BRUNSDON - -

EXHIBIT 5

BUREAU OF INDIAN AFFAIRS

UINTAH AND OURAY AGENCY

ENVIRONMENTAL IMPACT ANALYSIS

ROCKET MOTOR TEST SITE

SKULL VALLEY BAND OF GOSHUTE INDIANS

SKULL VALLEY RESERVATION

FORT DUCHESNE, UTAH

MARCH 28, 1975

UT-19369

A. INTRODUCTION

1. Project Description

a. Background

Hercules Incorporated has been a major solid propellant rocket motor manufacturer for the Army, Navy, Air Force, and NASA since 1957. A major facility for developing, producing, and testing these motors is presently located at Bacchus Works near Magna, Utah.

In May 1974, a second stage motor being developed for the Navy's Trident program malfunctioned at the Bacchus Works and destroyed part of the motor testing facility. Following the malfunctioning incident, the continued use of the Bacchus site was evaluated. In view of the encroachment of private and commercial development on the boundaries of Bacchus Works and the possible attendant threat to life and property, it was concluded that further investments in large motor testing facilities at Bacchus Works was not advisable. Therefore, there is a need by Hercules for a facility to static test solid propellant rocket motors that is remotely located from population centers.

The immediate need by Hercules is to static fire motors in support of the Navy's Trident C4 development program. The Trident program consists of a five year development phase with follow-on increments of production to continue for an additional five years or more. Static firings in the development phase are needed to determine performance, reliability, acceptance and other technical data verification.

b. Proposed Action

It is proposed that Hercules be allowed to lease for their exclusive use, an area 500 feet by 500 feet (5.74 acres) for the firing pad and associated bunkers, and a second area 500 feet by 500 feet (5.74 acres), approximately one-half mile from the first area, for remote firing of rocket engines.

(1) Construction

All structures will be designed to comply with the Uniform Building Code and State of Utah requirements. Inspections during and after construction will be performed by registered professional engineers.

(2) Operation

Static firing of all three stages of the Trident missile is planned at the proposed test site. Firings are to be conducted on a routine basis. Procedures involved in each firing and use of each structure are described in the paragraphs which follow.

Each static firing is expected to last approximately 70 seconds. During this period, there will be acoustic and vibrational effects and a cloud of non-toxic smoke and dust is emitted from the test site.

Upon completion of static firing, a boom will swing into position at the rear of the rocket to inject approximately 2,500 gallons of quench water into the empty rocket chamber. This procedure will then be disassembled from the test stand and returned to the Bacchus Plant for engineering evaluation.

Beginning the fourth quarter of 1975 (the site readiness date) the firing schedule is expected to average approximately 2-1/2 motors per month with a maximum of four motors in any one month from January 1976 through May 1978 (the latter part of the present development program). A mixture of first, second, and third stage motors are scheduled to be fired. Hercules has contracted for an initial production program subsequent to development and anticipates additional follow-on programs with a static firing frequency of approximately one per month.

Traffic to the test site will consist of personnel from Hercules, Lockheed Missiles and Space Company Incorporated (LMSCI), Navy and other visitors. It is expected that approximately fifteen Hercules employees will be required to operate the site. It is planned for these individuals to staff the site on a 1-8-5 basis (one eight hour shift per day, five days per week) plus overtime as required.

Personnel traffic due to LMSCI, Navy, and other visitors is expected to be heaviest on the day of each test. As many as ten to twenty observers may visit the site on test days with one-half of these staying for the firing. Normal operating procedures would permit a maximum of ten individuals to remain in the firing control house during each test. All other personnel will be required to position themselves beyond the buffer zone.

(i) Accidental Detonation

Based on experience and thorough evaluation of the systems, the likelihood of an accidental detonation is extremely remote. The cause of the May 1974 incident has been ascertained and procedures modified to prevent a recurrence. Follow-up tests have been conducted at the Naval Weapon Center in China Lake, California. Intentional detonations have been conducted at this site to detect and resolve any other potential weaknesses in the system and operational procedures.

Should an accidental detonation occur, it would be accompanied by overpressure, short duration noise, cloud of smoke and

dusty, small fragment dispersal and probably small patches of range fires. Large fragments would be confined to the firing pad by the test stand.

2. Environmental Setting

a. Environment Prior to Proposed Action

Flora at the proposed rocket test facility is typical of that found in the shadscale-budsage plant community. This type of plant life is characteristically associated with the gently sloping alluvial fans created by runoff into Pleistocene Lake Bonneville from adjacent mountain peaks.

Shadscale (Atriplex confertifolia) is the most abundant plant comprising 66 percent of the plants counted while budsage (Artemisia spinescens) comprises 28,9 percent. Other browse species include Greasewood (Sacrobatus species). The base of some of the shadscale plants harbor scanty growth of grasses; largely cheat grass (Bromus tectorum) and squirrel tail (Sitanion hystrix) with an occasional stand of Indian ricegrass (Oryzopsis hymenoides), needle and thread (Stipa comata), Western wheatgrass (Agropyron smithii), Sandburg bluegrass (Poa secunda). Of the 23 plant species which populate the shadscale-budsage community, all are found at least occasionally in the area. Average height of these plants is 10 to 12 inches, but some grow to a height of 24 inches. Vegetation is rather sparse with the two dominant species occurring at a combined density of 3.1 plants per square meter.

Soils in this type of plant community are generally of a fine, sandy loam to a light loamy texture. In some of the more elevated areas and in those extending west of the Reservation, the soils will vary slightly from a sandy loam to a loamy sand in texture. All these soils have a high pH ranging from 8.4 to 9.2.

C4 F/S	-	-	58dB(A)	7500 ft	70dB(A)
C4 F/S	-	-	58dB(A)	1600 ft	90dB(A)
C4 T/S	-	-	25dB(A)	1600 ft	88dB(A)

F/S: First Stage
S/S: Second Stage
T/S: Third Stage

dB: decibel A,C; A and C Scales

A small amount of routine office/laboratory waste consisting of paper, metal, glass, rubber, wood and plastic will be disposed of in a nearby landfill. This will not constitute an environmental problem.

The maximum of 20,000 gallons of water per month will not tax the well to be established.

The in-house heat generated by the motor is directed almost totally to the rear. Vegetation at Beehive shows no sign of searing 30 feet to the side of the midline. The blast diverter deflects this heat upward. Occasionally, small particles of propellant may be ejected, ricochet off the diverter, land in the desert, and possibly start a small range fire. Even though the vegetation is rather sparse and a fire would not spread rapidly, fire fighting equipment will be on hand during each test.

C. Accidental Detonation

The only time a motor will be capable of igniting is when the electronic ignition device is installed. This is done immediately prior to testing. Before a motor is subjected to static test, it is Xrayed, manufacturing and inspection records reviewed, and all deviations from the design evaluated. Any deviation from design requires engineering and quality approval. Only motors which are expected to perform successfully will be tested at the proposed test site.

Immediately after the motor is unloaded and secured on the test pad, the environmental control building will be positioned over the test pad and motor. The major function of this building is to provide temperature control and dust protection for the rocket motor. Failure to maintain proper temperature conditioning will not be hazardous to personnel in the area, but adverse temperatures could significantly affect the performance of the motor. With the environmental building in place, the motor will be thoroughly inspected for damage that may have occurred during shipping and handling. Upon acceptance, the motor will be installed in the test stand. Although the possibility of an accident is extremely remote, the following analysis of the consequences of an accidental detonation is presented to show that, should such an incident occur, it would have a negligible environmental effect.

The planned facilities comply with quantity/distance requirements contained in DOD Directive 4145.26M. The worst case would involve the First Stage, Trident I C4 motor. Consequently, the following pertains to this motor:

There will be no effect on water and air quality with an accidental detonation.

Since essentially the same air pollutants and quantities will be released during an accidental detonation, compared to routine operating conditions, the effects will be basically the same. The only difference is that the pollutants will be released more quickly and concentrations in the cloud may be higher. A mitigating factor will be that the blast will tend to disperse the cloud more rapidly.

The safe limit for peak impulse noise is 140 dB(A). Under usual conditions this will occur less than 1,800 feet from the pad, however, the actual distance is very susceptible to meteorological conditions. The threshold overpressure causing eardrum rupture occurs at 2.3 to 5 pounds per square inch (psi). The distance calculated for an overpressure of 2.3 psi from a first stage detonation is 1,114 feet. The distance calculated for the second stage detonation is 847 feet. An overpressure of 2.9 psi has been measured at 300 feet during an intentional second stage detonation. Apparently the 100 feet figure contains an adequate margin of safety. Light glass damage occurs at 0.02 psi while heavy damage occurs at 1 psi. Since the nearest glass structures are located several miles away, glass damage is not expected.

After the May 1974 incident at Bacchus, in which approximately 12,000 pounds of propellant detonated, 90 percent of all fragments were found within 6,000 feet of the test pad. The Trident First Stage contains approximately 44,000 pounds of the same propellent. Assuming no propellent has been consumed prior to detonation, 90 percent of all fragments from a first stage trident would fall within 7,400 feet and 96 percent of all fragments would fall within 7,920 feet (1.5 miles). The above first stage fragment danger zone is based on the following document:

GENERAL SAFETY ENGINEERING DESIGN CRITERIA
CHEMICAL ROCKET PROPELLANT HAZARDS
CPIA PUBLICATION NO. 194
OCTOBER 1971

Only motors which are expected to perform successfully will be tested at the proposed site. It is unlikely that a motor would detonate, but if it did occur, it would not happen until part of the propellant had been consumed. Thus, it is evident that the 1.5 mile buffer zone is adequate for a fragment safety zone.