

National Aeronautics and Space Administration



**Record of Decision
Constellation Programmatic
Environmental Impact Statement**

**Exploration Systems Mission Directorate
NASA Headquarters
Washington, DC**

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RECORD OF DECISION
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
CONSTELLATION PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

A. Background

In January 2004, President George W. Bush announced a new exploration initiative (the *Vision for Space Exploration*) to return humans to the Moon by 2020 in preparation for human exploration of Mars and beyond. Congress expressly endorsed the President's exploration initiative and provided additional direction for the initiative in the National Aeronautics and Space Administration (NASA) Authorization Act of 2005.

The following directives were among those given to NASA in the NASA Authorization Act of 2005 and/or the President's announcement of the *Vision for Space Exploration*:

- Develop a Crew Exploration Vehicle (CEV) to replace the Space Shuttle fleet by 2014, and as close to 2010 as possible.
- To the fullest extent possible consistent with a successful development program, use the personnel, capabilities, assets and infrastructure of the Space Shuttle Program (SSP) in developing the CEV (renamed Orion), Crew Launch Vehicle (CLV [renamed Ares I]), and a heavy-lift launch vehicle (CaLV [renamed Ares V]).
- Undertake lunar exploration activities directed at enabling robotic and human exploration of Mars and beyond.
- Conduct the first extended human exploration mission to the lunar surface by the end of the next decade.
- Use the knowledge gained from successful sustained human exploration of the Moon and robotic exploration of Mars, conduct human exploration expeditions to Mars and, ultimately, other destinations in our Solar System.

The purpose of NASA's Proposed Action (Preferred Alternative) is to undertake the activities necessary to pursue the human exploration elements of these directives by 2020, including developing the flight systems and Earth-based ground infrastructure required to enable continued access to space and to enable future human missions to the International Space Station (ISS), the Moon, Mars, and beyond. Robotic exploration activities are the responsibility of other NASA programs.

To accomplish the specific directives given to NASA by the President and Congress, NASA proposes to continue preparations for and to implement the Constellation Program and develop a new class of exploration vehicles and the Earth-based infrastructure necessary to support their development and use in space exploration.

B. The Environmental Impact Statement

B.1 Introduction

NASA published a Notice of Intent (NOI) in the *Federal Register (FR)* (71 FR 56183) on September 26, 2006 to prepare a Draft Programmatic Environmental Impact Statement (PEIS) and conduct scoping for the Constellation Program. Scoping meetings were held in Florida, Washington, DC, and Utah. Comments were solicited and received from Federal, state, and local agencies and other interested parties on the scope of the Constellation Program. The following scoping comments expressed concerns or questions about both technological and environmental issues, and are addressed in the Final PEIS:

- The economic impact of the Constellation Program, locally and nationally, with an emphasis on the impact of the Program on jobs near NASA Centers.
- Risks to the public associated with launch and Earth atmospheric entry.
- Environmental impacts of the use of solid rocket fuels on the ozone layer and impacts associated with the deposition of combustion products near the launch area.
- Impacts on local animal species (*e.g.*, sea turtles and manatees) associated with construction and launch activities in the John F. Kennedy Space Center (KSC) area.
- Noise impacts associated with launch events.
- The relationship between the Constellation Program and the SSP, including how the socioeconomic impacts of the Space Shuttle retirement and the Constellation Program overlap.
- Alternative technologies to be used for the launch vehicles, including the possibility of using launch vehicles developed by the U.S. Air Force (*e.g.*, Atlas V and Delta IV launch vehicles) instead of developing new launch vehicles.
- Involvement of entities other than NASA in the development of the launch systems, in particular potential international partnerships and partnerships with private industry.

The following issues were raised during the scoping period and were considered outside the scope of the Final PEIS:

- Possible military applications associated with the Constellation Program.
- Legal issues associated with the use of the Moon and its raw materials.
- Environmental impacts in outer space, including impacts on the Moon.
- Use of nuclear systems in support of the Constellation Program (future program actions may or may not utilize nuclear systems; these actions would not be expected to occur during the timeline discussed in the Final PEIS).
- Maintaining funding for the Constellation Program for the extended period required to meet the Program's goals.
- The possible gap in the ability of the U.S. to provide crew transport to the ISS.
- Supply of crew and/or cargo to the ISS by commercial entities.

- Traffic impacts (*e.g.*, congestion and emissions) associated with landing events at a terrestrial landing site.

NASA issued a Notice of Availability (NOA) for the Draft PEIS on August 17, 2007 (72 *FR* 46218). The Draft PEIS was distributed to over 300 potentially interested Federal, state and local agencies; organizations; and individuals for review and comment and was made available on NASA's web site. The following issues were raised during the public review and comment period which closed September 30, 2007:

- Establishing a light management plan at KSC.
- Establishing a monitoring program for bird strikes at KSC.
- Water quality, air quality, and hazardous wastes at the U.S. Army's White Sands Missile Range (WSMR).
- Performing a coastal zone consistency determination for Langley Research Center (LaRC).
- Raising awareness of metals in the environment.
- Environmental impacts in outer space, including impacts on the Moon.

The U.S. Environmental Protection Agency (EPA), Office of Federal Activities issued a letter to NASA on October 1, 2007 stating that the Draft PEIS provides an adequate discussion of the potential environmental impacts of the proposed Program. Therefore, the Draft PEIS received EPA's highest rating (LO – Lack of Objection).

The Final PEIS addresses potential environmental impacts associated with proposed Constellation Program activities through the early 2020s. Under the present schedule, this includes the development of the Ares launch vehicles and Orion spacecraft, development of advanced systems needed to successfully complete lunar missions (*e.g.*, the Altair Lunar Lander, Lunar Surface Systems, spacesuits, and tools), development and construction of the infrastructure needed to support ground and mission operations, early missions to support the ISS, and short-duration missions to the Moon. The U.S. commitment to the ISS extends well into the next decade, with up to five proposed Orion/Ares I launches per year. The current Constellation Program baseline plan includes up to four lunar missions through 2020.

The NOA for the Final PEIS was published on January 23, 2008 (73 *FR* 4013) initiating the 30-day "waiting period." NASA distributed the Final PEIS to over 300 potentially interested Federal, state, and local agencies; organizations; and individuals and posted the Final PEIS on NASA's web site at: http://www.nasa.gov/mission_pages/constellation/main/peis.html. Comments received during the "waiting period" have been addressed in this Record of Decision (ROD). The ROD will be published in the website noted above, once rendered.

B.1.1 Related National Environmental Policy Act (NEPA) Documents

In order to meet the timeline established by the President and Congress for the exploration initiative, NASA needed to begin work on several actions in advance of completing the NEPA process for the Constellation Program. Therefore, NASA prepared separate NEPA documentation and incorporated those NEPA documents by reference in the Final PEIS. These tiered NEPA documents evaluated the impacts of such activities as the development of the Orion spacecraft; construction, modification, and operation of test equipment in support of multiple

Constellation Program activities at George C. Marshall Space Flight Center (MSFC), John C. Stennis Space Center (SSC), and WSMR/Johnson Space Center (JSC) White Sands Test Facility (WSTF); as well as the modification and operation of new launch infrastructure at KSC.

There are potential future activities associated with the Constellation Program that are beyond the scope of this Final PEIS. Missions to establish a permanent lunar outpost and crewed mission to Mars are not expected to occur during the timeframe addressed in this Final PEIS. Development, operation, and mission activities associated with these actions would be subject to separate NEPA review and documentation, as appropriate.

B.2 Alternatives Considered

The Final PEIS evaluates two alternatives, the Proposed Action (Preferred Alternative) and the No Action Alternative. NASA also considered alternatives to the Proposed Action that were not evaluated further.

B.2.1 Proposed Action

NASA proposes to continue preparations for and to implement the Constellation Program. The focus of the Constellation Program is the development and use of the flight systems and Earth-based ground infrastructure required to enable the U.S. to have continued access to space and to enable future human missions to the ISS, Moon, Mars, and beyond. The Constellation Program also would be responsible for developing and testing of flight hardware, and for performing mission operations once the infrastructure is sufficiently developed.

B.2.2 No Action Alternative

Under the No Action Alternative, NASA would not continue preparation for nor implement the Constellation Program. NASA would forego the opportunity for human missions to the Moon, Mars, and beyond using U.S. space vehicles. The U.S. would continue to rely upon robotic missions for space exploration activities. Other than the potential for commercial crew and cargo service to the ISS, the U.S. would depend upon foreign partners to deliver crew and cargo to the ISS.

B.2.3 Alternatives Considered But Not Evaluated Further

Alternatives to the Proposed Action that were not evaluated further included modifying the Space Shuttle fleet, varied designs and configurations for the Orion spacecraft, and multiple launch vehicle options for both crew and cargo launches. As explained in Section 2.3 of the Final PEIS, these alternatives were eliminated from further evaluation based on various considerations, including safety, technical feasibility, cost, development time and risk, and consistency with Presidential and Congressional directives.

B.3 Key Environmental Issues Evaluated

The key environmental issues evaluated in the Final PEIS fall within five areas:

- Programmatic socioeconomic impacts.
- Construction activities needed to modify existing or build new facilities, focusing on modifications to test facilities and operational facilities.
- Major test activities, focusing on engine ground tests and flight tests for the Orion spacecraft and the Ares launch vehicles.

- Missions, focusing on mission launches utilizing Ares launch vehicles, and the return of the Orion spacecrafts' Crew Module (CM) to Earth.
- Cumulative impacts.

NASA evaluated these key environmental issues primarily as they apply to the following U.S. Government and commercial facilities: KSC, SSC, Michoud Assembly Facility (MAF), JSC, MSFC, John H. Glenn Research Center at Lewis Field and at Plum Brook Station, LaRC, Ames Research Center, WSTF, Dryden Flight Research Center, Goddard Space Flight Center, Jet Propulsion Laboratory, and Alliant Techsystems-Launch Systems Group (ATK) facilities at Clearfield and Promontory, Utah. The Constellation Program would also be supported by various other government and commercial facilities throughout the U.S. These facilities are not evaluated in the Final PEIS because activities occurring would be within each facility's current scope of operation and no significant environmental impact would occur.

B.4 Environmental Consequences of the Alternatives

Section B.4 is a summary of information that can be found in greater detail in Chapter 4 of the Final PEIS as well as corresponding Environmental Assessments (EA) completed to date, which are incorporated by reference. A list of these EAs can be found in Section 1.4 of the Final PEIS.

B.4.1 Programmatic Socioeconomic Impacts

B.4.1.1 Proposed Action

The distribution of work related to the Constellation Program reflects NASA's intention to productively use personnel, facilities, and resources from across the Agency to accomplish NASA's exploration initiative. Assignments align the work to be performed with the capabilities of the individual NASA Centers. The diversity of projects would vary considerably; however, it is NASA's intent to retain a major socioeconomic footprint at each Center. In addition, NASA is committed to a strategy to maintain current civil servant workforce levels, to the extent practicable, and provide funding to preserve the critical and unique capabilities provided by each NASA Center.

A detailed socioeconomic analysis for the Constellation Program is limited by the fact that the Program is at an early stage and subject to change as Program requirements evolve.

B.4.1.2 No Action Alternative

At this time, a prediction cannot be made as to how the President or Congress would redirect funding and personnel that would otherwise support the proposed Constellation Program. The President has directed NASA to retire the Space Shuttle fleet by 2010. Without new programs and projects to fill the void left by the close-out of the SSP, substantial adverse socioeconomic impacts would be experienced by localities that host NASA Centers heavily involved in the SSP.

B.4.2 Impacts from Facility Modifications and New Construction

B.4.2.1 Proposed Action

Under the Proposed Action, modifications to existing facilities at some NASA Centers would be necessary, and involve changes such as updating electrical systems and construction of internal

walls. Projects involving new construction and/or major facility modifications would be undertaken at KSC, MSFC, SSC, and WSTF.

Impacts associated with new construction and/or major facility modifications at NASA Centers would be expected to generate noise, which would principally impact workers located on the site (*i.e.*, within a Center's boundaries). Air emissions would be released from construction equipment and construction wastes would be generated. Potential impacts to biota and wetlands would be considered and all construction activities would be performed in compliance with applicable licenses and permits.

Modifications to historic properties at NASA Centers (*e.g.*, KSC, MSFC) could affect the character or historic integrity of such properties. This is discussed in more detail in the Final PEIS and/or in the corresponding EAs.

B.4.2.2 No Action Alternative

Under the No Action Alternative, new construction and facility modifications to support the Constellation Program would not occur. NASA and the Constellation Program would not modify existing facilities or build new facilities in support of Constellation Program developmental activities required to carry out human exploration missions. Consequently, the environmental impacts associated with these modifications would not be incurred. However, needed facility maintenance which would be funded by the Constellation Program may not be performed. Such facilities could be placed under consideration for demolition.

B.4.3 Impacts from Test Activities

B.4.3.1 Proposed Action

Under the Proposed Action, development of the Ares launch vehicles and the Orion spacecraft would involve extensive testing of components and integrated vehicles. The tests with the greatest potential to have environmental impacts would include ground and flight tests of liquid fueled engines and solid rocket motors (SRM). These tests would occur at contractor facilities (SRM tests at ATK); at several NASA Centers, primarily SSC (Ares Upper Stage and Ares V Core Stage engine tests) and KSC (flight tests); and other government facilities, primarily at WSMR (Launch Abort System tests). Environmental impacts associated with test firing of SRMs at ATK's Promontory facility would principally be expected to be air quality impacts and short-term, localized noise impacts. The impacts of liquid fueled engine testing at SSC would principally be short-term noise impacts. Testing of the Main Propulsion Test Article, a full-scale fully functional prototype of the Upper Stage propulsion system, at MSFC would generate offsite noise at levels that may increase the nuisance impact of the tests due to its longer duration than current or past tests performed at MSFC; however, these tests would not result in health impacts to the public. No adverse impacts to wildlife or listed species are anticipated from test firings of liquid fueled engines and SRMs.

Constellation Program flight tests at KSC would have essentially the same impacts as mission launches.

All of the facilities listed above currently perform activities of a similar nature to those proposed in support of the Constellation Program. Therefore, the impacts of these activities would be similar to those already induced.

B.4.3.2 No Action Alternative

Under the No Action Alternative, the test activities associated with the development of the Ares launch vehicles and the Orion spacecraft would not be required. Consequently, the impacts associated with the preparation for and performance of these tests would not be incurred.

B.4.4 Impacts from Missions

B.4.4.1 Proposed Action

Under the Proposed Action, impacts associated with missions would primarily be from Constellation launch activities at KSC. Combustion products from burning solid propellant in the Ares would release hydrogen chloride (HCl), aluminum oxide (Al_2O_3), oxides of nitrogen, and particulate matter. The potential ground level effects of Ares launch vehicle exhaust clouds, acidic deposition, and far-field impacts (more than a few kilometers from the launch pad) would be similar to the Space Shuttle and therefore considered negligible.

An Ares V launch would be expected to generate noise, including vibration and ground waves, in excess of that experienced with the Space Shuttle and likely of the magnitude of or exceeding that of the Saturn V. Noise modeling for the Ares V resulted in calculated noise values at the city of Titusville and at the KSC Visitor Center/Industrial Area that are much lower and significantly shorter in duration than the exposure threshold. A hearing conservation program would not be required because the exposure threshold would not be exceeded. The potential for structural damage to close-in buildings from Ares V launches exists. NASA has procedures in place to evaluate such damage and provide for compensation, if warranted.

Ares I launch noise levels would be much less than the Ares V noise levels.

Sonic booms are associated with ascending launch vehicles and jettisoned launch vehicle components. The magnitude and location of Constellation sonic booms would be similar to those experienced with the Space Shuttle. The exact location of the sonic boom footprint would be mission specific and would occur over the open ocean.

Constellation launches would result in a temporary startle response from nearby birds and other wildlife, and potential fish kills in nearby impoundments; however, similarly to the Space Shuttle, no long-term adverse impacts to wildlife or fish populations would be expected.

Surface water quality near the launch area could be affected by the launch exhaust cloud; however, long-term adverse impacts would not be expected.

Processing and launch activities would generate waste streams from propellant servicing, and launch and recovery operations. Processing SRMs for Ares launch vehicles would be very similar to ongoing operations for the Space Shuttle fleet. All waste management activities would be within current permit requirements.

The results of a launch area accident, including extreme heat, fire, flying debris, and HCl deposition could damage adjacent terrestrial and marine biota within the impact region. As explained in Section 5 of the Final PEIS, mitigation measures and protective actions have or will be implemented to minimize or eliminate potential impacts to terrestrial and marine biota in the area. As experienced in the past, damaged vegetation would be expected to re-grow within the same growing season and no lingering effects would be expected to be present.

NASA's Range Safety Policy is designed to protect the public, employees, and high-value equipment, and is focused on the understanding and mitigation (as appropriate) of risk. Potential impacts from catastrophic incidents involving launch vehicles are assessed as part of the overall Range Safety evaluation for each launch, and KSC can make launch-specific operations or access adjustments, as appropriate, to mitigate the risk of potential launch accident impacts.

The Ares I First Stage and the Ares V solid rocket boosters (SRB) would be jettisoned during ascent and recovered from the Atlantic Ocean using the same processes used for the Space Shuttle. The Constellation Program is studying the possibility of not recovering the spent Ares I First Stage and Ares V SRBs for certain missions. Other Ares jettisoned sections would splash down through targeted atmospheric entry into the ocean and not be recovered. Potential environmental impacts from similar Space Shuttle operations have been demonstrated as negligible.

The landing site for the return of the Orion CM would most likely be a site in the Pacific Ocean, off the western coast of the U.S. The return would result in a sonic boom that would occur over the open ocean, the magnitude of which would be expected to remain well below the magnitude of sonic booms from Space Shuttle atmospheric entries. Any potential environmental impacts from the sonic boom of returning the Orion CM to a terrestrial landing site would be addressed in separate NEPA review and documentation, as appropriate.

If the Orion CM were to have a catastrophic failure during atmospheric entry, the primary hazard would be from falling debris over the open ocean. Prior to a planned Orion CM atmospheric entry, NASA will ensure that Notices to Mariners and Notices to Airmen (NOTAM) are issued for the return corridor to reduce the risk to aircraft and surface vessels.

B.4.5 Cumulative Impacts

B.4.5.1 Proposed Action

The principal activities associated with the Proposed Action that would result in environmental impacts include liquid fueled engine and SRM tests, launches, construction of new facilities, modifications of existing facilities, and other direct actions. In addition, there may be secondary impacts associated with the support infrastructure (*e.g.*, structures, utilities, and roads). Each NASA Center has ongoing programs that would be managed concurrently with the Constellation Program. It is reasonable to expect that these programs would entail many activities similar to those anticipated for the Constellation Program. Such activities would be evaluated for environmental impacts by the sponsoring program or affected Center(s) and would be subject to separate NEPA review and documentation, as appropriate. The projected cumulative environmental impacts of implementing the Proposed Action are principally the secondary impacts associated with the workforce that would support the Proposed Action at each respective facility. The Constellation workforce socioeconomic impacts were addressed previously in Section B.4.1.1.

With respect to Ozone Depleting Substances (ODS) and global warming, the cumulative impact of the Constellation Program through the year 2020 is expected to be negligible. It is estimated that the annual emissions of HCl and Al₂O₃ from Constellation launch vehicles would induce less than 0.0012 percent of the estimated annual global average ozone reduction for corresponding years.

The production of the SRMs currently requires the use of hydrochlorofluorocarbons (HCFC 141b), an ODS, and the Ares I Upper Stage and Ares V Core Stage liquid oxygen/liquid hydrogen tanks may also require the use of HCFC 141b blown foam insulation. NASA intends to develop cryoinsulation replacements for the Ares I Upper Stage that do not contain HCFC 141b. NASA will continue to use relatively small amounts of HCFC 141b-blown foam for use in research and development replacement activities. In addition, ATK also uses small quantities of HCFC 141b in foam used to fill test holes in foam insulation on the exterior surface of the SRB.

The global warming potentials for many greenhouse gases (expressed in metric tons of carbon dioxide [CO₂] equivalent) have been developed to allow comparisons of heat trapping in the atmosphere. The principal source of carbon emissions that would be associated with the Constellation Program would be from NASA's energy use in support of the Program. Constellation launches also would contribute to the production of carbon monoxide and CO₂. The total global warming potential of emissions from the Constellation Program are expected to total less than 0.004 percent of the annual U.S. carbon emissions over the 2009 to 2020 time period.

B.4.5.2 No Action Alternative

Under the No Action Alternative, the U.S. would continue to rely upon robotic missions for space exploration activities beyond Earth orbit. Other than the potential for commercial crew and cargo service to the ISS, the U.S. would depend upon our foreign partners to deliver crew and cargo to the ISS. Furthermore, NASA would forego the opportunity for human missions to the Moon, Mars, and beyond using U.S. space vehicles. Consequently, the impacts associated with conducting such missions would not be incurred.

C. Assessment of the Analysis

C.1 Summary of Major Findings

Activities associated with the Proposed Action that would result in potential environmental impacts include liquid fueled engine and SRM tests, launches, construction of new facilities, modifications of existing facilities, and other direct actions. In addition, there may be secondary impacts associated with the support infrastructure (*e.g.*, structures, utilities, and roads) such as wastes, impacts to water, noise, and air emissions, as well as the socioeconomic impacts of the workforce on the surrounding communities and region.

Since the proposed Constellation Program would be largely built upon the ongoing SSP, the potential environmental impacts would be expected to be very similar to the current impacts associated with the SSP. Constellation Program-related activities at the respective sites would largely be expected to be similar to ongoing operations at those sites and therefore have similar environmental impacts.

At NASA Centers, implementation of the Proposed Action would not involve major new construction or new types of activities with the potential for substantial environmental impacts. The proposed activities are expected to be similar in nature and magnitude to ongoing activities at the respective Centers.

The economic benefits associated with NASA's continued commitment to the Nation's leadership in space and aeronautics research are expected to continue through 2012 and beyond.

It is NASA's intent to retain a major socioeconomic footprint at each NASA Center. Furthermore, NASA is committed to a strategy to maintain current civil servant workforce levels, to the extent practicable, and provide funding to preserve the critical and unique capabilities provided by each NASA Center.

C.2 Incomplete or Unavailable Information

The Constellation Program is in the early design stages; therefore, it is reasonable to expect that there would be changes to the Program's plans and designs as the Program matures. The changes could include modification to the Orion spacecraft and the Ares launch vehicles; the locations where development and testing occurs as well as their timing; and/or a change in the number of launches from the planned baseline.

Several key aspects of the Constellation Program were not sufficiently defined to be thoroughly evaluated in the Final PEIS. These include potential facility modifications and new construction projects that may occur outside the timeframe of the Final PEIS, the need for continued use of ODSs, potential future test activities, and development of Lunar Landers, Lunar Surface Systems and other future systems which would occur beyond 2020. These future Program activities would be subject to NEPA review, documentation, and tiered off the Final Constellation PEIS, as appropriate.

Detailed analysis of the socioeconomic impacts of implementing the Constellation Program cannot be performed at this time as the prime contract procurements are not completed. Furthermore, complete and accurate socioeconomic information, including budgetary data, workforce projections, and future procurement actions in addition to prime contract procurements are not available thus limiting the ability to quantify the socioeconomic impact of the Constellation Program.

C.3 Choice of Alternatives

The Final PEIS addresses two alternatives, the Proposed Action (Preferred Alternative) and the No Action Alternative. Based on discussions in the Final PEIS and the ROD, it is my intention to select the Proposed Action.

Implementing the Proposed Action fulfills the long-term goals and objectives of the U.S Space Program of advancing the Nation's scientific, security, and economic interests through a robust space exploration program. The Congress, through the NASA Authorization Act of 2005 has provided additional direction to promote exploration, science, commerce, and U.S. preeminence in space.

The No Action Alternative would be the environmentally preferable alternative as the environmental impacts associated with implementing the Proposed Action would not occur. It should be noted that needed facility maintenance which would be funded by the Constellation Program may not be performed under the No Action Alternative. Therefore, many of these facilities which have historic status could be placed under consideration for demolition, which constitutes an adverse effect on historic properties.

D. Additional Information

The "waiting period" following release of the Final PEIS closed on February 22, 2008. NASA received a total of 10 responses (letters and emails) from Federal and state agencies;

organizations; and individuals. These responses included agreement with the assessments in the Final PEIS, “no comments”, requests for consultation with regard to historic or eligible resources, and requests for additional information.

A letter dated October 1, 2007 provided by the Alabama Historical Commission commenting on the Draft PEIS requesting consultation on historic and historically eligible properties and land disturbing activities on previously undisturbed land at MSFC was not included as a part of Appendix B of the Final PEIS. NASA’s response to the Alabama Historical Commission as follows: *“Thank you for your comment. As practiced previously, NASA has and will continue to consult with the Alabama Historical Commission if it is deemed a Constellation Program activity has the potential to impact a National Historic Landmark, a National Register eligible property, or an archeological site at MSFC. NASA has noted the Commission’s request to be consulted on land disturbing activities in previously undisturbed areas.”*

The Constellation Program is in the early stages of development thus some activities were undefined at the time of the preparation of the Final PEIS. As the Program matures and actions become firm, additional environmental analyses would be anticipated.

Three EAs were initiated for Constellation Program activities after the Final PEIS was published. The U.S. Army, in cooperation with NASA, has prepared an EA to address potential environmental impacts associated with the preparation and operation of a new drop zone for Orion and Ares parachute testing at Yuma Proving Ground, Arizona. This EA is expected to be released for public review and comment in early 2008. An EA is being prepared to address potential environmental impacts of modifying and operating a building of national historic significance at MSFC in support of welding and cleaning operations. This EA is expected to be released for public review and comment in the first half of 2008. Another EA is being prepared to address potential environmental impacts of modifying and operating a building that is under investigation for national historic significance at MAF in support of Ares Upper Stage tooling and welding operations. This EA is expected to be released for public review and comment in the first half of 2008. No significant environmental impacts are expected from these Constellation Program activities.

E. Mitigation

NASA will employ mitigation measures to avoid or reduce the magnitude of environmental impacts from the Constellation Program, as appropriate. NASA also will continue the good environmental practices already being employed at each of the NASA facilities supporting the Constellation Program. Many of these mitigation measures and good environmental practices will be similar to those currently being employed for the SSP.

Mitigation activities and ongoing environmental practices that will contribute to mitigation of potential environmental impacts from Constellation Program activities include, but are not limited to:

- Range Safety policies and procedures employed at launch sites (KSC and WSMR) which are designed to protect the public, employees, and high-value property.
- Notices to Mariners and NOTAMs preceding Constellation launches and Earth atmospheric entry of the Orion spacecraft to prevent collisions with surface ships and aircraft.

- Mitigation of bird and bat strikes resulting from modifications to Launch Complex (LC) - 39 at KSC (*e.g.*, minimize lightning tower height, use of minimum number of low intensity lights, use of large diameter stainless steel grounding wires) and at LC-32 at WSMR (*e.g.*, use of minimum number of low intensity lights and surveys of tower during nesting season).
- Compliance with the KSC lighting plan during construction, modification, and operation of LC-39 to protect nesting sea turtles.
- The perpetual restrictive easement at SSC (the “Buffer Zone”) that provides an acoustical and safety protection zone for NASA testing operations.
- Wetland banking at SSC to mitigate the loss of wetlands associated with construction of the new A-3 Test Stand.
- The physical separation between engine test facilities at MSFC and public property provided by the U.S. Army’s Redstone Arsenal that provides an acoustical and safety protection zone for NASA testing operations.
- SSC and MSFC would continue their practice of making engine test firing schedules available to the public through press releases.
- SSC and MSFC would delay engine tests if substantial risk of structural damage to private property is determined to exist.
- Offsite noise monitoring would be conducted at MSFC for engine tests whose thrust level meets or exceeds that of one medium engine.
- Noise impacts at WSMR would be mitigated by excluding the public from areas where they could be exposed to potentially harmful noise levels and by requiring WSMR personnel to use hearing protection devices, as appropriate.
- WSMR also would employ dust control techniques during construction activities, vehicle controls on off-road traffic, and soil remediation for hazardous and non-hazardous waste spills.
- If an archeological site is discovered during excavations at project sites, the Historic Preservation Officer would be notified.

NASA intends to develop cryoinsulation replacements for use on the Ares I Upper Stage that do not contain HCFC 141b. However, this test program will require relatively small amounts of HCFC 141b-blown foam for use in comparative studies that is needed to ensure that replacement cryoinsulation materials have similar properties and perform at least as well as the current materials.

Some historic resources at various NASA facilities could be adversely affected. Modifications to historic properties used by the Constellation Program could affect the character or historic integrity of such properties. NASA has a programmatic agreement with the Department of Interior, National Park Service, to mitigate impacts to National Historic Landmarks. Modifications to historic properties required for the Constellation Program at NASA facilities will be undertaken in compliance with the National Historic Preservation Act and in consultation with the respective State Historic Preservation Officer and the National Park Service.

DECISION

Based upon all of the foregoing and the Final PEIS, it is my decision to continue preparations for and to implement the proposed Constellation Program.

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2-28-08

Date

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