a current staff of about 55 employees assigned to STARS, has received $140.5 million of this amount. About 53 percent of the funds will go to subcontractors, according to Sandia.

Table 3: Funding for Development of STARS

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<tbody>
<tr>
<td>NASA's National Laboratory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>19.8</td>
<td>12.2</td>
<td>11.6</td>
<td>12.0</td>
<td>80.8</td>
</tr>
</tbody>
</table>

*Table 3 data is dollars.

For project engineering, Sandia used $43.6 million (see table 3). It used $20.6 million in-house to plan and conduct this work, and it paid about $13 million to subcontractors. The following activities were funded:

- Acceptance testing procedures and qualifying all electrical hardware to be integrated into the two booster stages, through a $1.2 million subcontract to Lockheed's Missile and Space Division.
- Development and testing of the third stage Orbis motors through a subcontract for $4.4 million to United Technologies.
- Design and fabrication of (1) ground support equipment, such as manual and automatic test equipment used to verify the system's design and identify and isolate component and system failures for all hardware components except the motors and (2) a launch control computer, which is used to conduct preflight and actual launch countdowns.
- Wind tunnel tests on the boosters to verify flight configuration.
- Three ground test missions, one canceled launch, and the first launch in February 1993.

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- Wind tunnel tests on the boosters to verify flight configuration.
- Three ground test missions, one canceled launch, and the first launch in February 1993.
Preparation of analysis to support preparing an environmental impact statement.

For refurbishment of retired Polaris missile stages, Sandia used $15.9 million (see Table 3). About $5 million was spent in house and $10 million was paid to subcontractors—$4.8 million to Aerotech and $5.3 million to Hercules to do the refurbishment process for Polaris first and second stage motors, respectively. Under the direction of Sandia, Aerotech and Hercules have refurbished 11 first stage motors and 10 second stage motors. Aerotech and Hercules also designed and built (1) test stands that were used to evaluate motor condition and conduct static firing tests for each stage motor and (2) stage unique ground support equipment.

Sandia also used Lockheed's Missile and Space Division, the Polaris motor developer and the Navy's designated contractor for the system, as the consultant for all booster integration testing and problem analysis. Sandia reviewed, among other ground support equipment, various manual test devices to evaluate first and second stage motor condition.

Sandia used $10.7 million to modify the Site 1 configuration to accommodate new tests (see Table 3). The funds were primarily spent in house to design, fabricate, and test all electronic and mechanical interfaces on Site 1 that were needed to join it with ODES.

Sandia used about $9.3 million to develop the guidance and control subsystem (see Table 3). Of this amount, $8.1 million was spent in house to develop, code, and verify guidance and control algorithms and software design, the guidance and control components, and conduct various component and system tests. Component tests included shock and full vibration tests of guidance and control flight computers, the inertial measurement unit, and junction and input boxes. System tests were conducted by integrating all components and mounting them on a flight simulation table to test missile pitch, yaw, and roll performance. To conduct component and system tests, Sandia developed special support equipment unique to guidance and control electronics. The balance, about $1.2 million, was spent by the subcontractor, Honeywell, to produce the control system's inertial measurement control and airborne flight computer components.

NASS provided $7.7 million through fiscal year 1990 to Sandia to develop ODES (see Table 2). These funds have been used primarily for engineering design, analysis, testing, and the production of on-site boost vehicle hardware. Sandia's project engineers (1) designed all data structures, electronic, and population components, (2) conducted special studies related to solving technical problems associated with data design, (3) designed payload interfaces for various test users, and (4) planned and conducted analyses related to ODES missions such as developing range safety procedures and mission flight trajectory patterns. Sandia awarded subcontracts totaling about $2.7 million to obtain costs for guidance and control and propulsion related hardware. A contract for $1.2 million was awarded to Honeywell for three inertial measurement units and flight computers, and Advanced Research Development Engineering, Inc., received a $1 million contract for ODES fuel tanks. Sandia awarded contracts for the remaining $1.5 million to a variety of vendors for propulsion related hardware such as regulator valves and flowmeters.

In 1990, NASS will have spent $123.5 million through fiscal year 1993 for operating test ranges and for upgrading the Pacific Missile Range Facility (see Table 2). According to the site manager responsible for the Site 1 program, about $114.9 million will be used to operate the Pacific Missile Range Facility (operational support) and the Kwajalein Missile Range (down range support) during launch related exercises. These funds supported two ground test missions, a canceled launch, preparation for the initial February 1993 launch, and related mission planning. The remaining (about $8.7 million) will have been primarily used to support (1) up grade the microwave voice transmitters and receivers located a tracking station to the launch site, which provided an improved in-flight safety analysis capability; (2) upgrade the telemetry processing to improve telemetry screen displays for operators to enhance range safety; and (3) augment fixed communication networks at all range communication sites to increase data processing capabilities of encrypted ODES missions.

In 1990, NASS has spent $6.8 million for construction projects (see Table 2). Most of the construction funds were used for two projects—$4.8 million in fiscal year 1997 for launch operations and missile assembly building, a missile assembly tower, and a launch pad at the Kwaj Range Test Facility, and $10.6 million in fiscal year 1991 for ordnance, fuel, and decontamination facilities for ODES.

In 1990, NASS will have spent $15.5 million for various program support activities (see Table 2). These funds will have been used primarily for (1) booster transportation and storage as contractor and government facilities during the refurbishment, integration, and launch operation process; (2) studies documenting the environmental impact of ODES launches from Kwaj; and...
### Operational Phase Costs

Check-out flights of STARRS will be completed in fiscal year 1994, and the operational phase of supporting testing will start in fiscal year 1995. DOE's Strategic Targets Office estimates that the annual STARRS operational phase budget will be about $17.8 million for fiscal year 1995 and $17 million for fiscal year 1996 (excluding inflation) for the remainder of the program.

Of the fiscal year 1995 funds, $14.1 million, or about 80 percent, will be used by Sandia to maintain a STARRS work force of about 55 engineers and technicians. According to the STARRS program manager, this level of staffing is needed even though plans for most years are to only have one STARRS launch. The program manager stated that the engineers and technicians will be used to plan for future STARRS missions and to conduct hardware fixes of any anomalies noted on completed missions.

The first five costs flights will use surplus National Aeronautics and Space Administration surpluses. Then, DOE plans to begin using a replacement motor that it will develop. It plans to spend about $4.6 million over a 3-year period beginning after fiscal year 1994 to develop the replacement motor. $1.8 million is included in the $17.8 million total for fiscal year 1996.

In addition to the above costs, STARRS users will pay an estimated $15.0 million for each STARRS mission and an estimated $10.0 million for each STARRS mission, beginning with the first launch in fiscal year 1995. The STARRS estimate is based on $5 million for hardware refurbishment and procurement (three missile stages and a guidance and control section) and about $5.0 million for Sandia mission support, booster transportation, and government and contractor travel and subsistence. A STARRS mission will cost about $10.0 million, including all costs associated with a STARRS mission plus $10 million for annual hardware and related integration of components delivered with the STARRS. The cost estimates do not include payload and range support costs associated with specific user experiments or the salaries and benefits of the Sandia work force.

### Catastrophic Failure Cost

Expenses associated with a failed launch over land have not been estimated but should be limited to the cost of clearing vehicle debris and the effects of any associated fires in the ground hazard area, which would not appear to be extensive. DOE officials have taken steps to contain debris from a failed launch within a specified hazard area.

Up to $4.5 million could be spent after fiscal year 1995 to obtain an easement for 6 years on land outside the launch facility but within the established ground hazard area. This land is owned by the state, and a memorandum of agreement was negotiated to allow the Navy to clear the area during launches until December 31, 1993. The proposed agreement, which would prohibit construction within the area and allow the Navy to control the area during future launches, is being negotiated.

The range safety provisions are contained in a range safety operational plan prepared by the Missile Flight Safety Officer at the Naval Air Warfare Center in Point Mugu, California. This center serves as the lead safety agency for the launch site. The plan establishes hazard areas at the launch site (ground hazard area) and immediately downrange of Kauai over the ocean (launch hazard area). The ground hazard area consists of land contained within a modified 10,000-foot radius arc from the launch pad (see fig. 3).

The range safety officer determines boundaries that cannot be violated if debris from a terminated flight is to be contained within the established hazard areas. The plan requires the range safety office to terminate a launch when the missile's flight path is approaching predetermined limits. To determine if a flight threatens to cross the predetermined flight boundaries, the range safety officer tracks the flight using information from radars, telemetry ground stations, and ground observers. The ground observers, who are in radio contact with the range safety officer, use devices—visual sighting devices containing flight boundary lines—to verify the missile's flight path during the final 25 seconds of flight. To terminate a launch, the range safety officers would send a flight termination signal that would ignite explosive charges placed within the booster.

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1. The launch hazard area is based on the flight path that is used, which for the first mission was 360 degrees. Individual plans for each launch will be prepared that will show a different launch hazard area if a different flight path is planned.
The first STARS flight, a hardware check-out flight, was successfully launched in February 1992. NASA plans to launch 12 more STARS boosters from Kauai that will deliver experiments into near space and targets to Kwajalein through fiscal year 2003. Table 4 provides the schedule by fiscal year for the STARS missions.

<table>
<thead>
<tr>
<th>Table 4: STARS Mission Schedule</th>
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<tbody>
<tr>
<td>Mission</td>
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<tr>
<td></td>
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<tr>
<td>STARS 1/2/3/4/5/6/7</td>
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<tr>
<td>Reality vehicle equipment</td>
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<td>OGER check-out flight</td>
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<td>VQRTVE vehicle equipment</td>
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<td>Ground transfer</td>
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<td></td>
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<tr>
<td>STARS 1/2/3/4/5/6/7</td>
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</tbody>
</table>

NASA evaluated alternatives to the proposed STARS launches from Kauai as part of the environmental impact statement prepared in response to local concerns about adverse effects from up to four launches a year over a 10-year period. On June 22, 1992, the NASA Director decided, based on this evaluation, that NASA would use the Kauai Test Facility for launching STARS because "the alternative sites and launch vehicles...did not meet operational and safety criteria or because they were excluded by treaty limitations."

Subsequently, NASA's decision to use the Kauai Test Facility was contested by the Sierra Club in the First Circuit Court for the state of Hawaii. It sought to bar Hawaii from entering into an agreement with the Navy that would allow land immediately outside the launch facility to be used as a ground-based area for future launches.

Faced with the prospect of delays while the decision was being contested in court and the possibility of an unfavorable decision that would prevent STARS launches from Kauai, the NASA deputy director in December 1992 directed that a study be conducted to determine whether missions 1, 4, 5, and 6 could be launched on a STARS booster from elsewhere and the
impacts on the mission of doing so. This study, however, was canceled
after the court did not grant a preliminary injunction in a January 25, 1983,
decision, and the initial STARS check-out flight was successfully launched in
February 1983.

We contacted project officials who are responsible for the missions that
were addressed to the study (3, 4, and 5) to determine if the preliminary
results indicated if alternative launch sites were available and the impacts
on mission objectives, schedule, and cost. We also contacted officials of
the projects that were to be supported by missions 3, 4, and 5 to obtain
similar information. These officials said that

- the primary objectives, but not all of the other objectives, of missions 3, 4,
  5, and 7 could be achieved from alternative sites with some adverse
  impacts on schedule and cost;
- the objectives of mission 2 could have been achieved from an alternate site
  had a decision been made to do so before May 1983; and
- the alternative possibilities for mission 8 are unknown because they have
  not been seriously evaluated. (See Table 1.)

Table 9 summarizes these officials' comments regarding program impacts
for identified sites and boosters. A more detailed discussion of each
mission and possible alternatives is contained in appendix L.

Table 9: Alternatives to Launching From Kwaj

<table>
<thead>
<tr>
<th>Scheduled STARS missions</th>
<th>Alternatives to Kwaj launch site</th>
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<tr>
<td>Through 1988 by mission number</td>
<td>Launch vehicle</td>
</tr>
<tr>
<td>1</td>
<td>STARS-I</td>
</tr>
<tr>
<td>2</td>
<td>STARS-II</td>
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<tr>
<td>3</td>
<td>STARS-III</td>
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<td>6</td>
<td>STARS-VI</td>
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<tr>
<td>7</td>
<td>STARS-VII</td>
</tr>
</tbody>
</table>

*The reason for launch site selection was based on preprogrammatic considerations which may be in secondary and tertiary test objectives.

The reason for mission 8 could have been planned on a Minimum III site that was going to be launched from Yankton for other purposes.

Specifics were not available regarding mission degradation, schedule, and cost impacts noted in the table, except for mission 2. Program officials estimated it would cost about $3 million to place the mission 2 payload on a Minuteman III launched from Vandenberg Air Force Base. However, this additional cost would be more than offset by not launching a STARS booster valued at about $5 million. Also, this no longer under consideration because another mission 2 was to be launched before May 1983. Specifics had not been developed for missions 3, 4, and 5 when the study was canceled. Ground-based radar officials have not seriously evaluated alternative launch sites or vehicles for mission 8. An analysis of mission 8, which was being conducted by the Brilliant Eyes project office, was terminated after the court cleared the way for the first flight in February 1983.

Project officials provided us with the following general comments on radar capabilities, mission degradation, schedule impact, and cost. A ship-based radar would be used instead of the Kwajalein radar for some alternatives. The radar on board the USS Observation Island is adequate but it is not as capable in power and sensitivity as the various types of radars on Kwajalein. In addition, Kwajalein radars can process more telemetry than the ship can. Therefore, some mission degradation would occur. Launches of STARS from an island such as Meck Island near
Kwajalein would use the Kwajalein radar, but because of the short distance between the launch island and Kwajalein, the flight trajectory would only allow limited data collection. Construction would be required at alternative STARS launch sites, such as Yankton or Meck Island, which would require funding and time to complete.

Project officials CAN'T say whether the planned STARS launches from Kwajalein would allow the unspecified missions supported by these launches to be successfully accomplished. The planned schedule for these launches cou
To determine the cost of the STAN program through fiscal year 1993, we obtained funding data generated by the STAN accounting system and maintained by STAN project officials. These officials also provided program funding estimates beyond fiscal year 1993. Stans provided us cost data through fiscal year 1993 that specified, by major program categories, the activities supported by STAN funding.

To determine if missions could be supported with launches from sites other than Kauai, we contacted STAN test and evaluation officials, STAN Strategic Targets Office officials, Program Executive Office Missile Defense officials, and STAN project officials. We reviewed DOD studies addressing site and launch vehicle alternatives and discussed the performance characteristics of the STAN booster with STAN and STAN officials. To determine the availability of STAN missiles for use in the STAN's test program, we contacted the Navy official responsible for managing the Navy missile inventory.

We discussed treaty reductions on use of missiles for test purposes with DOD STAN I and II experts. We reviewed the established range safety procedures for STAN launches and discussed range safety matters with STAN Flight Safety Officer responsible for STAN launches, who is located at the Naval Air Warfare Center, Point Mugu, California.

We performed our review at STAN, Washington, D.C., and at STAN, Huntsville, Alabama. Our review was conducted from October 1992 to July 1993 in accordance with generally accepted government auditing standards.

As requested, we did not obtain fully coordinated agency comments on a draft of this report. We did, however, discuss the results of our work with DOD and STAN officials and have made changes where appropriate. We agreed with the information in this report.
As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from its issue date. At that time, we will send copies to the Chairmen of the Senate and House Committees on Armed Services and on Appropriations; the Secretaries of Defense, the Air Force, the Army, and the Navy; and the Directors of DOD and the Office of Management and Budget. Copies will also be made available to others upon request.

If you or your staff have any questions concerning this report, please contact me at (301) 517-4341. The other major contributors to this report are J. Klein Spencer, Assistant Director, and Robert M. Crowl, Evaluator in Charge, and Mark A. Lambert, Site Senior, of the Atlanta Regional Office.

Sincerely yours,

[Signature]

Brad Hathaway
Associate Director, Systems Development and Production Branch
Appendix I

Strategic Target System Scheduled
Launches Through First Quarter of Fiscal Year 1998

Mission 2

This mission, which is scheduled for the fourth quarter of fiscal year 1993, will deploy both a U.S. and a British payload. The U.S. mission is to assess the performance of the reentry vehicle and its trajectory during reentry. The experiment will use a radar backed by Kwajalein and optical sensors to evaluate various characteristics of the reentry vehicle. Details regarding the British payload are classified. In this experiment, the third stage booster will be fired downward in order to achieve reentry speed close to an intercontinental ballistic missile (ICBM) reentry vehicle. The Strategic Target System (STS) missile will not be destroyed.

According to the mission's program manager, the Ballistic Missile Defense Organization's (BMDO) has determined that the mission could be conducted using a different target booster launched from a different location. BMDO obtained a contingency, a spot for both U.S. and U.S.S. payloads on an August 1993 Minuteman III flight from Vandenberg Air Force Base, California, to ensure a launch within the British program's time sensitive schedule. According to the program manager, the mission could be completed using a Minuteman III from Vandenberg without degradation to the mission objectives. It would, however, require ship-based radar support from the USNS Observation Island and cost about $3.5 million to place the payload on a Minuteman III from Vandenberg. However, this cost would be more than offset by not launching a STS booster valued at about $15 million. BMDO said a Minuteman III launch would increase the technical risk of the mission because additional testing of the payload modifications to meet Minuteman III launch criteria could not be completed within the time available before launch. This option is no longer available because BMDO had to commit to the Minuteman III launch by May 1993.

Mission 3

This mission is a hardware checkout flight of STS carrying the Operations and Deployment Experiment System (ODS), ODS is a post-boost vehicle designed to test a variety of test objects that replicate representative reentry vehicles. The primary purposes of the mission are to validate the ODS design, demonstrate its performance capabilities, and establish the vehicle as an operational launch system for experimental payloads. A secondary purpose for the initial flight is to deploy a number of test objects to support other STS programs. The mission is scheduled for the second quarter of fiscal year 1994.

Mission 4 and 5

Missions 4 and 5 involve launching two STS post-boost vehicles that will deploy numerous objects for the previously launched Midcourse Space Experiment (MSE) spacecraft to observe. STS will be launched into orbit from Vandenberg Air Force Base on a Delta II booster during the second quarter of fiscal year 1995 to conduct a variety of experiments, one of which will involve observing objects deployed from the two post-boost vehicles.

Although the experiments will support work being conducted in a number of areas, the data gathered will primarily support the Brilliant Eyes demonstration and validation program. The program is expected to provide information that will fill gaps in astrophysical models, collect data that will aid planned MMD deployment programs in advancing technology to solve for critical discrimination issues for both sensors and interceptors.

The first STS payload is scheduled to be launched in the second quarter of fiscal year 1995. The STS spacecraft's sensors will then view the numerous objects deployed on two axes from the post-boost vehicles during day time conditions. The objects will represent various representative targets and deployment techniques. Other air, water, and ground-based sensors will provide trajectory identification and cross-correlation verification.

The second STS payload is scheduled to be launched in the third quarter of fiscal year 1995. The STS spacecraft will then view the numerous objects deployed in the same manner as for the earlier experiment, except that the mission will be conducted during night time conditions.

According to the MSE program manager, the MSE's primary mission objective involves the STS launches targets could be accomplished with a STS vehicle launched from a different location than Kauai. While
the manager considers a subsonic launch from Kauai to Kwajalein as the optimum choice, he stated that the mission could be accomplished using a subsonic launch from either Meck Island or Vandenberg Air Force Base. He noted that these alternative launch sites would be more costly and that there would be a schedule delay, but that additional analyses are required to determine the cost and schedule impact. Launches from Meck Island would result in some mission degradation due to decreased sensor viewing time, but the manager stated that the degradation would not prevent the mission from meeting its primary objectives. Launches from Vandenberg would result in some degradation because ship-based radar on board the USS Observation Island would be used instead of the Kwajalein radar.

The ship can encrypt telemetry from the ships post-boost vehicle for both missions because, among other reasons, visual images of the representative test objects will be electronically transmitted.

Mission 6

The ground-based radar program has a requirement for a subsonic launched target during the third quarter of fiscal year 1994. The mission will allow the radar to track a subsonic-launched ballistic missile trajectory and evaluate the missile’s ability to discriminate between representative targets being released from a bus. Unlike the other experiments, the ground-based radar experiment must conclude in the Kwajalein area because that is where the radar being tested will be located. Details regarding the targets are classified.

Radar program officials maintain that a subsonic missile launched from Kauai represents the optimum target vehicle because it replicates both a subsonic-launched ballistic missile flight trajectory and a type of Temporary System that must perform against. The project manager stated that the radar project office has not seriously evaluated possible alternative launch sites or vehicles and does not plan to conduct such an assessment unless the mission program continues to experience delays. He hinted that Kauai or another launch site that will provide the required subsonic launched ballistic missile trajectory is needed. Because of the classified nature of the discrimination portion of the mission, telemetry will be encrypted.

Mission 7

The Brilliant Eyes program plans to use a subsonic missile to support a scheduled first quarter fiscal year 1994 demonstration flight test. The Brilliant Eyes program manager began assessing alternatives to a subsonic launch from Kauai in case that was not available. He stated that if space were unavailable, the Brilliant Eyes experiment could use either a Firebird missile launched from Wallops Island, Virginia, or a Minuteman III launched from Vandenberg Air Force Base, California. In his opinion, the primary mission objectives could probably be accomplished using a Minuteman II launch vehicle. He added that the Firebird’s performance would be marginal and that without additional study, it was not possible to comment on whether the primary mission objectives could be accomplished using it as a launch vehicle. The alternative analysis was terminated when the Hawaii state court ruled the state to enter into an agreement with the Navy for clearance of the ground hazard area, thus permitting the launch of attacks from Kauai.

The manager also noted that since the program is in the early development phase, 1994 could decide to delete the requirement for a subsonic-launched target. The program expects to complete, by October 1993, its review of converter test plans delivered in July 1993. These plans could suggest the need to test against targets launches from boosters other than stars. If the concurs, the mission could be deleted.
Conyers Takes Aim at Missile Tests

Defense Secretary Les Aspin recently announced that the military was canceling the Star Wars defense system's test sites, this was an isolated incident that wouldn't repeat itself. "I guarantee this: While I am here, Defense Department tests will be conducted honestly and reported honestly," Aspin said.

Aspin can't dismiss charges of military deception that predated his tenure. But an undated General Accounting Office report suggests that officials working on Ballistic Missiles Defense, formerly called the Strategic Defense Initiative, may not be telling the truth, according to Rep. John Conyers Jr. (D-Mich.), whose Government Oversight Committee requested the investigation.

Just last month, on the largest stretch of white sand beach in the Hawaiian Islands, the military launched a Strategic Target System missile known as STARS. Military officials said that the missile, originally designed to test the Star Wars defense initiative that would destroy Soviet missiles, could be launched only from the pristine island of Kauai.

"The Kauai test site is uniquely located to provide the appropriate range to launch the STARS missile into the final range," a Pentagon spokesman told an associate Andrew Conte. An Army environmental impact statement also refers to Kauai as "the only reasonable option."

Congressional investigators have concluded, however, that the missile could have been launched from a different site—this at a $1 million savings. The report also determined that the long-range launches scheduled a year ago could be moved from the island. Several remaining launch sites also could be moved after they are evaluated.

In a recent letter to Aspin, Conyers protested that Star Wars officials apparently misled the public and Congress on the existence of acceptable alternatives to launching these test missiles from Hawaii.

"Acting on the island have prevented the launching of STARS from Kauai because launchers require the evacuation of an area where the military believes is a 2,000 acres of state land, which lies 76 acres of a state park and an adjacent bald eagle nesting. A spokesperson for the Sierra Club Legal Defense Fund on the island explains that in the event of a missile, the cleanup would take 50 years." Aspin said.

"I guarantee this: While I am here, Defense Department tests will be conducted honestly and reported honestly," Aspin said.

Environmental and Engineering Office

Ms. Denise E. Antolini
Sierra Club Legal Defense Fund
212 Market Street, Suite 202
Honolulu, HI 96813

Dear Ms. Antolini:

Subject: Draft Environmental Impact Statement for Proposed Reconstructed Statement

Thank you for your comment of September 24, 1993, on the Draft Environmental Impact Statement (EIS). As a part of the public comment process, the U.S. Army Space and Strategic Defense Command is responding in this letter to your comment. Your comment and this response will be included in the final EIS.

Comment 1: Purpose and need for the Strategic Target System program and the availability of reasonable alternatives

Response 1: The U.S. Army is carrying out the Strategic Target System program in accordance with Congressional mandates and executive policies of the United States of America and must continue to do so unless and until those mandates and policies are changed. The Strategic Target System incorporates state-of-the-art technology and capabilities that provide a versatility not found in any other test platform. Combined with its treaty-exempt status, the Strategic Target System provides the testing community a unique asset for which there is no readily available substitute.

Our initial review of the Government Accounting Office (GAO) report indicates that its findings are consistent in terms of the alternatives eliminated from further consideration. The GAO report identifies the same shortcomings of other booster and launch locations as did the Strategic Target System EIS in terms of degraded missions, degraded test data, impacts to cost and schedule, and treaty compliance problems.

The Ballistic Missile Defense Organization (BMDO) has objected to Congressman John Conyers' statement that the BMDO has "missed" the public and Congress concerning alternative launch sites and boosters. Treaty compliance, mission requirements, and cost were considered in selecting the Strategic Target System launch vehicle. That decision made sense at the time based on availability of boosters. To further support optimum use of the Strategic Target System vehicle, it was specifically exempted from the provisions of the Strategic Arms Reduction Treaty (START). No other launch vehicle is similarly exempted from the START
and, consequently, would be restricted in its uses. The use of the Kaui Test Facility at the Pacific Missile Range Facility (PMRF) was thoroughly evaluated in an Environmental Assessment and an EIS completed in 1990 and 1992, respectively. Other sites were evaluated as a preliminary step in this process, and the decision to propose the PMRF as the launch site was based on its location with respect to the U.S. Army Kwajalein Atoll, the Strategic Target System launch vehicle performance capabilities, and treaty considerations.

Sincerely,

Thomas E. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

State of Hawaii
Department of Land and Natural Resources
DIVISION OF AQUATIC RESOURCES

September 28, 1993

To: Mason Young, Administrator
   Land Management

From: Henry N. Sakuda, Administrator
   Division of Aquatic Resources

Subject: Draft Environmental Impact Statement (DEIS) - Esateem Over State Land for Safety and Ground Hazard Areas for SAMS and Navy Vandal Missile Launches

Most of our concerns about potential impacts to aquatic resource values have been addressed by the Federal EIS and the record of decision. However, we note that the "Memorandum of Agreement" between the Department of Land and Natural Resources and the U.S. Department of the Navy expires on December 31, 1993.

We suggest that the Memorandum be renewed with clarifications to the public issues that are affected by the restrictive easement, and to allow monitoring of the applicant's extended activities by conditioning the Department's acceptance of this DEIS.

cc: Office of Environmental Control
    U.S. Army Space and Strategic Defense Command
Environmental and Engineering Office

Mr. Henry M. Sakuda, Administrator
Department of Land and Natural Resources
Division of Aquatic Resources
1151 Punchbowl Street
Honolulu, HI 96813

Dear Mr. Sakuda:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your letter of September 28, 1993, regarding the Draft Environmental Impact Statement for the proposed restrictive easement.

We appreciate your time and effort in reviewing the document.

Sincerely,

Thomas E. Dresser
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets
10.0 References
10.0 REFERENCES


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Appendix A
Draft Restrictive Easement
GRANT OF EASEMENT

THIS INDENTURE, made the ___ day of ______________, 19___, between the STATE OF HAWAII, hereinafter called the "GRANTOR", and the UNITED STATES OF AMERICA, hereinafter called the "UNITED STATES", represented by the Commander, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawaii 96860.

WITNESSETH: that

WHEREAS, the Department of the Navy operates the Pacific Missile Range Facility at Barking Sands, Kauai, Hawaii, hereinafter called the "Facility", to support the Department of Defense and other federal projects involved with the launching,
tracking and collection of data associated with guided missile, satellite and space vehicle research, development and evaluation and military training programs; and

WHEREAS, these programs involve rocket launching operations for which the establishment of a ground hazard area, hereinafter called "GHA", for a period of time just prior to, during and continuing shortly after launch is considered essential to limit the exposure of persons and property to potential risks related to these operations; and

WHEREAS, portions of this ground hazard area affect lands which are owned by the GRANTOR,

NOW, THEREFORE, the GRANTOR, for and in consideration of the sum of $1.00, the receipt of which is hereby acknowledged, does hereby grant and convey unto the UNITED STATES and its assigns, for a period of nine (9) years from January 1, 1994 to December 31, 2002, an easement on, over and under the following described lands owned by the GRANTOR for the establishment and maintenance of a GHA in connection with operations of the UNITED STATES:

All that land situated at Mana, Waimea (Kona), Kauai, State of Hawaii, identified as Parcels 1 and 2, containing 2,039.185 acres and 69.579 acres, respectively, as more fully described in Exhibit "A", attached hereto and made a part hereof by reference.

1. Use of the property within the easement area is hereby limited and restricted in favor of the United States as follows:
   a. Parcel "1" may only be used for agricultural purposes, such as the growing of crops and the grazing of cattle;
   b. Parcel "2" may only be used for public recreational
(park) purposes; and

c. No building or structure shall be constructed or permitted within the easement area without the prior written consent of the UNITED STATES.

2. Subject to the limitations of paragraph 3 and 4 hereof, the UNITED STATES may use the easement area as a GHA for rocket launching operations from the Facility. For this purpose, the GRANTOR hereby conveys to the UNITED STATES the following rights in order that the GHA may be verified clear of all persons twenty (20) minutes before a scheduled launch, namely, the right to:

(a) enter the easement area and notify all persons therein either through personal contact or the posting of warning signs that they will be required to leave at a specific time;

(b) close off all roads leading into the easement area;

(c) prohibit the entry of all persons into the easement area;

(d) evacuate all persons from the easement area; and

(e) post guards within the easement area, it being the intent of this easement to give to the UNITED STATES exclusive control over access to and use of the easement area during said period.

3. The UNITED STATES may exercise the rights conveyed by paragraph 2 above beginning three (3) hours before a scheduled launch. The GHA shall be reopened shortly after a successful launch when safety personnel of the UNITED STATES declare the area safe. In the event hazardous conditions exist in the GHA after a launch, said safety personnel may continue to maintain
exclusive control over the GHA until it is safe for the general public to reenter the area.

4. The UNITED STATES may exercise the rights conveyed by paragraph 2 above up to thirty (30) times during each annual period of this indenture, the first such annual period commencing as of the day and year first above written.

5. The UNITED STATES shall also have the right to post permanent warning signs at the edge of and within the easement area advising the general public of the existence of the GHA and that the area is subject to closure during planned rocket launches.

6. The UNITED STATES hereby agrees to remove any debris which may fall in the easement area and to control the consequences of such falling debris as the result of missile operations and shall have the right of access into the easement area for this purpose at all times.

7. The UNITED STATES will attempt to notify the GRANTOR at least seven (7) calendar days prior to each scheduled launch requiring the exercise of the above rights.

8. The GRANTOR reserves to itself and its successors and assigns all such rights and privileges in the easement area as may be used and enjoyed without interfering with or abridging the rights granted to the UNITED STATES by this indenture. The GRANTOR, also, hereby reserves the right to maintain, repair or replace in their present condition and at their present locations all existing structures, including but not limited to buildings, roadways, power and telephone poles, now within the easement.
9. The UNITED STATES shall be responsible for any claims or injury caused by or resulting from any act or omission of the UNITED STATES in connection with the UNITED STATES' use of the easement area herein described as provided in the Federal Tort Claims Act (62 Stat 869-982; 28 U.S.C. 2671-2680).

IN WITNESS WHEREOF, the parties hereto have executed this indenture on the day and year first above written.

GRANTOR

UNITED STATES OF AMERICA

By: ___________________________ By: ___________________________
PARCEL 1

LAND SITUATE AT MANA, WAIHEA (KONA), KAUAI, STATE OF HAWAII

Being a portion of the Government Land of Waimea (Kona), Kauai, under the jurisdiction of the Department of Land and Natural Resources of the State of Hawaii.

Beginning at the Northwesterly corner of the Northerly terminus of the right of way of the Mana-Kekaha Access Road, Hawaii Project No. DA-WR (1) (now known as Kaumualii Highway) as shown on State of Hawaii Department of Transportation, Highways Division Map P.H. 118-5, the coordinates of said point of beginning referred to Government Survey Triangulation Station "NOHILI" being 3,781.00 feet South and 3,899.63 feet East, and running by azimuths measured clockwise from true South:

1. 78° 51' 55" 798.13 feet along the Northerly terminus of said Kaumalii Highway;
   thence on a curve to the right with a radius of 944.32 feet, the chord azimuth and distance being:

2. 89° 24' 40" 345.66 feet along same;

3. 99° 57' 25" 1,929.32 feet along same and along remainder of Government Land of Waimea to a point on the Easterly side of Tract E-2 of State of Hawaii General Lease No. B-3852 dated August 20, 1964;

4. 185° 24' 107.94 feet along the Easterly side of said Tract E-2 (being also along Parcel 5 herein);

5. 180° 23' 351.61 feet along same;

6. 193° 32' 173.20 feet along same;

7. 203° 01' 540.31 feet along same;

8. 208° 23' 252.04 feet along same;

9. 194° 10' 30" 160.75 feet along same;

10. 183° 02' 299.35 feet along same;

11. 191° 26' 156.12 feet along same;

12. 198° 03' 244.98 feet along same;

13. 186° 44' 30" 661.62 feet along same;

14. 183° 02' 270.92 feet along same;
15. 191° 28' 460.00 feet along same;
16. 201° 43' 276.30 feet along same;
17. 209° 05' 326.22 feet along same;
18. 209° 48' 180.60 feet along same;
19. 191° 49' 267.80 feet along same;
20. 195° 19' 274.30 feet along same;
21. 189° 05' 255.65 feet along same;
22. 177° 49' 317.01 feet along same;
23. 182° 46' 304.55 feet along same;
24. 191° 06' 176.75 feet along same;
25. 92° 40' 67.00 feet along same to the Southeasterly corner of Tract E-2-A of General Lease No. S-3852 (Amendment dated May 31, 1973) (Parcel 4 herein)

thence on a curve to the right with a radius of
110.00 feet, the chord azimuth and distance
being:

26. 197° 53' 45.30 feet along the Easterly side of said Tract
E-2-A (Parcel 4 herein);
27. 209° 46' 14.00 feet along same;

thence on a curve to the left with a radius of
380.00 feet, the chord azimuth and distance
being:

28. 193° 14' 216.26 feet along same;
29. 176° 42' 224.06 feet along same to a point on the Easterly
side of Pacific Missile Range Facility (PMRF),
Barking Sands (formerly Bonham Air Base),
Governor's Executive Order (GEO) No. 945,
Part 2, dated June 10, 1941;

30. 196° 40' 2,512.76 feet along the Easterly boundary of said PMRF;
31. 191° 05' 181.49 feet along same to the South corner of Tract
E-1 of said State General Lease No. S-3852
(Parcel 3 herein);
32. 224° 03' 1,455.00 feet along Tract E-1 of GL S-3852 (Parcel 3);
33. 191° 05' 742.14 feet along same;
34. 224° 03' 1,506.89 feet along same;
35. 134° 03' 1,194.24 feet along same to the South corner of Polihale State Park, Governor's Executive Order No. 2901 (Parcel 2 herein);
36. 224° 03' 4,285.90 feet along said State Park to Government Survey Triangulation Station "MOHILI 3";
37. 325° 23' 35" 4,557.72 feet along remainder of Government land of Waimea to a corner of Department of Hawaiian Homes Land of Waimea;
38. 4° 30' 7,700.00 feet along said Dept. of Hawaiian Homes Land;
40. 76° 13' 25" thence on a curve to the right with a radius of 5,077.50 feet, the chord azimuth and distance being:
41. 78° 11' 35" 348.99 feet along the North side of said roadway;
42. 76° 35' 30" 18.66 feet along same;
43. 74° 59' 25" thence on a curve to the left with a radius of 5,142.50 feet, the chord azimuth and distance being:
44. 74° 11' 15" 287.42 feet along same;
45. 73° 23' 05" 484.69 feet along same;
46. 76° 07' 45" thence on a curve to the left with a radius of 10,272.50 feet, the chord azimuth and distance being:
47. 78° 52' 25" 287.85 feet along same;
48. 168° 33' thence on a curve to the right with a radius of 1,717.50 feet, the chord azimuth and distance being:
49. 164° 47 feet along same;
50. 78° 52' 25" 27.19 feet to the Easterly end of said Northerly terminus of said Kaumualii Highway;
51. 168° 33' 37.50 feet to the point of beginning and containing a
gross area of 2,040.509 acres or a net area of 2,039.185 acres after the exclusion of Grant 8153, 1.324 acres, owned by Kekaha Sugar Company, Limited (Parcel 1-A herein).

LAND SITUATE AT MANA, WAIMEA (KONA), KAUAI, STATE OF HAWAII

Being a portion of the Government Land of Waimea (Kona), Kauai, under the jurisdiction of the Department of Land and Natural Resources, Division of State Parks, of the State of Hawaii and being, further, a portion of Polihale State Park, Governor’s Executive Order No. 2901. Beginning at the South corner of this parcel of land, at the end of Course No. 35 of the description of Parcel 1 herein, the coordinates of said point of beginning referred to Government Survey Triangulation Station "NOHILI" being 3,083.01 feet North and 4,259.86 feet East, and running by azimuths measured clockwise from true South:

1. 134° 03’ 589.10 feet along the Pacific Missile Range Facility, Barking Sands, along remainder of Governor’s Executive Order No. 945, Part 2, dated June 10, 1941, to highwater mark at seashore;

thence along the highwater mark at seashore for the next 5 courses, the direct azimuths and distances between points on said highwater mark being:

2. 227° 00’ 1,055.77 feet;
3. 207° 00’ 500.00 feet;
4. 229° 00’ 1,300.00 feet;
5. 230° 00’ 850.00 feet;
6. 224° 00’ 856.85 feet;
7. 325° 29’ 35” 722.81 feet along remainder of said Polihale State Park to Government Survey Triangulation Station "NOHILI 3’’;
8. 44° 03’ 4,385.90 feet along Parcel 1 herein to the point of beginning and containing an area of 69.879 acres, more or less.
Appendix B
Executive Summaries from the Draft and Final Environmental Impact Statements for the Strategic Target System
EXECUTIVE SUMMARY

This Draft Environmental Impact Statement (DEIS) has been prepared in accordance with Council on Environmental Quality and Department of Defense regulations that implement the National Environmental Policy Act (NEPA). The proposed action is to launch Strategic Target System vehicles with experimental payloads into near space to simulate the reentry of intercontinental ballistic missiles and to establish land use controls over certain lands and waters adjacent to the launch site. The purpose of these launches (up to four each year for 10 years) is to test nonnuclear elements of the Strategic Defense Initiative (SDI).

Vehicles would be launched from the Kauai Test Facility (KTF) at the U.S. Navy Pacific Missile Range Facility (PMRF) on the island of Kauai. The vehicles would be aimed toward points within range of the sensing and tracking stations at U.S. Army Kwajalein Atoll (USAKA). KTF has been the site of more than 300 rocket test launches since the facility was first established for that purpose in 1962. PMRF has launched approximately 800 rockets and targets during this same period.

In July 1990, the U.S. Army Strategic Defense Command issued an Environmental Assessment (EA) for the Strategic Target System program that covered all activity in the continental United States and Hawaii relating to the proposed action. In August 1990, the U.S. Army and U.S. Navy issued a Finding of No Significant Impact (FONSI), and a demonstration launch was scheduled for March 1991. In October 1990, the finding was challenged in Federal District Court on grounds that the EA was inadequate and that an Environmental Impact Statement (EIS) was required by NEPA. The District Court ruled that an EIS was not required, but directed the U.S. Army to prepare a supplemental EA for air quality. Following publication of the supplemental EA, the court ruled that the U.S. Army had fully complied with NEPA and allowed the program to proceed.

In September 1991, responding to local concerns, the Department of Defense initiated an EIS for Strategic Target System activities on the island of Kauai. Congress provided funding for the preparation of the EIS. Launch preparations are limited until the EIS process is completed. In November 1991, the U.S. Army filed a Notice of Intent and solicited comments on the scope of the EIS from the public and from local, state, and federal agencies. In scoping comments and at public meetings on Kauai in 1990 and 1991, concerns were expressed about adverse effects on the physical environment, on public health and safety, on cultural resources, and on socioeconomic conditions.
Agencies and the interested public will have an opportunity to comment on this DEIS in writing and at a public hearing on Kauai as indicated at the front of this document. The Final EIS will address comments made in writing or at the public hearing.

ALTERNATIVES

NEPA requires the consideration of reasonable alternatives to a proposed action. This DEIS considered alternative launch sites and launch vehicles and a no action alternative. The alternative launch sites considered were U.S. Army Kwajalein Atoll, Republic of the Marshall Islands, Wake Island, Johnston Island, Midway Island, Guam, Poker Flat Research Range, AK, floating barges, fixed ocean platforms, Vandenberg Air Force Base, CA, and White Sands Missile Range, NM. None of these sites met both operational and safety criteria. Alternative launch vehicles considered were the Castor IV, Minuteman I and II, Minuteman III, Poseidon, Pegasus, Taurus, an augmented Strategic Target System vehicle, and several hybrid vehicle configurations. These vehicles did not meet operational and safety criteria or were eliminated by treaty limitations. Only the no action alternative was carried forward in the analysis. Under the no action alternative, PMRF and KTF would continue to perform its fleet training and other missile testing missions. Selection of the no action alternative would result in no significant impacts on Kauai.

AFFECTED ENVIRONMENT

PMRF occupies a long, narrow site extending 13 kilometers (km) (8 miles [mi]) along the western shore of the island of Kauai. The land area, 779 hectares (1,925 acres), is low and flat. Natural vegetation is mainly kiawe/koa haole scrub and grasses. The large open fields are regularly mowed.

The facility is bordered by Polihale State Park on the north, by sugar cane fields on the east, by the county landfill on the south, and by the ocean on the west. The Strategic Target System launch site is located on KTF at the northern end of PMRF, against the southern margin of the Nohili Dunes.

Geology and Soils

Subsurface conditions are stable and the sandy surface soils have been flattened and stabilized by ground cover. The soil is permeable and drains readily. Wind erosion can be severe when vegetation is removed.

Water Resources

The groundwater and surface waters within PMRF are significant mainly for support of native plants and animals. The aquifer is a lens of brackish groundwater floating on seawater and is recharged from rainfall and seepage from the underlying sediments. Marine water quality off PMRF is good.
Air Quality

Air quality in the vicinity of the Strategic Target System launch site is generally excellent. Air emissions of concern at PMRF are from diesel generators, aircraft, and periodic rocket launches. The practice of burning sugar cane fields causes periods of heavy smoke and ash.

Biological Resources

Portions of KTF and PMRF provide or could provide habitat for some of the 11 federally designated threatened or endangered, or candidate species found on the west side of the island or in the waters offshore.

Cultural Resources

The entire land area of KTF and PMRF could be considered archaeologically sensitive because of the cultural resources found within the installation.

Land Use

Most of the land around PMRF is planted in sugar cane. Polihale State Park on the north is a popular beach. The nearest community to PMRF is Kekaha, 13 km (8 mi) south. Commercial tourist facilities on Kauai are mostly concentrated on the eastern and southern shore. A danger zone has been established offshore to protect submerged cables for the underwater range and small craft from PMRF operations.

Visual Resources

The launch site is located adjacent to the Nohili Dunes, which are the highest natural feature on the base. In the area adjacent to the launch site, the Nohili Dunes are covered by thick vegetation. The view of the entire launch complex is effectively screened by vegetation except from the southwest.

Noise

Noise sources at PMRF and KTF are from aircraft operations and rocket launches and from daily base operations. Noise from rocket launches is infrequent and short term. The nearest off-base housing is 13 km (8 mi) away in the community of Kekaha.

Hazardous Materials and Waste

Hazardous wastes are disposed of through the Defense Reutilization and Marketing Office at Pearl Harbor. In 1990, PMRF accumulated and disposed of 44,710 kg (98,566 lb) of hazardous material/waste.
Public Health and Safety

Ground and range safety at PMRF and KTF is subject to a strict regulatory environment established by the Department of Defense, Department of Energy, Department of Transportation, and the Environmental Protection Agency. Regulations apply to the transport, use, and disposal of hazardous materials/waste and to launch preparation and launch operations. Specific safe operating procedures are established for all hazardous activities. All Strategic Target System launch vehicles (also referred to as "boosters") are certified to the original flight specifications. In the unlikely event of failure, the ground and range safety officers have established safety areas (from which the public will be excluded) to protect personnel, facilities, and the public.

Infrastructure

Electricity at PMRF is supplied by Kauai Electric Company supplemented by diesel generators on the site. Potable water is obtained from the Kekaha Sugar Company well, which is located high on Kamokala Ridge, and from the County of Kauai. Water pressure at the Strategic Target System launch facility is adequate for fire protection. A hydrant and fire suppression system are located inside the launch facility fence line. Existing septic tank and leach field systems have been sized to serve the launch facility.

Socioeconomics

Approximately 850 people are employed at PMRF. About 140 military personnel live on the installation. Most of the government civilian employees and contractor employees live in adjacent communities.

The economy of Kauai is dominated by tourism and agriculture. Employment at PMRF pays generally higher wages compared with other employment on Kauai. In 1991 PMRF had an operating budget of $50.1 million, including a payroll of $29.6 million. KTF has an annual operating budget of approximately $2.5 million.

ENVIRONMENTAL CONSEQUENCES AND MITIGATIONS

Geology and Soils

New construction will take place at previously disturbed sites where the ground has already been leveled and stabilized. Soil studies have found no evidence of contamination from the Strategic Target System type of solid-fuel components due to previous launches over many years.

Water Resources

Water sampling indicated no evidence that surface water or groundwater has been affected by past launches. Booster motor emission and dispersion rates and expected wind velocities are such that no measurable change is expected to occur in the quality of surface water. No emission byproducts are predicted to reach island drinking supplies.
Air Quality

The air quality impacts of Strategic Target System launches have been studied extensively using two dispersion models. These studies indicate that airborne pollutants from either a normal or a terminated launch would not endanger public health or cause significant environmental impacts. Nor would the amount of contaminants from the Strategic Target System program contribute in any measurable way to the depletion of stratospheric ozone.

Air samples will be collected during the first demonstration launch to validate the accuracy of the models and to evaluate compliance with federal and state standards.

Biological Resources

Construction will remove only 0.2 hectares (0.4 acres) of weedy ground cover from an area that is regularly mowed. The continuing presence of sensitive plant species after many years of launch activity suggests that emissions from Strategic Target System launches will not have any significant impact on adder's tongue (Ophioglossum atroviolaceum) and other rare species. Impacts from construction can be mitigated by relocating plants to protected locations.

The Newell's shearwater (Puffinus newelli) is a federally listed threatened species that may fly over PMRF at night, mainly between April and November. Reflection from outdoor lighting could disorient the birds. Lighting will be designed to minimize reflection.

The likelihood that debris from a spent booster or terminated launch would strike a humpback whale (Megaptera novaeangliae) is remote. If humpback whales or monk seals (Monachus schauinslandi) are sighted in the safety zone or launch hazard area, the launch will be delayed until they are clear. Liquid propellant transport activities will avoid any interference with green sea turtle (Chelonia mydas) nests that may be located on the beach.

Cultural Resources

New construction will not affect the Nohili Dunes. Where construction is planned south of the dunes, ground-penetrating radar will be used to scan the subsurface. An archaeologist will be on-site during ground-disturbing activities. Ignition of the trees and other vegetation on the dune could occur during an on-pad mishap or early flight termination. If extensive burning of the dune should occur, a postburn archaeological survey would be conducted.

Land Use

Public access to a small portion of the beaches fronting PMRF will be restricted for about 56 days a year. Because recreation use there is low and many other beaches are accessible, closure is not considered significant. For safety, 20 minutes before each scheduled launch, portions of sugar cane fields and Polihale State Park would be verified clear of people. Up to three hours before a scheduled launch, PMRF personnel may advise people within these areas of their need to leave to allow the area to be
verified clear 20 minutes prior to launch. Portions of the waters offshore would be closed by the U.S. Coast Guard prior to each scheduled launch.

Visual Resources

The new structures for Strategic Target System launches would be largely shielded from public view by the height of the vegetation and the dunes. The appearance of the new structures is not significant in the context of the many larger structures already existing at KTF and PMRF.

Noise

Noise levels from the Strategic Target System booster will be substantially less than from, for example, the Strypi booster that has been launched more than 20 times from PMRF and KTF without known public concern. The noise level will be high during liftoff but will last only a few seconds. The peak noise level at liftoff reaching the nearest off-base housing is estimated to be well within standard acceptable limits.

Hazardous Materials and Waste

Hazardous materials and wastes generated by Strategic Target System activities will not exceed existing capabilities for handling and disposal in accordance with the strict federal regulations currently in force. Hazardous materials will be transported by the safest available routes in containers approved by the U.S. Department of Transportation. Fueling operations will be conducted in accordance with the strict procedures in place at KTF.

Public Health and Safety

The refurbished launch vehicles will be carefully examined and certified to their original flight specifications. A safety zone and a safety easement have been established to protect workers and the public.

Infrastructure

Expected demand is within the capacity of the existing infrastructure.

Socioeconomics

Additional personnel traveling to PMRF for launch activities would benefit local hotels, restaurants, and other service establishments.
ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

Adverse impacts from the proposed action would be mitigated to no significance by measures prescribed in this DEIS. No significant unavoidable impacts would result from the proposed action.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

Use of refurbished launch vehicles avoids or reduces the commitment of new raw materials. The Strategic Target System program would not commit natural resources in significant quantities.
EXECUTIVE SUMMARY

The Environmental Impact Statement (EIS) for the Strategic Target System program consists of the Draft EIS, released for public review in February 1992, and the Final EIS, released in June 1992. These documents were prepared in accordance with Council on Environmental Quality and Department of Defense regulations that implement the National Environmental Policy Act. The U.S. Army Strategic Defense Command (USASDC) is the lead agency for these documents and is the executing agent for the Strategic Target System.

The Draft EIS analyzed the environmental effects of the proposed action and alternatives. The proposed action is to launch Strategic Target System vehicles with experimental payloads into near space to simulate the reentry of intercontinental ballistic missiles and to establish land use controls over certain lands and waters adjacent to the launch site. The vehicles would be launched from the Kauai Test Facility at the U.S. Navy Pacific Missile Range Facility on the island of Kauai.

The Final EIS is organized in three volumes. Volume I contains the additions and revisions made to the Draft EIS in response to comments from the public and agencies. This volume also contains the Army response to substantive comments received during the 45-day comment period on the Draft EIS, whether or not they resulted in changes to the Draft EIS. Volume II contains the full transcript from the public hearing held during the public comment period as well as written comments handed in at the hearing. Volume III contains copies of all written comments on the Draft EIS mailed to the Army during the public comment period. The three volumes of the Final EIS together with the Draft EIS constitute the complete EIS.

The 45-day comment period began with the release of the Draft EIS for public review on 28 February 1992. Over 700 copies of the Draft EIS were distributed to the public, local media, and to federal, state, and local government agencies during the comment period.

A public hearing was held at Lihue on the island of Kauai on 24 March 1992. Recipients of the Draft EIS were informed of the date and place of the meeting. News releases and paid advertisements on radio, television, and in the print media publicized the hearing and the availability of the Draft EIS. A toll-free telephone number was established to receive requests for the Draft EIS and to preregister speakers at the hearing. In order to accommodate the volume of requests to provide testimony, the public hearing was continued on the following night, 25 March.
The public hearing opened with an explanation of the Strategic Target System and of the findings from the environmental analysis. Elected officials and members of the public then provided comments. Approximately 160 speakers made statements during the public hearing. Over 100 letters and other exhibits were submitted. By the close of the public comment period on 13 April, over 500 more letters were received.

Based on public and agency comments, the Draft EIS has been revised and responses have been prepared as reflected in Chapters 2 and 3 of this volume.

It is apparent that the comment period provided a public forum for issues beyond the scope of the EIS. All comments, regardless of their relationship to environmental issues, have been included in the Final EIS for consideration in reaching a decision on the proposed action and alternatives.

The Strategic Defense Initiative Organization (SDIO) will issue a Record of Decision later this year. The Record of Decision will explain the decision about the proposed action and the alternatives examined in the EIS, and it will describe any mitigation measures committed to as part of the decision.

Appendix C
Restrictive Easement Environmental Impact Statement Preparation Notice and Notice of Availability
KAUAI

U.S. ARMY PROPOSED EASEMENT OVER STATE LAND FOR SAFETY AND GROUND HAZARD AREAS FOR THE STRATEGIC TARGET SYSTEM AND NAVY VANDAL MISSILE LAUNCHES AT THE PACIFIC MISSILE RANGE FACILITY

District: Waimea
TMK: 1-2-02: por. 1, 15 and por. 24
Accepting Authority:
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809
Attention: Linda McCrerey (587-0394)

Applicant:
U.S. Army Space and Strategic Defense Command
P.O. Box 1500
Huntsville, Alabama 35807-3801
Attention: Linda Ninh (205-995-3887)
Deadline: July 8, 1993

The proposed action is to allow the United States Government (USG) to purchase a restricted easement which would authorize the USG to exercise exclusive control for limited periods of time over certain state lands adjacent to Pacific Missile Range Facility (PMRF) launch sites. This restricted easement is for the establishment of a safety zone from which all unauthorized persons would be excluded just prior to and during actual launch operations. For Strategic Target Systems launches, the safety zone extends to a maximum of 10,000 feet from the launch pad, and for Navy Vandal launches, the safety zone extends out 6,000 feet from the launch pad. The restricted easement would be exercised a maximum of 30 times per year for a nine-year period of time ending in 2002. This would include no more than four launches per year for the Strategic Target System and up to eight Navy Vandal launches per year. In order to accommodate weather, maintenance, and technical delays, the easement allows for limited backup use of the easement for each scheduled launch. USG personnel may enter the safety zone up to three hours before a launch to post signs and to give notice to any personnel within the safety zone of their need to leave at a specified time due to an impending launch. Roads leading into the safety zone may be cleared and persons may be prohibited from entering, or evacuated from, the safety zone in order to verify 20 minutes before a launch that the safety zone is clear. The safety zone will be reopened following a launch as soon as the Range Safety Officer declares the area safe.

Retyped from the Office of Environmental Quality Control Bulletin, June 8, 1993.
KAUAI

PACIFIC MISSILE RANGE FACILITY EASEMENT OVER STATE LAND FOR SAFETY AND GROUND HAZARD AREAS FOR STARS AND NAVY VANDAL MISSILE LAUNCHES

District: Waimea
TMK: 1-2-02: por. 1, 15 and por. 24

Accepting Authority:
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809
Attention: W. Mason Young (587-0446)

Proposing Agency:
U.S. Army Space and Strategic Defense Command
P.O. Box 1500
Huntsville, Alabama 35807-3801
Attention: Linda Ninh (205-955-1154)

Deadline: September 22, 1993

The proposed action is to allow the United States Government (USG) to purchase a restrictive easement which would authorize the USG to exercise exclusive control for limited periods of time over certain state lands adjacent to Pacific Missile Range Facility (PMRF) launch sites. This restrictive easement is for the establishment of a safety zone from which all unauthorized persons would be excluded just prior to and during actual launch operations. For Strategic Target Systems launches, the safety zone extends to a maximum of 10,000 feet from the launch pad, and for Navy Vandal launches, the safety zone extends out 6,000 feet from the launch pad. The restrictive easement would be exercised a maximum of 30 times per year for a nine-year period of time ending in 2002. This would include no more than four launches per year for the Strategic Target System and up to eight Navy Vandal launches per year. In order to accommodate weather, maintenance, and technical delays, the easement allows for limited backup use of the easement for each scheduled launch. USG personnel may enter the safety zone up to three hours before a launch to post signs and to give notice to any personnel within the safety zone of their need to leave at a specified time due to an impending launch. Roads leading into the safety zone may be cleared and persons may be prohibited from entering, or evacuated from, the safety zone in order to verify 20 minutes before a launch that the safety zone is clear. The safety zone will be reopened following a launch as soon as the Range Safety Officer declares the area safe.

Review of the proposed project against environmental resources within the affected area determined that no significant impacts would occur from the activities associated with the purchase of the restrictive easement.

Retyped from the Office of Environmental Quality Control Bulletin, August 8, 1993.
Appendix D
Public Information Meeting Announcement and Transcript
STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
PUBLIC INFORMATION
MEETING ON
THE DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR A PROPOSED EASEMENT OVER STATE LAND
FOR SAFETY AND GROUND HAZARD AREAS FOR
THE STRATEGIC TARGET SYSTEM AND NAVY
VANDAL MISSILE LAUNCHES AT THE PACIFIC
MISSILE RANGE FACILITY, WAIMEA, KAUA‘I

NOTICE IS HEREBY GIVEN of a public information meeting to be
held by the Department of Land and Natural Resources, State of
Hawaii:

PLACE: Waimea High School Cafeteria
DATE: Thursday, September 9, 1993
TIME: Commencing at 6:00 p.m.

The purpose of the meeting is to provide residents an
opportunity to comment on the draft environmental impact statement
for a proposed easement over state land. The United States
Government (USG) desires to purchase an easement which would
authorize the USG to exercise exclusive control for limited periods
of time over certain state lands adjacent to Pacific Missile Range
Facility (PMRF) launch sites. The purpose of the easement is to
establish a safety zone from which all unauthorized persons would
be excluded just prior to and during actual launch operations. The
easement would be exercised a maximum of 30 times per year for a
nine-year period of time ending in 2002. This would include no
more than four launches per year for the Strategic Target System
and up to eight Navy Vandal launches per year. In order to
accommodate weather, maintenance and technical delays, the easement
allows for limited backup use of the easement for each scheduled
launch. USG personnel may enter the safety zone up to three hours
before a launch to post signs and to give notice to any personnel
within the safety zone of their need to leave at a specified time.
zone in order to verify 20 minutes before a launch that the safety zone is clear. The safety zone will be reopened following a launch as soon as the Range Safety Officer declares the area safe.

A key element of the environmental impact statement, pursuant to Chapter 343, Hawaii Revised Statutes, as amended, is the provision for public input. Although the upcoming meeting is informational rather than a formal public hearing, interested persons are invited to provide oral or written comments about the draft environmental impact statement. Written comments may be submitted at any time up to and including September 23, 1993 and addressed to the U.S. Army Space and Strategic Defense Command, P.O. Box 1500, Huntsville, Alabama 35807-3601, attention: Linda Ninh. Persons wishing to comment at the meeting will be signed up at the door in the order they appear. All comments will be evaluated in the final environmental impact statement.

Copies of the draft environmental impact statement are available for viewing at the following libraries: Kauai Community College Library, Hanapepe Public Library, Kapaa Public Library, Wai‘ele Public Library, Lihue Public Library, Koloa Community School Library, University of Hawaii Hamilton Library, State of Hawaii Main Library, Kaisuki Regional Library, Kaua‘i Regional Library, Pearl City Regional Library, Hilo Regional Library and Kahului Regional Library.

Should you have any questions about the upcoming meeting, please contact either the Kauai District Land Office at 241-3126 or the Honolulu Office at 587-0414.

BOARD OF LAND AND NATURAL RESOURCES

KEITH W. AHUE, Chairperson

THE GARDEN ISLAND:
STATE OF HAWAII

PUBLIC INFORMATION MEETING

FOR THE

RESTRICTIVE EASEMENT

ENVIRONMENTAL IMPACT STATEMENT

KAUAI, HAWAII

Taken on behalf of the Department of Land and Natural
Resources at Waimea High School, Waimea, Kauai, Hawaii,
commencing at 6:00 p.m. on Thursday, September 9th, 1993.

REPORTED BY: KATHY PEARSON, RPR-CR No. 313
Notary Public, State of Hawaii
APPEARANCES:

For the Department of Land and Natural Resources:

MR. SAMUEL LEE

For the Pacific Missile Range Facility:

CAPT. ROBERT MULLINS

Moderator:

MR. LEWIS MICHAELSON

Speakers in order of appearance:

James Tehada
Anderson Kilaunano
Gregg Gardiner
Dave Nekomoto
Averist Soto
James Lawshe
Richard Irwin
Norman Nitta
Bruce Baxter
Bob Valencia
Linda Matsuda
Gene Bullock
Dave Saunders
Cheryl Saunders
Ben Manuel
Tom Hughes

Charlene Castor
Raymond Chuan
Arthur Trask
Roy Chris Smith
Robert Inouye
Bob Rask
Karen Taketa
Ray Blouin
Owen Moe
Rev. Ilse Peetz
Richard Magyar
Aletha Kaohi
Mike Faye
Stewart Burley
Nelson Mukai
RECORD OF PROCEEDINGS

MR. LEE: Good evening, ladies and gentlemen.

Thank you for taking the time to come out and join us at our
public meeting. It's a few minutes after six, and I know
we're all interested in starting our meeting on time, so
let's get on with it.

My name is Sam Lee, and I'm with the Department of
Land and Natural Resources. The reason that we're all here
tonight is to get your comments on a draft environmental
impact statement for a proposed restrictive easement, which
if granted will affect about two thousand acres of land
adjacent to the Pacific Missile Range Facility.

In just a minute or so I'm going to turn the mike
over to Lewis Michaelson to my right, who is the moderator
for tonight's meeting. Mr. Michaelson will provide you with
an overview of the agenda tonight, and will also be
discussing ground rules for tonight's meeting.

After Mr. Michaelson completes his presentation,
Captain Robert Mullins, commander of the Pacific Missile
Range Facility, will speak to you and present to you the
details of the restrictive easement. I'm sure Captain
Mullins is well-known to each and every one of you in the
audience.

When Captain Mullins is done, Mr. Michaelson then
will begin the public input portion of the meeting.
That about winds up my presentation. I have a
couple of short announcements to make before I turn the
microphone over to Mr. Michaelson, and that is first, there
are restrooms available for your use along the makai side of
the building. That is out the building to my right and
around the bottom side.

The last announcement I have to make is, due to
recent state law, I'm obligated to inform you that smoking
is not allowed anywhere on the school premises. So if you
have to smoke, I'm sorry to say that you have to go across
the street and off the school property.

Mr. Michaelson?

MR. MICHAELSON: Thank you, Mr. Lee.

Good evening. My name is Lewis Michaelson, and I
will be your moderator for tonight's meeting.

For your information, this meeting is being
reported by a court reporter who's sitting here in front of
me. What that means is that everything that's said at this
meeting through the public address system has been and will
be recorded by the stenographer who is here in front of the
room. A transcript of this meeting will then be prepared
from this recording and placed in the final environmental
impact statement for the restrictive easement.

My job as moderator is to help insure that all
interested persons at this meeting tonight have the
opportunity to accomplish two things. The first is for you
to obtain information on proposed restrictive easement for
the Pacific Missile Range Facility and the preliminary
findings of the draft environmental impact statement for the
easement.

To accomplish that version of the purpose, there
are handouts hopefully you should have received when you
came in tonight. If you happened to come in from that back
door and missed them, over there at that corner are the
handouts.

In addition, as Mr. Lee mentioned, there will be a
presentation by Captain Mullins, which will also provide
additional information.

The second purpose for this meeting is for you,
the citizens, to provide comments to the State of Hawaii,
the U.S. Navy, and the U.S. Army Space and Strategic Defense
Command on the draft environmental impact statement for the
restrictive easement.

To accomplish these purposes, my role as a
moderator is to explain the meeting format, insure that
commenters are able to speak without interruptions, insure
that speakers adhere to the three minute time limit, and
provide various reminders and direction in order to keep us
on schedule.

The agenda then for tonight is straightforward.
Following my remarks, Captain Mullins, the commander of the Pacific Missile Range Facility, will provide a brief description of the restrictive easement and preliminary findings of the draft EIS. After the presentation, we will then begin taking public comments until we are finished.

Actually there are two ways to comment on the draft EIS. One is here tonight orally. For oral comments tonight, we have asked that you sign at the registration table which is, again, at that corner. If you would sign your name onto the card and print it, please, we will be calling people to speak tonight in the order in which they register.

Then we'll begin taking public comments. I will call the names of the people who registered, and we will ask you to come sit on this table over here just to make it easier for you to get to the podium instead of having to come from far back in the room. And again, everyone who comments will have three minutes to speak.

If you wish to speak tonight and you have not yet registered, please go back to the registration table and do so. Everyone is welcome to speak.

In addition to making oral comments, I said there's another way. The other way is to provide written comments during the forty-five day public comment period. There are two ways to do that.
First, if you want to, you can hand in written
comments tonight at the registration table. Or you can mail
your written comments to the names and addresses which
appear on the handout you should have received when you came
in tonight. If you choose to mail in comments, they should
be postmarked by September 22nd, 1993.

By the way, the ads announcing this meeting in the
local newspaper stated that the postmark date for any
written comments was September 23rd. The official date is
the 22nd, but due to the error, the State will still accept
comments postmarked by September 23rd.

For those of you who would like to receive a copy
of the final environmental impact statement when it's
published, again at the registration table, there is a
sign-up list where you can sign up to receive it when it's
available.

Also you may have noticed that there is a video
camera, and cameras here. The U.S. Navy is making a video
recording of this meeting that will be made available to the
EIS applicant and the decision makers for their
consideration along with the Navy transcript.

One final note. I know that many of the issues
that will be addressed tonight here are ones that people
have strong feelings about, both for and against. When a
speaker has finished his or her comments, I would expect
that some members of the audience would like to vocally
express how they feel about them, and that is fine.

However, because this is a reported proceeding and
the acoustics are not the best where we could be, and we're
trying to catch everyone's comments for the transcript, out
of deference to the court reporter I'd just ask that you
please refrain from making any vocal expressions when
someone is speaking from the podium. Please hold them until
they're finished. Thank you for your consideration on those
details.

And with that, we will now turn to the
presentation by Captain Mullins of the Pacific Missile Range
Facility.

CAPT. MULLINS: Good evening. What I'd like to
talk about briefly are the details, some of them, of the
proposed action. I won't get into great detail, because you
can read that for yourselves from the draft EIS.

The purpose of the meeting, as has been said
before, is to collect your inputs on the impacts of the
proposed action, which is a long-term land use agreement
between PMRF and the State of Hawaii for certain off base
lands.

In particular, it has to do with the purchase of a
long-term, nine year term safety easement over about two
thousand acres close aboard PMRF for the purpose of
permitting us to clear occasionally a ground hazard area for
some launches that we hope to have during the course of the
next nine years.

Some of the details are as follows. Hopefully you
all have copies of this. Are you able to hear me okay?

Again, it's, the lands that are affected are
primarily cane fields and a section of Polihale State
Beach. It's approximately 2,100 acres total. The
overwhelming majority of the acreage is cane fields
currently leased by Amfac for sugarcane cultivation.

It's natural marshland, as I think all the west
siders know, and has to be pumped out constantly else the
water table rises, and it fills up with water three months a
year. It is not suitable for permanent buildings or
habitation.

The other impact is just north of the base,
approximately a hundred acres I believe, about one statute
mile of the southern tip of Polihale State Park. The area
of Polihale State Park affected, the impact, I would like to
point out, runs from the area that's known as Queens Pond
south to the base boundary.

It does not include the picnic area, it does not
include the camping area, it does not include the popular
beach, it does not include the popular fishing beach, and it
does not include the popular boating beach. Those areas of
Polihale are never affected by this action with the
exception of the brief closure of the access road passing
through the cane fields, okay?

The duration is nine years, and I'll talk about
why nine years here in a few minutes.

The EIS also refers to a maximum number of events
of thirty per year. I would like to point out that thirty
events per year does not equate to thirty launches per year,
okay? The actual number of launches, the notional number of
launches that we foresee at this point is much less than
that.

As you know, because of cutbacks in the one
program, Stars, the maximum number of launches per year that
we expect for Stars over the next several years for the
duration of this action is two, two per year. Next year
there is one scheduled.

The overwhelming impact of this from the base
perspective is on a Navy program that's called Vandal.
Vandal is a target that we use to challenge the Navy's Aegis
weapons system for a Navy surface ship that comes on the
range to do testing and to do fleet training, which, of
course, are the two primary missions of the range.

Are there impacts regarding this proposed action?
Yes, there are. We will in fact have to close a section of
Polihale State Beach for approximately three hours maximum
per event. The total number of events per year is probably
going to be realistically anywhere between six to ten.

The reason for the extra events over and above the
number of launches is to permit us backups in the case of
technical delays, weather delays, other delays. Okay,
swings and misses, as they say in baseball.

Usually we have plenty of advance warning so that
we do not impact these ground hazard areas, and this
proposed action would not detract from anybody's ability to
access any of the off base lands.

For example, the recent Stars launch that we
accomplished a couple of weeks ago was delayed two
consecutive days because of weather delays down range. We
knew about the delays well in advance. The ground hazard
area was never exercised, and there was no impact on the
population.

I would also point out to you, sidebar comment,
that an informal, unscientific survey of the section of
Polihale State Beach that was conducted last week, the five
day work week, from Monday morning at eight o'clock until
Friday at noon when the campers started moving in for the
weekend, total number of people that accessed this section
of Polihale Beach was five. One a day, okay? Those are the
impacts.

The purpose of this action is to formalize a
long-standing, informal agreement that the base has had with
the State and the County to occasionally go off base and to
utilize off base lands for ground hazard areas for missile
launches.

I think you know that the mission of PMRF is
twofold. Fleet training and testing and evaluation. As
part of both of those missions, we occasionally have to
launch targets. We launch missiles. The name is not a
mismomer, it really is a missile range facility.

We launch over a hundred missiles a year, a
hundred targets a year from PMRF, I think with minimal
impact, with no impact to health, safety, or the
environment. As always, I invite you out there to see for
yourself.

I would like to gather your inputs on what you
foresee the impacts of this long-term land use agreement
being for the west side of Kauai. This is an important
issue for the base.

This is not a Stars issue. This is a base issue.
This has major import for the future viability of the base
as far as its capability to support the occasional testing
and training of Aegis class surface ships for the Navy,
okay? That's what this is about for the base.

As I say, this is a base issue, this is a land use
issue. It's also an island of Kauai issue, as well as a
Hawaii issue.

And to be sure, it is a native Hawaiian issue.

Particularly native Hawaiians who live on the west side of Kauai who are my neighbors out in Waimea, Kekaha, Kalaheo, and points in between. They're the ones to whom the cultural sanctity of the Polihale dunes and the other areas on the base are so important. Those are the people that I particularly would like to hear from this evening.

Recently I've had occasion to take informal input from a number of people who have turned up at the main gate of PMRF unannounced from a variety of places, with a variety of backgrounds, with a variety of agendas, with a variety of inputs regarding their opinion about what this action will have on Kauai and on the state of Hawaii.

I would like to hear your input, people from Kauai's input, particularly native Hawaiians from west Kauai. Thank you very much.

MR. MICHAELSON: Thank you. As mentioned, the primary purpose of this meeting is to receive comments related to the potential environmental impacts of the proposed restrictive easement for launches from Pacific Missile Range Facility as well as comments on alternatives to the restrictive easement and on the adequacy of the analysis and conclusions of the draft EIS.

To develop a complete record of the public
comments at this meeting, it is important that you speak
tonight and come forward to the podium at the front, state
your name, and speak audibly into the microphone.

To receive your comments in an efficient manner,
we have asked you to sign up at the registration table, and
currently I have about twenty people who have indicated
they're interested in doing so.

In addition, we have a row of chairs over here to
my left up against the dishwashing area of the cafeteria.
What I'd like to do is, I will read ahead the first four or
five speakers, and that way you can find your way to one of
those seats over there.

And then as I call your name subsequently, instead
of having to walk all the way from the back of the room,
you'll be able to just quickly approach the podium up here
where Sam Lee spoke from earlier.

As I mentioned, there's a three minute limit for
speakers. And I know you don't want to have to be checking
your watch every second, so to help you keep track of the
time, I've developed a very simple method for indicating how
much time you have left.

After two minutes of speaking, I will hold up one
finger, indicating that you have one minute left. This
should allow you to reach a comfortable ending place for
your comments. Then if you reach the three minute limit, I
will hold up my closed hand like this, indicating it is time
for you to end your comments.

    One final note. We expect to have a lot of
speakers tonight, and we would like to get to everyone as
early in the evening as possible, since this is a week
night. Consequently, if during the course of your comments
you ask a question, please do not pause for the answer, just
continue speaking.

    The government representatives who are here
tonight will note your questions, and after the periodic
breaks that we will take for the court reporter to rest her
tired fingers, they will come back and attempt to answer any
questions they can in a brief manner so that we can keep
things moving. If they do not have an answer to your
question tonight, keep in mind that it will still be
reported and considered in the preparation of the final
EIS.

    And once again, please save your vocal expressions
of approval or disapproval or comments until that person is
finished so we can be sure the stenographer hears and
records all the comments accurately.

    With that, we'll read the list of the first five
speakers in order. James Tehada, Anderson Kilauano, Gregg
Gardiner, Dave Nekomoto, and Averiet Soto. I believe there
are just exactly five seats over here.
Council Chair Jimmy Tehada?

JAMES TEHADA: Can you hear me? Thank you and
good evening. I'm here tonight, not as the Council
chairman, but as an individual. And to be brief, I speak
for the approval of this easement.

Let me go back to the late seventies when I was on
the Planning Commission, and we worked with the Kekaha
Waimea community to determine what are the economic impetus
within this community. Plantation. Tourism, the community
didn't want that. They wanted their life-style. They also
wanted the military, and they were very vocal about it.

As a result, if you were to look at your land use
documents, the Planning Commission at that time created a
buffer zone so that PMRF could experience the potential, or
have the potential of expanding. It was recognized, and
that time is still today, that the primary industries that
we have are the tourism, agriculture, and the military.

I'd also like to add that in my capacity I receive
a lot of call of people being unemployed, their insurance
running out. They're afraid that they're going to lose
their homes. They're pulling out their kids from college,
and the young ones are being forced to leave.

For this reason, we should continue to keep those
employed, gainfully employed. It is necessary. We have
enough problems.
I'd also like to speak on this term high tech. I was asked about bringing in manufacturing of computer chips. And my question was why? High tech. What are the support to make it a lucrative industry, and the person couldn't give me an answer.

Then I asked this question. The highest paid group in this community is right here at PMRF. Isn't that high tech? So why do we get rid of it? I object to that.

I would also like to reflect back recently, and I spoke at this Na Mee Iniki Opa, and PMRF was one of the recipients. I came to pick up, or help people put on plastic on their roof. I've seen how much they responded. And I asked myself, where are the opponents of PMRF? I know it in one word.

I'd like to briefly cap my comments by saying let's not forget history. We had the buzz bomb during the Second World War and we couldn't stop it. We had the tiger tank, and we couldn't stop it for quite a while. I'm a Korean War veteran, I carry a piece of shrapnel. When the T34 came, we couldn't stop that.

So let's not make the same mistake. Let's be prepared for the next conflict, and I hope there is none, there isn't one.

With that, thank you very much.

MR. MICHAELSON: Anderson Kilauano.
ANDERSON KILAUNAO: Good evening. My name is Anderson Kaole Kilaunao. I am a full-blooded kanaka raised in the Barking Sands, Queens Pond, and Polihale area. My ohana buried in this area. My sister Margaret and I tend to these graves.

Based on this and the fact that I have lived here all eighty-two years of my life, I feel that I have every right to speak for the majority of these Hawaiian, for the Hawaiian from this area. We don't need outsider to tell us what to think or say.

I support PMRF, not because my ohana work there, I support PMRF because it has kept the land and the west side life-style I grew up with intact.

Thank you for hearing my testimony.

MR. MICHAELSON: Gregg Gardiner, please?

GREGG GARDINER: Hello, my name is Gregg Gardiner. I'd like to speak about some of the economic impacts and some of the letters that we've received at the Kauai Times in support of PMRF. Those letters were addressed to Senator Daniel Inouye.

First, the Kauai Economic Development Board specifically supports PMRF and the BMDO mission. As well as the Chamber of Commerce, we also have a letter from the Chamber of Commerce supporting the BMDO mission as well.

It's interesting to note that the Chamber of
Commerce put out a survey last June to all the businesses. In that survey PMRF and the Stars project both overwhelmingly were supported by the businesses in the community.

When we think about that and we look at what the economics are involved, it's not hard to see why. PMRF now, because of the economic climate on Kauai, is our largest employer. Last year contributed almost seventy-seven million dollars to our local economy.

Is it important to keep? I think so. With over three thousand acres of ag land now laying fallow, and the problems of Oahu, our tourist industry in a state of flux, we have real problems. We need PMRF.

In addition to the economic issues, I think it's important that we look at the environmental issues. In the original EIS that was conducted for the Stars program, the Army looked at the environmental impacts. There's been two Stars launches now. Those environmental impacts have proved to be sound. The environmental monitoring around the base has shown no environmental impact to the base or the surrounding areas.

The other important thing to look at is what's happening in the Navy. The Navy is downsizing right now. By 1995 forty percent of the Navy's manpower will have been retired early, but only ten percent of their infrastructure
base facilities will be. 1995, we'll have to catch up.

Without the ability of the Navy and the Army to
keep this ground hazard area, the test and evaluation
portion of PMRF's mission is in grave danger. That danger,
according to all experts, would mean the closure of PMRF.
That's a very serious threat to our local economy, one that
we cannot afford.

So I ask all of us to take a good look at what
good neighbors PMRF has been. All of us to take a good look
at what they add to our economy. Not just in dollars, but
the people. Almost nine hundred of them, both military and
civilians, who work and live in our community, who go to our
schools, who volunteer their time at civic organizations,
the good neighbors.

I ask you for their support so that they can
continue to be good neighbors in the future. Mahalo.

MR. MICHAELSON: Dave Nekomoto, please?

DAVE NEKOMOTO: My name is David Nekomoto, and I
represent the United States Navy League, Kauai Council.
Kauai Council has over a hundred members at the present
time. And I'm chairman of the council's speakers bureau and
a member of the council's executive board.

I also represent the 593 citizens of Kauai who
have taken the time to sign this petition. And I might add
that there are more signatures forthcoming that would be
sent directly to the SDC representative.

At the end of my speech, I would like to present
these petition signatures to the SDC representative for
inclusion in the final EIS. Needless to say, all signatories
represent members of the community who support granting of
the restrictive easement and the mission at PMRF.

PMRF is Kauai's largest employer, as Gregg
Gardiner just mentioned. And PMRF needs to be able to
continue its work in supporting training and test and
evaluation.

In doing so, the people of Kauai benefit, the
Hawaiians of Kauai benefit, and the whole state of Hawaii
benefits. Because if PMRF closes, Hawaii's military
industry, the second largest in the state, would be in
serious jeopardy.

In the last two weeks, very serious threats to
PMRF's existence were made by the Chief of Naval
Operations. PMRF's training budget for fiscal year '95 was
eliminated. It was zeroed out. But due to strong protest
by Senator Inouye and high level users of the range, this
action was, for the moment, reversed. I might add that this
is the closest PMRF has ever been to being shut down.

I understand that opponents of the Stars launches
are now concentrating on the point that the area of concern
here tonight is ceded lands. Over the past few years their
tactics have shifted like the wind. They've lost their case
in court four times now.

When are they going to quit? They already have
caused costly delays. And more damaging than that, have
created apprehension on the part of potential customers of
the range. I urge that people of Kauai put pressure on
these opposition groups and urge them to back off.

With tourism and agriculture so shaky, it is
paramount that we do all we can to preserve Hawaii's
military industry. Let me repeat that. With tourism and
agriculture so shaky, it is paramount that we do all we can
to preserve Hawaii's military industry. The restrictive
easement that we are here to support tonight is one of the
steps necessary to do just that.

Please accept the signatures on this petition as a
partial measure of support for this easement. There are
many PWRF employees working at this very moment in support
of round the clock operations at the base, and were not able
to make it here tonight. Thank you very much.

MR. MICHAELSON: Before I ask Mr. Soto to come up,
let me announce the next few names in line so that you can
join the on deck circle over here.

James Lawshe. Excuse me, anyone, if I
mispronounce these names, but I'll do the best I can.
Richard Irwin, Norman Nitta, and Bruce Baxter. Mr. Soto?
And if I could ask the speakers to occasionally look my way, it may be easier to see my hand up in the air. I know it won't be a problem.

AVERIET SOTO: My name is Averiet Soto, and I represent myself tonight. And I guess my comments are primarily economic in nature as well.

Eighteen months ago, if any of us went to a similar public hearing on the Stars issue, at that time many expressed concerns over the negative economic impacts Stars would have on Kauai's tourism industry if an accident occurred. Little did anyone know that six months later Iniki would roar over Kauai, and in five hours change all our lives.

In its wake Iniki left Kauai's tourism industry in a shambles. Today Kauai's unemployment figures are still in double digits with many people in dire straits. Now, over the past year hotels and businesses have struggled to get back on their feet, and the ones that have survived are now waiting for the tourists to come back.

It's a sad state of affairs when so much of the island's economy is based on one industry, such as tourism. And who's to say when the next hurricane or natural disaster will hit.

In contrast, during the same period PMRF continued to employ all six hundred plus workers, assisted with
recovery efforts, and conducted training and test and
evaluation operations virtually without skipping a
heartbeat.

Over the past thirty years, PMRF has enjoyed broad
community support. But I'll tell you, community support
alone will not keep a base open. PMRF must be able to
perform its mission and do it better than anyone else can.

And we all need to consider, seriously consider
the impact of PMRF not being here. The approval of the
easement being considered tonight is crucial to helping PMRF
continue its mission. Without it PMRF is virtually doomed.
Well, some would like nothing better. I don't believe that
most west siders would share that viewpoint.

Issues have been raised regarding negative
environmental and cultural impacts caused by programs at
PMRF. As previously mentioned, records show no significant
impacts, period.

PMRF personnel will continue to be sensitive to
environmental and cultural issues. After all, we all have a
stake in Kauai's future generations. And the stewardship of
the lands that PMRF handles now could not be in better
hands.

I wholeheartedly support this easement and
courage the State of Hawaii to approve it, thereby sending
a clear message, which has not always been the case, to our
elected officials, the military, the project sponsors, and
the residents of Kauai that you are a responsible and
cooperative partner in PMRF's and Kauai's future. Thank
you.

MR. MICHAELSON: James Lawshe.

JAMES LAWSHE: Thank you. I am Jim Lawshe from
Kalaheo, and I support PMRF and the Strategic Target System
and the Vandal launch programs.

I furthermore support the proposed nine year
easement that would give the Pacific Missile Range Facility
occasional use of lands adjacent to the base during missile
launching operations.

I have been a resident of Kauai and a contractor
employee at PMRF for the last twenty years. Before this, I
was at Holloman Air Force Base and White Sands Missile Range
in New Mexico for twenty-three years.

One of my greatest experiences at Kauai has been
my association with the local PMRF people. Having worked at
both a mainland and a Kauai based range for over twenty
years, I can attest that the local people at PMRF are
basically the same as their mainland counterparts. They are
technically competent, sincere, and strive to improve
themselves. The local people at PMRF have earned what they
have, and I respect them for it.

There are at least a hundred fifty people employed
at PMRF of Hawaiian descent. These are distributed throughout government and contractor, scientific, technical, administrative, and trades organizations. These people are gainfully employed, and support PMRF and its programs. They're contributing to the economy of the island and to the national defense of the country.

Reverend Patterson, director of the Kauai Economic Coalition on Kauai, claims to represent the Hawaiian people on Kauai. The coalition, centered on the east side of Kauai, represents only itself. They do not represent all of the Hawaiian people on the island.

Dennis Antoline, an attorney for the Sierra Club Legal Defense Fund, has been credited to have claimed that five hundred thousand people come to Polihale State Park during the year before Iniki. This is a preposterous exaggeration.

During the year before Iniki, the HVW advised that 1,000,222 visitors came to Kauai. According to the Sierra Club, forty percent, or nearly half of these visitors drove to Polihale. Not true.

Five hundred thousand visitors in a year would be an average of 1,370 people a day driving in 456 cars each day with three people in a car. Can you imagine where a string of 450 cars would be? It would amount to a bumper to bumper string one and three-quarter miles long.
Can you imagine where one and three-quarter miles of bumper to bumper cars are going to park at the end of the road? And will the visitors go to the end of the road?

Absolutely. That's where the restrooms are.

By the way, do you know that the 1000 Friends of Kauai boast a membership of eighty people?

During a Stars operation, the road to Polihale is closed to through traffic twenty minutes before the launch. On the first few Star launches, no one drove up to the south roadblock after it was closed to request a pass through the hazardous area. Those that came earlier were allowed to pass through the check points. All respected and cooperated with the security personnel at the hazardous area check points. There were no problems.

It is also a fact that Ms. Vida Mossman from the PMRF public affairs office has received only one complaint in five years from a person who was not able to use the beach before a rocket launch. Incidentally, Vida is one of the hundred fifty people at PMRF of Hawaiian descent.

Let's finally put to rest all claims regarding inconveniences from the PMRF launch activities. They have not happened in the past, there is no reason to expect them to happen in the future.

To close, I respectfully request the Department of Land and Natural Resources to approve the restrictive
easement EIS. Thank you.

MR. MICHAELSON: Richard Irwin?

RICHARD IRWIN: My name is Richard Irwin, and my views are solely my own.

I strongly endorse the proposed restrictive easement because it will allow PMRF to continue its mission of fleet training and test and evaluation programs vital to the nation's defense. Without this easement, PMRF will die on the vine. And make no mistake, PMRF would not be able to attract new programs, which are vital to maintain the base on a strong, financially competitive footing.

PMRF needs customers just like any other business. To get those customers, the range capabilities and costs must be attractive to national users, or they'll go elsewhere.

This easement is necessary for one simple reason. Public safety. It's as simple as that. It's not a Stars issue and it's not an environmental issue. Without it, the west side and Kauai will suffer economically and socially.

The Stars environmental issues have been resolved. The courts have repeatedly ruled the Army's EIS is complete, valid, and adequately addressed all environmental issues.

While a small minority opposed to PMRF and its programs are gravely plotting its demise, the actual results
of the base closure are sobering. The loss of eight hundred
jobs at PMRF are of little concern to a merry band of
protesters.

But those who value a decent job and work hard for
a living would be devastated. The west siders would face
lost jobs, reduced standards of living, sons and daughters
would not get that college education, and home ownership
would remain only a dream. Don't we have enough
unemployment on Kauai?

The Sierra Club and others will say it's not their
fault. Why, they're merely protesting the rocket launches
at PMRF. It's the politically correct thing to do. It's
fun. And PMRF would certainly not close if the missiles
went away. What possible harm could it cause?

Think again, Ms. Freeman. Are you listening, Ms.
Martinek, Mr. Chuan? Stop your nonsense and take a hard
look at what you're trying to do to people's lives.

I would like to ask those opposed to this
restrictive easement, why are they opposed to development of
defensive systems? Would they prefer to have their military
sons and daughters unprotected and defenseless against
attack from some dictator's weapons?

If this easement is not allowed and the ballistic
missile defense research at PMRF is stopped, you will tie
the military's hands and expose them to attack.
Missile is the PMRF's middle name. And missiles, they do well, with a proven track record of hundreds of successful and safe launches over the past thirty years. Let them continue in this mission in the pursuit of peace. Approve this requested easement. Thank you.

MR. MICHAELSON: Norman Nitta.

NORMAN NITTA: Good evening. My name is Norman Nitta, and I'm from Kalaheo. I was born in Waimea, and I was raised in Kekaha. Attended Kekaha School, attended Waimea High School, went off to college on the mainland, and came back. Currently I'm a lieutenant colonel in the Hawaii Air National Guard. I'm one of the three island commanders of the Hawaii Air National Guard units here.

I support the U.S. government's proposal to acquire a restrictive easement for PMRF. I believe PMRF is vital to our national defense, to our community, and to our economy.

PMRF is a good neighbor, as evidenced by their recovery efforts after Hurricane Iniki. And I would like them to continue being a good neighbor far into the future. Thank you.

MR. MICHAELSON: Before I ask Mr. Baxter to approach to speak, the next four speakers up after him are Bob Valencia, Linda Matsuda, Gene Bullock, and Dave Saunders. If you'd join our table up here.
Mr. Baxter?

BRUCE BAXTER: Good evening. My name is Bruce Baxter. I was the former technical director at PMRF, I retired last year. And I'd like to tell you why I came here and what it's meant to me.

I grew up in Honolulu. I graduated from high school there. I graduated from the University of Hawaii. I spent six years in my chosen field of engineering in Honolulu. And then I realized that there just weren't good jobs for a dynamic young engineer, and I left for the mainland.

I spent twenty-one years at a test and evaluation command in southern California and learned the business. I had an exciting career. But I wanted to come back to Hawaii. I was able to come back to a good job because PMRF was there. And I was ready to be the technical director of PMRF.

What I've found at PMRF was a group of dedicated people that were local. And I realized that their safety record they had, as compared to the command I came from, because it is better here at PMRF, was because it is local people who live right here, and have stable jobs, and stick to their jobs because they like Hawaii and they like Kauai, just like I do. And they have an excellent record because of that. They take their job seriously.
During the time I was there, I was involved in upgrading the work force, because the equipment we used was being upgraded. During the time I was there, the contractor and the government hired approximately twelve new engineers, positions that hadn't been there before.

Five of those came from the University of Hawaii, and I helped recruit those young folks. And there's one of them here tonight, one of the young ladies tonight is an electrical engineer from the University of Hawaii working at PMRF. Those people are spending their salaries here on Kauai because PMRF exists.

Now, the second reason that I'm for this is I'm an avid diver. I dive off Polihale, and I have no problem at all transiting that area in a small boat and going out to dive. I don't have any problem at all going out to Polihale.

And if I'm held up twenty minutes or thirty minutes, it's not going to bother me, because I know the folks that are doing it are dedicated, and I can take that time. I have never been held up.

And I still am spending my salary here, even though it's a retirement salary, and enjoying Kauai, because PMRF is there. And I am for what they are trying to do, because they're enhancing our community. I am for that safety easement. Thank you.
BOB VALENCIA: My name is Bob Valencia. I am a long-time west sider that actually uses Polihale Beach area, unlike a very few vocal protesters that I have heard who couldn't find Polihale with a map. I am very close to retirement, and plan to use the west side beaches rather extensively in the near future.

There is absolutely no reason for me or anyone else to be concerned or get all worked up about the issue of sharing the use of the land specified in the EIS. The minor inconveniences for me to remain clear of the area during launches is insignificant compared to the potential problems that could occur if this project is stopped.

Additionally, the U.S. government is willing to pay for the occasional use of the area, which would be a definite positive for the state, and may result in some additional compensation for members of the Hawaiian community as well. This sounds like a win win situation to me.

As far as public safety and the environment is concerned, I know the public will be adequately protected during launch operations. And I also know that should a missile actually experience problems and land in the safety area, an unlikely event, no permanent damage to the land will occur.

It seems to me that we have everything to gain and
nothing to lose by this project. The launches benefit the
United States' defense effort, provides work for the PMRF to
help insure continued employment for Kauai, provides dollars
to the state, and does no damage to the environment.

As a card carrying, tax paying citizen of the
great state of Hawaii, United States of America, and the
user of the Polihale beaches, including Nohili dunes, I
stand solidly in support of this project.

LINDA MATSUDA: Hi, my name is Linda Matsuda, and
I'm here tonight to say that I support PMRF and the
easement. Thank you very much.

MR. MICHAELSON: Mr. Bullock?

GENE BULLOCK: Good evening, everyone. My name is
Gene Bullock.

I am retired, and have been a resident here in
Kauai for thirteen years. I am presently the president of
the Kauai Council of the Navy League of the United States.
I am a proud veteran of two world wars, and I call the
Korean War a world war.

And I am a life member of the American Legion, the
largest veterans organization in the world. And this year
within this organization, I am the state chairman for the
armed forces committee.

I am here to request and strongly urge the
approval of this nine year easement on lands that are vital
to assure PMRF remains the finest testing, evaluating, and
training ranges in the world.

This range is of major importance, and directly
involves the national security of the United States. This
is the prime source of Kauai's economy, and a solid
foundation for the recovery and healing process following
Hurricane Iniki. And while this range remains in full
operation, it assures us of keeping the Pacific fleet, its
air arm, and a submarine force in Pearl Harbor.

And if PMRF were to have to cease operations due
to safety easements, we would see a massive exodus of the
naval forces throughout this state. We cannot afford to see
this happen.

Therefore we, the membership of the Navy League of
the United States and the American Legion, strongly urge the
approval of this safety easement without further delays or
obstructions. Thank you.

MR. MICHAELSON: Before you get started, if I
could ask the next speakers, Cheryl Saunders, Ben Manuel,
and Charlene Castor to come up, please. Go ahead.

DAVE SAUNDERS: Good evening, my name is Dave
Saunders. I'm a resident and taxpayer on the west side of
Kauai. I've come here tonight to talk about the land use
agreement between the U.S. Navy and the State of Hawaii.

I can see no reason why this agreement should not
be granted. The land surrounding PMRF and the Kauai test
facility will suffer no adverse effects from the launch at
the Kauai test facility.

For thirty years missiles of various types,
shapes, and sizes have been launched from PMRF and KTF. And
I ask you to look around the area surrounding PMRF and KTF,
and look at what you'll find. You'll find that that area
there has suffered no damage whatsoever or adverse effects
from these launches.

What you will find is that the U.S. Navy and
Sandia National Laboratories have been an outstanding and an
exemplary good neighbor to the community of Kauai.

The land use agreement is vital in keeping with
safety procedures. That has been a main concern of PMRF,
Sandia National Laboratories, and the Stars program.

Programs of this sort make major contributions to
Kauai's economy. Currently with the government cutbacks, we
need the Stars program here to avoid possible closure of
PMRF.

A recent article in the Garden Island pointed out
that there were about eight hundred Hawaiians employed at
PMRF. And if this program is canceled, what's going to
happen to these employees?

They also stated that if just the Stars program is
canceled, there's only going to be twelve people lose their
jobs. I'm one of those twelve. And believe me, that me and my fellow workers, we stand to lose a lot more than just our jobs.

You know, I stated once, if we lose our jobs, what do they have to offer us? You know, welfare, handouts from the State? Not for me, no, thank you. I want to earn -- I want to get my money the old-fashioned way, I want to earn it.

Our children. You know, take a look at the future. What do we have for our children if PMRF closes? Menial jobs, working somewhere? No, thank you, not for my kids. I want the best that they have to offer, and that's high tech jobs at PMRF, like the jobs at PMRF.

There is one thing that I would like to clear up here. The thing I want the opposition to know right from the source, me, I'm here tonight because I want to be, of my own free will. No one threatened me with my job if I didn't come out here tonight. I came because I wanted to. I would have walked here barefooted if I couldn't have driven.

The only people that are threatening my job tonight are the people that are against this land use agreement and the Stars program in general. Thank y'all.

MR. MICHAELSON: When I read the list of speakers, I skipped Tom Hughes. He will follow Cheryl Saunders.

CHERYL SAUNDERS: Aloha. My name is Cheryl Ann
Leaala Saunders. I am a native Hawaiian, and I'm here this evening to give my views as Captain Mullins has graciously asked us to do.

I have traced my genealogy back to my lineage, which is King David Kalaukaua, so I can honestly say that I am a kanaka maoli. I have been a resident of the west side for the past thirty-six years.

I'm happy to say that my first job was at PMRF. I am not employed at PMRF right now, but because of my first job at PMRF, it afforded me opportunities for better employment, which I have today. I am proud to say that I have worked, have worked for what I have today.

Now, the opportunities that PMRF brings to those who choose to live on Kauai, it affords us native Hawaiians as well as the native Kauaians competitive jobs for a better future.

The issue here tonight is the land use agreement. The concerns -- well, it should concern the users of the area, which is the majority of the people on the west side. I urge all of you to voice your opinion and your concerns.

My immediate concern is employment for all those that work at PMRF, and I say all those that work at PMRF. Our unemployment rate is so high, I just don't want to become another statistic.

A lot of people, you know, also here is the issue
of the Hawaiians, the land that surrounds PMRF. But I would
like to say, if you're concerned about being a native
Hawaiian and you're kanaka maoli, tonight I urge you, the
best way is to educate your children.

It's not about the land that is being used at
PMRF. It is not about Stars and missiles. If we want to be
competitive, then educate your children. Don't force other
people to become unemployed and join the ranks of the
unemployment, which here on Kauai we have a lot. And I hear
of it all day.

So I urge you, voice your concerns and your
opinions. Call Captain Mullins. He would be more than
happy to sit down and talk with you about your concerns. I
appreciate your time. Mahalo.

MR. MICHAELSON: Tom Hughes? The order is Tom
Hughes. Wait, no, go ahead, you're up there.

BEN MANUEL: Captain Mullins, ladies and
gentlemen, thank you for allowing me to speak. My name is
Ben Manuel. I live in Kekaha.

Past, I'm retired from the Army as a sergeant
first class, E-7. I was the department commander for the
Disabled American Veterans in 1990. Presently I am student
in a master's of social work to graduate in May of 1994.

Two years ago some of you here might have been
involved in the survey that the social work students had
performed. We were under the direction of Dr. Matsuoka,
School of Social Work, and Dr. MacGregor, Ethnic Study
Program.

The primary purpose of the study, which involved
an islandwide survey and focused group discussions, was to
provide a profile of residential opinions regarding a
multitude of environmental and sociocultural issues.

In the study the average age, or the median age, I
should say, is forty years old. This study was readily
selected, I should say scientifically, readily selected with
a plus five or minus five error. There were 240 responded.
129 were male, 140 were female. Eleven percent
unaccounted. In fact, they didn't even want to tell what
sex they were.

It would be interesting to note that the racial
involvement, Caucasian, white, or haoles, was forty-five
percent. Japanese, eighteen percent. Filipinos, twelve
percent. Hawaiians, nine percent. Others, seventeen
percent. Others meaning black, Samoans, Chinese, Korean.
When I added this up and got a hundred one percent, I got to
talk to my professor about this.

Anyway, as I go on. Birth place. Those that were
born in Hawaii, fifty-one percent. Those that were born
only in Kauai, thirty-six percent. From the mainland,
thirty-nine percent. Others, Philippine, Japan, I assume,
ten percent.

Again, I added this up and got eighty-five percent. So the other people, they don't want to tell where they came from. Afraid that they might send them back to China or Russia.

This is what you're waiting for. There was numerous questions, but this question in particular, this is why I am here tonight. The question reads: I favor Star Wars, in parentheses, rocket launching at Barking Sands.

Now hear this. Strongly agreed --

MR. MICHAELSON: Mr. Manuel, can you just give the results of this? Your three minutes is up.

BEN MANUEL: The result is for, thirty-three percent. Against, sixty-five percent. In summary, most respondent expressed opposition to proposed rocket launching at Barking Sands.

This, my fellow comrades, is just informational. I am right now in the middle. Thank you very much.

MR. MICHAELSON: Thank you, Mr. Manuel.

TOM HUGHES: He skipped me. I thought he was saving all the unused time for me, but he already used it now.

I actually am Tom Hughes. As he mentioned, he skipped me, but maybe I'll get a few extra minutes. I could use thirty minutes in order to cover this very important
topic of getting the PMRF rid of their enemies which they
have on the island.

I don't represent anybody, but I'm one of the
51,000 friends of Kauai. Not representing anyone
particularly, but I'm one of those.

Actually I have no relationship with PMRF, I might
admit that in the beginning, except for one thing. And
that's I have a strong empathy for the people who are
working at PMRF, and the fact that they have to interrupt
their work, be harassed by people. This is going on for
some years while I've been here. And actually nonproductive
protests, as people got pointed out here tonight. That
disturbs me, I'm harassed by that.

Though these people, who I call the miniscule
minority, can cause a lot of trouble, as you heard already.
I call them the harassment group, because they have several
names, and I can save time from my three minutes by just
using one term.

This harassment group is interested in basically
shutting down PMRF. They won't admit this, but that's their
purpose. They know very well that if they don't get through
this last stage.

They've lost everywhere. They've lost in the
courts, they've lost in the EIS, they've lost in Washington,
D.C. And they feel this is the last chance. They're
pushing themselves in the back door in order to see if they
can't defeat this particular easement.

I won't go into details on the easement, but let
me just mention what they have said in several press
releases I have read over the years.

They have said they're not opposed to the military
as long as the military are not shooting. And they say they
would like to get jobs for the people at PMRF if it closes.
That's presumptious. Presumptious in more ways than one.

But one particular point I would make. They would
not know a high tech job from a hole in the wall.

These are the people who, incidentally, went to
Washington, and they said they were not interested in
particularly shutting us down, but they did work for it.

They went to Washington when the budget was being
considered. The Congress was under pressure to cut back --
Can I get another minute after that?

They were on pressure to get cut back, and they
knew they could maybe insinuate this particular problem and
say the best way you can save money is get rid of this
PMRF.

These unelected and unelectable people were in
Washington trying to sell your island and trying to make you
a sacrificial gift of that to the budget cutting process.

That's what they were trying to do. They know darn well
that the budget was a very important issue. They thought if
they got it, they would cover this particular thing. They
couldn't do it in any other way before this. That's a foul
play job.

Now, I'll give you, I want to give you a joke
which I got -- you'll give me time for that? Okay, half a
minute. Which I got from the coconut wireless. This is
interesting, because when the three leaders of this group
went to Washington, D.C., there was a power outage. And
when the power went off, they were stranded on the escalator
for more than one hour. That's an escalator.

Okay, just one more joke I have here, because I
also picked it up on the wireless.

MR. MICHAELSON: Mr. Hughes, I'm sorry. I think
you're going to have to tell the joke later.

TOM HUGHES: Okay, while they were on the east
cost -- one more, half a minute. While they were on the
east coast, they stopped at the office of the commissioner of
baseball, because they wanted to change some of the baseball
rules. The ones they wanted to change were where you have
three strikes, you go to first base.

MR. MICHAELSON: Okay --

TOM HUGHES: Another one they said, when you have
a foul ball, that's a home run.

MR. MICHAELSON: After Charlene Castor, the next
four speakers will be Raymond Chuan, Arthur Trask, Chris, Roy Chris Smith, and Robert Inouye.

CHARLENE CASTOR: Good evening. My name is Charlene Castor. I'm a resident of Koloa, and I work at Pacific Missile Range Facility in the public works office, and have been at the missile range for sixteen years. I'm a native Hawaiian originally from Molokai, raised on Molokai, lived on California, and migrated to Kauai, the beautiful island in Hawaii.

My concerns and my feelings is that I do want the missile range, and I feel strongly in supporting this restrictive easement. Because all of the EIS that was done and addressed in that, the issues, the concerns such as the cultural, the conservation of the land, the archaeological, the health, the safety, all of these, I feel, is not going to impact the area that we're concerned.

My Kauai family that I live with have a lot of concerns about this. And they feel that if we, PMRF, decide to close, then we won't have any job, and it will be a big impact on the community, as well as the whole island of Kauai and the whole state of Hawaii. Because without the military, we won't have a job here.

And as previous speakers have said, the military is a big impact to our people here. Not only to us native Hawaiians, but I really want to speak strongly for, being a
native Hawaiian of Hawaii, that we really need the support from our military members.

And I've been in the military, well, civilian positions for at least twenty-seven years. And I can say, being here on Kauai, because I had eleven years up in the mainland, it has brought me a lot of opportunities, and I've traveled all over the United States. And without the military giving me this kind of a job, I think that I would not even be here, and I would be one of those unemployed citizens.

So again, I want to express the support from all our people, not only here on Kauai, but throughout the state, to please support our EIS and give us the opportunity. Mahalo.

RAYMOND CHUAN: My name is Raymond Chuan. I'm well aware of the fact that I'm not exactly speaking to the choir today. However, what I would like to do is to clarify certain issues.

This particular EIS, unlike previous ones, is not, it is not a referendum on PMRF. It is on the question of the easement, whether an easement should be executed between the State and the United States government.

I say it's not a referendum on PMRF because I myself am actually not unfamiliar with the work you do. I would venture that I probably have more years of experience
in aerospace and defense work than any of you in this
audience. In fact, I launched my first payload here at
Barking Sands before many of you were out of grade school.

Therefore, I again say this has nothing to do with
PMRF. This has to do with the legal aspects of the
execution of an easement, the result of which will be the
denial of free access to a state park as required by
Hawaii's own law.

Even though there is a provision that the DLNR
could close a park when necessary for the safety and welfare
of persons and property, that is true. But this refers to
catastrophic, unpredictable, unforeseen circumstances under
which the DLNR has the authority to close a park for the
safety and welfare of persons and property.

That, however, is not the case here. Because the
very act of granting the easement creates the very hazard,
which the DLNR will then be constrained by law to close the
park.

One might draw the analogy that you have a fire
department that wants to tear down the house. But the
reason for tearing down that house is that they first set
fire to it. They said, well, it's burning, therefore we had
to tear it down.

And the question of access is very important.

Even only there are actually a maximum of thirty launches
per year, maximum of three hours per launch, but that is not
the real issue. The issue is for most people, not you folks
that live near here, coming to Polihale is something you
plan ahead of time.

And for out of state visitors especially, you have
to get a camping permit, you have to plan on transportation,
and so on. Therefore you cannot plan ahead. Not knowing
when the launch is to be, it essentially prevents you from
making plans to come to Polihale State Park.

And especially when these launches are essentially
unscheduled. A thirty day window is really not sufficient
for people to do planning, so in effect the indefinite
nature prevents public access.

And that, I believe, is one of the legal issues
that needs to be resolved before this easement can be
executed. Thank you for your courtesy.

MR. MICHAELSON: Arthur Trask. The next speaker
is Arthur Trask. Maybe he's no longer here. Where is he?

Yes? Please.

ARTHUR TRASK: Mr. Moderator, Captain Mullins, Mr.
Lee, ladies and gentlemen of Kauai. My name is Arthur
Kaukaou Trask. I go back at least fifteen generations of
Hawaii. I think I know about every line of Hawaiian
history.

I was a member of the Supreme Court of the United
States of America, the Supreme Court of the District of Columbia. Georgetown graduate in '36. I was in Washington as a secretary of the delegate McCandless, who took me to Hyde Park where McCandless got from Roosevelt that he would return to Hawaii within a year to help the Hawaiians get their land and papakolea. The Hawaiians were not given any land, and not given any land today.

You folks talk about sacrifice. What do you know about sacrifice? What do you know about sacrifice? You haven't given up anything. You gave up nothing. You came to Hawaii as slaves, indentured servants, contract labor. It's truth. Face it.

I am annoyed deeply to hear such, such the Hawaiians going to benefit, the Hawaiians going to benefit. When are you folks going to talk straight?

The question, is this of world importance, of national importance. Not merely of Kauai that I love as much as you. What is the world condition today?

Dr. Chuan is no fool. California Tech, just returned three weeks in Russia. Kamchatka, ports in the Pacific, Russia. What does he say?

The Russian people. The Russian people, not the native people, of Kamchatka. What do they say? They laughed. They think it's hilarious to talk about the Russian situation, to talk about starting and to talk about
ending of the monuments of glory of the Russian Soviets.

The Cold War, ladies and gentlemen, is over. It
is the people's war. And I ask you to stand up for it.

MR. MICHAELSON: Mr. Trask, if you can --

ARTHUR TRASK: Thank you. I ask you to stand up
as the people. It's a severe question. It's a severe
question, but don't be sassy about it. Think about it, and
think of the Hawaiians who have given you folks all you
have.

MR. MICHAELSON: Thank you, Mr. Trask.

ARTHUR TRASK: Thank you, thank you.

ROY CHRIS SMITH: I'm Roy Chris Smith. And as the
previous speaker said, it's hard for me to speak for
Hawaiians, so I have to speak for myself.

I've been in Hawaii for thirty years now. I've
lived on the big island, Kohala, on the big island. I lived
on Maui, Kula in Maui. I've lived on Oahu in Waipahu, and
now I live here in Kauai. I live in Lihue, but I work here
at Barking Sands.

I'm speaking for the easement, specifically for
several reasons. One is I wouldn't do it if it was just
jobs, because there are jobs that are not good jobs, and so
we don't want to prostitute ourselves just for money. The
jobs at PMRF are high tech jobs, they're well-paying jobs,
they're professional jobs, and they're very trained jobs in
other areas other than just the professions.

I'm in the National Guard, and we have seventy
people on Barking Sands. Each one of those individuals get
an annual training in environmental protection things. And
I would suspect that they have more training each year than
any one of the protestors, or any one of the people that are
against the easement. So they do more protecting of the
environment in Hawaii than any of the people that are
protesting against it.

Also, although not being a mathematician, I would
suspect that there's less pollutants or even probability of
pollutants at PMRF than there are from the air conditioners
of the protestors that come out to the base, or that bring
bacteria and viruses from various places, and as they try to
get on to the base and protest those things.

So I think the probability of environmental impact
is very, very minute mathematically. Of course, we don't
want to deal with mathematics when we're dealing with
emotion, because that might cloud the issue.

But I think we need to get away from clouding the
issue, and look into the probability of anything going
wrong. And that is exactly why the Navy wants this
easement. Because if there is anything that goes wrong,
they do not want to hurt those people that want to have
hundred percent access to a beach. They really are looking
out for their good.

Some people don't want other people looking out for their good. That's unfortunate. But that's what this issue is about, is the Navy wants to be a hundred percent correct in everything that they do.

They have the administration backing for the projects that are going out at Barking Sands. They have the training for environmental protection. They have the training on individuals on the base for good neighbors. In the last disaster they were able to take care of people because they had that training.

Having lived on several islands, I can say that the Navy takes better care of the environment than many of the people that were born and raised in Hawaii, and many people that say they are native Hawaiians. Those people that are on PMRF, because of their training, their education and so on, are able to take care of the environment better.

And so I am definitely for the proposal this evening. Thank you.

ROBERT INOYUE: My name is Robert Inouye. I'm an employee of PMRF, and also a resident of Kauai. I am a former resident of Kekaha. And PMRF has always been a good neighbor to Kekaha Sugar Company.

I've read the draft restrictive easement, and I concur that the proposed action will have no significant
impact on the environment within the restrictive easement
because of the infrequent exercise of this easement of up to
thirty times per year, and then that's maximum. And it's
highly unlikely that it's going to be exercised thirty times
a year.

There may be some inconvenience caused by the
restrictive easement. For example, whenever they have
launch related activities, the road trafficking through
Polihale Beach Park would be closed approximately thirty
minutes prior to, during, and immediately after the launch.
So it might be a slight inconvenience, but it's not a
permanent thing.

And there are no camp sites or picnicking areas
within that north end or the south end of Polihale Beach
Park where the restrictive easement would cover.

As far as socioeconomics, this particular action
will not impact the intended use of the land surrounding
PMRF for agriculture or for conservation, as Polihale Beach
Park is used for.

As far as hazardous materials and waste, there are
no hazardous wastes to be introduced within the restrictive
easement. Therefore there should be no significant
impacts.

As far as noise, there is a temporary elevation of
noise due to the launch and also for the related launch
activities, the helicopters and equipment traveling in the
area. But this is only temporary, so the impact would be
insignificant.

As far as cultural resources the area of concern,
Nohili dunes, would not be impacted. In fact, there's a lot
of the areas outside of the south of the dunes that have
more significant cultural and archaeological significance
than Nohili dunes, because we've never found any remains in
the dunes area.

In closing, I'd like to support the restrictive
easement, because it is important for PMRF to carry out
their mission.

MR. MICHAELSON: The reason I haven't called any
names forward is we're approximately an hour and a half into
a meeting, which is a good time to take a break for the
court reporter. So we will take a recess for ten minutes
and then come back. We have approximately eight more
speakers signed up to speak at this time. Thank you.

(Recess taken)

MR. MICHAELSON: The next speakers that we have
now on our list to speak tonight are Bob Rask, Karen Taketa,
Ray Blouin, Owen Moe, and Reverend Ilse Peetz. Can I ask --
thank you, everyone. Ask Mr. Bob Rask to come?

If you'll state your name at the beginning of your
comments. And for those of you who may not have been here
when I gave my original administrative remarks, there's a
three minute time limit on speaking.

And in order to make it easy for you to figure out
when that three minutes is going to be up, I have a couple
of simple hand signals. When there's one minute left of
your three minutes, I will put up my index finger thusly.
And when your three minutes are up and it's time for you to
end your comments, I will put my closed hand up like this.

With that, Bob Rask?

BOB RASK: Good evening. My name is Robert Rask.
I'm here on this evening to, providing testimony on behalf
of the Kauai Business Council, an organization of seven
business groups with a collective membership of over fifteen
hundred businesses and individuals interested and concerned
about the business on Kauai.

We are an eight year old, Kauai based business
coalition made up the Contractors Association of Hawaii, the
Hawaii Hotel Association, the Kauai Chapter, the Kapaa
Business Association, the Kauai Board of Realtors, the Kauai
Chamber of Commerce, the Kauai Economic Development Board,
and the Kukui Grove Merchants Association.

The reason I mention them all is because
collectively there's over fifteen hundred businesses here
that are represented by this council.

We have a deep concern and a deep interest in the
continuation of PMRF, because if we're going to maintain the
people we have employed with us, maintain their homes,
maintain their life-style, maintain the cost of living, and
maintain a decent life for them, we have to have energy and
new people and new business.

And PMRF is like new business. It brings in a new
load every year, providing the government doesn't shut us
down.

But we've been a vocal minority for a long, long
time. And it appears to me that it's time the business
people of this community and this island speak out and let
them know where their bread is buttered at, and what happens
in regard to building this cost of living.

We didn't have places like PMRF in my own case.
We couldn't buy the expensive machinery it takes to do some
of this specialized work. And as a result, we're able to do
other work for the County of Kauai and the State of Hawaii
at a very competitive price, and keep our people employed
here on the island of Kauai instead of bringing in the
people from Honolulu to do the work. And that's what the
Kauai Business Association is all about.

So I would like to say that the support we request
for the military in the Pacific Missile Range Facility for
restrictive easement in the area bounded by sugarcane fields
in Polihale. We feel this easement is necessary and
important for the future of the facility and the hundreds of
people it employs.

We understand that there has been a gentlemen's
agreement on the use of this area for an easement between
the military, the State, the Kekaha Sugar Company for the
past thirty years. We believe the formal arrangement being
requested is fair, proper, and the correct mechanism to
use.

We strongly urge this body to approve this request
as soon as possible so that the work being done by Captain
Mullins, his staff, contractors, and subcontractors can
continue for the good of our national security, and for the
economy and the security of the people of Kauai.

I thank you very much.

MR. MICHAELSON: Karen Taketa.

KAREN TAKETA: My name is Karen Taketa. I've been
asked to present this testimony on behalf of the Chamber of
Commerce of Kauai, Military Affairs Council.

I currently serve as vice chair of the State
Chambers Committee, of associate chambers, and affiliate
business organizations.

The Chamber's Military Affairs Council favors
State's approval of an easement next to Pacific Missile
Range Facility for use during missile launches on the
range. Approval of the safety arc is vital to PMRF's
survival as both a ground base launch site, and more importantly, as a maritime range for training Navy ships.

Without the easement, the entire Naval establishment's continued presence in the state would be at risk, resulting in huge job loss on both Kauai and Oahu.

The military will pay market rent for the lease land with portions of the money going to native Hawaiians.

The easement will be used no more than thirty times annually, probably less than fifteen times. For beachgoers, it closes the access road for only thirty minutes, and affects no camping and picnic areas at Polihale State Park. It does not include any Hawaiian homelands.

The launches are a low level research aspect of our national leader's efforts to protect the American people by developing a way to shoot down hostile missiles. The Israelis were saved by similar technology when Saddam Hussein fired SCUD missiles at them. Such threats are of major concern because arms sales to third world nations are on the rise.

As proven a year ago during Hurricane Iniki, the Pacific Missile Range Facility has shown to be a caring neighbor that greatly enriches both the economy and social fabric of Kauai.

We respectfully support the State's approval of the easement, and thank you for the opportunity to comment.
MR. MICHAELSON: Ray Blouin?

RAY BLOUN: Good evening, neighbors. I'm here tonight on behalf of the Kauai chapter of the Hawaii Hotel Association.

MR. MICHAELSON: If you would state your name, please.

RAY BLOUN: My name is Ray Blouin. And I just wanted to share with you some of the discussion from our earlier board of director meeting this morning that took place up in Wailua.

We discussed the KEDB, the Kauai Economic Development Board, letter of support to Senator Inouye a few weeks ago regarding the Pacific Missile Range Facility. And we reviewed the Chamber of Commerce letter that we had seen also in support of PMRF that was also sent to our senator.

And then we were proud to finally read our Kauai Hotel Kauai Chapter letter that our chairperson, David Shackleton, had completed. And then next to myself, a fellow director stated that yesterday the Kapaa Business Association had approved the letter to be written also to the senator in support of PMRF.

And I was happy to say that, because being a director from the west side of Kauai, I was happy to say that it appears that there's a tremendous crusade of support for PMRF that should continue. And that it is obvious that
PMRF needs the ability to clear the proposed easement area for all of our safety.

With strong, consistent, and positive support and commitment between the State, PMRF, and the neighborhood, PMRF stands strong and will continue to expand their operations. Let's continue to support them in their request for our safety and expanding this easement. Thank you very much.

MR. MICHAELSON: Owen Moe.

OWEN MOE: My name is Owen Moe. I'm president of the West Kauai Business and Professional Association. Tonight we wanted to offer our support for the easement and for its continued operations here on west Kauai for the economic benefit, that it provides the jobs, and all the work that it's doing. Thank you.

MR. MICHAELSON: After our next speaker, Reverend Ilse Peetz, the people I have signed up are Richard Magyar, Aletha Kaohi, Mike Faye, and Stewart Burley.

Reverend Ilse Peetz, please.

ILSE PEETZ: Good evening. My name is Ilse Peetz, and I'm the pastor of Kekaha and Kaumakani Methodist Churches, but tonight I speak just for myself.

For one thing, I am rather troubled by what I hear tonight, that many of you are using the defense industry as a public works industry. "We need the jobs." It's almost
as though you're saying to the government, build some more
weapons systems so that we have jobs.

I think there are other ways to go about jobs and
to keep FMRF. And some of the things they're already doing,
like with the environment. There could be conversion, there
could be jobs that are life enhancing, for instance, that
use your intellect. For instance, do some research and
development on technologies that would break down the
radioactive molecules of our radioactive waste.

But actually I came to talk about the easement.
And I'm puzzled in one way that benign rockets need an
easement to start with. But I do understand mistakes can
happen, and so you want the easement.

But then I would respectfully suggest to not use
the proposed action, but the revised memorandum of
agreement. Because the proposed action gives the total
jurisdiction of this land for those certain hours to the
United States government. And the revised memorandum of
agreement leaves the jurisdiction in Hawaii state, and maybe
even on Kauai. And I feel that is much closer to the
people.

The people ought -- I mean, the government ought
to ask the people of Kauai, may we launch another rocket,
instead of Kauai people having to ask the U.S. government,
may I build a house in this area.
And therefore I would like to recommend that you
would choose the revised memorandum of agreement. Thank
you.

MR. MICHAELSON: Richard Magyar.

RICHARD MAGYAR: Hi, my name is Richard Magyar,
and I'm a homeowner and live in Kekaha.

I can see that a lot of people don't go to
Polihale very often, because you're complaining about
fifteen hours' worth of the road being blocked in a whole
year's time.

Well, if you're a surfer like I am that goes, I go
down there and surf, I also run down there in the evenings,
I ride my mountain bike down there all the time, I ride my
bike out to Mana most every night. You'll notice that
probably three weeks out of the year it's closed because the
rain floods it. So people are not allowed to go in there
unless you've got a four-wheel drive. Believe me, I've
pulled a lot of tourists out of there over the years.

So a fifteen hour time span to close that down for
safety is definitely not going to hurt anybody or anything
in the area for a half an hour.

During the first launch, if you didn't know, there
were people surfing in Polihale, and there were people on
the beach camping and picnicking the whole time, and never
even noticed that there was a launch.
I am definitely for the restrictive easement.

Thank you.

MR. MICHAELSON: Aletha Kaohi.

ALETHA KAOHI: Aloha ahiahi. I'm Aletha Kaohi.

Maybe I'll just state my entire name. Aletha Kawakowahinekololieolimaola Goodwin Kaohi.

Did you hear Limaola? That's a place on the plains of Mana. I'm named after the myth of a woman that rides the white horse at night. And my great-grandmother happened to be there at the time, conceived a child by the powers of her gods, the gods of my kapunas.

I have just completed a survey and a research along with Kalani Flores of the entire area of Mana. We have been asked to do just Nohili. That was very difficult.

Nohili cannot stand alone. Nohili is the highest point or the highest sand dune that you see as you drive from Kekaha to Mana. To the ancient Hawaiians, that was a long distance away. People lived in that area. The Kilauano family lived in that area. Their kapunas are buried in the sand dunes in that area.

Throughout our research, never did it ever refer that there was any bones that we could find out that was in Nohili. For one reason that I say this. My grandparents and my parents would not have allowed me to run up and down
the Barking Sands if there were iwi or there were bones in
those sands. This is a very sacred place when there is
bones.

Tonight we're here because we're talking about the
easement. I wish that there were more people here that are
against it so we can hear their voices. I support PMRF and
the easement.

In one of your statements you say here that it's
only fifteen hours for recreation. I hope that place can be
kept as serene, open area so that the people here on Kauai
can come and enjoy a place. So when you stand at the end of
Polihale, you can see the ehukai on the seashores and over
the water as the sun sets.

I also understand that this restriction may
prevent resort development. Nothing should be built in that
area. It should be left open.

How do we feel as west siders about the PMRF and
the military being there? That's our back yard.

It has been very interesting for me to find that
there are very few, and I can't even count them, very few
native Hawaiians, kanaka maolis, as they want to be referred
to, that are from the west end of Kauai that have been
against the launching of the missiles there. It has been
people outside. East side, non-Hawaiians, not even
residents of these islands.
I think they forget the life-style of the Hawaiians. What is in your back yard, that is your place of home. That's where you take care. You have no business going into somebody else's back yard and tell them what to do.

So I get upset when I see non-Hawaiians, nonresidents of this area protesting. Why are they not here tonight? I wish they were here.

MR. MICHAELSON: Ms. Kaohi. If you can finish up, it's been three minutes.

ALETHA KAHOI: I hope that PMRF or the Navy will continue to be in that area, because they have protected the historic sites that are there. Nohili would not be there if the military was not there. Limestones were taken away, sand was hauled away over the years as I grew up. Mahalo.

MR. MICHAELSON: Mike, I don't know if it's Faye or Faye.

MIKE FAYE: Faye, thank you.

As most of you here know, I was born and raised in this community, and my family has been involved in the community for many years. I was one of the fortunate ones who was able to make a choice young in my life where I was going to live. I chose to come back to Kauai, because of the opportunities that were going to be there. And many of those opportunities are because of the Pacific Missile Range
and for the activities that have occurred there.

I also represent -- that's sort of my personal
view. I also represent Kikiaola Land Company. We are the
closest, largest, private landowner nearest to the base --
probably not grammatically correct. So if anything, if
there's any detrimental effect, we would probably have the
largest detrimental effect of any one group.

I want to say that Kikiaola Land Company is in
support of the findings of the EIS, and support the
easement.

The base, as Aletha mentioned, is our back yard.
The area's our back yard. I think sometimes we forget, too,
that the base has its own history and involvement, and has
caused us, this community, to have developed the way it
has.

My uncle helped launch Kingston Smith or something
like that, one of those guys who were flying the Southern
Cross to open up the air travel to the southern hemisphere
in 1926, took off from the dunes out there. We have lived
with it through World War II, through the slower years of
the fifties, and then kind of the boom years of recent
time.

The base provides us with many opportunities, and
sometimes restrictions. But it is our life-style, it is
part of our life-style.
I personally, and Kikiaola Land Company, I can assure you, are committed to supporting the life-style of this life-style, and will do everything in our power to see it continue.

So again, we support the easement, and thank you very much.

STEWART BURLEY: Howdy. I'm Johnny Cash.

I've always wanted to do that. When Johnny Cash played Folsom Prison, he got up and the whole house went wild because he said he was Johnny Cash. I just wanted to try that.

I'm Stew Burley, and I work at Barking Sands, but I'll give you a little bit of my background. I arrived here on 4 January, 1957. And even though I look haole, I dated a Filipino for a number of years, a Japanese girl in Honolulu. I've dated a Chinese girl from Hanapepe Heights, a Portuguese girl from Kalaheo — of course, where else from.

But I ended up marrying a sweetheart, a Hawaiian, in fact a two hundred percent Hawaiian. Because when we applied for Hawaiian Homes — and here I've lived on Hawaiian Homes, and I don't look Hawaiian to anybody. She had a father one hundred percent, a mother one hundred percent. And because she did not do well in math, she put down on the application two hundred percent. So we lived on
Hawaiian Homes for a number of years.

I did learn while living with her, occasionally, because I do travel a lot, but I have learned over the years that her grandparents are buried at Queens Pond. And I've asked her, does it bother you that there's a launch going on, or if that's inside of a hazard area? And her answer has always been no.

She's checked with her aunties and uncles. And you know Hawaiians, they can go on forever and forever. And they've all said no, it does not bother them at all.

So I have to support my wife, especially because she's here tonight, and I have to make sure I say the right thing.

But I do support the easement. I do support the easement.

Give you a little background. A few months ago, you probably read in the newspaper or you saw on TV, if you watch CNN or Headline News, that a submarine in the Middle East launched multiple Tomahawk missiles. Front page headlines around the world.

When we heard that, and we were one of the first to hear it at Barking Sands, we knew who it was, and we applauded secretly in our own office spaces because that submarine received all of his training, all of his training at Barking Sands at PMRF.
Would he have gone over to launch those Tomahawks for the United States government, for the United States of America, for the United Nations, if he had not received that training? Good question.

After Desert Storm we received calls, applauds, pats on the back that everyone that went across the Pacific did all of their training at Barking Sands. Would we still be there? Are you happy we're out? I am. And could they have done the job they did without the training that they received at Barking Sands?

Without this easement, the Stars program will probably go away, and slowly programs that are coming on line will go away, and we'll go away.

I support the easement. Thank you very much.

MR. MICHAELSON: Nelson Mukai.

NELSON MUKAI: Hi. I don't even know what's an easement, so. But I'm supporting PMRF, because I think we got to protect the island. We got to protect the island from outsiders coming in. We got to use those missiles to protect the island.

And I think we got to support the mayor over there, Mayor Kusaka, okay? I'm going to help her out. I'm going to give her my hundred percent. And later on she's going to become president of the United States. I'm going to be the vice president. Then later I'm going to be the
president. Then I'm going to be the pope. Okay?

All right, guys. Let's hear it for Kauai. One, two, three, Kauai. One, two, three. Banzai, banzai.

All right. I'm for PMRF.

MR. MICHAELSON: That concludes the speakers that we have for this evening that have signed up to speak. I will offer Sam Lee the opportunity, if he would care to, to make any closing remarks. He's shaking his head no.

With that then, we will bring this meeting to a close, and we thank you very much for your participation tonight. Thank you.

(Hearing concluded at 8:05 p.m.)
CERTIFICATE

STATE OF HAWAII  )
          )
COUNTY OF KAUA'I  )

I, Kathy Pearson, CSR, a Notary Public in and for
the State of Hawaii, do hereby certify:

That on Thursday, the 9th of September, 1993,
commencing at 6:00 p.m., that the aforementioned proceedings
were taken by me in machine shorthand and thereafter reduced
to typewriting under my supervision; that the foregoing
represents, to the best of my ability, a true and correct
transcript of the proceedings had in the foregoing matter.

I further certify that I am not an attorney for
any of the parties hereto, nor in any way interested in the
outcome of the cause named in the caption.

DATED: September 13, 1993

Kathy Pearson, CSR No. 313
Notary Public, State of Hawaii

My commission expires:
July 12, 1994
Appendix E
Cultural Resources
<table>
<thead>
<tr>
<th>State of Hawaii Inventory Site #</th>
<th>Site Description</th>
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<tbody>
<tr>
<td>50 - 30 - 01 - 06</td>
<td>Kapaula heiau at Kolo</td>
</tr>
<tr>
<td>50 - 30 - 01 - 07</td>
<td>Dune burials and campsites between Pohihale and Barking Sands</td>
</tr>
<tr>
<td>50 - 30 - 01 - 08</td>
<td>Elekuna Heiau at Nohili</td>
</tr>
<tr>
<td>50 - 30 - 01 - 09</td>
<td>House sites near the northern portion of Barking Sands</td>
</tr>
<tr>
<td>50 - 30 - 01 - 724</td>
<td>Former plantation camp</td>
</tr>
<tr>
<td>50 - 30 - 01 - 1820</td>
<td>Basalt, coral, shell, and metal shrapnel scatter near Barking Sands</td>
</tr>
<tr>
<td>50 - 30 - 01 - 1821</td>
<td>Basalt scatter near Barking Sands</td>
</tr>
<tr>
<td>50 - 30 - 01 - 1829</td>
<td>Burial site/native beach encampment and habitation area</td>
</tr>
<tr>
<td>50 - 30 - 01 - 1830</td>
<td>Occupation area</td>
</tr>
<tr>
<td>50 - 30 - 01 - 1831</td>
<td>Dune burial (single individual)</td>
</tr>
<tr>
<td>50 - 30 - 01 - 1884</td>
<td>Shoreline occupation area</td>
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<tr>
<td>50 - 30 - 01 - 6017</td>
<td>Paving and associated wall</td>
</tr>
<tr>
<td>50 - 30 - 01 - 6018</td>
<td>Retaining wall abuts large natural boulders at either end</td>
</tr>
<tr>
<td>50 - 30 - 01 - 6019</td>
<td>Small rectangular ahu-platform, possible burial cairn</td>
</tr>
<tr>
<td>50 - 30 - 01 - 6020</td>
<td>Terraces</td>
</tr>
<tr>
<td>50 - 30 - 01 - 6021</td>
<td>Stone wall</td>
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<tr>
<td>50 - 30 - 01 - 6024</td>
<td>Historic irrigation channel</td>
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