

## RECORD OF DECISION

### NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

#### Space Station Freedom Tier 1 Environmental Impact Statement

The Space Station Freedom (SSF) Program represents an action to design, develop, launch, assemble and operate an international orbiting research laboratory for scientific experiments, development of technologies, and stimulation of commercial space enterprises. The action originally consisted of four major elements: a manned base, a free flying laboratory, and two polar orbiting platforms. The management of the U.S. Polar Platform has been transferred to the NASA Office of Space Science and Applications. The free flying laboratory is being developed and planned to be launched by the European Space Agency.

It must be noted that the manned base configuration described in the Tier 1 Final Environmental Impact Statement (FEIS) is that configuration which existed in December 1990, as the development program completed its Preliminary Design Review (PDR). Changes to the configuration resulting from the PDR and subsequent program reassessments will be addressed in the Space Station Freedom Tier 2 EIS.

The Tier 1 EIS was developed to address all major elements of the Space Station Freedom program. Scoping was completed in May 1988. A Draft Tier 1 EIS (DEIS) was distributed for public comment in March 1990. Ten comment letters were submitted concerning the DEIS. Six letters were received which requested minor text clarifications or expressed their concurrence or no comment. The remaining letters presented questions concerning the following:

1. The effect of Shuttle and Expendable Launch Vehicle (ELV) rocket motor emissions on air quality,
2. The impact on the ionosphere of the Station's propulsion system and other contaminants due to leaking, venting and outgassing,
3. Environmental impact of the Titan IV launch of the Polar Orbiting Platform,
4. The impact of construction and operation of Space Station Program facilities at the Kennedy Space Center, and
5. Provision of guidance to emergency response personnel in the event of the Station's unplanned reentry.

Responses to those comments are presented in the Tier 1 FEIS along with references to text changes as deemed necessary. The NASA notice of availability of the FEIS was published in the Federal Register, issued April 4, 1991 (56 FR 13843); the U.S. Environmental Protection Agency (EPA) notice appeared at 56 FR 14097, April 5, 1991. In response to the FEIS, the EPA recommended that a summary of the environmental impacts on air quality associated with rocket motor emissions be included in the FEIS. The impacts of Space Shuttle rocket motor emissions on air quality are addressed in the Space Shuttle EIS and are appropriately referenced in the Space Station FEIS.

The alternatives addressed in this Tier 1 FEIS are:

1. Manned Space Station Freedom (SSF)
2. The Power Tower alternate configuration
3. A man-tended approach (MTA) (not permanently manned)
4. Termination of the program (no action alternative)

The selection of the SSF alternative is based on environmental as well as programmatic considerations. In NASA's view, the Power Tower and MTA alternatives would have essentially the same environmental impacts as the SSF. With the no action alternative, the environmental impacts would not be substantially different from the SSF because additional Shuttle or ELV flights would be needed to deploy and operate payloads which would have been on the Space Station. The considerations which led to the selection of the manned base (SSF) approach are as follows:

1. The Power Tower approach offered no difference in environmental impacts, but in comparison to SSF, had a major shortcoming in user payload accommodations.
2. The MTA approach also involved no differences in the effect on the environment, but included the following significant programmatic disadvantages:
  - No life sciences except during Shuttle visits
  - Delay in on-board fault/problem resolution
  - Manned visits dominated by maintenance actions at the expense of science missions
  - Mission capture in the areas of life sciences, observational sciences, materials processing and technology development projected to be less than 50% of that expected with permanent manning
  - Counter to international agreements to develop a permanently manned base

3. The no action alternative would have an adverse effect on both the planned science missions involved with the space station, and on the U.S. relationship with the international partners in the program. Further, it would not eliminate all potential environmental impacts as many of the planned science missions would have to be carried out piecemeal requiring a potential increase in Space Shuttle or ELV activities.

The resulting environmental consequences of the proposed action are summarized as follows:

The development and manufacture of the U.S. provided Space Station Freedom will be conducted at existing ground based facilities. Some expansion of the existing facilities is expected, and resultant environmental effects will be addressed in appropriate site specific environmental documentation. The program will directly employ approximately 20,000 people during the mid-1990's, and cause up to 30,000 related jobs to be created. The resulting overall economic impact will be positive, with appreciable local effects expected.

In the normal operating mode, Space Station Freedom is not expected to produce major perturbations to the ionosphere during engine firings to reboost the station to a higher orbit, or from venting, outgassing or leaking. All solid waste products and hazardous waste liquids and gases generated onboard the station will be returned to Earth in sealed containers and disposed of in accordance with environmental regulations. The impacts resulting from Space Shuttle and ELV launches have been addressed in the respective environment documents for those programs. No other impacts are anticipated due to the normal operation of Space Station Freedom.

The Space Station Freedom Program is taking numerous measures in the design process and in operations planning to prevent an unplanned reentry of Space Station Freedom. Section 4.1.1.2 of this FEIS discusses some of these measures. A reentry risk analysis and assessment of associated injury/damage probability will be included in the Space Station Tier 2 EIS.

All of the alternatives considered in the Tier 1 FEIS, including the proposed action, have very similar impacts on the environment. Accordingly, the proposed action was considered superior based on a combination of environmental and programmatic factors.

All practicable means to avoid or minimize environmental harm have been adopted consistent with the present early stages of design and planning. A more detailed discussion of environmental impact mitigation and monitoring will be presented in the Tier 2 EIS.

The Space Station Tier 2 EIS is being developed to reflect changes to station configuration, assembly sequence, and program milestones resulting from the PDR and subsequent program restructuring. It will address the environmental impacts of significant modifications to Space Station Freedom, as well as the probability of accidental reentry, the injury/damage probability associated with such reentry, and any significant new information relevant to environmental concerns.

Based on the foregoing, it is my decision to proceed with the design, development and planning for operation of the manned Space Station Freedom.

*William B Lenoir*

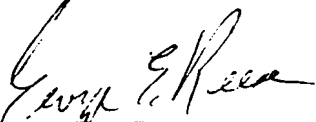
Date: *July 26, 1991*

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Concurrence:

  
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