Final Environmental Impact Statement

for the

Restrictive Easement Kauai, Hawaii

October 1993

U.S. Army Space and Strategic Defense Command
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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

ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	microgram(s) per cubic meter
ac	acre(s)
ALISH	Agricultural Lands of Importance to the State of Hawaii
ARPA	Archaeological Resources Protection Act
BMDO	Ballistic Missile Defense Organization
C	Celsius
CFR	Code of Federal Regulations
cm	centimeter(s)
dBA	A-weighted decibel level
DLNR	Department of Land and Natural Resources
DOD	Department of Defense
DOE	Department of Energy
EA	Environmental Assessment
EIS	Environmental Impact Statement
F	Fahrenheit
FNSI	Finding of No Significant Impact
ft	foot (feet)
FY	Fiscal Year
ha	hectare(s)
HRS	Hawaii Revised Statutes
in	inch(es)
km	kilometer(s)

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
OEQC	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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1.0 Program Overview

1.0 PROGRAM OVERVIEW

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 kiawe 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.

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, OEQC 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 USASSDC 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 OEQC 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 OEQC 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.

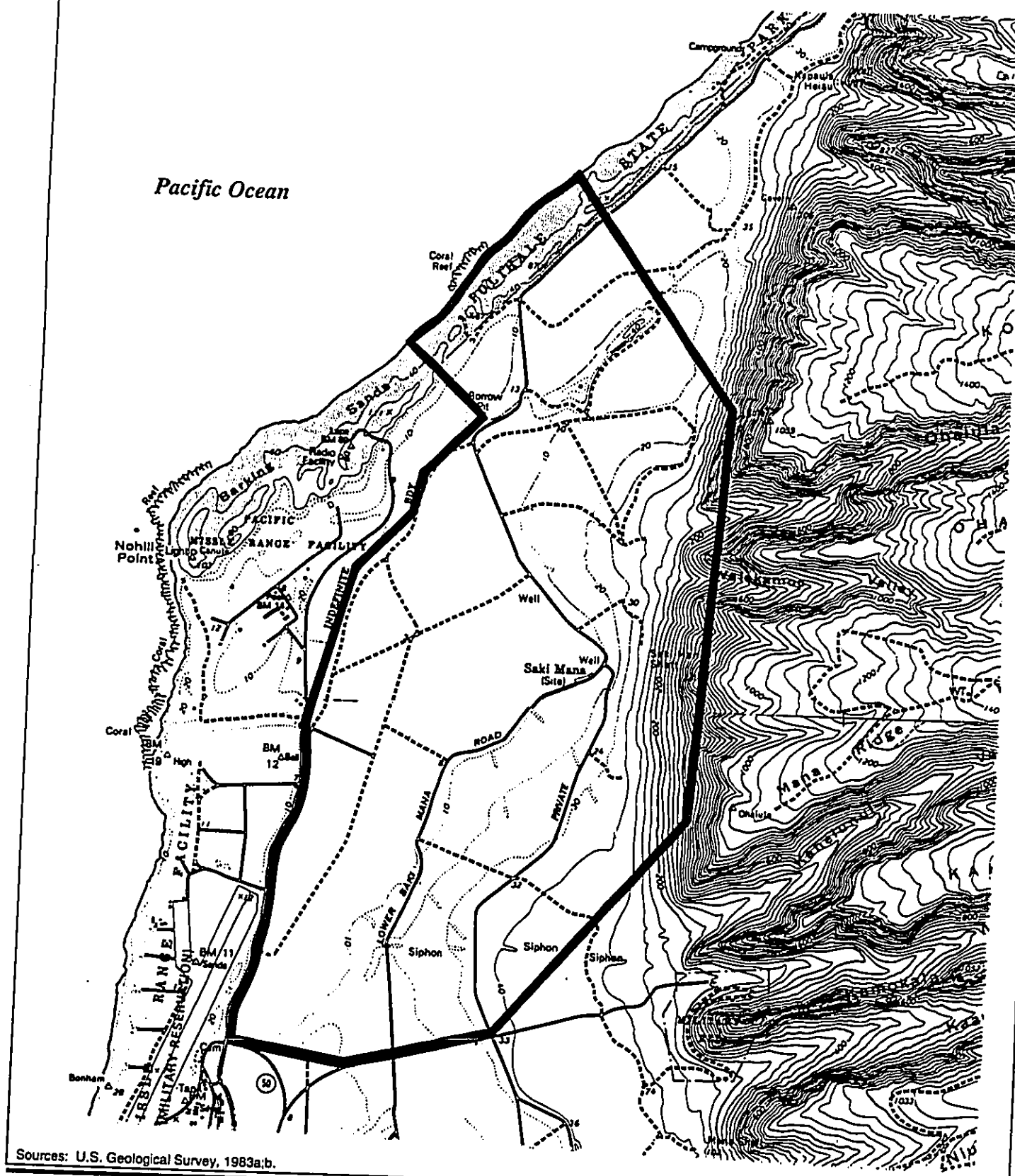
2.1 PROPOSED ACTION

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 (6,000-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.



Sources: U.S. Geological Survey, 1983a;b.

EXPLANATION

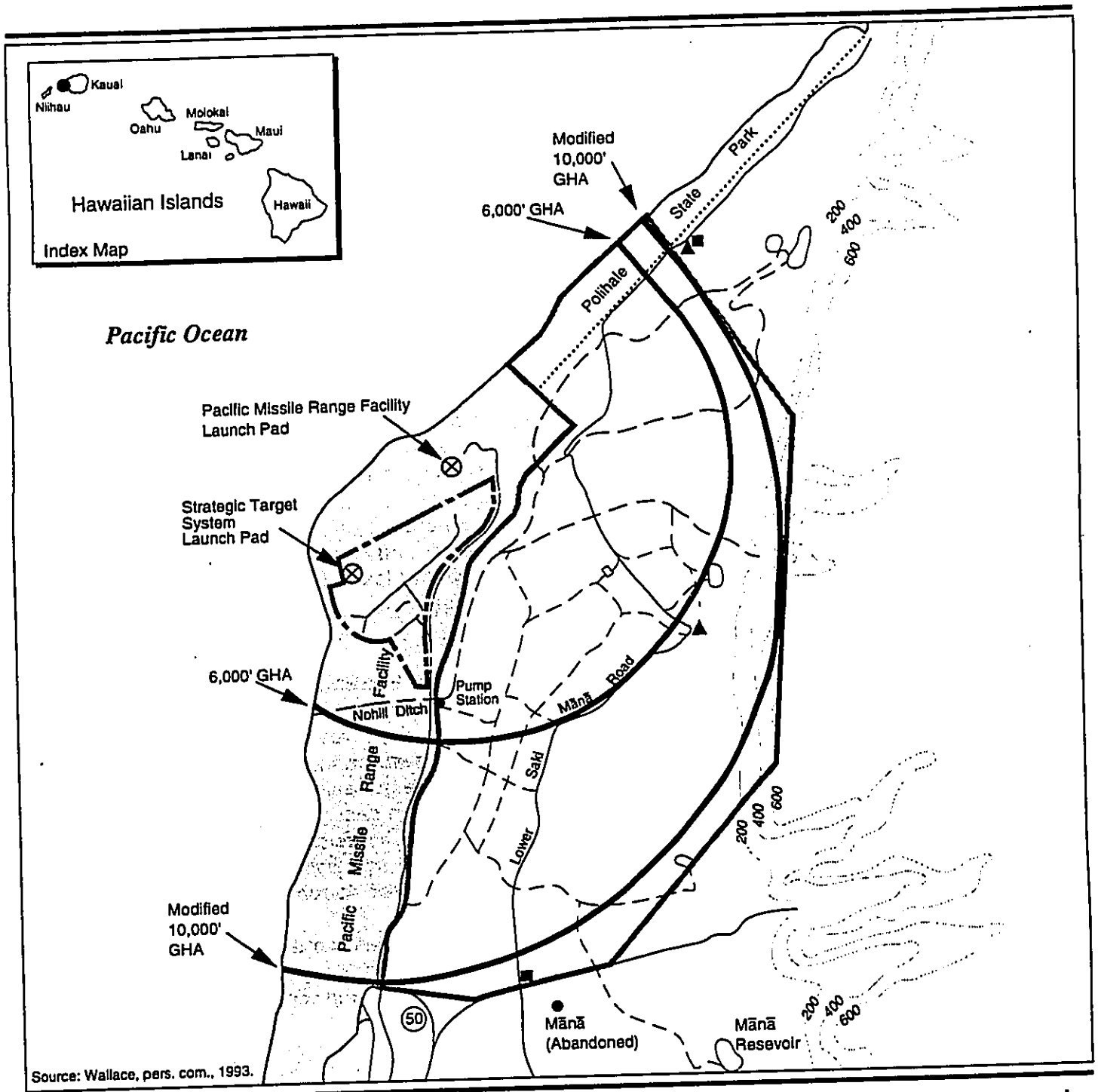
Restrictive Easement Boundary

0 375 750 Meters

0 1250 2500 Feet

Restrictive Easement Boundary

Figure 2-1



EXPLANATION

- Irrigation Drainage Ditch
- Approximate Ground Hazard Area Boundary
- Restrictive Easement Boundary
- Kauai Test Facility
- Polihale State Park Boundary
- GHA — Ground Hazard Area
- ■ Strategic Target System Control Points
- ▲ Vandal Control Points

0 500 1000 Meters

0 1500 3000 Feet

Restrictive Easement Boundary and Ground Hazard Area Boundaries

Figure 2-2

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.

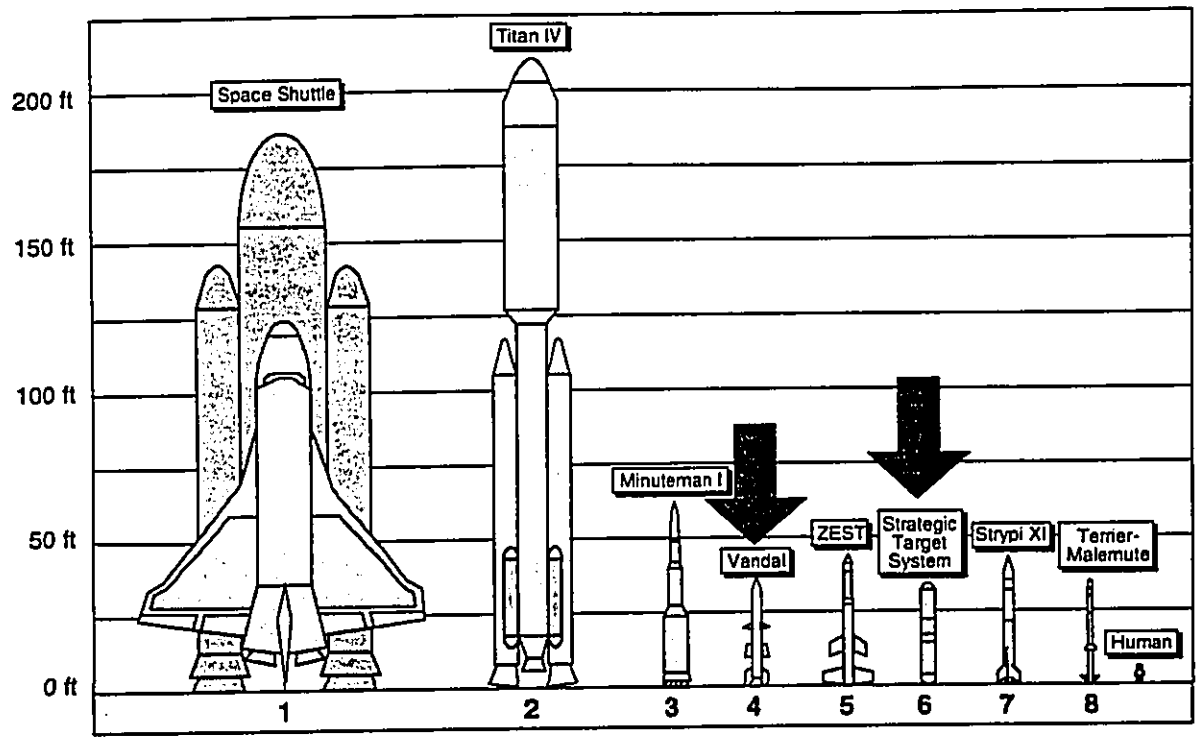
Vandal launches conducted by the PMRF to support naval fleet training and test and evaluation programs are launched from a rail system located at the northern section of the PMRF. The Vandal is approximately 10 to 11 m (32 to 36 ft) in length, depending on target requirements, compared to a length of 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



	1	2	3	4	5	6	7	8
Name	Space Shuttle	Titan IV	Minute-man I	Vandal	ZEST	Strategic Target System	Strypi XI	Terrier-Malemute
Height (ft)	184	204	60	36	44	34	43	35
Total weight (lbs)	4,432,667	2,102,800	69,481	8,234	15,301	36,577	14,500	3,605
Propellant weight (lbs)	2,667,000	1,246,500	59,028	2,803	10,104	30,541	10,555	2,345
Launch thrust (lbs)	6,525,000	4,800,000	220,000	128,700	128,700	75,000	110,310	76,000
Propellant type	Solid & liquid	Solid & liquid	Solid	Solid	Solid	Solid	Solid	Solid
Ground hazard area (ft)	15,000	8,000	6,500	6,000	2,200	10,000	2,000	1,200

Source: U.S. Army Strategic Defense Command, 1992c.

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

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.

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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, socioeconomics, 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, 1992b;c). 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.

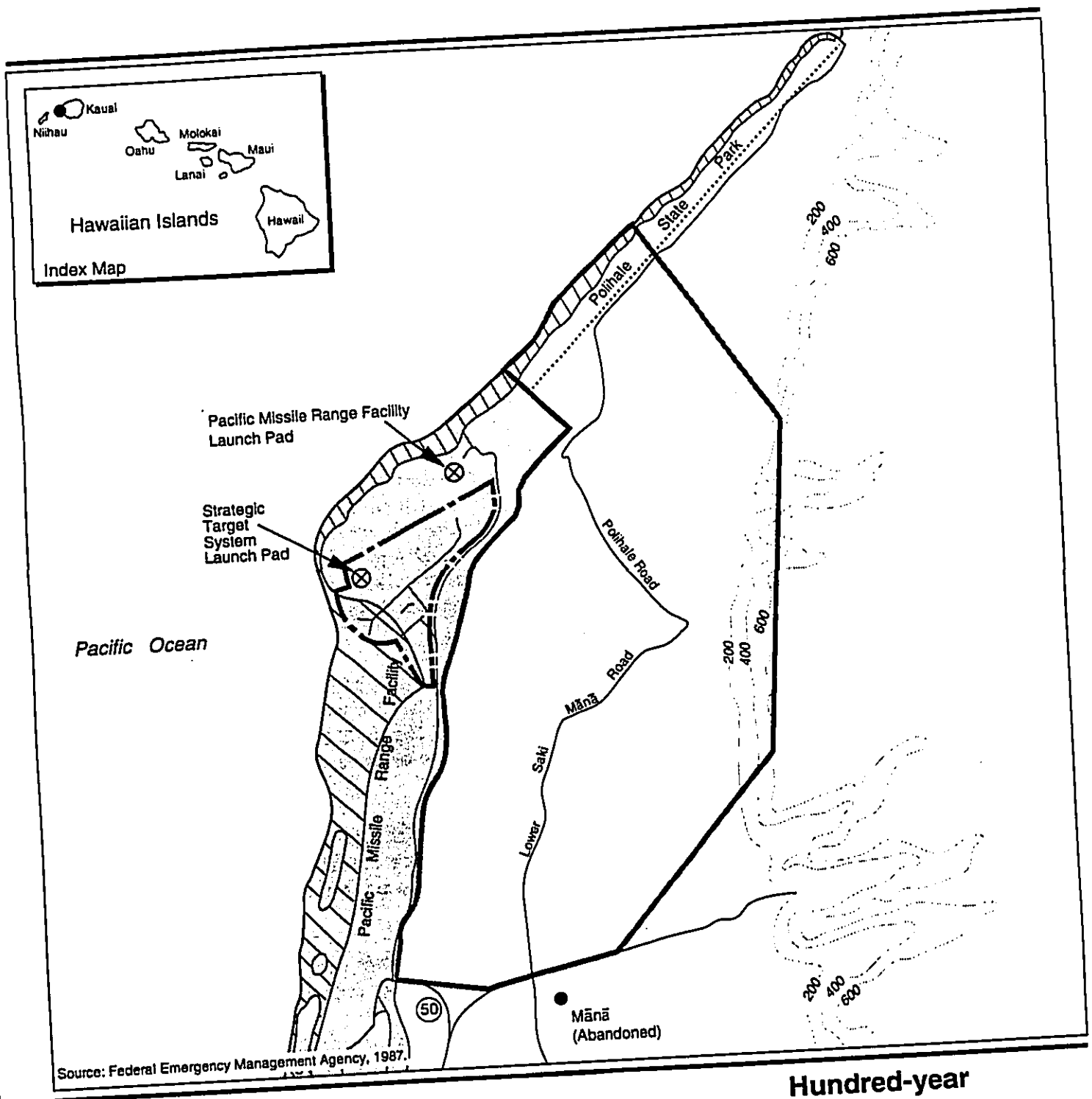
The Mānā Plain is made up of a wedge of terrestrial and marine sediments overlying volcanic basement rocks that consist of the Napali Formation of the Waimea volcanic series (Botanical Consultants, 1985). The basement rock crops out at the inland edge of the plain above an elevation of about 12 m (40 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 Polihale State Park.



Hundred-year Tsunami Flood Zone

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 Jaucas Series as described in the Strategic Target System Draft EIS (U.S. Army Strategic Defense Command, 1992b; U.S. Department of Agriculture, 1972).

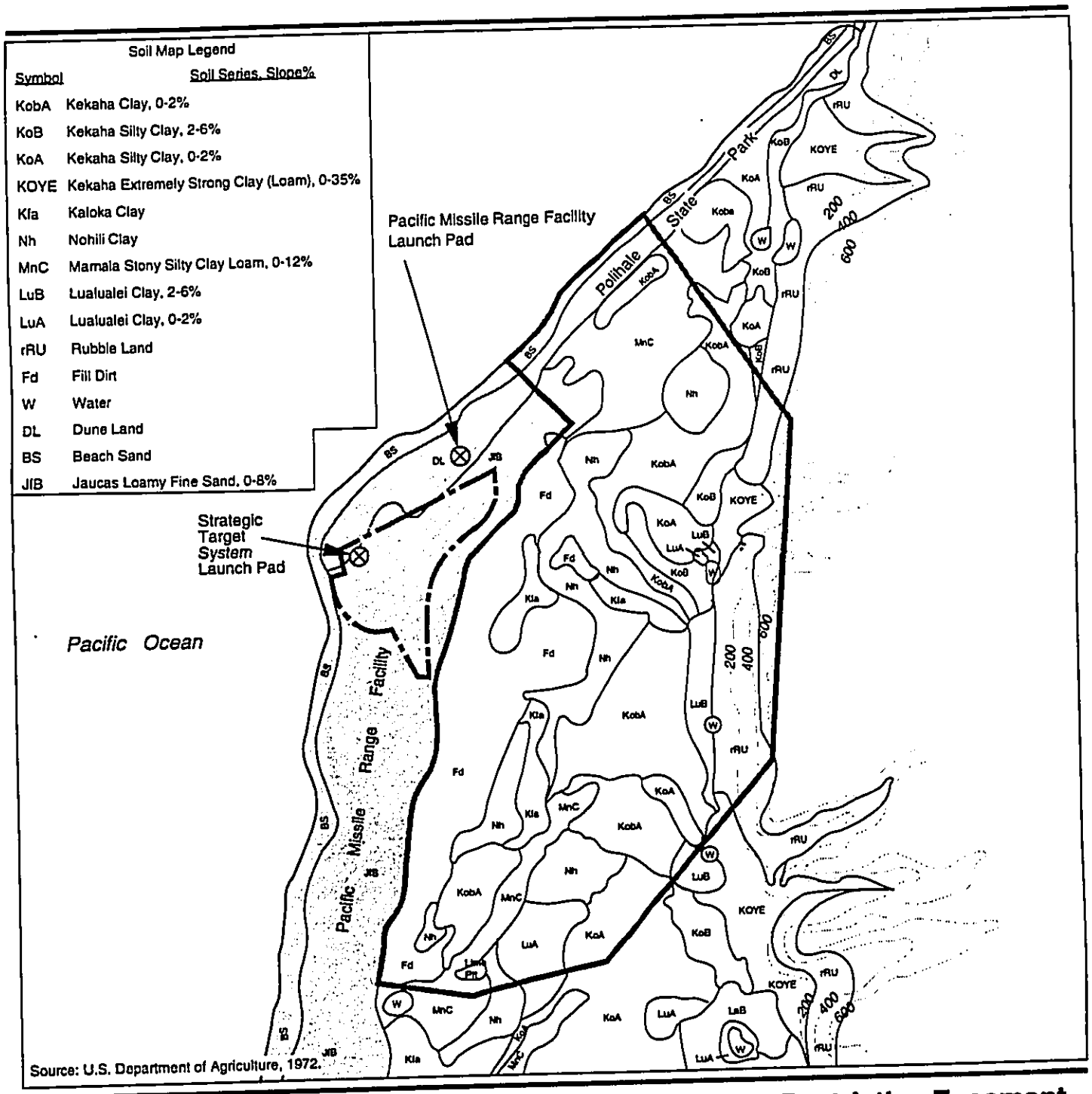
According to the Agricultural Lands of Importance to the State of Hawaii (ALISH) map for Kauai (Hawaii Department of Agriculture, 1977), the land within the restrictive easement is designated as Prime or Other Important Agricultural Land (figure 3-3). Lands within the PMRF are not designated as agricultural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



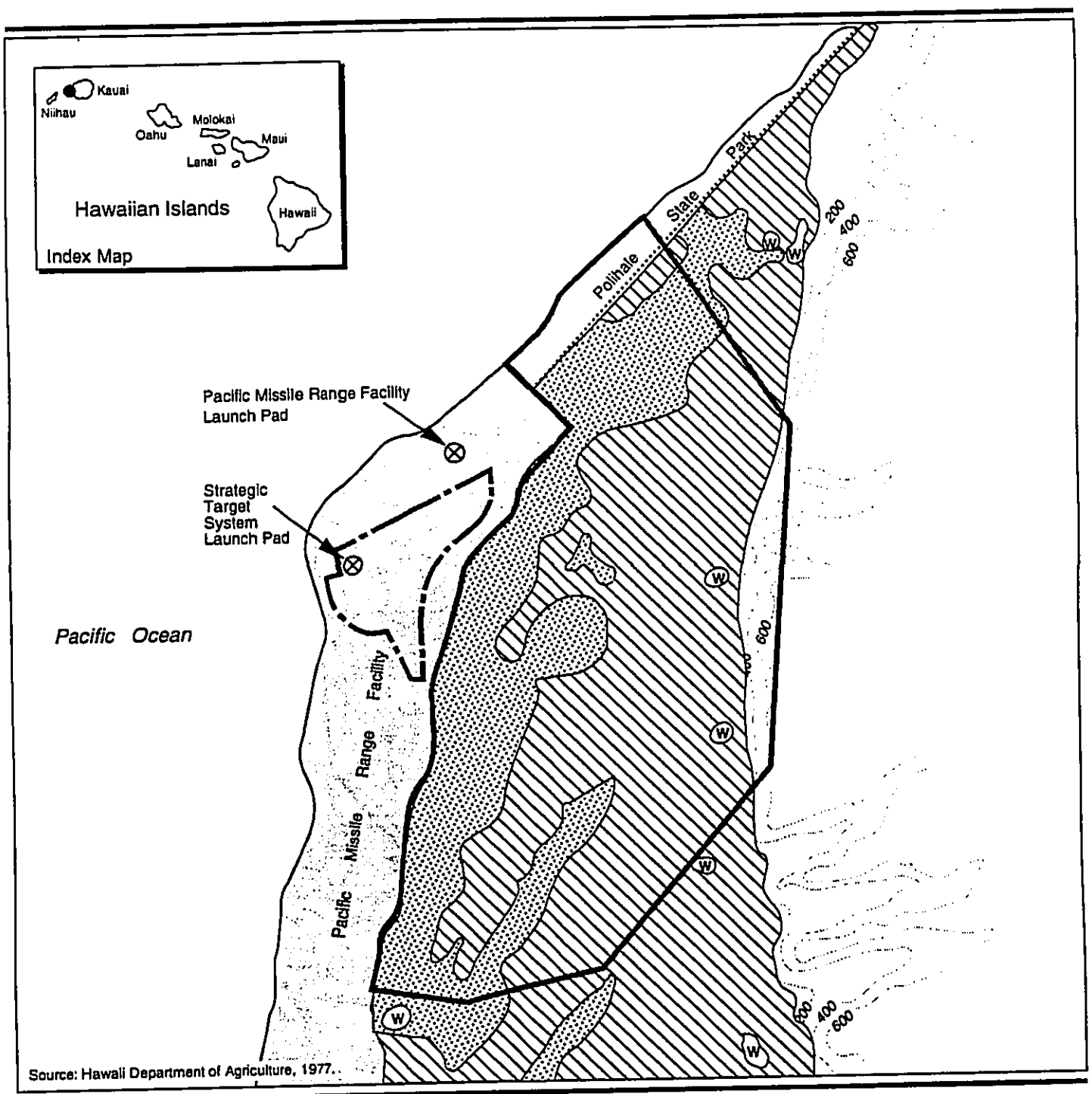
EXPLANATION

- Restrictive Easement Boundary
- Kauai Test Facility
- Pacific Missile Range Facility

0 500 1000 Meters
0 1500 3000 Feet

Restrictive Easement Soil Map

Figure 3-2



EXPLANATION

- Restrictive Easement Boundary
- Polihale State Park Boundary
- Water Ponds
- Prime Agricultural Land
- Other Important Agricultural Land
- Pacific Missile Range Facility

Agricultural Lands of Importance to the State of Hawaii within the Region of Influence

Figure 3-3

predominantly from coral and seashells (The Traverse Group, Inc., 1988). The surface typically consists of loose sand.

Elevated lead concentrations in soil samples taken from the KTF indicated a maximum concentration of 270 mg/kg (U.S. Department of Energy, 1992). The maximum lead concentration observed was not an "actionable level" requiring cleanup under existing laws and regulations (U.S. Army Strategic Defense Command, 1992b)

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

Pollutant	Averaging Time	National Ambient Air Quality Standard[a] ppm ($\mu g/m^3$)	Hawaii Ambient Air Quality Standard[b] ppm ($\mu g/m^3$)
Carbon Monoxide	1 hour	35 (40,000)	9 (10,000)
	8 hours	9 (10,000)	4.5 (5,000)
Ozone	1 hour	0.120 (235)	0.051 (100)
Nitrogen Dioxide	Annual	0.05 (100)	0.035 (70)
Sulfur Dioxide	3 hours	0.05 (1,300)	0.05 (1,300)
	24 hours	0.14 (365)	0.14 (365)
	Annual	0.03 (80)	0.03 (80)
PM-10	24 hours	150 $\mu g/m^3$	None
	Annual	50 $\mu g/m^3$	None
Total Particulate Matter	24 hours	None	150 $\mu g/m^3$
	Annual	None	60 $\mu g/m^3$
Lead	Quarterly	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$

ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter
[a]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.
[b]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.

pressure systems called Kona Storms develop at times during the winter but seldom cause extensive damage (U.S. Army Strategic Defense Command, 1992b; U.S. Department of Energy, 1991).

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:

- Aalii Lowland Dry Shrubland is dominated by the indigenous shrub species aalii (*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 norwegicus*), 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 niihausense)* 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

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

Source: U.S. Army Strategic Defense Command, 1992b; State of Hawaii, 1993.
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

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 schauinslandi*), 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 Waimea (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), Bordner (1977), Sinoto (1978), Kennedy/Jenks Engineers (1982), Yent (1982), McMahon (1988a;b), Douglas (1990), Gonzalez et al (1990), Walker and Rosendahl (1990), Welch (1990), Yent (1991), Flores and Kaohi (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 Polihale 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, Polihale 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 Polihale 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.

Common Outdoor Noise Levels	Noise Level (dBA)	Common Indoor Noise Levels
Unmuffled motorcycle	110	Rock Band
Jet Flyover at 1,000 ft		
	100	Inside Subway Train (New York)
Gas Lawnmower at 3 ft		
	90	Food Blender at 3 ft
Diesel Truck at 50 ft		Garbage Disposal at 3 ft
Noisy Urban Daytime		
	80	Shouting at 3 ft
Gas Lawnmower at 100 ft		Vacuum Cleaner at 10 ft
	70	Normal Speech at 3 ft
Commercial Area		
Heavy Traffic at 300 ft	60	
		Large Business Office
		Dishwasher Next Room
	50	
		Small Theater, Large Conference Room (Background)
Quiet Urban Nighttime	40	
Quiet Suburban Nighttime		Library
	30	Bedroom at Night
Quiet Rural Nighttime		Concert Hall (Background)
	20	Broadcast and Recording Studio
	10	
		Threshold of Hearing
	0	

Source: Acentech Inc., 1990.

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, Strypi, 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

Launch Vehicle	Distance m (ft)	Measured Average Peak (dB)
ZEST		
2 September 1991	305 (1,000)	122.5
	385 (1,263)	119.6
	221 (725)	124.8
	907 (2,975)	110.5
	427 (1,400)	119.5
11 September 1991	305 (1,000)	121.4
	385 (1,263)	118.2
	221 (725)	124.5
	907 (2,975)	109.0
	427 (1,400)	120.2

Launch Vehicle	Distance m (ft)	Measured Average Peak (dB)
Strategic Target System		
26 February 1993	175 (575)	125.3
	244 (800)	123.0
	269 (881)	121.8
	372 (1,222)	118.2
	483 (1,584)	115.3
	3,048 (10,000)	97.1
	10,668 (35,000)	54.0

solvents, fuels, oxidizers, and oils. There is no hazardous materials usage associated with activities at Polihale 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 Kekaka 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).

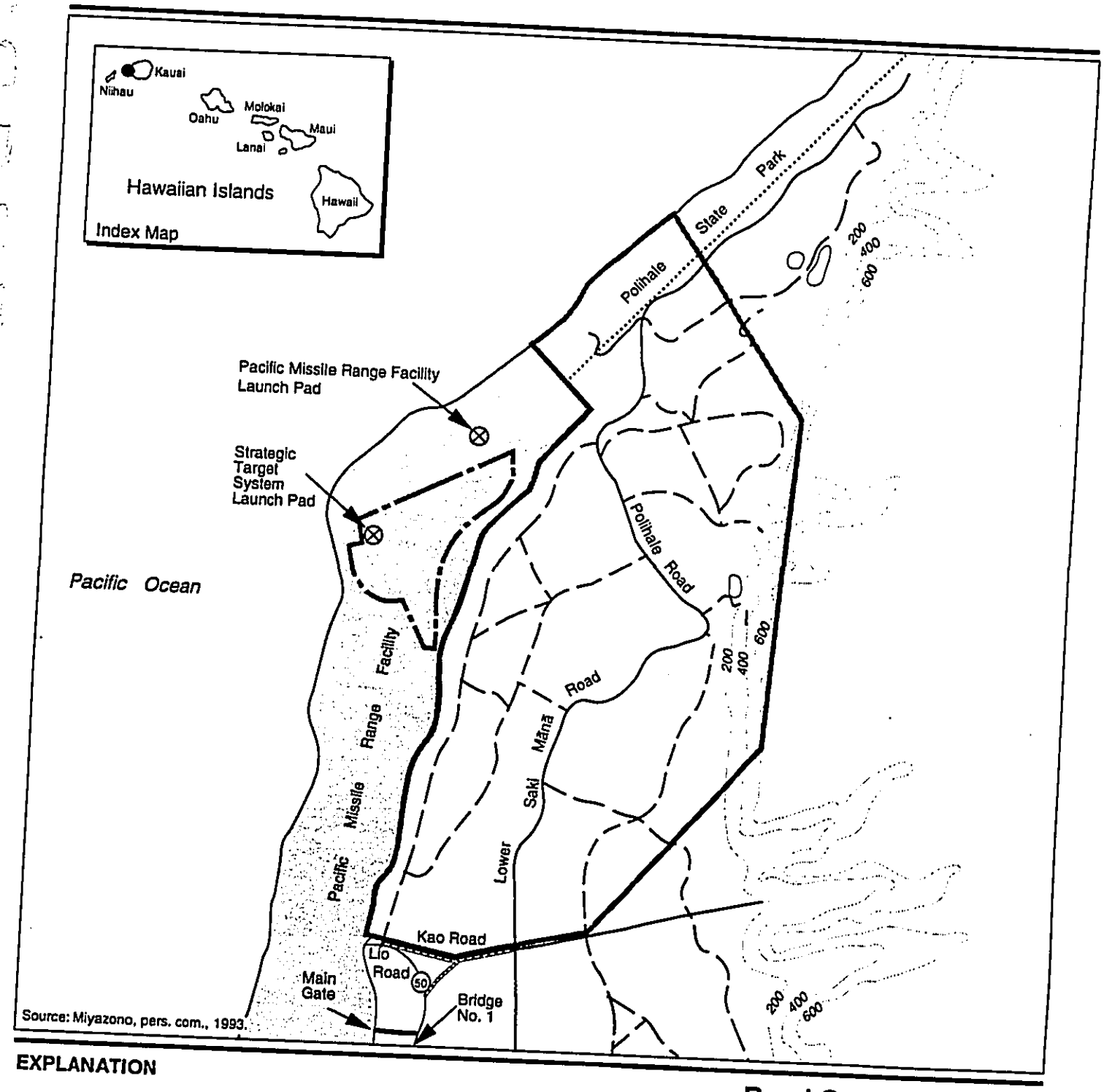
Kao Road is designated as a county road that runs east toward Lower Saki Mānā Road. The paved road parallels the southern boundary of the restrictive easement. The county responsibility ends at the intersection with Lower Saki Mānā Road. Lower Saki Mānā Road, which becomes Polihale Road, provides access 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).



EXPLANATION

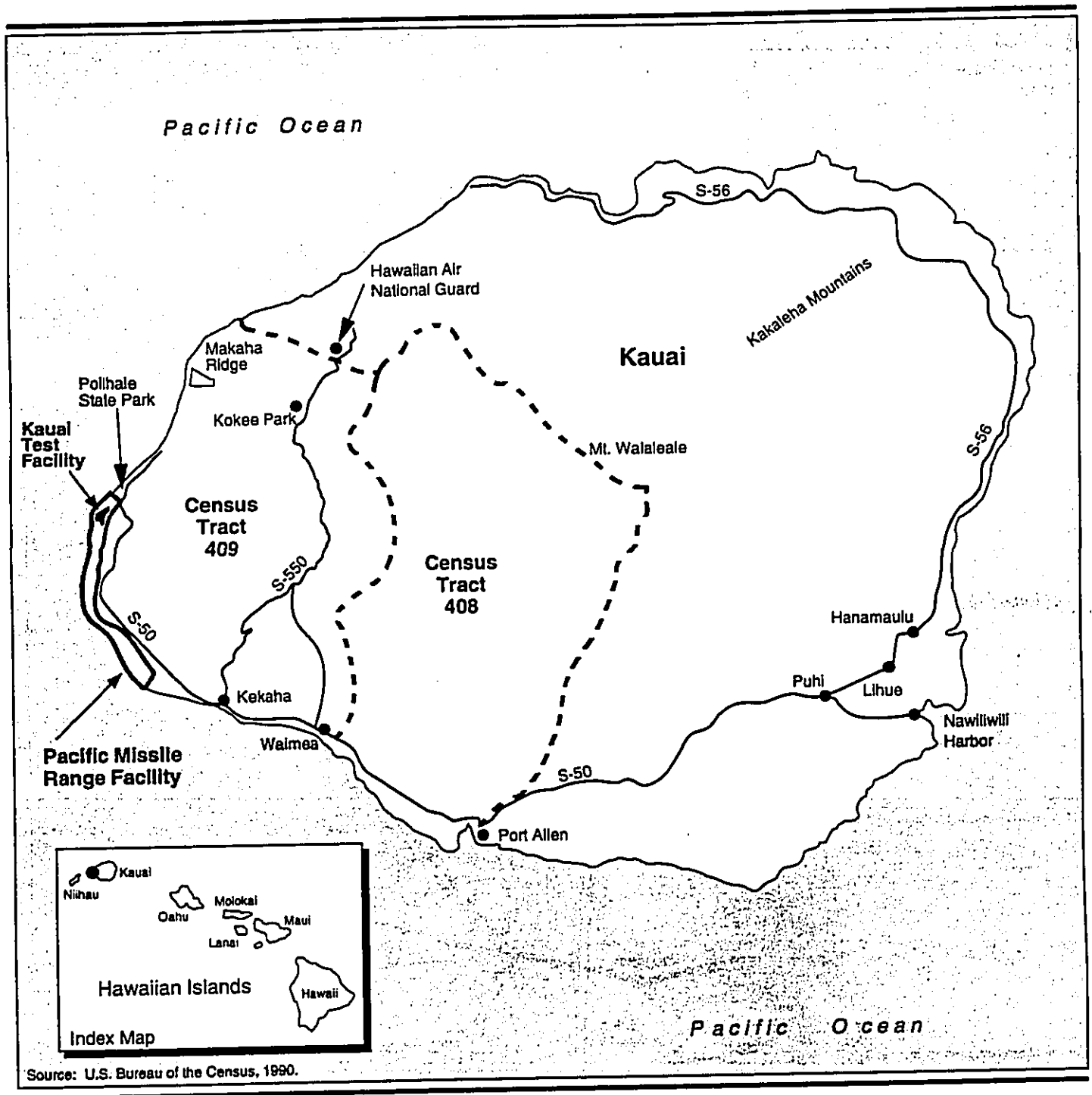
- Restrictive Easement Boundary
- State Land Access Road
- County Road
- Kekaha Sugar Company Private Haul Roads
- Polihale State Park Boundary
- Pacific Missile Range Facility
- (50) State Highway

0 500 1000 Meters

0 1500 3000 Feet

Road Ownership within Restrictive Easement

Figure 3-5



Socioeconomic Region of Influence

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 (977), 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

	Population			Income		
	1980	1990	Percent Change	Population Density per km²	Median Household Income	Percent of Persons Below Poverty Level
State of Hawaii	964,691	1,108,229	14.9	66.6	$38,829	8.3
ROI Kauai County	39,082	51,177	30.9	35.6	$37,425	7.2
PIA census tract 409	5,256	5,745	9.3	24.6	$34,675	10.1
Census tract 408	3,111	2,913	-6.4	9.3	$29,960	5.8

Source: U.S. Bureau of the Census, 1980; 1990.

Table 3-5: Housing Characteristics

				Housing Vacancy Rates		
	Percent of Units Owner Occupied	Median Value of Owner Occupied Units	Median Rent for Rental Units	Owner Occupied	Renter Occupied	Percent of Occupied Housing Units with One or More Persons per Room
State of Hawaii	54	$245,300	$599	0.8	5.4	15.9
ROI Kauai County	59	$171,500	$532	0.7	4.3	15.9
ROI census tract 409	54	$130,900	$N/A	0.7	2.7	19.1
Census tract 408	31	$148,400	$N/A	0.4	1.1	17.4

Source: U.S Bureau of the Census, 1990.
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 1990 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

	Kauai		State of Hawaii	
	Percent Unemployed	Employed Labor Force	Percent Unemployed	Employed Labor Force
1990	3.6	27,350	2.8	524,000
1991	4.2	29,050	2.8	541,650
1992				
January	5.4	28,550	3.6	544,958
February	5.9	28,450	3.7	542,733
March	5.3	28,450	3.5	544,957
April	5.5	28,100	3.5	540,801
May	6.3	28,050	4.2	538,145
June	7.7	28,350	5.0	544,011
July	7.0	28,750	4.8	546,314
August	5.8	28,850	4.2	546,193
September	6.0	28,350	4.4	537,459
October	16.8	24,700	4.8	540,342
November	16.1	25,000	4.9	547,797
December	13.5	25,250	4.4	533,135
Annual Average	8.4	27,550	4.3	543,900
1993				
January	14.2	25,950	4.8	547,850
February	13.4	25,850	4.8	542,950
March	12.2	26,350	4.7	545,750
April	12.9	26,650	4.6	549,650

Source: U.S. Department of Labor, 1993.

$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 Hawaii, 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)

	Unprocessed Sugar Cane	Taro	Fruits and Vegetables	Other/ Field Crops	Flowers and Nursery Products	Total Crop Value
1980	$83,600	$865	$2,073	$954	$615	$88,107
1985	53,300	1,032	2,305	1,716	1,719	59,532
1990	52,400	1,379	2,836	1,952	1,956	60,163

Source: Kauai County, 1992.

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

Sugar Company	Average Cane Land in hectares (acres)
Kekaha Sugar Company	3,357 (8,294)
Lihue Plantation Company	4,541 (11,220)
McBryde Sugar Company	2,839 (7,015)
Olokele Sugar Company	1,909 (4,716)
Gay and Robinson, Inc.	1,112 (2,747)
Total	13,758 (33,992)

Source: Hawaiian Sugar Planter's Association, 1992.

(table 3-8). Kekaha 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 Wailua-Kapaa 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

	1988	1989	1990	1991	1992	5-year Average
	Raw Sugar Production (short tons)					
Kekaha Sugar Company	52,867	51,149	46,953	40,770	36,523	46,652
Kauai County	227,838	210,887	200,356	176,470	137,073	190,524
State of Hawaii	928,195	863,614	819,631	724,100	652,304	797,568
	Tons of Sugar Produced (per acre)					
Kekaha Sugar Company	13.21	12.78	11.61	11.36	11.53	12.09
Kauai County	11.34	11.57	11.38	9.10	9.25	10.53
State of Hawaii	12.21	10.39	10.16	10.69	10.50	10.79

Source: Hawaiian Sugar Planter's Association, 1992.

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

	Kauai	State of Hawaii	Kauai as % of State
1988	16,400	141,410	11.6
1989	19,140	169,670	11.3
1990	18,200	162,070	11.2
1991	19,020	157,590	12.1
1992			
January	15,440	156,070	9.9
February	14,680	154,950	9.5
March	19,260	171,540	11.2
April	16,160	139,160	11.6
May	15,740	135,040	11.7
June	17,760	163,670	10.9
July	18,750	165,310	11.3
August	19,630	163,580	12.0
September	9,860	136,220	7.2
October	4,160	137,610	3.0
November	4,320	150,520	2.9
December	5,650	165,830	3.4
Annual Average	13,460	153,390	8.8

Source: Hawaii Visitors Bureau, 1993.

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)

Market Area	Type of Accommodation	Number of Properties	Available Units
Kalaheo-Waimea	Cottage	2	53
	B&B	2	2
	Lodge	1	12
Total		5	67
Lihue	Hotel	5	1,272
	Condo	4	364
	Other	2	51
Total		11	1,687
Poipu-Kukuiula	Hotel	5	1,631
	Condo	17	941
	Hotel/condo	2	60
	Cottage	5	30
	B&B	5	21
	Other	5	48
Total		39	2,731
Princeville-Hanalei	Hotel	1	252
	Condo	13	412
	Hotel/condo	3	218
	Apt, apt/hotel	1	4
	Cottage	4	25
	B&B	2	6
	Other	4	4
Total		28	921
Wailua-Kapaa	Hotel	7	1,601
	Condo	5	442
	Hotel/condo	4	250
	Cottage	1	1
	B&B	15	44
	Hostel	1	34
Total		33	2,372
Kauai Total		116	7,778

Source: Hawaii Visitors Bureau, 1993.

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 3-12: Total PMRF Employment and Expenditures

Activity/Tenant	Employees	Support[a] Personnel	FY 93 Annual Budget (millions)
AEGIS	1	300	$6.0
Allied Signal GSD (Vandal)	2	10	–
Beech Aerospace	3	–	$0.7
Bendix/NASA	7	–	$1.0
HIANG 154th ACS	25	113[b]	$1.5
HIANG 298th ATCF	13	59[b]	$1.0
Marines	–	–	$0.3
NIST	4	–	$0.3
NEX	16	–	$1.6
NUWC	25	–	$2.6
PMRF CPK[c]	705	–	$50.1
NAVAIRWARCENWPNDIV	2	30	$2.0
Sandia	14	30	$2.4
SRS Tech	8	6[a]	$1.4
U.S. Dept. of Agriculture	7	–	$1.5
U.S. Dept. of Agriculture/ Animal Damage Controls	3	–	$0.02
Total	836	548	$72.4

[a]Support personnel who work at the PMRF during selected program activities
[b]Training personnel
[c]Included in PMRF totals
Source: Inouye, pers. com., 1993.

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

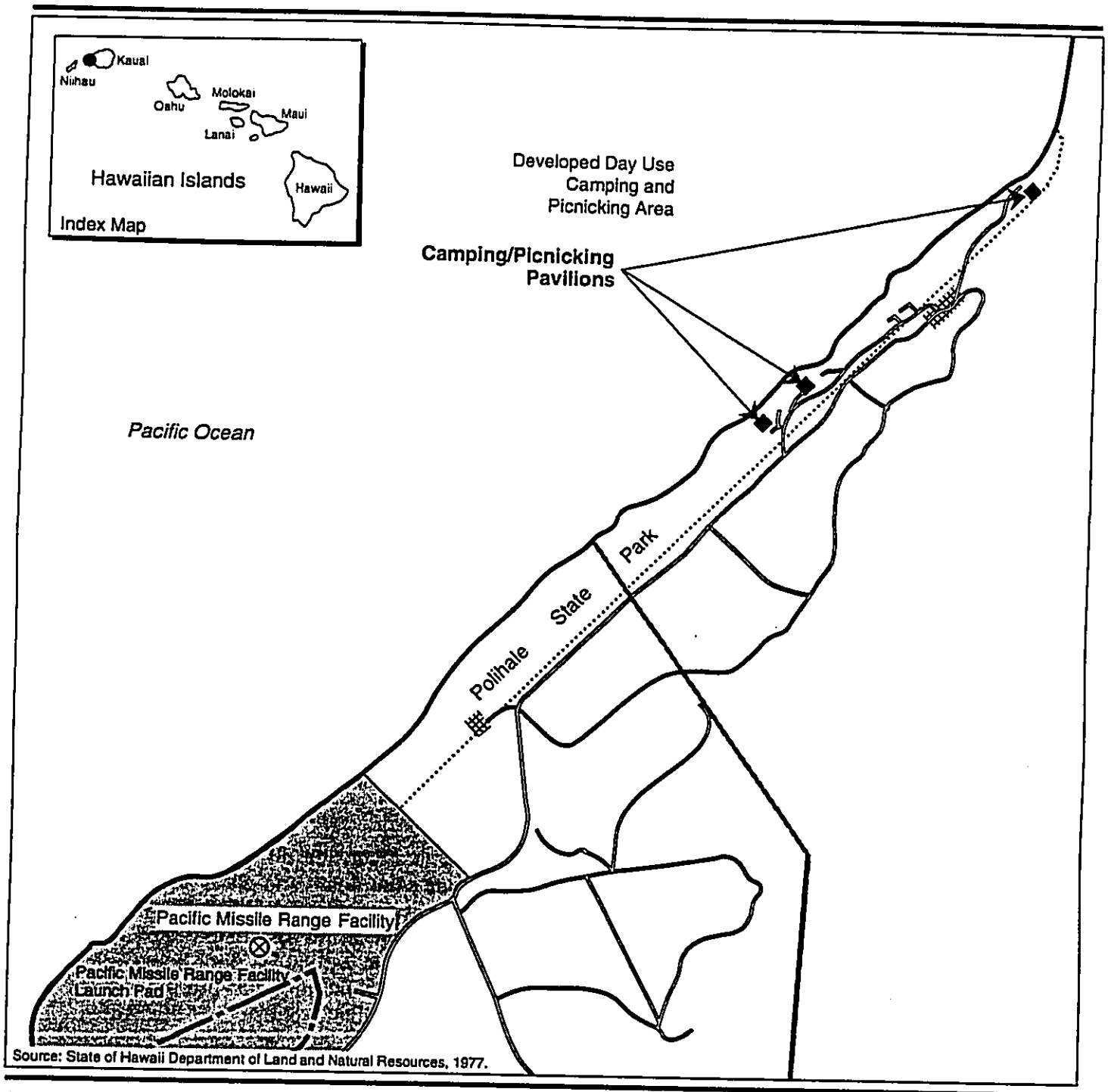
Recreation includes designated areas such as state and county parks, beaches, and fishing areas. A park is defined as an area which, by reason of location, natural features, scenic beauty, or legendary, historical, or scientific interest, possesses distinctive physical, aesthetic, intellectual, creative, 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



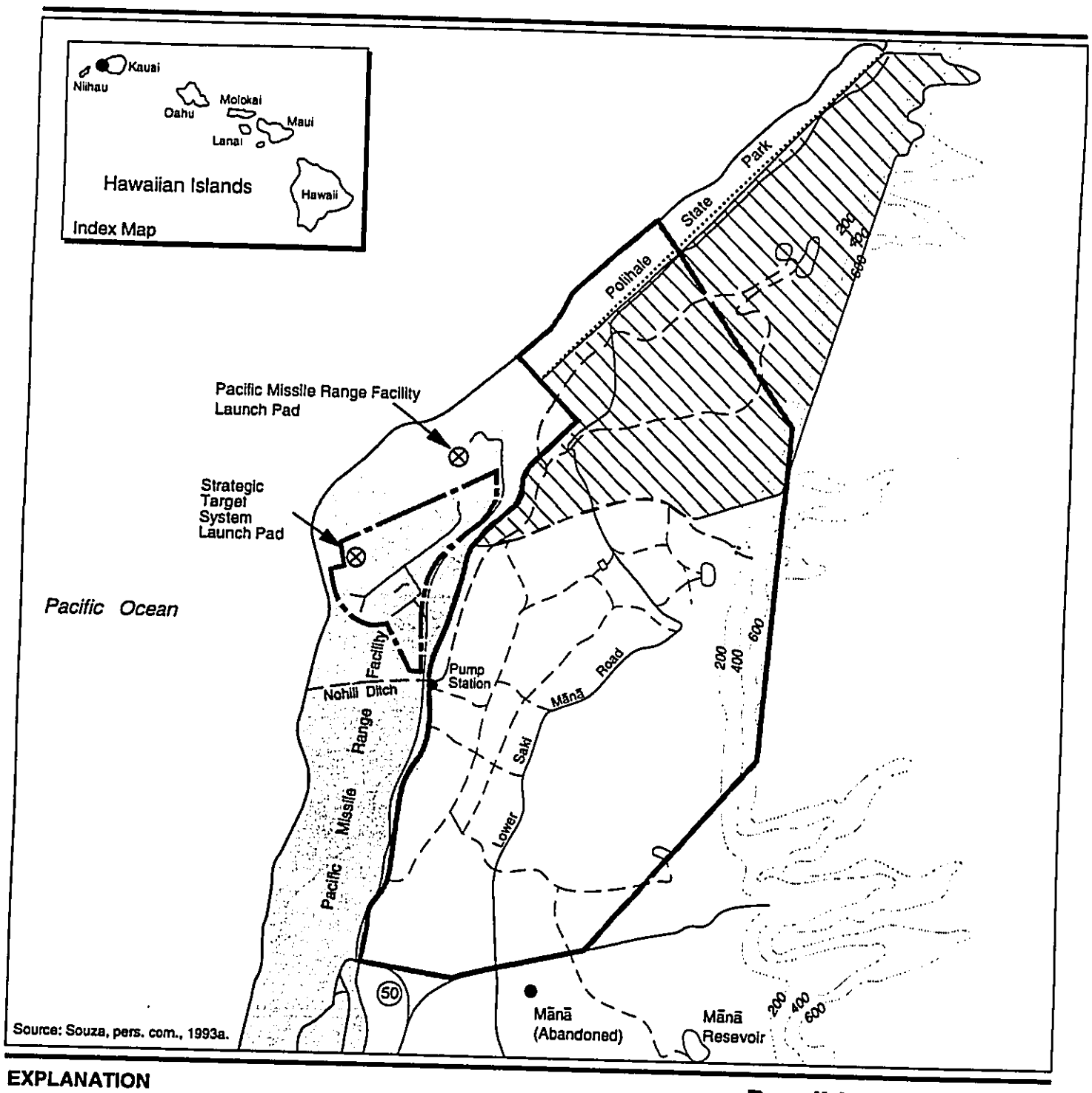
EXPLANATION

- Restrictive Easement Boundary
- Pacific Missile Range Facility
- Kauai Test Facility
- Polihale State Park Boundary
- Parking Area

0 300 600 Meters
0 1000 2000 Feet

Polihale State Park

Figure 3-7



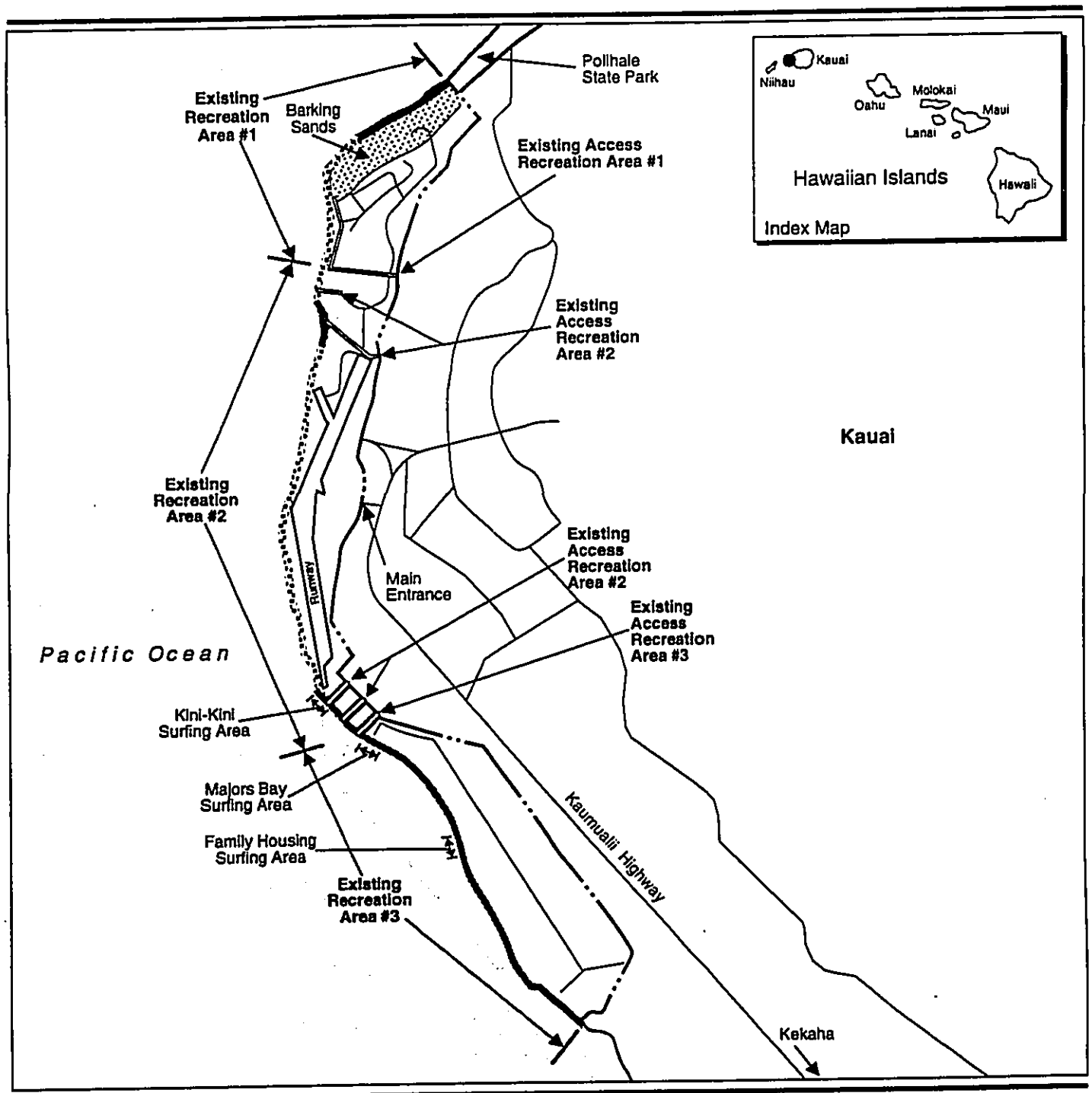
EXPLANATION

- Irrigation Drainage Ditch
- Restrictive Easement Boundary
- Polihale State Park Boundary
- Kauai Test Facility
- Pacific Missile Range Facility
- Possible Expansion Area
- (50) State Highway

0 500 1000 Meters
0 1500 3000 Feet

Possible Expansion Area for Polihale State Park

Figure 3-8



EXPLANATION

- Sand Dune
- Beach Access
- Rocky Beach
- Sand Beach
- Pacific Missile Range Facility Boundary

0 2,500 5,000 Feet

0 750 1,500 Meters

Pacific Missile Range Facility Recreational Areas

Figure 3-9

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).

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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 kiawe 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.

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

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

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

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 EISs, 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.

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 90 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,

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 3.11, 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.

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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;c; 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;c; 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, 1992b;c; 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

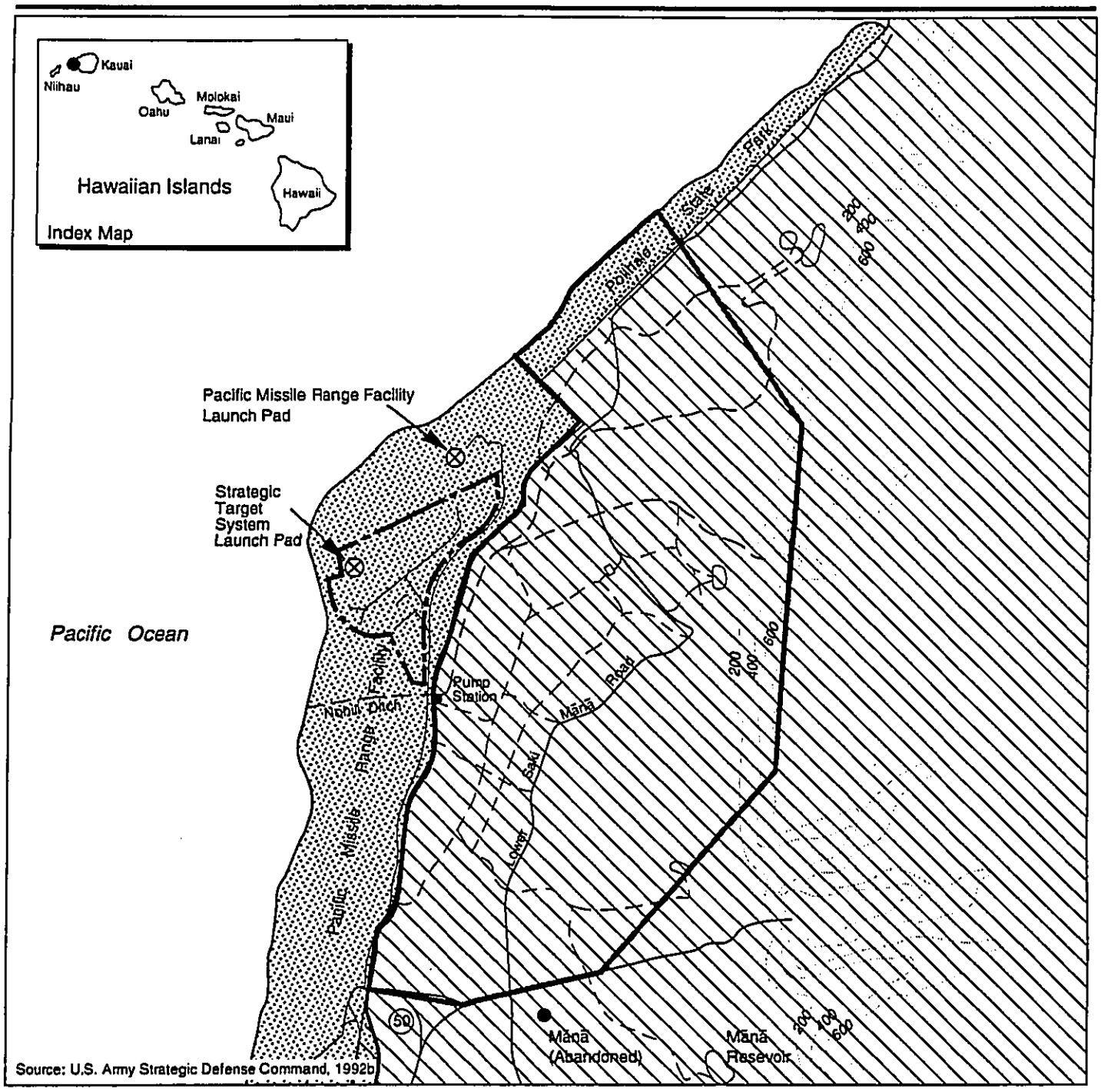
Land use in the State of Hawaii is regulated by HRS Chapter 205 and Title 15, Subtitle 3, Chapter 15, Hawaii Administrative Rules. Land use in Hawaii is classified into four categories: urban, rural, agricultural, and conservation.

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.



EXPLANATION

- Irrigation Drainage Ditch
- Restrictive Easement Boundary
- Kauai Test Facility
- Pacific Missile Range Facility
- Conservation Use
- Agricultural Use
- (50) State Highway

0 500 1000 Meters

0 1500 3000 Feet

State Land Use Designations within the Restrictive Easement Boundary

Figure 5-1

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.

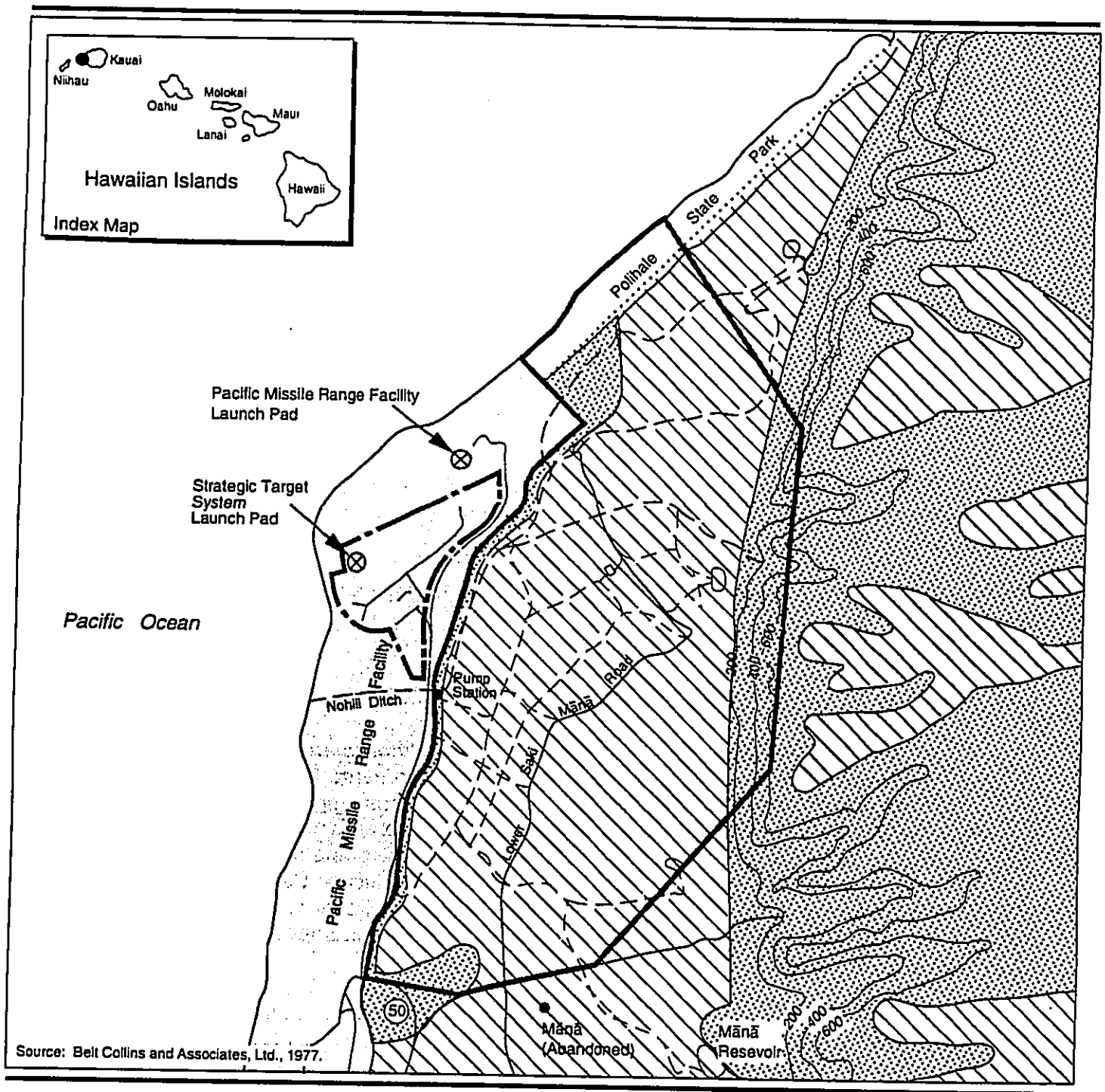
Revised Memorandum of Agreement – Impacts from this alternative would be similar to those of the proposed action.

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



Kauai County Land Use Zoning within the Restrictive Easement Boundary

Figure 5-2

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.

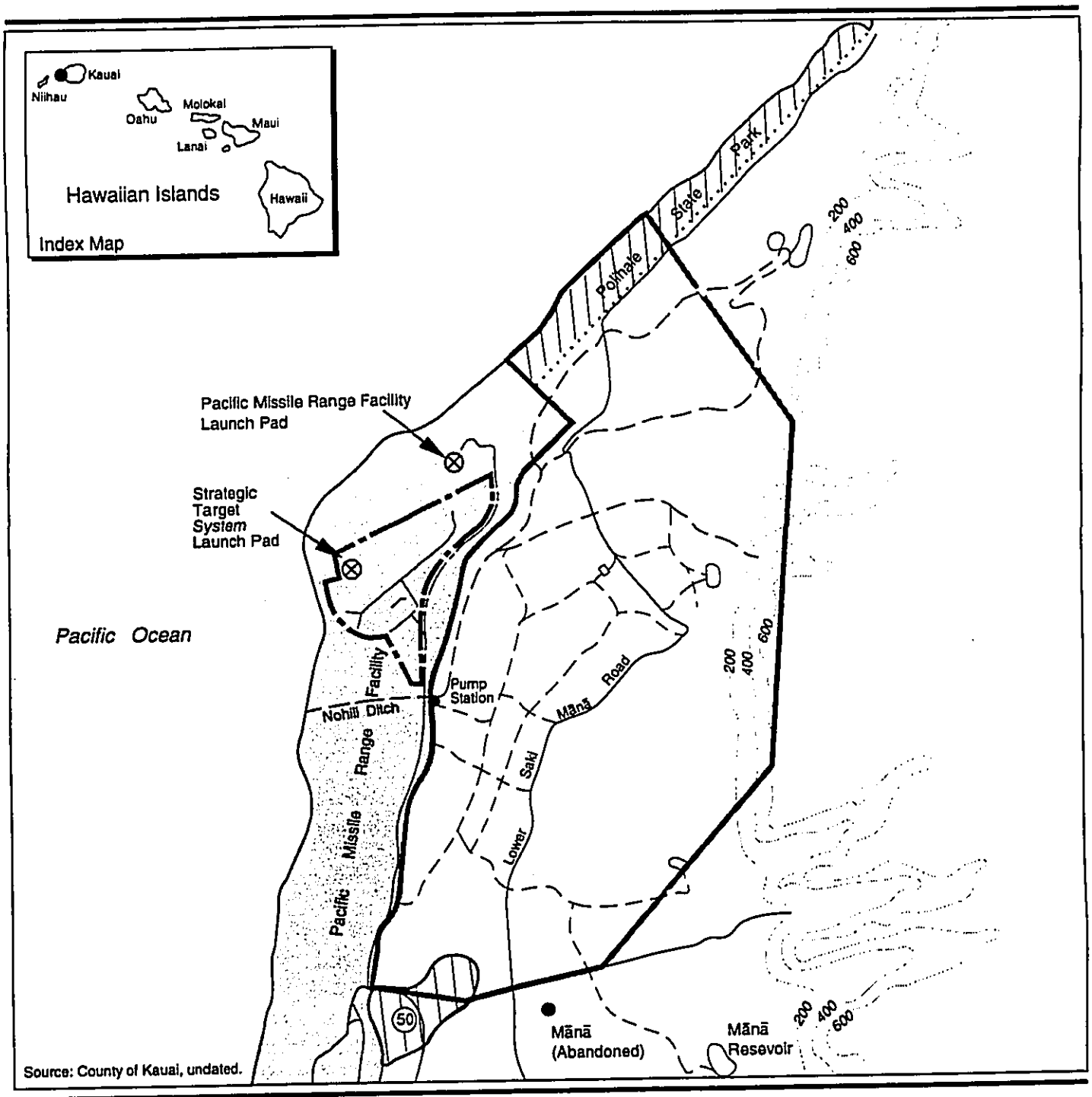
5.6 SPECIAL MANAGEMENT AREA USE PERMIT

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.



EXPLANATION

- Irrigation Drainage Ditch
- Restrictive Easement Boundary
- Polihale State Park Boundary
- Kauai Test Facility
- Pacific Missile Range Facility
- Special Management Area
- (50) State Highway

0 500 1000 Meters
0 1500 3000 Feet

Kauai County Special Management Areas within the Restrictive Easement

Figure 5-3

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 interfingering 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.

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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 OEQC Bulletin by the Office of Environmental Quality Control on 8 June 1993. In addition, representatives of the USASSDC 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
Mariann 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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June 15. 1993

Dept. of Land and Natural Resources
Attention: Linda McCrerey
P.O. Box 621
Honolulu. Hawaii 96809

Dear Ms. McCrerey:

I was pleased to see in the June 8 OEQC 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 Kaual. 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 Paty 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 reliabilities by 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 ZEST 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 nine years that the restricted easement would be in effect. Note that a reliability of 98% 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 Aries 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 Niihau or to the southeast toward the town of Kekaha. It should be noted that the Aug. 20. 1991 Aries 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) HCl concentrations from STARS launches: The 8-hour average values of the predicted HCl concentrations at the boundary of the GHA should be compared to the Hawaii HCl guideline. As I indicated in my Sept. 22, 1992 letter to William Paty, document 228 in the Administrative Record for the STARS EIS indicates that the Hawaii HCl 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 REEDM computer model used for the STARS EIS and with those of the DIFOUT 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 Paty:

"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 evaluate 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 lead from Vandal launches: Item 7 of the MOA which is currently in effect for STARS and Vandal launches contains the statement, "For Navy launches, the Navy will remove contamination caused by liquid propellant (JP-10) and solid propellants solid propellants (sic) (nitrocellulose/nitroglycerine, cellulose acetate -

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 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 8-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 4-5 of the STARS EIS and are both larger than the Hawaii guideline. A handwritten 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 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 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

for insulation) and exhaust product of lead." The EIS should describe in detail how and when the clean up of lead will be done. Lead emissions from the 72 Vandal launches anticipated in the next nine years should be a source of concern because higher than normal levels of lead have been found in soil samples taken near some of the KTF launch pads. (See Appendix H of the July 1992 EA for KTF.) The EIS should evaluate the cumulative effects of these continuing lead emissions.

8) reporting of lead releases from Vandal launches: According to the July 1992 EA for KTF, the Talos rocket motor used for Vandal emits 47.65 pounds of lead in the exhaust. This quantity is a reportable amount under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980. The EIS should note which Hawaii agencies received reports of previous lead releases from rocket launches at PMRF and which agencies will receive these reports for future launches. Apparently, neither the Clean Air Branch nor the Hazard Evaluation and Emergency Response Office of the Hawaii Dept. of Health (DOH) have been notified in the past. In response to my question about lead releases from rocket launches at PMRF, a March 5, 1993 letter signed by Bruce S. Anderson, Deputy Director for Environmental Health, contained the following statements:
"Similarly, neither of the two DOH offices has been consulted about the lead release of 9.2 kilograms (kg) of lead from a Terrier rocket or the 20.5 kg (45 pounds) of lead from a Vandal rocket. Also, neither office has received any reports of lead release after launches."

I trust that you will send me a copy of the draft EIS as soon as it is available.

Sincerely,

Michael Jones

Michael Jones
Physics Dept.
Univ. of Hawaii
2505 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

done. 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 guideline. 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

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

DEPARTMENT OF THE ARMY
U.S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

July 23, 1993

Environmental and
Engineering Office

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

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 withstood 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 is 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 (ZEST 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 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. 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 when an 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 Assessment 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 public exposure area. The monitoring report will include evaluation of previous modelling 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 Ninh, Attention: CSSD-EN-V, Post Office Box 1500, Huntsville, Alabama 35807-3801.

Sincerely,

JEFFREY L. SCHREPPLE
Lieutenant Colonel, U.S. Army
Strategic Targets Product Manager

8-8

June 26.93

Ms. McCreery,

After following the progress; a dubious word, of the STARS program here on Kauai; I am writing in the interest of perhaps MANY. I know who will not take time to write. I am requesting at minimum, the EIS be completed for the easement purchase creating safety and hazard areas for STARS program. At least may you follow the required legal steps to proceed prior to lifting off these toxics missiles into our environment. Please, if you will, address the issues directly; perhaps it is through this method the true risks and negative (potentially) impacts will be revealed.

Thank you, Mariann Silver

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

July 23, 1993

Environmental and
Engineering Office

Ms. Mariann Silver
P.O. Box 442
Lawai, HI 96765

Dear Ms. Silver:

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

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

Sincerely,

JEFFREY L. SCHREPPLE
Lieutenant Colonel, U.S. Army
Strategic Targets Product Manager

NATIVE HAWAIIAN LEGAL CORPORATION

July 8, 1993

Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96813

Attn: Linda McCrerey
(Via FAX [587-0390] and U.S. Mail)

U.S. Army Space and Strategic Defense Command
P.O. Box 1500
Huntsville, Alabama 35807-0394

Attn: Linda Ninh
(Via U.S. Mail)

Re: Comments on EIS Preparation Notice: 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

Ladies and Gentlemen:

I ask that the following issues be addressed in the EIS to be prepared on the above-entitled project:

(1) Effect on revenue from adjacent State-owned lands

Lands adjacent to Pacific Missile Range Facility (PMRF) and within the proposed ground hazard area (GHA) are owned by the State of Hawaii and are assets of the § 5(f) Ceded Lands Trust. Because these lands are under lease for sugar cultivation, 30% of the rental revenues is paid to the Department of Hawaiian Home Lands; another 20% of the revenues is paid to the Office of Hawaiian Affairs in accordance with § 10-13.5, H.R.S. The EIS must disclose the adverse effect of the proposed action on the revenue-generating capability of these lands, including any opportunity costs that would result if more intensive uses of the land are foreclosed because of the use restrictions inherent in the GHA.

(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 343, 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 those lands, other than sugar cultivation, including the socioeconomic effect, see Molokai Homesteaders Cooperative Ass'n v. Cobb, 63 Haw. 453 (1981), of the various uses on DHHL and OHA 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 Limbo: An Analysis of the State-County Jurisdictional Dispute (1989); see also Atty. 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 regard to the access road from the end of the Kaumualii Highway and/or Kao Road northward to Polihale State Park and other connecting roads in the immediate vicinity. Indeed, a sign at the intersection of the Kaumualii 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, opened, 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-

1(a)(1),[1] one or more must be "County highways, which are all other public highways," § 264-1(a)(2).[2] One or more of the roads in question would thus appear to be under the jurisdiction of the County of Kauai, not the State, because they have not been designated for inclusion in the state highway system under §§ 264-41 or 264-42.[3] Neither Roads in Limbo, Atty Gen. Op. 1986-15, nor Chapter 246, give any indication that the mere fact that a road open to the public crosses State-owned land gives the State jurisdiction over that road. Accordingly, although these roads cross State-owned lands, they are nevertheless "public highways" because they are "actually constructed and existing on the ground" and are not mere "paper roads," which are not considered to be "public highways" by DLNR but are instead treated as ""unencumbered State lands" subject to the jurisdiction of the Department [of Land and Natural Resources]." See Staff Submittal accompanying Agenda Item F-2 for the August 12, 1992, meeting of the Board of Land and Natural Resources.

The EIS must identify the government agency having jurisdiction over each of the various roads located within the GHA which will be subject to closure under the proposed agreement and must disclose that information in the EIS.

(4) County of Kauai as additional "accepting authority"

If any of the roads to be affected by this action are in fact owned or controlled by the County of Kauai, rather than by the State, the approval of the County of Kauai would be essential before any agreement to close the roads could be executed.

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[1]See Legislative Reference Bureau, Roads in Limbo: An Analysis of the State-County Jurisdictional Dispute 98 (1989) for a listing of "Streets and Highways on Kauai Under the Jurisdiction of the State Highways Division" as of January 1988.

[2]Because these roads are not "nonvehicular rights of way" they cannot be "public trails" as defined in § 264-1(a)(3), jurisdiction over which rests either with DLNR or with the County of Kauai.

[3]See also Santos v. Perreira, 2 Haw. App. 387, 633 P.2d 1118 (1981) (a public highway is not a state highway unless it is designated for inclusion in the state highway system); see generally, Legislative Reference Bureau, Roads in Limbo: An Analysis of the State-County Jurisdictional Dispute (1989); id. at 19 (noting Kauai County Attorney's criticism of State's inconsistent position that responsibility for maintenance of non-DOT roads lies with the counties, but that DLNR "freely leas[es] or sell[s] these roads when it benefits them").

Similarly, the County of Kauai 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 Sierra Club v. Paty, Civil No. 92-2597-07, 1st Circuit Court, have specifically denied "that the GHA includes submerged land[.]" State Defendants' Answer to Verified Complaint for Declaratory and Injunctive Relief Filed July 21, 1992, ¶ 17 at 5. 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 GHA will adversely impact submerged lands located makai of Polihale State Park and PMRF. These submerged lands are owned by the State of Hawaii and are assets of the § 5(f) Ceded Lands Trust. The EIS must address in full the effect of the proposed action on 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 understanding 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 their use and safety, and improve them in such manner as to retain to a maximum extent their scenic, historic, and wildlife values for the use and enjoyment of the public." § 184-6, H.R.S. (emphasis added). Furthermore, § 184-3, which prescribes DLNR's special powers with respect to the state parks system, makes no mention of any power to exclude the public from state parks in favor of an exclusive use, even of a temporary nature, for non-park purposes. The proposed action is thus of considerable precedential significance, as it assumes the authority in DLNR to use public parks for non-park purposes in its sole discretion, 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 Vandenburg 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. 90-0775 HMF, 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. Christensen

Carl C. Christensen

8-11

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

July 23, 1993

Environmental and
Engineering Office

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

Dear Mr. Christensen:

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: 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 all anticipate 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 leasing 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 by responsible authorities. Consequently, an evaluation of more intensive uses or development than 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 54507)

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 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 their use and safety." DLNR has promulgated administrative rules implementing Chapter 184. Hawaii Administrative Rules section 13-146-4 provides that the Land Board 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 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 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 gives 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.

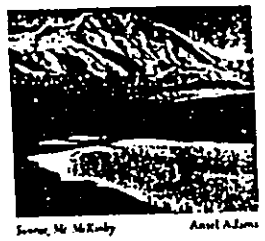
Comment 9: Effects on traditional and customary rights and practices

Response 9: With respect to traditional rights and 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 other than those already addressed in previous environmental documents would result from the restrictive easement on state-owned lands.

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

Sincerely,

JEFFREY L. SCHREPPLE
Lieutenant Colonel, U.S. Army
Strategic Targets Product Manager



Sunset, Mt. McKinley — Ansel Adams

SIERRA CLUB LEGAL DEFENSE FUND, INC.

The Law Firm for the Environmental Movement

212 Merchant Street, Suite 202 Honolulu, Hawaii 96813 (808) 599-2436 FAX (808) 521-6841

NORTH PACIFIC OFFICE
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Kim Ramos
Office Manager

HOME OFFICE
San Francisco, California

REGIONAL OFFICES
Denver, Colorado
Juneau, Alaska
New Orleans, Louisiana
Seattle, Washington
Tallahassee, Florida
Washington, D.C.

July 8, 1993

Ms. Linda McCrerey
Department of Land and Natural Resources
Post Office Box 621
Honolulu, Hawaii 96809

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. McCrerey:

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 OEQC Bulletin is completely misleading as to the actual scope of the proposed action. This concern is explained further below.

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. § 11-200-11(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 OEQC Bulletin.

The draft proposed easement is not limited to the launches of STARS/VANDAL missiles. To the contrary, the purposes 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?

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This distinction is critical and not merely semantics. 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 misleads 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 HEPA, 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, HEPA 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, than 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 both 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 343:

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 Home lands in the ahupua'a of Waimea must be addressed.

b. Native Hawaiian Subsistence Fishing. The executive orders that designated lands at PMRF 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 located adjacent to PMRF. The economic impacts of restrictions on the use of these lands must be discussed. In addition, the entire ahupua'a of Waimea is composed of Crown Land. The Native Hawaiian people have identified this ahupua'a as ideal for inclusion in a sovereign land base. The impacts of the use of lands adjacent to PMRF 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 36,000 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 PMRF 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 PMRF 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.

i. Closure. 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 PMRF 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 proposed 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 treatment. 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 VANDAL and STARS launches, then this would allow the applicant the opportunity for partial fulfillment of the proposed programs. 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 PMRF. 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.

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

e. Reduced Term Of Easement. Given the likelihood of reduced future budgets of the Department of Defense for the SDC, 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 HEPA 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 OEQC Bulletin. Moreover, pursuant to HEPA, we also request your written response to our questions and concerns prior to your proceeding with the DEIS.

Very truly yours,

Denise E. Antolini

cc: Linda Ninh
U.S. Army Space and Strategic Defense Command
Post Office Box 1500
Huntsville, Alabama 35807-3801

DEPARTMENT OF THE ARMY
U.S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

July 23, 1993

Environmental and
Engineering Office

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

Dear Ms. Antolini:

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 Kekaha Sugar Company. However, the restrictive easement is intended to cover clearance of a ground hazard 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 9-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 connected, related, and cumulative actions during this 9-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 unmindful 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 Kwajalein Atoll 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 Kwajalein Atoll. The Kwajalein Atoll 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 by 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 MOA as a procedure to ensure protection of the public through the clearance of a ground hazard area during launches. Alternatives to the launches 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,

JEFFREY L. SCHREPPLE
Lieutenant Colonel, U.S. Army
Strategic Targets Product Manager

SIERRA CLUB, HAWAI'I CHAPTER

The Arcade Building, Room 201
212 Merchant Street, Honolulu, Hawai'i 96813
P.O. Box 2577, Honolulu, Hawai'i 96803
(808) 538-6616

Please reply to:

P.O. Box 1172
Hanalei
Hawaii 96714
(808) 826 6877

July 8, 1993

To:

Mr. Keith Ahue
Department of Land and Natural Resources
Fax # 808 587 0401

Mr. Brian Choy
Office f Environmental Quality Control
Fax # 808 586 2452

Aloha Gentlemen:

I write addressing the entry on page 10 of the June 8, 1993 OEQC Bulletin, regarding 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.

In formulating and 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 recompense to the people whose land is being used.
2. The proven history of failure in clearing the ground hazard area of human beings. Please include a comprehensive security overview.
3. The cultural, economic, and ecological impacts of continued militarization of private land.
4. The failure 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 Kwajalein Atoll; both in its entirety and regarding specific islands such as Ebeye. In such an overview, please chart the decline or ascent of social, political, cultural, and environmental mores as militarism has become more and more a part of those islands' lives.

7. The overview of Hawaii's land policy that allows state and private land to become expansions of missile bases (colonization, I believe it is called in some places).
8. Please explain how support for the STARS/Vandal launches can be justified within the context of a corroded and malfunctional SDI program that is being killed off by Congress bite by bite.
9. Please explain how the two (2) jobs created for Kauai by the STARS program can justify supporting a program that gives so little back to a damaged island, rather than spending the same amount of investment in economic conversion and job security issues elsewhere on the West side of Kauai.
10. Please explain why the second scheduled launch (anticipated for August, 1993), does not merit environmental review, all the rest clearly do. Just what is being hidden about this second launch?
11. What monitoring of emissions occurred during and after the February, 1993 launch, and what were the results of that monitoring?
12. Please include information about the reliability of the infra-red monitoring equipment that was theoretically used in the February, 1993 launch window, with which the state-held land was theoretically used to search for living humans within the launch hazard zone.

Thank you very much. I look forward to reading a very good Environmental Impact Statement some day soon.

Kind regards,

Suzanne Marinelli
Pacific Basin Vice-
President

cc: Mr. Randy Gallien/USA Strategic Defense Command
Mr. Nelson Ho/Sierra Club Chapter Chair
Ms. Denise Antolini and Mr. Mark Smaalders/Sierra Club
Legal Defense Fund

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

July 26, 1993

Environmental and
Engineering Office

Ms. Suzanne Marinelli
Pacific Basin Vice-President
Sierra Club, Hawaii Chapter
P.O. Box 1172
Hanalei, HI 96714

Dear Ms. Marinelli:

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 Ninh, Attention: CSSD-EN-V, Post Office Box 1500, Huntsville, Alabama 35807-3801.

Sincerely,

JEFFREY C. SCHREPPLE
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 Reed
Representative Ezra Kanoho
Representative Bertha Kawakami
Representative Paula Ishii-Morikami

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
Kaipo 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 Yukimura
Randal Valenciano, Kauai County Council
Maxine Correa, Kauai County Council
Maurice Munichika, 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 Compoc*
Christine Nonaka*
Russell Ruiz*
Micheal Castillo*
Manuel L. Cabral*
Benjamin Domingo Jr.*
Fernando Bran Jr.*
Turk Tokita*
Paul T. Akama*

Section 9.0

Comment Response Letters

Table of Contents

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JOHN WAIHEE
Governor
MUFI HANNEMANN
Director
BARBARA KIM STANT
Deputy Director
RICK EGGE
Deputy Director
TAKESHI YOSHIMA
Deputy Director

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

Central Pacific Plaza, 220 South King Street, 11th Floor, Honolulu, Hawaii
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804 Telephone: (808) 586-2423 Fax: (808) 586-2377

RECEIVED
DIVISION OF
LAND MANAGEMENT
AUG 20 10 00 AM '93

August 17, 1993

Mr. W. Mason Young
Department of Land and
Natural Resources
P.O. Box 621
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 Vandal 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 587-3826.

Thank you for the opportunity to comment.

Sincerely,

Mufi Hannemann

Enclosure
cc: Ms. Linda Ninh

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
LAND USE COMMISSION
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813
Telephone: 587-3822

RECEIVED
DIVISION OF
LAND MANAGEMENT
AUG 26 10 00 AM '93

August 16, 1993

SUBJECT: Director's Referral 93-235-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 Vandal 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:

TMK: 1-2-02: por. 1 State Land Use Agricultural District
1-2-02: 15

TMK: 1-2-02: por. 24 State Land Use Conservation District

Additionally, Section 5.J 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.

EU:LRA:th

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Mr. Mufi Hanneman
Department of Business, Economic Development & Tourism
Post Office Box 2359
Honolulu, HI 96804

Dear Mr. Hanneman:

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 1-2-02: 15	State Land Use Agricultural District
Tax Map Key:	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. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FORT SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

August 20, 1993

Planning Division

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 (TMK 1-2-2: por. 1, 15, and 24). The following comments are provided pursuant to Corps of Engineers authorities to disseminate flood hazard information under the Flood Control Act of 1960 and to issue Department of the Army (DA) permits under the Clean Water Act; the Rivers and Harbors Act of 1899; and the Marine Protection, Research and Sanctuaries Act.

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

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

Sincerely,

Hisuk Cheung, P.E.
Director of Engineering

Copies Furnished:

Ms. Linda Ninh
U.S. Army Space and Strategic Defense Command
P.O. Box 1500
Huntsville, Alabama 35807-3801

Office of Environmental Quality Control
State of Hawaii
220 South King Street, 4th Floor
Honolulu, Hawaii 96813

9-12

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Mr. Kisuk Cheung
Planning Division
Department of the Army
U.S. Army Engineer District, Honolulu
Fort Shafter, HI 96858-5440

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. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

United States Department of the Interior

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
677 Ala Moana Blvd., Suite 415
Honolulu, HI 96813

August 20, 1993

Mr. W. Mason 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 Launches, Waimea, Kauai

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 Sinh
U.S. Army Space and Strategic Defense Command
P.O. Box 1500
Huntsville, AL 35807-3301

State of Hawaii
Office of Environmental Quality Control
220 South King Street
Fourth Floor
Honolulu, Hawaii 96813

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Mr. William Meyer
U.S. Department of the Interior
Geological Survey
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,

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

JOHN WAIHEE
Governor
MUFI HANNEMANN
Director
JEANNE SCHULTZ
Deputy Director
RICK EGGED
Deputy Director
TAKESHI YOSHIHARA
Deputy Director

DEPARTMENT OF BUSINESS,
ECONOMIC DEVELOPMENT & TOURISM

ENERGY DIVISION, 335 MERCHANT ST., RM. 110 HONOLULU, HAWAII 96813 PHONE (808) 587-3800 FAX (808) 587-3820

August 25, 1993

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

Attention: W. Mason Young

Dear Sir:

Subject: 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.
Island of Kauai, District of Waimea
Tax Map Key Numbers: 1-2-02:Por.1, 15 amd Por. 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,

Maurice H. Kaya
Energy Program Administrator

MHK:hkeis91

cc: Office of Environmental Quality Control
U.S. Army Space and Strategic Defense Command

9-14

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Mr. Maurice H. Kaya
Department of Business, Economic Development & Tourism
Energy Division
335 Merchant 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. Oresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

Johnson Space Center
White Sands Test Facility
P O Drawer MM
Las Cruces, New Mexico 88004

NASA
National
Aeronautics and
Space
Administration

Reply to Attn of RD/93-196

AUG 2 6 1993

Department of Land and Natural Resources
Attn: Mr. W. Mason Young
P. O. Box 621
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-V/Ms. Linda Ninh
P. O. Box 1500
Huntsville, AL 35807-3801

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Mr. Richard A. Colonna
Johnson Space Center
White Sands Test Facility
Post Office Drawer MM
Las Cruces, NM 88004

Dear Mr. Colonna:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your letter of August 26, 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. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

28 August 1993

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

Dear Mr. Young:

Here are my comments on the Draft Restrictive Easement Environmental Impact Statement dated 8 August 1993. Comments 1-7 refer to points in my June 15, 1993 letter and the responses to it (pages 8-4 to 8-11). Comments 8-11 address specific parts of the Draft Restrictive Easement EIS. Comments 12-21 concern aspects of the 2 July 1993 report on the Environmental Monitoring Program for the 26 Feb. 1993 Strategic Target System (STARS) launch.

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 Polihale 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.

9-16

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5) 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 Paty 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 5,000 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.

6) 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, page3-5 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), which requires that if 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 statements:

"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."

3

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 February 1992 Sandia letter from Eric J. Schindwolf 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 (and to whom) 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.

7) 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.

8) 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 26 Feb. STARS launch.

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

10) 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 Mana had lead levels of 9.1 and 11 mg/kg respectively and the

background sample taken at an unspecified location at PMRF, 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 launches.

11) Vandal launch products: The quantites 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 (GHA-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 TRPUF and REEDM predictions are given is 1000 m so quantitative comparisons of AEB results with these predictions are not very meaningful. The REEDM predictions at the GHA boundary were for a site downwind of the launch pad and for a wind speed of 1.0 m/sec. According to the data in Appendix K of the U.S. Army Environmental Hygiene Agency (USAEHA) report (Attachment II), the wind speeds at both 50 ft and 100 ft elevations exceeded 1.0 m/sec. The wind directions at the time of the launch were southwest at 50 ft and west at 100 ft. The description of the motion of the launch plume on page 3-2 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 TRPUF and REEDM 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 TRPUF and REEDM 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 USAEHA report (Attachment II) is very peculiar. It is hard to understand how the CO concentration could peak for a duration of only 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. The USAEHA report offers no explanation for the peculiar behavior of the CO data. Unless some convincing explanation is made, one should be very skeptical of the CO data.

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 43.5 ppm because the nominal maximum reading is 50 ppm. It is noted in Appendix C that the HCl data from Interscan monitor 86182 were not reliable but the data in fig. 5 seem to come from Interscan monitor 86923. Apparently the USABRDL HCl monitors are believed to give reliable peak values (see pages D-4 and D-5 in Appendix D) of 77 to 80 ppm. However, the Interscan monitor data were used to compute average HCl concentrations in Table 10. Because this monitor seems to have saturated, these averages appear to be unreliable. In particular, the more reliable value for the instantaneous maximum HCl concentration appears to be 80 ppm, not 5.5 ppm as given in Table 10.

16) methodology for calculating average HCl concentrations: The USAEHA 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 DEIS. 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 values and 0.66 times the 60-min average values. With this methodology, the AEB 30-min average HCl concentration in Table 10 implies an 8-hour average value of 1.7 ppm, which greatly exceeds the Hawaii 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 the concentrations versus time are not given in the USAEHA 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 interrupts.

18) GHA-South hydrogen chloride monitoring data: According to the information on page I-7 of Appendix I of the USAEHA report, the only HCl monitor recorded a concentration of -2.0 ppm between 9:38 and 10:04 A.M. It is unclear what a negative concentration means, but the last line on page I-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 3-8 are given in units of mg/kg but the units for these quantities in Attachment IV are mg/l.

6

20) vegetation sampling results: The high correlation ratio of 12 is for site S-15, not S-12 as stated on page 3-8.

21) 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 HCl emissions from the STARS launch are responsible. The observation of an increase in the chloride concentration at site S-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 HCl 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

Michael Jones
Physics Dept.
Univ. of Hawaii
2505 Correa Road
Honolulu, 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 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

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 August 28, 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: 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 EISs (U.S. Army Strategic Defense Command, 1992b;c). 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 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 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 Target System Final EIS on page 2-20 (U.S. Army Strategic Defense Command, 1992c) notes that the calculation of a 97-percent overall system reliability combines both key and non-key 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 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 J1) 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, 37 Vandal 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 (EA) 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 Kauai Test Facility (KTF). 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 (HCl) concentrations from Strategic Target System

Response 5: Air quality issues were exhaustively examined in the Supplement to the Environmental Assessment for the Strategic Target System and the subsequent EIS. Rocket Exhaust Effluent Dispersion Model (REEDM) 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 (SPEGL), 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 (7.5 mg/m^3). 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 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 0.025 ppm (Aki, 1991; Sugihara, 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 SPEGL 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 (USAEHA) in consultation with the State of Hawaii Department of Health 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 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 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 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 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 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 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.

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 USAEHA Report that "no appreciable pollutant-specific concentrations were measured at the GHA-S monitoring location during the STARS FTU1 launch" is accurate. Because the wind patterns on the morning of the FTU1 launch were different than those modeled in the REEDM predictions, it was not assumed that a direct quantitative comparison could be made.

Comment 13: DIFOUT computer model

Response 13: 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 the DIFOUT, TRPUF, 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 span, which is 80 percent of the 100 millivolt fullscale of the monitor. On the post-calibration span, 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 value 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 Interscan monitor 86182 were not reliable but the data in fig. 5 seem to come from Interscan monitor 86923." The meaning of this statement is not clear. Two HCl monitors were run at the AEB site, monitor 86182 and monitor 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 operation is described above. The instantaneous HCl ambient air concentration of 5.5 ppm presented in table 10 of the USAEHA report is derived from a 15-minute averaging period.

Comment 16: Methodology for calculating average HCl concentrations

Response 16: The air concentration data collected at the KTF during the morning of February 26, 1993, were obtained by ambient air monitoring equipment. The USAEHA 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 emitting source, either continuous or instantaneous. At this time, the USAEHA 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, possibly due to the refueling of the generators near this timeframe. 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 dubious 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 were validated data at the GHA-South perimeter site on February 26, 1993, from monitor 86181. The calibration data information page for HCl monitor 86181 was not included in Appendix I for the June 9, 1993, USAEHA Monitoring Report. This data sheet for HCl 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 ratio of 12 is for site S-15, not S-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,

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

Enclosure

MONITOR CALIBRATION AND SAMPLING DATA

Manufactor: Interscan Model: 4360SP SN: 86181

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

Multipoint Zero And Spans

Multipoints	Values	Linear Regression
Zero	0 PPM	0 PPM
Span 1 (set)	40 PPM	40 PPM
Span 2 (No linear regression due to varying HCl values caused by losses in the calibration		
Span 3 dilution system.)		

Pre and Post Zero/Span

Date	2/22/93	2/22/93	2/24/93	2/24/93
Pre or Post	Pre	Post	Pre	Post
Zero	0 PPM	0 PPM	0 PPM	None
Span	40 PPM	33 PPM	40 PPM	None

Pre and Post Zero/Span

Date	2/26/93	2/26/93
Pre or Post	Pre	Post
Zero	0 PPM	0 PPM
Span	40 PPM	39 PPM

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 08:49:40 – Three Peaks 12.5/13/12 PPM
08:49:40 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 (-2%) of full scale

STATE OF HAWAII
DEPARTMENT OF EDUCATION
P. O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF THE SUPERINTENDENT

August 30, 1993

MEMO TO: Mr. W. Mason Young, Administrator
Land Management Division, DLNR

F R O M: Charles T. Toguchi, Superintendent
Department of Education

SUBJECT: Draft Environmental Impact Statement
for Restrictive Easement
Pacific Missile Range Facility
TMK: 1-2-02: 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.

CTT:hy

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

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Mr. Charles T. Toguchi, Superintendent
Department of Education
State of Hawaii
Post Office Box 2360
Honolulu, HI 96804

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,

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

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

9-24

United States Department of Agriculture

Soil Conservation Service

P. O. Box 50004
Honolulu, HI
96850-0001

September 1, 1993

Mr. W. Mason Young
Division of Land Managment
Department of Land and Natural Ressources
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Young:

Subject: Draft Restrictive Easement Environmental Impact Statement
Pacific Missile Range Facility, Waimea, 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 Tulang at (808) 541-2606.

Sincerely,

NATHANIEL R. CONNER
State Conservationist

cc: Linda Ninh, U.S. Army Space and Strategic Defense Command,
CSSD-EN-V, P.O. Box 1500, Huntsville, AL 35807-3801
State of Hawaii, Office of Environmental Quality Control,
220 South King Street, Fourth Floor, Honolulu, HI 96813
Laurie Ho, District Conservationist, Lihue Field Office

"To lead the way in helping our customers conserve, sustain, and enhance Hawaii's natural resources through efficient service of the highest quality."

7 SEP 93 11:15

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Mr. Nathaniel R. Conner
U.S. Department of Agriculture
Soil Conservation Service
Post Office Box 50004
Honolulu, HI 96850-0001

Dear Mr. Conner:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your letter of September 1, 1993, indicating that you have no major concerns at this time regarding the Draft Environmental Impact Statement for the proposed restrictive easement.

We appreciate your time and effort in reviewing the document.

Sincerely,

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

(P)1644.3

SEP 2 1993

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
Waimea, 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 MATSUOKA
State Public Works Engineer

RY:jk
cc: OEQC
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 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Mr. Gordon Matsuoka
State Public Works Engineer
Department of Accounting and General Services
1151 Punchbowl Street
Honolulu, HI 96813

Dear Mr. Matsuoka:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your letter of September 2, 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. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

9-26

JOHN WAIHEE
GOVERNOR

BRIAN J. J. CHOY
Director

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
220 SOUTH KING STREET
FOURTH FLOOR
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185

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. J. Choy
Director

BC:jt

c: U.S. Army Space and Strategic Defense Command

REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

October 8, 1993

Environmental and
Engineering Office

Mr. Brian J. J. Choy
Office of Environmental Quality Control
State of Hawaii
220 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. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

JOHN WAIHEE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

September 9, 1993

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

LIBERT K. LANDGRAF
DEPUTY

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

W. Mason Young
Department of Land and Natural Resources
Box 621
Honolulu, HI 96809

Dear Mr. Young:

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

We have no comments.

Sincerely,

Michael G. Buck
Administrator

cc: OEQC
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 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

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,

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

9-28

MILITARY AFFAIRS COUNCIL

The Chamber of Commerce of Hawaii / Established 1850

735 Bishop Street
Honolulu, Hawaii
96813
(808) 522-8021
Fax (808) 522-8836

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 beach goers, it closes the access road for only 30 minutes, and affects no camping and picnic areas at Polihale 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.

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

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,

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

COALITION AGAINST STAR-WARS ON KAUAI
P.O. Box 1183
Hanalei, HI 96714
808-826-6814, Fax 808-826-1115

September 9, 1993

U.S. Army Space and Strategic Defense Command
P.O. Box 1500
Huntsville, AL 35807-3801
Attention: Linda Ninh

Dear Friends:

Pursuant to provisions of Hawaii Revised Statutes Chapter 343, herewith are our comments on the Draft EIS for the proposed grant of easement of Hawaii state land.

(1) The draft Grant of Easement (Appendix A of DEIS) which is apparently the same as the one appended to the DEIS of February, 1992 for the Strategic Target System (Appendix C), describes the activities at PMRF as related to the subject easement as "..to support the Department of Defense and other federal projects involved with the launching, tracking and collection of data associated with guided missiles, satellite and space vehicle research, development and evaluation and military training programs, ...". These are far beyond the scope of the launches of Strategic Target systems and Navy VANDALS; yet the DEIS does not address the impact of these other activities. This discrepancy was pointed out by the Sierra Club Legal Defense Fund in its comments of July 8, 1993. (Comment 1). The Army's response to this comment, by Lt Col. Schrepple on July 23, 1993, avers that the final version of the subject document will reflect the precise nature of the launch activities, and that such precise terms and wording are subject to further negotiation between the USG and Hawaii state. It seems illogical that before the precise terms are negotiated there could be an adequate and relevant DEIS. And it certainly gives reason for doubt on the part of the public, given that more than a year and a half had passed between the first issuance of the proposed GOE and the current DEIS , that the Army and the DLNR are not attempting to obfuscate the issues.

(2) The question of the legal responsibility of the State of Hawaii, through its Department of Land and Natural Resources, to serve the public in preserving Polihale State Park and maximizing public use and enjoyment (as provided under HRS §184-6) was raised by the Native Hawaiian Legal Corporation in its comments on the EIS Preparation Notice on July 8, 1993 (Comment 6). The Army's response to this important legal question, as stated in its response to the NHLC comments by Lt. Col. Schrepple on July 23, 1993, is so disingenuous as to border on the ludicrous. The Army claims that the denial of public use of the park is consistent with Hawaii Administrative Rules section 13-146-4 which provides that the DLNR may "close or restrict the public use of all or any portion" of state parks "when necessary for the ... safety and welfare of persons and property." The logic behind this citation of HAR 13-146-4 is analogous to the fire department wanting to tear down a building after first setting fire to it. Without the act of allowing hazardous activities to take place in and near a park there would not exist any condition that would warrant the invocation of section 13-146-4. The very act by the DLNR in executing the proposed GOE would create the very conditions that would render the park unsafe. Without the GOE and the consequent missile launches the DLNR would not have to invoke section 13-146-4, except in unforeseen circumstances such as natural disasters. The conditions generated by the execution of the GOE will lead to clearly predictable hazards to the public. (Hence the creation of a Ground Hazard Area.) Thus the Army's response to the comment by the NHLC is a non sequitur; and in no way exonerates the DLNR from its violation of the public trust.

(3) The park closures argued by the Army and the DLNR are by no means of limited durations. One must address the question of public access to the park. The location and the nature of use of Polihale State Park are such that members of the public (with the exception of a very small number who happen to live very near the park) do not casually (on the spur of the moment) decide to visit the park. For the vast majority of the residents of Kauai and the other parts of the state, as well as visitors from out of state, a trip to Polihale is planned well in advance, the planning to include such matters as obtaining camping permits from the DLNR, arranging for vehicle or boat transport etc. Since the military refuses to provide a schedule of the 30 launches per year the public has no way to plan and be assured that any plan be abruptly abandoned at the last minute. The U.S. government does not even provide for any short term notification. Paragraph 7 of the proposed GOE states, " The UNITED STATES will attempt to notify the STATE at least seven (7) days prior to each scheduled launch requiring the exercise of the above rights." (Emphasis added by us.) The actual experience with the first two launches in 1993 of the STARS has been the announcement of a not very specific 30-day window. The DLNR was apparently notified of the exact launch date (as evidenced by its posting of guards on the approaches to Polihale Park; but refused to respond to the public's inquiry as to the launch date, except to instruct members of the public to call every day to learn if there was to be a launch on that particular date). It thus becomes clear that the U.S. government and the DLNR have conspired to deny the public the opportunity to plan for visits to Polihale State Park; and thus in effect deny public access on an indefinite basis. It would seem much more logical, considering that Polihale is a state park created primarily for the use and enjoyment by the public, to set aside thirty time slots during the year to accommodate the needs (legitimate and palpably free of environmental impacts) of the U.S. government (and these needs are certainly secondary to those of the public in this time of no national emergency), and allow the public unrestricted access and the opportunity to plan for visits to the park. Such an arrangement would also be consistent with the obvious tenet that the state of Hawaii and its agencies owe first allegiance to the interests and welfare of the citizens of the state of Hawaii.

We of the Coalition Against Star Wars on Kauai believe that the legal questions posed above raise sufficient doubt on the legitimacy of the proposed Grant of Easement that the whole matter should be either abandoned or seriously reconsidered, with adequate attention given to the concerns of the public to which the state and the DLNR, in particular, owe first allegiance.

Sincerely yours,

Raymond L. Chuan

Raymond L. Chuan, PhD
Co-chair

cc: DLNR
SCLDF
Mayor Yukimura

9-30

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Raymond L. Chuan, Ph.D.
Coalition Against Star-Wars on Kauai
P.O. Box 1183
Hanalei, 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 able 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 Polihale 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 analysis 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 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 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 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 campers were delayed from entering or leaving Polihale State Park during the temporary closure of the access road.

Sincerely,

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

West Kauai Business & Professional Assn.

P. O. Box 903; Waimea, Kauai, Hawaii 96796 Telephone (808) 338-9957

Sept 8, 1993

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

Dear Senater Inouye,

The West Kaua' Business & Professional Association (WKBPA) 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.

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

With Kekaha and Waimea being the closest towns to PMRF, WKBPA 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.

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

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

Sincerely,

Calvin Shirai
Project Director
West Kauai Main Street

Owen Moe
President
West Kauai Business &
Professional Association

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

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

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,

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

COMMENT ON RESTRICTED EASEMENT EIS

The restricted easement on State 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 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 concure 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 effect 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, OHA and the Hui Malama I Na Kupuna O Hawaii 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 concure 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 picnicing 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 statment no significant impact would occur.

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

Thomas Nizo

THOMAS NIZO
P.O. BOX 64
MAKAWELI, HI
96769

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Thomas Nizo
P.O. Box 64
Makaweli, HI 96769

Dear Mr. Nizo:

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. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

COMMENT ON RESTRICTED EASEMENT EIS

The restricted easement on State and Kelaha 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 concure 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 effect 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, OHA and the Hui Malama I Na Kupuna O Hawaii 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 concure the launch related activities within the GHA will not impact the socioeconomic of the area.

The state parl area within the restricted easement boundary would be cleared during launch activities. No campsites of picnicing 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 statment no significant impact would occur.

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

Scott A. Zenger
P.O. Box 1208
Kalaheo, HI 96741

1

9-33

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Scott A. Zenger
P.O. Box 1208
Kalaheo, 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 E. Diesen
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.

Noise: 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 (HM) would be introduced into the restricted easement area; therefore, no significant impacts are expected to occur.

Socioeconomics: I agree that this proposed action will not impact the socioeconomics 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 have no 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 more of 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 of the infrequent excise of the easement of up to 30 times per year

Sincerely,

Robert Inouye

Robert Inouye
Lihue, HI

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Robert Inouye
2639 Alaekea Street
Lihue, HI 96766

Dear Mr. Inouye:

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. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

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

September 9, 1993

PMRF Grant of Easement Testimony

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 roared 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. The ones that have survived are now waiting for the tourist to decide Hawaii is chic 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 that 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 todays 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.

9-36

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Averiet 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 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,

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

September 9. 1993

Department of Land and Natural Resources
P.O. Box 621
Honolulu, HI 96809

Re: Draft Restrictive Easement Environmental Impact Statement (EIS)

Dear sirs,

My comments for the official record:

I strongly endorse the proposed restrictive easement because it will allow PMRF to continue it's 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, 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 Kauai are now hiding behind the sovereignty movement. While the small minority opposed to PMRF and it's 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 merry 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 doubt,.... 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 Ms. Freeman! .....are you listening Ms 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 expouse 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,

Freemen'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 one simple reason public safety. It's as simple as that. It's not a STARS issue, it's not 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
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

MCPO Richard M. Irwin, USN. (Ret.)
3441 Aso 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 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,

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

U.S. Army Space and Strategic Defense Command
P.O.Box 1500
Huntsville, Alabama 35807-3801

Attn: Linda Ninh

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

I am a long time Westsider that actually uses the Polihale beach area, unlike a few very vocal protestors 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 inconvenience 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 SSDF 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 a user of the Polihale beaches including Nohili Dunes, I stand solidly in support of this project.

Robert R. Valencia Sr. 9/9/93
Robert R. Valencia Sr.
P.O. Box 723
Kekaha, Hawaii 96752

DEPARTMENT OF THE ARMY
U.S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Robert R. Valencia
P.O. Box 723
Kekaha, HI 96752

Dear Mr. Valencia:

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 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,

Thomas E. Dresen
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. Loretta Lopez
Makaweli, Hi
96769

2. Emalia Kanahele
Ekeke Hi
96705,

3. Keala Schmidt
P.O. Box 281
Makaweli, Hi 96769

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Loretta Lopez
c/o Keala Schmidt
P.O. Box 281
Makaweli, HI 96769

Dear Ms. Lopez:

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. Dresen
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 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Emalia 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 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. Dresen
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 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

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 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. Dresen
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,

Fernando Compoc
P.O. Box 596
Lawai, Kauai, HI 96765

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Fernando Compoc
P.O. Box 596
Lawai, HI 96765

Dear Mr. Compoc:

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. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

9-42

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,

Christine Nonaka
P.O. Box 451
Hanapepe, Hi 96716

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Christine Nonaka
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,

Thomas E. Dresen
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,

Russell Ruiz P.O. Box 999 Kekaha, HI. 96752

Michael Castillo P.O. Box 396 Waimea HI 96796

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Russell Ruiz
P.O. Box 999
Kekaha, HI 96752

Dear Mr. Ruiz:

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. Dresen
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 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Micheal Castillo
P.O. Box 386
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. Dresen
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] POB Hanapepe, HI 96716
2. [signature]
P.O. Box 112
Kekaha, Hi. 96752
3. [signature]
P.O. Box-1933
Lihue, HI 96766

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Manuel L. Cabral
P.O. Box 282
Hanapepe, 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 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. Dresen
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 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Benjamin Domingo Jr.
P.O. Box 112
Kekaha, 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 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. Dresen
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 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Fernando Bran Jr.
P.O. Box 1933
Lihue, HI 96766

Dear Mr. Bran:

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. 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 interupted 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.

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	PAUL MIRAHAM JR	Box 703 IOLEKAA HI 96732
	WINONA LEI MARTIN	PO Box KEKAHA, HAWAII 96752
	KENNETH YOSHIDA	P.O. Box 66 LAWAI 96765
	Gary [illegible]	PO Box 162 ELEELE 96705
	[illegible]	[illegible] 96797
	Mary A Hemphill	Box 565 Kekaha HI. 96752
	BRUCE K. SHIMADA	P.O. Box 258 WAIMEA 96796
	LEON GONSALVES JR	PO Box 101 KALAHEO 96741-001
	[illegible]	[illegible]
	[illegible]	P.O. Box 53 [illegible] 96765
	Scott [illegible]	PO Box 211 [illegible] 7676
	Calvin Cravalho	P O Box 646 Kalaheo 96741
F. DeCosta JR	Francis W DeCosta Jr	P.O. Box 505 Kekaha 96752

Signature	Name	Address
	Damien D. Costa	Po Box 913 Waimea
	CHARLES PERERA JR.	P.O. BOX 361 HANAPEPE
	SYDNEY S SAKAI	P.O. BOX 4428 KOLOA
		P.O. Box 152 Kekaha
	Marshall Ando	P.O. Box [illegible]
	Glenn Ado	P.O. BOX 129 KEKAHA
	Jack K Lee	PO Box 76 Waimea
	Robert Link Lenki	P.O. Box 1078 Kekaha
	Debora Arpoalani	P.O. Box 433 Kekaha
	Charles K. Fu	PO Box 165 Waimea
	C. Kuhana Arpoalani	P.O. Box 433 Kekaha
	Myrene Mary K Costa	PO Box 525 Kekaha HI 96752
	Emmanuel K. Silva	P.O. Box 259 Waimea
	Clare L Nihen-Yong	PO Box 145 Makaweli HI 96769
	Hueman Yong	PO Box 145 Makaweli HI 96769
	AUBREY H. KUNISHIGE	P.O. Box 693 WAIMEA HAWAII 96796

Signature	Name	Address
	NELSON T HASHIMOTO	P.O. Box 242 Kekaha HI 96752
	Edwin Ikeshima	" " "
	Sadao Inazu	PO BOX 626, Kekaha HI 96752
	Doreen T Inoue	" " "
	Claire Seaver	" "
	Charles Nitta	P.O. Box [illegible] Kekaha HI
	Tometsu Nitta	P.O. Box 6 Kekaha HI 96752
	YOSHIE N MASUMOTO	P.O. Box 162 Kekaha HI 96752
	Hajime Masumoto	" " "
	Masao Ueno	P.O. Box [illegible]
	HISAKO UENO	P.O. Box 236 "
	Thomas Shimaoka	P O Box 605 Kekaha
	Doris Shimaoka	P O Box 605 Kekaha
	[illegible]	[illegible]
	Edgar Hayashi	[illegible] Kekaha
	Haruko Ando	P.O. Box 424 Kekaha
	Lyoshi Ando	P.O. Box 424 Kekaha
	Michael Yula	PO Box 883 Waimea
	Yoshie SMITH	P.O. Box 271 Kekaha, HI 96752
	Ambrose Smith	" "
	Shimatsu	Box 411 Kekaha Hi. 9675

9-68

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

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 Waimea 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 690 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. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

DEPARTMENT OF WATER
RECEIVED
COUNTY OF KAUAI
DIVISION OF WATER
LIHUE, HAWAII 96766-5706
PHONE NO: (808) 245-5406 FAX NO. 245-5813
Sep 14 11 55 AM '93

September 10, 1993

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

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.

Jeremiah M. Kaluna
Acting Manager and Chief Engineer

WH:et

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

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. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

JOHN WAIHEE
GOVERNOR OF HAWAII

COPY

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

REF:HP-AMK

SEP 10

KEITH AHUE, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES

JOHN P. REPPUN III
DONA L. HANAIKE

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

LOG NO 9118
DOC NO 9308NM69

MEMORANDUM

TO Brian Choy, Director
Office of Environmental Quality Control

FROM Keith Ahue, Chairperson and
State Historic Preservation Officer

SUBJECT Draft EIS for the PMRF Easement over State Land for Safety and Ground Hazzard Areas for STARS and Navy Vandal Missile Launches Historic Preservation Review & National Historic Preservation Act Compliance
TMK: 1-2-02: por. 1, 15 and por. 24
Mana, Waimea, Kaua'i

We have reviewed the above document It should be clearly stated in the document that no 100 % archaeological inventory survey has been conducted in the ROI (2110 acres) Small portions of the area have been recently surveyed by DLNR- State Parks (Carpenter and Yent, pers . com August 1993) However, it is presumed that no physical action will occur in this area Therefore, since it is an easement, we concur 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 permanent signs No map was provided on the location of these siens Since they will be permanent, we need to know what type of construction will take place, along with information on the design of this signs

The summary on the archaeological research conducted to date, should be updated and include the following: Cleeland 1974, Bordner 1976, Sunoto 1978, Kikuchi 1970, Kennedy/Jenks 1982, Yent 1982, McMahon 1988a & b, Gonsalez et al. 1990, Walker, Kalima & Rosendahl 1990, Welch 1990a & b, U S Navy (n d), draft Flores and Kaohi 1992 and O' Hare & Rosendahl 1993 Appendix D-1 should be updated to include current State of Hawaii inventory sites numbers 6017, 6018, 6019, 6020, 6021, 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 McMahon at 587-0006

NM:amk

c: Linda Ninh, U.S. Army Space and SDC

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Mr. Keith 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 Restrictive Easement

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 in 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 take place, 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: Cleeland 1974, Bordner 1976, Sinoto 1978, Kikuchi 1970, Kennedy/Jenks 1982, Yent 1982, McMahon 1988a & b, Gonzalez et al. 1990, Walker, Kalima, and Rosendahl 1990, Welch 1990, U.S. Navy (n.d.), draft Flores and Kaohi 1992, and O'Hare & Rosendahl 1993. Appendix D-1 should be updated to include current State of Hawaii inventory site numbers: 6017, 6018, 6019, 6020, 6021, 6024, and 724.

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,

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

M.K. DEAN - Hawaii

P.O. Box 82 - Lawai, Hawaii 96765
TEL: (808) 332-8431 FAX: (808)

9/13/93

W. Mason Young
Dept. of Land & Natural Resources
P.O. Box 621
Honolulu, HI 96809

SEP 15 2 00 PM '93

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 world stress. In addition we want to do everything possible to insure that the Navy Base will remain on Kauai for helping to keep our island alive in this time of severe economic stress.

Sincerely,

Melvin K. Dean

DEPARTMENT OF THE ARMY
US ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

Environmental and Engineering Office

October 8, 1993

Mr. Melvin K. Dean
P.O. Box 82
Lawai, HI 96765

Dear Mr. Dean:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your letter of September 13, 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. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

9-71

14 September 1993

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

Attention: W. Mason Young

Subject: RESTRICTIVE EASEMENT

Dear Mr. Young:

I support the Restrictive Easement required for missile launches by the Pacific Missile Range facility and it's various users.

As mentioned by the majority of speakers in the public information meeting held on 09 September 1993, without this easement, most of the operations held at Barking Sands would be cancelled which would then make PMRF an excellent 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 their 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 hopeful that the new contractor will be rehiring all the employees 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 effort 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.

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 nui loa for allowing myself to express my opinions on the subject matter. May God's blessings be with you during this stressful decision making process!

Sincerely,

Randy R. Chinen
P.O. Box 1133
Kekaha, Kauai, Hawaii 96752-1133
Ph. (808)337-1586

copy: U.S. Army Space and Strategic Defense Command
Attn: Linda Ninh
P.O. Box 1500
Huntsville, Alabama 35807-3801

Office of Environmental Quality Control
220 South King Street, Suite 400
Honolulu, Hawaii 96813

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Mr. Randy R. Chinen
P.O. Box 1133
Kekaha, Kauai, HI 96752-1133

Dear Mr. Chinen:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your letter of September 14, 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. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

RECEIVED
DIVISION OF
LAND MANAGEMENT
SEP 22 10 33 AM '93

Lihue, Hawaii
Sept. 16, 1993

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 PMRF on their EIS draft application for a Land Use Agreement for an restrictive easement at Mana, Kauai, HI.

I hereby submit my testimony in favor of the request of Pacific Missle Range Facility's request for a restrictive easement at Mana for reasons of safety for the public when missles 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, for 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 missle misfiring.

As to pollution, there is no evidence of any pollution in the area from the multitudes of launches of various types of missles from this base over the past 20 years or more of missle launches.

One of the main mission of PMRF or Pacific Missle Range Facility has been the firing of test missles far into the Pacific range and they are accomplishing this mission with a 100% efficiency and safety.

PMRF is the only high tech industry on Kauai at this time and they employ more than 700 workers at this base making them the largest employer on Kauai at this moment.

I urge the members of the Land Board to support PMRF draft EIS application for the creation of a restrictive easement at Mana, Kauai, Hawaii.

Your favorable consideration is respectfully solicited.

Respectfully yours,

Turk Tokita
2794 Pikake St.
Lihue, Hi. 96766

9-74

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Mr. Turk Tokita
2794 Pikake Street
Lihue, HI 96766

Dear Mr. Tokita:

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. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

RECEIVED
DIVISION OF
LAND MANAGEMENT
Sep 22 10 20 AM '93

Lihue, Hawaii
Sept. 17, 1993

Mr. W. Mason Young
Dept. of Land & Natural Resources
P. O. Box 621
Honolulu, Hi. 96809

Dear Mr. Young:

I hereby submit my testimony in favor of the request of Pacific Missle Range Facility's request for a restrictive easement at Kana for reasons of safety for the public when missles are launched from the base.

P.M.R.F. has a good record of safety on their launches, having a rated safety factor of 95% to 97%. There has never been an accident at this base caused by missle misfiring so their safety factor to date is 100%. I don't believe that you can get a better record than that.

The base at PMRF serves as an active participant in the yearly International Pacific Rim Nations joint training and manuevers for air, land, water and underwater exercises and curtailing or hampering a part of the mission of the base would cripple the entire complex.

There is no evidence at the missle 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 Mana, Kauai, Hawaii.

Respectfully yours,

Paul T. Akana
2809 Pikake St.
Lihue, Hi. 96766

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Mr. Paul T. Akama
2809 Pikake Street
Lihue, HI 96766

Dear Mr. Akama:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your letter of September 17, 1993, indicating your support for the proposed restrictive easement.

Sincerely,

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

[redacted]

RECEIVED
DIVISION OF
LAND MANAGEMENT
SEP 20 10 53 AM '93

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

Tom Hughes
Enc.(1)
cc: U.S. Army Space and Strategic Defense Command
Office of Environmental Quality Control

9-76

Forum The Garden Island

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 feature story weaves a deceptive combination of facts with falsehood which seems to be essentially a prejudged acceptance of the future report of the GAO. The report is said to be recommending "saving millions of dollars by launching a series of "Star Wars" tests from California rather than from the PMRF on Kaua'i." The article quotes a selected source saying "a large segment of the population in Hawai'i does not want the problem." It also says that "the report is expected to bolster arguments made by critics of the Kaua'i launches that the tests would ... cause less damage to Hawai'i's pristine tropical environment if they were launched from the mainland Air Force base."

The whole slant and emphasis here is insidiously attempting to undermine the missile launching program at PMRF. It creates the specter of large segments of the population and many critics expecting the worst scenario 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 Kaua'i wholeheartedly support the mission of PMRF including its work on systems to defend against incoming missile attacks. Two highly successful launches have shown the few doom and gloom predictors that they have misplaced emotions.

The article correctly states that the GAO report was "requested by Rep. John Conyers, D-Mich." It did not add the further information that anti-PMRF Kaua'i activist Elizabeth Freeman has been working in collusion with Conyers to get the GAO study done and has used this back-door approach to stop missile launches at PMRF! In addition, Conyers is known to be essentially anti-military and still works on the naive assumption that the STARS program is really not even necessary because the Soviet warheads are no longer a threat! This asinine view may explains why Michigan is in trouble—having a representative like Conyers.

In a continuing misrepresentation of the facts, your news article says "the Sierra Club Legal Defense Fund has filed several lawsuits against the Army in an attempt to block further tests (at PMRF)." Why not write the facts? The Sierra Club last Lost several lawsuits, lost in the Environmental Impact Statement, and lost in attempts to get the Clinton Administration to issue an executive order ending the research on defensive missile systems of which STARS is a part. The emphasis here is "lost" lawsuits, not "filed" lawsuits. There have been two successful launches since the Sierra lawyer lost the lawsuits, in case the writer of the misleading article just arrived in Kaua'i. Semantics can help a lot when you want to slant a story but the blatant abuse of words is not often as plain as in this case.

The news story on the same page starts out with a proper headline: "Backers show support at PMRF hearing." It covers the public information hearing, by the State of Hawai'i, Department of Land and Natural Resources, held in Waimea. The story could have been improved with emphasis to fit the headline. Only three people spoke against PMRF at the meeting while very large numbers were supportive of the base. This incidentally included a large number of native Hawaiians who realize that the U.S. Navy is very helpful in properly preserving their sacred areas.

The professional "harassment group," which I'll call them to save space since they go by several names, went to Washington in a desperate attempt to essentially take the heart out of PMRF by denying its vital mission of using missiles in tests, training, and defense research. These few people have been a continual harassment of the PMRF personnel for several years: Not one of the harassment group is elected, or even electable, yet now they are trying to use the Congress, through zealots like Conyers, under the new guise of cutting the budget, which is a very popular item at this time. Maybe it is too much to expect all of news media to at least provide a balanced view of the operations of the harassment group and the devious ways they are trying to accomplish their aims.

Perhaps it's just as well that hey had to go to the likes of Conyers, a congressman from Michigan, who has a skewed track record. I thank God for our Senator Dan Inouye who by his recent actions has proven that he is indeed one of the 51,000 real friends of Kaua'i.

Tom Hughes
Kalaheo

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Mr. Tom Hughes
P.O. Box 1319
Kalaheo, HI 96741-1319

Dear Mr. Hughes:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

Thank you for your letter of September 17, 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. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

JOHN WAIHEE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF BUDGET AND FINANCE
HOUSING FINANCE AND DEVELOPMENT CORPORATION
677 QUEEN STREET, SUITE 300
HONOLULU, HAWAII 96813
FAX (808) 587-0600

JOSEPH K. CONANT
EXECUTIVE DIRECTOR

IN REPLY REFER TO:
93:PPE/4556

September 20, 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.

c: OEQC
Ms. Linda Ninh, 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 35807-3801

REPLY TO
ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Mr. Joseph K. Conant, Executive Director
Department of Budget and Finance
Housing Finance and Development Corporation
State of Hawaii
677 Queen 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. Dresen
Lieutenant Colonel, U S. Army,
Product Manager, Strategic Targets

9-78

JOHN WAIHEE
GOVERNOR
STATE OF HAWAII

HOALIKU L. DRAKE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P. O. BOX 1879
HONOLULU, HAWAII 96805

September 20, 1993

Mr. Mason 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, Waimea, Kauai; TMK 1-2-02: Por. 1, 15, and Por. 24

The proposed easement agreement would restrict the use and development of the 2,110 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 easement 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.

For 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 Ben Henderson of our Planning Office at 586-3838.

Warmest aloha,

Hoaliku L. Drake, Chairman
Hawaiian Homes Commission

HLD:BH:JC:asy/3003L

cc: OEQC
U. S. Army, SSDC

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Mr. Hoaliku 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 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: Description of proposed easement

Response 1: Your comment provides an adequate description of the proposed action.

Comment 2: Compensation 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. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

Responsible Citizens for Responsible Government

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 Vandal Missile Launches.* I further request that Congressman Conyer's 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 Conyer's 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 overtly fallacious (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

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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 taxpaying 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,

Elizabeth Freeman

Elizabeth Freeman
Director, Responsible Citizens for Responsible Government and Pacific Peace Trust

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 Ebeye 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

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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 arc. The article quotes Valerie Arruda, spokeswoman with the Space and Missiles Center at Norton Air Force Base in San Bernadino, 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.

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september 17, 1993
september 17, 1993

VAFB missile in 'state of shock'

Guidance glitch blamed in failure

By Nora K. Wallace

A Minuteman I intercontinental ballistic missile was in a "state of shock" when it veered off course June 15 and had to be destroyed, a military investigation has determined.

Eight seconds after it blasted out of its silo at Vandenberg Air Force Base, the missile deviated from its flight path, prompting safety crews to blow it up. The blast hurled showers of flaming debris toward the ground igniting a 1,000-acre brush fire that sent residents of nearby Cuyama into a voluntary evacuation.

The out-of-control test was set to develop "lightweight target objects and techniques to deploy them," an Army spokesman said. The objects would have been used in future Strategic Defense Initiative experiments managed by the Ballistic Missile Defense Organization.

The ill-fated test cost the Defense Department $18 million.

The 21-member investigative team narrowed the missile's erratic behavior to a problem with part of the guidance system, called the "reset bit," said Maj. Michele Boyd, spokeswoman at Los Angeles Air Force Base. The guidance system is referred to as "the brains" of the missile.

Rather than finding a single cause for the accident, Boyd said the failure is linked to two possibilities: mechanical or electrical malfunctions.

A mechanical defect would have

See MISSILE, Page A 3

Missile

Continued from Page A 1

meant that at launch, "the missile was in kind of a shock," Boyd said. "It was cold-soaked at launch, is (it) dazed state and didn't know what to do. It was as if someone got popped in the head by a baseball or puck — that kind of dazed."

A surge in electrical power also could have caused the missile to go out of control, but the Air Force could not determine "where those might have come from. The systems are always grounded," Boyd said.

The launch was part of the Army's Space and Strategic Defense Command's target development test. It cost about $18 million to produce the payload aboard the Minuteman. Missile launches alone typically cost $3 million.

The explosion was so extensive that the investigation team was "looking for a needle in a haystack" when it examined the debris, said Valerie Arruda, a spokeswoman with the Space and Missiles Systems Center at Norton Air Force Base in San Bernardino.

"Nothing like this has ever happened before," Arruda explained. "Once it is launched and you destroy it, there's not much evidence left."

A military official said the investigation into the mishap was finished in late July, but repeated requests by the News-Press for the results were not answered until this week. A military spokeswoman could not explain why it took so long to get answers.

Fifteen Minuteman I missiles remain in the Air Force's supply, but Boyd said the accident does not preclude future Minuteman I launches. Minuteman 2 and 3 missiles also will not be affected, she said.

Investigators recommended the military review electrical systems and inspect missile grounding fixtures, Boyd said. Computer modules, boards and connectors associated with the Minuteman system also will be cleaned and inspected, she added.

Experts critical of the military's practice of using aging missiles to launch expensive defense experiments have expressed concern about the mishap. The Minuteman destroyed in June was 28 years old and the "aging phenomenon is not understood," Arruda admitted.

The explosion drew the notice of a group of scientists and environmentalists protesting the launching of a missile system similar to the Minuteman.

David Wright of the Union of Concerned Scientists in Boston tracked reliability rates of the Minuteman I to help determine potential problems with the Polaris missile. The Polaris, developed originally as a weapon launched from submarines, is used for a new program called the Strategic Target System, or STARS, in Kwaj.

"There are complex machines which have been going around for more than 30 years," Wright said. "The lesson is, you have to expect these things to happen."

Anti-ballistic missile defenses, which Jason Minuteman I test had STARS set intended to develop, are "the most expensive and least effective way to approach the problem of nuclear weapons proliferation," Wright said in June.

"The bottom line is these are complicated systems," he said. "It's not that the people are incompetent. If you're thinking about making public policy based on this, you need to look at the reliable environmental risks."

To Marla Smaalders
Sierra Club
Legal Defense

From Nora Wallace
805 736 1070

CVI

SB News-Press

Martin Marietta wins competition to convert Minuteman IIs

Martin Marietta has received a $30 million Air Force contract to convert decommissioned Minuteman II ICBMs into target vehicles and launch them in support of Defense Department test programs.

The company, which observers said was chosen over Boeing, Orbital Sciences and Rockwell, could win $133 million under the contract if all options are exercised.

The Minuteman IIs, taken out of service because of Strategic Arms Reduction Treaty agreements, would carry sensors and be used as ballistic and sounding rocket targets for other sensors, most of which would be operated by the Strategic Defense Initiative Organization.

The contract, awarded Monday, calls for conversion of two Minuteman IIs, one of which would be launched in August 1994 and the second in October 1994. If the Air Force exercises its contract options, 42 additional missiles would be converted and launched.

Facilities from which the launches would be made include the Eastern and Western Test Ranges, Wallops Island, Poker Flats, Barking Sands and Kwajalein Missile Range.

Martin Marietta Astronautics Group's Launch Systems Co., Denver, received the contract from the Air Force's Ballistic Missile Organization. It calls for the company to build a new front section for the Minuteman II, which includes new guidance and range safety systems.

In addition to providing launch services, Martin Marietta will provide ground support equipment, perform payload integration and mission analysis.

A total of 182 Martin Marietta people will be involved in the five-year Multi-Service Launch System (MSLS) contract.

"This is an important win in the continuation of our launch systems business," said John D. Eagen, MSLS program director.

Kazakhstan accepts START treaty conditions

Kazakhstan President Nursultan Nazarbayev accepted U.S. conditions for ratifying the Strategic Arms Reduction Treaty (START) protocol and agreed to sign the Non-Proliferation Treaty (NPT) as a non-nuclear state, Thomas Niles, assistant secretary of state for European and Canadian affairs, said at a White House briefing.

Nazarbayev's acceptance came after meetings with President Bush and Secretary of State James Baker. Baker received Nazarbayev's signed confirmation at breakfast Tuesday, Niles said.

The treaty calls for Kazakhstan to eliminate 104 SS-18 missiles and 1,040 warheads within seven years of ratification by all five signatory nations, Niles said.

Leaders of the U.S., Kazakhstan, Russia, Belarus and Ukraine could sign the protocol as early as Sunday during a session in Lisbon to discuss aid to the former Soviet republics, according to Jack Mendelsohn, deputy director of the Arms Control Association in Washington.

At this pace, he said, the Senate could begin debating the treaty as early as the first week of June and could ratify it before Congress's Fourth of July recess. At the outside, it should be ratified by the November presidential election, he predicted.

"If anything, people will want to speed it through rather than hold it up because the clock won't start ticking on all these commitments until the treaty is in force," he said. "People will recognize that it's in our interest to get this thing up and running" as soon as possible.

Niles, however, said he was unsure whether last-minute paperwork could be completed by this weekend, guessing that the process could take weeks. Nazarbayev did agree to the same protocol that Ukrainian President Leonid Kravchuk agreed to two weeks ago in Washington, but U.S. officials must ensure that Belarus and Russian officials will also agree to these terms, Niles said.

"There are no new terms," he said. "We just need to make sure everybody agrees to the same thing."

The governing bodies in the former Soviet republics aren't expected to face any major obstacles to ratification, Mendelsohn said. He predicted, however, that nationalists in Ukraine and Kazakhstan will oppose giving up nuclear weapons, which means surrendering a certain amount of political power.

The Senate is expected to debate whether to count warheads instead of just delivery systems, whether deeper cuts should be made than were called for in the [illegible] former, how firm the commitment [illegible] (Daily, Vol. 19)

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Ms. Elizabeth Freeman
Responsible Citizens for Responsible Government
P.O. Box 1440
Hanalei, HI 96714

Dear Ms. Freeman:

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 in this letter to your comments. Your comments and these responses will be included in the Final EIS.

Comment 1: Government Accounting Office (GAO) report

Response 1: The U.S. Army is in the process of reviewing the recently released GAO report concerning the Strategic Target System program. Currently we find no relevance of this report to the environmental issues pertaining to the proposed action being evaluated in the subject EIS.

Comment 2: Strategic Target System EIS

Response 2: It is unclear from your comment whether you believe the GAO report reflects negatively on statements in the Strategic Target System EIS regarding the purpose and need for the Strategic Target System program on Kauai, the analysis of alternatives, or the environmental impact analysis. With regard to the need, 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 need for the restrictive easement would exist irrespective of the need for Strategic Target System launches from Kauai because of the Navy Vandal launches in support of fleet training and test and evaluation missions. With regard to the analysis of alternatives, 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 a unique asset for the testing community for which there is no readily available substitute. 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.

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 5.0 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 Waimea-Kekaha 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. Oresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

21 Sept. 1993

Dept. of Land and Natural Resources
Attention: W. Mason 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 5640 feet from the launch pad (which is indicated as LF-03). The cluster of debris near this location is attributed to the explosion of the 2nd and 3rd stages of the missile upon impact.

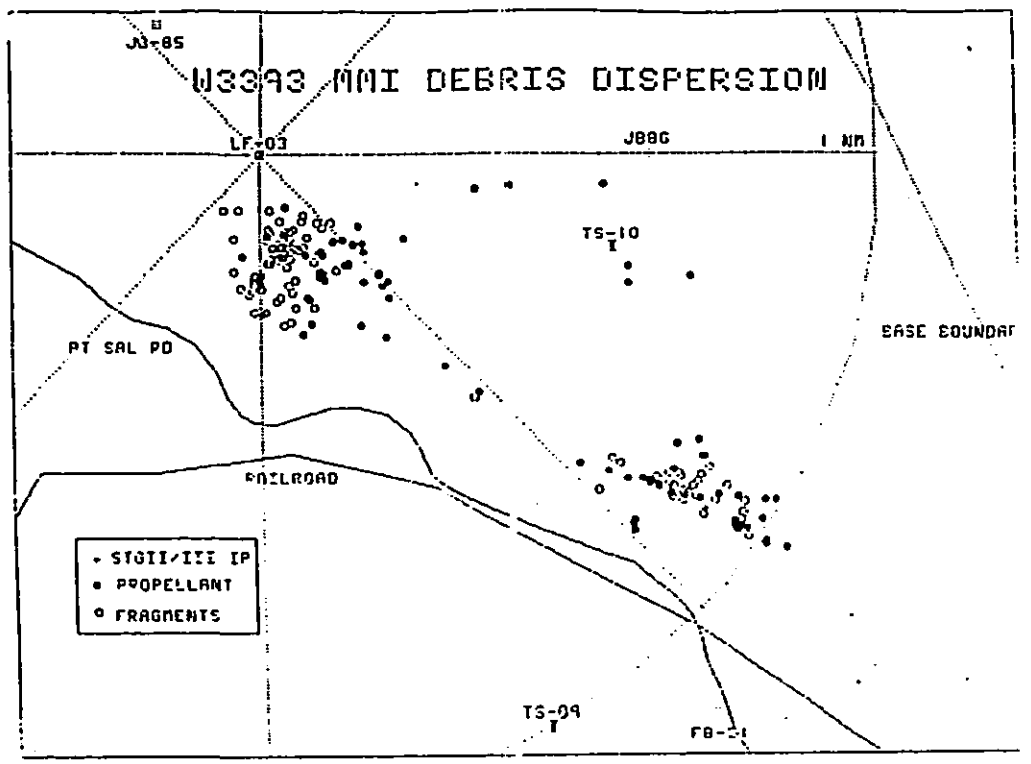
The second attached figure is Figure 2-2 from the Draft Restrictive Easement EIS with the MM I debris dispersion diagram, reduced to approximately the same scale, in the upper left corner. One can see from comparing these diagrams that the cluster of debris associated with the impact of the 2nd and 3rd MM I stages is at a distance from the launch pad comparable to that of the road to Polihale 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
2505 Correa Road
Honolulu, Hawaii 96822

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



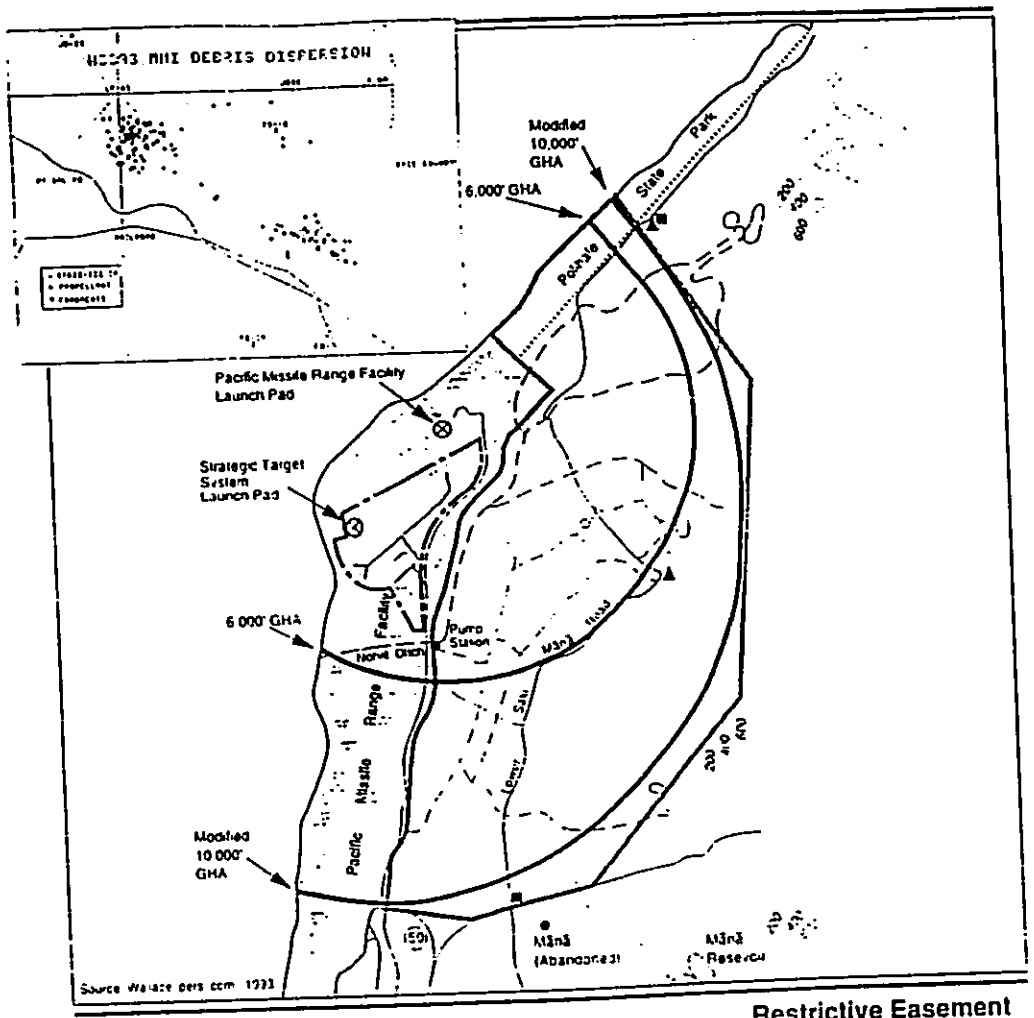
a. Two plots showing the debris impact dispersion after breakup. The solid circles present the solid propellant impact locations. The empty circles present the other fragment types (metallic, ceramic, rubber, etc.) impact locations. The plus (+) presents the intact stage 3,stage 3/payload impact location. The concentration of debris nearest to LF-03 is from stage 1. The concentration of debris further away from LF-03 represents the dispersion from the stage 2/stage 3/payload exploding after impacting the ground intact.

b. The following is a flight event sequence:

	TIME FROM STG 1 IGNITION, SECONDS	UTC
Stage 1 Ignition current	0.00	1730:00.66
Liftoff	0.15	1730:01.032
Command Destruct Destruct Command	8.54	1730:09.42
Stage 1 Motor Pressure Rapid Drop	8.54	1730:09.42
Impact (Telemetry LOS)	37.12	1730:38.00

9-83

9-84



Restrictive Easement Boundary and Ground Hazard Area Boundary

Figure 2-2

DEPARTMENT OF THE ARMY
U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND
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REPLY TO ATTENTION OF

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 comment 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 in this letter 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 reopen any portion not immediately necessary for safety-related purposes. For example, if a portion of Polihale or Lower Saki Mana roads needed to be avoided for several hours, there are numerous detours that would be available using the network of cane haul roads that criss-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. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

NATIVE HAWAIIAN LEGAL CORPORATION
1164 BISHOP STREET • SUITE 1205 • HONOLULU, HAWAII 96813 • TELEPHONE (808) 521-2302 • FAX (808) 537-4268

September 22, 1993

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

U.S. Army Space and Strategic Defense Command
P.O. Box 1500
Huntsville, Alabama 35807-3801

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, 2-1. 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. Paty, 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 make 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

9-86

183, H.R.S.[1]).

3. Inaccuracy of "Environmental Analysis Process Background"

The section of the DEIS entitled Environmental Analysis Process Background, DEIS at 1-3ff, 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 2-4, states that "(t)he U.S. Navy would notify the State of Hawaii, the Kekaha 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 GRANTOR at leats seven (7) calendar days prior to each scheduled launch requiring the exercise of the above rights." Id., ¶ 7. The Grant of Easement must be amended to require actual (not merely "attempted") notice to the State

[1]The DEIS, at 5-12, states that in State of Hawaii v. Cheney, Civ. 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." This statement significantly misrepresents the holding of that case. While the Cheney Court recognized the United States' ability to hide behind the shield of sovereign immunity to avoid the burden of complying with state law, in no way did Cheney determine that the State of Hawaii or its agencies could enter into an agreement disposing of public lands, as is proposed, without ensuring that the State's tenant is in full compliance with state law, including the CDUP requirement. Accordingly, the proposed Grant of Easement is not exempt from the CDUP requirement, and failure to ensure compliance with state law would render the Board of Land and Natural Resources and its tenant vulnerable to a replay of the Sierra Club v. Paty litigation. Furthermore, Cheney did not concern land owned by the State of Hawaii and leased to the United States. Because the State of Hawaii cannot contract away its police power to anyone, including the United States, compliance with state law and waiver of the United States' sovereign immunity to allow the enforcement of State law must be implied conditions of any lease or easement agreement. Under such circumstances, non-compliance with state law would be a breach of contract subjecting the United States to suit under the Tucker Act.

and to Kekaha Sugar and any other lessee of affected State lands. There is a considerable likelihood that Kekaha Sugar will not continue to lease the State lands within the Ground Hazard Area (GHA) for the entire period of the proposed easement agreement, and any successor lessees must be given actual notice of scheduled launch events.

5. Procedures for Assuring Clearance of the GHA

The DEIS states, id. at 2-4, that PMRF 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 launchsite to a more southern position within the PMRF, 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-using public. 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 launchsite 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 substantially larger GHA requirement proposed here.

8. Ownership of Lower Saki Mana Road

The DEIS, at 3-22, states that "Lower Saki Mana 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 8, 1993, reproduced as pages 8-14 to 8-18 ofthe DEIS, the Legislative Reference Bureau's study of the controversial issue of state versus county ownership of roads, Roads in Limbo, 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 Mana 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 Kekaha 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 signficantly 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 "[t]he 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 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 in ¶ 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 "assigns" (presumably, non-government personnal using the 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 STS and Vandal launches, the draft Grant of Easement does not limit the use of the easement to those launches, but instead would allow its use for any and all activities "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." If activities beyond the STS and Vandal launches described in the DEIS are contemplated, they must be described in full. If no 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. Cheney, 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

9-88

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
POST OFFICE BOX 1500
HUNTSVILLE, ALABAMA 35807-3801

REPLY TO ATTENTION OF

October 8, 1993

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 if 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: Advance 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 Vandal launch site southward so that the GHA would not include any portion of Polihale State Park would require a new launch site in the Nohili Ditch area. It would not, however, eliminate the need to close the access road to Polihale State Park for Vandal 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 Mana Road

Response 8: The citation for Lower Saki Mana 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.

Comment 10: Application of the grant of easement to the U.S. "assigns"

Response 10: It is an accepted principle of law that an act of a duly authorized agent is attributed to the party on whose behalf the agent is acting. The Federal Tort Claims Act and its case law recognize this principle.

Comment 11: Ambiguity regarding the scope of activities to be conducted under the proposed grant of easement

Response 11: 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 GHAs 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 able 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 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.

Sincerely,

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

University of Hawaii at Manoa

Environmental Center
A Unit of Water Resources Research Center
Crawford 317 • 2550 Campus Road • Honolulu, Hawaii 96822
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September 22, 1993
RE:0634

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
Waimea, 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.

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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, 1992b;c). The results of these 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 effects on the environment of past launches have been identified (p. 4-1).

Furthermore, the document states,

> 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 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 stipulates 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 the 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 in either the Draft EIS for the proposed easement or in the EISs for the STS. There 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.

Stars 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 faiiure at Vandenburg 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 Vandenburg 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 the 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 Makua 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 Dune. 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 Vandal 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 Vandal launches and the 11 Stars launches. This is important due to the tests of soil samples taken from areas surrounding the KTF 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 Vandal 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 I-7).

While there may be no potential significant impacts from lead, HCL, and CO, it is doubtful that a definitive conclusion can be reached concerning the potential impacts from releases of substances based on the data presented in the Draft EIS and the monitoring report.

Conclusion

The vague nature of the document and its reliance on cross-referenced information and data make it difficult to assess the potential cumulative impacts of the proposed actions. The Final EIS should include summaries of the monitoring results and data from the past EISs in order to support its conclusion that no significant environmental impacts would occur from the proposed action. In addition, the Final EIS needs to expand the discussion presented in the Draft and Final EISs for the STARS project on potential impacts from missile launches on the existing environment.

Thank you for the opportunity to review this document. We hope our comments have been helpful.

Sincerely,

Jacquelin N. Miller

Jacquelin N. Miller
Associate Environmental Coordinator

cc: OEQC
U.S. Army Space and Strategic Defense Command
Roger Fujioka
James Morrow
Michael Jones
Yu-Si Fok
Henry Gee
Marshall Mock
Andrew Tomlinson

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DEPARTMENT OF THE ARMY
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REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

Ms. Jacquelin 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 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: General comments

Response 1: 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 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 "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 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 Easement 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 EISs (U.S. Army Strategic Defense Command, 1992b;c). 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 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 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 Target System Final EIS on page 2-20 (U.S. Army Strategic Defense Command, 1992c) notes that the calculation of a 97-percent overall system reliability combines both key and non-key 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 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.

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 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 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, 37 Vandal launches have occurred, with no failures occurring during the boost phase that would affect the GHA.

Comment 3: Emergency response and the impacts from fire

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.

Comment 4: Cultural resources and archaeology

Response 4: For cultural resource and archaeological issues related to the launches, the Strategic Target System EIS should be reviewed. As stated in the Restrictive 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 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 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 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 Restrictive 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 Restrictive Easement EIS. Finally, the Strategic Target

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System program on Kauai has been exhaustively analyzed in numerous previous environmental documents, and its conclusions have withstood legal challenges in both Federal and State courts.

Sincerely.

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

SIERRA CLUB LEGAL DEFENSE FUND, INC.

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September 22, 1993

Ms. Linda McCrerey
Department of Land and Natural Resources
Post Office Box 621
Honolulu, Hawai'i 96809

Re: Comments on Draft EIS for Pacific Missile Range Facility Easement Over State Land for Safety and Ground Hazard Areas For STARS and Navy 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 8, 1993 OEQC 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 Preparation Notice and the DEIS itself 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."

Commendably, 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) missiles and how this 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. § 11-200-16. As explained below, this overarching requirement has not been satisfied by the DEIS prepared by the Army.

Moreover, the statement "must include responsible 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

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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 scoping 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 these 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 HEPA 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.") (emphasis added); see also id. at 2-5 (same); 2-1 ("during launches conducted by the U.S. Government"); 4-1 (listing STARS and Vandal as "examples" of launch activity at KTF).

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 Kaua'i in Section 1.3.1 (Environmental Analysis Process Background). The last paragraph on page 1-5 omits the fact that the EA was prepared only after a lawsuit was brought to force HEPA 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 comment outlined above.

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 punts on 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 blithely in one sentence: "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 (STARS) EISs." 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 3, infra). Each sub-section of Section 4 thereafter is merely a talismanic incantation of "no effect," without analysis; so 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 OR 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 4-1. 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 1993 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.

Nor has there been any information included about the actual impacts of the years of Vandal launches from PMRF. This information is critical, as many of the launches contemplated under the Easement are Vandals, and actual data from monitoring would greatly enhance the analysis of future impacts.

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 of 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 them 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 fully evaluate the impacts to these lands from the launches, and 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 mere prescription of the GHA constitutes an admission that there will be significant impacts in this zone in the event of an unsuccessful launch.

However, even without this significant admission, the record provides undisputed evidence that the risk of a catastrophic launch is much higher than estimated by the State or the Army and that the zone of impact from a terminated launch could be substantially larger that the 10,000 feet GHA. For DLNR 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. See 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's EA for the MOA 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 . . . . Realistic reliability estimates should be included in the EIS being prepared. In particular, the . . . report on Polaris and Minuteman I reliabilities by David Wright . . . should be evaluated."

The response to Dr. Jones from Lt. Col. Schrepple of the U.S. Army Space and Strategic Defense Command (dated July 23, 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 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. DEIS at 8-9.

Although the STARS launches have been the subject of litigation over the past three years, no court has passed judgement on the adequacy of the Army's reliability analysis. Federal Judge Ezra did not have before him at the time of his decision the information in the Administrative Record that reveals the Army's reliance on an assumption of 100% reliability for key components of the STARS missile. Judge Ezra's decision signed May 9, 1991 predates the availability of the key reliability information by almost 1-1/2 years. That information is contained only in the STARS EIS Administrative Record, which was available in Honolulu for the first time in September 1992.

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.

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 stage 1 and stage 2 motors 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).

DLNR 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] Subsystem." 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 10. 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 systems 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 Kaua'i. 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, much 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 HEPA, 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 be proven.

Most importantly, even if the Polaris boosters have perfectly been refurbished to meet their original design capabilities, that figure was only 75-85%. See MOA-FEA, at 00138. But, rather than using this more realistic figure, the Army simply assumed that reliability of these critical components will be 100%. See Federal EIS A.R. 69 at 1-2.

Even using the same methodology employed by the Sandia Memo, 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 92.8%.

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 R.W. Plowman, Sandia National Laboratories" by Dr. David Wright (hereinafter "Technical Review") (Attachment "1" hereto). See also Second Affidavit of Dr. David Wright (Attachment "2" hereto).

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 82%. See Technical Review, at 5.

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 82%, 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).

Notably, Dr. Wright prepared his analysis in December 1992. Six months later, a Minuteman I launch 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 Casmalia into a voluntary evacuation." Santa Barbara News Press, September 17, 1993, A-1, and related articles, Attachment "1" hereto. The problem is thought to have been a mechanical or electrical malfunction in the guidance system, but the military was ultimately unable to determine the precise cause of the missile 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 spokeswoman with the Space & Missiles System Center at Norton Air Force Base; "The aging phenomena is not understood." Id. The Army must explain why the same catastrophic event would not happen on Kaua'i. 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 75%.

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.

HEPA prohibits this type of reliance on prior EISs. As H.A.R. § 11-200-13(b) directs: "Agencies shall not, without considerable pre-examination and comparison, use part determinations and previous EIS's to apply to the action at hand, The action for which the determination is sought shall be thoroughly reviewed prior to the use of previous determinations and previously accepted EIS's." There is no indication in the DEIS 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

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 8-4. We wholeheartedly agree with Dr. Jones concerns, and find the Army's response disconcerting and inadequate.

According to Lt. Col Shrepple, the reliability of the Talos booster used for the Vandal missile was addressed in the Zest Flight Test Experiment Environmental Assessment ("ZEST 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 ZEST EA does provide data on the number of successful flights prior to February 1991, no data on subsequent flights is provided. Indeed, the ZEST 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 ZEST 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 "4" to these comments is a piece of debris located by recreational users at Polihale State Park. Is this the result of Vandal or other launches 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 ZEST 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 6.5-8.0 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 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 question must be answered in detail.

IV.

INADEQUATE ANALYSIS OF CLOSURES OF POLIHALE 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 to 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 recreation 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 "guarantee[d] 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 DLNR and the military will violate this fundamental state policy. Nevertheless, the Army's EIS gives short shrift to these concerns, minimizing the length of closures and the impact on recreational activities. Much, much more is required to comply with HEPA. 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 PMRF before, during, and after the launches of STARS and Vandal missiles. The hazard area for these launches slices through the heart of Polihale State Park -- including the spectacular white sand beach adjacent to the Nā-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 minimum minutes of closure 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 the public as a result of beach closures, which the EIS ignores.

Polihale State Park has, without doubt, one of Hawai'i's most spectacular beaches. John R.K. Clark, the definitive authority on Hawai'i's beaches, described it as: "One of the longest continuous sand beaches in Hawai'i." John R.K. Clark, Beaches of Kaua'i and Ni'ihau 49 (1990). The beach averages over 300 feet wide during the summer, comprises massive sand dunes 50 to 100 feet high at Nohili Point, and is backed by the scenic cliffs of the Nā-pali Coast. Clark adds, "in the midst of this extensive dune complex are Hawai'i's famous Barking Sands," which have great historical and cultural significance. Id.

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 482,000 "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 Nā-pali Coast. This location presents unique opportunities and constraints. The Park is frequently used as a pick up point for kayakers who land in the Park after completing the rough Nā-pali Coast trip.

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. 92-2597-07 (First Circuit Court, State of Hawaii) (Attachment "5" hereto), Miguel Dionisio Godinez, Sierra Club Kaua'i Group Outing Committee Chair and a partner in Kayak Kaua'i Outfitters, explains that the natural resources of the Park "are of enormous value to the people of Kaua'i." As Mr. Godinez's affidavit makes clear, these resources are an important asset to Kaua'i's visitor industry, particularly because the increase in demand for kayaking in this area has been "phenomenal" recently.

As Mr. Godinez explained, 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 Affidavits of Ms. Suzanne Marinelli, Mr. Raymond Chuan and Mr. Charles E. Jetty. (Attachments "6," "7," and "8," 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 EIS completely ignores the importance of the Park to the people of Kaua'i, and to those who may have travelled many thousands of miles for a "once in a lifetime" kayaking trip up the world-famous Nā-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, PMRF 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 technical 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 22, 1993. However, DLNR officials apparently blocked the highway into the Park prior to 2:00 p.m. the previous day, and forcibly evicted

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 clearance themselves, such as the dogs, searchlights, and helicopters used during the STARS launches this year.)

Under normal launch conditions (i.e., absent a catastrophic launch that may 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, that such notification will occur only a maximum of three hours in advance of launches, 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 move or leave.[1]

[1] 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, should there 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 terminated launch may result in a rapidly spreading fire, putting these visitors in grave peril.

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 Nā-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 30 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, whale 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 reenter." 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 of 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

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 western coast is small compared to the public and commercial demand for beach related activities. Therefore, the restriction of even 2 percent of the beach is significant and the socioeconomic consequences of the additional demand on other beach areas, should be discussed.

Federal EIS, Volume III, at 2-79 (emphasis added).

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 [PMRF] beaches would be equal to 80 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).
>
> . . . .
>
> [W]e are still quite concerned over the potential impact of launch/flight activities on public access to Polihale State Park and shoreline areas adjacent to [PMRF]. 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/clearance 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, 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 EIS'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 HEPA. In essence, the EIS 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 Hawaii. 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

laws 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 final EIS must fully and honestly address all of the 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. DLNR's decision on whether or not to grant the proposed easement to the military is wholly voluntary. However, DLNR has no power to simply grant the easement without following the procedures required by statute and regulation.

Contrary to the Army's assertion in its comments, Sierra Club v. Cheney, 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 land without obtaining a CDUP. See H.R.S. §183-41; 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 important permitting process even though it is requesting that the State sell it the right to use state lands would emasculate this important state policy. In short, the EIS must address these important issues, and explain (if it can) how 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 policy.

The proposed easement is also inconsistent with DLNR's statutory obligation for operating and maintaining state parks. DLNR "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 to retain to a maximum extent their scenic, historic, and wildlife values for the use and enjoyment of the public." H.R.S. § 184-6 (emphasis added). 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 in the EIS are the policies to: (1) "[p]romote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes" (H.R.S. § 226-11(b)(9)(emphasis added)); (2) "[p]ursue compatible relationships among activities, facilities, and natural resources" (H.R.S. § 226-11(b)(8)); (3) achieve "the objective of enhancement of Hawaii's scenic assets, natural beauty, and multi-cultural/historic resources" (H.R.S. § 226-12(a)(emphasis added)); (4) "[p]rotect those special areas . . . that are an integral and functional part of Hawaii's ethnic and cultural heritage" (H.R.S. § 226-12(b)(4)); and (5) "[e]ncourage actions to maintain or improve aural 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 Easement DEIS does not adequately address the potential impacts of the STARS launches from hazardous air emissions, both in the instance of a "normal" and a "failed" or "terminated" 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 Army used computer models, referred to as "TRPUF" and "REEDM." The model results presented by the Army in the STARS EIS, and upon which it now relies, are only the latest in a series of emission predictions -- none of which agree, and some of which in fact vary by a factor of over 100. See Affidavits of Dr. Michael Jones, Attachments "9" and "10" hereto.

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.

Id. ¶ 11 (emphasis added); see also id., Exhibit A.

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 26, 1993 STARS launch has unfortunately not clarified the situation, due to flaws in the monitoring program design, 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. 354 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 own guideline for HCl exposure (8-hour average value of .025 ppm; see Aff., Exh. B) will be exceeded beyond the GHA during all flights, and far beyond it in the case of an early flight termination.

> Both the TRPUF and REEDM models predict that the 8-hour average 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 GHA 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 36,000 feet downwind in the case of an early flight termination. . . . 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.

Aff. ¶¶ 11, 12 (emphasis added); see also id., Exh. A (emphasis added).

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 launch operations]," 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.

B. Vandal Lead Releases

The Easement EIS must also incorporate a complete analysis of the impact of lead releases associated with the Vandal launches. The soil lead levels reported in the DEIS were measured at the Kauai Test Facility, not at the PHRF launch pad that will be launching the Vandal missiles. Measurements should be taken at the PHRF launch pad to determine existing concentrations, and the results reported in the DEIS.

The FEIS should also clarify the Army's intention with respect to lead emission reporting. The following statement was made in response to Dr. Jones' comments on reporting of lead releases (letter from Lt. Col J. Schrepple to Dr. Michael Jones, July 23, 1993, Easement EIS at B-11): "such routine emissions [will not] be characterized as "releases" for purposes of reporting requirements under . . . CERCLA." This is not consistent with the statement in the ZEST EA (which is incorporated by reference in this EIS): "A total of 48 pounds of lead will be emitted from each talos rocket motor . . . if the total lead release exceeds one pound it must be reported. . . Lead releases for ZEST launches will be reported to the National Response Center, the State of Hawaii, and local response centers." ZEST EA at 3-5. Which is correct?

The effect of lead on humans are serious and well documented, and the impacts on children can be particularly devastating. They include IQ reductions, reading and learning disabilities, hyperactivity and aggressive behavior. Any increase in ambient lead levels is cause for concern, and the Vandal's 48 pound airborne release is of particular concern due to the possibility it may be spread well beyond the limits of the GHA. The Easement FEIS must analyze the dispersal of lead from

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the Vandal launches and the probable impact of this lead on nearby populations, as well as plants and wildlife.

VII.

HAZARDOUS MATERIALS AND WASTES

A. Risk of Hazardous Materials Within GHA

The Army's own analysis, presented in the Draft and Final STARS EISs, 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 Systems Draft and Final EISs.

Easement DEIS at 4-11 and 4-12. The section concludes with the comment that "Because 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 must analyze the impacts associated with hazardous wastes and materials, and consider 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 than 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 "9" and "10").

Dr. Jones, a high energy physicist, explains that if a missile were to "pitch back" toward Kaua'i, flight termination must occur within 15.1 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 seconds (when pitch over should occur) until 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 Aries 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 8.3 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.

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. Easement DEIS at 4-17. However, in the likely event of fire spreading beyond the hazard area, or debris being strewn 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. Paty's [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 members of the public.

Affidavit of Suzanne Marinelli, ¶ 15, Attachment "6" 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 Easement has not been demonstrated to be sufficient, 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 FEIS fully examine these issues, so that the State and the public can weigh the risks associated with the proposed Easement.

VII.

THE RISK OF FIRES

The termination of a STARS missile launch will also result in flaming debris raining over the GHA. According to the Army:

> In the event of an early flight termination, burning fuel may reach the ground. If the solid fuel continues to burn it may start fires. Controlling fires may require ground-disturbing activities in the sugar cane fields, in kiawe/koa haole scrub, or in other vegetation in the ground hazard area. . . . Identifiable unburned fuel or residual burned fuel will be recovered during the debris recovery process. . . . The recovered fuel and residue will be disposed of following standard PMRF waste management procedures.

Federal EIS, at 4-3 (emphasis added).

Beyond this benign description, the likelihood of fires has never been analyzed in terms of potential impact on the significant natural resources in the GHA. Fires in Polihale State Park may destroy the existing native dune vegetation, including the critically imperilled endemic coastal dry shrubland community (Chamaesyce celastroides). Fire (and fire suppression activities) also threatens the rare and endangered plant species present in the Park and on adjacent state lands. See Affidavit of Kenneth R. Wood ("Wood Aff."), Attachment "11" hereto.

The Army also acknowledges, but fails to address in detail, the concerns that fire may also chemically alter or damage cultural deposits. "Impacts could also include such things as erosion caused by spraying water to extinguish a fire as well as changes in chemical constituents of the soil that could alter the preservation of materials such as bone, shell, and wood. Chemical changes could also contaminate carbon, shell, and wood, thereby affecting the accuracy of radiocarbon and other dating techniques." Federal EIS, at 4-31.

Nevertheless, the Army has claimed that "mitigation measures" will prevent any impacts from occurring to these sensitive resources. Unfortunately, however, a review of these "mitigation measures" reveals that there is no mitigation measure that will not itself have significant impacts.

According to the Army's EIS, the State Historic Preservation officer of Hawai'i has indicated that the best mitigation for historic site protection, including Native Hawaiian burials, may

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 Hawai'ian plants, as well as to the globally imperilled native vegetation communities that occur at Polihale (See Section IX).

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-mitigation 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 Nohili 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 it impossible to attack spot fires. Id., ¶¶ 10-12. Such fires would obviously devastate the fragile vegetation described above, and might also result in the burning of subsurface cultural materials. Id., ¶ 13.

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 "1" 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 these 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.

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 launches, 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 Nohili Dunes and Polihale State Park is extremely significant in terms of species rarity and endangerment. Approximately 90 percent of Hawai'i's native plants and animals are found naturally 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 endangerment 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 Hawai'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

the islands. Many coastal ecosystems in Hawai'i have been destroyed by land development, including residential and resort development, and much of what remains has been severely altered by human occupation and use. (On Kaua'i, of course, Hurricane 'Iniki severely damaged coastal vegetation in some areas.)

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 Nohili Dunes and Polihale State Park represents a rare native coastal dune ecosystem, few of which remain in any of the Hawaiian islands. The Nohili-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 celastroides Coastal Dry Shrubland 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 celastroides community 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 niihauense is located within the GHA. This candidate endangered species was previously thought to be extinct. Id., ¶ 14. This extremely rare native grass is classified by the U.S. Fish and Wildlife Service as a Category 2 candidate species and was only recently discovered at Polihale State Park in a botanical survey in 1992. Prior to this recent and significant discovery, P. niihauense was known only from the island of Ni'ihau. Id.

On December 14, 1992, biologist Wood personally surveyed Polihale State Park and noted only 21 individuals of P. niihauense. Id. Loss of 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 easement.

The endangered 'ohai (Sesbania tomentosa) is also found in Polihale State Park and vicinity. Id., ¶ 12. This plant is a

Category 1 candidate species for listing as threatened or endangered. This species has been adversely affected by human-related activities along the coast, such as off-road vehicles and trampling by humans. Consequently, it is being added to the list of threatened and endangered species.

The rare native fern Ophioglossum concinnum is also found in the GHA at Polihale State Park and at PMRF. Id., ¶ 13. The population at PMRF is the largest one currently known in the islands. O. concinnum is also a Category 1 candidate endangered species, which will be proposed for listing within the next few months.

The state and federally listed endangered dwarf iliau, Wilkesia hobdyi, and the listed endangered Schiedea apokremnos occur to the northeast of the GHA. Id., ¶ 15. W. hobdyi is known only from the island of Kaua'i and has been documented in the Ha'ele'ele area (northeast of the GHA) and above the Nā-pali coast. W. hobdyi populations and the Nā-pali coast populations are threatened by goat browsing, erosion and invasive alien weeds. They are in need of protection, not the additional risks posed by the STARS and Vandal launches.

S. apokremnos is also known only from Kaua'i. Id. It was historically known from around five populations, and was only recently discovered in the Ha'ele'ele area. There may be only a few extant populations of this plant remaining, including the one at Ha'ele'ele, making it a significant one and extremely important to protect.

In short, the only-known representatives of the native community Chamaesyce celastroides (Coastal Dry Shrubland), the endangered Sesbania tomentosa, the candidate endangered species Panicum niihauense, and Ophioglossum concinnum, and the endangered Wilkesia hobdyi and Schiedea apokremnos, in or near the GHA, are at risk of being completely destroyed by fires or related mitigation activities that could be caused by accidents or early flight termination.

Debris, fire and the GHA-clearing activities undertaken by the Navy in conjunction with the STARS and Vandal launches could directly destroy or harm these significant and irreplaceable plants at Nohili and Polihale. Direct harm to the native plants and communities at Nohili and Polihale (and adjacent to the GHA) would be irreparable. Given the physical nature of the area and sensitivity of the dune ecosystem, any increased risk of fire would also be significant. Id., ¶¶ 17-20.

The Easement DEIS fails to evaluate the impacts of the easement the launches on these plants and vegetation communities,

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except through reference to the STARS EIS. The latter does not address impacts to P. niihauense, to the Chamaesyce celastroides community, nor to the endangered plants to north of the GHA.

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.

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 Nohili 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 1931, record the presence of burials and campsites extending between Barking Sands and into Polihale State Park, with numerous artifacts present in the sand. Army EIS, at 3-28.

The Navy's own files include records of burials in the dune area in the northern portion of PMRF, extending into Polihale State Park, and Kaua'i County has designated Nohili Dune area as a special treatment district because of burials and other significant cultural resources. Id., at 3-27.

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.

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 removing 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 claims 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 Malama I Na Kapuna 'O Hawai'i Nei, 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 launches 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 GHA.

The ground hazard area includes over 2,000 acres of ceded lands held in trust by the State of Hawai'i and currently under

lease to Kekaha Sugar Company as part of General Lease S-4222. The lease expires at the end of 1993. The terms of the proposed easement preclude any use of these lands other than agricultural, and would effectively prevent the State from converting these lands to a "higher use." This negatively impacts Native Hawaiians, who are supposed to receive 50% of the revenues generated by these lands (30% of the revenues to the Department of Hawaiian Home Lands under § 213 of the Hawaiian Homes Commission Act and Article XII, § 1 of the State Constitution, while an additional 20% of these revenues go to the Office of Hawaiian Affairs pursuant to H.R.S. § 10-13.5). These impacts, too, should be fully disclosed in the Final EIS.

XI.

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 Notice, 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 PMRF 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.

HEPA 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.

HEPA 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 fails all of these criteria.

XII.

THE DEIS FAILS TO DISCUSS THE USE OF PUBLIC FUNDS FOR THE PROPOSED ACTION AND REASONABLE ALTERNATIVES

HEPA requires that EISs to discuss the use of public funds for the proposed action. H.A.R. § 11-200-17(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 Vandal 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 "15"

hereto includes 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 Kaua'i." Moreover, Congresswoman Patsy Mink has made it clear that the G.A.O. report will be important to how Congress views this entire issue. Id.

The EIS must discuss these issues directly and in detail.

CONCLUSION

In conclusion, the Draft EIS does not comply with HEPA. 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. DLNR 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 DLNR accept supplemental public comment on the issues covered by the imminent 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 DLNR 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?

We look forward to receiving a copy of the final EIS.

Very truly yours,

Denise E. Antolini

Attachments "1" - "15"

cc: Linda Ninh
U.S. Army Space and Strategic Defense Command
Post Office Box 1500
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 DLNR; reproduction not possible)
5. Affidavit of Miguel Dionisio Godinez
6. Affidavit of Suzanne Marinelli
7. Affidavit of Dr. Raymond L. Chuan
8. Affidavit of Charles E. Jetty
9. Affidavit of Dr. Michael D. Jones (Dec. 1992)
10. Affidavit of Dr. Michael D. Jones (Jan. 1992)
11. Affidavit of Kenneth R. Wood
12. Affidavit of William H. Sager
13. David C. Wright, "Missing The Target: SDI in the 1990s" (Apr. 1992)
14. Federation of American Scientists, "STAR Wars After 10 Years" Report (Mar./Apr. 1993)
15. "GAO: Move STARS to Vandenberg," The Garden Island, Sept. 10, 1993; Statement of Rep. Patsy Mink, Congressional Record, Vol. 139, No. 21 (Feb. 25, 1993).

Attachment 1

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. 92-2597-07 (Injunctions) AFFIDAVIT OF DR. DAVID C. WRIGHT; EXHIBITS "A" THROUGH "C"

AFFIDAVIT OF DR. DAVID C. WRIGHT

STATE OF CALIFORNIA)
) SS.
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' Motion 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 - 1 (FTU-1)." This document was written by K. C. Abbott and R. W. Plowman and referred to hereinafter as the "Abbott/Plowman analysis" or "paper," and attached hereto as Exhibit "B."

5. The Abbott/Plowman 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

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 judgements, and finds that a reliability of 82%, as he has calculated for the Minuteman 1 ("MM1") 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 flight been tested, 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 MM1 missiles.

9. Affiant examined the success and failure rate of

the MM1, 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 MM1 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 judgements 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 STARS missile of 92.8%. 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.

David C. Wright

David C. Wright

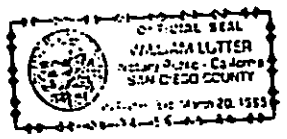
SUBSCRIBED AND SWORN BEFORE ME

THIS 21st DAY OF December 1992

William Lutter

Notary Public, State of California

My commission expires: March 20 1995



DAVID C. WRIGHT

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Cambridge, MA 02238
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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 (9/72-6/74)

Current Position

Senior Staff Scientist, Union of Concerned Scientists (1/92-), and Visiting Scholar, Program for Defense and Arms Control Studies, MIT (10/92-).

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 (9/88-8/90).

Research Fellow, Physics Department, Cornell University (8/87-8/88)

Research Fellow, Physics Department, Univ. of Pennsylvania (9/85-8/87)

Research Fellow, Physics Department, Ohio State University (9/83-8/85)

Awards

SSRC-MacArthur Fellowship in International Peace and Security (1987)
Wisconsin Alumni Research Foundation (WARF) Fellowship (1977)
Phi Beta Kappa (1976)
Alumni Scholarship (1974)
Joseph P. Cullen Physics Award (1973)
Alumni Scholarship (1972)

EXHIBIT A

Physics Publications

"The Space Groups of Axial Crystals and Quasicrystals, D.A. Rabson, N.D. Mermin, D.S. Rokhsar, and D.C. Wright, *Rev. Mod. Phys.* 63, 699 (July 1991).

"A Constrained Spin Model of Phason Dynamics in Quasicrystals," L.D. Gronlund, D.C. Wright, J.P. Sethna, and D.S. Rokhsar, *Phys. Rev.* B42, 8517 (1990).

"Stacking Quasicrystallographic Lattices," N.D. Mermin, D.A. Rabson, D.S. Rokhsar, and D.C. Wright, *Phys. Rev.* B41, 10498 (1990).

"The Cholesteric Blue Phases: Crystalline Liquids," D.C. Wright and N.D. Mermin, *Rev. Mod. Phys.* 61, 385 (April 1989).

"Scale Equivalence of Quasicrystallographic Space Groups," D.S. Rokhsar, D.C. Wright, and N.D. Mermin, *Phys. Rev.* B37, 8145 (1988).

"The Two Dimensional Quasicrystallographic Space Groups with Rotational Symmetries Less Than 23-Fold," D.S. Rokhsar, D.C. Wright, and N.D. Mermin, *Acta Cryst.* A44, 197 (1988).

"An Explanation of Peak Shapes Observed in Diffraction from Icosahedral Quasicrystals," J.E.S. Socolar and D.C. Wright, *Phys. Rev. Lett.* 59, 221 (1987).

"Beware of 46-Fold Symmetry: The Classification of Two Dimensional Quasicrystallographic Lattices, N.D. Mermin, D.S. Rokhsar, and D.C. Wright, *Phys. Rev. Lett.* 58, 2099 (1987). Reprinted in *The Physics of Quasicrystals*, ed. P.J. Steinhardt and S. Ostlund (Singapore: World Scientific, 1987), pg. 169.

"Rudimentary Quasicrystallography: The Icosahedral, Decagonal and Pentagonal Reciprocal Lattices," D.S. Rokhsar, N.D. Mermin, and D.C. Wright, *Phys. Rev.* B35, 5487 (1987). Reprinted in *The Physics of Quasicrystals*, ed. P.J. Steinhardt and S. Ostlund (Singapore: World Scientific, 1987), pg. 160.

"Scale invariance and the Group Structure of Quasicrystals," S. Ostlund and D.C. Wright, *Phys. Rev. Lett.* 56, 2068 (1986). Reprinted in *The Physics of Quasicrystals*, ed. P.J. Steinhardt and S. Ostlund (Singapore: World Scientific, 1987), pg. 156.

"Resistance Fluctuations in Random Resistor Networks Above and Below the Percolation Threshold," D.C. Wright, D.J. Bergman, and Y. Kantor, *Phys. Rev.* B33, 396 (1986).

"Cholesteric Blue Phases in the High-Chirality Limit," D.C. Wright and N.D. Mermin, *Phys. Rev.* A31, 3498 (1985).

"A Percolation Model for Electrocatalysis on Microparticle Electrodes," D.C. Wright and D. Stroud, *J. Electrochem. Soc.* 132, 1507 (1985).

"Relieving Cholesteric Frustration: The Blue Phase in Curved Space," J.P. Sethna, D.C. Wright, and N.D. Mermin, *Phys. Rev. Lett.* 51, 467 (1983).

"Black Holes and the Gibbs-Duhem Relation," D.C. Wright, *Phys. Rev.* D21, 884 (1980).

"Atomic Diamagnetism: Quasi-Landau Spectrum near the Ionization Limit," R.J. Fonck, D.H. Tracy, D.C. Wright, and F.S. Tomkins, *Phys. Rev. Lett.* 40, 1366 (1978).

International Security Publications

"Depressed-Trajectory SLBMs: A Technical Assessment and Arms Control Possibilities," L. Gronlund and D.C. Wright, *Science and Global Security* 3 (1992), p. 101.

"Limits on the Coverage of a Treaty-Compliant ABM System," L. Gronlund and D.C. Wright, *Physics and Society* 21 (April 1992), p. 3.

"Third World Missiles Fall Short," Lora Lumpe, L. Gronlund, and D.C. Wright, *Bulletin of the Atomic Scientists* 47 (No. 10) (March 1992), p 30.

"Underflying Brilliant Pebbles," D.C. Wright and L. Gronlund, *Arms Control Today* 21, No. 4, (May 1991), p. 16.

"Underflying Brilliant Pebbles," D.C. Wright and L. Gronlund, *Nature* 350, (25 April 1991), p. 663.

"Short Time-of-Flight Nuclear Weapons," L. Gronlund and D.C. Wright, *Physics and Society* 20, (January 1991), p. 13.

"Short Time-of-Flight Nuclear Attacks: An Assessment of the Problem and Possible Arms Control Solutions," L. Gronlund and D.C. Wright, *Science and International Security*, ed. Eric Arnett (Washington, DC: American Association for the Advancement of Science, 1990).

"Saying No to Star Wars: The National SDI Boycott," L. Gronlund and D.C. Wright, *Physics and Society* 15, (April 1986), p. 3.

Unpublished Reports

"Missing the Target: SDI in the 1990s," April 1992.

"Brilliant Pebbles as ASATs: The Threat to Satellites in High-Earth Orbits," (15 May 1991), reprinted in part in *Inside the Air Force* (17 May 1991), p. 16.

"A Status Report on the Boycott of Star Wars Research by Academic Scientists and Engineers", Lisbeth Gronlund, John Kogut, Michael Weissman, and David Wright, May 13, 1986, unpublished report.

Selected Talks on Security Issues

"The Future of Battlefield Nuclear Weapons in Europe" (with L. Gronlund), Program for Defense and Arms Control Studies, MIT, 4/10/89.

"Earth Penetrating Warheads," Harvard/MIT Technical Working Group, Center for Science and International Affairs, Harvard University, 12/8/89.

"Depressed Trajectory SLBMs and a Ban on Flight Testing" (with L. Gronlund), Center for Energy and Environmental Studies, Princeton University, 1/11/90.

"Science and Diplomacy in the 1960s: The Soviet-American Defease Study Group," Conference for SSRC-MacArthur Fellows in International Peace and Security, Budapest, Hungary, 5/16/90.

"Short Time of Flight Nuclear Attacks," Second International Summer School on Science and World Affairs, Princeton University, 8/11/90.

"New Reentry Vehicle Technologies and Limits on Flight Testing," Center for Program Studies, Soviet Academy of Sciences, Moscow, 11/1/90.

Briefing to Congress on SDI (with Richard Garwin, Matthew Bunn, and Peter Clausen), 1310A Longworth House Office Building, 3/7/91.

"Depressed-Trajectory SLBMs: A Technical Assessment and Arms Control Possibilities," Department of Engineering and Public Policy, Carnegie Mellon University, 5/20/91.

"GPALS: A Technical Assessment of the New SDI Proposals," Third International Summer School on Science and World Affairs, Moscow, 7/2/91.

Briefing to Congress on SDI (with Kevin Knobloch), 1310A Longworth House Office Buiding, 5/30/92.

"The Development of Ballistic Missiles in Asia," Fourth International Summer School on Science and World Affairs, Fudan University, Shanghai, PRC, 8/25/92.

Sandia National Laboratories

Albuquerque, New Mexico 87185

date: October 1, 1990

to: R. L. Eno, 7525

from: K. C. Abbott and R. W Plowman, 7222

subject: Strategic Target System (STARS) Predicted Mission Reliability for Flight Test Unit - 1 (FTU-1)

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 stage 1 and stage 2 motors are not included. Also, reliability data for a portion of the Polaris Thrust Vector Control (TVC) subsystem has not been included in this prediction, due to non-availability of data from Lockhead Missiles and Space Company and the U.S. Navy Strategic Systems Program Office (SP 273). 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 motors and components of the TVC system.

EXHIBIT B

Mission Reliability.

First Stage (FS) Mission Reliability 0.9968
Second Stage (SS) Mission Reliability ... 0.9960
Third Stage (TS) Mission Reliability 0.9837

Stars 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 SDI system. It will be launched from the Kauai Test Facility, carrying reentry vehicles weighing up to 600 pounds. Impact point will be the broad ocean area near the Kwajalein Atoll.

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 Aerojet 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 hydraulics system battery, and four hydraulic actuator packages; the MA170 FS Destruct Arming and Firing (A&F) system, including dual channel MC3644 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 MC3644. Other mechanical components, such as fasteners, brackets, 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 SS. Early in the service life of the A3 motor, potting material liquification 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 liquification problem led to motor forward dome burn

through failure, necessitating a repotting procedure. Since the institution of the repotting procedure by Hercules, Inc., six motors have been repotted and two successfully static fired with no evidence of motor dome or case insulation erosion. All STARS SS motors will be repotted. 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 initiator, a hot gas relief valve, and a freon flowmeter; missile vibration sensors, the MA170 Destruct A&F, with dual MC3644 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 squib-fired. Other major components of the TS are the Attitude Control System (ACS), including a gas manifold, four valve blocks located at 90 degree 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 MC3644 detonators and FLSC; nose fairing release detonators (MC3644s); 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 SANDAC V computer, the Inertial Measurement Unit (IMU), dual PCM Encoders, dual S-Band transmitters, a C-Band radar transponder, the MA175 Telemetry Junction Box, the MA179 Fiber-Optic Transmitter, the MA181 and MA171 Destruct packages, the Command Receiver/Control Decoder, the MA180 Electronic Power Distribution Package, the MA168 A&F Assembly, the MA178 A&F Sequencer, the rate gyro, the MA173 System Junction Box, the MA173 System Junction Box, the MA176 ACS Electronics Box, and the MA172 TVC Servo Amplifier.

Overview of STARS System Operation. (Refer to Figure 1)
To better understand the STARS system operation, some of the major functions of STARS are covered below:

- SANDAC V and the A&F Sequencer algorithms handle most of the mission's critical timing events.
- The IMU generates thrust g-force data and guidance feedback, used by SANDAC for stage separation and next stage motor ignition.
- The TVC for first, second, and third stages is controlled by SANDAC 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 S-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 (MA180) 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 (time: 0 seconds). Figure 1 shows the block diagram for the STARS system. After the first stage ignition signal is received, the SANDAC V timer and guidance algorithms, start operating. The A & F Sequencer begins its clock when the First Ignition Fiducial and Launch First Motion signals are set or the X-Axis Acceleration is greater than 2g. SANDAC V controls the lift-off roll using its internal algorithms and the time from lift-off (Time: 1.48 - 1.98 seconds). After ignition, SANDAC V controls FS roll and pitch by sending control signals to the FS/SS Servo Amplifier. The Servo Amplifier then uses these signals to control the first stage hydraulic TVC unit. SANDAC V uses the time after lift-off and software algorithms to derive the correct control signals. SANDAC V begins pitch control based on time from lift-off and information about the trajectory from the IMU (Time: 2.24 seconds).

If the IMU indicates a FS motor thrust greater than 3.55g between 48 and 55 seconds from lift-off, the A&F Sequencer. will enable the SS Motor for ignition. The A&F Sequencer controls firing through the A&F System, which then amplifies these control signals to drive the detonators. The A&F Sequencer next initiates the hot gas generator after the IMU

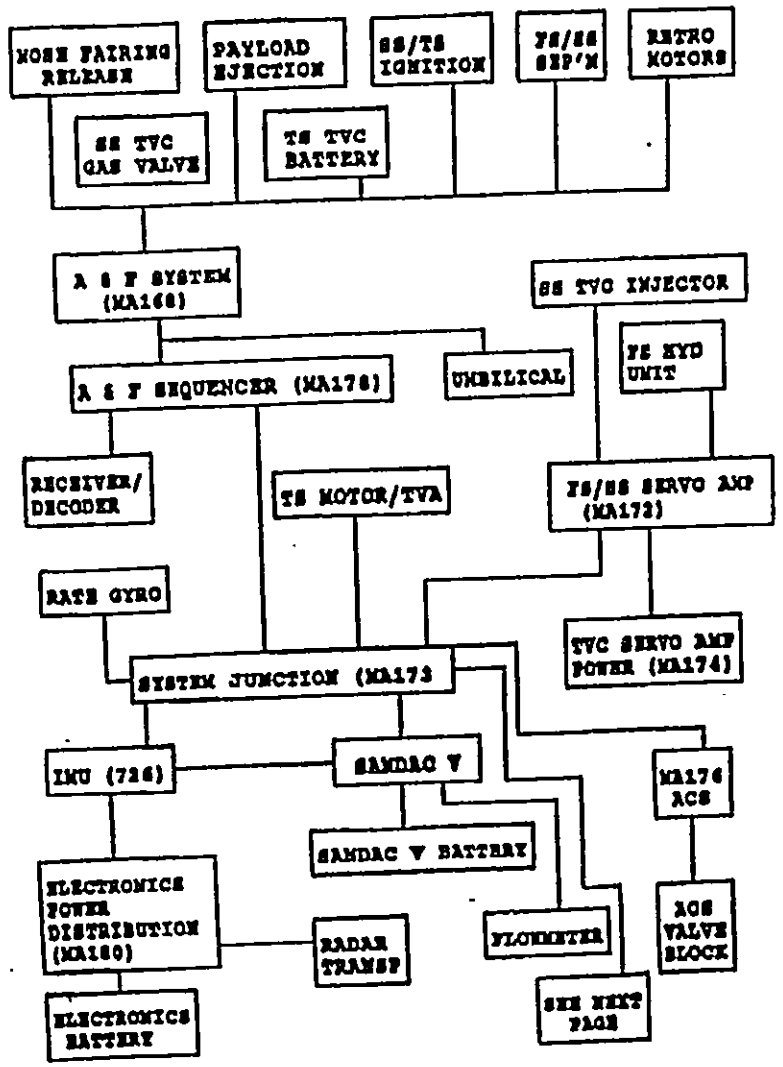
detects that thrust is below 3.55g (Time: - 59 seconds). The A&F Sequencer causes FS/SS separation and SS motor ignition when the IMU indicates the thrust is below 1.30g. SANDAC V, using the IMU, software algorithms, FS/SS Servo amplifier and the TVC injector valves, guides the missile during the second stage. The SANDAC V and A&F Sequencer monitor the SS thrust between 103 and 113 seconds from lift-off. If the IMU does not observe thrust above 4g for at least two seconds during this time period, SANDAC V and the A&F Sequencer will terminate the mission. The A&F Sequencer continues to monitor thrust through the IMU after 113 seconds from lift-off. When the thrust is less than 0.1g the SS retros are ignited and 10-20 milliseconds later, the A&F Sequencer initiates SS/TS separation. SANDAC V turns on the payload experiment one second after the A&F Sequencer indicates SS/TS separation. At approximately 140 seconds after lift-off, the SANDAC 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 SANDAC V and the A&F Sequencer through the Mild Detonating Fuse (MDF) material. During this time, ACS and SANDAC V continue the attitude maneuvers by using feedback data from the IMU. Also during this time, USAKA 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, USAKA will send the enable tone signal through the receiver/decoder circuit to the A&F Sequencer. If the TS motor enable signal is present when the A&F Sequencer is ready to initiate the TS TVA battery, a signal to start is sent through the A & F System to initiate the battery (Time: 593.98). The payload experiment is turned off by SANDAC V before third stage ignition.

The A&F Sequencer sends the TS motor ignition signal if the TS TVA battery voltage is nominal and the TS motor enable signal from ground is still present. The SANDAC V then controls TS guidance through the TS TVA system, with trajectory feedback from the IMU (Time: 598.38 - 638.01).

SANDAC V, ACS, and IMU controls the second ACS maneuver before the payload is released. Ground control receives the flight telemetry for these maneuvers through the PCM and S-band transmitter. Shortly after the second ACS maneuver, the SANDAC V and A&F Sequencer fire the four explosive bolts to release the payload (Time: 708.38). The third ACS maneuver moves the TS out of the payload's path. Finally, the A&F Sequencer fires the TS retros to back the TS away from the payload.

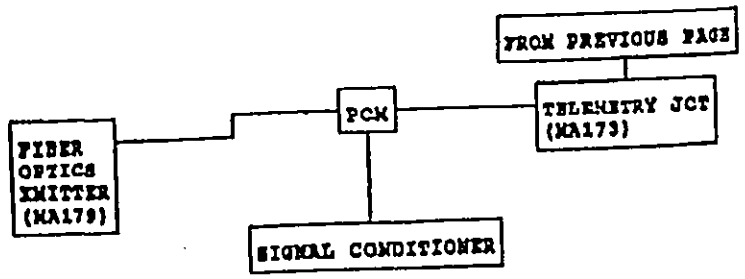
FIGURE 1

STARS SYSTEM BLOCK DIAGRAM



STARS SYSTEM BLOCK DIAGRAM

FIGURE 1 (CON'T)



APPROACH

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 Guidance, 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, Thrust Vector Control (TVC) operation, and separation; (2) second-stage ignition, TVC operation, burnout, coast, separation, and ignition of retro-fire motors; (3) third-stage Attitude Control System (ACS) operation, ascent shroud jettison separation, third-stage ignition, burnout; and (4) expulsion of reentry body from bus and ignition of bus retro-fire motor. The mission reliability calculation does not include pre-launch monitoring equipment or primary source(s) of external power.

The following STARS components or subsystems do not contribute to mission reliability, unless noted in the following paragraph:

- 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 premature unreliability, in that an unwanted 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 1st, 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.

- Premature reentry body ejection signal.
- Premature jettison of the third stage ascent shroud.

Mission abort, 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-HDBK-217E, "parts count" technique was used to build the subassembly failure rates. The technique assumes a "missile 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 FS/SS 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 FS/SS motor reliabilities and FS/SS TVC failure rates.

Procedure. 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 was "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-217E, "Reliability Prediction of Electronic Equipment." The handbook assumes a constant failure rate model for part failure rates. It is assumed that failure rates from vender 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 FTU-1 timeline provided by Division 9132.

- The prediction does not address failures due to environmental inputs exceeding design specifications.

- Electrical "noise" and its potential effect on electronics is not addressed in this prediction.

RELIABILITY BLOCK DIAGRAM AND MATHEMATICAL MODEL

The block diagram in Figure 1, pages 6-7, shows the generalized circuit diagram used in this analysis. Table 1, page 12, contains the overall mission reliability prediction. Figure 2, page 12, shows the STARS system reliability diagram. Table 2, page 13, provides the major subassembly failure rates. Reliability concerns are voiced on page 14. Figures 3 - 5, pages 15 to 21, contain reliability models, equations, and reliability estimates for each stage of flight. Table 3, page 22, provides the failure rate calculations for individual circuit boards. The references used in this study are shown on page 38.

TABLE 1

STARS MISSION RELIABILITY

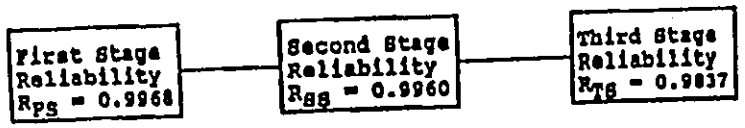
STARS mission reliability consists of reliability predictions for each of the three stages. Since the STARS model for the three stages is a series model, mission reliability is simply the product of the stage reliability values. Figure 2 shows the block diagram used for computation of STARS mission reliability.

First Stage (FS) Reliability Prediction = 0.9968
Second Stage (SS) Reliability Prediction = 0.9960
Third Stage (TS) Reliability Prediction = 0.9837

STARS MISSION RELIABILITY = 0.9766

Figure 2

STARS SYSTEM RELIABILITY DIAGRAM



$R_{SYSTEM} = R_{FS} \times R_{SS} \times R_{TS} = 0.9766$

TABLE 2

Failure rates or failure probabilities are listed below for STARS components. Failure rates are in units of failures per million hours. For one-shot (O/S) devices, a failure probability is given. Failure rates were obtained from calculations in Table 3, using MIL-HDBK-217E. Other failure rates/probabilities were obtained from vendor data.

Component/System Name	Failure Rate ($\times 10^6$ Hours)	Variable Name
ELECTRONICS BATTERY	10,000.000	J1
SANDAC V BATTERY	10,000.000	J2
ELECTRONICS DISTRB.(MA180)	1,037.850	J3
RATE GYRO	200.000	J4
RADAR TRANSPONDER (C BAND)	1,200.000	J5
FLOWMETER	600.000	J6
SANDAC V	1,133.869	J7
RECEIVER/DECODER	200.000	J8
A & F SEQUENCER (MA178)	6.291	J9
A & F SYSTEM (MA168)	0.226	J10
SYSTEM JUNCTION (MA173)	239.826	J11
TS MOTOR PRESSURE SENSOR	100.000	J12
TS TVC	3,390.000	J13
FS/SS SERVO AMPL.(MA172)	7,486.022	J14
TVC SERVO POWER (MA174)	28.668	J15
FIBER OPTICS XMIT (MA179)	39.240	J16
SIGNAL CONDITIONER	12.758	J17
TELEMETRY JUNCTION (MA175)	690.348	J18
TS TVC/IGN BAT.	10,000.000	J19
TS IGNITION	0.001 (O/S)	J20
FS IGNITION	0.001 (O/S)	J21
SS IGNITION	0.001 (O/S)	J22
PCM ENCODER A & B (Redundant)	0.169	J23
S-BAND TRANSMITTER (Redundant)	0.889	J24
ACS. ELECTRONICS (MA176).	8.207	J25
HYDRAULIC BATTERY	2,000.000	J26
FS MOTOR	See classified annex	J27
SS MOTOR	See classified annex	J28
TS MOTOR	360,903.000	J29
ACS VALVE BLOCK	20.833	J30
HYDRAULIC ACTUATOR	See classified annex	J31
FS SEP. DET & MDF	0.0015 (O/S)	J32
SS SEP. DET & MDF	0.0015 (O/S)	J33
SS RETRO MOTOR	0.0007 (O/S)	J34
TS RETRO MOTOR	0.0004 (O/S)	J35
SS TVC ACTUATION	See classified annex	J36
SS TVC INJECTION VALVE	See classified annex	J37
IMU(RING LASER) (MA726)	260.49030	J38
HYDRLC PWR DIST.	1,014.48000	J39
NOSE FAIRING DETONATOR & MDF	0.0015 (O/S)	J40
PAYLOAD EXPLOSIVE BOLTS	0.0040 (O/S)	J41

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 25,000 Volts DC, from a 500 picofarad capacitor through a 5K Ohm resistor. These test conditions are in accordance with Sandia Specification (SS) 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 1975 SLE Report indicated that several SS TVC Gas Generators exhibited possible separation at the propellant-to-insulation bond line in the head cap area, during FY75 inspection of 32 missiles.

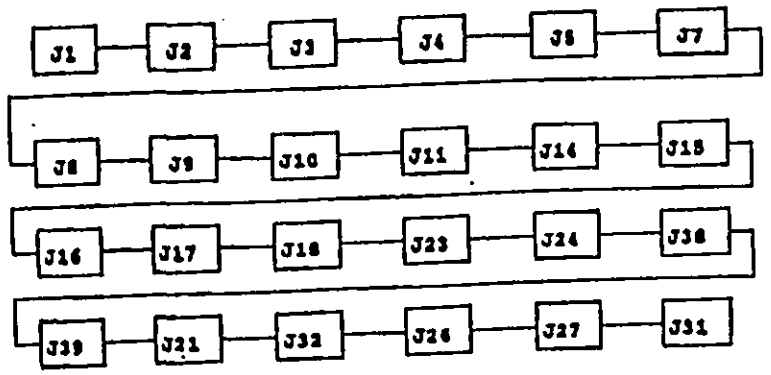
- During this same time period, an "Alarm Condition" existed on the SS Hot Gas Relief Valve. LMSC also recommended additional testing of the fluid injector valves for the SS.

- 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 LMSC and other vendors, has undertaken a rework and recertification program to ensure that the SS motor and TVC components meet STARS performance requirements.

Figure 3

FIRST STAGE RELIABILITY DIAGRAM



FIRST STAGE TIME: 0 SECONDS TO 61.109 SECONDS

FIRST STAGE (FS) RELIABILITY PREDICTION

The reliability equations for the FS are presented below, based on the reliability model in Figure 3.

COMMON CONTROL COMPONENTS

PART 1:
Time Active: 0 seconds to 61.109 seconds
Hours Active = t1 = 0.01697 hours

FAILURE RATE EQUATION (PART 1):
QK1 = J1+J2+J3+J4+J5+J7+J8+J9+J10+J11+J14+J15+J16+
J17+J18+J23+J24+J38+39
= 33,651.12 failures per million hours

FS IGNITION

PART 2:
RELIABILITY (PART 2):
Q2(T) = J21
= 0.9990

FS SEPARATION

PART 3:

RELIABILITY (PART 3):
Q3(T) = J32
= 0.9985

FS TVC

PART 4:
Time Active: 0 seconds to 61.109 seconds
Hours Active = t4 = 0.01697 hours

FAILURE RATE EQUATION (PART 4):
QK4 = J26+J27+J31
= 2,000 failures per million hours

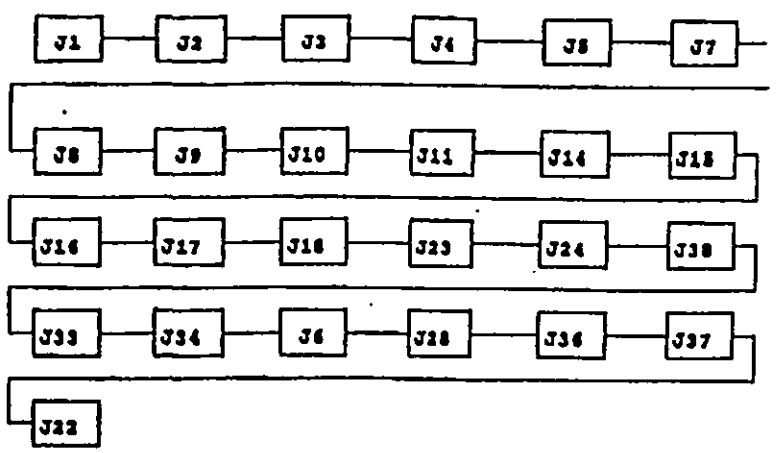
FS RELIABILITY

Reliability = $e^{-(QK1*t1)}*Q2(T)*Q3(T)*e^{-(QK4*t4)}$
= Q1(T) * Q2(T) * Q3(T) * Q4(T)
= 0.9994 * 0.9990 * 0.9985 * 0.9999

Reliability = 0.9968

Figure 4

SECOND STAGE RELIABILITY DIAGRAM



SECOND STAGE TIME: 61.109 SECONDS TO 140.09 SECONDS

SECOND STAGE (SS) RELIABILITY PREDICTION

The reliability calculations for the SS are shown below, based on the reliability model in Figure 4.

COMMON CONTROL COMPONENTS

PART 1:
Time Active: 61.109 seconds to 140.09 seconds
Hours Active = t1 = 0.02194 hours

FAILURE RATE EQUATION (PART 1):
QK1 =J1+J2+J3+J4+J5+J7+J8+J9+J10+J11+
J14+J15+J16+J17+J18+J23+J24+J38
= 32,636.50 failures per million hours

SS SEPARATION

PART 2:
RELIABILITY EQUATION (PART 2):
Q2(T) = J33
= 0.9985

SS RETRO MOTOR

PART 3:
RELIABILITY EQUATION (PART 3):
Q3(T) = J34
= 0.9993

SS TVC

PART 4:
Time Active: 61.109 seconds to 140.09 seconds
Hours Active = t4 = 0.02194 hours

FAILURE RATE EQUATION (PART 4):
QK4 = J6+ +J28+ J36+ J37
= 600 failures per million hours

SS IGNITION

PART 5:
RELIABILITY EQUATION (PART 5):
Q5(T) = J22
= 0.9990

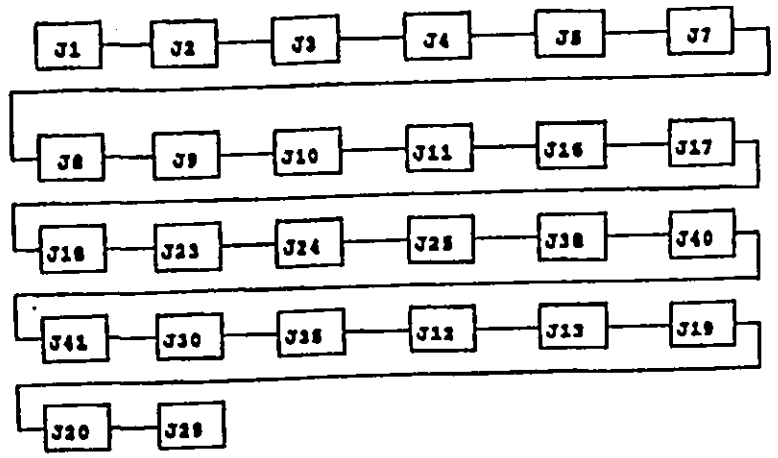
SS RELIABILITY

$$\text{Reliability} = e^{-(QK1*t1)} * Q2(T) * Q3(T) * e^{-(QK4*t4)} * Q5(T)$$
$$= Q1(T) * Q2(T) * Q3(T) * Q4(T) * Q5(T)$$
$$= 0.9993 * 0.9985 * 0.9993 * 0.9999 * 0.9990$$

Reliability = 0.9960

Figure 5

THIRD STAGE RELIABILITY DIAGRAM



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.

COMMON CONTROL COMPONENTS

PART 1:
Time Active: 140.09 seconds to 748.38 seconds
Hours Active = t1 = 0.16897 hours

FAILURE RATE EQUATION (PART 1):
QK1 = J1+J2+J3+J4+J5+J7+J8+J9+J10+J11+J16+J17+J18+
J23+J24+J25+J38
= 25,130.03 failures per million hours

NOSE FAIRING RELEASE

PART 2:
RELIABILITY EQUATION (PART 2):
Q2(T) = J40
= 0.9985

AV EJECTION

PART 3:
RELIABILITY EQUATION (PART 3:
  Q3(T) = J41
        = 0.9960

TS ACS

PART 4
  Time Active: 168.09 seconds to 748.38 seconds
  Hours Active = t2 = 0.16119 hours

FAILURE RATE EQUATION (PART 4):
  Q4(T) = J30
        = 20.83 failures per million hours

TS RETRO MOTOR

PART 5:
RELIABILITY EQUATION (PART 5):
  Q5(T) = J35
        = 0.9996

TS TVC

PART 6:
  Time Active: 590.00 seconds to 638.01 seconds
  Hours Active = t6 = 0.01334 hours

FAILURE RATE EQUATION (PART 6):
  QK6 = J12+J13+J19
      = 13,490 failures per million hours

TS IGNITION

PART 7:

RELIABILITY EQUATION (PART 7) :
  QK7 = J20
      = 0.9990

TS MOTOR

PART 8:
  Time Active: 590.38 seconds to 638.38 seconds
  Hours Active = t8 = 0.01333 hours

FAILURE RATE EQUATION (PART 8):
  QK8 =J39
      = 360903 failures per million hours

TOTAL TS RELIABILITY

$$\text{Reliability} = e^{-(QK1*t1)}*Q3(T)*Q3(T)*e^{-(QK4*t4)}* Q5(T)*e^{-(QK8*t8)}*Q7(T)*e^{-(QK8*t8)}$$

$$= Q1(T) * Q2(T) * Q3(T) * Q4(T) * Q5(T) * Q6(T) * Q7(T) * Q8(T)$$

$$= 0.9957 * 0.9985 * 0.9960 * 0.9999 * 0.9996 * 0.9998 * 0.9990 * 0.9952$$

Reliability = 0.9837

TABLE 3

FAILURE RATE TABLES

HYDRAULIC POWER DISTRIBUTION SYSTEM

Hydraulic Power Distribution failure rate data using MIL-HDBK-217E to compute the failure rates are the following:

DESCR.	Failure Rate ($X 10^6$ Hrs)	Quantity	Total Fail Rate ($X 10^6$ Hrs)
Switch	1,000.000	1.0	1,000.000
Resist-RWR	1.950	4.0	7.800
Diode	0.215	4.0	0.860
Connector,Cir	1.290	4.0	5.160
Connector,PCB	0.660	1.0	0.660

HYDRLC POWER DISTRIB. FAILURE RATE = 1,014.480
(Failures per million hours)

ARMING & FIRING (A&F) SEQUENCER (MA178)

Failure rates for the A&F Sequencer were derived from parts lists, schematics, and MIL-HDBK-217E. Failure rates for the two hybrid components were obtained from the vendor.

Description	Failure Rate ($X 10^6$ Hrs)	Quantity	Total Fail Rate ($X 10^6$ Hrs)
Redundant PCB	0.124	1.0	0.124
Connector,Cir	1.290	4.0	5.160
DC-DC Convert	1.007	1.0	1.007

A&F Sequencer Failure Rate = 6.291

PCB	Failure Rate ($X 10^6$ Hours)
Memory Board	31.945
RTI Board	47.116
PPI Board	201.593
CPU Board	71.521
Subtotal	352.175

Memory Board

Description	Failure Rate ($X 10^6$ Hrs)	Quantity	Total Fail Rate ($X 10^6$ Hrs)
MC54HC138	0.779	1.0	0.779
54HC32	0.953	4.0	3.812
HM6516	1.627	4.0	6.508
HM6616	1.627	8.0	13.016
Connector,PCB	0.660	1.0	0.660
Connector,cir	1.290	1.0	1.290
CAP.-CKR	0.420	14.0	5.880
Memory Board Failure Rate =			31.945

CPU Board

Description	Failure Rate ($X 10^6$ Hrs)	Quantity	Total Fail Rate ($X 10^6$ Hrs)
80C86MIN	2.273	1.0	2.273
RESIST-RK	5.400	1.0	5.400
CAP.-CKR	0.420	16.0	6.720
CRYSTAL	2.310	1.0	2.310
1N914/883	0.215	1.0	0.215
82C86H	4.299	4.0	17.194
82C82	4.299	3.0	12.896
HM54C00	0.953	4.0	3.812
82C84A	4.299	1.0	4.299
82C59A	4.299	1.0	4.299
HD6440	0.779	1.0	0.779
MC54H138	0.779	1.0	0.779
Connector,PCB	0.660	1.0	0.660
Connector,Cir	1.290	1.0	1.290
82C54	4.299	2.0	8.597
CPU Board Failure Rate =			71.521

A&F SEQUENCER (MA178)
(CON'T)

RTI Board

Description	Failure Rate ($X 10^6$ Hrs)	Quantity	Total Fail Rate ($X 10^6$ Hrs)
IDT7132	2.673	1.0	2.673
IDT7142	2.673	1.0	2.673
MH54C00	0.953	4.0	3.812
Resist-RE	6.000	2.0	12.000
FC1553TI	3.600	2.0	7.200
FC1553921	7.436	1.0	7.436
Resist-RH	0.162	4.0	0.648
54HC74	0.953	2.0	1.906
Cap.-CKR	0.420	6.0	2.520
UT1553	4.299	1.0	4.299
Connector,PCB	0.660	1.0	0.660
Connector,Cir	1.290	1.0	1.290
RTI Board Failure Rate =			47.116

PPI Board

Description	Failure Rate ($X 10^6$ Hrs)	Quantity	Total Fail Rate ($X 10^6$ Hrs)
1N914/883	0.215	2.0	0.430
Resist-RH	0.162	60.0	9.720
Resist-RE	6.000	1.0	6.000
Cap.-CKR	0.420	7.0	2.940
82C55A	4.299	2.0	8.597
6N140/883	172.000	1.0	172.000
DS26L33	0.953	2.0	1.906
PPI Board Failure Rate =			201.593

ARMING AND FIRING SYSTEM (MA168)

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.

	Failure Rate ($X 10^6$ Hrs)
REDUN. Decoder	0.226
REDUN. A&F	- 0
REDUN. Retro	- 0
A & F System Failure Rate =	0.226

Retro Board

Description	Failure Rate ($X 10^6$ Hrs)	Quantity	Total Fail Rate ($X 10^6$ Hrs)
Resist-RZ	5.400	2.0	10.800
Resist-RWR	1.950	6.0	11.700
2N6193JTX	1.100	4.0	4.400
1N4942JTX	0.215	2.0	0.430
Resist-RLR	0.141	1.0	0.141
Connector,Cir	1.290	3.0	3.870
Connector,PCB	0.660	1.0	0.660
Retro Board Failure Rate =			32.001

A & F Board

Description	Failure Rate ($X 10^6$ Hrs)	Quantity	Total Fail Rate ($X 10^6$ Hrs)
Resist-RWR	1.950	3.0	5.850
Resist-RZ	5.400	1.0	5.400
2N6193JTX	1.100	1.0	1.100
Sub-total =			12.350
Redundant Ckt =	0.00015	1.0	0.00015
Connector,Cir	1.290	2.0	2.580
Connector,PCB	0.660	1.0	0.660
A & F Board Sub.			3.240
A & F Board Tot	3.240	7.0	22.681

Decode Board

Description	Failure Rate ($X 10^6$ Hrs)	Quantity	Total Fail Rate ($X 10^6$ Hrs)
MHE28//8T/ET	1.007	1.0	1.007
6N140/883	172.000	6.0	1,032.000
MM54HC4514/883	0.779	4.0	3.116
ULN2003	0.779	14.0	10.906
Connector,Cir	1.290	1.0	1.290
Connector,PCB	0.660	1.0	0.660
Decoder Board Failure Rate =			1,048.979

TVC SERVO AMPLIFIER POWER (MA1741)

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 FS/SS TVC servo amplifier unit.

Description	Failure Rate ($\times 10^6$ Hrs)	Quantity	Total Fail Rate ($\times 10^6$ Hrs)
8R10-L-11-8HC83	2.310	1.0	2.310
MFN28##8F/ES	1.007	7.0	7.049
Resist-RCR	0.011	3.0	0.034
Connector,Cir	1.290	2.0	2.580
5JX3709	1.015	15.0	15.225
Cap.-CHR	0.490	3.0	1.470

TVC Servo AMP Power Failure Rate = 28.668

ATTITUDE CONTROL SYSTEM ELECTRONICS (MA1761)

The ACS Electronics contain parallel or redundant circuits to increase reliability. MIL-HDBK-217E was used to calculate the failure rates indicated below.

Description	Failure Rate ($\times 10^6$ Hrs)	Quantity	Total Fail Rate ($\times 10^6$ Hrs)
Resist-RCR	0.011	2.0	0.023
Cap.-CHR	0.490	2.0	0.980
Cap.-C8R	0.660	2.0	1.320
MHE28##8F/ES	1.007	2.0	2.014
Connector,Cir	1.290	3.0	3.870
Redun Channel	- 0	1.0	- 0

ACS Electronics Failure Rate = 8.207

Redundant Channel A&R

Description	Failure Rate ($\times 10^6$ Hrs)	Quantity	Total Fail Rate ($\times 10^6$ Hrs)
2N6766JTX	1.100	4.0	4.400
VQ1004P	54.000	1.0	54.000
CD4050BD	0.953	1.0	0.953
6N140A/883	172.000	1.0	172.000
Resist-RCR	0.011	32.0	0.365
Resist-RWR	1.950	4.0	7.800
Cap.-CKR	0.420	4.0	1.680
Channel Subtotal F.R. =			241.198

Redundant Channel Failure Rate = - 0

FS & SS TVC SERVO AMPLIFIER (HA1721)

The FS/SS TVC servo amplifier is used to control the guidance of the first two stages of STARS. As the name indicates, this unit amplifies the control signals received from the SANDAC V. The reliability calculation was achieved by dividing the unit into logical parts (parts 1-7) and functions as indicated below.

Description	Failure Rate ($X 10^6$ Hrs)	Quantity	Total Fail Rate ($X 10^6$ Hrs)
Part 1	701.966	1.0	701.966
Part 2	76.764	2.0	153.527
Part 3	1,387.131	1.0	1,387.131
Part 4	697.406	1.0	697.406
Part 5	710.417	1.0	710.417
Part 6	1,053.959	1.0	1,053.959
Part 7	1,404.725	1.0	1,404.725
30 VDC/SERVO PCB	207.442	1.0	207.442
Switchover PCB	349.248	1.0	349.248
Flowmeter PCB	820.201	1.0	820.201
FS & SS TVC Servo Amp Fail Rate =			7,486.022

Part 1

Description	Failure Rate ($X 10^6$ Hrs)	Quantity	Total Fail Rate ($X 10^6$ Hrs)
IS0102	172.000	4.0	688.000
CAP.-CKR	0.420	24.0	10.080
Resist-RCR	0.011	4.0	0.046
DG307AAK	1.920	2.0	3.840
Part 1 Failure Rate =			701.966

Part 2

Description	Failure Rate ($X 10^6$ Hrs)	Quantity	Total Fail Rate ($X 10^6$ Hrs)
AD6445H/883	0.943	12.0	11.316
Resist-RCR	0.011	12.0	0.137
Resist-RNC	0.162	60.0	9.720
Resist-RNR	1.950	8.0	15.600
Cap.-CKR	0.420	32.0	13.440
LVA456A	0.385	8.0	3.080
OP-09AY/883	0.943	16.0	15.088
1N3070JANTX	0.215	8.0	1.720
2N2222JANTX	0.042	8.0	0.339
RD101DD-14-HC883	1.581	4.0	6.324
Part 2 Failure Rate =			76.764

FS & SS TVC SERVO AMPLIFIER (HA1721) (CON'T)

Part 3

Description	Failure Rate ($X 10^6$ Hrs)	Quantity	Total Fail Rate ($X 10^6$ Hrs)
DG307AAK	1.920	4.0	7.680
IS0102	172.000	8.0	1,376.000
Resist-RCR	0.011	8.0	0.091
Cap.-CKR	0.420	8.0	3.360
Part 3 Failure Rate =			1,387.131

Part 4

Description	Failure Rate ($X 10^6$ Hrs)	Quantity	Total Fail Rate ($X 10^6$ Hrs)
DG307AAK	1.920	4.0	7.680
IS0102	172.000	4.0	688.000
Resist-RCR	0.011	4.0	0.046
Cap.-CKR	0.420	4.0	1.680
Part 4 Failure Rate =			697.406

Part 5

Description	Failure Rate ($X 10^6$ Hrs)	Quantity	Total Fail Rate ($X 10^6$ Hrs)
IS0102	172.000	4.0	688.000
Resist-RCR	0.011	12.0	0.137
Resist-RNC	0.162	8.0	1.296
Cap.-CKR	0.420	32.0	13.440
OP-09AY/883	0.943	8.0	7.544
Part 5 Failure Rate =			710.417

Part 6

Description	Failure Rate ($X 10^6$ Hrs)	Quantity	Total Fail Rate ($X 10^6$ Hrs)
IS0102	172.000	6.0	1,032.000
Resist-RCR	0.011	8.0	0.091
Resist-RNC	0.162	8.0	1.296
Cap.-CKR	0.420	40.0	16.800
OP-09AY/883	0.943	4.0	3.772
Part 6 Failure Rate =			1,053.959

Part 7

Description	Failure Rate ($X 10^6$ Hrs)	Quantity	Total Fail Rate ($X 10^6$ Hrs)
IS0102	172.000	8.0	1,376.000
Resist-RCR	0.011	12.0	0.137
Resist-RNC	0.162	8.0	1.296
Cap.-CKR	0.420	56.0	23.520
OP-09AY/883	0.943	4.0	3.772
Part 7 Failure Rate =			1,404.725

Y8 & S8 TVC SERVO AMPLIFIER (HA172) (CON'T)

Switchover Board

Description	Failure Rate (X 10^{-6} Hrs)	Quantity	Total Fail Rate (X 10^{-6} Hrs)
Cap.-CKR	0.420	1.0	0.420
Cap.-CSR	0.660	1.0	0.660
Resist-RCR	0.011	6.0	0.068
Resist-RWR	1.950	2.0	3.900
Resist-RNC	0.162	2.0	0.324
LVA456A	0.385	2.0	0.770
4N55/883	172.000	1.0	172.000
IRFF-131	29.000	1.0	29.000
2N2222JANTX	0.042	2.0	0.085
1N3070JANTX	0.215	1.0	0.215
Switchover Board Failure Rate =			207.442

30 VDC TO SERVO AMP Board

Description	Failure Rate (X 10^{-6} Hrs)	Quantity	Total Fail Rate (X 10^{-6} Hrs)
Resist-RCR	0.011	8.0	0.091
Cap.-CKR	0.420	3.0	1.260
4N55/883	172.000	2.0	344.000
CD4049	0.953	3.0	2.859
2N2907JANTX	0.042	1.0	0.042
2N2222JANTX	0.042	1.0	0.042
CD40106	0.953	1.0	0.953
30 VDC to Servo Amp Board Failure Rate =			349.248

Flowmeter Board

Description	Failure Rate (X 10^{-6} Hrs)	Quantity	Total Fail Rate (X 10^{-6} Hrs)
Resist-RCR	0.011	12.0	0.137
Resist-RNC	0.162	2.0	0.324
CAP.-CSR	0.660	2.0	1.320
CAP.-CKR	0.420	12.0	5.040
VQ1004P	54.000	2.0	108.000
4N55/883	172.000	3.0	516.000
CD40106	0.953	7.0	6.671
LVA456A	0.385	2.0	0.770
CD4049	0.953	1.0	0.953
CD4024	0.953	2.0	1.906
2N2222JANTX	0.042	1.0	0.042
CD4070	0.953	1.0	0.953
CR100	0.660	2.0	1.320
CD4076	0.953	4.0	3.812
6N140/883	172.000	1.0	172.000
CD4071	0.953	1.0	0.953
Flowmeter Board Failure Rate =			820.201

TELEMETRY JUNCTION (HA173)

The telemetry junction is used for circuit connections and is a common point to 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:

Description	Failure Rate (X 10^{-6} Hrs)	Quantity	Total Fail Rate (X 10^{-6} Hrs)
R07704	45.085	1.0	45.085
R07703	54.796	1.0	54.796
R07702	58.491	1.0	58.491
R07701	58.010	1.0	58.010
R07700	59.488	1.0	59.488
R07699	65.821	1.0	65.821
R07698	62.654	1.0	62.654
R07684	194.227	1.0	194.227
R07680	40.966	1.0	40.966
R07764	50.808	1.0	50.808
TM Junction Failure Rate =			690.348

R07698

Description	Failure Rate (X 10^{-6} Hrs)	Quantity	Total Fail Rate (X 10^{-6} Hrs)
Connector,Cir	1.290	7.0	9.030
Connector,Inter	0.106	508.0	53.624
R07698 Failure Rate =			62.654

R07699

Description	Failure Rate (X 10^{-6} Hrs)	Quantity	Total Fail Rate (X 10^{-6} Hrs)
Connector,Cir	1.290	7.0	9.030
Connector,Inter	0.106	538.0	56.791
R076999 Failure Rate =			65.821

R07704

Description	Failure Rate (X 10^{-6} Hrs)	Quantity	Total Fail Rate (X 10^{-6} Hrs)
Connector,Cir	1.290	5.0	6.450
Connector,Inter	0.106	366.0	38.635
R07704 Failure Rate =			45.085

R07764

Description	Failure Rate (X 10^{-6} Hrs)	Quantity	Total Fail Rate (X 10^{-6} Hrs)
Connector,Cir	1.290	6.0	7.740
Connector,Inter	0.106	408.0	43.068
R07764 Failure Rate =			50.808

SANDAC V

Failure rates for the SANDAC V were obtained from the STRYPI-GOLD report, dated August 12, 1988. The failure rate for the MIL-STD-1553B board was obtained from MIL-HDBK-217E. Failure rates for the two bus hybrids were obtained from DDC (vendor) for missile launch environment.

Description	Failure Rate (X 10^6 Hrs)	Quantity	Total Fail Rate (X 10^6 Hrs)
Processor Module	155.470	3.0	466.410
Utility Module	203.422	1.0	203.422
System Module	309.065	1.0	309.065
MIL-STD-1553B	154.972	1.0	154.972
Sandac V Failure Rate =			1,133.869

MIL-STD-1553B Mod.

Description	Failure Rate (X 10^6 Hrs)	Quantity	Total Fail Rate (X 10^6 Hrs)
Connector,Rack	0.114	1.0	0.114
Connector,Rack	0.060	2.0	0.120
Connector,Strip	0.608	12.0	7.294
Connector,Strip	0.400	4.0	1.599
Cap.-CKR	0.420	35.0	14.700
Cap.-CSR	0.660	13.0	8.580
Resist-RZ	5.400	7.0	37.800
Resist-RWR	1.950	4.0	7.800
EP600	1.627	1.0	1.627
EP900	1.627	1.0	1.627
EP320	1.627	1.0	1.627
54L8592JTX	0.953	1.0	0.953
54FCT244	0.953	4.0	3.812
54FCT245	0.953	8.0	7.624
54ALS04	0.953	1.0	0.953
IDT6116	2.673	4.0	10.690
54FCT373	0.953	1.0	0.953
54L8593	0.953	1.0	0.953
Crystal	2.310	1.0	2.310
Bus-65600	20.833	1.0	20.833
Bus-66300II	16.667	1.0	16.667
FC1553II	3.168	2.0	6.336
1553 Bus Module Failure Rate =			154.972

FIBER OPTICS TRANSMITTER (MA179)

The fiber optics transmitter failure rate was computed using MIL-HDBK-217E and the failure rate obtained from the vendor for the DMT-12-TAG05.

Description	Failure Rate (X 10^6 Hrs)	Quantity	Total Fail Rate (X 10^6 Hrs)
Connector,Optics	0.100	2.0	0.200
Cap.-CKR	0.420	2.0	0.840
Connector,Cir	0.400	2.0	0.800
DMT-12-TAG05	18.700	2.0	37.400
Fiber Optics Xmitter Failure Rate =			39.240

REFERENCES

1. Military Handbook 217E, Reliability Prediction of Electronic Equipment, Section 5.2, Parts Count Analysis, October 27, 1986, Rome Air Development Center, Griffiss AFB, New York.

2. Polaris A1 Data Book (U), Report Number LMSD-80825, Lockheed Missiles and Space Division, October 21, 1965, Sunnyvale, California. (This document is Classified)

3. Predicted Probability of STRYPI GOLD Departing From Nominal Trajectory Due to Equipment Failure and Human Error, E. W. Collins, August 12, 1988, Division 7222, Sandia National Laboratories, Albuquerque, NM.

4. Reliability Prediction for the STARS MA168 Arming and Firing Assembly, M. C. Rost, March 28, 1990, Division 7222, Sandia National Laboratories, Albuquerque, NM.

5. Reliability Predictions for the STARS Destruct System, S. J. Blankenau, May 12, 1989, Division 7222, Sandia National Laboratories, Albuquerque, NM.

6. Service Life Extension (SLE) Program Report, Lockheed Missiles and Space Company, February 1975, Sunnyvale, California.

7. STARS FTU-1 Timeline, John White, July 24, 1990, Division 9132, Sandia National Laboratories, Albuquerque, NM.

8. STARS A&F Sequencer Operation, T. L. Downey, October 2, 1989, Division 7525, Sandia National Laboratories, Albuquerque, NM.

9. STARS Flight Test Unit Trajectory, D. L. Outka, April 19, 1990, Division 1555, Sandia National Laboratories, Albuquerque, NM.

10. STARS Third Stage Thrust Vector Actuator (TVA) Assembly Failure Probabilities, K. C. Abbott and R. W. Plowman, September 18, 1990, Division 7222, Sandia National Laboratories, Albuquerque, NM.

RWP:7222

UNION OF CONCERNED SCIENTISTS

December 16, 1992

Technical Review of "Strategic Target System (STARS) Predicted Mission Reliability for Flight Test Unit - 1 (FTU-1)" by K.C. Abbott and R.W. Plowman, Sandia National Laboratories

-Dr. David Wright, Senior 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 K.C. Abbott and R.W. Plowman, dated October 1, 1990. In reviewing the Abbott/Plowman 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/Plowman analysis *does not support* a reliability figure of 97% for the STARS vehicle as stated in the Environmental Impact Statement (EIS).[1] 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 are assumed by the authors to be 100%, which is clearly unrealistic. As a result of my review, I have concluded that the Abbott/Plowman analysis should not be used as the basis for policy decisions concerning the STARS program.

Augmenting the Abbott/Plowman 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/Plowman analysis, this figure is still expected to be an overestimate of the actual reliability of the STARS booster.

[1]Final Environmental Impact Statement, Volume 1, Responses to Comments and Changes to Draft EIS, May 1992, U.S. Army Strategic Defense Command, p. 2-20, in revision to p. 4-53 of Draft EIS.

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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 1985 and 1992. 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 82%. 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 92.8%, 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 launches of the refurbished Minuteman I missiles, there would be a greater than 50% chance of failure within the first year of STARS launches.

December 16, 1992

Technical Review of "Strategic Target System (STARS) Predicted Mission Reliability for Flight Test Unit - 1 (FTU-1)" by K.C. Abbott and R.W. Plowman, Sandia National Laboratories

Dr. David Wright, Senior Staff Scientist
Union of Concerned Scientists

Section I. Introduction

While Abbott and Plowman 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/Plowman analysis should not be used as the basis for policy decisions.

Indeed, Abbott and Plowman clearly state in the report that "the reliability prediction must be seen as a best case prediction."[2] Moreover, they state that "the prediction is not based on flight or laboratory testing of the STARS system,"[3] 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"[4] 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.

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[2]Abbott and Plowman, p. 1.

[3]Abbott and Plowman, p. 10.

[4]Abbott and Plowman, 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 those 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 problem areas with Polaris A3 components,"[5] presumably indicating effects of aging, and they list the particular components that raised concern. Despite the fact that these components are known to be the source of reliability concerns, 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 actuator, 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 components, 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 especially important for the STARS booster since most of the electronics of 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 99.85% 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,"[6] 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. 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."[7] 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 boosters is unknowable 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.

[5] Abbott and Plowman, p. 14.

[6] Abbott and Plowman, p. 10.

[7] Abbott and Plowman, p. 10.

Using data on Polaris A3 flights for failures attributable to motor failures gives:

	No. of Flights	No. of Failures	Motor Reliability
Stage 1	203	2-5	0.975 - 0.990
Stage 2	203	4	0.980

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:

	No. of Flights	No. of Failures	Motor Reliability
Stage 1	486	10-17	0.965 - 0.979
Stage 2	486	13-17	0.965 - 0.973

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 Abbott/Plowman analysis, the Abbott/Plowman total reliability prediction of 0.9766 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 missile reliability of 0.928.

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 reliabilities.

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 0.9 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, 1985 through December 1, 1992 for which I have data, there were twelve MMI launch attempts.[8] For each, I have attempted to determine whether the launch was a success or failure, where a failure includes missiles that do not launch on command, 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, 1992 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 launcher reliability was at best 9 of 12, or 0.75, 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 judgements, 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. Since the STARS launch schedule assumes four launches per year, each vertical line denotes one year.

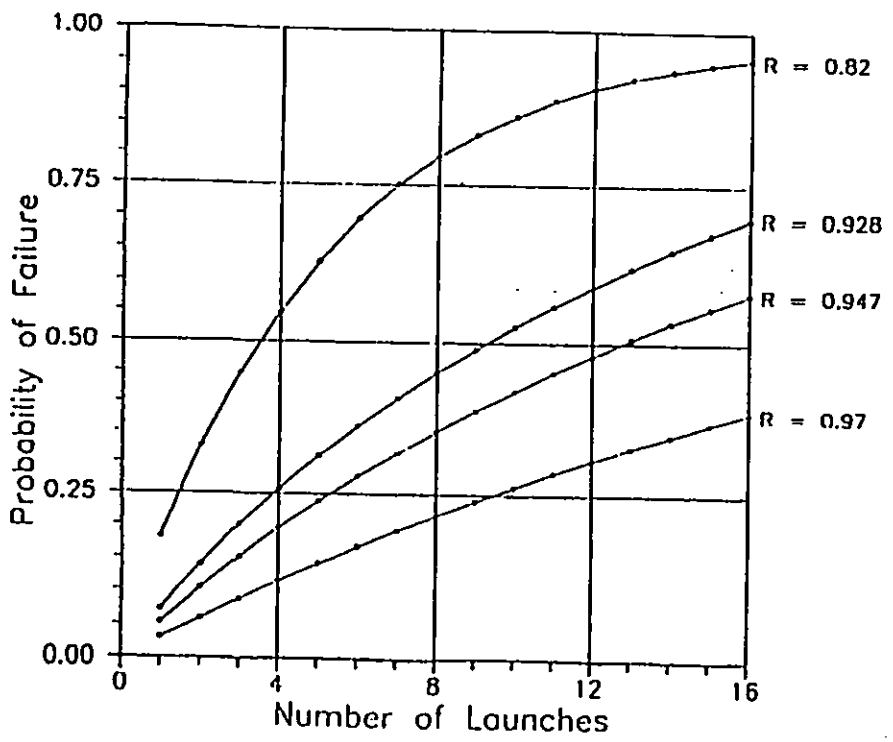
With a realistic estimate of overall missile reliability of 92.8%, there will be a greater than 50% probability of at least one failure within 10 launches. Assuming a test schedule of four launches per year, this means that there would be a greater than 50% chance of

[8] The launch dates were obtained from Jeffrey Geiger in the Base Historian's Office at Vandenberg Air Force Base (personal communication, 12/14/92). The launch dates were 5/22/85, 3/17/86, 1/20/87, 9/21/87, 1/18/88, 2/14/90, 1/28/91, 5/11/91, 6/20/91, 1/20/92, 3/13/92, and 10/24/92.

seeing a failure by the third year of STARS launches. If the actual reliability is 82%, 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 82% 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.

Overall Missile Reliability	Expected number of failures in 40 launches
97%	1
92.8%	3
82%	7



Appendix A.

Reference: James Baeker, "Space Shuttle Range Safety Hazards Analysis," J.H. Wiggins Co., Technical Report #81-1329, July 1981.

Table 3-7. Solid Rocket Motor Case/Nozzle Failure History

PROGRAM	STAGE***	NO. MOTORS FLOWN	CASE/NOZZLE (THROAT) FAILURES	FACTOR OF SAFETY*
NAVY FBM:				
POLARIS A1	F/S	164	4([2]*	2.05 (STEEL)
POLARIS A1	S/S	164	0	2.05 (STEEL)
POLARIS A2	F/S	119	4[2]	2.0 (STEEL)
POLARIS A2	S/S	119	1[1]	1.33
POLARIS A3	F/S	253	2[3]	1.33
POLARIS A3	S/S	253	0	1.33
POSEIDON	F/S	67	0[1]	1.66
POSEIDON	S/S	67	3[6]	1.66
TRIDENT	F/S	25	1	1.33
TRIDENT	S/S	25	1	1.20
CASTOR II (MM 39	-	682	1	1.05
CASTOR IV	-	36	1	UNKNOWN
TITAN III 120° WTC	STAGE 0	110	0	1.27
TOTALS		1502	33(37)	

*STS 50% FACTOR OF SAFETY = 2.05
**NUMBERS IN BRACKETS INDICATE ADDITIONAL POSSIBLE CASE/NOZZLE FAILURES
***F/S = FIRST STAGE, S/S = SECOND STAGE

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 1.7×10^{-2}. If the additional possible case/nozzle failures are included, this increases to about 2.9×10^{-2}. (The foregoing solid rocket motor failure history data has been informally documented in a briefing [22]).

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

Attachment 2

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. 92-2597-07 (Injunctions) AFFIDAVIT OF DR. DAVID C. WRIGHT

AFFIDAVIT OF DR. DAVID C. WRIGHT

~~STATE OF~~ DISTRICT OF COLUMBIA)
) SS.
~~COUNTY OF~~ _____)

DR. DAVID C. WRIGHT, having been first duly sworn, deposes on bath 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. Plowman and is referred to hereinafter as the "Abbott/Plowman analysis" or "paper," was attached to Affiant's previous affidavit as Exhibit B.

5. The Abbott/Plowman 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/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 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 ("MM1") 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 exp(-J27*t1) and exp(-J28*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, <u>even if</u> 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 MM1 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 MM1 is very relevant to the expected <u>actual</u>, as opposed to <u>theoretical</u>, behavior of the STARS missile. As stated in Affiant's prior affidavit and detailed in his technical review, the actual reliability of the MM1, 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 judgements. 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 MM1 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 MM1 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

David C. Wright

SUBSCRIBED AND SWORN BEFORE ME
THIS 14th DAY OF January 1993

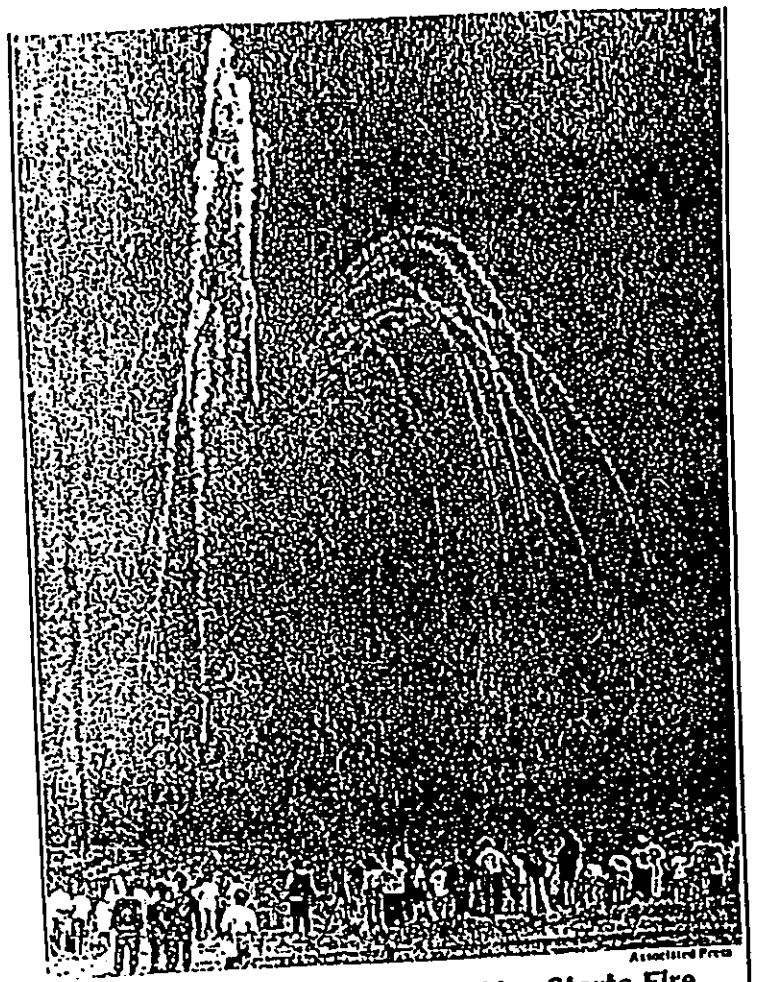
Vanessa Y. Gines

Notary Public, State of District of Columbia

My commission expires: Vanessa Y. Gines Notary Public, District of Columbia My Commission Expires Aug. 31, 1997

Attachment 3

THE NEW YORK TIMES NATIONAL WEDNESDAY, JUNE 16, 19



Associated Press

Missile Blown Up During Launching Starts Fire

Pieces of a Minuteman I missile falling after its destruction yesterday at Vandenberg Air Force Base, Calif. The errant missile carrying an Army payload was blown up during launching, and flaming debris ignited a 400-acre brush fire near a hamlet at the edge of the base. An Air Force statement said controllers "detected a flight anomaly and terminated the flight for safety reasons." No injuries were reported.

—Hawaii Tribune - Herald, Thursday, June 17, 1993

Minuteman destroyed

Spectators at a Point Sal viewing site watch smoke rise from a brush fire at Vandenberg Air Force Base caused by debris from a missile destroyed when it strayed off course Tuesday. The Minuteman 1 missile was destroyed seconds after the 10:30 a.m. launch, causing several brush fires that threatened the town of Casmalia, Calif., north of the launch site. The Air Force routinely test fires missiles and launches space boosters from the central California coastal base.

—Associated Press photo

RECEIVED AS FOLLOWS

Minuteman

Continued from Page B 1

use in future tests, Whitaker said. It would benefit the military, Pike believes, to examine the condition of the remaining missiles.

While space experts sifted through the political debris from the launch, fire crews at Vandenberg continued to clean up the remains of a brushfire sparked by falling missile parts. Several blazes consumed almost [redacted] acres. About 100 acres were charred on the northern edge of the base, while almost 600 acres burned nearby but off base property near Casmalia.

The military, a base official said, is "going to keep a lid" on the investigation and doesn't plan to allow the media near the wreckage. Most of the remains are no bigger than a tabletop, said Master Sgt. James Scott, base superintendent of safety.

In the launch control room on base, civilian Mark Berte was the one responsible for pushing the buttons that led to the missile's destruction.

As the Minuteman left its pad, Berte and others had mere seconds to determine something was amiss.

"At two seconds (after launch), it was supposed to go downrange," Berte explained. "But it started to go straight up."

The control room uses charts to make sure the missile is heading in the right direction — and lives by the motto "Track 'em or crack 'em," Berte said.

With his heart rate twice its normal rate eight seconds after launch, Berte "cracked 'em." It was a textbook example of a destruction in terms of how the debris fell and personnel response, Scott said.

The primary concern, both said, was making sure the approximately 100 workers in the area were safely evacuated after the explosion.

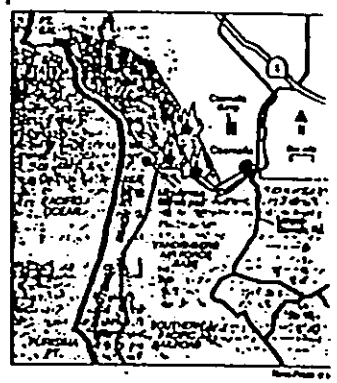
Berte has been in charge of destroying five other missiles in his career, and said he believes the Minuteman guidance system failed. A formal investigation is underway and could take months, officials said.

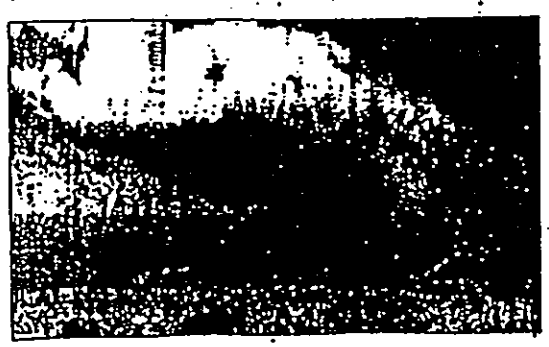
Despite the spectacular nature of the explosion, which threw missile parts hundreds of feet, "You're in more danger driving to work than watching a missile launch from Vandenberg," Berte said.

Santa Barbara
News-Press
Santa Barbara, California, Wednesday, June 16, 1993

Minuteman 1 missile destroyed after launcl

Fires flare up as debris rains dow





Casmalia residents wait, watch for flames

Barbara News-Press, Wednesday, June 16,

Officials say fire posed no health risks at Casmalia

[illegible]

Casmalla

Continued from Page A1

[illegible]

[illegible]

September 17, 1993

September 17, 1993

VAFB missile in 'state of shock'

Guidance glitch blamed in failure

By Nora K. Wallace
News-Press Staff Writer

A Minuteman 1 intercontinental ballistic missile was in a "state of shock" when it veered off course June 15 and had to be destroyed, a military investigation has determined.

Eight seconds after it blasted out of its silo at Vandenberg Air Force Base, the missile deviated from its flight path, prompting safety crews to blow it up. The blast hurled chunks of flaming debris toward the ground, igniting a 1,000-acre brush fire that sent residents of nearby Casmalia into a voluntary evacuation.

The one-of-a-kind test was set to develop "lightweight target objects and techniques to deploy them," an Army spokesman said. The objects would have been used in future Strategic Defense Initiative experiments managed by the Ballistic Missile Defense Organization.

The ill-fated test cost the Defense Department $15 million.

The 24-member investigative team narrowed the missile's erratic behavior to a problem with part of the guidance system, called the

Missile

Continued from Page A1

meant that at launch, "the missile was in kind of a shock," Boyd said. "It was cold-cocked at launch, in (a) dazed state and didn't know what to do. It was as if someone got popped in the head by a hockey puck — that kind of dazed."

A surge in electrical power also could have caused the missile to go out of control, but the Air Force could not determine "where those might have come from. The systems are always grounded," Boyd said.

The launch was part of the Army's Space and Strategic Defense Command's target development test. It cost about $10 million to produce the payload aboard the Minuteman. Missile launches alone typically cost $5 million.

The explosion was so extensive that the investigation team was "looking for a needle in a haystack" when it examined the debris, said Valerie Arruda, a spokeswoman with the Space and Missiles Systems Center at Norton Air Force Base in San Bernardino.

"Nothing like this has ever happened before," Arruda explained. "Once it is launched and you destroy it, there's not much evidence left."

A military official said the investigation into the mishap was finished in late July, but repeated requests by the News-Press for the results were not answered until this week. A military spokeswoman could not explain why it took so long to get answers.

Fifteen Minuteman 1 missiles remain in the Air Force's supply, but Boyd said the accident does not preclude future Minuteman 1 launches. Minuteman 2 and 3 missiles also will not be affected, she said.

Investigators recommended the military review electrical systems and inspect missile grounding facilities, Boyd said. Computer mo-

Attachment 4

SIERRA CLUB LEGAL DEFENSE FUND, INC.

The Law Firm for the Environmental Movement

212 Merchant Street, Suite 202 Honolulu, Hawaii 96813 (808) 599-2436 FAX (808) 521-6841

September 24, 1993

Hand-Delivered

Ms. Linda McCrerey
Department of Land and Natural Resources
Kalanimoku Building
1151 Punchbowl Street
Honolulu, HI 96813

Re: Comments on Draft EIS for Pacific Missile Range Facility Easement Over State Land for Safety and Ground Hazard Areas for STARS and Navy Vandal Launches

Dear Ms. McCrerey:

Enclosed please find Attachment "4" to Sierra Club's and 1000 Friends of Kaua'i's Comments on Draft EIS for Pacific Missile Range Facility Easement Over State Land for Safety and Ground Hazard Areas for STARS and Navy Vandal Launches, post-marked on September 22, 1993.

Very truly yours,

Denise E. Antolini

cc: Linda Ninh
U.S. Army Space and Strategic Defense Command
Post Office Box 1500
Huntsville, Alabama 35807-3801

Missile debris recovered from Polihale State Park.

(Hand delivered to DLNR. Not reproducible.)

Attachment 5

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. 92-2597-07 (Injunctions) AFFIDAVIT OF MIGUEL DIONISIO GODINEZ

AFFIDAVIT OF MIGUEL DIONISIO GODINEZ

STATE OF HAWAII)
) ss.
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.

2. Affiant resides at 5-5088 Kuhio Highway in Hanalei, Hawai'i.

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 and paddle sea caves and reef areas along Na Pali Coast. After breaking for lunch at Miloli'i, 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 Hanalei.

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 Kauai 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 Kauai.

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 Vandal 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.

Attachment 6

Further, Affiant sayeth naught.

Miguel Dionisio Godinez

Subscribed and sworn to before me
this 16th day of December, 1992.

Notary Public, State of Hawaii

My commission expires: 7-7-93

7

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. 92-2597-07 (Injunctions) AFFIDAVIT OF SUZANNE MARINELLI

AFFIDAVIT OF SUZANNE MARINELLI

STATE OF HAWAII)
) SS.
COUNTY OF KAUAI)

SUZANNE MARINELLI, having been first duly sworn, deposes on oath and says that:

1. She makes this Affidavit in support of Plaintiffs' Motion For Summary Judgment And/Or For Preliminary Or Permanent Injunction.

2. Affiant resides at 5-5527 Kuhio Highway in Hanelei, Hawai'i.

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, picnicing, 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 termination point for Na 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, picnicing, 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 Reviewers 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 PMRF) 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 PMRF. 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 burials 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 (HOA-FEA at 310). In response to comment #1, Mr. William W. 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 (HOA-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 HOA 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 HOA, 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 (HOA-FEA at 40), damage to the park was minimal, and in marked 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 unaccessible. 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 (HOA-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 these 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.

SUZANNE MARINELLI

Attachment 7

Subscribed and sworn to before me this 12th day of January, 1993.

Notary Public, State of Hawaii

My commission expires: 7-7-93

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. 92-2597-07 (Injunctions) AFFIDAVIT OF RAYMOND L. CHUAN; EXHIBITS "A" AND "B"

AFFIDAVIT OF DR. RAYMOND L. CHUAN

STATE OF HAWAII)
) SS.
KAUAI COUNTY)

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 1953. He owns a business, Femtometrics, 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 Vandal 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, ¶3) but the State's response failed to address his concerns (MOA-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 "B" 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 13, 1992 to inquire regarding its consultation with the DLNR over the EA. His call was referred to Mr. Art Bauckham 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. Bauckham 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 (MOA-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 (MOA-FEA at 21 and 23). In his comments of April 21, 1992 Dr. Lewin states, for example, " A serious concern exists as to the devastating impact an early termination of the booster, either on the launch pad or just above the launch pad, would have on the environment and human health." (Emphasis added.) In his conversation with Mr. Bauckham of the DOH's Environmental Planning Office on August 13, 1992 and with Mr. Mike Miyasaki 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. Lewin'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 swim 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-DEA (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 campsites within the ground hazard area." However, in response to comments by the Affiant on this same subject (MOA-FEA at 177), Mr. William 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 campsites 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 (MOA-FEA at 28). 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 MOA 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 MOA may be modified.

15. In summary, the potential impacts from the STARS launches to State lands included in the GHA, and subject to the MOA, 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.

Raymond L. Chuan
Dr. Raymond L. Chuan

Subscribed and sworn to before me
this 21st day of December, 1992.

C. Kashiwa
Notary Public
County of Kauai
State of Hawaii

My commission expires: 7-7-95

7

RAYMOND L. CHUAN
P.O. Box 1183
Hanalei, HI 96714
808 826-6414, Fax 826-1113

September 1, 1992

Department of Land and Natural Resources
P. O. Box 621
Honolulu, HI 96809

Attention: William Paty

Reference: DLNR Draft 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, dated August 7, 1992.

Dear Mr. Paty:

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(a).

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(a), 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

1

EXHIBIT A

9-161

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 (5) requires "Summary description of the affected environment, including suitable and adequate location and site 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 this "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 uses of the environment;
> (4) Substantially affects the economic or social welfare of the community or State;
> (5) Substantially affects public health;
> (7) Involves a substandial degradation of environmental quality;
> (10) Detrimentally 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 EIS's 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 EIS's. ....."

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 resort to circular logic by referring back to the very sections of the Draft EIS that generated the comments in the first place. Examples abound; one is the comment from the Department of Health (Letter from Dr. John Lewin 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 draft EIS 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 actions will be taken to clean up the chemical contamination and to handle the disposal of the contaminated hazardous waste. ....". My contacts with Mr. Art Hauckham of the Office of Environmental Planning of the DOH and with Mr. Mike Miyasaki of the Hazardous Waste Branch reveal that neither could concur that the issues raised by Dr. Lewin had been properly addressed by the Army in its Final EIS.

Another example: Comments from Harold Masumoto of the Office of State Planning, in his letter to the Army of April 15, 1992, regarding CZM consistency, were not addressed at all in the Final EIS. Mr. Masumoto also noted in an earlier letter (dated October 2, 1990) that a CDUA would be required by the DLNR. There is no mention of a CDUA 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 (WR2)
Tom Norris, Moss Landing Marine Laboratories, (WR 328)
Marjorie Ziegler, Hawaii Audubon Society, 4-13-92 (WR 326)
Clifford Arinaga, Attorney, 4-13-92 (WR 327)

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 prescribed 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 Nohili Point, for example, over the sand dunes back to where his car is parked. Likewise, it would take a security personnel on 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 that 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 30-day window. The proposed MOA obligates 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 notification 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 statues and rules.

Sincerely yours,

Raymond L. Chuan, PhD

CC: Sierra Club Legal Defense Fund
Mr. Brian Choy, OEQC
Dr. John Lewin, DOH
Mr. Harold Masumoto, OSP
Dr. John Harrison, UH Environmental Center
Mayor JoAnn Yukimura, County of Kauai

COALITION AGAINST STAR-WARS ON KAUAI
P.O. Box 1183
Hanalei, HI 96714
808-826-6814, 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 Practices 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(a) 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 not have reached the conclusion in its Draft EA that it found no impact on public health and safety. Mr. Art Baukham of the Environmental Planning

EXHIBIT 5

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 latter'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 submittal 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 Hanaike 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 unseemly 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 11-200-13(c)), 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.

Attachment 8

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. Chuan, PhD
Co-chair
Coalition Against Star-Wars on Kauai

Attach. Letter to Young, 8-17-92
Bauckham letter of 8-19-92

cc: SCLDF (w/o attchm.)
Ms Hanaike (w/o attachm.)

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. 92-2597-07 (Injunctions) AFFIDAVIT OF CHARLES E. JETTY

AFFIDAVIT OF CHARLES E. JETTY

STATE OF HAWAII)
) SS.
CITY AND COUNTY OF HONOLULU)

CHARLES E. JETTY, 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.

2. Affiant resides at 2840 Kauape'a Road in Kilauea, Hawai'i.

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, picnicing, 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

Polihale 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 Polihale 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 Polihale 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 Polihale 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 Polihale 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.

Charles E. Jetty

Subscribed and sworn to before me this 10th day of ~~December~~ January, 1992.

Notary Public, State of Hawai'i

My commission expires: 9-20-96

Attachment 9

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. 92-2597-07 (Injunctions) AFFIDAVIT OF DR. MICHAEL D. JONES; EXHIBITS "A" THROUGH "E"

AFFIDAVIT OF DR. MICHAEL D. JONES

STATE OF HAWAII)
) SS.
CITY AND COUNTY OF HONOLULU)

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 11

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 Kaua'i. 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 TRPUF 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 emissions modeling, Affiant states that one cannot confidently asses 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 Hawaii guidelines for HCl far beyond the boundaries of the 10,000 foot-radius GHA 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 36,000 feet downwind in the case of an early flight termination.

12. The State of Hawaii's exposure guideline for HCl is .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." Exceedence of the State's guideline of .025ppm 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 Hawaii exposure guideline of .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 GHA 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 GHA. 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 (MOA-FEA at 123) overestimate the time available to activate the flight termination system and contain all debris within the GHA. 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 <u>within 15 seconds</u> if the center of mass of the debris is to be contained within the GHA. This does not insure that <u>all debris</u> will be contained within the GHA, but only that the center of mass of the debris pattern will be within the GHA. 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 W. Paty's response to the Affiant's comments on the EA (MOA-FEA 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 90 degrees off course. The flight safety officer issued the destruct signal 23 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 8.3 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 "TBD" 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 16th day of December 1992.

Iris M. Kessler
Notary Public, State Of Hawaii

My commission expires: 7/16/96

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 TRPUF computer model and only wind speeds above 1.5 meters per second were considered. The TRPUF 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 116 times the State of Hawaii guideline (8-hour average value) 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. TRPUF also predicted that the carbon monoxide concentration at the LHA boundary would exceed 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 TRPUF 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 TRPUF (wind speed of 1.6 m/sec only) and REEDM (wind speed of 1.0 m/sec) so direct comparison was still difficult due to different wind speeds. In addition, 8-hour average values were not given 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 comment (WR2-3) 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 stressed again that the differences between the predictions of the different REEDM versions and between TRPUF 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. 5, 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 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 228 in this Record clearly indicates that REEDM predicts that the 8-hour average hydrogen chloride concentrations will exceed the Hawaii guideline. Documents 249 and 250, 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 (dated Sept. 22, 1992) to William Paty 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 250 is a NASA Technical Memorandum from July 1986 which compares hydrogen chloride depositions 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

EXHIBIT A

CONTACT REPORT

PROJECT TITLE: STARS EA Supplement
SUBJECT: State of Hawaii's Comments to Draft
ASI CONTACTS: George Mathews, ASI - San Diego
DATE OF CONTACT: 7/3/91
CONTACT: Tyler Sugihara, Staff Engineer, Clean Air Branch, ph: 808-543-8200

A response letter has been drafted to ASI, 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 5 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_{8hr}) rather than the ceiling limit interpretation (TWA-C) which I have been using. This TWA_{8hr} of 0.025 ppm would be the exposure guideline at the public access boundary, i.e., the Launch Hazard Area Boundary (3000 m).

Hawaii resolutely 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 ~0.57), since our TRPUF printouts have been 30-minute averages.

If the modeling can be shown to be overly conservative, then such an discussion would have to be presented to allow Hawaii some latitude in applying its conservative guideline.

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/access, at a fence line, for example, or at the LHA boundary, or toward the population centers. The monitoring section should be improved.

EIS AR 295

EXHIBIT B

TO: STARS EA Supplement File
FROM: George Mathews
DATE: August 16, 1991

SUBJECT: Additional REEDM Run at 1 m/s Wind Speed

At ASI's request, ACTA, Inc. at Vandenberg AFB (contact person: Ken Conley, phone: 805-865-0404) conducted additional air dispersion modeling a STARS missile launch with REEDM. The results are the computer printouts dated 8/13/91.

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 ASI'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 conflagration 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 concentrations 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 [POL1L] 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 gave [POL1L]. So, in these 1991 runs, the output of the bearing from pad (degrees) is meaningless.

EIS AR 228

EXHIBIT C

Polaris mesh parameters used in ACCEDM runs

	Normal	Configuration
total pixels	9.4166 pts	13.8446 pts
computation rate	1.5465 pts/s	5.1364 pts/s
burn time	61.2 s	270 s
fuel content	656 cal/g	219 cal/g

Cloud parameters

initial radius	24 m	24 m
initial velocity	5 m/s	0 m/s

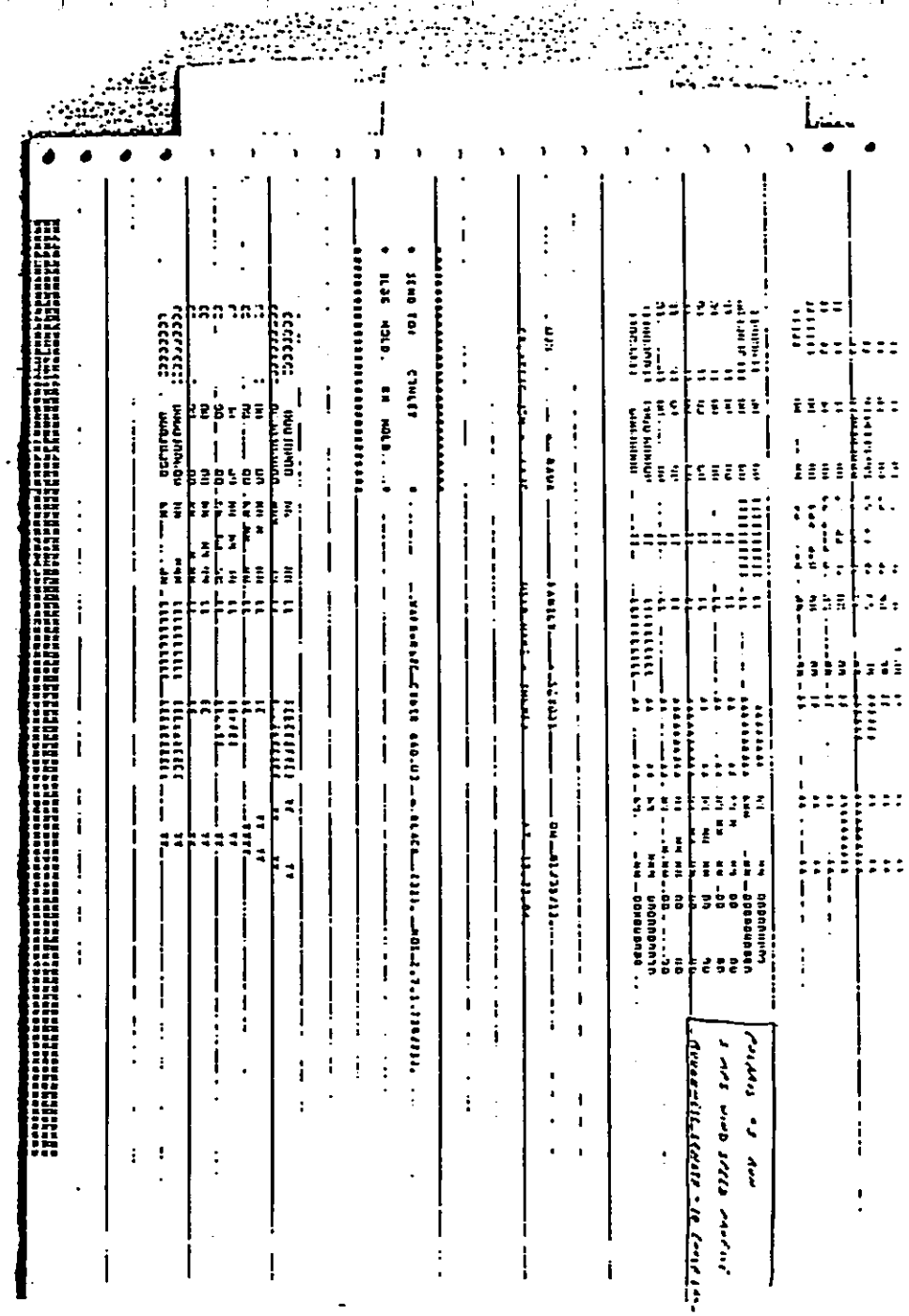
Chemical species production

HCl	17%
CO_2	2%
CO	25.7%
Al_2O_3	38%

normal burned fire height curve
$z = 0.4206\ h^{0.5607}$

FROM :
KEN CONLEY
ACTA, INC
VANDENBERG AFB
805-865-0404

8/13/91



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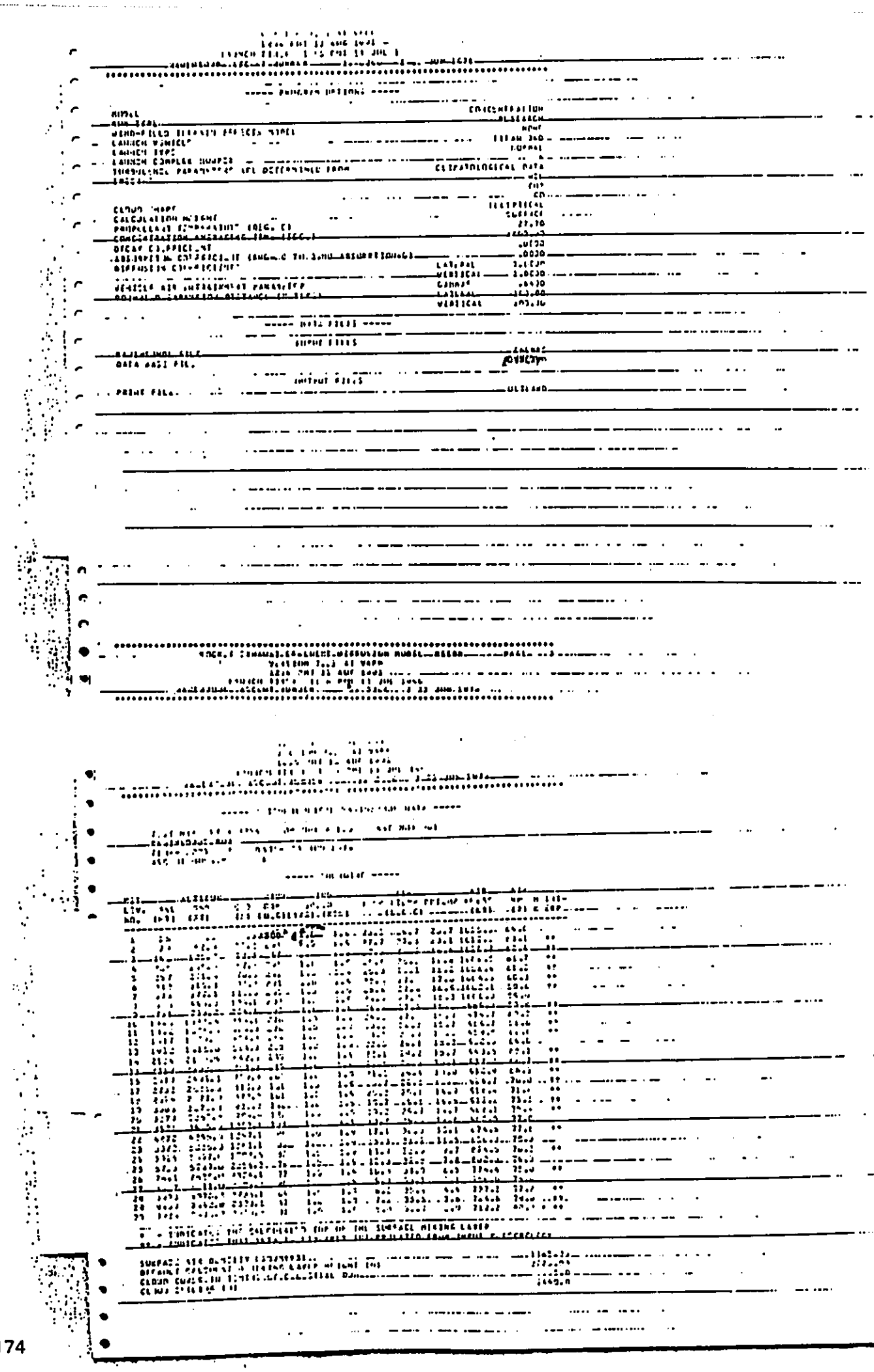

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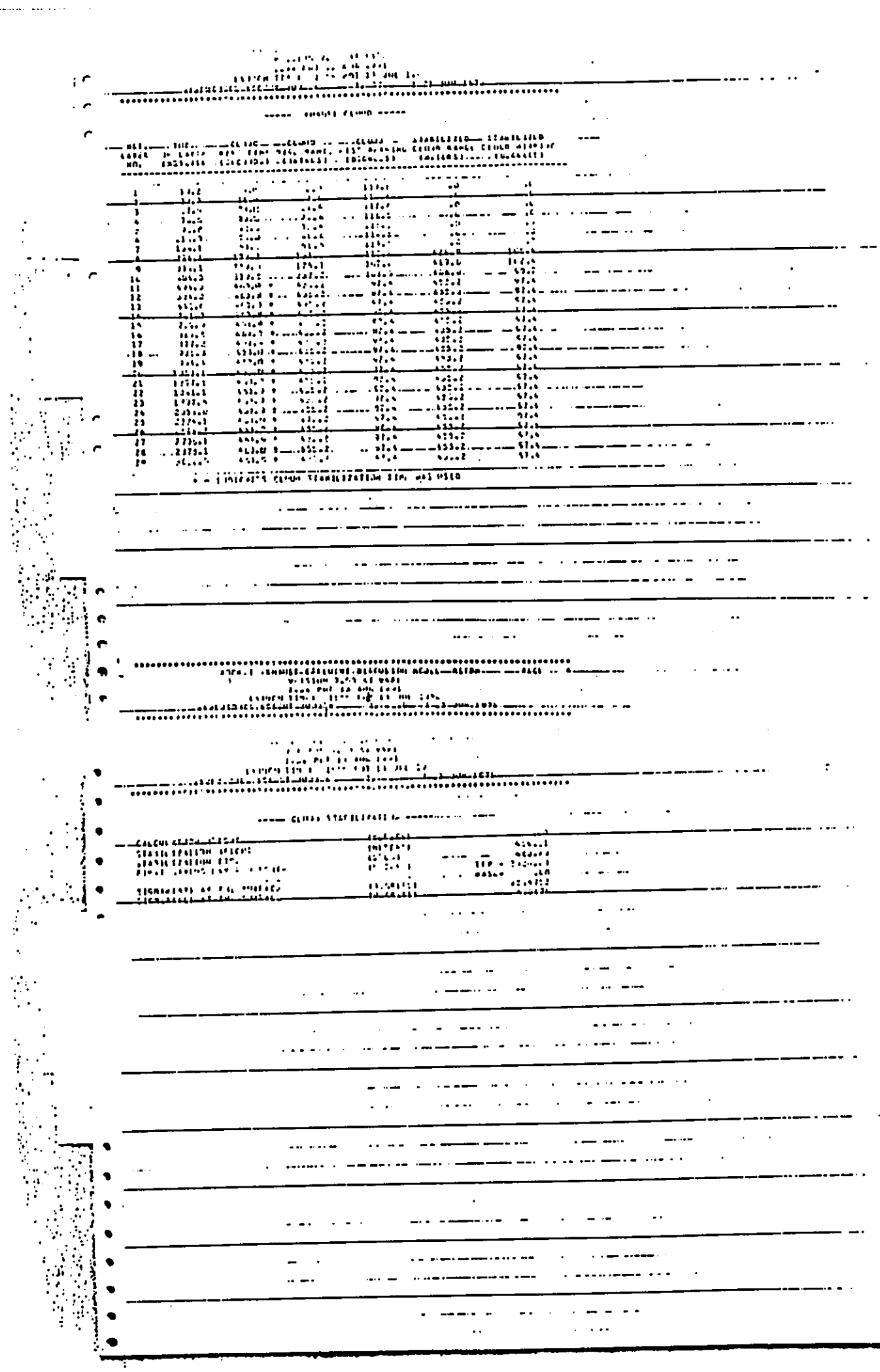

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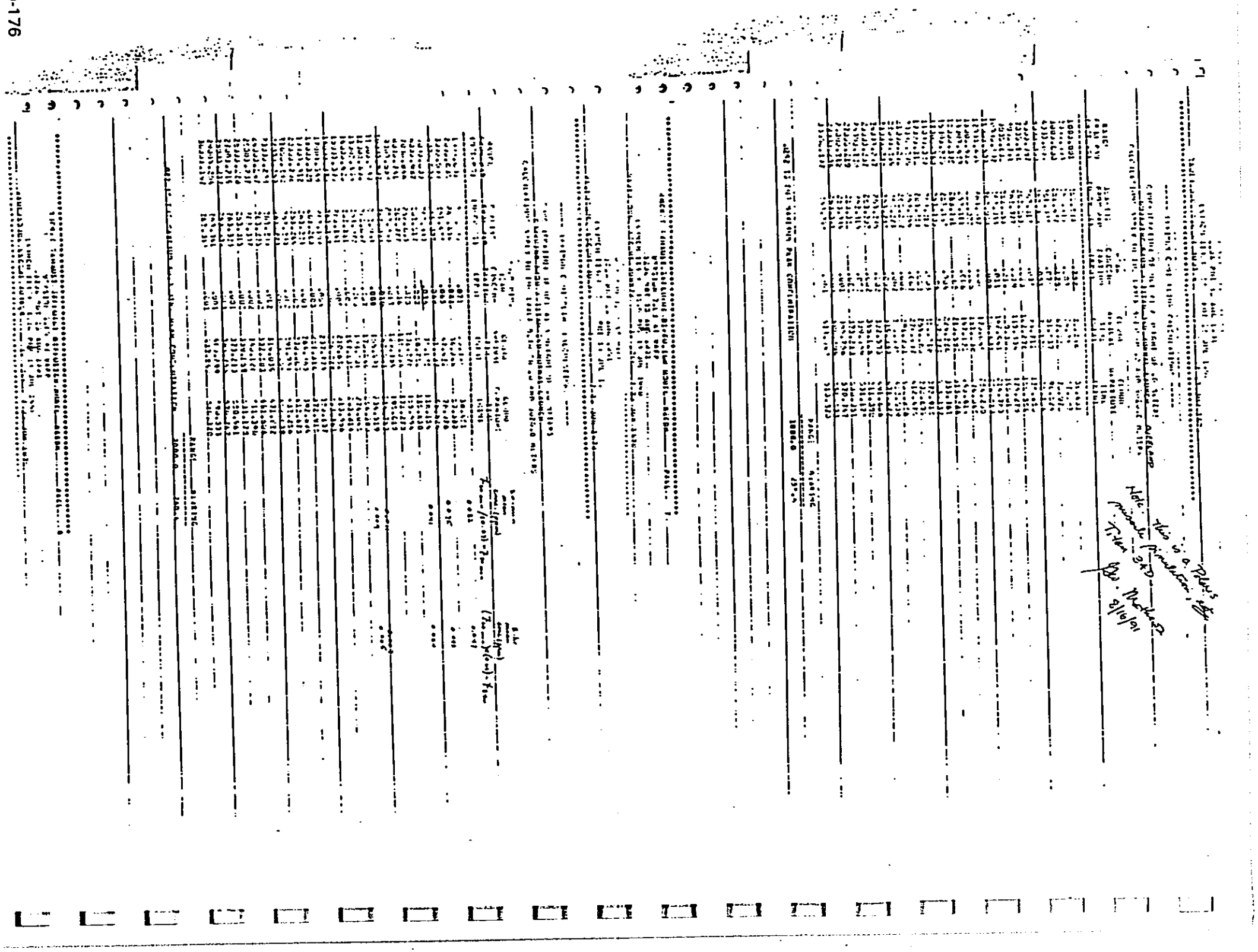

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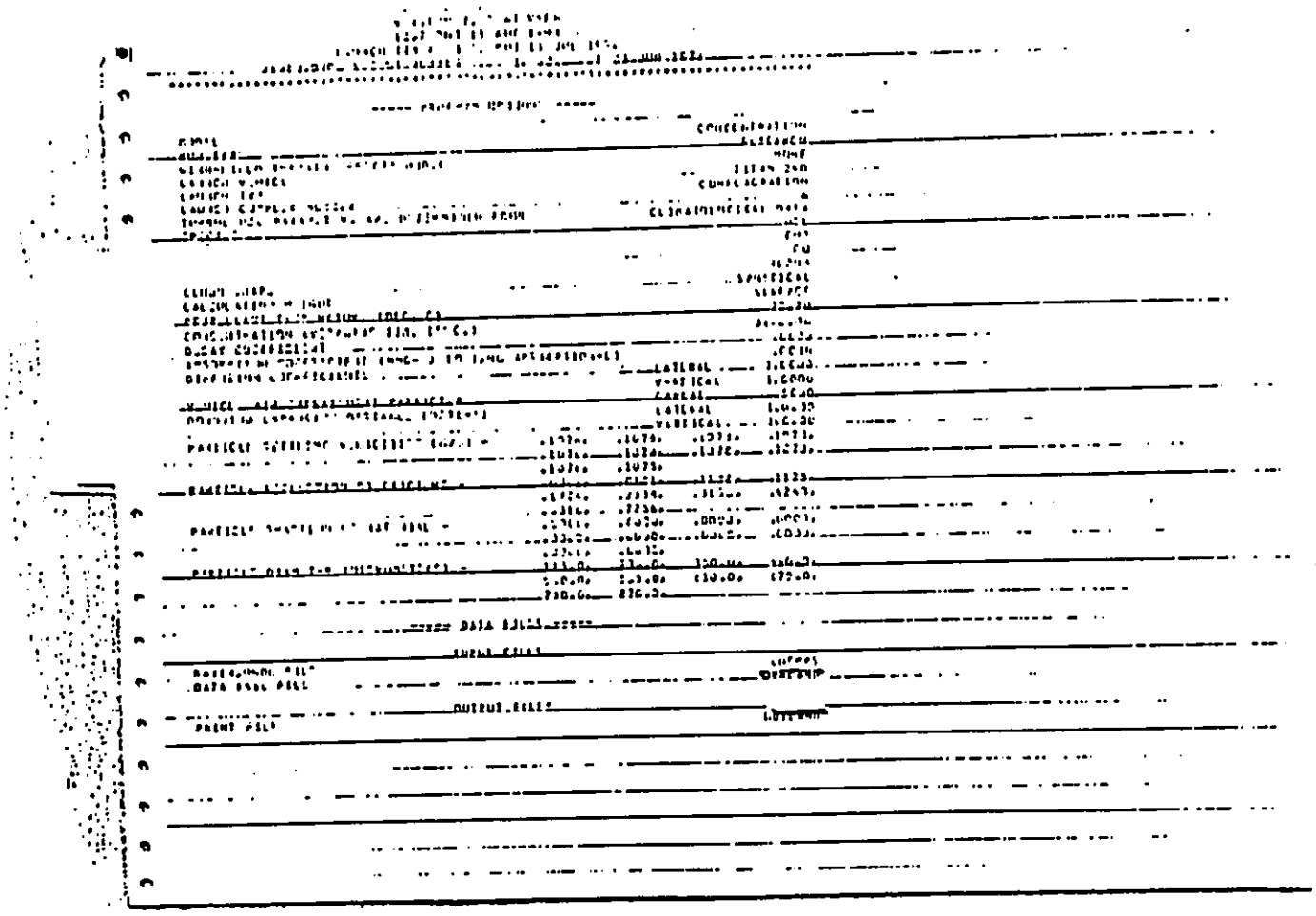

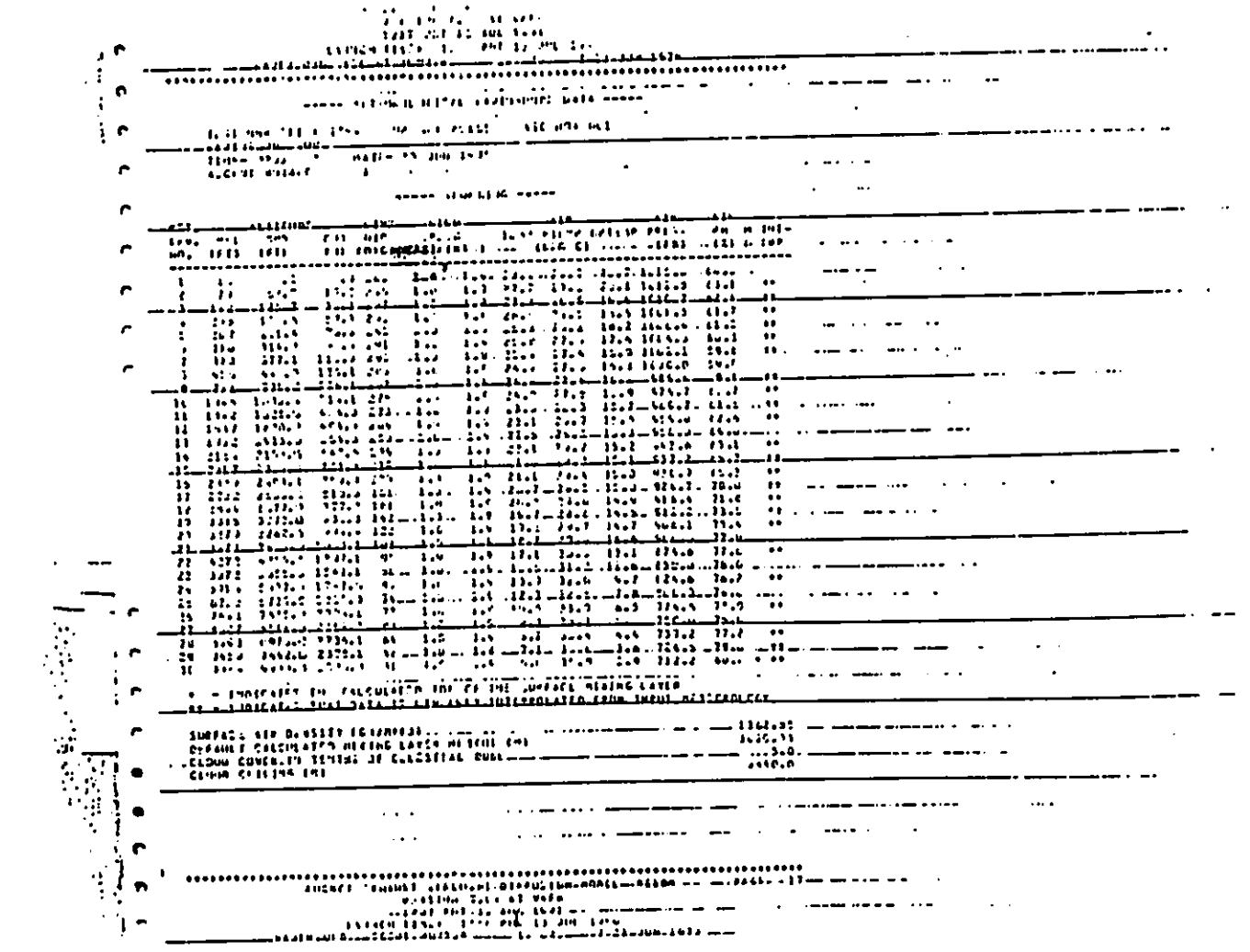

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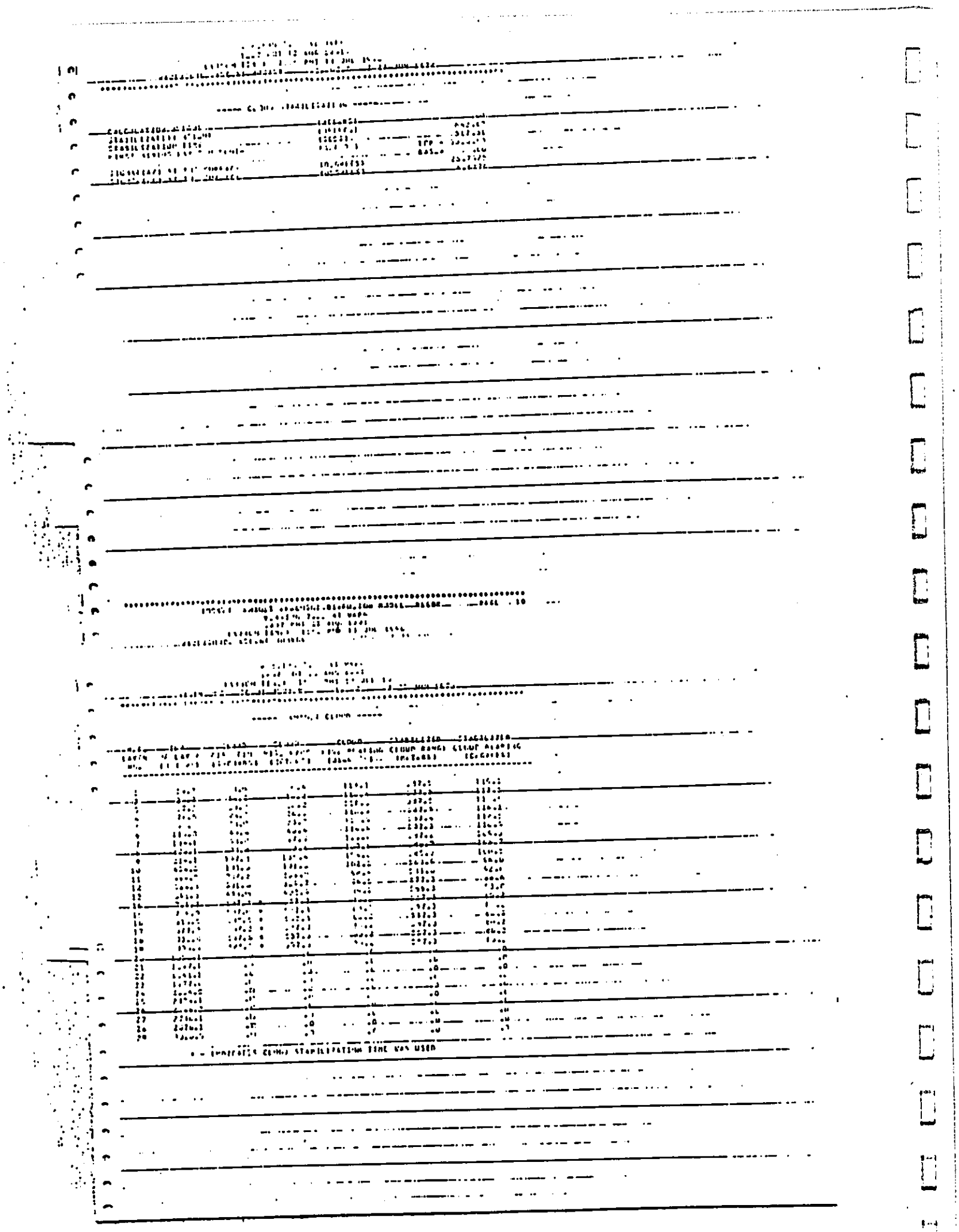

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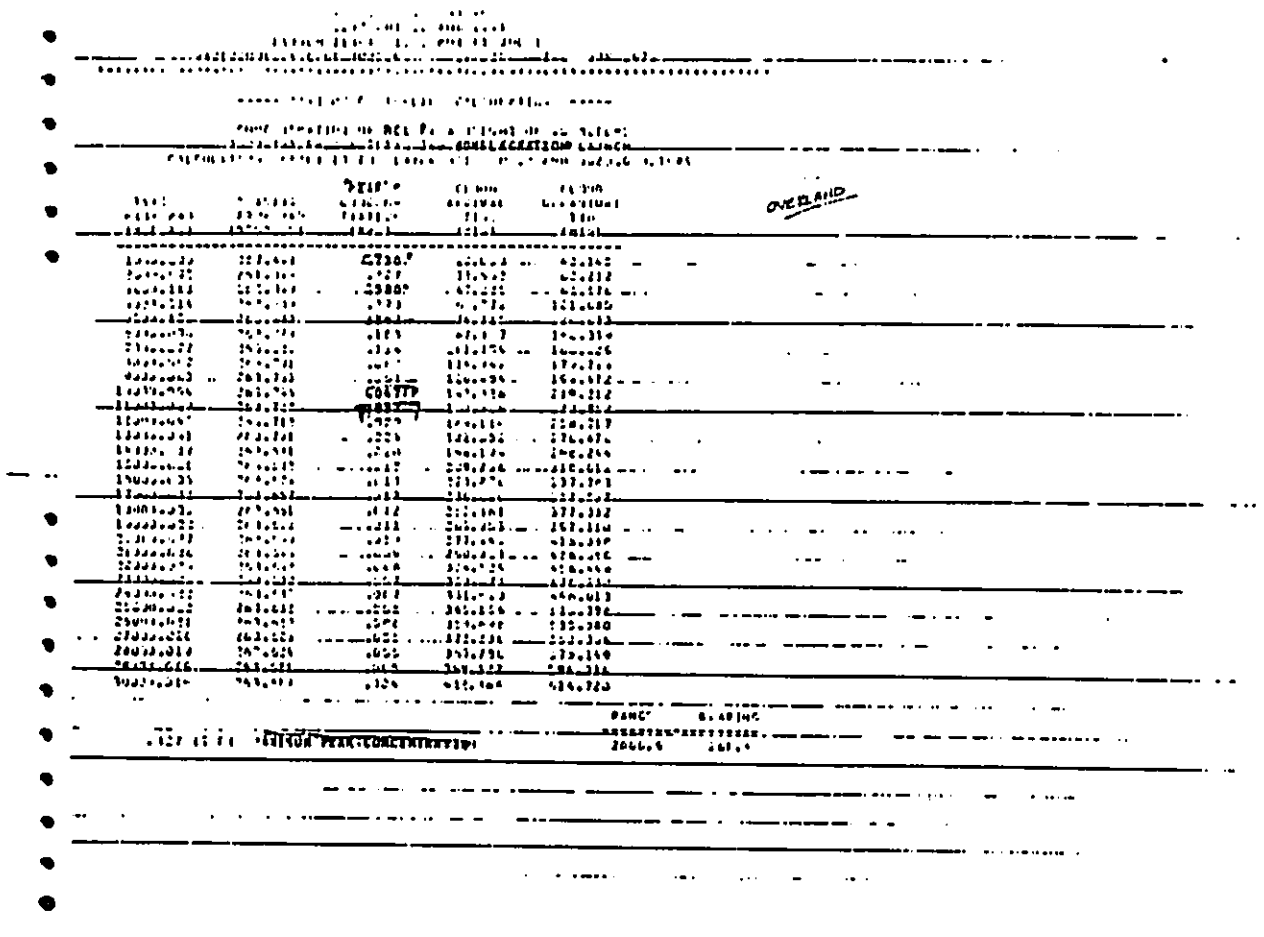

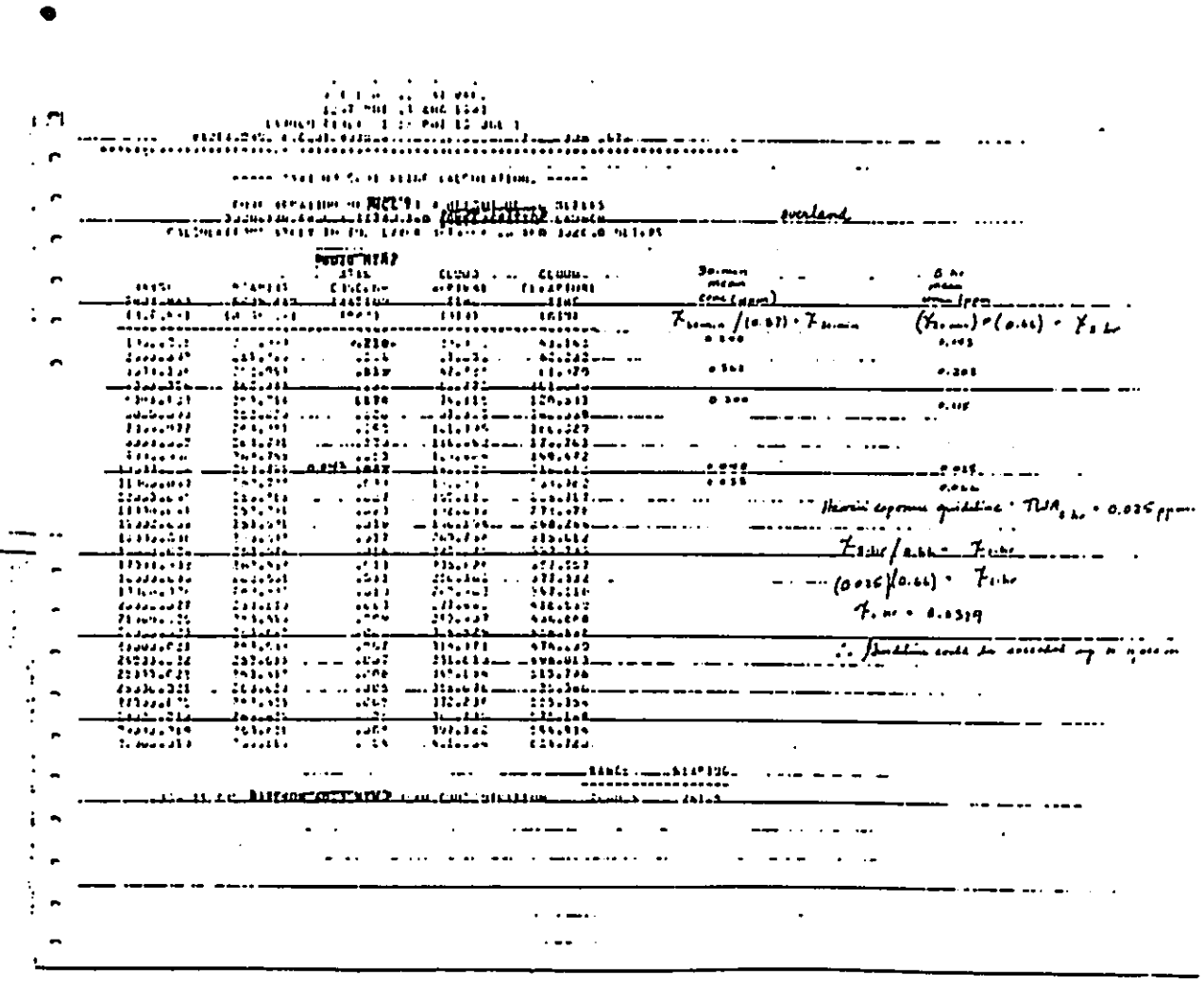

9-180

Sandia National Laboratories
Albuquerque, New Mexico 87185

date: July 29, 1991

to: Distribution

from: W. A. Millard, 1555 J. E. White, 9132

subject: Final Trajectory for the STARS FTU-1 Flight Test (FTU1-9105.10)

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 autopilot design. The purpose of this memo is to document this final trajectory, and to present the plots and tables necessary to update the flight safety data package presented previously in Volume 3 of ref. 6. To differentiate this trajectory from previous simulations, an identifier, FTU1-9105.10, is being placed on all data pertaining to it. The final trajectory was generated on the AD100 flight simulator by personnel from Division 9132.

The results for nominal trajectories for the spent first, second, and third stages; the nose shroud; 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 I. A more detailed sequence of events pertaining to the missile guidance and control functions is presented in Table II, which has been prepared by Div. 9132. The expected 3σ variations in time around each event are also presented in Table II. The times for shroud eject and payload separation are variable, and will be governed by how quickly the vehicle cold gas attitude control system gets the vehicle reoriented to the required pointing angles. The third stage ignition time, and consequently burnout, are also variable, 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 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 memo. In addition, all of the tabular data are also provided on a 3.5 inch high density floppy diskette (IBM PC format) that is enclosed with this package. These files are in a compressed format generated using the PKZIP shareware 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

Table III. FTU-1 Nominal Trajectory in Geographic Sy

Time (Sec)	Altitude (Ft)	Geod Lat (Deg)	Longitude (Deg)	Velocity (Ft/Sec)	VFPA (Deg)	HFPA (Deg)	Grnd Rang (NM)	Dyn Pres (Lb/Sq-Ft)	Mach No	Ang of Att (Deg)	Ang of Yaw (Deg)
0 00	91	22 06188	-159 78125	0 00	0 0000	0 0000	0 000	0 0	0 00	0 00	0 00
0 07	92	22 06188	-159 78125	2 42	6 2955	11 1252	0 000	0 1	0 00	0 00	0 00
1 00	108	22 06188	-159 78125	34 57	89 9356	156 9316	0 000	1 3	0 03	-0 02	-0 03
2 00	160	22 06188	-159 78125	69 18	89 9435	169 4100	0 000	5 4	0 06	-0 02	-0 04
2 18	175	22 06188	-159 78125	75 37	89 9430	109 8067	0 000	6 8	0 07	-0 23	-0 05
3 00	246	22 06188	-159 78125	103 54	89 9407	-161 7192	0 000	12 0	0 09	-1 17	-0 12
4 00	367	22 06188	-159 78125	138 10	88 7138	-60 4138	0 000	21 4	0 12	-2 42	-0 15
5 00	523	22 06188	-159 78127	173 49	87 0779	-79 0709	0 000	33 6	0 16	-2 33	-0 16
6 00	714	22 06189	-159 78131	210 47	85 2723	-78 7763	0 000	49 1	0 19	-3 23	-0 14
7 00	942	22 06190	-159 78138	249 10	83 3894	-78 7471	0 010	68 4	0 22	3 39	-0 11
8 00	1209	22 06192	-159 78147	289 41	81 4879	-78 8168	0 010	91 7	0 26	-3 43	-0 08
9 00	1515	22 06195	-159 78162	331 39	79 6079	-78 9268	0 020	119 2	0 30	-3 37	-0 03
10 00	1861	22 06198	-159 78183	375 13	77 7795	-79 0458	0 030	151 2	0 34	-3 22	0 01
11 00	2249	22 06203	-159 78208	420 70	76 0182	-79 1580	0 050	188 1	0 38	-3 01	0 05
12 00	2678	22 06209	-159 78241	468 17	74 3358	-79 2578	0 070	230 2	0 42	-2 77	0 08
13 00	3151	22 06218	-159 78282	517 72	72 7357	-79 3422	0 090	277 9	0 47	2 50	0 08
14 00	3667	22 06225	-159 78332	569 57	71 2171	-79 4116	0 120	331 4	0 52	2 27	0 08
15 00	4230	22 06235	-159 78389	623 78	69 7744	-79 4684	0 150	391 2	0 57	2 04	0 08
16 00	4838	22 06246	-159 78457	680 42	68 4053	-79 5139	0 190	457 5	0 62	-1 83	0 04
17 00	5495	22 06260	-159 78535	739 55	67 1081	-79 5503	0 230	530 3	0 68	-1 61	0 05
18 00	6202	22 06275	-159 78624	801 23	65 8867	-79 5800	0 280	609 6	0 73	-1 33	0 03
19 00	6959	22 06292	-159 78725	865 64	64 7521	-79 6046	0 340	695 1	0 79	-1 03	0 03
20 00	7768	22 06312	-159 78838	932 97	63 7001	-79 6257	0 400	787 0	0 86	0 77	0 04
21 00	8632	22 06333	-159 78965	1003 31	62 7257	-79 6443	0 480	886 8	0 93	-0 52	0 02
22 00	9552	22 06357	-159 79106	1076 33	61 8278	-79 6609	0 560	992 9	1 00	-0 25	0 02
23 00	10530	22 06384	-159 79260	1150 39	61 0035	-79 6753	0 640	1102 0	1 07	-0 05	0 02
24 00	11565	22 06412	-159 79430	1225 78	60 2519	-79 6877	0 740	1213 8	1 14	0 18	0 02
25 00	12658	22 06443	-159 79614	1303 28	59 5675	-79 6967	0 840	1328 7	1 22	0 36	0 02
26 00	13813	22 06477	-159 79814	1382 47	58 9414	-79 7084	0 960	1444 4	1 30	0 50	0 02
27 00	15027	22 06514	-159 80028	1462 56	58 3731	-79 7170	1 080	1558 5	1 38	0 63	0 02
28 00	16303	22 06553	-159 80258	1543 57	57 8523	-79 7248	1 210	1669 2	1 47	0 68	0 02
29 00	17641	22 06594	-159 80505	1625 58	57 3538	-79 7317	1 350	1777 0	1 55	0 63	0 02
30 00	19041	22 06639	-159 80769	1708 64	56 8666	-79 7378	1 500	1879 7	1 64	0 56	0 01
31 00	20503	22 06686	-159 81047	1792 84	56 3901	-79 7434	1 650	1976 0	1 73	0 51	0 01
32 00	22027	22 06736	-159 81344	1878 33	55 9256	-79 7486	1 820	2065 6	1 83	0 47	0 01
33 00	23615	22 06789	-159 81658	1965 16	55 4742	-79 7536	2 000	2149 1	1 92	0 44	0 01
34 00	25266	22 06845	-159 81981	2053 40	55 0355	-79 7585	2 190	2223 4	2 02	0 42	0 01
35 00	26980	22 06904	-159 82342	2142 66	54 6089	-79 7632	2 390	2286 6	2 13	0 40	0 01
36 00	28759	22 06968	-159 82711	2232 48	54 1954	-79 7677	2 600	2337 6	2 23	0 40	0 01
37 00	30601	22 07031	-159 83100	2322 58	53 7962	-79 7719	2 820	2375 8	2 34	0 41	0 01
38 00	32507	22 07100	-159 83507	2412 67	53 4119	-79 7758	3 050	2399 2	2 45	0 42	0 01
39 00	34478	22 07172	-159 83935	2502 68	53 0415	-79 7797	3 290	2408 3	2 57	0 43	0 01
40 00	36507	22 07247	-159 84380	2592 58	52 6836	-79 7833	3 540	2402 3	2 68	0 45	0 01
41 00	38599	22 07325	-159 84848	2682 27	52 3381	-79 7868	3 810	2382 1	2 77	0 47	0 01
42 00	40753	22 07408	-159 85332	2771 84	52 0043	-79 7900	4 080	2347 8	2 86	0 49	0 01
43 00	42968	22 07491	-159 85837	2861 78	51 6812	-79 7933	4 370	2300 4	2 96	0 51	0 01
44 00	45244	22 07579	-159 86361	2952 70	51 3672	-79 7964	4 660	2241 8	3 05	0 52	0 01
45 00	47581	22 07671	-159 86908	3044 58	51 0611	-79 7995	4 970	2171 8	3 14	0 54	0 01
46 00	49980	22 07765	-159 87472	3137 44	50 7625	-79 8026	5 290	2091 4	3 24	0 56	0 01
47 00	52442	22 07863	-159 88058	3231 70	50 4713	-79 8057	5 620	2003 5	3 34	0 57	0 01
48 00	54966	22 07965	-159 88664	3327 88	50 1869	-79 8089	5 970	1885 4	3 44	0 59	0 01
49 00	57554	22 08070	-159 89293	3426 15	49 9074	-79 8121	6 320	1720 4	3 54	0 61	0 01
50 00	60208	22 08180	-159 89944	3526 57	49 6333	-79 8152	6 690	1561 5	3 64	0 64	0 01
51 00	62929	22 08292	-159 90618	3629 46	49 3653	-79 8185	7 070	1417 1	3 75	0 68	0 01
52 00	65717	22 08408	-159 91314	3735 26	49 0820	-79 8218	7 470	1281 7	3 86	0 17	0 00
53 00	68574	22 08530	-159 92038	3843 99	48 7707	-79 8249	7 880	1159 7	3 96	0 03	0 00
54 00	71500	22 08654	-159 92783	3955 60	48 4619	-79 8278	8 300	1047 5	4 07	0 00	-0 02
55 00	74496	22 08784	-159 93556	4070 09	48 1574	-79 8305	8 740	949 1	4 18	-0 03	-0 05
56 00	77584	22 08918	-159 94353	4187 44	47 8582	-79 8242	9 190	860 4	4 29	-0 04	-0 06
57 00	80708	22 09056	-159 95183	4305 22	47 5678	-79 8211	9 660	777 6	4 40	-0 05	-0 08

FTU1-9105.10

-III.1-

EXHIBIT D

Dec. 16. 1992

STARS GROUND HAZARD AREA CONSIDERATIONS

M.E.
Smith
E

Using data given in Table III of document 175 (July 29. 1991 Lab memo on the 'Final Trajectory for the STARS FTU-1 Flight Te Administrative Record for the STARS EIS, I have calculated wher mass of the debris from a terminated launch would hit the surfa page of this document was available when I examined the Administrative Record on Sept. 22. 1992. The first time I saw other parts of this document 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. III. 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 effects due to air resistance and winds 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.

				Center of mass of debris after explosion	
Time (sec)	Altitude (feet)	Velocity (ft/sec)	Ground Range (feet)	Additional Range (feet)	Final Ground Range (feet)
15	4230	624	911	9229	10140
20	7768	933	2430	24938	27368
23	10530	1150	3889	40145	44034
30	19041	1709	9114	94537	103651

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 exploding 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 10000 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) "the vehicle's flight could be terminated up to15.1 seconds into the flight and debris would still not exceed the ground hazard area."

The Dec. 2. 1992 letter to me from William Paty 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. 5. 1992 letter to William Paty, I suggested that it was important to re-evaluate the ground hazard area for STARS in light of the Aug. 20. 1991 Aries launch failure from Cape Canaveral. (Even though the Aries booster is different from the STARS booster, I believe this Aries failure is relevant to STARS because it is planned to use the Aries for the EDX launches on Kauai with the same ground hazard area and because human intervention is required to terminate the flight.) In this Aries launch. the rocket motor performed as expected but the wrong program had been loaded into the guidance control computer resulting in the rocket going about 90 degrees off course. The flight safety officer issued the destruct signal to explode the rocket 23 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. From 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 Niihau if the launch were to go off-course toward Niihau.

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

Attachment 10

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. 92-2597-07 (Injunctions) AFFIDAVIT OF DR. MICHAEL D. JONES; EXHIBITS "A" and "B"

AFFIDAVIT OF DR. MICHAEL D. JONES

STATE OF HAWAII)
) SS.
CITY AND COUNTY OF HONOLULU)

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 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 Hawaii'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 ("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 .010 parts per million ("ppm"), measured as a 60-minute average, and .007 ppm as an eight-hour average. The Hawaii 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 Hawaii 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 <u>new</u> 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 Hawaii'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. <u>The HCl concentration predictions in the Draft EIS are over six times higher than those in the Supplemental EA.</u> For a normal launch the eight-hour average at the edge of the GHA is

.043 ppm, 1.7 times the State of Hawaii guideline of .025 ppm. 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 MOA-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 MOA-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 MOA-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 one 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 judgeme... 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 SDIO. 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 System 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 System Environmental Impact Statement, we have no documents concerning the August 20, 1991 Aries launch failure."

15. The limited information provided by the SDIO in response to Affiant's requests has included the fact the flight safety officer waited until 23 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 23 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.

Michael D. Jones
Michael D. Jones

Subscribed and sworn to before me
this 31st day of January 1992.3

Iris M. Kessler
Notary Public, State Of Hawaii

My commission expires: 7/16/96

CS

9-186

DEPARTMENT OF THE ARI
OFFICE OF THE GOVERNOR GENERAL

August 21, 1991

CSSD-EN

MEMORANDUM FOR Deputy Commander, U.S. Army Strategic Defense Command, ATTN: SFAE-SD-STA, P.O. Box 1500, Huntsville, AL 35807-3801

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 Gallien at (205) 955-3294.

ROBERT D. HAMMOND
Lieutenant General, USA
Commanding

EXHIBIT A

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 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 8-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 4-5 of the STARS EIS and are both larger than the Hawaii guideline. A handwritten 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 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 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

done. 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 guideline. 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

Attachment 11

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. 92-2597-07 (Injunctions) AFFIDAVIT OF KENNETH R. WOOD

AFFIDAVIT OF KENNETH R. WOOD

STATE OF HAWAII)
) SS.
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 taxa 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 Nohili Dunes and at Polihale State Park approximately 12 times in the last 3 years. Affiant's most recent survey of the Nohili 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 Nohili 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 animals 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 Nohili 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 Nohili 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 Polihale State Park, at least three rare and endangered Hawaiian plants are found within the GHA. The endangered 'ohai (Sesbania tomentosa) is found within the GHA on the Nohili Dunes, in the Park and inland at Mana.

13. The largest currently known population of Ophioglossum concinnum, 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 Polihale State Park.

14. The extremely rare and endangered Panicum niihauense was discovered in Polihale State Park in 1992. P. niihauense was previously thought to be extinct; it is a candidate for listing. It was 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. niihauense at Polihale State Park is within the GHA and represents the only currently known population of this species in the world. P. niihauense occurs with the co-dominant native 'ilima (Sida fallax) and 'a'ali'i (Dodonaea viscosa). On December 14, 1992, Affiant surveyed the vegetation at Polihale State Park and documented only 21 individuals of P. niihauense. Affiant also noted a native coastal vine community dominated by the morning glory, Ipomoea pes-caprae in Polihale State Park.

15. Affiant states that at the mouth of Ha'ele'ele Gulch and northeast of Kapa'ula Heiau above Polihale State Park,

there are populations of the endangered dwarf iliau (Wilkesia hobdyi) and endangered Schiedea apokremnos.

16. Introduced kiawe (Prosopis pallida) trees and understory alien species of grasses are found on the Nohili Dunes and in Polihale State Park. Sugarcane (Saccharum officinarum) is planted inland on the Mana 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 Nohili Dunes and Polihale 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 celastroides Coastal Dry Shrubland, the last known population of Panicum niihauense and other native plants and communities in the area.

18. The Chamaesyce celastroides Coastal Dry Shrubland and endangered plants at Nohili and Polihale 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. Hosing fires could cause damage to cultural resources, such as Hawaiian burials in the Nohili Dunes. However, allowing the fires 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 Nohili Dunes and Polihale State Park as a GHA for the STARS and Vandal 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.

Kenneth R. Wood

Subscribed and sworn to before me
this 22nd day of December, 1992.

Notary Public, State of Hawaii

My commission expires:

ALAN W. ALBAO
Notary Public
Fifth Judicial Circuit
State of Hawaii
My Commission Expires
May 18, 1994

Attachment 12

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. 92-2597-07 (Injunctions) AFFIDAVIT OF WILLIAM H. SAGER

AFFIDAVIT OF WILLIAM H. SAGER

STATE OF HAWAII)
) SS.
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 (1958) 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 1958 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 1972, Affiant was employed by the Hawai'i 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 fire-fighting 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 Hawai'i.

7. In Affiant's 20 years of employment as a Forester for the State of Hawai'i, he fought fires on all of the main Hawaiian Islands except Lana'i and Kaho'olawe, including fires on the west side of Kaua'i. Affiant is familiar with the physical nature and vegetation at Nohili Dunes and in Polihale State Park.

8. Affiant has reviewed the State of Hawai'i'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 Kaua'i. 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 Nohili Dunes, Polihale State Park, state roadways and state-owned lands at Mana leased to Kekaha Sugar Company.

10. Affiant states that the vegetation in the Nohili 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 mature kiawe (Prosopis pallida) trees, which burns long and hot. Numerous spot fires would quickly burn together to form a configuration that could approach a full-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 Nohili and Polihale assumes that at least a D9 tractor and two 10-man crews trained in wildland fire-fighting 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 and 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 foredune 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 Puako on the island of Hawai'i (with fuel loads similar to those at Nohili and Polihale), he observed fire burning 3 feet deep in the organic litter.

14. Following such a fire at Nohili and Polihale, wind erosion resulting from the loss of protective vegetative cover would devastate the Nohili 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 was successful, the non-native grasses would likely out-compete 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 (3) 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 Kaua'i Test Facility, spraying of vegetation adjacent to the launch pad, and the presence of fire crews should prevent fires from occurring at Nohili 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 Nohili 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 PMRF 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 kiawe 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.

Attachment 13

Further, Affiant sayeth naught.

William H. Sager

William H. Sager

Subscribed and sworn to before me
this 13th day of ~~December, 1992~~. JANUARY, 1993

Notary Public, State of Hawai'i

My commission expires: 10-14-93

8

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. 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 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 for deployment" 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 reexamination 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 arsenal. Second, there is no Third World country with both the technical capability and hostile intent to threaten the United States with ballistic missiles, and no such 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 means other 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 as 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 threats 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 anti-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 $80 billion (FY 1992 dollars), over and above the $30 billion spent from 1983 to 1992. The cost of a ground-based SDI system deployed at just one site—inadequate to protect the entire country—is estimated by the Congressional Budget Office to be more than $36 billion through 2005, 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 could 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 relationship between 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, many 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) when it comes up for review in 1995 and thus hinder efforts to stem nuclear proliferation.

The SDI program is also diverting attention and scarce resources from other security objectives. Some of the recent decisions of the Bush administration and Congress contrast sharply with the emphasis being given to the SDI program:

- Congress and the administration have been slow to help the former Soviet republics stabilize their economies and dismantle their nuclear weapons. The $400 million that Congress earmarked for weapons shipment, storage, and dismantlement is less than one-tenth the amount authorized for SDI in FY 1992.

- The United States continues to withhold payments of dues to the United Nations, thus hindering efforts to strengthen that body's role in maintaining world peace. The United States currently owes $739 million, about one-seventh SDI's FY 1993 budget request.

- The Bush administration devotes insufficient resources and attention to efforts to prevent proliferation of nuclear, chemical, and biological weapons. For example, the administration recently allowed commercial military sales to Pakistan, using a loophole to skirt legislation intended to cut off US military aid because of Pakistan's nuclear weapons program.

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 responses that are today largely ignored. SDI diverts money, attention, and commitment from these far more promising solutions and thus undercuts, rather than enhances, US security.

These conclusions and the embodied 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 $2.3 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 countermeasures 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 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 related to assessing the feasibility of SDI concepts can be addressed within the ABM Treaty as traditionally interpreted.

- Focus the R&D program on the key unsolved 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 the 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 Dean and Kurt Gottfried. 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 warheads removed from the arsenal and disposing of the fissile 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 IAEA and update and strengthen nuclear safeguards based on the lessons from the Iraqi nuclear program. Sanction the use of go-anywhere IAEA 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.

- Support an active role for the United Nations Security Council in stemming proliferation.

- Promptly finish 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 destruct-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 more 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 Iraqi 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 minimum 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 twists 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 of serious concern, the chance of such an attack is very small and declining; on the other hand, there is no Third World country with both the technical capability and hostile intent to threaten the United States with ballistic missiles, and no such 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 $4 billion in 1988.

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 missile 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 terrorist-style strike on cities, SDI's priority once again became population defense.

The GPALS system proposed by the Strategic Defense Initiative Organization (SDIO) in April 1991 retained much from earlier plans, with the biggest piece of the budget still devoted to what was previously referred to as the "Phase I" defense. GPALS was envisioned as a global missile defense consisting of:

- 1000 space-based "brilliant pebble" interceptors intended to intercept missiles launched from anywhere around the world;
- 750 to 1000 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 ostensibly it was sized to stop a simultaneous attack by up to 200 warheads (the number on a single Soviet Typhoon-class ballistic missile submarine).[1] 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 amendment 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 defenses 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 "nondeterrable" 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).

	FY 1992 (Appropriated)	FY 1993 (Requested)
Strategic		
Brilliant Pebbles	$390	$449
Brilliant Eyes	116	278
Ground-Based Radar (strategic)	38	89
Ground-Based Interceptor	172	159
Ground Surveillance and Tracking System	118	90
Exo/Endoatmospheric Interceptor	80	0
Other Programs	2373	3300
Subtotal	3287	4365
Theater		
Thaad	100	243
Erint	160	129
Patriot	135	109
Arrow	60	58
Ground-Based Radar	44	123
Patriot Procurement	25	63
Other Programs	334	335
Subtotal	858	1060
Total	4146	5425

Source: *Inside the Pentagon* (2 April 1992), p. 9.

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.[2] Their plan called for amending the ABM Treaty within two years to remove the legal barriers 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.[3] 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 pushes into the future some of the more controversial aspects of GPALS, particularly its space-based interceptors, and finesses 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.

The act does not represent, as is often stated, a final decision to deploy a defense system, but rather calls on the Secretary of Defense to "develop for deployment" the necessary technology. The act explicitly states that it does not constitute final authorization for deployment.

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 additional 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 deployment, the act increased the SDI budget to $4.1 billion for FY 1992, a 34 percent increase over the previous year. (See Table 1.) 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 defense. However, the SDIO has recently come under fire from some members of Congress and the military for taking steps that appear to support deployment of space-based sensors and interceptors at the expense of the land-based systems emphasized in the act.[4] For example, SDIO 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 requests in the FY 1993 SDI budget are for space-based interceptors (brilliant pebbles) and space-based sensors (brilliant 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.[1] That impression 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.[3] However, aside from an interest in discussing SDI issues, a firm position has not emerged. A number of statements by Yeltsin and his advisors 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.[4] 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 have been 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 much 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 certain to be resisted by the US government. The Bush administration would like Yeltsin's blessing for SDI and thus will 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.[5]

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 in 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 to the United States will be one of accidental or unauthorized launches from the former Soviet Union, now the Commonwealth of Independent States.[10] This threat, however, is currently declining and will most likely continue to decline. Any increase in the risk of inadvertent launches resulting from political instability is more than outweighed by other factors that tend to reduce this risk, particularly the current absence of tensions 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 nukes" in the wake of the Soviet breakup has centered not 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 the United States.

The danger of an accidental or unauthorized missile launch against on 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 an attack 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.[11] While elaborate procedures exist for validating warning of a threat, in a time of crisis such a situation would 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.[12]

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 and 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 Permissive Action Links (PALs) that prevent their launch without the receipt of the proper codes from the leadership.[12] US submarine-launched ballistic missiles, in contrast, do not have PALs. Moreover, the codes to unlock CIS weapons must be released jointly by civilian and military leaders and transmitted to launch crews over communication links that are established only in time of crisis by order of the political leadership. Despite 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 remained 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 concern is no doubt justified, there is a good deal of confusion about the nature of the threat to 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 statistics are largely irrelevant to the debate over SDI, however, as they include US allies, friendly or neutral countries, and countries with only short-range missiles that cannot reach the United States.

The problem of missile proliferation has been further misrepresented by those US officials whose statements have implied that the number of ballistic missile states is increasing rapidly.[10] These statements have been used to bolster support for SDI, leading to complaints that the Pentagon is engaging in "threat inflation."[11]

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 ranges 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 inadvertent or terrorist-style attacks, whereas a theater missile defense system is intended mainly to protect military assets as part of a broader theater air defense strategy.

No developing country presently has both the technical capability and hostile intent to threaten the United States with long-range ballistic missiles. To the extent developing countries are seeking ballistic missiles,

Table 2. Ballistic missile states and maximum missile ranges at standard payloads.

	Current		Under	Kilometers to
	Purchased	Indigenous	Development	Continental US
Countries that now deploy ICBMs or SLBMs:				
China		13,000		7,500
United States		13,000		—
CIS		13,000		4,000
Britain	4,700			4,500
France		3,500		5,000
Countries with advanced missile or space-launch vehicle programs:				
Japan		10,000[a]		7,000
Israel		1,450	5,000[b]	8,500
India		240	2,400	12,000
			13,000[b]	
Countries that deploy indigenous short-range missiles:				
North Korea		280	600	8,000
Egypt		280	1,200[b]	8,000
Iran	250	130	160	9,000
South Korea		240		8,500
Countries engaged in missile R&D:				
Brazil			4,000[b]	3,500
South Africa			1,450	13,000
Argentina			1,200[b]	6,000
Taiwan			600	10,000
Pakistan	280		600	10,500
Indonesia			100	11,000
Countries with purchased missiles but little or no indigenous R&D:				
Saudi Arabia	2,700			9,000
Bulgaria	500			7,000
Czechoslovakia	500			6,000
Afghanistan	280			11,000
Hungary	280			6,500
Libya	280			7,000
Poland	280			6,000
Romania	280			6,500
Syria	280			8,500
Yemen	280			10,500
Cuba	70			200
Possession and production of missiles prohibited by UN Security Council:				
Iraq				9,000

[a]Space launch vehicle. [b]Project abandoned.
Source: Lora Lumpe, Lisbeth Gronlund, and David C. Wright, "Third World Missiles Fall Short," Bulletin of Atomic Scientists, March 1992, p. 31.

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 place them out of the reach of most developing countries for at least a decade and probably much longer,[9] a judgement shared by the US government's own intelligence analysis.[10] Virtually all of the developing countries seen by the United States as potential adversaries 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 would 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 taken 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.[11]

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 it. 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 bright booster plume generated by missiles is highly observable[12] and would be detected by the Defense Support Program (DSP) satellites that were credited with observing and giving preliminary trajectory information on all Scud launches during the Gulf War. Moreover, since 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 no doubt be known from satellite surveillance, leaving open the possibility that they could be destroyed in preemptive air strikes.

The relatively limited damage from Scuds during the Gulf War shows that ballistic missiles only pose a serious threat if they are tipped with nuclear, or perhaps biological, weapons.[13] 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 attaining a usable weapon. Of the countries that Senator John McCain has called "states that threaten world peace"[14]—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 missile, 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 inspections 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 (ICBMs) and two to three dozen submarine-launched ballistic missiles (SLBMs). 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, an 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 reducing this threat, however, for two main reasons. First, there are better ways of reducing the dangers of accidental or unauthorized launches 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 launches 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, when the dangers resulting from political instability in the former Soviet republics are likely to be greatest. In addition, a limited SDI system could not defend against the inadvertent launch of a large number of missiles, which is as likely to occur as the launch of only a few. Moreover, other measures could reduce the threat more effectively than an SDI system and could be employed more quickly and at much less cost. Four measures deserve attention:

- The United States should work with all countries having nuclear weapons to improve their safety procedures and ensure that modern PALs and other safety devices are installed on all warheads. (An important first step would be to install PALs on US SLBMs.)

- Recent US and CIS decisions to lower the alert levels 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 barriers 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 launches.[23] This practice has a clear precedent: In the late 1940s and early 1950s, US nuclear warheads were placed in civilian custody during peacetime.

- Negotiating deep reductions in US and CIS nuclear arsenals and making such cuts as 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. Ironically, as we will see, deploying an SDI system may prevent such deep reductions.

- Destruct-after-launch mechanisms could be installed so that any missiles launched accidentally or without authorization could be destroyed.[24] Such devices are routinely used in missile test flights to abort test failures; similar mechanisms could be installed to destroy warheads after boost phase. Destroying missiles in this way is much more reliable than trying to shoot them down with an interceptor 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 launches 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, removing it as a rationale for SDI greatly reduces the size of the defense system to be considered for deployment. Both GPALs and the Limited Defense System proposed by Congress are far too large for any potential Third World missile threats.

Regardless of the size of the SDI system, however, several issues must be considered in assessing its value against Third World threats: Will a defense be necessary, given that the United States can threaten any potential attacker with overwhelming (even nuclear) retaliation? How likely is it that Third World countries will choose to attack with ballistic missiles compared to other means? And how effective would SDI be against ballistic missile attacks?

Are Some Third World Countries "Nondeterrable?"

Les Aspin, chair 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.[25] 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 security 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 weaker 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 undeterrable. 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 at Israel and Saudi Arabia was logical under the circumstances, for two reasons. First, Iraq was already being bombed extensively by allied aircraft and thus had little to lose by launching Scuds. Second, attacking Israel could have had a major payoff if it had provoked Israel to respond, thereby undermining the Arab coalition arrayed against Iraq.

Moreover, at two critical junctures Hussein appears 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 confrontation suggests that he may have been deterred by the initial deployment of US troops there, which, though small, signalled 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 reprisals, including possibly nuclear retaliation by Israel. The evidence concerning whether Iraq had deliverable chemical warheads for the Scud is mixed, but it is known that Iraq had chemical artillery shells that were never used.

Even if a "nondeterrable" country were someday to threaten the United States with nuclear attack, it is unclear how deployment of an SDI system would significantly reduce this threat, since there are many easier methods of delivering a nuclear weapon besides a ballistic missile. The key problem, which SDI does nothing to address, is the spread of nuclear or biological weapons, not 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 intercontinental-range ballistic missiles until the 1960s, yet there was no doubt nuclear weapons could be delivered by other means (principally bombers). More recently, it is reported that the Israeli government, before it had developed intermediate-range ballistic missiles, attempted to deter the Soviet Union from supporting an Arab attack on Israel by quietly informing the leadership that it could not stop Israel from smuggling a nuclear bomb into the Soviet Union. It appears the Soviet government took this threat seriously.[17]

Even if intercontinental-range ballistic missiles begin to appear in Third World arsenals, there are strong reasons 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 inviting retaliation. Furthermore, a crude missile such as that likely to be used by a Third World country would almost certainly be less reliable than other means of attack and would be more visible and vulnerable to preemption. As former Chair of the Joint Chiefs of Staff General David Jones stated, a "terrorist or Third World delivery of a nuclear weapon is more likely to be done by an aircraft or a ship sailing into one or our harbors or other such simple ways."[18]

Since means other than missiles could be used to attack the United States, building an SDI system might do nothing more than shift the threat of attack from one delivery mode to another, without reducing its overall probability, in a manner similar to locking the doors of a house to prevent burglary but leaving the windows open. The fact that the recent push for SDI has not been accompanied by a similar push for air defenses[19] or strengthened coastal protection reveals a profound inconsistency in the Bush administration's approach to protecting the United States from nuclear threats and calls into question the military rationale for SDI.

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 stopping such an attack? Despite the common perception that it would be relatively easy, this is not necessarily so. Several key problems of previous SDI plans remain unsolved and are relevant even to limited, Third World attacks. There have been no revolutions in SDI technology. The ground-based and space-based interceptors currently being developed evolved from those developed in the 1980s, and, though smaller and lighter, they have many of the same drawbacks.

It is no doubt possible to erect a more effective defense against limited missile attacks than against larger ones since the defense system would have fewer objects to track and identify and might be able to launch several interceptors against each incoming warhead to increase the probability of intercept. At the same time, however, since the system would be defending cities rather than military installations, the proper criterion for assessing its effectiveness is that it be able to stop all incoming warheads. The problems encountered 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.

Lessons from 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 new Army study reports a high degree of confidence that only about 10 Scud warheads out of 50 fired on by Patriots were destroyed.[20]

Supporters of the Patriot have nevertheless argued that the Patriot was of significant value because it helped 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 populations. If even one or two nuclear warheads had landed in either Israel or Saudi Arabia, Patriot would have been judged a failure.

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 confront the interceptor with a target having unexpected characteristics.[21] For example, the probability of interception of Scuds by the Patriot was decreased by the presence of debris from the breakup of Scuds as they slowed in the atmosphere and by the erratic motion of the warheads after breakup. Since countermeasures, such as decoys, can be technologically simple compared to the missile itself, one can expect that any country intending to use ballistic missiles against an adversary armed with missile defenses would employ them.

During the midcourse phase of a ballistic missile's trajectory, when the warhead travels above the earth's atmosphere, simple measures such as releasing large numbers of mylar balloons, while hiding the warhead in a balloon of its own, could confuse a defense system. In discussing countermeasures before the House Armed Services Committee in 1984, Richard DeLauer, then Under Secretary of Defense for Research and Engineering stated that "any defensive system can be overcome with proliferation and decoys, decoys, decoys, decoys." Reliably distinguishing decoys from real warheads remains an unsolved problem for SDI. SDI Director Cooper stated in a February 12, 1991 press conference that midcourse discrimination "is a very tough problem that has challenged defense designers for 30 years" and that it would require "inventions" to overcome it. In the absence of such inventions, the effectiveness of a defense system could be very low.

Decoys are not the only conceivable countermeasure. For delivering nonnuclear (i.e., conventional, chemical, or biological) weapons, the payload of a single missile can be divided into a large number of sub-

munitions, or "bomblets." Since each of the submunitions would have to be intercepted independently, this could greatly increase the number of interceptors required by the defense.[20] While using sub-munitions has been considered mainly for theater-range missiles, a similar method could be used for long-range missiles if the bomblets could be adequately heat-shielded. Such a scheme would not only disperse a chemical or biological agent in the warhead more effectively, it would help to compensate for the inaccuracy of a relatively crude missile.

Software Errors and BM/C³

Software errors have long been identified as a key roadblock to building an effective SDI system.[21] In the Patriot's case, a software error kept interceptors from being launched against the Scud that hit the Al Khobar Marine barracks in Saudi Arabia. This failure was not the result of substandard 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."[22] In addition, a software error (later corrected) appears to have been responsible for several Patriots exploding into the ground in both Israel and Saudi Arabia.

An SDI 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—including sensors, ground control stations, and interceptors—is known as battle management/command, control, and communications (BM/C³). The core of SDI's BM/C³ 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."[23] 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 piece of the SDI system.[24]

The problem of BM/C³ 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 know precisely 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 especially difficult to test under realistic circumstances. For one thing, 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 missile targets. 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 problems of countermeasures and software reliability apply both to the ground-based Limited Defense System proposed by Congress and to the space-based components of the GPALS 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 decoys or multiple warheads. Some of the difficulties of space-based interception of Soviet ballistic missiles are less severe against a Third World threat. For example, developing countries are unlikely to acquire fast-burn 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, a large number must be spread in a band around the globe to ensure that some will be in range of a missile launch site at any time. As a result of this "absentee" problem, many interceptors are required to defend against even a limited missile threat: The GPALS system, for example, assumes a constellation of 1000 brilliant pebble interceptors. Even so, the system is susceptible to being locally overwhelmed by an adversary launching multiple missiles from roughly the same location at the same time. Alleviating this problem would require increasing the spatial density of space-based interceptors; but this would lead to a large 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 sensors were added to allow them to attack targets after booster burnout, then theoretically the relatively long midcourse phase would allow time for multiple intercept attempts. However, like other types of interceptors, brilliant pebbles could be overwhelmed by decoys during midcourse phase. And they could not intercept warheads during reentry since their sensors would be blinded when flying through the atmosphere at altitudes below about 100 kilometers, roughly the same altitude at which the decoys would begin to be swept away by the atmosphere.[25]

The atmospheric blinding of brilliant pebbles' sensors also means that brilliant pebbles would not be effective against most theater-range missiles, even though the SDIO continues to tout their suitability for this mission.[26] Short-range missiles like the 300 km-range Scud do not rise as high as 100 km at any point on their trajectory. The 800 km extended-range Scud used by Iraq could be flown on a slightly depressed trajectory below 100 km altitude and yet would still have a range of over 700 km. Depressed trajectories are also an option for longer range missiles but lead to a proportionately greater range penalty. If, rather than depressing the trajectory so much, a country deployed decoys to defeat brilliant pebbles in midcourse phase, much longer missile ranges are possible. For example, the booster of the 2800 km-range Chinese DF-3 missile purchased by Saudi Arabia burns out at an altitude of slightly over 100 km. If the missile's trajectory is depressed only enough to ensure that booster burnout occurs below an altitude of 90 km and the missile then deploys simple decoys to avert midcourse interception, the range of the DF-3 would be reduced by only a few hundred kilometers. This countermeasure is especially effective for theater-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 workable SDI system, it is important to establish clear performance criteria for determining when such deployment should be considered. Two earlier criteria for deploying an SDI system—that it must be survivable and cost effective at the margin[27]—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 decrease 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 Act set a goal of deploying a "cost effective" and "operationally effective"

defense without further defining either criterion. Before proceeding with deployment, Congress should clarify this issue. In light of the foregoing discussions 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 in 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 weighed against its substantial costs. These costs include not only the direct monetary costs, but also the diversion of attention and 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 technologies 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 a natural one, the probability of an attack on the United States using ballistic missiles must be weighed against the attainability and cost of an effective level of defense. Competition for scarce 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 debates. 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.[m] Still, the Congressional Budget Office (CBO) estimates the acquisition costs of this system would be nearly $18 billion through 1997 and more than $36 billion through 2005[n] (all costs are given in fiscal year 1992 dollars, except where noted). In addition, operation 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.[o] If a similar cost increase applied to the SDI system, the total cost of the single-site system would be more than $50 billion. Since sites other than Grand Forks would require considerably more construction and site preparation, a decision to deploy at a different site would be still more expensive.

The SDIO estimates that the total cost of the GPALs system would be $42 billion (in FY 1988 dollars), including $10 billion for theater missile defense, $22 billion for a six-site ground-based system, and $10 billion for a space-based system with 1000 brilliant pebbles. In 1992 dollars, this comes to roughly $50 billion.[n] 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,[o] raising the total to roughly $64 billion. If cost 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 2005 is $80 billion.[o]

A truly effective defense of the United States would require defenses against means of delivery 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 made no sense to invest in air defenses against Soviet bombers when ICBMs could not be stopped, it makes little sense to invest in a missile defense when other means of delivery exist.[4] And yet, in contrast to the emphasis being given to SDI, the Pentagon decided last year that because of the high costs of acquisition and operation, it would not complete the over-the-horizon (OTH-B) radar network for detecting airplane and cruise missile threats to the continental United States and would operate only one of two completed systems, and then only during business hours (9 AM to 5 PM, Monday through Friday).[4]

The use of funds by SDIO has been called into question by several recent Congressional investigations into allegations of mismanagement and waste.[4] Although these investigations are still under way, the concerns they raise are especially great considering SDI's large annual budget increases in the past two years: If approved, the budget request for FY 1993 would be a 32 percent increase over the FY 1992 budget, which was in turn a 34 percent increase over the budget for the previous year. Increases of 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 CIS nuclear arsenals to very low levels, 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 future 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 irreversible 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.[4]

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 increase incentives to launch a preemptive strike during a crisis, since once in 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 crises in the former republics, the threat of strategic instability is much reduced. Some SDI proponents argue that the treaty should therefore be discarded altogether; others urge that it 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 insurance against a reversion to hostile, authoritarian rule in Russia. Some analysts suggest that the chances of a military-backed takeover of the Russian government within two years may be as high as 50 percent.[4] 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 rush to deploy an SDI system could hinder or block efforts to reduce US and CIS arsenals down to very low levels. Facing the prospect of a US defense system consisting of 700 to 1200 ground-based interceptors and perhaps as many brilliant pebbles in space, 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 seem limited with respect to the present CIS nuclear arsenal, it would not seem limited to China. Deployment of such a system by Russia and the United States could induce China to build more missiles to maintain its deterrent, which in turn could motivate India, and then Pakistan, to expand their nuclear capabilities in response. Deployment of an SDI system (especially global defenses) may also be seen by other countries as a US effort to expand its military dominance. This perception could complicate efforts to extend the Nuclear Non-Proliferation Treaty when it comes up for review in 1995 and thus hinder efforts to stem nuclear proliferation.

Yet retaining the ABM Treaty and avoiding deployment of an SDI system does not preclude continuing a strong SDI research and development program. After an extensive study of the SDI program, Ashton Carter, a physicist and director of the Center for Science and International Affairs at Harvard University, testified that "all of the outstanding scientific and technological issues identified at this time that bear upon the feasibility of SDI concepts can be addressed within the ABM Treaty as traditionally interpreted."[4] Among these issues are the problems of countermeasures and software reliability mentioned earlier.

Although an immediate abandonment or major rewriting of the ABM Treaty is unwise, efforts are needed to clarify some of its key provisions. For example, the types and roles of permitted space-based sensors are unclear, as is the line to be drawn between theater and strategic missile defenses. These issues can and should be resolved through negotiations between the United States, Russia, and other affected states in a forum such as the Standard Consultative Commission and do not require formal modifications to the treaty.

DIVERSION OF RESOURCES

Deployment of an SDI system would not only be costly for the United States, it would 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 dismantle their nuclear weapons.[4] It is ironic that after the United States spent

trillions of dollars over three 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-tenth 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 $739 million, less than one-seventh the FY 1993 SDI budget request. Last December, then-Secretary General 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."[1]

- 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 run "a skeletonlike operation," according to deputy chair Robert Gallucci.[2] The United States has not pushed to increase the resources of the Commission.

- Even though the spread of nuclear and biological weapons presents a serious threat to international security, non-proliferation efforts continue to be underemphasized 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 weapons program.

Conclusions and Recommendations

The SDI program has been redirected toward a new set of threats and yet faces many of the same unsolved 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 planned 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 means other than SDI, such as implementing further arms reductions, taking all remaining weapons off alert, and separating warheads from the delivery vehicles. Improved command and control procedures and destruct-after-launch mechanisms could also be effective and should be fully studied. Since no country other than those in the Commonwealth of Independent States could 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 (GPALS).

- 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 defenses, but not an SDI system.

- If a future nuclear-armed adversary were nondeterrable and determined to attack the United States, ballistic missiles would be only one of several possible delivery methods, and probably one of the least likely. 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, countermeasures using relatively simple technologies could greatly diminish the effectiveness of the defense. Hidden errors or limitations in the computer software that ran the SDI system could also 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 criterion for assessing the effectiveness of an SDI system is that it be 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 fully 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 these far more promising measures.

GENERAL 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 $2.3 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 countermeasures of technical sophistication comparable to that of ballistic missiles themselves. Second, it should be amenable to full testing under realistic 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 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 related to assessing the feasibility of SDI concepts can be addressed within the ABM Treaty as traditionally interpreted.**

- **Focus the R&D program on the key unsolved 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 the 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 Dean and Kurt Gottfried. 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 warheads removed from the arsenal and disposing of the fissile 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 IAEA and update and strengthen nuclear safeguards based on the lessons from the Iraqi nuclear program. Sanction the use of go-anywhere IAEA 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.**

- **Support an active role for the United Nations Security Council in stemming proliferation.**

- Promptly finish and ratify the chemical weapons convention with effective verification measures.

Measures to Control the Spread and Use of Delivery Systems

- Work with Russia and other nuclear powers to install destruct-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.

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 its engines stop burning. 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 attaining the high burnout speeds required for intercontinental 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 sizing GPALS, SDIO assumes that the 200 warheads are targeted such that they can be engaged by interceptors 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.

2. John Warner and William Cohen, "The Future of Ballistic Missile Defenses and the ABM Treaty: A Basis for Consensus," 23 May 1991.

3. National Defense Authorization Act for Fiscal Years 1992 and 1993, Conference Report, Sec. 231-240, 102d Congress, 1st Session (Washington DC: Government Printing Office, 1991), p. 33.

4. See, for example, "Pentagon Pushes Case for Pursuing Space-Based Missile Defense Programs," *Inside the Pentagon* (2 April 1992), p. 1; "DOD Strives to Make Brilliant Pebbles, Brilliant Eyes Top Two SDI Programs," *Inside the Pentagon* (2 April 1992), p. 6; William Broad, "Pentagon Space-Arms Stance Faulted," *New York Times* 11 March 1992, p. A20.

5. Bruce Schoenfeld, "Despite No Firm Requirements, GPALS Proceeds," *Defense Week* 13, 9 (2 March 1992), p. 1.

6. Department of Defense, "Conceptual and Burden Sharing Issues Related to Space-Based Ballistic Missile Defense Interceptors," (March 1992).

7. "Yeltsin Missile Defense Proposal Doesn't Include Space Weapons," *Aerospace Daily* 161 (4 February 1992), p. 183.

8. Don Oberdorfer and R. Jeffrey Smith, "New Era of Nuclear Disarmament," *Washington Post*, 2 February 1992, p. A26; "Yeltsin Delivers Statement on Disarmament," *FBIS-SOV-92-019* (29 January 1992), p. 1.

9. Bruce Schoenfeld, "Joint US-Russian Missile Defenses Are a Far-Off Proposition," *Defense Week* (24 February 1992), p. 2.

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.

11. Gary Hart and Barry Goldwater, "Recent False Alerts from the Nation's Missile Attack Warning System," report to Committee on Armed Services, U.S. Senate (9 October 1980).

12. Bruce G. Blair and Henry W. Kendall, "Accidental Nuclear War," *Scientific American* (December 1990), p. 53.

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 DoD/SDIO 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 TBMs [tactical ballistic missiles]." In a speech to the Amherst Association of New York on 22 May 1991, CIA Director William Webster stated that by the year 2000 "as many as 15 countries could be producing their own ballistic missiles." Craig Gralley, Webster's speech writer, later clarified that these 15 countries are worldwide, not just in the developing world.

15. Bruce Schoenfeld, "Echoes of Cold War Threat Inflation Undercut Missile Defense Supporters," *Defense Week* 13 (21 January 1992), p. 1.

16. For a discussion of the missile capability and military technology base of developing countries see Lora Lumpe, Lisbeth Gronlund, and David Wright, "Third World Missiles Fall Short," *Bulletin of Atomic Scientists* 48 (March 1992), p. 30.

17. See, e.g., Robert Gates, testimony to the Senate Committee on Governmental Affairs, 15 January 1992.

18. Gary Milhollin, "India's Missiles—With a Little Help from Our Friends," *Bulletin of Atomic Scientists* (November 1989), p. 31.

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 Fetter discusses the relative destructiveness of nuclear, biological, chemical, and conventional high-explosive warheads in "Ballistic Missiles and Weapons of Mass Destruction," *International Security* 16 (Summer 1991), p. 5. This analysis suggests that both chemical and conventional warheads are of less danger to urban populations than nuclear and biological weapons.

21. *Congressional Record*, 31 January 1991, p. S1371.

22. This suggestion was raised recently by Russian Foreign Minister Andrey Kozyrev at the UN conference on disarmament, quoted in Tass, 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 alleviate these concerns, see Sherman Frankel, "Stopping Accidents After They've Happened," *Bulletin of the Atomic Scientists* 46 (November 1990), p. 39, and "Aborting Unauthorized Launches of Nuclear-Armed Missiles Through Post-Launch Destruction, *Science and Global Security* 2 (November 1990), p. 1. CIS 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 Podvig, Moscow Institute of Physics and Technology, private communication).

24. Representative Les Aspin, "From Deterrence to Denuking: Dealing with Proliferation in the 1990s," speech delivered at Center for Strategic and International Studies, Washington, DC, 18 February 1992.

25. Seymour M. Hersh, *The Samson Option: Israeli Nuclear Arsenal and American Foreign Policy* (New York: Random House, 1991), p. 177, 220.

26. Quoted in Spurgeon Keeney, "Limited ABM Defense: Dangerous and Unnecessary," *Arms Control Today* (October 1991), p. 14.

27. The FY 1992 budget for the US Air Defense Initiative was cut from the administration request of $0.27 billion to $0.16 billion—a figure 25 times smaller than the SDI budget (*Inside the Pentagon*, 21 November 1991, p. 3).

28. George Lardner, "Army Cuts Claims of Patriot Success," *Washington Post*, 8 April 1992, p. A1. See also, Theodore A. Postol, "Lessons of the Gulf War Experience with Patriot," *International Security* 16 (Winter 1991/92), p. 119; Ethan Bromler and John Farrell, "US, Israeli Experts Dispute Patriot Claims," *Boston Globe*, 19 March 1992, p. 1.

29. See Philip Finnegan, "Gulf War Exposes Effectiveness of Countermeasures," *Defense News* 6 (12 August 1991), p. 1.

30. Sub-munitions have been discussed for defeating tactical defenses by Richard Garwin, "1991 Views on Ballistic Missile Defense," in *Reassessing Tactical and Strategic Missile Defense*, American Academy of Arts and Sciences Conference Report (20 December 1991), p. 31.

31. See, for example, Herbert Lin, "The Development of Software for Ballistic-Missile Defense," *Scientific American* (December 1985), p. 46.

32. Eric Schmitt, "Army Is Blaming Patriot's Computer for Failure to Stop the Dhahran Scud," *New York Times*, 20 May 1991, p. 6; Government Accounting Office, "Patriot Missile Defense: Software Problem Led to System Failure at Dhahran, Saudi Arabia (February 1992).

33. "Strategic Defense Initiative: Changing Design and Technological Uncertainties Create Significant Risk," United States General Accounting Office, Report GAO/IMTEC-92-18 (February 1992), p. 26.

34. *ibid*, p. 23.

35. Atmospheric blinding of the sensors has also plagued development of the ERI interceptor ("Senate Plan for Missile Defenses Could Squeeze Key SDIO Programs From Budget," *Inside the Pentagon* 7 (29 August 1991), p. 1.

36. For details, see David C. Wright and Lisbeth Gronlund, "Underflying Brilliant Pebbles," *Nature* 350 (25 April 1991), p. 663.

37. Paul Nitze, address to the Philadelphia World Affairs Council, 20 February 1985.

38. Even if the interceptors were cued by a sensor such as GSTS, the coasts would remain unprotected against SLBMs, or ICBMs on trajectories that are depressed somewhat below their standard minimum-energy paths. See Lisbeth Gronlund and David C. Wright, "Limits on the Coverage of a Treaty-Compliant ABM System," *Physics and Society* (April 1992), p. 3.

39. Congressional Budget Office, "The Budgetary Impact of Limiting Strategic Defense Initiative Programs," January 1992.

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.

41. Bruce Schoenfeld, "SDIO Asserts Its Cost Figures Are On Target," *Defense Week* (26 August 1991), p. 3. The CBO estimate for acquisition costs through 2005 is $54 billion (CBO, "Budgetary Impact").

42. *Military Space*, 12 August 1991, p. 7.

43. CBO, "Budgetary Impact."

44. Les Aspin, "From Deterrence to Denuking: Dealing with Proliferation in the 1990s," 18 February 1992.

45. "USAF Limits OTH-B on East Coast, Mothballs West Coast Site," *Aviation Week and Space Technology* 134, 22 (3 June 1991, p. 24; William C. Hidlay, "Maine Defense Radar to Run Only Part Time," *Boston Globe* (28 May 1991), p. 60.

46. Senator David Pryor, "Time to Derail the SDI Gravy Train," *Space News*, 9 March 1992, p. 15; Sharon Begley and Daniel Glick, "A Safety Net Full of Holes," *Newsweek* (23 March 1992), p. 56; Tim Weiner, "Critics Call Star Wars a Contractors' Feast," *Philadelphia Inquirer*, 23 March 1992, p. A1; Aldric Saucier, "Lost in Space," *New York Times*, 9 March 1992, p. 17.

47. A 1990 RAND Corporation study shows that the presence of defenses can destabilize the transition to low arsenals (Glenn A. Kent and David E. Thaler, "First Strike Stability and Strategic Defenses" (Santa Monica, CA: RAND, 1990), Report #R-3918-AF)).

48. Paul Nitze, testimony to the Senate Foreign Relations Committee, 25 February 1992.

49. Testimony before the Senate Foreign Relations Committee, 24 April 1991.

50. Jim Hoagland, "Little Help for Yeltsin," *Washington Post*, 11 February 1992, p. A21.

51. Paul Lewis, "UN's Fund Crisis Worsens as Role in Security Rises," *New York Times*, 27 January 1992, p. A1.

52. Nabila Megalli, "Iraqis Nearly Had Nukes," *Washington Times*, 15 January 1992, p. A1.

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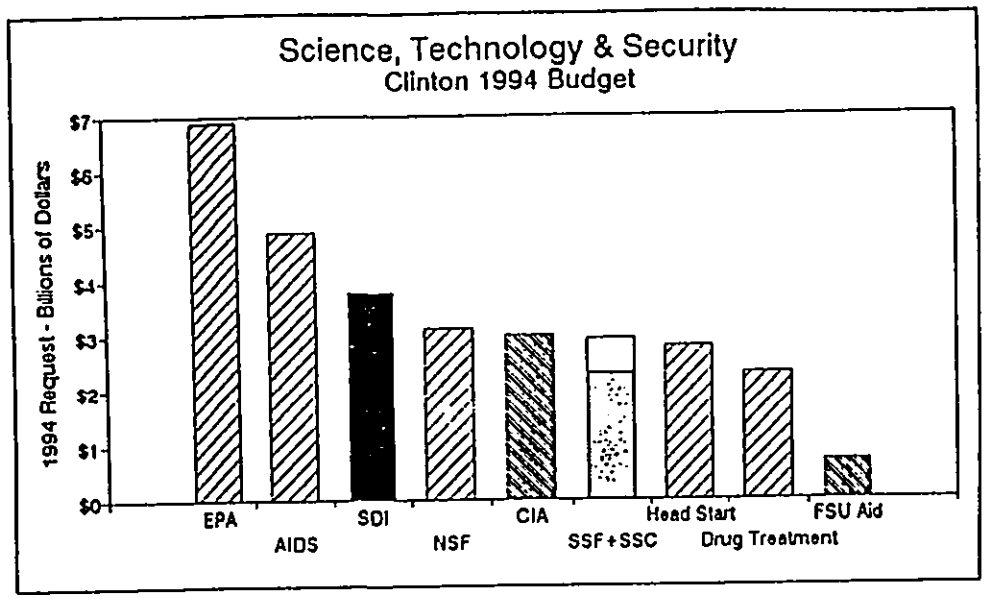
Attachment 14

F.A.S. *PUBLIC INTEREST REPORT*

Journal of the Federation of American Scientists (FAS)

STAR WARS AFTER 10 YEARS

Volume 46, No. 2 March/April 1993



PROPER END TO SDI CRUSADE IS COLLABORATION

Announced a decade ago, the Strategic Defense Initiative is now entering its fourth incarnation. President Clinton has inherited, 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 debate over anti-missile systems lost some of its earlier religious fervor. Reality, perhaps no less or no more political than economic, interrupted a mass of expectations. Fingers that once moved so excitedly through a rosary of exotic strategic defenses hesitated and moved back a bead or two.

Even so, strategic defenses remain one of the central elements defining American views of national 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 preeminent incarnation of fear of an implacably resolute Soviet mentee. Today, SDI incarnates all of the inchoate apprehensions of implacably hostile regional actors, and perpetuates a view of a world order primarily characterized by military threats rather than economic and cultural opportunities.

This multi-billion dollar a year program has invested itself with the icons of the Cold War. The doctrine that chemical, nuclear and missile proliferation are the major threats to American security incenses the argument that since little that can be done to stop their flow, SDI remains the only, the absolute, solution.

Proliferation of other weapons, such as strike aircraft or military space systems, is being obfuscated by the haze from candles lighted for American exports. And efforts to achieve limits on advanced weapon proliferation through unilateral restraint, multilateral arms control or international cooperative regimes have become

(continued on page 3)

IN MEMORIAM

Physicist Bernard Feld and Biochemist Robert Holley, two of America's leading scientists and longstanding supporters of the Federation, died in February.

Bernard T. Feld

Feld, a Founder of FAS who helped Enrico Fermi develop the atomic bomb, said in 1982 "I was involved in the original sin, and I have spent a large part of the rest of my life atoning." Indeed, Feld was fiercely and vocally supportive of arms control agreements, opposed to nuclear stockpiling and the arms buildup in the 1980s, and convinced that scientists should involve themselves in public policy

In 1976, FAS awarded Feld its annual public service award, calling him the "indispensable man." In a statement to be read at the March 31 memorial service in Cambridge, Council Chairman Robert Solow, Fund Chairman Frank von Hippel and President Jeremy Stone said:

"Bernard Feld was invariably constructive, often creative and always, above all, dedicated. If, as he felt it had, his role at Los Alamos placed heavy burdens of social responsibility upon him, history will record that he amply fulfilled them."

Feld retired from MIT two years ago after a distinguished teaching career and a half-century of leadership in arms control. His death came from lymphoma at the age of 73. He is survived by his artist wife Ellen, two daughters, and three brothers.

Robert W. Holley

Holley, a Sponsor of FAS who won the Nobel Prize for unraveling the genetic code of RNA, died of lung cancer at the age of 71.

His scientific breakthrough of enormous proportion was first reported in a two-sentence journal abstract, reading "The complete nucleotide sequence of an alanine transfer RNA, isolated from yeast, has been determined. This is the first nucleic acid for which the structure is known." Isolating the RNA sample took him three years and 200 pounds of yeast. Breaking the code in a strand of RNA with 77 subunits took him another four.

The President of the Salk Institute, where Holley had been a fellow and professor since 1966 focusing on cell growth and inhibitor factors, said his "discoveries deepened our understanding of cell growth and opened new possibilities for the diagnosis and treatment of cancer and other diseases."

Holley, a resident of Los Gatos, California, is survived by his wife Anne, one son, three brothers and two grandchildren. ☐

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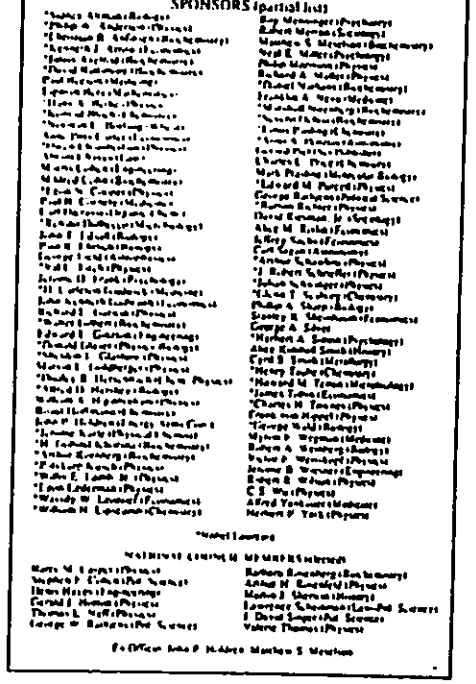

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(continued from page 1)

the province of well-versed, but less powerful, acolytes in the arms control community.

So, while the fourth stanza of the Star Wars hymn may be less fervent in tone, and Bill Clinton may find himself comfortable with the lyrics, the refrain is the same: How much will it cost? Is it needed? Will it work? And what about arms control?

How Much Will It Cost?

The costs of currently contemplated anti-missile systems are modest compared with the trillion dollar fantasies of a decade ago. But the roughly four billion dollars that is proposed for anti-missile systems each year for the remainder of this decade is real money, even by Washington standards.

Clinton's proposed SDI budget exceeds that of the National Science Foundation. It exceeds the combined budgets of the Space Station and Superconducting Super Collider. It is more than that of the CIA. It is more than what is proposed to be spent on productive domestic programs such as Head Start and Drug Rehabilitation.

Is It Needed?

The case for deploying theater missile defenses with capabilities beyond those of the improved PAC-3 Patriot has not been made.

There is little prospect within the foreseeable future that the United States or its allies will be threatened by Third World ballistic missiles that cannot be addressed just as well by new generations of Patriot as by an SDI consisting for the most part of fixed ground-based systems. And even if one were to concede that such Third World ballistic missiles are, or will be, a threat, counterforce strikes against their launchers may be a more cost-effective response.

Moreover, air-breathing systems such as cruise missiles—an equal if not greater threat—would not be countered by dedicated anti-ballistic missile systems.

Will It Work?

Intercepting tactical and theater ballistic missiles poses the same challenges to system effectiveness as those faced by strategic defense. The experience of the Patriot deployed in Desert Storm confirmed the long-standing apprehensions of those skeptical of SDI. Performance of anti-missile systems is easily degraded by the difficulties of discriminating real targets from decoys, and by the unreliability of software.

The more advanced systems of SDI obviously remain untested in combat, but simulated testing has to date produced mixed results and no measurable increase in the confidence level.

And What About Arms Control?

Notwithstanding the fact that America and Russia will, for the foreseeable future, retain large arsenals of strategic offensive forces aimed at each other, reductions in nuclear force now underway on both sides confirm the original logic of the ABM Treaty. Reductions in offensive forces require strict limitations on anti-ballistic missile systems and mandate definition of treaty-compliant anti-tactical ballistic missile systems.

The Bush Administration engaged the Russians in negotiations aimed at loosening or eliminating Treaty restrictions. The Clinton Administration should reverse course and focus on more restrictive limitations.

Money Better Spent Elsewhere

We have very little to show for the $32 billion spent on SDI over the past ten years. And we will have even less to show for spending another $32 billion on it over the next eight years. Only two rationales remain for spending any amount. They are the threat of Third World missile proliferation and the effects of political instability in the former Soviet Union.

Both of these problems largely result from the dissolution of the former Soviet aerospace complex. It would be better to keep Russian aerospace workers on the job than to see them moving to work on Third World missile projects, or taking to the streets to demand a return to the old system. But the amount of money allocated for direct aid to Russia is negligible, compared to either the magnitude of the problem or to the proposed SDI budget.

It would be far more prudent to redirect much of the proposed SDI budget into an aid program targeted at stabilizing the former Soviet aerospace complex. Such a program, patterned after the one already enacted to deal with the former Soviet nuclear weapons complex, would have an immediate impact—both on promoting Russian democracy and on discouraging missile proliferation.

Paradoxically, SDI has been at the forefront of developing cooperative projects with the Russian aerospace complex. This was the lure in the Bush Administration's strategem of gaining Russian support for the program. The Clinton Administration should build on this experience, taking it one step further and in a different direction, and greatly expand the scope of civil space cooperation recently begun by NASA.

Such cooperation would reduce potential threats arising from instability in the former Soviet Union and from ballistic missile proliferation—providing economies in our space effort almost immediately and even greater economies in defense over time.

—John E. Pike ■

RECOUNTING THE HISTORY, DISCOUNTING THE CLAIMS

Since President Reagan first unveiled his Strategic Defense Initiative on 23 March 1983, the program has been marked by shifting goals and uncertain plans. The past decade has witnessed three major phases in the evolution of SDI.

Each new phase was marked by less ambitious performance goals that were to be met by less ambitious technical means. The inevitable trend of the evolutions, however, has been to confirm the observations of those who have questioned both the need for and feasibility of anti-missile systems.

The Magic Peace Shield

At its outset, SDI was to offer a perfect defense against a very large missile strike by the Soviets. When this proved unworkable, it evolved to a less-than perfect-defense against a large attack. Later, it returned to claims of perfection, but this time protecting against a small attack. However, at no point was SDI able to find something it could do that was worth doing.

The vision that President Reagan initially presented for his Strategic Defense Initiative was a world in which nuclear weapons were rendered "impotent and obsolete." Although this was a somewhat vague and indefinite notion, it was generally taken to mean that the SDI would lead to a virtually perfect defense of populations. Certainly the exuberant rhetoric that was used in support of the program would have been difficult to sustain in support of less exalted goals, such as defense of retaliatory forces.

But this ambitious goal was generally thought to require an implausible level of technical perfection. While Reagan's goal of an impermeable shield over Western Civilization was attractive, there was little reason to expect that it was attainable. Obvious Soviet countermeasures, such as massive numbers of decoy warheads, coupled with the unpredictable unreliability of battle management computer software, guaranteed that the goal of perfection would stay just beyond our grasp.

Finding Out What Wouldn't Work

Perhaps the greatest accomplishment of the first four years of the SDI program consisted of learning what technologies would not work. At its beginning, the program contemplated an investigation of a bewildering array of devices that might be of some use in shooting down missiles and warheads.

Most of these gadgets, such as railguns, space-based lasers, and particle beams, were weighed in the balance and found wanting. By 1987, the negative appraisal led to erosion, even abandonment, of support for unpromising technologies.

This loss of support was a blessing in disguise. The Congress demonstrated a stubborn unwillingness to grant the program more than about $4 billion in annual appropriations. And Congressional rejection of the Administration's attempt to reinterpret the ABM Treaty further constrained the prospects for testing or deploying exotic systems.

Phase One: Validating What Would Work—Sort Of

The fading dream of technological perfection left in its shadow a lowering of ambitions. In August 1987, the SDI Organization received approval from the Defense Acquisition Board, the Pentagon's highest committee dealing with procurement matters, to proceed with demonstration and validation of those anti-missile technologies that could be deployed in the mid-to-late 1990s.

It was anticipated that an actual decision to deploy the system would come this year—1993, and that initial operational capability of the system would be achieved in 1997. The system was to include up to 2000 ground-based interceptors and 4000 space-based interceptors, at a cost of over $70 billion.

One mission defined for the system was the protection of American land-based missiles. Specifically, the requirement was that the system demonstrate the ability to intercept fifty percent of the Soviet's force of 308 SS-18 ICBM's—the core of Soviet counter-silo capability and our window of ICBM vulnerability.

An umbrella capable of keeping out only half the rain is clearly a leaky one. It was also a case of too much, too late.

The Scowcroft commission had nearly closed the window in 1983 by noting that missile silo vulnerability had limited significance when compared to the other two legs of the triad—the bomber and submarine, both of which had continuing viability. The long-running MX/Midgetman debate would have closed the window long before SDI could, at a fraction of the cost. Too, the window of vulnerability was wearing thin as a compelling rationale for new weapons systems.

Then, in late 1989, the Berlin Wall cracked, effectively marking the end of the Cold War and largely eliminating political anxieties over the prospects of impending nuclear combat with the Soviet Union.

Maybe Global Protection Against Limited Strikes?

In 1990, growing disenchantment with the technical and military prospects of an anti-missile system oriented toward the declining Soviet threat led Congress to endorse, for the first time, significant cuts in the SDI budget (as opposed to reductions in what had been requested), and to call for a major restructuring of the SDI program.

But the end of the Cold War did not mark the end of SDI. By late 1990, the Strategic Defense Initiative was reoriented into Global Protection Against Limited Strikes (GPALS) to defend against tactical and theater missile threats, as well as up to 200 long-range ICBM or SLBM warheads aimed against the United States. Plans for the components of the operational Strategic Defense System underwent significant changes, with a new generation of systems replacing those that were the focus of activity in the 1980s.

This new system would be deployed in three stages: a Transportable Protection Against Limited Strikes (T-PALS)—an air-transportable system to defend against theater missiles, a Continental US system (C-PALS) of Brilliant Eyes sensors and ground-based interceptors deployed at multiple sites, and the global system (G-PALS) with space-based Brilliant Pebbles interceptors.

All of these systems were inherited without modification from earlier plans for more massive defenses oriented against the Soviet Union. The order-of-magnitude reduction in the number of warheads that would turn a "strategic" attack into a "limited" one did not translate into a comparable reduction in the size of the defensive system. The 1000 space-based components are about 25 percent of the previous number, and the 1000 ground-based interceptor are 50 percent of what had been determined necessary for a "strategic" system. The total estimated cost of deploying the GPALS system was in the range of about $40 billion.

Desert Storm Fever Hits And Runs

In the wake of the Gulf War, and the perceived success of the Patriot, the Congress responded by passing the Missile Defense Act, which called for deploying a ground-based system covering the United States by 1996 and restored the funding cuts imposed the previous year.

However, this Congressional enthusiasm was short lived. By mid-1992 it was apparent that Patriot had been much less successful than originally claimed. Whistleblower Aldrie Saucier raised disturbing questions about the technical judgement and management of the SDI program. The Pentagon itself admitted that there was no prospect of meeting the 1996 deployment target. 2002, said the military, was a more realistic goal. So, in 1992 the Congress eliminated the target dates and, further, declined to increase the program's budget.

Debate Gets Down to Earth

The first eight years of the Star Wars debate were marked by zealous disputations unsullied by concrete evidence. Like strategic nuclear war, there was (fortunately) no actual combat experience to constrain the speculations of the SDI "theologians." Then, in early 1991, the Patriot engaged Iraqi missiles during Operation Desert Storm.

Proponents of SDI immediately embraced the Patriot as vindicating their claims for the utility of anti-missile systems. President Bush and others immediately claimed that Patriot had given the virtually perfect performance that had long been the goal of the Star Warriors. And enthusiasm for limited anti-missile systems was rejuvenated.

Conflicting Claims For Patriot Performance

The Pentagon asserted that at least 81 Scuds were fired during the conflict; independent sources count as many as 89. Against these eighty-odd missiles, 158 Patriots were fired against 47 to 51 of them (again, the number is uncertain), an average of three Patriots fired at a single Scud through the mid-point of the conflict and four fired at each incoming missile thereafter. The three or four-to-one firing sequence, of course, made it impossible to test the 70-90 percent single-shot kill probability SDI advocates had promised.

It was initially claimed that of the 47-51 Scuds fired at, 45-50 were successfully intercepted. Such was not the case.

Subsequent analysis by the Army, as well as analysis of the pattern of damage in Israel and of commercial television coverage, suggested a less optimistic conclusion on Patriot's success. As the excitement of the war cooled, it became increasing apparent that actual performance had fallen far short of the initial claims of near-perfection. Given government and industrial secrecy and the paucity of reliable data, how far short may be unknowable. But it is clear that the number of missiles intercepted, rather than being "virtually all," actually ranged somewhere between "some" and "none."

Instead of fulfilling the promises by SDI advocates, the performance of the Patriot system during Desert Storm confirmed the initial concerns of skeptics that the perform-

THE BASIS FOR CHOOSING WHAT TO FUND

In earlier debates over SDI, it was generally accepted that if the cost of intercepting a missile was greater than the cost of the missile to the attacker, deployment of anti-missile defenses would stimulate a spiraling competition between offensive and defensive systems in which the cost advantage of offensive systems would make them the winner. The ABM Treaty avoided this competition between the superpowers.

Generally speaking, applying any such metric is manifestly unfavorable to defense and in many ways denies its proper rationale. The Nitze criteria illustrated how the offense-defense game can be transformed into simple economic warfare, with the weaker economy the loser. With roughly matched economies, as once was the case with the United States and Soviet Union, such a contest can continue for some time, though at enormous costs. The greater the inequality in economic resources, the more quickly the contest will be decided.

For example, Israel is clearly disinclined to pay the full costs of the Arrow program, fearing a ruinously expensive arms race with its regional adversaries. In principle, the United States, with an economy that dwarfs that of Israel's antagonists, could pay for defenses of Israel that would outmatch Arab missile forces. In practice, however, the American government has been properly reluctant to accept such an open-ended commitment. This caution is all the more appropriate, given the likelihood that no prospective anti-missile system would manifest the level of perfection necessary to contribute much to resolving Israel's dilemmas. ■

- of anti-missile systems would be degraded by the blems of discriminating decoys from real targets, and the abiding unreliability of computer software.

Flaws In Scuds Create Inadvertent Decoys

rget discrimination was hampered by design flaws in 's modification of Scuds to Al-Husayns. Structural knesses broke the missiles up into several pieces, reby inadvertently approximating the effects of deliber- countermeasures. Most Al-Husayns seem to have dis- grated at fairly low altitudes, after they had been de- ed and tracked by the Patriot units. Therefore, Patriots launched at what was presumed to be a single target were then faced with two or more targets

In 17 January in Saudi Arabia, 28 Patriot interceptors re fired at 5 Scud missiles, because pieces of disintegrat- Scuds were discerned by Patriot fire units as distinct eatening objects. On 25 January in Israel, more than 27 riot interceptors were fired at 7 Al-Husayns under simi- ircumstances.

the first example, US satellites reported 5 Scud iches. As the missiles approached Dhahran, Patriot ar detected 14 objects and launched two intercepters at h target. This demonstrates the challenge to successful sile defenses posed by technical aberrations, much less berate countermeasures.

Surgical Precision Lacking In Software

"Even a simple system like Patriot, which is managed by a atively modest several-million-line computer code, can e software errors that result in a complete failure of the tem to perform its basic functions. This was demonstrat- in the case of the Scud that killed 28 Americans in a racks in Saudi Arabia in the closing days of Desert rm.

A programming error in the tracking software generated ming error that increased the longer the computer ran hout being reset. Over the course of 100 hours of opera- , an error of just over a third of a second was sufficient cause the Patriot unit to malfunction. Radar operators erved no return or track from the missile as it passed ough the search pattern. The missile was not detected l, thus, not engaged.

Campaign Against Launchers Had Chilling Effect

A third lesson from Desert Storm relates to the relative ectiveness of counterforce versus active defenses— netimes referred to as shooting the archer versus catch- the arrows. In the conduct of Desert Storm it appeared t the air campaign against Iraqi missile launchers was a ssive effort that produced dis-proportionately small re- lts. However, this negative assessment rests on too nar- w a definition of success.

While it is true that only a few Iraqi launchers were stroyed from the air, the campaign induced frantic Iraqi orts to avoid detection and destruction. The result was a sile force that was for the most part too preoccupied h its own survival to mount sustained fire against Israel or Saudi Arabia. And though Iraq was occasionally able to fire as many as 10 Scuds in a single day, the fact remains that fewer than 90 missiles were launched during the 42 days of combat—stark contrast to the more than 400 that theoretically could have been fired.

The air campaign succeeded in inflicting a 75 percent virtual attrition rate against Iraq. Early proponents of SDI asserted that the boost-phase layer of the defense was the most highly leveraged, since it could engage missiles before they deployed multiple warheads or countermeasures. Some wags responded that the most highly leveraged layer of the defense was the pre-boost phase, otherwise known as preemptive counterforce, attacking the missiles before they are launched. Desert Storm confirmed the importance of pre-boost phase engagement. □

During the 1992 campaign, Bill Clinton made several statements related to Star Wars and the ABM Treaty, statements that were a refreshingly realistic appraisal of the issue, reflecting an appreciation of the lessons of Desert Storm and a recognition of the end of the Cold War.

In July 1992, Clinton stated:

"We should focus the SDI program on three more concrete goals connected to hard-headed analysis of the real threats that the United States might face in the future."

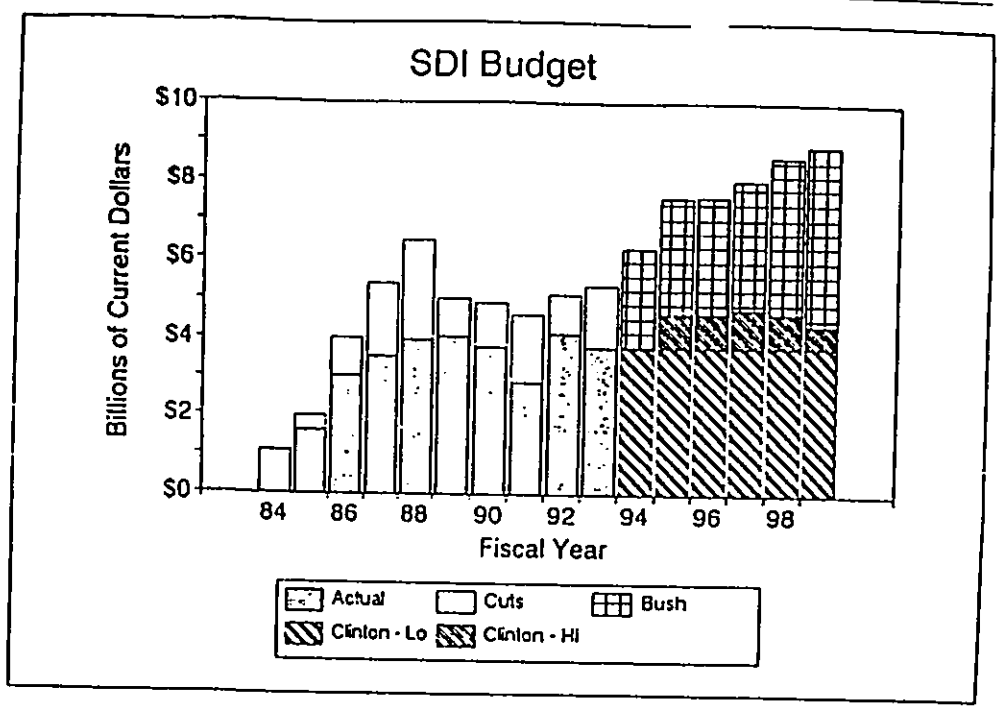
"First, we would develop and deploy theater-based defense systems—like Patriot and its successors—to defend US troops and allies against the existing threat of short-range missile attack."

"Second, we should focus strategic defense research on a limited defense of the United States against the possibility of new ICBM threats. Such threats have not yet and may never emerge—the CIA says there will be no new ICBM threat for at least a decade. But, it is prudent to be in a position to deploy a limited defense should the need arise."

"Third, we should support a prudent research program on more advanced follow-on anti-missile technologies. This would ensure American technological leadership in the field, as well as preserve the option to deploy more capable systems in the future, should the need arise."

Not surprisingly, these statements by Clinton, the candidate, were of a general nature.

The question now is how President Clinton will translate his general goals into specific action. In the absence of affirmative decisions on the part of the new Administration, the multitude of existing SDI programs will likely continue, outliving the outdated political and strategic assumptions from which they arose. ■



The present budget is heavily weighted in favor of investments in active defenses against ballistic missiles, while potentially more rewarding investments in defenses against air-breathing threats and counterforce systems are relatively poorly funded.

Even so, the costs of the Patriot can at this juncture be more easily justified than those projected for deployment of more expensive systems of a scaled-back Star Wars. The Patriot at least has the advantages of actuality, a modicum of performance on which to build and a demonstrated threat to counter. The more capable systems now proposed appear to be based on optimistic assumptions that may never be actualized and threats that may never be encountered. Furthermore, upgrades to Patriot build on existing investments in support infrastructure; more capable systems require major new investments.

Patriot Anti-tactical-missile Capability (PAC-1/2/3)

From the beginning of its development in the mid-1980s, the Patriot anti-aircraft missile was intended to also have an anti-missile capability. The first phase of Patriot Advanced Capability (PAC) consisted of software upgrades to enable Patriot radar and the fire control system to engage high-angle missile targets. This system was declared operational and entered service in 1988 as a limited self-defense capability for US and German forces.

The second phase (PAC-2) provided the Patriot missile with a warhead that produces larger fragments (700 grains) and an improved fuse to increase the interceptor's effectiveness against ballistic missiles. Initial deliveries of the PAC-2 system began on 30 August 1990, just in time for use during Desert Storm.

The Advanced Tactical Patriot, or Patriot PAC-3, will incorporate an active radar seeker on the missile itself and employ a more sensitive ground tracking radar. Other improvements increase its range, improve communications links to permit launchers to be fired by radars up to 30 kilometers away, and reduce the complexity of the system to facilitate rapid deployment. Testing of the PAC-3 started in 1992, and will be completed this year.

Extended Range Interceptor (ERINT)

In contrast to the Patriot, the Extended Range Interceptor (ERINT) uses a millimeter-wave radar in the nose of the interceptor itself for guidance, rather than the ground-based radar used in systems such as Patriot, destroys its target by direct impact and is smaller (a Patriot launcher could carry 16 ERINTs in place of 4 Patriots).

While the direct-impact capability might provide enhanced lethality against missiles, ERINT would be less effective than Patriot against aircraft, since the small mis-

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sile could pass harmlessly through an airplane's wing. During 1993, ERINT will participate in a competitive fly-off with Patriot PAC-3 to determine which of these interceptors will be approved for production.

Theater High Altitude Area Defense (THAAD)

The Theater High Altitude Area Defense system is a 5-year, multi-hundred million dollar effort to develop an integrated two-layer, wide-area defense against ballistic missiles with ranges up to 3000 kilometers. If successful, THAAD will be capable of engaging such targets at distances of up to 200 kilometers, at altitudes in excess of 150 kilometers.

The THAAD, the first-layer interceptor missile, will be larger than either Patriot or ERINT, though smaller than the Israeli Arrow. ERINT will be the second-layer interceptor in the system. As with the HEDI endo-atmospheric interceptor (previously developed), THAAD would use an infrared homing kill vehicle.

Initial testing of this interceptor is anticipated by 1994, with tests continuing through 1996. Unlike ERINT, which will take advantage of existing Patriot infrastructure, the larger THAAD will require all-new launch and support equipment, greatly increasing the overall cost of the system.

Arrow (Chetz)

The Arrow (Chetz) is a medium range anti-missile interceptor intended for defense against ballistic missiles with ranges up to 1000 kilometers. There is considerable confusion in the public record over almost every feature of the Arrow. However, it is clear that this two-stage solid-fueled missile, which uses infra-red homing guidance (as with THAAD) and an explosive shrapnel warhead (as does Patriot), is substantially larger and more expensive than its American counterparts.

A range of technical problems has emerged in the program. The system's radar has an inadequate scan area. Better command and control equipment is needed. And many elements need to be miniaturized. The first three tests of this interceptor failed, with only the fourth, in February 1993, finally succeeding. Although the project is jointly financed by America and Israel, both governments have stated that they have no plans to finance the deployment of this system, suggesting that each thinks the other should shoulder the costs.

Ground-Based Interceptor (GBI)

SDI plans include continued work on strategic ground-based interceptors that would intercept missile warheads during the mid-course phase of flight, just before they reenter the atmosphere over North America. This effort extends the approach used in the Homing Overlay Experiment (HOE), which successfully intercepted a warhead in 1984, and the Exo-atmospheric Reentry-vehicle Interception System (ERIS), which incorporated a much smaller and lighter kill vehicle.

The relative pre[illegible] among these three generations of interceptors is indicated by the mass of the kill vehicle, which dropped from near 1200 kilograms with Homing Overlay, to less than 200 kilograms with ERIS, to about 25 kilograms with GBI-X.

Competitive development of the operational Ground Based Interceptor Experiment (GBI-X), a smaller and more sophisticated version of the ERIS, was awarded in mid-1990. Under these plans, testing of the GBI would begin about 1995, with deployment at one or more sites in the 2002-2004 time-frame. Award of the contract has been delayed, pending a review of the program by the Clinton Administration.

Boost-Phase Sensors (BSTS and FEWS)

Early detection of missile launches can significantly improve the performance of defenses against both tactical and ballistic missiles. During the 1980s, SDIO spent several hundred million dollars on developing the Booster Surveillance and Tracking System (BSTS).

When the anti-missile mission requirement for BSTS was eliminated in 1990, the program went back to the Air Force. Renamed the Follow-on Early Warning System (FEWS) to reflect improved early warning of missile attack and enhanced intelligence collection and verification capabilities, its proponents are once again stressing its potential in a theater missile defense. But given the performance of the Defense Support Program warning satellites during Desert Storm, it is far from clear that the greater sensitivity of the FEWS sensors would improve tracking or interception capability.

Mid-Course Sensors (GSTS/GBR/PAVE PAWS/Brilliant Eyes)

When the SDI program first began, there was considerable optimism that sensitive thermal sensors could detect minute differences in the heat emitted from real warheads and decoys and would enable the system to attack the first and ignore the latter. Although subsequent work on using laser radars to detect slight differences in the vibration patterns of warheads and decoys showed some promise, over the years the mid-course discrimination problem seemed to grow increasingly intractable.

By 1992, a total of four mid-course sensor systems were under study by the SDI Organization.

The Ground-based Surveillance and Tracking System (GSTS) would use long-wavelength infrared sensors for tracking and discrimination. GSTS probes would be lofted into space on ballistic trajectories upon warning of an attack, remain in space for tens of minutes—long enough to discriminate and transmit data before falling back to earth.

The Ground Based Radar, based on earlier SDI work on the Terminal Imaging Radar, would provide late mid-course discrimination and tracking. This program was divided into two related projects. A GBR-TMD (Theater Missile Defense), using technology similar to the Patriot's, is to be tested at White Sands starting in 1994. And a larger GBR-SMD (Strategic Missile Defense) that uses X-band technology to track ICBM and SLBM reentry vehicles before they reenter the atmosphere is under development.

The SDIO has also evaluated upgrades to existing PAVE PAWS early warning radars that would enable them to support anti-missile operations. Upgrades to PAVE PAWS radars promise to provide the least costly option for a national missile defense, should such a need arise.

The most ambitious sensor is the Brilliant Eyes constellation of 50 to 80 spacecraft orbiting at altitudes of somewhat less than 1000 kilometers. Each spacecraft would be equipped with a combination of long-wavelength infrared, visible light and laser radar sensors, for tracking targets in mid-course. This large constellation of satellites would be capable of covering only 20 percent of the Earth's surface at any one time, and would have to rely on other sensors, such as the DSP satellites, for warning of missile launches.

Again, based on the Desert Storm experience, none of the sensors, with the possible exception of the Tactical Ground Based Radar, would appear needed for defending against existing threats.

Third World Threats

Recent estimates of the number of prospective ballistic missile states—ranging from 15 to 25 by the year 2000—have been used by advocates of SDI oriented defenses to win support for their position. Missiles to be held by these nations generally fall into three categories:

- Short-range, conventionally armed missiles deployed by Third World countries, including Scuds and Scud-derivatives;
- Long-range missiles currently deployed by nuclear powers, including the states of the former Soviet Union; and
- Longer range or more sophisticated missiles that are supposed to be under development by various Third World countries, including space launch vehicles that could be converted into long-range missiles.

The first category can be adequately addressed with Patriot or ERINT.

The second category, an abiding Cold-War fact of life now parsed in terms of rogue commanders and accidental launch, poses no new case for deploying SDI. The American intelligence community continues to believe that, despite instability in CIS republics, controls on the former Soviet nuclear arsenal remain adequate. In any event, the current internal problems will have been resolved long before an SDI defense would be ready.

There are only a few missile programs in no more than a handful of Third World states—North Korea, Iran, Iraq, Syria and Libya— and each of them is under intense international scrutiny. Yet, it is the third category that is at the heart of the call for more ambitious anti-missile systems.

Considering the range of options available to counter this actual or supposed threat, a major investment in proposed anti-missile systems beyond Patriot appears the least attractive. A strengthened Missile Technology Control Regime, economic assistance to the states of the former Soviet Union, more stringent international export controls on missile-usable materials and components, and the confidence building that is inherent in US-Russian force reductions would seem more productive and more consistent with post-Cold War goals.

Do Missiles Make Good Terror Weapons?

A review of the War with Iraq suggests that the principal result of the Iraqi missile campaign against Israel lay [illegible] in the fear created in the minds of the threatened population than in actual destruction, which was relatively meager.

Still, there are those who contend that the use, or potential use, of conventionally armed ballistic missiles as weapons of terror against civilian populations mandates the deployment of SDI. In the absence of such defenses, it is said, other countries might be reluctant to join American led coalitions against regional actors, or otherwise be subject to untoward political pressures of some sort.

But neither the ballistic nor the tactical/theater missile is a unique agency for such political pressure. Nor will prospective anti-missile systems resolve such concerns. As the recent bombing of the World Trade Center suggests, no country is beyond the reach of a determined terrorist organization. The cost of maintaining the capability, even a worldwide network, to use incendiary devices against public facilities or commercial airliners is negligible compared to that of developing and deploying either Scud-type or long-range ballistic missiles.

Since it is the fear of attack that is at issue in terrorist threats, a system to protect against the use of ballistic missiles as terrorist weapons must be thoroughly reliable, which is to say essentially perfect. If only a few missiles penetrate a defensive screen, the terrorist achieves his goal. And no prospective anti-missile system can guarantee a contrary outcome.

He Who Has Missiles Has Countermeasures

The probability of countermeasures could prove just as stressful to the performance of tactical and theater defenses as it would be to that of strategic defenses. There are a range of relatively simple countermeasures that could readily defeat the even the most capable systems currently planned by SDIO. Such countermeasures are not beyond the reach of most countries capable of building their own ballistic missiles.

For example, one measure would be to replace the unitary warhead used on Scud-derivative ballistic missiles with multiple bomblets (similar to mortar shells). Instead of a single 1000 kilogram warhead, such a multiple warhead missile might be armed with eight 100 kilogram bombs, or dozens of 10 kilogram bomblets. Or the missile could carry dozens of canisters loaded with chemical or biological agents.

If the goal were simply to overwhelm the defense, a precision dispensing mechanism might not even be needed. While such errant submunition warheads would likely be too small and their impact too random to be of significant military value, they would still be effective as a weapon of terror.

The challenge of gaining access to the boost-phase of strategic ballistic missiles which has bedeviled Star Wars for the past decade is recapitulated at the tactical and

(continued on page 10)

Attachment 15

FRIDAY
September 10, 1993

Today's weather
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Tonight...A few
windward and mauka
showers.

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GAO: Move STARS to Vandenberg

By CHRIS ROSCHO

WASHINGTON, D.C.\- 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 Kaua'i.

In a report scheduled to be released on two weeks, auditors for the General Accounting Office will recommend the Pentagon use refurbished Minuteman I missiles launched from Vandenberg Air Force Base in Central California to complete the tests, congressional sources have told The Garden Island.

Such a move, the sources say, could cut the costs of the launches nearly in half, saving at least $5 million for each test of the Strategic Target System, or STARS.

The savings occur primarily because transferring the launches to Vandenberg would require using a different missile that is cheaper to refurbish and launch for the STARS tests, sources say.

The report is expected to bolster arguments made by critics of the Kaua'i launches that the tests would be less expensive and cause less damage to Hawai'i's pristine tropical environment if they were launched from existing facilities at the mainland Air Force base.

Vandenberg, located about 130 miles north of Los Angeles, was built primarily for housing military rockets into space and missing unarmed nuclear ballistic missiles.

The Army's Ballistic Missile Defense Organization, which conducts the tests, had planned to use refurbished Polaris submarine launched missiles fired from an outside range on Kaua'i.

But the environmental plan has brought criticism from environmental groups, area residents and native Hawaiians who charge that launches could affect the island's sensitive wildlife and damage sacred cultural sites.

Under the program, three-stage missiles such as the Polaris are fired from Barking Sands to the Kwajalein Atoll, just north of the Equator. As it nears the target, the missile launches small warheads similar to those the BMDO is trying to learn how to shoot down.

No live warheads or explosive weapons are used in the experiments.

The Sierra Club Legal Defense Fund has filed several lawsuits against the Army in an attempt to block further tests until the Defense Department completes a comprehensive study of the potential environmental effects.

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GAO

(Continued from Page 1)

The GAO report was requested by Rep. John Conyers, D-Mich., chairman of the House Government Operations Committee, who wanted the Pentagon to look at cheaper alternatives.

The GAO estimated that each STARS launch from Kaua'i costs $10 to $15 million, a congressional source said.

Auditors determined that the cost could be nearly halved to $5 million to $7 million by using Minuteman I launched from Vandenberg.

A spokesman for Conyers declined to comment on the report until it was publicly released.

Steven Aftergood, a space policy analyst with the Washington based Federation of American Scientists, said the report's finding would provide more incentive for the BMDO to switch to Minuteman missiles.

"The reduction of costs is not really due to the change in location, but the launch vehicle," Aftergood said. "It may be that this is the optimum solution. A large segment of the population in Hawai'i does not want the problem, and Vandenberg is eager to take it.

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House of Representatives

POLARIS MISSILE LAUNCH FROM THE ISLAND OF KAUAI

REMARKS BY REPRESENTATIVE PATSY T. MINK

The SPEAKER pro tempore. Under a previous order of the House, the gentlewoman from Hawaii [Mrs. MINK] is recognized for 60 minutes.

Mrs. MINK. Madam Speaker, I take the time this afternoon to address the House on a matter of grave importance to a very large segment of my congressional district. It has to do with the launching or the planned launching of a Polaris missile from the island of Kauai, from the Pacific Missile Range Facility at Barking Sands.

Under normal circumstances, I would have assumed that after the prolonged debate and discussion that we have had about these tests being launched from the island of Kauai, that perhaps the objections and the criticisms and the protests would have subsided over the long term. But the circumstances on this island are quite different today than they were even when this discussion first ensued back in 1990.

What has happened to the island is the devastating effects of the hurricane which hit the island of Kauai in September, on September 11, 1992.

□ 1210

The hurricane virtually changed the nature of the island as well as the feelings and sentiments of the people. Roughly two-thirds of the residential properties were severely damaged, and in many cases totally destroyed. The people have not been able to put their lives back together. The major economic opportunities for people on the island lay really in the hotel, tourist industry, and all of the corollary service opportunities that a large number of tourists to the island brought each year.

The hurricane hit the hotels with tremendous force, and most of them closed, with very little prospects that they will be able to open up for full business activity until much later this year. The unemployment rate, of course, has accordingly soared. People are truly concerned about their future. They thought at one time that they had a home for the rest of their lives, particularly the retired people who looked to their homes as fully paid with some degree of security. Many of them did not have insurance to cover whatever losses might ensue because their retirement incomes were not sufficiently adequate to pay the premiums on the insurance. Federal programs under FEMA were not adequate to even begin to rebuild these homes. And so many of our citizens there on Kauai are homeless. The economic potential for the island is severely curtailed because of what happened to us in September.

This is the climate and emotional makeup of the thousands of people who live on that island today. Curiously, one of the facilities that was not damaged, almost not at all, was the Pacific Missile Range Facility which employs many hundreds of persons who live on the island, and it is a foundation of employment opportunity and stability that does not exist in the rest of the island. And so people are looking at this issue of the proposed missile test with a great deal of worry and concern, and I think the backdrop of the hurricane experience explains this.

Nonetheless, there is still serious objection to going forward with the missile test. Right after the hurricane the military themselves decided to indefinitely postpone the launches which had been planned last fall because of the feelings and attitudes of the people on the island. But that time of postponement has ended, and we were advised recently that the military intended to proceed with the tests and, indeed, I have heard from people that the tests were supposed to have begun yesterday morning. That was the window of opportunity.

However, the Army yesterday decided, for some circumstances, some other reasons, not to do the test at all yesterday, but to wait for more satisfactory circumstances. So we believe that the test could occur maybe even perhaps at this very moment as I am addressing the House, or maybe in a day or two. But the window of opportunity on weather and so forth apparently ends on March 2. Meanwhile, the people on the island of Kauai was with considerable concern.

I would like to take the opportunity this afternoon to trace the development of our concern in the House and the steps that the Members of the Congress have taken to raise this issue to the persons in the military in particular, to congressional committees here in order to assure the people of the island of Kauai that what they were going to be exposed to had been studied with a very critical and cautious eye. It was May 17, 1990 that the Army announced that Kauai was to be the site of 40 strategic defense initiative missile firings under their new STARS Program. That means an estimated 40 launches over a period of 10 years. So the concern is not today's launch or tomorrow's launch or the launch that might occur a few days hence, it is a concern that is addressed over a 10-year period with 40 possible launches.

So the issues I raise today cannot be dismissed by a safe launch that may be occurring right at this moment, but about the rest of the 39 that are to come. Accordingly, reviewing the documents and the proposals, both Senator AKAKA and others from the delegation, including myself, made many requests for a full appraisal of the program, its safety and other considerations. They decided that they would respond to our requests, and submitted information very readily.

We raised the issues with our State government, and the State government concurred that there were serious questions, and the State of Hawaii Land Board chairman, Mr. Paty, expressed those concerns with respect to part of the launch area which was to take place over State property, and so the State government got involved.

We then began a very serious inquiry as to the environmental hazards, the hazards that might occur in the buffer areas, the hazards with reference to the fuel that was to be used, the exposure to the island for the fallout of hydrogen chloride and other harmful chemicals.

Accordingly, on September 23 and 24, Senator AKAKA and myself introduced a bill mandating the Army to conduct a complete environmental impact statement [EIS] before proceeding fully with this STARS launch off of the Pacific missile range of Kauai. We pushed the bill, we discussed the matter, wrote letters to the various committee chairs, and eventually in a series of discussions with the heads of the committees and various other people, we were able to move the bill forward and to get the Congress of the United States to include it in the bill relating to defense appropriations. That was on May 14, 1991, where we were to able to come to an agreement in a sense of the Congress amendment in the House of Representatives that an EIS ought to be conducted. In this case only environmental assessment had been done, which in our opinion was not complete.

So with the conjunction of both the House requests and the Senate requests, a final decision was made that indeed a full EIS had to be done.

There were many considerations that were raised during the discussions, one having to do with the aging, 20-year-old plus Polaris missiles that were to be utilized, whether their safety was assured, why we had to expose the island with these aging, leftover missiles that were not useful for other programs. We discussed a great deal about the potential damage of the impact of hydrogen chloride on the community as part of the fallout, and of course on the buffer areas.

In Hawaii, we have a very serious issue that is being debated every day, and that has to do with the question of the sovereignty of the authority of the native Hawaiian population. I do not have the time this afternoon to go into a discussion about the importance of this issue to the State of Hawaii and its citizens, and of the important of all of us to recognize that the issues they raise are of critical importance to the future of our State. Involved in this debate regarding the missile launch are lands that belong to the native Hawaiians.

□ 1220

And, therefore, they are very much involved, that they have not been consulted, that they will have a direct impact on these lands if the tests go forward. So we have a multiplicity of issues that need to be looked at.

In any event, the EIS was required and proceeded in regular order. The difficulty in EIS's, I think that most Members have experienced and certainly people who are dealing with EIS's in a local community, it is always difficult to penetrate through the EIS process, because those who produce the EIS process by and large are the proponents of the projects, and so no matter the persistence of our questions with reference to the environment and to safety issues, in the end result when the EIS was finally produced after a year-long process in May 1992, the EIS conclusion was that the tests were perfectly safe, that all hazards and alternatives had been discussed and that, therefore, the testing should proceed, and the Army Strategic Command issued that final EIS on May 24, 1992.

Subsequently I submitted a number of questions which really were not answered. They have to do with the projected safety of the launch itself. Within the EIS document there were repeated suggestions that the safety factor was as high as 93 and 97 percent. There was no substantiation for those statistics, and so we have submitted a number of letters, a number of inquiries to the strategic command asking verification for these safety factors, which is really the crux of my interest in this whole issue.

I want to be certain that everything has been done and will be done to assure the safety of these launches. All of us know and have read headlines of missile launch failures and of the lack of explanation as to where they occurred, whether it was lack of preparations in advance or some technical difficulties that were encountered during the launch, but launch failures are a reality. We read about them often in the newspapers. So long as they do not occur in our backyard, it is a news item of interest.

My point here is that so long as the command and the EIS can only speak about 93-percent to 97-percent assurance of safety, what does that mean when we are talking about 30 launches? We are talking about the possibility that 1 out of the 40 may misfire. Under those worst case scenarios, what does that mean for a small island community that does not have, in my estimation, a large enough buffer area around the facility to protect and assure the safety of the community?

All of us in the State of Hawaii are very much involved in the whole idea of expansion of economic opportunities and stabilizing their research, technical facilities, whether they are related to the military or not. This is not a matter of being against a military effort or a military test or anything of that kind. It is a fear that we have not been given the full and final assurances from the strategic defense command as to their ability to prepare the community for any misfires, and misfires do occur.

Recently we were told that there are some changes, internal changes, being made to the launch program. And if that is the case, then it seems to me that we ought to be talking about a further hard look at the environmental consequences.

I received a letter from a Michael Jones who is a very distinguished scientist, professor at the University of Hawaii. And he wrote to me recently in a letter dated February 11 in which he said that he had learned within the past week that the Talos booster used for the Navy Vandal launcher, which is covered and included in the permit which will be allowed at the Kauai facility, emits about 45 pounds of lead in its exhaust. That issue is not covered in the EIS and not studied in terms of its environmental consequences.

One other paragraph in Michael Jones' letter which I thought was especially noteworthy for our concern and consideration was where he says from his letter, "From the information available on the SDI experiments to be launched by STARS, it seems that the main focus is on weapons and sensors that could be used against multiple-warhead ICBM's which are banned by the START II treaty. I believe," he says in his letter, "that the best way to deal with this threat is to ratify START II and to help the Russians get rid of these missiles as soon as possible. At the least, it seems to me that there needs to be a reevaluation of the goals and scope of SDI and the implications of developing GPALS," with which the Kauai launch is associated, "whose multiple ground-based sites and space-based weapons would violate the ABM treaty. Until this reevaluation is done, the importance and urgency of the tests to be launched by STARS," Kauai, "is at best dubious."

I think that is the note upon which I want to end my comments today, and that is that lawsuits have been filed by the Sierra Club and other groups. Injunctions have been filed by citizen groups. The State government got involved in one of the lawsuits to try to bring greater understanding and clarity and appreciation of what the consequences might be to this small island if there should be a mishap.

And despite all of these efforts, the courts have cleared the way for the launches to occur. There appears to be very little that we can do to stop this activity.

There are 40 launches planned over a 10-year period, and so the debate only begins, it seems to me, and the crux of the matter is not this one small aspect of the SDI program or this one small test that may or may not occur this week. What is at issue which needs to be addressed by the whole House and by the Congress and by the Clinton administration is what do we do about the whole strategic defense program, the SDI program in toto.

I understand that there have been reductions and cuts proposed in the new administration's budget, but it seems to me that the changing circumstances worldwide have not been interpreted in terms of our defense strategic planning or testing or mobilizing our limited resources, and it is time that we do that. We have the opportunity, and I believe that the American public in electing a new administration is making that call upon us as a partner with that administration to make sure that the critical questions are asked.

That to me is the approach that we in Hawaii must take. We must call upon this House and this Congress as a whole and the administration to ask ourselves and to answer the question as to what are we going to do different because of the changing circumstances worldwide. Certainly even when the SDI program was first discussed and instituted and suggested, there were people that were saying that it was not feasible, not reasonable, too expensive, not geared to the immediate realities of our defense requirements. Certainly, if that argument prevailed at that point some years ago, the circumstances that have changed today require us to look at this.

Billions of dollars can be saved, and the hazard that is now a part of the whole unevaluated continuation of this program because moneys are there seems to be unjustified, and so I call upon my colleagues of the House, as we review the budget and as we analyze the needs for these programs in the strategic area, that we concentrate upon the SDI program as to its necessity, its reasonableness, and whether it is focused on what our needs are today in this part of the century.

I think if we do that, we will come out with an answer which will terminate this program which has been my long-enduring objective from the very beginning.

DEPARTMENT OF THE ARMY
U S ARMY SPACE AND STRATEGIC DEFENSE COMMAND
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REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

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

Dear Ms. Antolini:

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 (USASSDC) is responding in 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 revisitation 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 discolored 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 below, 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 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 "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

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 Easement EIS satisfies the HEPA and its implementing regulations.

The United States, by incorporating by reference its previous environmental studies, has, in effect, made the analyses contained therein an integral part of the analysis in this Restrictive Easement EIS. This has accomplished the same purpose as republishing this material under a common binding and title with the current document. While the Hawaii environmental laws and regulations did not anticipate this precise scenario, their primary intent of ensuring complete analysis of relevant environmental issues, opportunity for public review and comment, and an informed decision-making process has been achieved.

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 restrictive easement. 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 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, 1992b;c). 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 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 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 Target System Final EIS on page 2-20 (U.S. Army Strategic Defense Command, 1992c) notes that the calculation of a 97-percent overall system reliability combines both key and non-key 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 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.

The reliability of the Talos booster, which is the same booster used for the Vandal rocket, has been addressed in a previous environmental document (ZEST Flight Test Experiment Environmental Assessment) which has been incorporated by reference in the Restrictive Easement EIS. The unparalleled safety record of Vandal launches from these facilities attests to the adequacy of the analyses and procedures for protecting public health and safety employed in launches from the PMRF. 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. Regardless of what reliability figures one assumes or imputes for the Vandal, the launch record of Vandal speaks for itself: while several Vandal launches have failed to complete their flights, none has resulted in injury to the public. Regarding the issue of delaying potential activation of the missile destruct system for 6.5 to 8.0 seconds, it is necessary to take into account the fact that the Vandal missile is launched from a rail. Given the ballistic trajectory imparted to the Vandal by the time it leaves the rail, it is physically impossible for the Vandal to reverse direction within the first 8

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 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 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 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, 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, prior to the launching of Strategic Target System missiles, these launches went 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: Inadequate 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 base and provides ample, open public access to these shoreline areas for fishing, surfing, and general beach activities. With regard to 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 count, 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 EIS 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 at the last minute because of ground clearing activities. The nature of the restrictive easement, the analysis 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 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 infrequent; 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, 26 February 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 of 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 some 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 Polihale or Lower Saki Mana roads needed to be avoided for several hours, there are numerous detours that would be available using the network of cane haul roads that criss-cross the entire area. Thus, an inadvertent closure from an unlikely flight 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 Waimea-Kekaha area (see comments of Jimmy Tehada provided in Appendix D of the Final EIS) indicates that the lands adjacent to the PMRF 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 (military, recreation, and agriculture) which have historically tried 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" Polihale 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, infrequent 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 Polihale State Park should cease because of these temporary interferences with the wholly unfettered use of Polihale State Park. The United States recognizes the existence of three coexisting land uses in the GHA and has attempted to properly evaluate and implement ways to ensure the compatibility of these three 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 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 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 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 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.

Air quality issues were exhaustively examined in the Supplement to the Environmental Assessment for the Strategic Target System and the subsequent EIS. Rocket Exhaust Effluent Dispersion Model (REEDM) 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 (SPEGL), 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 (7.5 mg/m^3). 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 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 0.025 ppm (Aki, 1991; Sugihara, 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 SPEGL provides the appropriate standard to determine a health-based risk from HCl 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 combust before reaching the earth's surface. Should some of the uncombusted 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 uncombusted propellant will be removed in accordance with the cleanup procedures described in the Strategic Target System EIS, which essentially involves picking 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 preset timing regimens, 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 Polihale State Park would be trapped given the network of cane haul 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 Polihale State Park, however, the PMRF 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 postulates the potential for a "full-fledged 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 PMRF 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 improbable. 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 Restrictive Easement EIS catalogues and addresses the potential impacts on all rare and endangered species within the region of influence. The U.S. Government agrees with the Sierra Club that many of these species have been adversely affected by human-related activities along the coast, such as off-road vehicles and trampling by humans. However, on the west side of Kauai, these impacts are observed mostly in Polihale State Park as the result of park users, not military operations. The U.S. Government has demonstrated great care in its conduct of launch operations to minimize to the maximum extent possible any deleterious effects on rare species including the transplantation of the ephemeral species *Ophioglossum concinnum* found near the Strategic Target System launch site. 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 USASSDC, Department of Energy, and SNL 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 (Sepio, 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 converting these lands to 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 it 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 fleet training and test and evaluation in Hawaii. The PMRF serves as a 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 user, 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 $5 to $7 million. Furthermore, as a result, the PMRF would lose approximately $5.5 million in funds, and the local economy would lose approximately $2.5 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, moving 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.

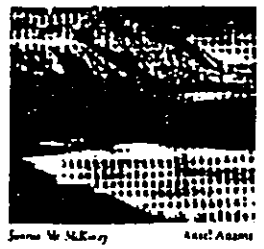
Comment 12: The Draft EIS fails to discuss the use of public funds for the proposed action and reasonable alternatives.

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(e)(4) that refers to the use of public funds relates to the

statutory provision in HRS Section 343-5(1) 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. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets



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Washington, DC

September 24, 1993

BY HAND DELIVERY

Ms. Linda McCrerey
Department of Land and Natural Resources
Post Office Box 621
Honolulu, Hawai'i 96809

Re: Supplemental Comments on Draft EIS for PMRF Easement Over State Lands

Dear Ms. McCrerey:

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

3. Column by Jack Anderson, "Conyers Takes Aim at Missile Tests," The Washington Post, September 23, 1993.

Ms. Linda McCrerey
September 24, 1993
page 2

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(e)(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.

Very truly yours,

Denise Antolini

Enclosures

cc: Linda Ninh
U.S. Army Space and Strategic Defense Command
Post Office Box 1500
Huntsville, Alabama 35807-3801

ONE HUNDRED THIRD CONGRESS

Congress of the United States

House of Representatives

COMMITTEE ON GOVERNMENT OPERATIONS

2157 Rayburn House Office Building

Washington, DC 20515-6143

September 17, 1993

The Honorable Les Aspin
Secretary of Defense
The Pentagon
Washington, D. C. 20301

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.

<u>Eliminating the Obsolete</u>

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-exoatmospheric interceptor -- have now been canceled or reduced to basic research programs. Further, 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 minimum 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:

Development, FY 1985-1993	$183.1 million
FY 1994 Request	27.0 million
Total Annual Operational Cost FY 1995-98 (@ $20M/yr.)	80.0 million
Launch Costs, FY 1995-98 (5 launches @ $10.9M)	54.5 million
TOTAL COST FY 1985-98	$344.6 MILLION

As you know, the original plan to launch 40 STARS missions was cancelled last year. With the cancellation of the National Missile Defense system and the elimination of the need for six STARS missions for planned integration tests 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.

False Claims

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 5 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 25, could have been fired from a Minuteman III from Vandenberg Air Force Base in California at a savings of over $1.5 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 $14.1 million a year. Are we really paying $256,000 per engineer, to respond to hypothetical "anomalies" 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) 225-5147 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,

John Conyers, Jr.
Chairman
Legislation and National Security
Subcommittee

Enclosure

cc: Honorable Ronald V. Dellums
Honorable John P. Murtha
Honorable Sam Nunn
Honorable Daniel Inouye

GAO

United States
General Accounting Office
Washington, D.C. 20548

National Security and
International Affairs Division

B-223094

September 13, 1993

The Honorable John Conyers, Jr.
Chairman, Legislation and National
Security Subcommittee
Committee on Government Operations
House of Representatives

Dear Mr. Chairman:

This letter presents information you requested on certain aspects of the Ballistic Missile Defense Organization's[1] (BMDO) plans to launch Strategic Target System (STARS) boosters carrying targets and other experiments from Kauai, Hawaii. Specifically, you wanted to know (1) what the cost of the STARS program is, (2) what the cost of a catastrophic failure would be, and (3) whether planned STARS missions could be accomplished from launch sites other than the Kauai site.

Background

STARS is a BMDO program managed by the U.S. Army Space and Strategic Defense Command (SSDC). 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 would be depleted by 1988. SSDC tasked 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 check-out flight, was successfully launched in February 1993.

Results in Brief

BMDO will have spent about $183.1 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 or targets will pay the estimated $6.9 million for each STARS I launch and $10.9 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.

[1]Formerly the Strategic Defense Initiative Organization.

B-233094

Expenses related to a failed launch would be related primarily to clearing 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. SSDC officials have taken actions to contain debris from a failed launch within an established hazard area.

Twelve more STARS launches from Kauai are scheduled through fiscal year 2003—one a year except for two in fiscal years 1995 and 1998 and none in fiscal year 1997.[2] 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 degradation 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 6 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.

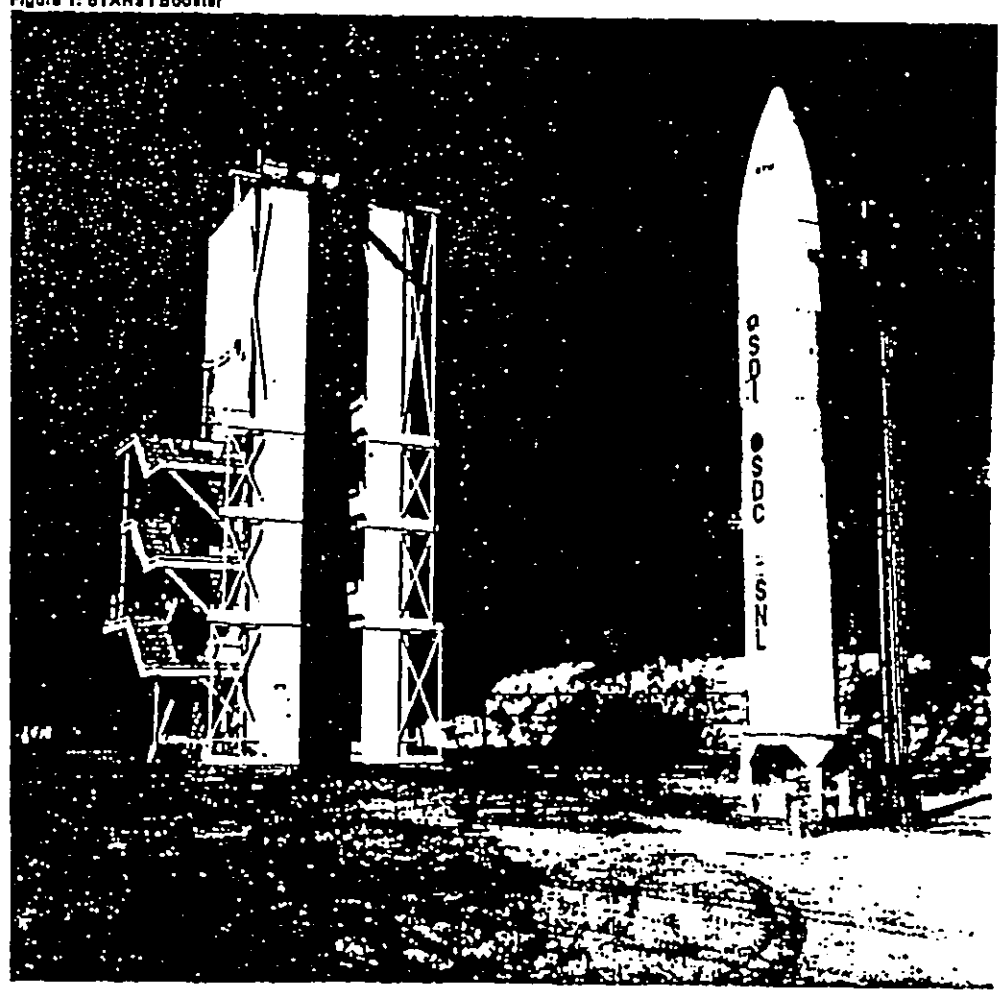
STARS Program

STARS I consists of refurbished Polaris first and second stages and a commercially procured Orbus I third stage. STARS I can deploy single or multiple payloads, but the payloads cannot be deployed in a manner that simulates bussing. To meet this specific need, Sandia developed an Operations and Deployment Experiments Simulator (ODES) post-boost vehicle.[3] When ODES is added to the three STARS I stages, the configuration is designated STARS II. (See figs. 1 and 2 for photographs of the STARS I booster and the ODES structural test unit.)

[2]Mission 2 was successfully launched on August 28, 1993.

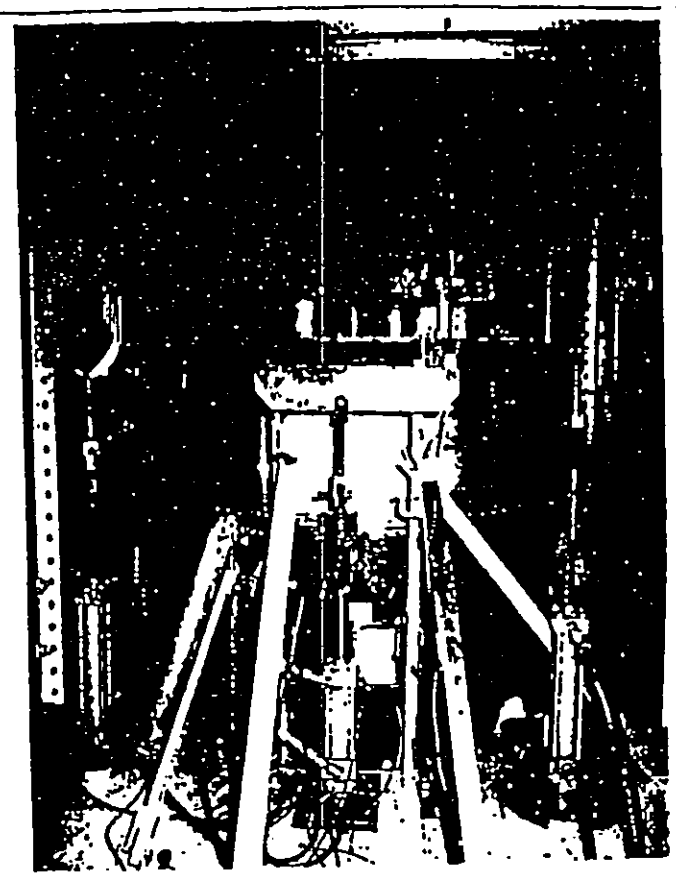
[3]A post-boost vehicle, also referred to as a "bus," is that portion of a missile payload that carries multiple warheads and which has the maneuvering capability to independently target each warhead on a final trajectory toward a target.

Figure 1: STARS I Booster



Source: SSDC.

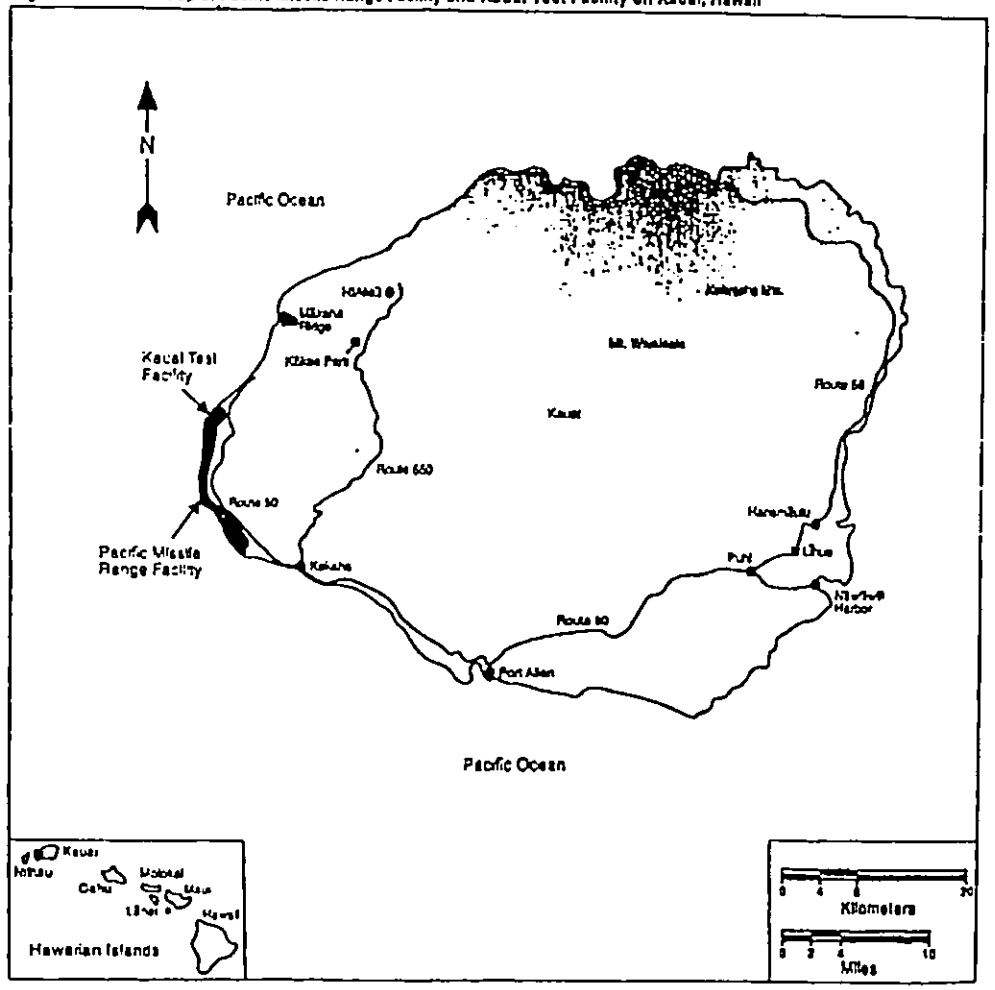
Figure 2: ODES Structural Test Unit



Source: SSDC.

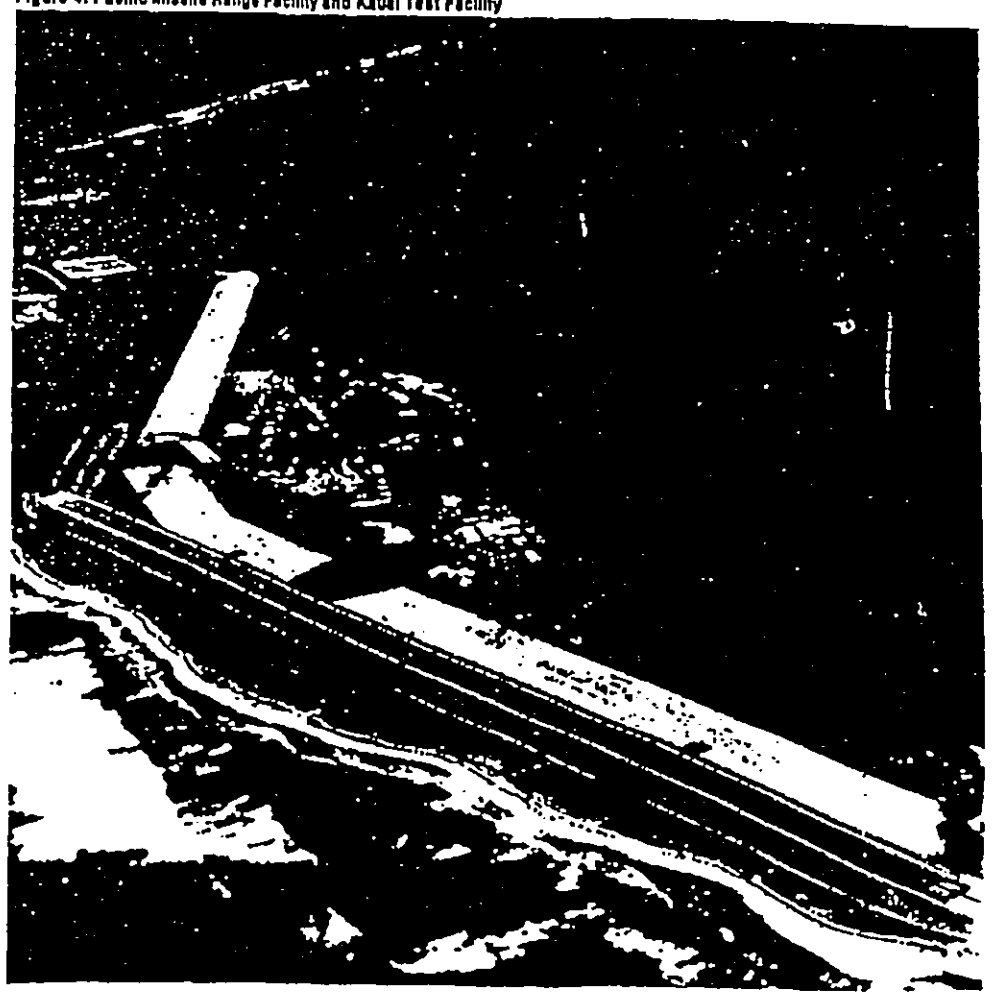
The STARS launch facility is located on Kauai (see figs. 3 and 4). The booster's range, about 2,500 miles, is about the same as the distance from Kauai to the Kwajalein Atoll in the Marshall Islands, the intended destination. Kwajalein, where sensing and other tracking devices are located (see fig. 5), is one of two designated test ranges under the Anti-ballistic Missile Treaty. The other, White Sands Missile Range, is inadequate for the types of tests planned for STARS.

Figure 3: Location Map of Pacific Missile Range Facility and Kauai Test Facility on Kauai, Hawaii



Source: SSDC.

Figure 4: Pacific Missile Range Facility and Kauai Test Facility



Source: SSDC.

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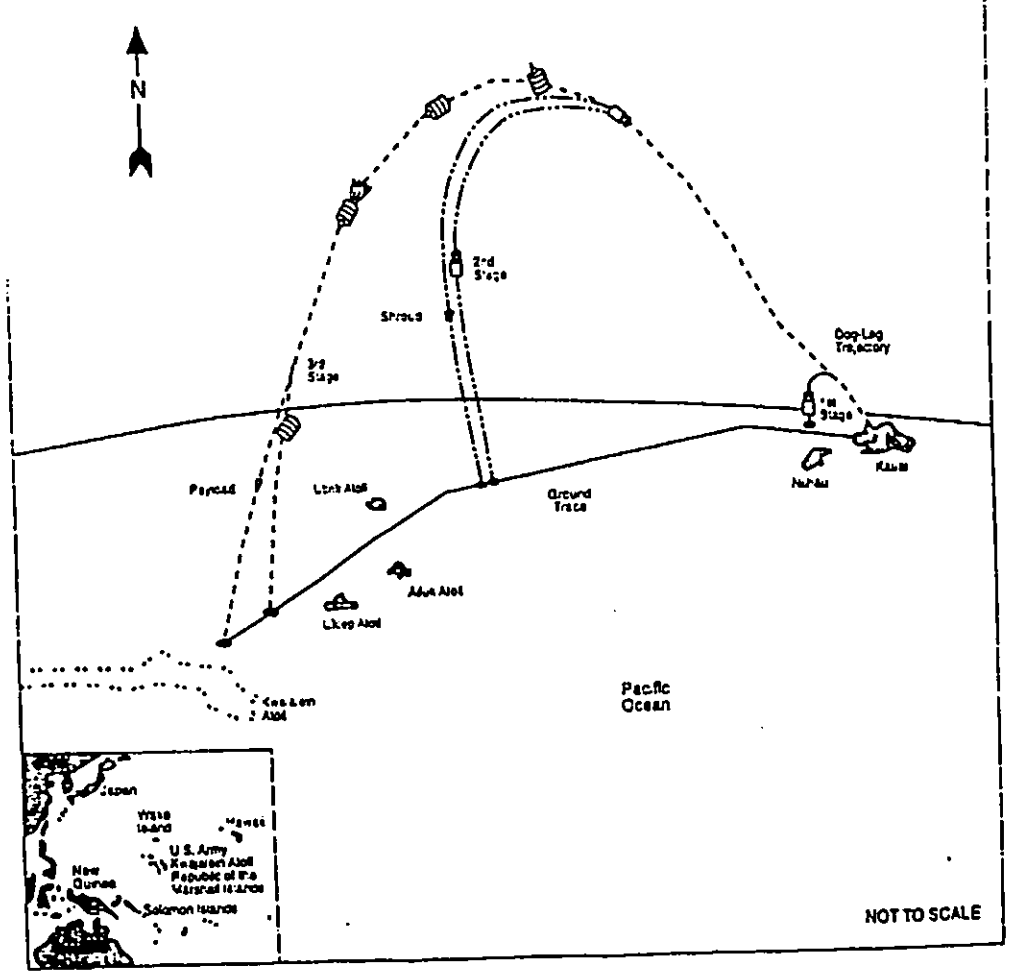
Figure 6: Representative STARS Mission Profile



Source: SSDC.

BMDO's plans for launches at Kauai 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 STARS launches 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, STARS will support national missile defense system integration tests. If the schedule for developing a national missile defense system slips, requirements for STARS-launched targets could also slip.

Table 1: STARS Mission Schedule and Feasibility of Achieving Primary Test Objectives at Alternative Launch Sites

Mission	Launch schedule by fiscal year											Primary test objectives could be met at alternative launch sites
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	
STARS I check-out flight	1[a]											Launched in Feb. 1993
Reentry vehicle experiment	2											Yes, if decision had been made prior to May 1993
ODES check-out flight		3										Yes
Midcourse Space Experiments			4 5									Yes
Ground-based radar				6								Unknown
Brilliant Eyes						7						Yes
System integration tests							8	9	10	11	12 13	Unknown

[a]Numbers shown represent mission numbers.

STARS Program Cost

The STARS program consists of two phases—development and operational. The development phase is expected to cost $169.1 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, BMDO project offices will pay an estimated $6.9 million and $10.9 million to launch experiments on STARS I and II boosters, respectively.

B-223084

Development Phase Costs

BMDO will have spent $183.1 million to develop STARS by the end of fiscal year 1993 (see table 2). Sandia, with a current staff of about 55 employees assigned to STARS, has received $140.3 million of this amount. About 33 percent of the funds will go to subcontractors, according to Sandia.

Table 2: Funding for Development of STARS

Dollars in millions

	Fiscal year						
Item	1985-88	1989	1990	1991	1992	1993	Total
Sandia National Laboratories:							
STARS launch vehicle[a]	$28.1	$13.4	$11.7	$17.6	$16.2	$15.6	$102.6
ODES	3.3	0.2	8.9	7.8	10.9	6.6	37.7
Range development	0	1.8	1.5	6.3	7.9	6.0	23.5
Site construction	5.8	0.4	0	0.6	0	0	6.9
Miscellaneous	0.7	0.2	1.5	3.2	3.4[b]	3.5[b]	12.5
Total[c]	$38.0	$16.8	$23.6	$35.8	$38.4	$31.7	$183.1

[a]See table 3 for details.

[b]In fiscal year 1992 the Department of Energy, Sandia's owner, began charging a 3.2 percent surcharge on funds going to Sandia. The amount retained in fiscal year 1992 was $1.1 million, which included a surcharge of about $158 thousand on fiscal year 1991 funds not used until fiscal year 1992. The fiscal year 1993 charge was $3.7 million. These funds are included in the miscellaneous line.

[c]Totals may not add due to rounding.

STARS

Through fiscal year 1993, BMDO has provided $102.6 million to Sandia to develop the launch vehicle (see table 3). The major pieces of the launch vehicle's hardware are

- the retired Polaris first and second stage motors,
- the Orbus third stage motor,
- the electrical and mechanical hardware to integrate the three stages, and
- the guidance and control subsystem.

Table 3: Sandia's Cost for Development of STARS

Dollars in thousands

	Fiscal year						
Item	1985-88	1989	1990	1991	1992	1993[a]	Total
Funding received from BMDO:							
Funding brought forward	$0	$82	$460	$557	$5,619	$8,442	
Current year funding (see table 1)	28,141	13,364	11,686	17,562	16,205	15,609	$102,567
Total available	28,141	13,446	12,146	18,119	21,823	24,051	102,567
Funding spent:							
Project engineering	18,074	6,321	8,429	6,134	2,554	2,128	43,640
Refurbishment of Polaris stages	6,185	4,230	666	958	876	2,014	14,949
Modify STARS for OCES	0	0	11	1,567	3,935	5,210	10,723
Guidance and control subsystem	2,595	1,442	1,393	1,850	660	1,328	9,268
Kwajalein Range support	1,171	888	720	299	1,013	466	4,557
Launch operations	3	0	51	677	1,419	2,372	4,522
Range flight safety	31	105	299	352	371	232	1,390
Operational flight support	0	0	0	664	2,553	3,238	6,455
Total spent	28,059	12,986	11,569	12,501	13,381	18,988	95,502
Funding carried forward	$82	$460	$557	$5,618	$8,442	$7,065	$7,065

[a]Fiscal year 1993 costs are projected based on costs incurred during the first half of the year.

For project engineering, Sandia used $43.6 million (see table 3). It used $30.6 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 Orbus motors through a subcontract for $6.4 million to United Technologies.[4]
- 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 practice 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.

[4]BMDO purchased the Orbus motors with other BMDO funding for about $1 million each.

- Preparation of analyses to support preparing an environmental impact statement.

For refurbishment of retired Polaris missile stages, Sandia used $14.9 million (see table 3). About $6 million was spent in-house and $9 million was paid to subcontractors—$4.8 million to Aerojet and $2.2 million to Hercules to do the refurbishment process for Polaris first and second stage motors, respectively. Under the direction of Sandia, Aerojet and Hercules have refurbished 11 first stage motors and 10 second stage motors. Aerojet 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) STARS-unique ground support equipment. Sandia also used Lockheed's Missile and Space Division, the Polaris motor developer and the Navy's designated caretaker for the system, as the consultant for all booster integration testing and problem analysis. Sandia developed, 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 STARS I configuration to accommodate ODES (see table 3). The funds were primarily spent in-house to design, fabricate, and test all electronic and mechanical interfaces on STARS I 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, about $8.1 million was spent in-house to develop, code, and verify guidance and control algorithms and software; design the guidance and control component; and conduct various component and system tests. Component tests included shock and altitude 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.

ODES

BMDO provided $37.7 million through fiscal year 1993 to Sandia to develop ODES (see table 2). These funds will be used primarily for engineering design, analysis, testing, and the production of ODES post-boost vehicle hardware. Sandia's project engineers (1) designed all ODES structural,

electronic, and propulsion components, (2) conducted special studies related to resolving technical problems associated with ODES design, (3) designed payload interfaces for various BMDO user experiments, 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 $3.7 million to obtain ODES 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.

Range Development

BMDO will have spent $23.5 million through fiscal year 1993 for operating test ranges and for upgrading the Pacific Missile Range Facility (see table 2). According to the SSDC manager responsible for the STARS program, about $14.9 million will have been used to operate the Pacific Missile Range Facility (up-range 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 remainder (about $8.7 million) will have been used primarily to (1) upgrade the microwave voice transmitters and receivers linking a tracking station to the launch site, which provided an improved in-flight safety analysis capability; (2) upgrade STARS telemetry processing to improve telemetry screen displays for operators to enhance range safety; and (3) augment radar communication at all STARS radar/communication sites to increase data processing capabilities of encrypted ODES missions.

Site Construction

BMDO has spent $6.8 million for construction projects (see table 2). Most of the construction funds were used for two projects—$5.8 million in fiscal year 1987 for launch operations and missile assembly buildings, a missile service tower, and a launch pad at the Kauai Test Facility and $0.6 million in fiscal year 1991 for oxidation, fuel, and decontamination facilities for ODES.

Miscellaneous

BMDO will have spent $12.5 million for various program support activities (see table 2). These funds will have been used primarily for (1) booster transportation and storage at contractor and government facilities during the refurbishment, integration, and launch operation process; (2) studies documenting the environmental impact of STARS launches from Kauai; and

(3) basic project office engineering and technical assistance support contracts.

Operational Phase Costs

Check-out flights of STARS will be completed in fiscal year 1994, and the operational phase of supporting testing will start in fiscal year 1995. SSDC's Strategic Targets Office manager estimates that the annual STARS operational phase budget will be about $17.8 million for fiscal year 1995 and $17 million to $20 million (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 STARS work force of about 55 engineers and technicians. According to the STARS program manager, this level of staffing is needed even though plans for most years are to only have one STARS launch. The program manager stated that the engineers and technicians will be used to plan for future STARS missions and to conduct hardware fixes of any anomalies noted on completed missions.

The first five ODES flights will use surplus National Aeronautics and Space Administration motors. Then, BMDO plans to begin using a replacement motor that it will develop. It plans to spend about $4.6 million over a 2-year period beginning after fiscal year 1994 to develop the replacement motor; $2.3 million is included in the $17.8 million total for fiscal year 1995.

In addition to the above costs, STARS users will pay an estimated $5.9 million for each STARS I mission and an estimated $10.9 million for each STARS II mission, beginning with the first launch in fiscal year 1995. The STARS I estimate is based on $5 million for hardware refurbishment and procurement (three missile stages and a guidance and control section) and about $0.9 million for Sandia mission support, booster transportation, and government and contractor travel and subsistence. A STARS II mission will cost about $10.9 million, including all costs associated with a STARS I mission plus $5 million for ODES hardware and related integration of ODES with the STARS I. 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. SSDC officials have taken actions to contain debris from a failed launch within a specified hazard area.

Up to $5.4 million could be spent after fiscal year 1993 to obtain an easement for a 9-year period 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 easement, 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 down range of Kauai over the ocean (launch hazard area).[3] The ground hazard area consists of land contained within a modified 10,000 foot radius arc from the launch pad (see fig. 6).

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 officer 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 skyscreens—visual sighting devices containing flight boundary lines—to verify the missile's flight path during the first 25 seconds of flight. To terminate a launch, the range safety officer would send a flight termination signal that would ignite flexible linear-shaped charges placed within the booster.

[3]The launch hazard area is based on the flight path that is used, which for the first mission was 260 degrees. Individual plans for each launch will be prepared that will show a different launch hazard area if a different flight path is planned.

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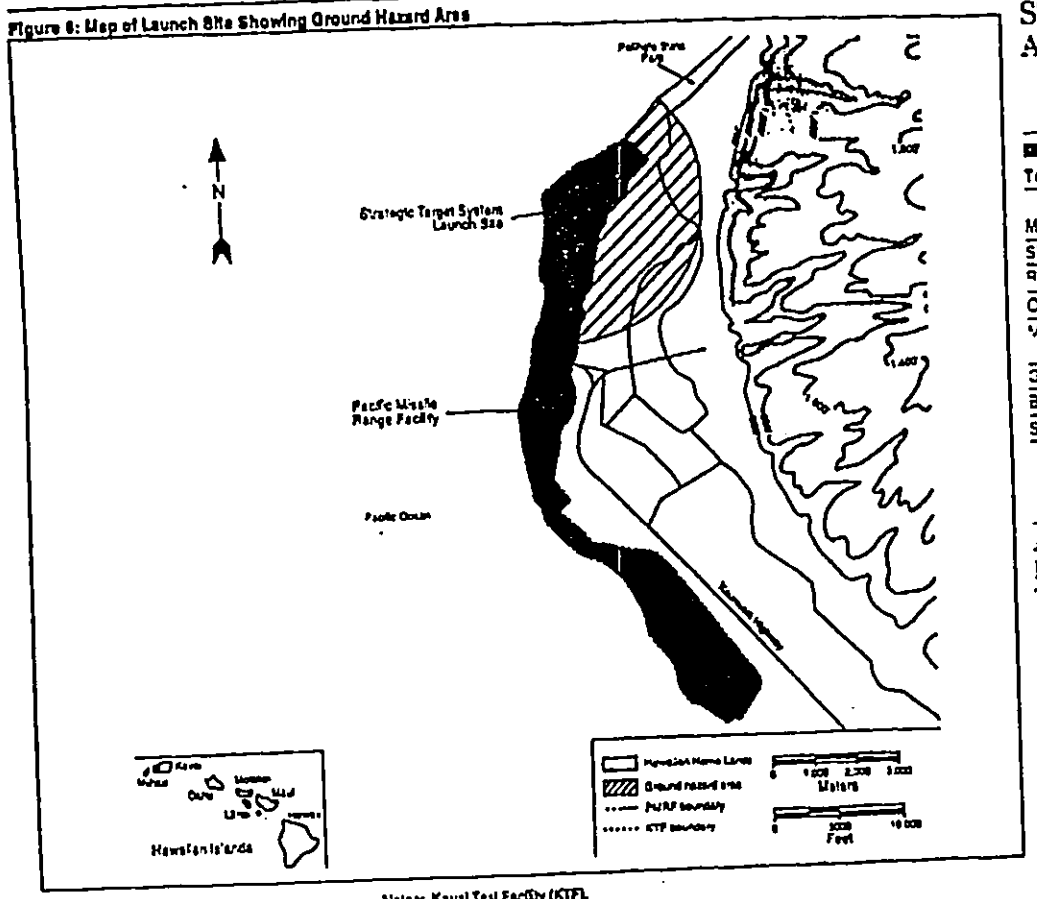
Figure 6: Map of Launch Site Showing Ground Hazard Area



Notes: Kauai Test Facility (KTF).
Pacific Missile Range Facility (PMRF).

Source: SSDC.

STARS Missions and Available Alternatives

The first STARS flight, a hardware check-out flight, was successfully launched in February 1993. BMDO 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 4: STARS Mission Schedule

	Fiscal year										
Mission	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
STARS I check-out flight	1										
Reentry vehicle experiment	2										
ODES check-out flight		3									
Midcourse Space Experiments			4 5								
Ground-based radar				6							
Brilliant Eyes						7					
System integration tests						8	9	10	11	12	13

Note: Numbers shown represent mission numbers.

Alternatives to STARS Launches for Missions Two Through Seven

BMDO 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 BMDO Director decided, based on this evaluation, that BMDO 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, BMDO'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 hazard area for STARS 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 BMDO deputy director in December 1992 directed that a study be conducted to determine whether missions 1, 3, 4, and 6 could be launched on a STARS booster from elsewhere and the

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impacts on the mission of doing so.[8] This study, however, was canceled after the court did not grant a preliminary injunction in a January 25, 1993, decision, and the initial STARS check-out flight was successfully launched in February 1993.

We contacted project officials who are responsible for the missions that were addressed in 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 2, 6, and 7 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 1993; and
- the alternative possibilities for mission 6 are unknown because they have not been seriously evaluated. (See table 1.)

Table 5 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 I.

Table 5: Alternatives to Launching From Kaual

Scheduled STARS missions		Alternatives to Kaual launch site					
Through 1998 by mission number	Launch vehicle	Launch vehicle	Launch site location	Use ship-based radar	Mission degradation	Schedule impact	Additional cost
2	STARS-I	MM III	Vandenberg, Calif.	Yes	No	No	No
3	STARS-II	STARS-II	Vandenberg, Calif.	Yes	Yes[a]	Yes	Yes
		STARS-II	Wallops Island, Va.	Yes	Yes[a]	Yes	Yes
		STARS-II	Eastern Test Range, Fla.	Yes	Yes[a]	Yes	Yes
4	STARS-II	STARS-II	Meck Island, Pacific	No	Yes[a]	Yes	Yes
		STARS-II	Vandenberg, Calif.	Yes	Yes[a]	Yes	Yes
5	STARS-II	STARS-II	Meck Island, Pacific	No	Yes[a]	Yes	Yes
		STARS-II	Vandenberg, Calif.	Yes	Yes[a]	Yes	Yes
6	STARS-II	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
7	STARS-II	MM II	Vandenberg, Calif.	Unknown	Yes[a]	Unknown	Unknown
		Freeburd	Wallops Island, Va.	Unknown	Yes	Unknown	Unknown

[a] Primary test objective(s) could be accomplished; degradation would occur in secondary and tertiary test objectives.

[b] The mission 2 payload could have been placed on a Minuteman III that was going to be launched from Vandenberg 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 $3.5 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 is no longer an option because BMDO had to commit to the Minuteman III launch before May 1993. 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 6. An analysis of mission 7, which was being conducted by the Brilliant Eyes project office, was terminated after the court cleared the way for the first launch in February 1993.

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 USNS 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 facilities 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 Vandenberg or Meck Island, which would require funding and time to complete.

Alternatives to STARS Launches for Missions Eight Through Thirteen

BMDO plans to use STARS to launch targets from Kauai to Kwajalein to support six of its national missile defense system integration tests—one a year from 1998 through 2003. According to a BMDO official, Minuteman II boosters will be used to launch targets for the other system integration tests. The overall objective of integrated testing is to determine if the system's components—the ground-based interceptor, the ground-based radar, the battle management system, and possibly the Brilliant Eyes sensor—are properly integrated and will function together as designed. The specific objectives of the six tests using STARS-launched targets have not yet been determined by BMDO. Accordingly, we could not assess whether alternatives exist to these planned STARS launches from Kauai th. would allow the unspecified missions supported by these launches to be successfully accomplished. The planned schedule for these launches cou

slip if an ongoing "bottom-up" review of Department of Defense programs by the Secretary of Defense results in less emphasis being placed on developing and deploying a national missile defense system.

Potential Use of Trident I C4 Boosters for Launching Targets

BMDO is discussing with the Navy the possibility of obtaining Trident I C4 boosters, some of which are being replaced in the fleet with Trident D5s, for use as another integration testing launch vehicle. It is also studying whether the C4 can be modified to carry the STARS bus or whether the C4 bus can be used for deploying targets. The Navy has indicated a willingness to provide enough C4s to more than cover current requirements for bus-deployed targets. The C4 could carry targets from Vandenberg Air Force Base to Kwajalein.

If used as a target launch vehicle, the C4 will be subject to the Strategic Arms Reduction Treaty (START) I because BMDO has determined that electronic telemetry transmitted from the booster's bus to the ground needs to be encrypted for security reasons. Under START I, waivers to the electronic telemetry encryption restriction are provided for up to 11 test missions a year of which no more than 4 test missions may be of a type of ICBM or submarine-launched ballistic missile (SLBM) ever flight-tested with a post-boost vehicle, such as the C4. Additionally, START I limits waivers to the telemetry encryption restriction to no more than two encrypted flights on an existing type (i.e., operationally deployed) ICBM or SLBM, such as the C4. Although the Navy may retire the C4, until all C4 operational missiles are retired and all C4 launchers are eliminated or converted to another SLBM type in accordance with START provisions, BMDO cannot encrypt the telemetry from more than two test missions annually.

According to BMDO officials, STARS is exempted from START I and is also exempted from the START II provision that will prohibit, possibly as early as the year 2000, ICBM flight tests carrying more than one reentry vehicle. STARS is exempted because, for START purposes, STARS is considered to be a booster used only for research and development purposes subject to the 1987 Intermediate-range Nuclear Forces Treaty.

BMDO officials estimated that it could take up to 4 years to develop an alternative launch vehicle to meet its needs and that it would cost $30 million to $40 million. They stated that these estimates were based on data developed during a BMDO study completed in August 1992 and that, although the C4 was not addressed in the study, they thought these rough estimates would apply to a C4 conversion. Regarding the cost estimate,

about 20 percent would be for construction. A study, expected to be completed in September 1993, will estimate the funding required to develop C4s as a target launch vehicle for system integration testing, the time it would take to do so, and the feasibility of using the ODES bus or the C4's bus to deploy targets.

Scope and Methodology

To determine the cost of the STARS program through fiscal year 1993, we obtained funding data generated by the SSDC accounting system and maintained by SSDC project officials. These officials also provided program funding estimates beyond fiscal year 1993. Sandia provided us cost data through fiscal year 1993 that specified, by major program categories, the activities supported by STARS funding.

To determine if missions could be supported with launches from sites other than Kauai, we contacted BMDO test and evaluation officials, SSDC Strategic Targets Office officials, Program Executive Office Missile Defense officials, and BMDO project officials. We reviewed BMDO studies addressing site and launch vehicle alternatives and discussed the performance characteristics of the STARS booster with BMDO and SSDC officials. To determine the availability of C4 missiles for use in the BMDO's test program, we contacted the Navy official responsible for managing the Navy missile inventory.

We discussed treaty restrictions on use of missiles for test purposes with BMDO START I and II expert. We reviewed the established range safety procedures for STARS launches and discussed range safety matters with the Missile Flight Safety Officer responsible for STARS launches, who is located at the Naval Air Warfare Center, Point Mugu, California.

We performed our review at BMDO, Washington, D.C., and at SSDC, 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 SSDC and BMDO officials and have made changes where appropriate. They 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 it 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 BMDO 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 (202) 512-4841. 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,

Brad Hathaway
Associate Director, Systems
Development and Production Issues

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.[1] The U.S. mission is to assess the performance of the reentry vehicle and its trajectory during reentry. The experiment will use a radar based at 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 (STARS) missile will not be encrypted.

According to the mission's program manager, the Ballistic Missile Defense Organization (BMDO) has determined that the mission could be conducted using a different target booster launched from a different location. BMDO obtained, as a contingency, a spot for both U.S. and British 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 launched from Vandenberg. However, this cost would be more than offset by not launching a STARS booster valued at about $5 million. BMDO said a Minuteman 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 before May 1993.

Mission 3

This mission is a hardware check-out flight of STARS carrying the Operations and Deployment Experiments Simulator (ODES). ODES is a post-boost vehicle designed to deploy a variety of test objects that replicate representative reentry vehicles. The primary purposes of the mission are to validate the ODES design, demonstrate its performance capabilities, and establish the vehicle as an operational launch system for experimental payloads. A secondary purpose for the initial ODES flight is to deploy a number of test objects to support other BMDO programs. The mission is scheduled for the second quarter of fiscal year 1994.

[1]Mission 2 was successfully launched on August 25, 1993.

According to the STARS product manager, this mission could be conducted from Wallops Island, Virginia; Vandenberg Air Force Base, California; or the Eastern Test Range, Florida. The launch date would be delayed and some additional costs would be incurred if an alternative launch site were used. In addition, radar on board the USNS Observation Island would be required. BMDO will encrypt telemetry from the STARS post-boost vehicle for this mission because, among other reasons, visual images of representative test objects will be electronically transmitted.

Missions 4 and 5

Missions 4 and 5 involve launching two STARS post-boost vehicles that will deploy numerous objects for the previously launched Midcourse Space Experiment (MSX) spacecraft to observe. MSX 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, two 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 BMDO scientific models, collect phenomenology data that will aid planned BMDO deployment programs in resolving technology problems during their development phases, and address critical discrimination issues for both sensors and interceptors.

The first STARS payload is scheduled to be launched in the second quarter of fiscal year 1995. The MSX spacecraft sensor's 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 STARS payload is scheduled to be launched in the third quarter of fiscal year 1995. The MSX 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 MSX program manager, the MSX's primary mission objectives involving the STARS-launched targets could be accomplished with a STARS vehicle launched from a different location than Kauai. While

the manager considers a STARS/ODES launch from Kauai to Kwajalein as the optimum choice, he stated that the mission could be accomplished using a STARS 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 impacts. 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 MSX program from meeting its primary objectives. Launches from Vandenberg would also result in some degradation because ship-based radar on board the USNS Observation Island would be used instead of the Kwajalein radar.

BMDO will encrypt telemetry from the STARS post-boost vehicle for both missions because, among other reasons, visual images of representative test objects will be electronically transmitted.

Mission 6

The ground-based radar program has a requirement for a STARS/ODES-launched target during the third quarter of fiscal year 1998. The mission will allow the radar to track a submarine-launched ballistic missile trajectory target 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 STARS missile launched from Kauai represents the optimum target vehicle because it replicates both a submarine-launched ballistic missile flight trajectory and a type of bussing the system 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 STARS program continues to experience delays. He insisted that Kauai or another launch site that will provide the required submarine 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 STARS II missile to support a scheduled first quarter fiscal year 1998 demonstration flight test. The Brilliant Eyes program manager began assessing alternatives to a STARS

launch from Kauai in case STARS was not available. He stated that if STARS were unavailable, the Brilliant Eyes experiment could use either a Firebird missile launched from Wallops Island, Virginia, or a Minuteman II 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 alternatives analysis was terminated when the Hawaii state court allowed the state to enter into an agreement with the Navy for clearance of the ground hazard area, thus permitting the launch of STARS from Kauai.

The manager also noted that since the program is in the early development phase, BMDO could decide to delete the requirement for a STARS-launched target. BMDO expects to complete, by October 1993, its review of contractor test plans delivered in July 1993. These plans could suggest the need to test against targets launched from boosters other than STARS. If BMDO concurs, the mission could be deleted.

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THE WASHINGTON POST THURSDAY, SEPTEMBER 23, 1993

JACK ANDERSON and MICHAEL BINSTEIN

Conyers Takes Aim at Missile Tests

Defense Secretary Les Aspin recently announced that the military was coming clean: Although Reagan administration officials had allegedly rigged the "Star Wars" defense system's test results, 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 rightly dismiss charges of military deception that transpired before his tenure. But an unreleased General Accounting Office report suggests that officials working on Ballistic Missile Defense, formerly called the Strategic Defense Initiative, may not be heeding Aspin's admonition, according to Rep. John Conyers Jr. (D-Mich.), whose Government Operations Committee requested the investigation.

Just last month, on the longest 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 incoming Soviet missiles, could be launched only from the pristine island of Kauai.

"The Kauai test facility is uniquely located to provide the appropriate range to launch the STARS missile into the [test] range," a Pentagon spokesman told our 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—and at a $1.5 million savings. The report also determined that five other launches scheduled over the next decade could be moved from the island. Seven remaining launches 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.

Activists on the island have protested the launching of STARS from Kauai because launches require the evacuation of an area where the military believes a failed launch could fall. The hazard area includes 2,000 acres of state land, within which lies 76 acres of a state park and an ancient burial ground. A spokeswoman for the Sierra Club Legal Defense Fund on the island explains that in the event of a misfire, the cleanup would be "like running a bulldozer through the Arlington Cemetery."

The hazard is hardly hypothetical, considering the mishap last June at Vandenburg Air Force Base in California. After an aborted missile launch, burning debris ignited a brush fire destroying 1,000 acres.

Conyers also questions whether the entire STARS program should be shot down. Every system that the military has said STARS was designed to test in the missile's environmental impact statement has either been canceled or delayed by the Pentagon's "bottom-up" review.

The Pentagon defends the program, arguing that STARS "supports . . . potential Army and Navy theater missile defense programs and technical application for future potential national defense elements" as well as something called the Midcourse Space Experiment designed to track the flight of ballistic missiles from space.

"In keeping with President Clinton's call to eliminate the obsolete in our government," Conyers counters in his letter to Aspin, "we can save over $160 million by canceling this unneeded system. . . . We should stop throwing good money after bad."

In the wake of last month's revelation that 369 Internal Revenue Service employees had browsed through the confidential tax records of celebrities and other citizens, the IRS has vowed to step up its internal controls and computer-security procedures.

That's ostensibly why 100 IRS internal security employees gathered in Washington this week for a taxpayer-sponsored "seminar." But an internal memo detailing the week's itinerary sounds more like Camp IRS than a crackdown to prevent employees from snooping and creating fraudulent tax refunds.

Only one hour during the four-day schedule was devoted to discussing "Computer Security," which was followed by a one-hour tour of the Capitol. The following day, a full 3½ hours were scheduled for "health improvement activities," including billiards, croquet and volleyball. But an IRS spokeswoman told us that the games were canceled at the last minute because officials "didn't think it was appropriate."

DEPARTMENT OF THE ARMY
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REPLY TO ATTENTION OF

October 8, 1993

Environmental and
Engineering Office

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

Dear Ms. Antolini:

Subject: Draft Environmental Impact Statement for Proposed Restrictive Easement

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 for 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 details 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 "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.

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

'93 SEP 2

September 28, 1993

OFC. SYS.
QUAL

To: Hason Young, Administrator
Land Management

From: Henry H. Sakuda, Administrator
Division of Aquatic Resources

Subject: Draft Environmental Impact Statement (DEIS) - Easement Over State Land for Safety and Ground Hazard Areas for STARS 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.

/c: Office of Environmental Control
U.S. Army Space and Strategic Defense Command

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October 8, 1993

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Division of Aquatic Resources
1151 Punchbowl Street
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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. Dresen
Lieutenant Colonel, U.S. Army
Product Manager, Strategic Targets

10.0 References

10.0 REFERENCES

Acentech, Inc.,.1990. Comparative sound levels table.

Belt Collins and Associates, Ltd., 1977. *Waimea-Kekaha Regional Development Plan*, prepared for the county of Kauai, September.

Bennett, W., 1931. *Archaeology of Kauai*, Bernice P. Bishop Museum Bulletin 80, Bishop Museum Press, Honolulu.

Bordner, R., 1977. *Cultural Reconnaissance Report for Kekaha Beach Shore Protection, Kekaha, Kona, Kauai Island, State of Hawaii*, prepared by Archaeological Research Center, Hawaii, Inc., for U.S. Army Engineers District, Pacific Ocean, Corps of Engineers.

Botanical Consultants, 1985. *Flora, Fauna and Water Resources Report of the Pacific Missile Range Facility, Hawaiian Area, Kauai, Hawaii, Honolulu, Hawaii*, prepared for the U.S. Navy contract No. N62742-85-C-0136.

Ching, F., 1974. *Department of Land and Natural Resources Inventory of Historic Sites,* Site Record #50-30-05-07.

Cleeland, B., 1975. "Cemeteries of West Kaua'i," *Archaeology on Kaua'i.*

Cooper Engineers, Inc., 1985. *Final Environmental Impact Report, Los Angeles City Energy Recovery (Lancer) Project*, April.

County of Kauai, undated. *Special Management Area Rules and Regulations of the County of Kauai (As Amended).*

Department of the Air Force, 1987. *Environmental Assessment, Repair and Restoration of Space Launch Complex 4, Vandenberg Air Force Base, California*, June.

Department of the Air Force, 1990. *Final Environmental Assessment, Starlab Program*, 17 August.

Federal Emergency Management Agency, 1987. Flood Insurance Rate Map.

Flores, K.E., and A.G. Kaohi, 1991. Hawaiian Cultural and Historical Survey of Nohili and Mānā Area, Kona District, Island of Kauai, State of Hawaii, unpublished draft manuscript.

Fornander, A., 1917. *The Hawaiian Account of the Formation of their Islands and Origin of their Race with the Traditions of their Migrations, etc., as gathered from original sources,* Fornander Collection of Hawaiian Antiquities and Folk-Lore, Memoirs of the Bernic P. Bishop Museum, Volume 4, Part 2, Bishop Museum Press, Honolulu.

Gonzalez, T., S. Berryman, and D. Welch, 1990. Archaeological Survey and Testing, Department of Energy, Kauai Test Facility, Barking Sands, Kauai, Hawaii. Prepared as Supplement for the Kauai Test Facility Environmental Assessment. Prepared for Sandia National Laboratories, August 29.

Governor's Economic Recovery Committee, 1993. IMUA: Kauai Beyond Hurricane Iniki, January.

Han, T., S. Collins, S. Clark, and A. Garland, 1986. *Moe Kau A Ho'Oilo: Hawaiian Mortuary Practices at Keopu, Kona, Hawaii*, Department of Anthropology, Department Report Series: Report 86-1, Bishop Museum Press, Honolulu.

Hawaii Department of Agriculture, 1977. *Agricultural Lands of Importance to the State of Hawaii (ALISH) Maps, Makaha Point and Kekaha, U.S.G.S., 7.5 Minute Topographic Quadrangle Series*, January.

Hawaii Department of Land and Natural Resources, 1977. *Pavilions Polihale State Park, Waimea, Kauai, Hawaii*, December.

Hawaii Department of Land and Natural Resources, 1992a. State Historic Preservation Division comment letter to the Draft Environmental Impact Statement for the Strategic Target System, March 21.

Hawaii Department of Land and Natural Resources, 1992b. State Historic Preservation Division comment letter to the Environmental Assessment for Kauai Test Facility, April 27.

Hawaii Department of Land and Natural Resources, 1992c. State Historic Preservation Division comment letter to the Environmental Assessment for Kauai Test Facility CDX [sic.] Rocket Operation, May 21.

Hawaii Department of Land and Natural Resources, 1993. State Historic Preservation Division, *The Historic Preservation Development Review Process.*

Hawaii Visitors Bureau, 1993. "Average Daily Visitor Statistics Kauai and State of Hawaii," Market Research Department.

Hawaiian Sugar Planters' Association, 1992. Hawaiian Sugar Manual.

Hommon, R., 1989. Personal communication with Hommon, U.S. Navy, Pacific Division, Facilities Planning Department, and Advanced Sciences, Inc., regarding cultural resources on the Pacific Missile Range Facility.

Inouye, R., 1993. Personal communication, written communication from Inouye, Pacific Missile Range Facility, July.

Kauai County, 1992. Statistical Abstract of the Kauai Economy, Office of Economic Development.

Kauai Realty Inc., 1993. Response to request for information regarding accommodations on Kauai, July.

Kanoho, S., 1993. Personal communication between Kanoho, Executive Director, Kauai Economic Development Board, and The Earth Technology Corporation regarding Kauai economic trends and characteristics, June.

Kennedy/Jenks Engineers, 1982. *Draft Environmental Impact Statement for the Kitano Hydroelectric Project*, prepared for Kekaha Sugar Company, Ltd., Kekaha, Hawaii.

Kikuchi, W., D. Kikuchi, and R. Carter, 1987. "The Fishponds of Kaua'i," *Archaeology on Kaua'i.*

Kikuchi, W., 1970. "The Halawa Valley Project: A Preliminary Report." The New Zealand Archaeological Association Newsletter.

Klemm, R., 1993. Personal communication between Klemm, Hawaiian Sugar Planters' Association, and The Earth Technology Corporation, June.

Marshall, R. B., et al., 1910. Topographic map of the western Kauai area, Territory of Hawaii.

McMahon, N., 1988a. *Field Inspection of Sand Mining Activities at Kawaiele, Kauai.*

McMahon, N., 1988b. Field check of Northrop King digging, Mana, Waimea, Kauai.

Miyasaka, M., 1993. Personal communication between Miyasaka, State Department of Health, Environmental Management Division, and The Earth Technology Corporation regarding solid and hazardous wastes, 7 July.

Miyazono, K., 1993. Personal communication between Miyazono, State Highway Department, and The Earth Technology Corporation regarding traffic counts, 14 June.

Moe, O., 1993. Personal communication between Moe, Kekaha Sugar Company, and The Earth Technology Corporation regarding characteristics of Kekaha Sugar Company land use, infrastructure, and sugar cane production, July.

O'Hare, R., and P. Rosendahl, 1993. Archaeological Subsurface Inventory Survey, IMA Target Facility Project Site, Pacific Missile Range Facility, Barking Sands, Kauai. Prepared for the Department of the Navy, Pacific Division Naval Facilities Engineering Command, August.

Pacific Missile Range Facility, 1993. Memorandum entitled "PMRF Support to Joint Task Force During Hurricane Iniki Recovery Efforts" from Commanding Officer R.D. Mullins, Pacific Missile Range Facility, April.

R.M. Towill Corporation, 1983. *Revised Environmental Impact Statement for the Kekaha Sanitary Landfill Expansion Project,* Kauai, Hawaii, December.

Sandia National Laboratories, 1988. *Safety Assessment for Missile Launch Complex at Barking Sands, Kauai.*

Sinoto, A., 1978. Cultural reconnaissance of rock borrow areas near Kekaha, Kauai, Hawaii, prepared by the Department of Anthropology, Bishop Museum, for U.S. Army Engineer District, Pacific Ocean, Honolulu, Hawaii.

Souza, W., 1993a. Personal communication between Souza, State Park Bureau, and The Earth Technology Corporation, June 24.

Souza, W., 1993b. Personal communication between Souza, State Park Bureau, and The Earth Technology Corporation, July 13.

State of Hawaii, 1985. *Hawaii Coastal Zone Management Program Federal Consistency Procedures Guide,* Department of Planning and Economic Development, April.

State of Hawaii, 1989. "Hawaii's Sugar Industry and Sugarcane Lands: Outlook and Options," Department of Business and Economic Development, April.

State of Hawaii, 1991a. *The Hawaii State Plan,* Office of the Governor, Office of State Planning.

State of Hawaii, 1991b. *The Hawaii State Plan, Conservation Lands, State Functional Plan.*

State of Hawaii, 1991c. *The Hawaii State Plan, Recreation, State Functional Plan.*

State of Hawaii, 1991d. *The Hawaii State Plan, Agriculture, State Functional Plan.*

State of Hawaii, 1992. *Guide to Hawaii's State Parks,* Department of Land and Natural Resources, July.

State of Hawaii, 1993. *Botanical Database and Reconnaissance Survey of the Polihale Area, Kauai,* Division of State Parks, Department of Land and Natural Resources, Honolulu.

Strategic Defense Initiative Organization, 1991. *ZEST Flight Test Experiment, Kauai Test Facility, Hawaii,* July.

Thrum, T., 1907. "Tales from the Temples", *Hawaiian Annual.*

The Traverse Group, 1988. Natural Resources Management Plan, Pacific Missile Range Facility, Barking Sands, March.

University of Hawaii, 1967. Detailed Land Classification, Island of Kauai, December.

U.S. Army Strategic Defense Command, 1990a. *Strategic Target System (STARS) Environmental Assessment*, July.

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

U.S. Army Strategic Defense Command, 1991. *Final Supplement to the Strategic Target System Environmental Assessment,* July.

U.S. Army Strategic Defense Command, 1992a. *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, 1992b. *Draft Environmental Impact Statement for the Strategic Target System,* February.

U.S. Army Strategic Defense Command, 1992c. *Final Environmental Impact Statement for the Strategic Target System*, May.

U.S. Army Space and Strategic Defense Command, 1993a. *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, 1993b. *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. Bureau of the Census, 1980. Selected social, economic, and housing information for the State of Hawaii by island and census tract produced by Hawaii State Data Center.

U.S. Bureau of the Census, 1990. Selected social, economic, and housing information for the State of Hawaii by island and census tract produced by Hawaii State Data Center.

U.S. Department of Agriculture, 1972. *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii,* August.

U.S. Department of Energy, 1991. Kauai Test Facility (KTF) Environmental Assessment, Sandia National Laboratories, Albuquerque, New Mexico, March.

U.S. Department of Energy, 1992. *Kauai Test Facility Environmental Assessment*, July.

U.S. Department of Labor, 1993. Bureau of Labor Statistics.

U.S. Geological Survey, 1983a. Makaha Point topographical map.

U.S. Geological Survey, 1983b. Kekaha Point topographical map.

U.S. Navy, (undated). Map Files (archaeology), Facilities Planning Department, Pearl Harbor, Hawaii.

Van Holt, l., 1985. Stories of Long Ago AHN Niihau, Kauai, Oahu.

Walker, B.A., and P.H. Rosendahl, 1990. Archaeological Inventory Survey, USN Radio Telescope Project Area, Land of Waimea District, Island of Kauai, prepared for Helber, Hastert, and Kimura Planners by Paul Rosendahl, Ph.D., Hilo, Hawaii.

Wallace, J., 1993. Response to request for ground hazard area arcs from Wallace, U.S. Navy, Pacific Division, at the Pacific Missile Range Facility.

Welch, D.J., 1990. "Draft Final Report: Archaeological Survey and Testing of Proposed Roadway and Parking Apron, Kauai Test Facility, Barking Sands, Kauai, Hawaii," International Archaeological Research Institute, Inc., Honolulu, Hawaii.

Yamoto, B., 1993. Personal communication between Yamoto, Department of Land and Natural Resources, Kauai Office, and The Earth Technology Corporation regarding road ownership, 24 June.

Yent, M., 1982. *Archaeological Reconnaissance: Proposed Kokee Hydropower Project, Kokee State Park, Waimea Canyon State Park, and Upper Kekaha, Waimea District, West Kauai*, prepared by Hawaii Division of State Parks for Division of Water and Land Development, Department of Land and Natural Resources.

Yent, M., 1991. *Preliminary Archaeological Site Inventory Polihale State Park, Waimea, Kauai*, TMK:1-2-02:24.

Yent, M., 1993. Personal communication between Yent, Hawaii Division of Land and Natural Resources, State Parks Division, and The Earth Technology Corporation regarding cultural resources surveys currently in progress within the restrictive easement region of influence.

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4344 Hardy Street
Lihue, Kauai, HI 96766

University of Hawaii, Hamilton Library
2550 The Mall
Honolulu, HI 96822

State of Hawaii Main Library
478 South King Street
Honolulu, HI 96813

Kaimuki Regional Library
1041 Koko Head Avenue
Honolulu, HI 96816

Kaneohe Regional Library
45-829 Kamehameha Highway
Kaneohe, HI 96744

Pearl City Regional Library
1138 Waimano Home Road
Pearl City, HI 96782

Hilo Regional Library
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Kahului Regional Library
90 School Street
Kahului, HI 96732

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Appendix A
Draft Restrictive Easement

DRAFT

LAND COURT | REGULAR SYSTEM

AFTER RECORDATION, RETURN BY MAIL ( ) PICK-UP ( ) TO:

NAVY IDENTIFICATION
NO. N6274293RP00075

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 (. 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

area.

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, 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 of the State of Hawaii.

Beginning at the Northeasterly 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 9,781.00 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 Kaumualii 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. S-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"	140.75	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′	276.90 feet along same;
17.	209° 05′	326.22 feet along same;
18.	205° 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′	216.28 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′	2,612.76 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′	1,458.00 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′	4,385.90	feet along said State Park to Government Survey Triangulation Station "NOHILI 3";
37.	325° 29′ 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;
39.	39° 59′ 29"	5,364.75	feet along remainder of Government Land of Waimea to the North side of General Lease No. S-3852, Easement "A", Part I, at the end of Course No. 8 thereof;
			thence on a curve to the right with a radius of 5,077.50 feet, the chord azimuth and distance being:
40.	76° 13′ 25"	348.99	feet along the North side of said roadway;
41.	78° 11′ 35"	18.66	feet along same;
			thence on a curve to the left with a radius of 5,142.50 feet, the chord azimuth and distance being:
42.	76° 35′ 30"	287.42	feet along same;
43.	74° 59′ 25"	484.69	feet along same;
			thence on a curve to the left with a radius of 10,272.50 feet, the chord azimuth and distance being:
44.	74° 11′ 15"	287.85	feet along same;
45.	73° 23′ 05"	380.10	feet along same;
			thence on a curve to the right with a radius of 1,717.50 feet, the chord azimuth and distance being:
46.	76° 07′ 45"	164.47	feet along same;
47.	78° 52′ 25"	27.19	feet to the Easterly end of said Northerly terminus of said Kaumualii Highway;
48.	168° 53′	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).

SUBJECT, HOWEVER, to State General Lease No. S-4222 dated 1 January 1969 in favor of Kekaha Sugar Company, Limited.

PARCEL 2

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.	219° 00'	1,300.00	feet;
5.	230° 00'	850.00	feet;
6.	224° 00'	856.55	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 69.579 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 concinnum*) 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 mydus*) 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.

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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.

Retyped from *Strategic Target System Environmental Impact Statement*, U.S. Army Strategic Defense Command, June 1992.

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 (205-955-3887)
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, KAUAI

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 35807-3801, 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, Waimea Public Library, Lihue Public Library, Koloa Community School Library, University of Hawaii Hamilton Library, State of Hawaii Main Library, Kaimuki Regional Library, Kaneohe 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 241-3326 or the Honolulu Office at 587-0414.

BOARD OF LAND AND NATURAL RESOURCES

KEITH W. AHUE, Chairperson

HONOLULU ADVERTISER:

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-CSR 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 Kilauano
Gregg Gardiner
Dave Nekomoto
Averiet 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

LAWYER'S NOTES

Page	Line	

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 misnomer, 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 cafetorium. 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 KILAUANO: Good evening. My name is Anderson Kaole Kilauano. 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 tooken 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. Needles 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 PMRF 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 encourage 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 HVB 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. Marinelli, 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 here tonight are the people that are against this land use agreement and the Stars program in general. Thank you.

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 coast -- one more, half a minute. While they were on the east cost, 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 INOUYE: 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 beach goers, 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 BLOUIN: 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 BLOUIN: 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 hear 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 PMRF. 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 home owner 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 Kaweakowahinekololioolimaola 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 were 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 KAOHI: 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.)

C E R T I F I C A T E

STATE OF HAWAII)
)
COUNTY OF KAUAI)

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 15, 1993

Kathy Pearson

Kathy Pearson, CSR No. 313
Notary Public, State of Hawaii

My commission expires:
July 12, 1994

Appendix E
Cultural Resources

Table E-1: Cultural Resources Sites Located Within the ROI

State of Hawaii Inventory Site #	Site Description
50 - 30 - 01 - 06	Kapaula heiau at Kolo
50 - 30 - 01 - 07	Dune burials and campsites between Pohihale and Barking Sands
50 - 30 - 01 - 08	Elekuna Heiau at Nohili
50 - 30 - 01 - 09	House sites near the northern portion of Barking Sands
50 - 30 - 01 - 724	Former plantation camp
50 - 30 - 01 - 1820	Basalt, coral, shell, and metal shrapnel scatter near Barking Sands
50 - 30 - 01 - 1821	Basalt scatter near Barking Sands
50 - 30 - 01 - 1829	Burial site/native beach encampment and habitation area
50 - 30 - 01 - 1830	Occupation area
50 - 30 - 01 - 1831	Dune burial (single individual)
50 - 30 - 01 - 1884	Shoreline occupation area
50 - 30 - 01 - 6017	Paving and associated wall
50 - 30 - 01 - 6018	Retaining wall abuts large natural boulders at either end
50 - 30 - 01 - 6019	Small rectangular ahu/platform, possible burial cairn
50 - 30 - 01 - 6020	Terraces
50 - 30 - 01 - 6021	Stone wall
50 - 30 - 01 - 6024	Historic irrigation channel

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