

**CONSTRUCTION OF FACILITIES**  
**FISCAL YEAR 2000 ESTIMATES**  
**SUMMARY OF RESOURCE REQUIREMENTS**

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>Page</u> <u>Number</u>
Discrete Projects	34,171	46,100	43,200	MS 4-26
Minor Revitalization	56,729	68,400	65,500	MS 4-53
Minor Construction	1,100	---	5,000	MS 4-59
Facility Planning and Design	19,000	14,000	19,200	MS 4-62
Deferred Major Maintenance	---	---	8,000	MS 4-66
Environmental Compliance and Restoration	<u>11,400</u>	<u>40,000</u>	<u>40,100</u>	MS 4-69
 TOTAL	 <u>122,400</u>	 <u>168,500</u>	 <u>181,000</u>	
 <u>Distribution of Program Amount by Installation</u>				
Johnson Space Center	4,907	13,990	15,500	
Kennedy Space Center	17,109	28,190	30,800	
Marshall Space Center	23,076	31,110	25,400	
Stennis Space Center	8,828	10,600	11,000	
Ames Research Center	5,520	13,600	12,800	
Dryden Flight Research Center	6,867	4,520	6,550	
Glenn Research Center	14,957	17,670	18,750	
Langley Research Center	7,758	10,550	9,300	
Goddard Space Flight Center	14,587	18,940	17,700	
Jet Propulsion Laboratory	12,055	13,750	9,800	
Various Locations	3,721	3,240	6,000	
Headquarters	<u>3,015</u>	<u>2,340</u>	<u>17,400</u>	
 TOTAL	 <u>122,400</u>	 <u>168,500</u>	 <u>181,000</u>	

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATES**

**SUMMARY**

**MISSION SUPPORT**

	<u>Amount</u>	<u>Page</u>
	<u>(Dollars)</u>	<u>No</u>
<u>Mission Support Discrete Projects:</u>		
Restore Electrical Distribution System (ARC)	2,700,000	MS 4-27
Rehabilitate Main Hangar Building 4802 (DFRC)	2,900,000	MS 4-29
Rehabilitate High Voltage System (GRC)	7,600,000	MS 4-31
Repair Site Steam Distribution System (GSFC)	2,900,000	MS 4-33
Restore Chilled Water Distribution System (GSFC)	3,900,000	MS 4-35
Replace Hydrostatic Bearing Runner, 70 meter Antenna, Goldstone (JPL)	1,700,000	MS 4-37
Upgrade 70 meter Antenna Servo Drive, 70 meter Antenna Subnet (JPL)	3,400,000	MS 4-39
Rehabilitate Utility Tunnel Structure and Systems (JSC)	5,600,000	MS 4-41
Connect KSC to Cape Canaveral Air Station Wastewater Treatment Plant (KSC)	2,500,000	MS 4-43
Repair and Modernize HVAC System, Central Instrument Facility (KSC)	3,000,000	MS 4-45
Replace High Voltage Load Break Switches (KSC)	2,700,000	MS 4-47
Repair and Modernize HVAC and Electrical Systems, Bldg. 4201 (MSFC)	2,300,000	MS 4-49
Repair Roofs, Vehicle Component Supply Buildings (MAF)	<u>2,000,000</u>	MS 4-51
 TOTAL DISCRETE PROJECTS	 <u>43,200,000</u>	

**CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATES**

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PROJECT TITLE: Restore Electrical Distribution System

INSTALLATION: Ames Research Center

FY 2000 Estimate: \$2,700,000

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LOCATION OF PROJECT: Moffett Field, Santa Clara County, California

COGNIZANT HEADQUARTERS OFFICE: Office of Aero-Space Technology

FY 1999 AND PRIOR YEARS FUNDING: The following prior years funding is related to this project:

	<u>Planning and Design</u>	<u>Construction</u>	<u>Total</u>
Specific Construction Funding . . . . .	\$384,000	\$ 2,200,000	\$ 2,584,000
Capitalized Investment . . . . .	---	<u>9,795,543</u>	<u>9,795,543</u>
Total . . . . .	<u>\$384,000</u>	<u>\$11,995,543</u>	<u>\$12,379,543</u>

SUMMARY PURPOSE AND SCOPE:

This project provides for repairs to the Center's primary electrical distribution system as part of a phased program to improve reliability. The existing relays in Substations N225B, N225, and the Arc Jet Facility will be replaced. Additionally, selected 115kV air switches, switchgear, and oil-filled circuit breakers will be replaced Centerwide.

PROJECT JUSTIFICATION:

The existing electrical system Centerwide at Ames is unreliable and in some cases unsafe. Ames has experienced a number of power interruptions emanating from varying sources, which has impacted critical research. Much of the electrical equipment such as the 115,000 volt oil circuit breakers, air operated switches, and metering systems were installed during or shortly after 1945. The oldest equipment at the Center is nearly 60 years old and much of the remaining equipment is 30 to 45 years old. Parts are not available for the majority of electrical equipment that is more than 40 years old.

The protective relays used in the Center are of electro-mechanical type. Electro-mechanical relays are still manufactured today by several manufacturers; however, they are rapidly being replaced by solid state (electronic) relays. Many of the oldest electro-mechanical relays at the Center can no longer be calibrated because of worn mechanical components. Replacement parts for many of those relays are no longer available.

IMPACT OF DELAY:

Power outages caused by electrical equipment failure will continue to disrupt mission-critical research across the Center and the ability of the Center to operate in an efficient manner and reduce costs. Power outages will continue to cost the Center in productivity, materials, and equipment.

PROJECT DESCRIPTION:

This project will enhance and improve the existing deteriorated systems and replace with new equipment such as: metering system, 115kV oil circuit breakers, 115kV air operated switches and protective relays. Approximately eight (8) 115kV air switches and eight (8) 115kV oil circuit breakers in the Substation N225 and N225B will be replaced. The existing protective relays in electrical Substations N225B and N225, for systems A, B, C, and D, will be replaced with new microprocessor based relays.

FY 2000 PROJECT COST ESTIMATE:

	<u>Unit of Measure</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
Replace Relays . . . . .	LS	---	---	\$ 350,000
Replace Air Switches . . . . .	LS	---	---	550,000
Replace Oil Breakers . . . . .	LS	---	---	950,000
Replace Switch Gears . . . . .	LS	---	---	850,000
Total . . . . .				<u>\$2,700,000</u>

OTHER EQUIPMENT SUMMARY: None

FUTURE ESTIMATED CONSTRUCTION FUNDING REQUIRED TO COMPLETE THIS PROJECT: None, however, this project is part of a phased program to restore the electrical distribution system, on which a study is in progress. The full scope of restoration requirements are extensive, and may be in the \$30 to \$50 million dollar range.

**CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATES**

PROJECT TITLE: Rehabilitate Main Hangar Building 4802

INSTALLATION: Dryden Flight Research Center

FY 2000 CoF Estimate: \$2,900,000

LOCATION OF PROJECT: Dryden Flight Research Center, Kern County, California

COGNIZANT HEADQUARTERS OFFICE: Office of Aero-Space Technology

FY 1999 AND PRIOR YEARS FUNDING: The following prior years funding is related to this project:

	<u>Planning and Design</u>	<u>Construction</u>	<u>Total</u>
Specific Construction Funding . . . . .	\$232,000	---	\$ 232,000
Capitalized Investment . . . . .	---	\$2,947,213	<u>2,947,213</u>
Total . . . . .	<u>\$232,000</u>	<u>\$2,947,213</u>	<u>\$3,179,213</u>

SUMMARY PURPOSE AND SCOPE:

The Main Hangar, the largest NASA-owned hangar at the Center, is essential to Dryden's mission as Lead Center for Flight Research. Although it received only limited upgrades since first being constructed, heavy usage and age results in it needing extensive rehabilitation. This project will rehabilitate the hangar to support modern aircraft and comply with current building, environmental, occupational health and safety, fire protection, disabled-employee access, and energy conservation codes and requirements.

PROJECT JUSTIFICATION:

Rehabilitation of the Main Hangar is essential to meet Dryden's flight research mission. Upgrading the hydraulics, shop air, and electrical systems will enable the hangar to support modern aircraft requirements, which are radically different from the requirements of aircraft existing in the 1950's. Ground support equipment must be moved in and out, and sometimes piecemeal repairs or modifications to the hangar have to be done, in order to meet the operational requirements of various aircraft. The massive steel and glass overhead doors at the north and south ends of Hangar B4802 are 30' high, 150' wide and weigh an estimated five tons each. These doors must be refurbished to decrease risk of damage from seismic events and the resulting danger to personnel and research aircraft. The fire suppression system must be rehabilitated to decrease risk of fire damage to the hangar and its contents. Rehabilitation is long overdue to meet current building, environmental, occupational health and

safety, fire protection, disabled-employee access, and energy conservation codes and requirements. Airtight double doors are needed to keep hazardous fumes from escaping into the adjoining office and laboratory building.

IMPACT OF DELAY:

Delaying this project puts personnel and aircraft at risk from falling or collapsing hangar doors should an earthquake occur at or near Dryden. Collapse of the massive hangar doors would endanger personnel and aircraft. Some of Dryden's research aircraft are one-of-a-kind and irreplaceable. Others are modified production aircraft with replacement values ranging from \$5M to \$50M each. Dryden will continue to operate inefficiently to meet the operational requirements of various aircraft. Energy and maintenance costs will continue to increase.

PROJECT DESCRIPTION:

This project will refurbish both hangar doors to meet seismic codes and standards. It will upgrade the heating, cooling, and electrical systems, including the installation of sixteen electrical stations. The central hydraulic and shop air systems will be refurbished. It will rehabilitate the fire suppression system (deluge valves) and provide airtight double entry doors into the adjoining office building. It will increase available hangar space by providing an addition to house ancillary activities now located within the hangar and rehabilitate the hangar to meet current building codes including environmental, occupational health and safety, fire protection, disabled-employee access, and energy conservation requirements. All new systems will allow for maximum operational flexibility within the hangar to meet requirements of current and future flight research aircraft.

FY 2000 PROJECT COST ESTIMATE:

	<u>Unit of Measure</u>	<u>Unit Quantity</u>	<u>Cost</u>	<u>Cost</u>
Doors and Windows . . . . .	LS	---	---	\$ 462,000
Mechanical/Fire Protection . . . . .	LS	---	---	766,000
Electrical . . . . .	LS	---	---	629,000
Finishes & Specialties . . . . .	LS	---	---	449,000
Masonry & Metals . . . . .	LS	---	---	452,000
Thermal & Moisture Protection . . . . .	LS	---	---	142,000
 Total . . . . .				 <u>\$2,900,000</u>

OTHER EQUIPMENT SUMMARY: None

FUTURE ESTIMATED CONSTRUCTION FUNDING REQUIRED TO COMPLETE THIS PROJECT: None

**CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATES**

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PROJECT TITLE: Rehabilitate High Voltage System

INSTALLATION: John H. Glenn Research Center

FY 2000 ESTIMATE: \$7,600,000

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LOCATION OF PROJECT: Various Locations

COGNIZANT HEADQUARTERS OFFICE: Office of Aero-Space Technology

FY 1999 AND PRIOR YEARS FUNDING: The following prior years funding is related to this project:

	<u>Planning and Design</u>	<u>Construction</u>	<u>Total</u>
Specific Construction Funding . . . . .	\$200,000	\$ 17,300,000	\$ 17,500,000
Capitalized Investment . . . . .	---	<u>32,400,000</u>	<u>32,400,000</u>
Total . . . . .	<u>\$200,000</u>	<u>\$39,700,000</u>	<u>\$39,900,000</u>

SUMMARY PURPOSE AND SCOPE:

This project is the third of three construction phases that will rehabilitate and modify the Glenn Research Center's (GRC) existing High Voltage Power System. The project is required to assure continued reliability and safe electrical power supply at GRC. The system distributes power to all of the Center's aerospace research and development facilities, computer center, and the institutional facilities. The Agency's Enterprises and Center of Excellence missions support this project.

PROJECT JUSTIFICATION:

The high voltage power system provides power to all the aeronautics and aerospace R&D facilities to support major programs. It is over 50 years old, obsolete, and experiencing increased maintenance and emergency repairs each year. Current circuit breaker overloads and single point failures warn of a major failure that could result in a 6 to 12-month shutdown. Economic analysis indicates this project is the most cost-effective approach to maintain an operating system for the next 30 years.

IMPACT OF DELAY:

Unless the system is rehabilitated, failure rates currently being experienced are expected to increase. Major disruptions of electrical services, associated with single point failures, are also anticipated. These failures will result in the shutdown of critical research facilities and the programs they support for periods up to 12 months.

PROJECT DESCRIPTION:

This phase of the project replaces 34.5 kV overhead lines feeding Substation M from Substation A with underground lines from Substation K; replaces all overhead lines feeding Buildings 306, 307, 308, and 310 with underground lines from Substation N and Building 300 from substation M; replaces a 2.4 kV transformer at Building 300; replaces 34.5 kV transformer and cabling at Substation D and E; installs switchgear at Substation E; adds a 34.5 kV transformer at Substation H and Substation K; replaces miscellaneous substation breakers; provides control house improvements; and installs a solid state variable frequency drive starting system in Building 4.

FY 2000 PROJECT COST ESTIMATE:

	<u>Unit of Measure</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
Substation H modifications . . . . .	LS	---	---	\$1,400,000
Replacement of overhead lines . . . . .	LS	---	---	1,800,000
Substation K modifications . . . . .	LS	---	---	700,000
Substation D and e modifications . . . . .	LS	---	---	1,500,000
Solid State Variable Frequency Starting System . . . . .	LS	---	---	1,700,000
Miscellaneous Substations . . . . .	LS	---	---	500,000
Total . . . . .				<u>\$7,600,000</u>

OTHER EQUIPMENT SUMMARY: None

FUTURE ESTIMATED CONSTRUCTION FUNDING REQUIRED TO COMPLETE THIS PROJECT: None.

**CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATES**

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PROJECT TITLE: Repair Site Steam Distribution System

INSTALLATION: Goddard Space Flight Center

FY 2000 Estimate: \$2,900,000

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LOCATION OF PROJECT: Greenbelt, Prince George's County, Maryland

COGNIZANT HEADQUARTERS OFFICE: Office Earth Science

FY 1999 AND PRIOR YEARS FUNDING: The following prior years funding is related to this project:

	<u>Planning and Design</u>	<u>Construction</u>	<u>Total</u>
Specific Construction Funding . . . . .	\$392,000	\$2,000,000	\$2,392,000
Capitalized Investment . . . . .	---	<u>1,823,159</u>	<u>1,823,159</u>
Total . . . . .	<u>\$392,000</u>	<u>\$3,823,159</u>	<u>\$4,215,159</u>

SUMMARY PURPOSE AND SCOPE:

This project is the second phase of a multiyear program to rehabilitate the central steam distribution system. The steam system has deteriorated with age and has become undersized due to substantial growth in buildings and related steam demand at Goddard Space Flight Center (GSFC).

PROJECT JUSTIFICATION:

The central steam distribution system was originally installed in the early 1960's and is at the end of its useful life. The added steam loads on the East Campus require significant upsizing of the main headers. Some condensate and high pressure drip lines have failed. The condensate is piped to a drain, resulting in waste of water, energy and treatment chemicals. This project will reduce operation and maintenance costs and enhances the reliability and maintainability of the site steam distribution system.

IMPACT OF DELAY:

A major failure could occur in the campus-wide steam distribution system, resulting in the loss of steam supply to several buildings. That would seriously impact critical spacecraft operations at GSFC. The delay will also increase operation and maintenance costs to keep the deteriorated system operational.

PROJECT DESCRIPTION:

This project provides for the replacement of major portions of the GSFC steam distribution system. Work includes replacing the south header, conducting utility designations/test holes in the construction area of the project, and other related construction items.

FY 2000 PROJECT COST ESTIMATE:

	<u>Unit of Measure</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
Replace south header . . . . .	LS	---	---	\$2,700,000
Utility designation/test holes . . . . .	LS	---	---	80,000
Related construction items . . . . .	LS	---	---	120,000
Total . . . . .				<u>\$2,900,000</u>

OTHER EQUIPMENT SUMMARY: None

FUTURE ESTIMATED CONSTRUCTION FUNDING REQUIRED TO COMPLETE THIS PROJECT: None. However, funding will be required in future years to rehabilitate other elements of the steam distribution system.

**CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATES**

PROJECT TITLE: Restore Chilled Water Distribution System

INSTALLATION: Goddard Space Flight Center

FY 2000 ESTIMATE: \$3,900,000

LOCATION OF PROJECT: Greenbelt, Prince George's County, Maryland

COGNIZANT HEADQUARTERS OFFICE: Office of Earth Science

FY 1999 AND PRIOR YEARS FUNDING: The following prior years funding is related to this project:

	<u>Planning and Design</u>	<u>Construction</u>	<u>Total</u>
Specific Construction Funding . . . . .	\$712,000	\$9,116,781	\$ 9,828,781
Capitalized Investment . . . . .	---	<u>11,597,139</u>	<u>11,597,139</u>
Total . . . . .	<u>\$712,000</u>	<u>\$20,713,920</u>	<u>\$21,425,920</u>

SUMMARY PURPOSE AND SCOPE:

This project continues the restoration of major portions of the chilled water distribution system at Goddard Space Flight Center (GSFC). The project replaces underground piping and valves that are old, deteriorated, and undersized due to substantial increase in buildings and related chilled water demand at GSFC. Shutoff valves will be installed where needed.

PROJECT JUSTIFICATION:

GSFC has experienced serious operational problems with the central chilled water distribution system. The underground piping to be replaced is approximately 30 years old. The pipes and valves have badly deteriorated and leak substantially. Pipe sizes in several sections of the system are inadequate for existing, as well as future design flow rates. Many sections of piping do not have shutoff valves. The new lines will improve reliability and cooling conditions in several buildings, some of which do not have adequate redundancy in the event of a chilled water service failure.

IMPACT OF DELAY:

Delay of this project will result in continued leaking and failures due to old piping and increasing pressures. Some portions of the system will experience flow deficiencies unless pipe sizes are increased. As a result, several buildings will have inadequate chilled water quantities and air conditioning capacity causing shutdown of mission critical and technical support operations. The delay will also increase operation and maintenance costs required to keep the deteriorated system operational.

PROJECT DESCRIPTION:

The project provides for the replacement of major portions of the GSFC chilled water distribution system. This includes replacing the remainder of the northeast header from Building 7 to Building 16, the southwest header and supply lines to Buildings 6 and 11, and supply lines to Buildings 7 and 10; installing a branch to Building 22, a feed to Building 14, and connections to Building 5; and renting temporary chillers/diesel generators and other related construction items

FY 2000 PROJECT COST ESTIMATE:

	<u>Unit of Measure</u>	<u>Unit Quantity</u>	<u>Cost</u>	<u>Cost</u>
Replacement of remainder of northeast header from building 7 to building 16 . . . . .	LS	---	---	\$860,000
Replacement of southwest header and supply lines to Bldgs 6 and 11 . . . . .	LS	---	---	1,224,000
Replacement of supply lines to Bldgs 7 and 10. . . . .	LS	---	---	376,000
Rental of temporary chillers, diesel generators, other related construction costs. . . . .	LS	---	---	120,000
Branch to Bldg. 22 . . . . .	LS	---	---	452,000
Feed to Bldg. 14 . . . . .	LS	---	---	524,000
Connections to Bldg. 5 . . . . .	LS	---	---	118,000
Miscellaneous related construction costs. . . . .	LS	---	---	226,000
Total . . . . .				<u>\$3,900,000</u>

OTHER EQUIPMENT SUMMARY: None

FUTURE ESTIMATED CONSTRUCTION FUNDING REQUIRED TO COMPLETE THIS PROJECT: None. However, funding will be required in future years to rehabilitate other elements of the chilled water distribution system.

**CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATES**

PROJECT TITLE: Replace Hydrostatic Bearing Runner, 70 meter Antenna

INSTALLATION: Jet Propulsion Laboratory

FY 2000 CoF Estimate: \$1,700,000

LOCATION OF PROJECT: Goldstone Deep Space Communications Complex (GDSCC), Goldstone, California

COGNIZANT HEADQUARTERS OFFICE: Office of Space Science

FY 1999 AND PRIOR YEARS FUNDING: The following prior years funding is related to this project.

	<u>Planning and Design</u>	<u>Construction</u>	<u>Total</u>
Specific Construction Funding . . . . .	\$136,000	---	\$ 136,000
Capitalized Investment . . . . .	---	<u>\$14,092,236</u>	<u>14,092,236</u>
Total . . . . .	<u>\$136,000</u>	<u>\$14,092,236</u>	<u>\$14,228,236</u>

SUMMARY PURPOSE AND SCOPE:

This project replaces the multi-segment azimuth runner with a single piece, welded azimuth runner. The new design will reduce the oil leakage by eliminating the splices of the existing runner segments.

PROJECT JUSTIFICATION:

The present design of the runner includes eleven mechanical splices that allow oil to leak during antenna azimuth rotation. The oil penetrates and deteriorates the grout underneath the runner, causing loss of hydrostatic bearing film height. When the film height drops below acceptable limits, tracking stops immediately, regardless of the mission being supported, resulting in data loss. To avoid this adverse situation, at least ten hours of maintenance is required per week to continually shim the bearing runner to maintain minimum operational film height.

IMPACT OF DELAY:

Bearing shutdown causes unscheduled interruption of tracking support for major missions, such as Space VLBI, Ulysses, and Cassini resulting in the loss of valuable irretrievable data.

PROJECT DESCRIPTION:

This project replaces the azimuth runner on the 70 meter antenna at GDSCC. This includes lifting and supporting the entire antenna structure that rotates on the hydrostatic bearing and removing the existing runner and grout. A new, single-piece, welded runner design will be installed and the runner segments will be welded together in the field. Existing anchor and adjustment bolts will be used. The welded connections will be machined in-place and the entire bearing will be re-grouted and leveled to specification.

FY 2000 PROJECT COST ESTIMATE:

	<u>Unit of Measure</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
Runner . . . . .	LS	---	---	\$638,000
Jack Support . . . . .	LS	---	---	462,000
Installation . . . . .	LS	---	---	600,000
Total . . . . .				<u>\$1,700,000</u>

OTHER EQUIPMENT SUMMARY: None

FUTURE ESTIMATED CONSTRUCTION FUNDING REQUIRED TO COMPLETE THIS PROJECT: None

**CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATES**

PROJECT TITLE: Upgrade 70 meter Antenna Servo Drive, 70 meter Antenna Subnet

INSTALLATION: Jet Propulsion Laboratory

FY 2000 CoF Estimate: \$3,400,000

LOCATION OF PROJECT: Goldstone, California; Canberra, Australia; and Madrid, Spain

COGNIZANT HEADQUARTERS OFFICE: Office of Space Science

FY 1999 AND PRIOR YEARS FUNDING: The following prior years funding is related to this project.

	<u>Planning and Design</u>	<u>Construction</u>	<u>Total</u>
Specific Construction Funding . . . . .	\$272,000	---	\$ 272,000
Capitalized Investment . . . . .	---	\$43,975,268	43,975,268
Total . . . . .	<u>\$272,000</u>	<u>\$43,975,268</u>	<u>\$44,247,268</u>

SUMMARY PURPOSE AND SCOPE:

The project provides for the replacement of the existing 35-year old servo drive hydraulic system used on the 70 meter antennas (DSS-14, 43, and 63) with current designs that are commercially available. Sequential implementation at the three complexes will minimize disruption of 70 meter Subnet tracking schedules. The new design will take advantage of advancements in hydraulic technology to optimize low speed performance for a smoother, more precise operation. This improvement will enhance antenna tracking and pointing performance.

PROJECT JUSTIFICATION:

The hydraulic components are no longer available from manufacturers and require costly custom machining to refurbish. The key components, such as motors and pumps, are rebuilt every two years and before any critical mission phase. The refurbishment lead times are increasing, jeopardizing antenna availability and increasing maintenance costs. Replacing obsolete equipment with commercial of-the-shelf-equipment will decrease maintenance costs and down time.

IMPACT OF DELAY:

If this project is not implemented, custom machining of components will continue to unnecessarily increase maintenance budgets.

Because the components are unreliable, they pose a serious threat to antenna system availability and safety. The antennas' high level of reliability will be placed at risk. Missions affected by the unavailability of the antennas will suffer loss of irretrievable valuable data.

PROJECT DESCRIPTION:

The project will remove and replace the existing antenna servo drive hydraulics system; consisting of numerous high pressure pumps, motors, tachometers, accumulators, brakes and servo valves; at each of the three 70 meter Antenna Subnet sites. The new equipment, as well as spare parts, is commercially available.

FY 2000 PROJECT COST ESTIMATE:

	<u>Unit of Measure</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
Hardware . . . . .	LS	---	---	\$3,100,000
Installation . . . . .	LS	---	---	300,000
Total . . . . .				<u>\$3,400,000</u>

OTHER EQUIPMENT SUMMARY: None

FUTURE ESTIMATED CONSTRUCTION FUNDING REQUIRED TO COMPLETE THIS PROJECT: None

**CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATES**

PROJECT TITLE: Rehabilitate Utility Tunnel Structure and Systems

INSTALLATION: Lyndon B. Johnson Space Center

FY 2000 Estimate: \$5,600,000

LOCATION OF PROJECT: Houston, Harris County, Texas

COGNIZANT HEADQUARTERS OFFICE: Office of Space Flight

FY 1999 AND PRIOR YEARS FUNDING: The following prior years funding is related to this project:

	<u>Planning and Design</u>	<u>Construction</u>	<u>Total</u>
Specific Construction Funding . . . . .	\$421,055	\$4,840,000	\$5,261,055
Capitalized Investment . . . . .	---	<u>9,446,333</u>	<u>9,446,333</u>
Total . . . . .	<u>\$421,055</u>	<u>\$14,286,333</u>	<u>\$14,707,388</u>

SUMMARY PURPOSE AND SCOPE:

This project is the third and final phase to rehabilitate the existing utility tunnel structure and systems. The work includes structural modifications, systems modifications, and provides safety features to meet Occupational Safety and Health Administration (OSHA) requirements. The utility tunnel is required for JSC to perform its assigned Agency roles and missions.

PROJECT JUSTIFICATION:

The utility tunnel system was originally constructed in 1962 to provide a protected passageway to carry utilities and services to Center buildings. The utility tunnel requires restoration in many areas to prevent water seepage through the structural concrete and to bring the tunnels into compliance with current safety regulations. The deteriorating conditions were confirmed as critical priorities during the Johnson Space Center (JSC) Facility Condition Assessment of 1992. Water infiltration into the tunnel structure is increasing in frequency and severity. The steam return/condensate system is rapidly approaching catastrophic failure condition. Numerous cable tray failures and inadequacies exist and hamper communications upgrades. Many valves in the chilled water system are beginning to exhibit wall failures from over-extended usage. Tunnel access and ventilation are inadequate for personnel safety. Future major failures in the tunnel steam and chilled water systems are increasingly likely and would cause considerable disruption of services to buildings and potential hazard to operations personnel.

IMPACT OF DELAY:

If this project is not approved, the reliability and safety of the JSC utility tunnel and systems will continue to deteriorate and increase the risk of a catastrophic failure seriously disrupting mission operations.

PROJECT DESCRIPTION:

The work includes repairing and sealing of areas of water infiltration; correcting wall-section displacements; replacing concrete access sections; modifying substandard personnel access provisions; replacing steam condensate piping, components, and asbestos insulation; and replacing selected chilled water system valves and components. It upgrades the ventilation system; provides structural, cable, and cable tray modifications; and provides safety features to meet OSHA requirements.

FY 2000 PROJECT COST ESTIMATE:

	<u>Unit of Measure</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
Electrical Primary Distribution . . . . .	LS	---	---	\$3,900,000
Cable Tray Modifications . . . . .	LS	---	---	600,000
Civil/Structural Modifications . . . . .	LS	---	---	500,000
Mechanical Repairs . . . . .	LS	---	---	600,000
Total . . . . .				<u>\$5,600,000</u>

OTHER EQUIPMENT SUMMARY: None

FUTURE ESTIMATED CONSTRUCTION FUNDING REQUIRED TO COMPLETE THIS PROJECT: None

**CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATES**

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PROJECT TITLE: Connect KSC to Cape Canaveral Air Station Waste Water Treatment Plant

INSTALLATION: Kennedy Space Center

FY 2000 CoF Estimate: \$2,500,000

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LOCATION OF PROJECT: Merritt Island and Cape Canaveral, Brevard County, Florida

COGNIZANT HEADQUARTERS OFFICE: Office of Space Flight

FY 1999 AND PRIOR YEARS FUNDING: The following prior years funding is related to this project:

	<u>Planning and Design</u>	<u>Construction</u>	<u>Total</u>
Specific Construction Funding . . . . .	\$198,000	\$ ---	\$ 198,000
Capitalized Investment . . . . .	---	<u>784,241</u>	<u>784,241</u>
Total . . . . .	<u>\$198,000</u>	<u>\$784,241</u>	<u>\$982,241</u>

SUMMARY PURPOSE AND SCOPE:

This project is an optimum revitalization investment that will eliminate high operation and maintenance costs and provide efficient and cost effective wastewater processing. It will provide the necessary pump stations and piping to connect KSC wastewater effluent distribution to the new Cape Canaveral Air Station (CCAS) wastewater treatment plant.

PROJECT JUSTIFICATION:

This project will eliminate environmental issues associated with obtaining permits for sewage treatment plants #1 & #4 drain fields. Consolidation of KSC sewage treatment will significantly reduce costs by eliminating the need for off-site sludge disposal, associated transportation, and operation and maintenance of existing aged systems.

IMPACT OF DELAY:

Delay of this project will significantly increase operating costs to transport and treat sewage off-site.

PROJECT DESCRIPTION:

This project will provide a new pump station to transfer effluent from STP-4 to STP-1 and a second pump station to transfer effluent from STP-1 approximately 9.8 kilometers to the CCAS treatment plant. The associated piping for the transfer lines, including approximately 300 meters of line to be bored under the Banana River Bridge, is included in the project. The CCAS percolation pond will be expanded to handle the wastewater transferred from KSC.

FY 2000 PROJECT COST ESTIMATE:

	<u>Unit of Measure</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
Pumping Stations, Transfer Lines . . . . .	LS	---	---	\$2,300,000
Expansion of CCAS Percolation Pond. . . . .	LS	---	---	200,000
Total . . . . .				<u>\$2,500,000</u>

OTHER EQUIPMENT SUMMARY: None

FUTURE ESTIMATED CONSTRUCTION FUNDING REQUIRED TO COMPLETE THIS PROJECT: None

**CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATES**

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PROJECT TITLE: Repair and Modernize HVAC System, Central Instrument Facility

INSTALLATION: Kennedy Space Center

FY 2000 Estimate: \$3,000,000

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LOCATION OF PROJECT: Merritt Island, Brevard County, Florida

COGNIZANT HEADQUARTERS OFFICE: Office of Space Flight

FY 1999 AND PRIOR YEARS FUNDING: The following prior years funding is related to this project:

	<u>Planning and Design</u>	<u>Construction</u>	<u>Total</u>
Specific Construction Funding . . . . .	\$237,600	\$950,000	\$1,187,600
Capitalized Investment . . . . .	---	<u>10,145,291</u>	<u>10,145,291</u>
Total . . . . .	<u>\$237,600</u>	<u>\$11,095,291</u>	<u>\$11,332,891</u>

SUMMARY PURPOSE AND SCOPE:

This project repairs and modernizes the heating, ventilating, and air conditioning (HVAC) system in the Central Instrument Facility (CIF). This facility requires rework of the HVAC air handling system to rehabilitate ductwork and install more efficient variable air volume and reheat systems. Present systems are old, obsolete, and in bad need of repair.

PROJECT JUSTIFICATION:

This HVAC system does not properly control the humidity level in the CIF. This is particularly critical in the calibration laboratories and other operational areas where humidity causes damage. The system is unreliable and inefficient. The air distribution ducting is old and needs to be replaced. Failure of the HVAC system would cause a lengthy outage in this building, leading to potential launch delays and extensive damage to computer and calibration equipment.

IMPACT OF DELAY:

Failure to implement this project will result in continued risk of HVAC failure, poor operational environment, and inefficient system operation. This wastes energy and increases costs. HVAC failure would cause a lengthy outage in the CIF leading to delay of missions, pose a safety hazard to operating personnel, and extensive damage to computer and calibration equipment.

PROJECT DESCRIPTION:

The project provides for rehabilitation of the HVAC system in the CIF. Work includes overhauling of ductwork; replacing obsolete air terminal induction units, air handling units, pumps, motors, air and water distribution piping; and installing an automated control system with electronic reheat to increase energy efficiency. Asbestos abatement is required.

FY 2000 PROJECT COST ESTIMATE:

	<u>Unit of Measure</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
Mechanical. . . . .	LS	---	---	\$1,250,000
Electrical. . . . .	LS	---	---	800,000
Asbestos Abatement. . . . .	LS	---	---	950,000
Total . . . . .				<u>\$3,000,000</u>

OTHER EQUIPMENT SUMMARY: None

FUTURE ESTIMATED CONSTRUCTION FUNDING REQUIRED TO COMPLETE THIS PROJECT: None

**CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATES**

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PROJECT TITLE: Replace High Voltage Load Break Switches

INSTALLATION: Kennedy Space Center

FY 2000 CoF Estimate: \$2,700,000

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LOCATION OF PROJECT: Cape Canaveral, Brevard County, Florida

COGNIZANT HEADQUARTERS OFFICE: Office of Space Flight

FY 1999 AND PRIOR YEARS FUNDING: The following prior years funding is related to this project:

	<u>Planning and Design</u>	<u>Construction</u>	<u>Total</u>
Specific Construction Funding . . . . .	\$257,000	\$3,100,000	\$3,357,000
Capitalized Investment . . . . .	---	<u>31,162,000</u>	<u>31,162,000</u>
Total . . . . .	<u>\$257,000</u>	<u>\$34,262,000</u>	<u>\$34,519,000</u>

SUMMARY PURPOSE AND SCOPE:

This project is the fourth and final phase of a comprehensive activity to replace all 15kV load break switches in the power distribution system at Kennedy Space Center. This project will replace high voltage manual type oil break switches to eliminate the explosive hazards associated with the operation and maintenance of oil-filled switches.

PROJECT JUSTIFICATION:

These obsolete switches have caused numerous explosions that could potentially injure or kill operating personnel. They are increasingly difficult and expensive to maintain. Replacement parts are no longer available from the manufacturer. These switches must be replaced for the safety of personnel and property.

IMPACT OF DELAY:

Delay of this project will continue the use of obsolete oil break switches that are in violation of NASA safety standards and criteria. The possibility of a switch containing several gallons of oil exploding presents unacceptable risk of fire, injury, and environmental pollution.

PROJECT DESCRIPTION:

The manual type oil load break switches are to be replaced with newer style switches incorporating compression spring operators. Switch ratings will be increased from 400 amps to 600 amps with close-into-fault ratings of 40,000 amps. The system will be converted from oil to sulfurhexafloride (SF-6) as recommended by NASA's Safety, Reliability and Quality Assurance experts.

FY 2000 PROJECT COST ESTIMATE:

	<u>Unit of Measure</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
Switches and associated equipment. . . . .	LS	---	---	\$2,100,000
Installation . . . . .	LS	---	---	600,000
Total . . . . .				<u>\$2,700,000</u>

OTHER EQUIPMENT SUMMARY: None

FUTURE ESTIMATED CONSTRUCTION FUNDING REQUIRED TO COMPLETE THIS PROJECT: None

**CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATES**

PROJECT TITLE: Repair and Modernize HVAC and Electrical Systems, Building 4201

INSTALLATION: George C. Marshall Space Flight Center

FY 2000 Estimate: \$2,300,000

LOCATION OF PROJECT: Marshall Space Flight Center, Madison County, Alabama

COGNIZANT HEADQUARTERS OFFICE: Office of Space Flight

FY 1999 AND PRIOR YEARS FUNDING: The following prior years funding is related to this project:

	<u>Planning and Design</u>	<u>Construction</u>	<u>Total</u>
Specific Construction Funding . . . . .	\$182,000	---	\$182,000
Capitalized Investment . . . . .	---	\$2,803,280	<u>2,803,280</u>
Total . . . . .	<u>\$182,000</u>	<u>\$2,803,280</u>	<u>\$2,985,280</u>

SUMMARY PURPOSE AND SCOPE:

This project is the first of three phases to repair and modernize old, deteriorated heating, ventilating, and air-conditioning (HVAC) equipment and electrical systems in Building 4201. The size, function and occupancy of this facility require this effort to be phased. This phase repairs and modernizes HVAC equipment, control systems, and electrical systems for the basement and floors 1, 2, and 3 of the building.

PROJECT JUSTIFICATION:

Building 4201, constructed in 1964, is a six-story steel frame structure with a basement and total gross area of 109,200 square feet. It is part of the Building 4200 complex, which is the central administrative campus for the Center, and houses many major project and program offices. The Building 4201 existing HVAC system and controls, along with the supporting electrical system, have been in use for over 30 years. Upgrading this building to modern office standards will provide adequate control of the building's climatic systems and reduce energy consumption. This project will help MSFC comply with an Executive Order, dated April 17, 1991, requiring all Federal agencies to reduce energy consumption per gross square foot 20 percent below 1985 consumption by the year 2000 and an additional 10 percent by 2005.

IMPACT OF DELAY:

If this project is delayed Building 4201 will continue to experience excessive maintenance costs and high energy consumption. MSFC will not be able to comply with the Executive Order. Complaints about the unsatisfactory environment in the building will increase and lower employee morale.

PROJECT DESCRIPTION:

This project will repair and modernize old and deteriorated HVAC equipment, control systems, and electrical systems for the basement and the first, second and third floors of Building 4201. The work includes replacing the control systems on more than 108 mixing boxes. The existing air-handlers will be left as they are. Heating coils, cooling coils, dampers, and fan impellers will be replaced. The existing mixing boxes will be upgraded with new direct digital control hardware and interface with the Utility Control System. The new control configuration will enable the interior mixing boxes to function as variable-air-volume units while the exterior mixing boxes continue to operate as constant-volume-units. Office lighting will be replaced with energy efficient lighting. An engineering study is being conducted to determine the extent of mechanical modifications required in Building 4201.

FY 2000 PROJECT COST ESTIMATE:

	<u>Unit of Measure</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
Architectural . . . . .	SF	---	---	\$184,000
Mechanical . . . . .	SF	---	---	1,403,000
Electrical . . . . .	SF	---	---	713,000
Total . . . . .				<u>\$2,300,000</u>

OTHER EQUIPMENT SUMMARY: None

FUTURE ESTIMATED CONSTRUCTION FUNDING REQUIRED TO COMPLETE THIS PROJECT: Future funding requirements will be determined based upon an engineering study currently under contract.

**CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATES**

PROJECT TITLE: Repair Roofs, Vehicle Component Supply Buildings

INSTALLATION: Michoud Assembly Facility

FY 2000 ESTIMATE: \$2,000,000

LOCATION OF PROJECT: New Orleans, Orleans Parish, Louisiana

COGNIZANT HEADQUARTERS OFFICE: Office of Space Flight

FY 1999 AND PRIOR YEARS FUNDING: The following prior years funding is related to this project:

	<u>Planning and Design</u>	<u>Construction</u>	<u>Total</u>
Specific Construction Funding . . . . .	\$83,000	\$ ---	\$ 83,000
Capitalized Investment . . . . .	<u>---</u>	<u>3,890,986</u>	<u>3,890,986</u>
Total . . . . .	<u>\$83,000</u>	<u>\$3,890,986</u>	<u>\$3,973,986</u>

SUMMARY PURPOSE AND SCOPE:

This project will replace 2,005 squares of roofing on Building 220 and 254 squares of roofing on Building 104. Repairs to the 220 and 104 roofs are necessary to prevent further structural deterioration that may result in damage to flight hardware, equipment, and supplies.

PROJECT JUSTIFICATION:

The Building 220 roof was installed in 1966 and the Building 104 roof was installed in 1943. Both roofs have exceeded their 20-year design life. The roof on Building 220 (which contains flight hardware and tooling components) has bare spots in the gravel, soft spots/blisters in the membrane, rust, open laps, felt deterioration, leaks in several areas, and inadequate lightning protection. The roof on Building 104 (which contains the battery shop and maintenance equipment) has bare spots in the gravel, "alligating"/cracking, deterioration, blister, rust, and inadequate lightning protection. Both roofs are in poor condition and recommended for replacement in the 1990 Long-Range Roofing Inspection/Assessment plan.

IMPACT OF DELAY:

Failure to repair roofs will result in continued deterioration, which may lead to structural, flight hardware, and equipment/supplies damage.

PROJECT DESCRIPTION:

The existing built-up roofs will be removed and replaced with a new roofing system of 4-ply gravel that has reflective coating. The Building 220 roof needs 2,005 squares and the Building 104 roof needs 254 squares. Rust will be removed from all metal flashings, copings, and other ferrous material. Lightning protection will be provided on both buildings.

FY 2000 PROJECT COST ESTIMATE:

	<u>Unit of Measure</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
Architectural/Structural. . . . .	LS	---	---	\$1,850,000
Electrical/Mechanical. . . . .	LS	---	---	150,000
Total . . . . .				<u>\$2,000,000</u>

OTHER EQUIPMENT SUMMARY: None

FUTURE ESTIMATED CONSTRUCTION FUNDING REQUIRED TO COMPLETE THIS PROJECT: None

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**

**CONSTRUCTION OF FACILITIES**

**FISCAL YEAR 2000 ESTIMATES**

**SUMMARY**

**MINOR REVITALIZATION**

Location:

	<u>Amount</u>
Ames Research Center	\$ 8,050,000
Dryden Flight Research Center	2,500,000
Glenn Research Center	7,500,000
Goddard Space Flight Center	5,300,000
Jet Propulsion Laboratory	3,900,000
Johnson Space Center	4,200,000
Kennedy Space Center	6,600,000
Langley Research Center	7,950,000
Marshall Space Flight Center	7,050,000
Michoud Assembly Facility	2,750,000
Stennis Space Center	6,100,000
Wallops Flight Facility	2,700,000
Various Locations	<u>900,000</u>
Total	<u>\$65,500,000</u>

**CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATES**

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PROJECT TITLE: Minor Revitalization of Facilities, Not in Excess of \$1,500,000 Per Project

INSTALLATION: Various Locations

FY 2000 Estimate: \$65,500,000

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FY 1998: \$56,729,000

FY 1999: \$68,400,000

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COGNIZANT INSTALLATIONS/LOCATIONS OF PROJECT: Various Locations

COGNIZANT HEADQUARTERS OFFICE: Office of Management Systems and Facilities

SUMMARY PURPOSE AND SCOPE:

These resources provide for revitalization of facilities at NASA field installations and Government-owned industrial plants supporting NASA activities. The request includes facility revitalization needs for FY 2000 that are greater than \$500 thousand but not in excess of \$1.5 million per project. Revitalization projects provide for the repair, modernization, and/or upgrade of facilities and collateral equipment. Repair and modernization projects restore facilities and components thereof, including collateral equipment, to a condition substantially equivalent to their originally intended and designed capability. Repair and modernization work includes the substantially equivalent replacement of utility systems and collateral equipment necessitated by incipient or actual breakdown and major preventive measures that are normally accomplished on a cyclic schedule. Upgrade projects may include some restoration of current functional capability but also includes enhancement of the condition of a facility so that it can more effectively accomplish its designated purpose or increase its functional capability. The facilities being revitalized in this program are expected to remain active in the long term and are consistent with current and anticipated Agency roles and missions.

PROJECT JUSTIFICATION:

NASA is now experiencing "block obsolescence" where substantial portions of the agency's facilities have been in use for over 30 years. Repair costs for mechanical and electrical systems in a typical building are almost three times higher after system operations exceed 15-20 years than they are during the initial years. Many electrical and mechanical components reach the end of their serviceable or economic life at the 20-year point and should be replaced in the interest of long-term economy. Continued piecemeal repair of these components is more costly in the long run than replacement at the end of the economic life of the original components. Approximately 90 percent of NASA's physical plant has been in service for over 25 years.

The NASA physical plant has a capital investment of \$5.8 billion and has a current replacement value of more than \$17 billion. A continuing program of revitalization of these facilities is required to accomplish the following:

- a. Protect the capital investment in these facilities by minimizing the cumulative effects of wear and deterioration.
- b. Ensure that these facilities are continuously available and that they operate at peak efficiency.
- c. Improve the capabilities and usefulness of these facilities and thereby mitigate the effects of obsolescence.
- d. Provide a better and safer environment for all personnel.
- e. Avoid significantly greater future repair costs.

This program includes revitalization work exceeding \$500 thousand per project. Projects \$500 thousand and less in magnitude are normally accomplished by routine day-to-day facility maintenance and repair activities provided for in Human Space Flight; Science, Aeronautics and Technology; and Mission Support appropriations. Projects estimated to cost more than \$1.5 million are included as separate discrete projects in the budget request.

PROJECT DESCRIPTION:

Proposed projects for FY 2000 totaling \$65.5 million are identified under "MINOR REVITALIZATION PROJECT COST ESTIMATE". The projects that comprise this request are of the highest priority based on relative urgency and expected return on investment. Deferral of this mission-essential work would adversely impact the availability of critical facilities and program schedules. The titles of the projects are designed to identify the primary intent of each project and may not always capture the entire scope or description of each project. Also, during the year, some rearrangement of priorities may be necessary which may force a change in some of the items to be accomplished. Any such changes, however, will be accomplished within total available revitalization resources.

MINOR REVITALIZATION PROJECT COST ESTIMATE:

A. <u>Ames Research Center (ARC)</u>	<u>\$8,050,000</u>
1. Repair and Modernize 60 Megawatt Direct Current Power Supply, Thermal Protection Lab [N234A]	1,400,000
2. Modify/Add to Building 566 for Ames Child Care Facility	1,400,000
3. Repairs to Unitary Plan Wind Tunnel [N227]	1,200,000
4. Repair and Modify Shop and Model Preparation Areas, Model Construction Facility [N246]	1,200,000
5. Repair High Pressure Systems	800,000
6. Repair and Modernize Fire Suppression and Alarm Systems, Research Support Facility [N213]	600,000
7. Repair and Modernize Building, Life Sciences Research Laboratory [239A]	550,000
8. Upgrade to 8-cm Arc Jet Heaters, Arc Jet Laboratory [N238]	900,000
 B. <u>Dryden Flight Research Center (DFRC)</u>	 <u>\$2,500,000</u>
1. Seismic Repair, Integrated Test Facility [4840]	800,000
2. Repair, Modernize, and Upgrade Infrastructure of Research, Development, and Test Facility [4800]	1,000,000
3. Repair and Modify Communications Ductbank Infrastructure	700,000

C. <u>Glenn Research Center (GRC)</u>	<u>\$7,500,000</u>
1. Upgrades to Safety, Security, and Information Infrastructure, Plum Brook Station	800,000
2. Repair and Modernize Mechanical and Electrical Systems, Chemical Laboratory [6]	900,000
3. Repair Roof of Engine Research Building Complex [5, 23, 38]	900,000
4. Repair and Modernize Electrical and Mechanical Systems [51, 106]	1,100,000
5. Repair Sanitary Sewer Systems	800,000
6. Repair and Modernize Cryogenic Services Building [83]	550,000
7. Repair Underpass Road Bridges	850,000
8. Repair and Modernize Mechanical and Electrical Systems in 8x6 Subsonic Wind Tunnel Office [54]	900,000
9. Repair and Modernize Main Cafeteria [15]	700,000
D. <u>Goddard Space Flight Center (GSFC)</u>	<u>\$5,300,000</u>
1. Repair and Modernize Fire Protection and Domestic Water System, Area 200	800,000
2. Repair and Modernize Heating, Ventilation, and Air Conditioning Systems [22]	850,000
3. Repair High Voltage Electrical System, Various Buildings	850,000
4. Repair Roofs, Various Buildings	850,000
5. Repair and Modernize Heating, Ventilation, and Air Conditioning Systems [25]	1,250,000
6. Consolidate and Upgrade Applied Engineering and Technology Directorate Labs [5, 11]	700,000
E. <u>Jet Propulsion Laboratory (JPL)</u>	<u>\$3,900,000</u>
1. Install Uninterruptible Power Supply, Space Flight Support Facility [264]	850,000
2. Modify Fire Alarm Systems, Various Buildings	700,000
3. Modify Air Handling and Controls, Earth and Space Science Laboratory [300]	1,500,000
4. Modernize 1st and 2nd Floors, Information Systems Development Building [126]	850,000
F. <u>Johnson Space Center (JSC)</u>	<u>\$3,350,000</u>
1. Repair and Upgrade Fire Alarm and Sprinkler Systems, Various Facilities	1,150,000
2. Replace 12 kV Switches, Various Facilities	950,000
3. Repair and Upgrade Fire Alarm System, Emergency Operations Center [30]	700,000
4. Repair Propulsion Area Water Lines @ White Sands Test Facility [300, 400 Areas]	850,000
5. Repair and Modernize Mission Simulation Development Facility [35]	550,000
G. <u>Kennedy Space Center (KSC)</u>	<u>\$6,600,000</u>
1. Upgrade Facilities for Disabled Access, Various Facilities	600,000
2. Repair and Upgrade Roads and Paved Areas	900,000
3. Replace Feeder Cables 608 and 614, Various Locations	550,000
4. Repair and Modernize Ground Support Equipment Development Laboratory	950,000
5. Repair and Modernize HVAC, Thermal Protection Systems Facility	900,000

6. Safety Modifications to Pad B Hinge Column Crossover	500,000
7. Revitalize Secondary Power Systems, LC-39 Industrial Area	900,000
8. Modify Helium Gasification Complex to Provide Storage Capabilities	1,300,000
<b>H. <u>Langley Research Center (LaRC)</u></b>	<b><u>\$7,950,000</u></b>
1. Modify Building 647 to Provide Additional Model Preparation Area	1,100,000
2. Performance Modifications to 8-Foot High Temperature Tunnel Combuster Facility [1265]	1,400,000
3. Replace Heater Controls, 31-inch Mach 10 Tunnel [1251A]	1,425,000
4. Repair and Modernize Interior of Information Media Center	1,175,000
5. Repair and Modernize Office Building [1192C]	1,425,000
6. Upgrade Control and Fuel Systems, Arc-Heated Scramjet Test Facility [1247B]	1,425,000
<b>I. <u>Marshall Space Flight Center (MSFC)</u></b>	<b><u>\$7,050,000</u></b>
1. Safety Modifications to Overhead Cranes	600,000
2. Repair and Modernize Fire Alarm Systems, Various Buildings	1,000,000
3. Repair and Modernize Electrical and Mechanical Systems, Developmental Process Lab [4711]	1,100,000
4. Replace Roofs of Structural Dynamics and Thermal Vacuum Laboratory [4619]	1,250,000
5. Repairs to South Tank Line, Surface Treatment Facility [4760]	1,500,000
6. Repair and Modernize Electrical and Mechanical Systems, Structures and Mechanics Lab [4619]	900,000
7. Convert 20-Foot Vacuum Chamber to Cryopumps, Environmental Test Facility [4619]	700,000
<b>J. <u>Michoud Assembly Facility (MAF)</u></b>	<b><u>\$2,750,000</u></b>
1. Repair Dehumidifiers Cells C&H, Vertical Assembly Building/High Bay Addition Building [110/114]	900,000
2. Repair and Modernize Sterilizer System, Systems Engineering Building [130]	900,000
3. Replace Two Critical Chillers, Vertical Assembly Building/Acceptance and Prep Building [110/420]	950,000
<b>K. <u>Stennis Space Center (SSC)</u></b>	<b><u>\$6,100,000</u></b>
1. Repairs to Shuttle Parkway	600,000
2. Repair and Modernize Energy Management Control System, Various Facilities	700,000
3. Repair and Modernize Mechanical Systems, Data Acquisition Facility [4995]	1,100,000
4. Repairs and Modifications to 13.8 KV Electrical Distribution System, Centerwide	1,200,000
5. Repair Marine Mooring Dolphins	550,000
6. Increase Capacity and Expand GH2/GN2 High Pressure Distribution System	1,400,000
7. Repair and Modernize Secondary Power Systems, Various Facilities	550,000

L. <u>Wallops Flight Facility (WFF)</u>	<u>\$2,700,000</u>
1. Repair Communications Ductbank	650,000
2. Repair Storm Drainage System, Mainbase Area	800,000
3. Repair and Modernize Radar Facilities [U-25, U-30]	550,000
4. Repair and Modernize Payloads Development and Integration Facility [F-8]	700,000
M. <u>Various Locations</u>	<u>\$900,000</u>
1. Replace Hydraulic Drive, 26M Antenna [DSS-16]	900,000
 Total Minor Revitalization	 <u>\$65,500,000</u>

FUTURE ESTIMATED CONSTRUCTION FUNDING REQUIRED:

Annual funding will be required for continuing minor revitalization needs.

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**

**CONSTRUCTION OF FACILITIES**

**FISCAL YEAR 2000 ESTIMATES**

**SUMMARY**

**MINOR CONSTRUCTION**

Location:

Various Locations

Total

Amount  
\$ 5,000,000

\$ 5,000,000

**CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATES**

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PROJECT TITLE: Minor Construction of New Facilities and Additions to Existing Facilities Not in Excess of \$1,500,000 Per Project

INSTALLATION: Various Locations

FY 2000 Estimate: \$5,000,000

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FY 1998: \$1,100,000

FY 1999: \$0

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SUMMARY PURPOSE AND SCOPE:

These resources will provide for minor facility construction at NASA field installations. Each project in this program is estimated to cost no more than \$1.5 million and involves either the construction of new facilities or additions to existing facilities.

PROJECT JUSTIFICATION:

The FY 2000 \$5.0 million Minor Construction program will primarily replace substandard facilities in cases where it is more economical to demolish and rebuild than it is to restore. In selected cases, additional square footage may be built when there are compelling reasons to support new or specialized requirements of a nature that cannot be provided for using existing facilities. Included in this latter category are technical, programmatic, and institutional projects that are essential to the accomplishment of an installation's mission objectives.

PROJECT DESCRIPTION:

Included in the FY 2000 Minor Construction Program are those facility projects for institutional or technical facility needs that could be fully identified at the time of submission of this budget estimate. Items of work totaling \$5.0 million are included in this resource request. Projects were selected on the basis of the relative urgency of each item and the expected return on the investment. During the course of the year, the revision of priorities may require changes in some of the items to be accomplished. Such changes will be accommodated within the total resources allocated. Most of these projects replace old and dilapidated railroad box cars, trailers, and other modular facilities that do not meet current occupational health and safety standards, and which no longer satisfy user functional requirements. Poor ventilation and leaky walls and roofs make the interior barely habitable. When weather conditions increase the probability of lightning activity, occupants of these facilities must evacuate them due to lack of lightning protection and the associated fire hazard. These facilities must also be evacuated in times of tornado watches and warnings, and high wind alerts. This is a frequent and very disruptive routine that impacts productivity and employee morale. It results in higher costs and increased risk of human error. Life cycle analyses support replacing these facilities with new permanent buildings rather than trying to repair the existing ones.

MINOR CONSTRUCTION PROJECT COST ESTIMATE:

A. <u>Kennedy Space Center (KSC)</u>	<u>\$5,000,000</u>
1. Construct Replacement Housing for Orbiter Processing Facility (OPF) Hazardous Ops Personnel	550,000
2. Construct Replacement Housing for Shuttle Landing Facility (SLF) Landing Aids Ops Personnel	1,000,000
3. Construct Replacement Housing for Pad A LOX/LH2 Operations Personnel	1,000,000
4. Construct Replacement Housing for Payload Processing Support Personnel	800,000
5. Construct Replacement of Building 21900 Operations Support Space	900,000
6. Construct Addition to LC-39 News Facility	750,000
 Total Minor Construction	 <u>\$5,000,000</u>

FUTURE ESTIMATED CONSTRUCTION FUNDING REQUIRED: Annual funding will be required for continuing minor construction needs.

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**

**CONSTRUCTION OF FACILITIES**

**FISCAL YEAR 2000 ESTIMATES**

**SUMMARY**

**FACILITY PLANNING AND DESIGN**

	<u>Amount</u>
Master Planning	\$ 400,000
Sustaining Engineering Support	1,000,000
Project Planning and Design Activities	<u>17,800,000</u>
Total	<u>\$19,200,000</u>

**CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATE**

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PROJECT TITLE: Facility Planning and Design

FY 2000 Estimate: \$19,200,000

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FY 1998: \$19,000,000

FY 1999: \$14,000,000

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These funds are required to provide for advance planning and design activities; special engineering studies; facility engineering research; preliminary engineering efforts required to initiate design-build projects; the preparation of final designs, construction plans, specifications, and associated cost estimates; and participation in facilities related professional engineering associations and organizations as follows:

A. Master Planning

\$400,000

Provides for updating, developing and automating existing field installation master plans. This effort includes facility studies, site investigations, and analyses of utility systems. The existing utility and civil drawings will be converted into a highly detailed electronic database using computer-aided-design (CAD) systems. Topographical features from original drawings will be merged electronically to create individual area maps or an entire center map. The master plan documents will be updated to reflect as-built conditions and to graphically represent the 5-year facility plan baseline for future development.

The NASA field center master plans are periodically updated. The master plans are essential as reference documents for land use planning, identification of physical relationships of facilities, and proper orientation and arrangement of facilities. The updates reflect as-built condition of facilities and utility systems with emphasis on changes caused by recent facility construction and modifications.

B. Sustaining Engineering Support

\$1,000,000

Provisions for facility studies and specific engineering support continue in importance as evidenced in recent years. These efforts are important due to changing trends in construction equipment, materials, and fuels; the operation and maintenance costs for the physical plant; and energy conservation and efficiency. The following items are included in the FY 2000 requirements:

1. Value Engineering, and Design and Construction Management Studies

Provides for critically important studies to improve the quality and cost effectiveness of NASA's facility components and construction practices, and to ensure that developing technology and industry best practices are incorporated into the agency's construction program. Also provides services necessary to predict and validate facility costs to aid in resources planning.

2. Facility Operation and Maintenance Studies

Provides for studies and engineering support where not otherwise provided for, at NASA field installations relative to functional management of maintenance, automated maintenance management systems, and facilities condition assessments. Included in

this activity are field surveys to be conducted at selected NASA field installations to evaluate the effectiveness and efficiency of the operations and maintenance management activities, and to identify possible improvements in productivity.

### 3. Facilities Utilization Analyses

Provides for the analyses of agencywide facilities utilization data covering (1) office and other types of building space; (2) designated major technical facilities; and (3) special studies comparing the utilization of technical facilities which are similar in type or capability, such as wind tunnels. Such analyses provide for (1) insights into and development of better methods of identifying underutilized facilities; (2) improved techniques to quantify level of facilities use; (3) actions to improve facilities utilization; and (4) recommendations regarding consolidation/closure of Agency facilities.

### 4. Facilities Management Systems

Provides for continued engineering support for the technical updating of NASA's master text construction specifications to reflect the use of new materials, state-of-the-art construction techniques and current references to building codes and safety standards. Also provides engineering support for the Major Facilities Inventory, the Real Property Database and the Facilities Utilization Database systems.

### 5. Capital Leveraging Research Activities

Provides for modest participation in facilities related professional engineering associations, institutes, and organizations established to bring together major facility owners, contractors, and academia in proven research and study efforts to improve the quality and cost effectiveness of facilities engineering management practices for member organizations. Such organizations include, but are not limited to, the Federal Facilities Council of the National Research Council, National Institute of Building Sciences, and the Construction Industry Institute. This also provides for independent research activities to address facility problems unique to NASA.

## C. Project Planning and Design Activities

\$17,800,00

### 1. Preliminary Engineering Reports (PERs)

0  
(700,000)

This estimate provides for preparation of PERs, investigations, project studies and other pre-project planning activities related to proposed facility projects in the FY 2002 and FY 2003 Construction of Facilities programs. These reports are required to permit the early and timely development of the most suitable project to meet the stated programmatic and functional needs. Reports provide basic data, cost estimates and schedules relating to future budgetary proposals.

### 2. Related Special Engineering Support

(400,000)

This estimate provides for investigations and project studies related to proposed facility projects to be included in the subsequent Construction of Facilities programs. Such studies involve documentation and validation of 'as-built' conditions, survey/study of present condition of such items as roofing and cooling towers, utility plant condition and operational modes, and other similar studies. These studies are required to allow for the timely development of projects to meet the stated functional needs and to provide basic data, cost estimates and schedules for related future budgetary proposals.

### 3. Final Design

(16,700,000  
)

The amount requested will provide for the preparation of designs, plans, drawings, and specifications necessary for the accomplishment of construction projects. Also provides technical and engineering support analyses, designs, and reviews required to verify, confirm and ensure suitability of construction designs within the project cost estimates. This work is associated with construction proposed for the FY 2002 program, estimated to cost \$110 to \$120 million, and with changes to projects proposed for the FY 2001 program. The goal is to obtain better facilities on line earlier at a lower cost. An additional \$8 million has been provided for work required to accomplish the increase in construction anticipated in FY 2001 and FY 2002, estimated to cost \$170 to \$190 million, as determined by the Agency's core capabilities study currently underway.

Total Facility Planning and Design

\$19,200,000

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**

**CONSTRUCTION OF FACILITIES**

**FISCAL YEAR 2000 ESTIMATES**

**SUMMARY**

**DEFERRED MAINTENANCE**

Location:

Various Locations

Total

Amount  
\$ 8,000,000

\$ 8,000,000

**CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATES**

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PROJECT TITLE: Deferred Maintenance of Facilities, Not in Excess of \$500,000 Per Project or Unlimited for Maintenance Work

INSTALLATION: Various Locations

FY 2000 Estimate: \$8,000,000

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FY 1998: \$0

FY 1999: \$0

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COGNIZANT INSTALLATIONS/LOCATIONS OF PROJECT: Various Locations

COGNIZANT HEADQUARTERS OFFICE: Office of Management Systems and Facilities

SUMMARY PURPOSE AND SCOPE:

These resources provide for projects to partially mitigate the growth in deferred maintenance and repair of facilities at NASA field installations and Government-owned industrial plants supporting NASA activities. The request includes facility maintenance and repair needs for FY 2000 that are up to \$500 thousand per repair and unlimited for maintenance work. These maintenance and repair activities include work to provide for the repair and/or overhaul of facilities and collateral equipment. Repairs and/or overhauls restore facilities and components thereof, including collateral equipment, to a condition substantially equivalent to their originally intended and designed capability, and level of safety. This work includes the substantially equivalent replacement of utility system components and collateral equipment necessitated by incipient or actual breakdown, major preventive measures that are normally accomplished on a cyclic schedule, restoration of current functional capability, and upgrades to comply with current codes, safety standards and other commercial practices so the facility can effectively accomplish its originally designated purpose and functional capabilities. The facilities being repaired and overhauled in this program are expected to remain active in the long term and are consistent with current and anticipated Agency roles and missions.

PROJECT JUSTIFICATION:

NASA is experiencing annual growth in deferred maintenance and repair due to severely constrained resources. Accelerating deterioration potentially threatens safety and NASA's mission. This backlog of maintenance covers a substantial portion of the agency's facilities, which have been in use for over 40 years. The NASA physical plant has a capital investment book value of \$5.8 billion and has a current replacement value of more than \$17 billion. An adequate continuing program of routine maintenance and repair of these facilities is required to accomplish the following:

- a. Protect the capital investment in these facilities by minimizing the cumulative effects of wear and deterioration.
- b. Ensure that these facilities are continuously available to support NASA's mission and that they operate at peak efficiency.
- c. Maintain the originally designed level of safety and reliability that the facilities were constructed to.
- d. Avoid significantly greater future repair costs that result from facility failures.
- e. Minimize the growth of additional unfunded backlog of deferred maintenance and repair.

This routine maintenance and repair work costing \$500 thousand and less for repair or unlimited for maintenance is normally accomplished by routine day-to-day facility maintenance and repair activities provided for in Human Space Flight; Science, Aeronautics and Technology; and Mission Support appropriations.

PROJECT DESCRIPTION:

The highest priority deferred work totaling \$8 million will be identified based on the findings of the Agency's Core Capabilities Assessment currently underway. The deferred maintenance and repair work that is to be completed by this request will be the highest priority based on safety, relative urgency, and expected return on investment. Continued deferral of this mission-essential work would adversely impact the availability of critical facilities and program schedules.

FUTURE ESTIMATED CONSTRUCTION FUNDING REQUIRED: Additional funding will be necessary to ameliorate the present backlog of deferred facilities maintenance and repair. Funding requirements will be based on the findings of the Agency's Core Capabilities Assessment currently underway.

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATES**

**SUMMARY**

**ENVIRONMENTAL COMPLIANCE AND RESTORATION (ECR) PROGRAM**

<u>Summary of Project Amounts by Location:</u>	<u>Amount</u>
Dryden Flight Research Center	600,000
Glenn Research Center	2,550,000
Jet Propulsion Laboratory	4,700,000
Johnson Space Center	1,300,000
Kennedy Space Center	6,020,000
Marshall Space Flight Center	6,825,000
Michoud Assembly Facility	1,250,000
Stennis Space Center	3,600,000
Wallops Flight Facility	1,100,000
White Sands Test Facility	3,200,000
Studies, Assessments, and Investigations; Plans; Designs; Sampling, Monitoring and Operation of Remedial Treatment Processes; Related Engineering and Program Support	<u>8,955,000</u>
Total	<u>\$40,100,000</u>

**CONSTRUCTION OF FACILITIES  
FISCAL YEAR 2000 ESTIMATES**

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PROJECT TITLE: Environmental Compliance and Restoration (ECR) Program

INSTALLATION: Various Locations

FY 2000 Estimate: \$40,100,000

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FY 1998: \$11,400,000

FY 1999: \$40,000,000

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COGNIZANT INSTALLATIONS/LOCATIONS OF PROJECT: Various Locations

COGNIZANT HEADQUARTERS OFFICE: Office of Management Systems and Facilities - Environmental Management Division

SUMMARY PURPOSE AND SCOPE:

These resources will provide for environmental activities necessary for compliance with environmental measures including environmental program initiatives. The purpose of the ECR Program is to enable NASA to comply with environmental statutory and regulatory requirements and standards, orders, regulatory and cooperative agreements, and support of environmental program initiatives. The Program focuses our efforts into the following principal areas: compliance, remediation, restoration, and prevention. Within this framework, compliance with environmental requirements is performed, while implementing remediation at previously contaminated sites, and promoting the identification of pollution prevention and restoration activities. The resources authorized and appropriated pursuant to this program may not be applied to other activities. Program activities include projects, studies, assessments, investigations, plans, designs, related engineering, program support, and sampling, monitoring, and operation of remedial treatment processes as part of the remediation/cleanup measures. These activities will be performed at NASA installations, Government-owned industrial plants supporting NASA activities, and other locations where NASA operations have contributed to environmental problems and NASA is obligated to contribute to cleanup costs. In addition, these resources will be used to provide for regulatory agency oversight costs, to acquire land if necessary to implement environmental compliance and restoration measures, and to perform studies, assessments, and activities in support of functional leadership initiatives related to the environmental program. Examples of activities included in the program are: prescribed remedial investigations and feasibility studies required by environmental laws and regulations; performance of environmental restoration, hazardous waste removal and disposal, remediation/cleanups, closures, and environmental compliance actions; studies, investigations, and assessments to determine compliance status and options for remedial/cleanup and compliance measures, including evaluation and use of new cleanup technologies; support of pollution prevention, restoration, and other environmental program initiatives.

PROJECT JUSTIFICATION/DESCRIPTION:

Proposed environmental program activities for Fiscal Year 2000 total \$40.1 million. This program represents this year's request on a phased approach in relation to the total Agency requirements for the environmental remediation activities that must be implemented within the next several years, as well as needed requirements for other environmental compliance measures. Based on relative urgency and potential health hazards, the listed activities are the highest priority requirements currently planned for accomplishment in FY 2000. Deferral of these necessary compliance and remedial measures would preclude NASA from complying with environmental requirements and regulatory agreements, and jeopardize critical NASA operations. As studies, assessments, remedial investigations, feasibility studies, and designs progress and as new discoveries or regulatory requirements change, it is expected that priorities may change and revisions of these activities may be necessary.

Remediation activities include one or more phases of a site cleanup program, including but not limited to, the following: 1) site assessments; 2) site investigations; 3) interim cleanup actions; 4) testing and evaluation; and 5) remedial treatment processes and other activities associated with the CERCLA/RCRA cleanup requirements.

The following broad environmental categories summarize the effort to be undertaken with the identified estimated costs:

- |   |              |
|---|--------------|
| a. Remediation Activities and Initiatives (e.g. CERCLA, RCRA)   | \$34,540,000 |
| b. Other Environmental Compliance Requirements and Initiatives -- Compliance, Restoration, Prevention, Closure Activities and Initiatives -- (e.g. CAA, CWA, RCRA, ESA, AEA, PPA) | 5,560,000    |

CERCLA = Comprehensive Environmental Response, Compensation and Liability Act

RCRA = Resource Conservation and Recovery Act

CAA = Clean Air Act

CWA = Clean Water Act

ESA = Endangered Species Act

AEA = Atomic Energy Act

PPA = Pollution Prevention Act

COST ESTIMATES:

A. <u>Dryden Flight Research Center (DFRC)</u>	<u>\$600,000</u>
1. Remediation of Soil/Groundwater Contamination	600,000
B. <u>Glenn Research Center (GRC)</u>	<u>\$2,550,000</u>
1. Remediation of UST Sites, PBS	1,000,000
2. Remediation Activities at Operable Units, PBS	650,000
3. Plum Brook Reactor Decommissioning Activities	900,000
C. <u>Jet Propulsion Laboratory (JPL)</u>	<u>\$4,700,000</u>
1. Remediation of Arroyo Seco Groundwater Contamination	4,700,000
D. <u>Johnson Space Center (JSC)</u>	<u>\$1,300,000</u>
1. Environmental Assessment/Cleanup for NASA Industrial Plant, Downey	250,000
2. Storm/Sanitary Cross Connections Compliance	400,000
3. Closure of Treatment Systems, B410 & B223	650,000
E. <u>Kennedy Space Center (KSC)</u>	<u>\$6,020,000</u>
1. Remediation of Launch Complex 34	1,200,000
2. Remediation of Hydrocarbon Burn Facility	1,000,000
3. Remediation of Central Heating Plant	600,000
4. Remediation of Components Cleaning Facility Laboratory, Phase 2	1,000,000
5. Interim Remediation of Crawler Park Sites, West	400,000
6. Remediation of Contractor Heavy Equipment Area	670,000
7. Remediation of Hypergol Support Building, M7-1061	150,000
8. Restoration of Wetlands and Scrub Habitat, Phase 3	600,000
9. Various Interim Remedial Actions, Various Locations	400,000
F. <u>Marshall Space Flight Center (MSFC)</u>	<u>\$6,825,000</u>
1. CERCLA Investigation and Cleanup	5,625,000
2. RCRA Investigation and Cleanup, Santa Susana Field Laboratory (SSFL)	500,000
3. Sewer System Rerouting and Compliance Modifications	700,000
G. <u>Michoud Assembly Facility (MAF)</u>	<u>\$1,250,000</u>
1. Remediation Activities, Various Locations	1,250,000
H. <u>Stennis Space Center (SSC)</u>	<u>\$3,600,000</u>
1. Remediation Activities at Various Sites	3,600,000

I. <u>Wallops Flight Facility (WFF)</u>	<u>\$1,100,000</u>
1. Remediation of Advanced Data Acquisition System Radar Antenna Site, N168	800,000
2. Wastewater Treatment Plant De-nitrication Process Upgrade	300,000
J. <u>White Sands Test Facility (WSTF)</u>	<u>\$3,200,000</u>
1. Groundwater Contamination Assessment and Remediation	3,200,000
K. <u>Studies, Assessments, and Investigations; Plans; Designs; Sampling, Monitoring and Operation of Remedial Treatment Processes; Related Engineering and Program Support</u>	<u>\$8,955,000</u>
Total Environmental Compliance and Restoration (ECR) Program	<u>\$40,100,000</u>

FUTURE ESTIMATED PROGRAM FUNDING REQUIRED:

Requirements will be re-evaluated each year to ensure the necessary activities are accommodated within the budget. Specific outyear funding levels will become better defined as plans and estimates are completed, and planned activities are reviewed and coordinated with federal, state, and local regulators.