

RECORD OF DECISION

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Engine Technology Support for NASA's Advanced Space Transportation Program Environmental Impact Statement (EIS)

A. Background

The purpose of Engine Technology Support for the Advanced Space Transportation Program (ASTP) is to explore key advanced technologies in propulsion systems which could enhance U. S. technical capabilities necessary for the development of future space launch vehicles and improve the U. S. commercial launch industry's competitiveness. The goal is to demonstrate the technology maturity levels necessary to reduce development risk of the selected propulsion system(s) to an acceptable level and produce highly operable, high thrust-to-weight propulsion systems for future Reusable Launch Vehicles (RLV's), Evolved Expendable Launch Vehicles (EELV's), and other space launch systems. An additional goal is to examine, evaluate, and/or demonstrate the potential for foreign hardware and technology to enhance the capability of the existing expendable launch vehicle fleet, the Space Shuttle Transportation System, and Advanced Space Transportation Systems. NASA is considering a wide variety of liquid-fueled engines to accommodate the propulsion requirements of new space launch vehicle(s). The proposed action to fulfill the purpose and goals of the ASTP consists of: (1) testing new and advanced engines and components for possible use in developing new vehicle(s); and (2) modifying government-owned facilities to support the activities.

B. Introduction to the EIS

This EIS was developed to address all major elements of the ASTP with regards to testing new and advanced space launch engines and components and modifying government owned facilities to support test activity (i.e., specifically environmental issues associated with preparing and implementing engine/component test activities at all reasonable sites identified).

On November 30, 1994, NASA published the Notice of Intent (NOI) to prepare this EIS in the Federal Register (59 FR 61346), which initiated the formal scoping process. Comments were solicited both in writing and at public scoping meetings on December 6, 1994, in Huntsville, Alabama, and December 13, 1994, in Hancock County, Mississippi. Nine comment letters were received during the public scoping comment period with the majority of comments being endorsements or expressions of confidence in NASA to conduct testing in an environmentally safe manner. The Tennessee Valley Authority requested to be kept informed. Other issues identified concerned federally listed threatened and endangered species and respective habitats; local school district data in Mississippi; detail list of program elements and requirements; and the use and handling of kerosene.

On November 14, 1996, NASA published the Notice of Availability (NOA) of the draft EIS in the Federal Register (61 FR 58548). Comments were solicited at public meetings on December 2, 1996, in Huntsville, Alabama, and December 12, 1996, in Hancock County, Mississippi, and from Federal, State, and local agencies, organization and members of the general public through the November 14, 1996, Federal Register notice, newspaper advertisements, and direct mailing to interested parties. Nineteen comment letters were received during the comment period with the majority of comments being endorsements of NASA to conduct testing in an environmentally-safe manner. Issues identified and addressed concerned air quality; threatened and endangered species; noise and associated startle effects; water quality; secondary containment; propellant handling procedures; clarification of EAFB environmental assessment; and notification of spills to USFWS.

On August 21, 1997, NASA published the Notice of Availability (NOA) of the final EIS in the Federal Register (62 FR 44490). The final EIS was provided to Federal, State, and local agencies, organization and members of the general public through direct mailing and distribution to local and NASA libraries for public viewing. One comment letter was received from the U. S. Environmental Protection Agency (EPA) noting that the majority of EPA's original uncertainties regarding procedural issues and data gaps were satisfactorily addressed EPA recommended enumerating potentially affected residents/residences that would be exposed to 65 dBA or higher noise levels; clarifying some terms in the Record of Decision (ROD); providing preferred alternative(s); and further addressing noise impacts on Edwards Air Force Base (EAFB) or documenting a decision that EAFB would not be used for test firings.

Alternatives Considered

The alternatives considered in the EIS for the testing activities are listed as follows:

1. NASA Marshall Space Flight Center (MSFC) in Huntsville, Alabama: The MSFC facility occupies 745 hectares (1,841 acres) within the grounds of the 15,400 hectares (38,000 acres) of the Department of the Army's Redstone Arsenal (RSA). The closest private property is approximately 4 kilometers (2.5 miles) from the proposed MSFC test facilities.
2. NASA Stennis Space Center (SSC) near Bay St. Louis, Mississippi: The SSC facility occupies 5,585 hectares (13,800 acres) and is surrounded by 50,616 hectares (125,071 acres) of acoustical buffer zone primarily in western Hancock County, Mississippi and eastern St. Tammany Parish, Louisiana. The closest private property is approximately 8 kilometers (5 miles) from the proposed SSC test facilities. Due to the large acoustical buffer zone, SSC was also the only test location considered for multiple engine testing for whose collective thrust levels exceeds that of one large engine test.

3. EAFB near Lancaster, California: The EAFB facility is located on approximately 121,815 hectares (301,000 acres) in the Antelope Valley region of the western Mojave Desert.
4. The "No Action Alternative" would maintain the status quo of the Nation's space launch capability and entail continued production and use of existing rocket engine and rocket motor designs for current and future space launch vehicle programs. The "No Action Alternative" provides the benchmark against which the proposed actions are evaluated.

Key Environmental Issues Evaluated

Key environmental issues with respect to implementation of the ASTP are air quality, water discharges, natural resources, threatened and endangered species, wetlands and noise. All potential effects were evaluated in accordance with National Environmental Policy Act of 1969, as amended (NEPA) (42 U.S.C. 4321 et seq.), and NASA policy and procedures (14 CFR Part 1216).

Environmental Consequences of the Alternatives

The final EIS provides the environmental consequences for the MSFC/SSC/No Action Alternative and preliminary decisions to the USAF EA for EAFB. All three sites were found to be capable of fulfilling some or all program obligations without major modifications or potential environmental harm. Impacts were rated as either significant, moderately significant, or insignificant based upon definitions provided for each discipline area. Ratings of insignificant were found for all areas of potential environmental concern, with the following exceptions:

1. At MSFC, moderate impacts may be associated with respect to air quality and noise for medium and large single engine tests, and multiple engine tests whose collective thrust level does not exceed that of one large engine. Based on 1990 census data, it is estimated that 9,141 residences and 24,500 residents are currently within the 65 dBA noise contour that could potentially be impacted by large engine testing. However, air quality is expected to remain within the National Ambient Air Quality Standards. Also, there may be moderate impacts associated with accidental RP-1 spills.
2. At SSC, moderate impacts may be associated with respect to air quality for both medium and large single engine tests as well as for multiple engine tests. However, air quality is expected to remain within the National Ambient Air Quality Standards. Moderate noise impacts at SSC are expected only with large multiple engine tests. Based on 1990 census data, it is estimated that 1,643 residences and 6,320 residents are within the 65 dBA noise contour that could potentially be impacted by multiple engine testing. Also, there may be moderate impacts associated with accidental RP-1 spills.

3. EAFB impacts were only evaluated by the U. S. Air Force with respect to large, single engine testing. Moderate impacts to air quality, noise, threatened and endangered species, and water quality are projected at EAFB. However, air quality is expected to remain within the National Ambient Air Quality Standards.
4. The "No Action Alternative" would entail continued production and use of existing rocket engines and rocket motors for current and future space vehicle programs. Rocket motors use solid propellant comprised of aluminum and ammonium perchlorate fixed in a rubber-like binder. The "No Action Alternative" would not meet NASA's objective to reduce development risk and annual operations cost of advanced propulsion systems.

C. Assessment of the Analysis

Each of the alternatives have environmentally sensitive areas; however, none are expected to be significantly impacted by the proposed action. Air quality levels are expected to remain within the National Ambient Air Quality Standards. Air emissions have been included in either existing permits or appropriate permits would be obtained. Potential impacts associated with accidental RP-1 spill events will be minimized, if not eliminated, with the use of containment measures designed to meet regulatory guidelines. SSC would be less impacted from noise due to the large acoustical buffer zone surrounding the Center. Overall, the short-term effects associated with rocket engine testing, as described in the final EIS, have no long-term negative impacts on the environment surrounding each of the alternative sites. By using existing test facilities, this program also would not add to the irreversible and irretrievable commitment of environmental resources that previously occurred at the test locations when they were constructed.

Choice of Alternatives

Due to its large acoustical buffer zone, SSC is the environmentally preferred and selected alternative for all multiple engine testing whose collective thrust level exceeds that of one large engine. The environmentally preferred alternative for single engine testing is also SSC for the same reason. No environmental impacts were found to be substantially different between SSC and MSFC for small engine testing. No NASA engine test programs are expected to be conducted at EAFB due to NASA's preference to conduct its projects where the NASA workforce is established for that purpose, thereby minimizing cost and logistics.

D. Additional Information

Letters of coordination with a project summary description were sent by NASA to the relevant offices of the U. S. Fish and Wildlife Service (USFWS) and State Historic Preservation Officers (SHPO). The USFWS provided a current list of federally listed species and their respective habitats that should be considered in the development of the

EIS. This list was used in the development of this EIS. The SHPO concurred with NASA's opinion that the program would have no effect on any properties eligible or listed on the National Register of Historic Places.

E. Mitigation

MSFC would make available to the public through press releases test firing schedules for medium, large, and multiple engine tests whose collective thrust level does not exceed that of one large engine. Off site noise levels would be projected using real time meteorological data. If acoustical focusing resulting in overall noise levels of 120 dB or greater is expected offsite, evaluation of potential impact will be made and the results presented to test managers. Engine tests will be delayed if substantial risk of structural damage to private property is determined to exist. However, NASA test management reserves the right to proceed with testing if atmospheric focusing conditions are expected to reasonably diminish as the day advances and meteorological conditions favorably improve. SSC would implement similar noise mitigation for single large engine tests or multiple engines whose thrust level exceed that of one large engine.

To verify noise modeling software results, off-site noise monitoring would be conducted at MSFC for approximately six engine tests whose thrust level meets or exceeds that of one medium engine. Similar monitoring would be conducted at SSC for all engine tests whose thrust level equals or exceeds that of one large engine.

Decision

Based upon all of the foregoing, it is my decision that SSC will be used for all multiple engine testing whose collective thrust level exceeds that of one large engine. Small, medium, and large single engine testing may be conducted at either SSC or MSFC, depending on schedule and other programmatic needs established by SSC in its role as NASA's lead center for propulsion testing.

Richard J. Wisniewski

2/20/98

Date

JH

Joseph H. Rothenberg
Associate Administrator,
Office of Space Flight