

FINDING OF NO SIGNIFICANT IMPACT (FONSI)
ENVIRONMENTAL ASSESSMENT FOR TITAN IV
SOLID ROCKET MOTOR UPGRADE TESTING
AT EDWARDS AIR FORCE BASE, CALIFORNIA

DESCRIPTION OF THE PROPOSED ACTION

INTRODUCTION

To support the U.S. Department of Defense Space Program and to ensure access to space through the continued use of Titan solid propellant rocket motors, the U.S. Air Force (USAF) proposes to test-fire five Titan IV solid rocket motors at Test Stand 1-c, located at the Air Force Astronautics Laboratory (AFAL), Edwards Air Force Base (AFB), California, during the period from July 1989 to August 1990.

PROPOSED ACTION

The proposed action calls for the modification of an existing rocket motor test stand (Test Stand 1-C) and an associated receiving and inspection building located on Leuhman Ridge at AFAL to conduct the static test firings. Test Stand 1-C was used to test liquid rocket engines from 1965 until the early 1970s and was renovated in 1986 to test Titan solid propellant rocket engines (the 34D static rocket tests). Proposed test stand and receiving and inspection building modifications include refurbishment of and changes in structural, mechanical, and electrical systems; addition of a heat shield to protect the steel deflector plate; water collection basin improvements; and addition of instrumentation, control, and monitoring equipment. In addition to modifications to the test stand and associated buildings, an existing railroad spur will be upgraded to facilitate rocket motor transport. This upgrade will include improving roads, building a concrete-pad working area and asphalt parking areas, and modifying overhead high-voltage power lines.

Following renovation of the test stand and associated facilities, five three-segment Titan IV solid propellant rocket motors will be test-fired over a period of approximately 14 months. The tests will be conducted to

1. Evaluate motor performance by measuring the thrust, motor case deflection, effects on fired cases and pressure of motors during firing;
2. Measure insulator erosion;
3. Evaluate nozzle performance by measuring force vectors, nozzle movement, and response time;
4. Monitor ignitor performance through pressure monitoring; and
5. Evaluate propellant performance by measuring burn time and rate.

NATURAL ENVIRONMENT

Air Quality

The proposed Titan IV rocket motor test firings will not significantly impact air quality at areas surrounding Edwards AFB. Primary constituents of the rocket exhaust will be aluminum oxide (Al₂O₃), hydrogen chloride (HCl), carbon monoxide (CO), and nitrogen (N₂). Afterburning in the atmosphere oxidizes some of the constituents, particularly CO to CO₂ and a small amount of N₂ to NO_x. A

reasonable and conservative worst-case modeling analysis of the Titan IV motor exhaust indicated that the general population will not be exposed to HC1 concentrations greater than the national Academy of Sciences (NAS) recommended limit for short-term public exposure (limit of 3 parts per million HC1, 10-minute average). Maximum downwind concentrations of CO and NO2 are expected to be well below applicable federal and state standards.

The maximum downwind concentration of particulate matter less than 10 microns in diameter (PM10) for the test firings will exacerbate existing exceedances of the state 24-hour standard of 50 micrograms per cubic meter. However, the worst-case predicted PM10 impact concentrations in the region. Given the relatively small number of tests (5) in a 14 month period. This is not considered a significant impact.

Soils

Implementation of the Titan IV testing program involves refurbishing the water containment berm at Test Stand 1-C because of its deterioration from earlier tests. Refurbishing the berm will not significantly affect the soils at Edwards AFB of the surrounding area. The deposition of HC1 from the test is expected to be heavy in the immediate area of the stand based on the results of the 34D test firing. The impacts of this deposition to soil are expected to be small due to the use of the carbonate buffer system, the previously disturbed nature of the area, and the generally alkaline makeup of the soil.

Implementation of the Titan IV testing program involves refurbishing the water containment berm at Test Stand 1-C because of its deterioration from earlier test. Refurbishing the berm will not significantly affect the soils at Edwards AFB of the surrounding area. The deposition of HC1 from the tests is expected to be heavy in the immediate area if the test stand based on the results of the 34D test firing. The impacts of this deposition to soils are expected to be small due to the use of the carbonate buffer system, the previously disturbed nature of the area, and the generally alkaline makeup of the soil.

In addition, soil erosion will occur in the immediate vicinity of the test stand, since approximately 344,000 gal of deluge water will not be trapped in the water collection system. The erosion will be limited in area, but perhaps extensive near the test stand. Pre- and post-test mitigation measures are proposed to minimize impacts to soils.

Hydrology

No significant impacts to groundwater or surface water hydrology will result from the Titan IV motor test. All water used for the tests will come from a water storage tank fed from wells on Edwards AFB. Most of the deluge (cooling) water used in the test will be conditioned with a carbonate buffer to mitigate potential effects of HC1 absorption into the soil and Low PH. Most deluge water will be deposited as acid mist (ph of 3 or lower) from the exhaust plume onto the ground surface near the test stand. The remainder of the deluge water not entrained into the exhaust gas stream will be collected and evaporated in concrete-lined channels and a basin located near Test Stand 1-C.

Water Quality

No significant impacts on water quality will result from the Titan IV tests. All deluge water contained in the channels and basin will be evaporated. The amount of deluge water will be deposited from the exhaust onto the rocks and soil nearby will be large but will evaporate leaving a residue of HC1 and inert nonhazardous compounds (mostly aluminum oxide and sodium chloride) on the ground surface. The amount of HC1 deposition will have no significant impact on ground or surface waters.

Ecological Resources

No significant impacts to the ecological resources of Edwards AFB or surrounding areas are expected as a result of the Titan IV motor tests. Impacts to vegetation and habitat from acidic mist will be minor because much of the impact area has been previously disturbed. No critical habitat for threatened or endangered species will be lost as a result of the Titan IV test program. Adverse impacts to the desert cymopterus present in the area are unlikely because known populations occur outside the near-field deposition zone. Impacts to desert tortoises are presently uncertain because this species has only recently been observed in the area. Impacts to Mojave ground squirrels are presently uncertain because the presence of this species in the railroad spur construction area has not been determined. Planned additional surveys and monitoring of these species by the USAF, in consultation with DFG and USFWS, will provide additional information to avoid or minimize any impacts from future use of the test facility.

MANMADE ENVIRONMENT

Population

The renovation of Test Stand 1-C and the subsequent test program of the Titan IV rocket motors will have no significant impacts on population and housing at Edwards AFB or within surrounding communities. The Titan IV test program will utilize existing personnel at AFAL and Edwards AFB. Temporary staff from the USAF Space Division, Hercules, and their contractors will be on-site during renovation work and motor testing periods.

Socioeconomics

The proposed Titan IV test program is compatible with the surrounding land use, will require no land purchase and no construction work beyond the boundaries of the air base, and will not require additional permanent employment. No significant impacts on the socioeconomics of Edwards AFB, Los Angeles County, or Kern County, California, are anticipated.

Safety

All regulatory agency safety procedures and guidelines for rocket motor transportation and testing will be followed. Safety monitoring will be conducted during the tests. A protective clear zone of about 1 mile will be established around the test stand, and no one will be allowed into the immediate downwind area within boundaries. In addition, testing will only occur if the wind direction is such that the exhaust cloud will not proceed over housing areas. Thorough real-time dispersion monitoring, data analysis, and refinement of the rocket exhaust dispersion model will be conducted to determine of conditions would allow an easing of the wind restrictions for test firings. This process will insure that if firings are conducted under alternate parameters, such testing would not in any way expose the general public to HC1 concentrations above the recommended standards or reduce the level of protection provided by the current parameter. Essential test personnel will be located in a protected concrete bunker near the test stand. Realtime monitoring of bunker air supply, test area exhaust cloud and deposition will be performed in conjunction with downwind cloud monitoring. Tests will not proceed until appropriate meteorological conditions are verified.

Noise

Noise levels associated with the Titan test program will not significantly affect the general public due to the distance between the test site and the nearest unregulated area (3 miles). Noise produced during the test firing

will be of short duration (approximately 2 minutes and 13 seconds for each event) and, at worst, will be a minor nuisance. Portions the AFAL will be evacuated to minimize noise impacts to personnel on-site.

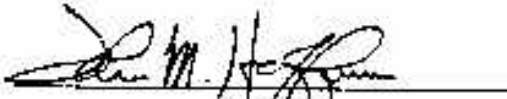
Archaeological and Cultural Resources

The areas surrounding Test Stand 1-C and the railroad spur do not contain unique archaeological or historic resources. As a result, the Titian IV test program will have no effect on archaeological or cultural resources.

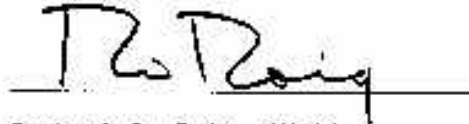
FINDINGS

Based on the above, a finding of no significant impact is made. Copies of an Environmental Assessment of the proposed action, dated April 1988, can be obtains from:

HQ Space Division
Post Office Box 92960
Worldway Postal Center
Los Angeles, California 90009-2960
ATTENTION: Mr. John R. Edwards, SD/DEV



John M. Hoffman, COT USAF
Chairman, Edwards AFB
Environmental Protection Committee



Raphael O. Roig, GM-14
Chairman, Space Division
Environmental Protection Committee