

# **ENVIRONMENTAL ASSESSMENT**

## **RESTORATION OF THE SSC CANAL LOCK SYSTEM JOHN C. STENNIS SPACE CENTER HANCOCK COUNTY, MISSISSIPPI**

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**ABSTRACT**

**NASA is planning to restore the existing Canal Lock System at the Stennis Space Center. The Canal Lock System will continue to be used to support the static test firing of the Space Shuttle Main Engines. The proposed restoration will not result in significant impact on the quality of the human environment.**

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## 1.0 Introduction

### 1.1 Description and Purpose of the proposed action:

The National Aeronautics and Space Administration (NASA) is planning to restore the existing Canal Lock System at the John C. Stennis Space Center (SSC). The present Canal Lock System has been in operation since the early 1960's. The system is approaching its operational lifetime and requires major maintenance rehabilitation to prevent an operational failure.

### 1.2 Alternative Actions:

Two possible alternatives to the restoration of the Canal Lock System are considered: the construction of a new facility, or the no action alternative. The proposed restoration of the system is the most desirable based on environmental impacts, cost, and expediency.

### 1.3 No Action Alternative:

The major mission of the Stennis Space Center is the static test firing of the Space Shuttle Main Engine (SSME). Test components, materials, fuels, and support equipment are transported by water to the SSC through the Canal Lock System. A no action alternative would result in continued high level maintenance on the Canal Lock System with the possibility of unplanned periodic failures that would restrict the center's ability to receive critical material.

### 1.4 Environmental Considerations:

Based on the preliminary design requirements, the environmental impacts associated with this restoration identified in this assessment are minor. The result of this action will not alter the environment presently existing and as defined in the SSC Environmental Resources Document.

### 1.5 Conclusions and Recommendations:

Restoration of the Canal Lock System will cause no significant physical environmental impact; therefore, a finding of no significant impact is recommended.

## 2.0 Facility Description and Purpose

### 2.1 SSC Location and Function:

Stennis Space Center is located along the southern edge of the Gulf Coastal Plain near the Gulf of Mexico, approximately 88.5 kilometers (55 miles) northeast of New Orleans, Louisiana and 58 kilometers (36 miles) west of Gulfport/Biloxi, Mississippi. The facility is situated between the towns of Picayune to the north and Bay St. Louis to the south. The majority of SSC is located in Hancock County, Mississippi, although portions of the Buffer Zone extend into St. Tammany Parish, Louisiana and into Pearl River County, Mississippi.

SSC was built between 1963 and 1966. The facility was originally established to perform developmental and acceptance tests of large liquid-propellant rocket systems for the United States Space Program. Currently, SSC is the site for development and testing of the Space Shuttle Main Engines. SSC is host to other Federal, State, and related organizations located at SSC including, the U.S. Department of Commerce; the U.S. National Oceanic and Atmospheric Administration; the U.S. Environmental Protection Agency-Toxic Analysis Center; the U.S. Department of Defense; the U.S. Geological Survey; and Mississippi and Louisiana State agencies.

SSC consists of both a Fee Area and Buffer Zone. The Fee Area is comprised of approximately 5439 hectares (13,440 acres) of government-owned land. Within the Fee Area, NASA and the other resident government agencies have constructed the test facilities, laboratories, office and support buildings necessary to conduct their operations.

Surrounding the Fee Area, the government has acquired a perpetual restrictive easement which prohibits the maintenance or construction of dwellings and other buildings suitable for human habitation or occupancy. This region, which is mainly privately owned, is known as the Buffer Zone and covers approximately 50,505 hectares (124,800 acres).

### 2.2 Restoration of the Canal Lock System:

The Canal Lock System at SSC provides access to the SSC canal for waterborne traffic delivering various commodities to the center. The bascule bridge allows vehicular traffic to cross the canal system and gain access to the center from the south. The continued successful operation of this system is required for the timely development, acceptance testing, and certification of NASA's rocket propulsion systems and subsystems.

## 3.0 Description of the Proposed Action and Alternative Actions

Two alternatives to the rehabilitation of the Canal Lock System are considered: the construction of a new lock or the no action alternative.

### 3.1 The Proposed Action:

This project is to restore the Canal Lock System to a reliable operating system by replacing worn mechanical components with new components and upgrading the electrical system with

new wiring and electronic components. The lock will be drained and inspected for structural soundness. Any areas found to be unsound will be repaired.

### 3.2 The New Facility Alternative:

The Canal Lock System provides access to the SSC canal system that sits at a higher elevation than the nearby navigable waterway. Construction of a new lock would require severe disturbance of the wetlands surrounding the area. Mitigation of the environmental impacts would likely be cost prohibitive and the construction could cause significant adverse physical environmental impacts. The impact associated with the siting of a new lock, its associated adverse environmental considerations, the cost of constructing a new lock, and the time required to construct the new lock make this alternative less desirable than the restoration of the existing lock.

### 3.3 The No Action Alternative:

The mission at SSC as a propulsion system testing center cannot be fulfilled without the support of the Canal Lock System. The system must be efficient and reliable. Presently, the Canal Lock System at SSC is approximately twenty-five years old and is approaching the design life of this system. This aging system is requiring ever increasing maintenance and expenses to remain operational. Periodic or possibly permanent outages would prevent SSC from fulfilling its mission.

## 4.0 Environmental Impacts

### 4.1 Air Quality Impacts:

Short term fugitive air emissions may result from the abrasive blasting and re-coating of the structural components of the Canal Lock System. Fugitive air emissions resulting from this process will be captured by curtains, enclosures or other appropriate methods to prevent deterioration of air quality during the restorations. There will be no air emissions during normal operation of the system.

### 4.2 Water Quality Impacts:

Short term minor impacts on water quality may be caused by storm water erosion during the restoration and disturbances of the canal sediment during the maintenance phase of the project. There are no operational wastewater discharges. No change in the present operating conditions are anticipated.

### 4.3 Solid and Hazardous Waste Impacts:

The solids resulting from the abrasive blasting will contain lead from the original paint primers. Emissions resulting from this process will be captured by the method of blasting, the type of blast material or enclosures for capturing the spent material to prevent deterioration of the environmental quality during the restoration. The waste solids containing lead will be collected and transported off-site to a permitted hazardous waste disposal facility. Contractors will have proper permits for the hazardous waste they generate and provide the appropriate methods for

disposal off-site. NASA and the contractors will comply with all relevant Federal and State laws and regulations. Other solid waste produced will be parts replaced from the old system. The scrap material should not be considered hazardous. Where material recovered from replacement has a scrap value, it will be salvaged and sold.

#### 4.4 Toxic Substances:

Curtains or other suitable enclosures will be utilized during the abrasive blasting process to minimize the airborne fugitive emissions to environmentally safe levels. The lead containing abrasive will be collected and removed as described in 4.3 above.

#### 4.5 Radioactive Materials and Ionizing Radiation:

No radioactive materials or the generation of ionizing or non-ionizing radiation will occur during this project nor during normal operations as a result of this project.

#### 4.6 Wetlands:

The SSC facility straddles the watersheds of two rivers: the East Pearl River on the western Fee Area boundary and the Jourdan River on the Eastern Fee Area boundary. Some tributaries at the facility flow west to Harper Bayou and eventually drain into the East Pearl River. Other tributaries flow east into Catahoula Creek, with some intermittent streams flowing south into Devil's Swamp. Catahoula Creek and Devil's Swamp both eventually drain into the Jourdan River. The Pearl River empties into Lake Borgne, while the Jourdan River drains into the Bay of St. Louis. Both Lake Borgne and the Bay of St. Louis discharge into the Mississippi Sound.

As a result of the wetlands hydrology found at and around SSC and the presence of hydric soils and hydrophytic vegetation, a large portion of both the Fee Area and Buffer Zone are considered jurisdictional wetlands by the Corps of Engineers. The proposed restoration of the Canal Lock System is a previously developed area and not in a functional or jurisdictional wetlands. Therefore, the proposed project is not located in and will not affect wetlands.

#### 4.7 Threatened and Endangered Species:

A survey for threatened and endangered species in the vicinity of the Canal Lock System have been reported by Drs. Edmund Keiser and Paul Lago. There have not been any documented sightings of threatened or endangered species in the area of the Canal Lock System. A 1992 fall survey of flora at the landfill site did not uncover any threatened or endangered botanical species. Proposed restoration of the Canal Lock System should not adversely effect any threatened and endangered species or critical habitat possibly known to exist in the SSC Fee Area.

#### 4.8 Noise:

Noise impacts from construction will be short term and not heard outside the immediate construction area. There are no long term adverse noise impacts anticipated as a result of this project.

### 5.0 Land and Natural Resource Impacts

### 5.1 Geology, Topography, and Soils:

SSC lies in the Lower Coastal Plain Physiographic Province of Mississippi, with the Buffer Zone surrounding the Fee Area extending into the Pine Hills Province. The site is underlain by a thick sequence of sedimentary deposits dipping to the south and west. Recent age alluvium, quaternary coastal deposits, and the citronelle formation of the Pliocene Age occur at the surface. Strata ranges from unconsolidated alluvium and coastal deposits, sands, gravel, and clays to sediments varying from clays to gravel. Bedrock is thought to be as much as 3,000 to 3,700 meters (10,000 to 12,000 feet) below the surface. The Lower Coastal Plain is a low flat area; elevations increase gradually from sea level to slightly higher elevations in the northern highlands of the Province. Southern areas of the Province are primarily marshlands. North to south elevated ridges are the topographic features. Land surface elevation ranges from 2 to 27 meters (10 to 90 feet) above sea level, and local relief is negligible. Fee Area elevations range from approximately 1.5 to 9.1 meters (5 to 30 feet) above mean sea level. The topography of the Pine Hills Province is generally a level or rolling hills. Heavy forestation of pine occur in parts of the Province.

The Hancock County, Mississippi Soil Survey indicates the soils in the Fee Area are dominated by Atmore silt loam (At), the Smithton association (Su), and Escambia loam (EsA). These soils are generally composed of poorly to somewhat poorly drained silty and loamy soils. They are generally acidic with other significant characteristics of wetness, high organic matter, and weathered clay mineralogy.

There will be no impacts to the geology, topography, or soils at SSC as a result of this project.

### 5.2 Land Use:

The Fee Area and Buffer Zone at SSC occupy approximately 36% of the Hancock County land base. Land uses outside the Buffer Zone vary. Urban areas interspersed with open spaces, such as coastal wetlands, are scattered along the coast. The northern half of the county is primarily commercial forestry and cropland. Recreational areas are scattered along open bodies of water. Institutional and industrial land uses occupy areas of the Buffer Zone perimeter.

The majority of the land within the Buffer Zone is used for commercial pine forests. The remaining land uses include wildlife management areas, cattle grazing, limited cropland, and small mineral mining operations.

There will be no changes to or impacts on the land use at SSC as a result of this project.

### 5.3 Floodplain:

The Canal Lock System is not a critical activities facility. The documented floodplain at SSC includes a 100-year floodplain along the East Pearl River at the western edge of the Fee Area, and a 100-year floodplain along the Wolf Branch and along the Lion Branch of Catahoula Creek in the northeast portion of the Fee Area.

The majority of SSC is in an area of minimal flooding. This project is not located in the SSC floodplain.

#### 5.4 Energy Impacts:

There are no energy impacts as a result of the restoration of the Canal Lock System.

#### 6.0 Archaeological, Historic and Cultural Aspects

##### 6.1 Archaeological:

Historically, the land at SSC has been severely disturbed by timber harvesting and the associated naval stores industry during the late nineteenth and early twentieth centuries. More recently, the land was disturbed by the construction of the facility during the 1960's, making it unlikely that undisturbed archaeological sites would be found. In the Fee Area, only the townsite of Gainesville may require future archaeological considerations if land disturbing activities are proposed for the Fee Area. This project is on previously disturbed land and should have no archaeological impact.

##### 6.2 Historical:

Three test stands at SSC have been designated as National Historic Landmarks and appear on the National Register of Historic Places. These test stands and associated control centers have been designated because of their importance in the testing of Saturn rockets, and the importance of the Saturn rocket in landing men on the moon. The Canal Lock System restoration project does not involve nor is it in the vicinity of the three test stands.

##### 6.3 Socioeconomic:

This project will not change the number of personnel presently involved in the operations of the Canal Lock System. There will be an increase in the number of transient short term construction and installation personnel. The Canal Lock System restoration project does not have a socioeconomic impact.

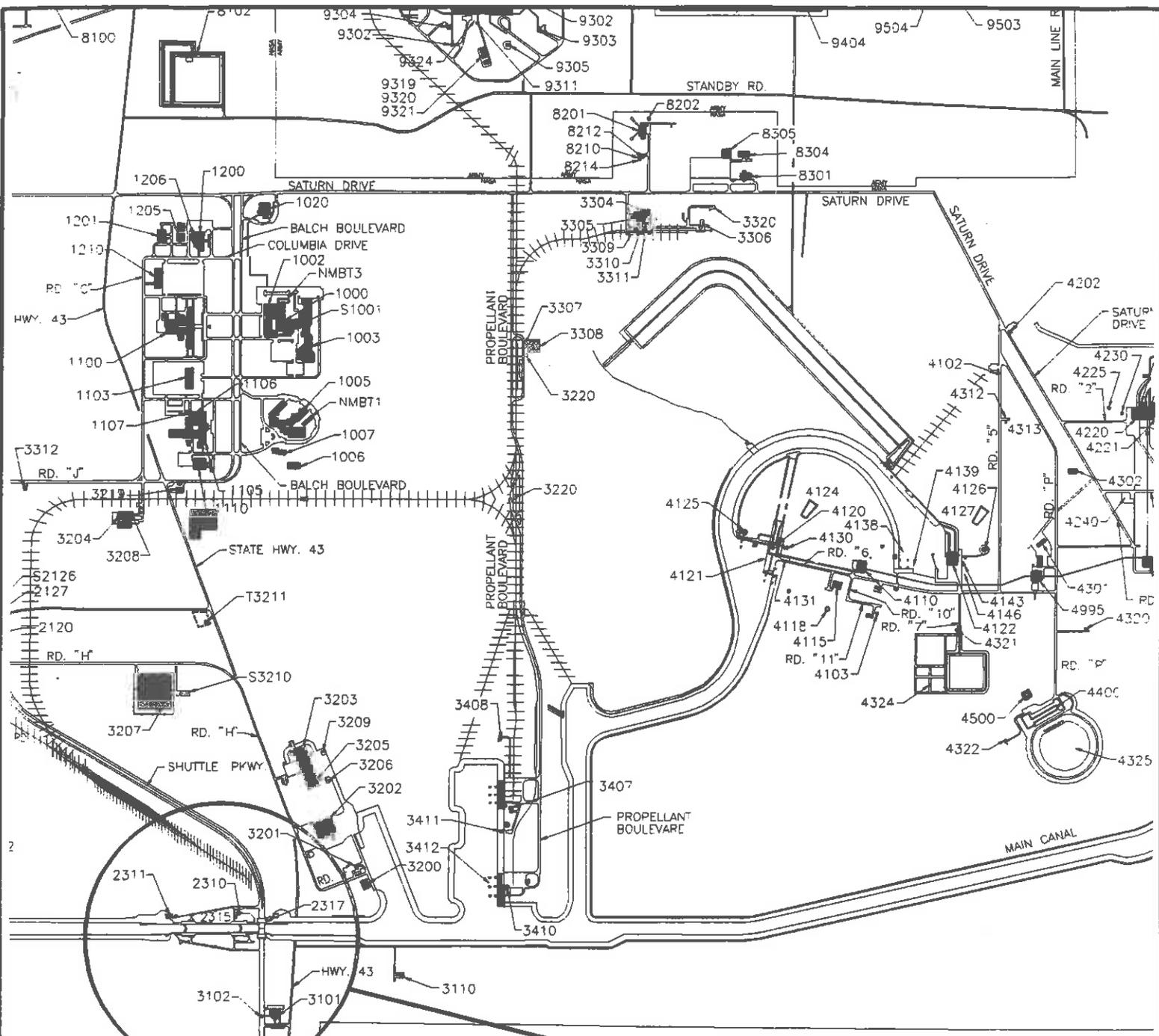
7.0 Contacts

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Lynn Landrum	Johnson Controls World Services	Environmental Regulations

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3. Keiser, E.D., and Lago, P.K., 1991, Survey of the Amphibians, Reptiles, Birds, and Mammals on the 3,000 acre Stennis Space Center ASRM Site Final Report, University of Mississippi, University, Mississippi, 185 p.
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6. Wooten, J.W., 1990, A Fall Botanical Survey of a portion of the National Aeronautics and Space Administration Installation Stennis Space Center Mississippi, 120 p.
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Figure 1 - Proposed Location of the Canal Lock System restoration



**CANAL LOCK SYSTEM RESTORATION**

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