5.1 GENERAL INFORMATION

5.1.1 Annex Description

This annex provides definitions and general information which relate to performance of facility maintenance and operations at Stennis Space Center described in Annex 5 that is subdivided as follows:

5.1 General Information
5.2 Preventive Maintenance
5.3 Corrective Maintenance
5.4 Operations
5.5 Availability
5.6 Special Operations and Maintenance Test Complex
5.7 Facility Inspections Programmed and Planned Maintenance
5.8 Grounds Maintenance and Integrated Pest Management Services

The facilities are all located within the boundaries of the SSC fee area and include facilities occupied by NASA, NASA contractors, Resident Agencies and their contractors.

5.1.2 Contractor Responsibility

The Contractor shall be responsible for performance of Preventive Maintenance (PM), Corrective Maintenance (CM), Operations, System Availability, and all other work specified. The Contractor shall use the following documents, lists, tables, databases, and geographical boundaries to further define the scope of the Contractor's responsibility:

1. Table 5.1-1 This table identifies and defines major systems, Subsystems, and units such as 13.8 KV Electrical System, Potable Water-System, Sanitary Sewage System, Energy Management and Control System, Natural Gas System, Marine System, Mechanical Systems, and Other Systems.

2. The **MAXIMO equipment database** (available at TRL) identifies numbered equipment and gives criticality for each. For proposal purposes, the baseline is the data in the RFP Workload Data. Where is a difference in the RFP Workload Data and the MAXIMO database in the TRL, the RFP Workload Data will govern.

3. The Specified Structures and Facilities List (Exhibit 8) identifies the structures and facilities included in Structures Facilities Utilities, Systems and Subsystems (SFUSS).

4. The IAGP List (J-10, List 1 and List 2) identifies equipment for which the Contractor has Maintenance and Operations responsibility.

5. The **Systen Operational and Maintenacne Responsibility Databse (SOMRD** identifies SFUSS and IAGP for which the Contractor has M&O responsibility. Additionally, this database identifies the System Management Organization responsible for M&O funding. The FOSC is responsible for the development and maintenance of this database in accordance with NASA Work Instruction, RA-98-08 and SSC STD 99-025. Reports shall be provided as detailed in DR 5-GA25.d IA

6. The **Master Facility Plan** (available at TRL) defines the geographical boundary of the SSC fee area. The NASA portion of this area contains all SFUSS and IAGP for which the Contractor is responsible.

5.1.3 Equipment Replacement

Equipment covered under this annex may be replaced when it reaches "end of service life" or becomes uneconomical to repair in accordance with the PM plan. Replacement of this equipment in-kind (including upgrade to accommodate equivalent modern technology) shall not relieve the Contractor of the responsibility of continued performance of specified work within Annex 5. The Contractor shall begin maintenance and operations of such replacement equipment as soon as it is placed in service. Where applicable, equipment numbers shall be assigned and installed.

5.1.4 Tree Diagrams

The Lead Page(s) in Annexes 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7 and 5.8 are pictorial tables of content or "Tree Diagrams" of the requirements in each individual Annex. They are included to help understand the layout of the performance work statements. They are not intended to be a guide or even a suggestion of what you personnel structure should be.

5.1.5 Equipment Numbering/Tagging

Corrections to the Computerized Maintenance Management System (CMMS) Equipment Database shall be accomplished in accordance with 5.2.2.3.

5.1.6 Definitions

The following are definitions for Annex 5. See Annex 1 for additional definitions that may relate to this annex.

Augmentation: The method to be used to augment the core work force to handle additional work for each sub-annex.

Biennially: Also called 2-year Frequency. Activities accomplished 1 time during each 24 month period of the contract, at intervals of 23 to 25 months. 50% of the Biennial Tasks shall be completed each year under any given task sheet.

Backlog of Maintenance and Repair (BMAR): The unfunded facilities maintenance work required to bring facilities and collateral equipment to a condition that meets acceptable facilities maintenance standards.

Base: See Institution

Buffer Zone: An area of 125,071 acres surrounding the fee area . All activities within all portions of this zone are subject to specific easement provisions. These provisions specify that habitable buildings cannot be erected, however, farming livestock raising, pulpwood and timber operations, and mining activities are allowed.

Collateral Equipment: See equipment definition from ****Facility Maintenance Handbook**.**

Common Use Areas: Facilities and/or portions of facilities, to which access is afforded and which are constructed, maintained and operated specifically for, but not incidental to, the benefit of all SSC residents. Common use areas include entry and hallways, stairs and stairwells, restrooms, and vending areas within dedicated facilities. Access restrictions, for security or other reasons, does not alter this definition.

Criticality Level:
Level I - Safety and/or Environmental Impact
Level II - Mission Operational Impact
Level III - Significant Operational Impact (replacement cost)
Level IV - Personnel Costs (loss of facility use)
Level V - Non-Critical

Debris: For purposes of this annex, debris is defined as any trash, wastepaper, gum, limbs, leaves or other matter lying scattered about which is foreign to its surroundings; e.g., leaves/rocks in equipment areas, or other items not placed or intended for the given location.

Energy Management and Control System (EMCS): A computerized system for monitoring and controlling systems and equipment through an integrated network of microprocessor based controls.

Facilities: A facility is an enclosed structure to protect personnel, material or equipment from the elements and provide associated work or storage space. For purposes of this contract, a facility includes the utility systems inside the building/structure and extends five feet from the facility or as otherwise defined.

(1) Architectural. Includes (interior/exterior) doors; windows; flooring (coatings and coverings); stairs and stairwells; interior walls, ceilings, and partitions.

(2) Structural. Includes foundation; structural system; building shell; roof; external attachments (e.g. walkway covers, overhangs, loading docks, etc); and facilities water collection and drainage system.

(3) Electrical. Includes electrical wiring and lighting, hardware, and panels; power for equipment up to the point of disconnect, grounding or lightning arresting systems; alarm systems and communication equipment (excluding telephones).

(4) Mechanical. Includes all equipment, components and controls associated with the following systems as well as components located outside the facility: HVAC; plumbing; compressed air; steam; fire suppression; gas; boilers, furnaces; and generators.

(5) Building Specialty. Includes installed equipment within the facility such as food service and processing equipment; appliances; elevators; automatic doors; roll-up doors; blast doors; vehicle gates; waste disposal equipment; shop equipment and hoists; and Visitor Center exhibits.

Fee Area: An area of approximately 25 square miles (13,800 acres) of government-owned land. The property was acquired in "Fee Simple" and includes the underlying mineral rights. It is within this area that NASA and the other resident agencies have constructed the test facilities, laboratories and office and support buildings necessary for conducting their operations.

General Maintenance Work Priority System - The following is a description of the General Maintenance Work Priority System:

Priority/Description	Narrative
1 Emergency	Safety of life or property threatened; immediate mission impact; loss of utilities: Begin immediately; divert resources as necessary; overtime may be authorized.
2 Urgent	Maintenance or repair work should be completed to ensure continuous operation of the facility and to restore healthful environment. Not a life-threatening emergency.
3 Priority	Work that is to support the mission on a priority basis or to meet project deadlines. Complete before starting new Priority 4 (routine) work.
4 Routine	Facilities maintenance work that can be scheduled routinely within the capability of the facilities maintenance organization. Complete in order of receipt, subject to availability of resources, and consolidate by facility or zone or as directed to obtain efficiency of operation.

Institution or base: For purposes of this contract Institution and Base are used interchangeably. Institution refers to those facilities and equipment that are in the fee area, west of a line parallel to and 1000 feet west of D road and excludes all Test Complex structures, facilities and utilities, and the Army Complex.

Integrated Pest Management: The utilization of control measures coordinated for overall environmental protection so as to reduce pest numbers to a controlled level without adverse effects to the surroundings.

IAGP: Installation-Accountable Government Property in the possession of, or directly acquired by the Government and subsequently made available to the contractor for use in the performance of work related to this contract.

Location: The Contractor shall define the location where each type of work will be performed (or location based out of).

Maintenance - Includes day-to-day periodic, scheduled or unscheduled work required to preserve or restore a piece of equipment, a system, or utility to such a condition that it may be effectively utilized for its intended purpose, output, redundancy and availability.

Maintenance Level: A designation used to specify the frequency of services and type of grounds maintenance required.

Monitor and Inspect: These terms are used in conjunction with "Operate" to delineate system activities other than actual operations which require periodic staffing. The Government requires that these activities would be accomplished by trained personnel with ability to recognize abnormal conditions and evidence of potential problems.

Mowing: Mowing shall include cutting and trimming, within the designated area, all grasses, weeds and other vegetation, which is 1 inch, or less in diameter (at ground level).

Operate: This term is used for systems that require periodic operational activities but not continuous staffing. Personnel may be available for other contract activities. Operations include at least the first hour of trouble-shooting/investigation of a malfunction or availability loss (See Table 5.5-4 for response time), and also includes operational support for planned outages required for Utility PM's.

Outage: The planned or unintentional interruption or termination of a utility service such as electricity, water, sanitary sewage, EMCS control, or natural gas.

Planned Maintenance Projects: A project which is approved and funded for a fiscal year as a result of the comprehensive inspection process (5.7.3.2 - 5.7.8) or as designated by the CO.

Predictive Testing and Inspection (PT&I): The use of testing techniques (primarily non-intrusive), visual inspection, and performance data to assess equipment condition. Continuing analysis of equipment condition is used to replace arbitrarily timed maintenance tasks with maintenance that is scheduled based on equipment condition.

Preventive Maintenance (PM): PM is the planned, scheduled periodic inspection, adjustment, cleaning, lubrication, parts replacement and calibration of components, equipment and systems. Also frequently called time-based, but in the broad sense, is extended to include PT&I.

Proactive Maintenance (PAM): Maintenance which seeks to reduce maintenance costs through better design, construction/installation, specifications, maintenance procedures, workmanship, and scheduling. Proactive Maintenance employs techniques such as specification of new/rebuilt equipment, precision build/installation, failed part analysis, root-cause failure analysis, reliability engineering, rebuild certification/verification, age exploration and recurrence control.

Programmed Maintenance: Programmed Maintenance consists of those maintenance task whose cycle exceeds 1 year, such as painting a building every 5th year.

Pruning: Pruning is selectively removing unwanted growth to make a plant or tree grow or respond in a desired manner. Pruning differs from 'shearing'. Pruning involves selection and judgment. 'Shearing' means clipping all growth on a plant at a uniform distance and shape.

Quinquennially: Also called 5-year Frequency. Activities accomplished 1 time during each 60 month period of the contract, at intervals of 58 to 62 months. 20% of the Quinquennial Tasks shall be completed each year under any given task sheet.

Reliability Centered Maintenance (RCM): An on-going structured process which determines the optimum mix of reactive, preventive, PT&I and proactive maintenance practices in order to provide the required reliability at the minimum cost.

Service Requests: Service Requests are not maintenance items, but are so often performed by facilities maintenance organizations they become a part of the baseline. Service Requests are requests for facilities related work which is new in nature, and as such are funded by the requesting organization. Service Requests, initiated by anybody on the Center, are submitted on a demand SWR, require approval by someone before any action is taken, are planned and estimated, materials procured, and shop personnel discretely scheduled to accomplish the work. Examples of these requests include installation of an outlet to support a new copier machine; providing a compressed air outlet to new test bench; renovating an office; and installing special cabinetry.

Six-Year Frequency: Activities accomplished 1 time during each 72 month period of the contract, at intervals of 70 to 74 months. 1/6 of the Six-Year tasks shall be completed each year under any given task sheet.

Special Purpose Mobile Equipment (SPME): Commercially available, self-propelled vehicles or trailers that incorporate internal combustion engine power designed for special-purpose use, e.g., forklifts, bulldozers, cranes, fire trucks, tractors, pressurant and propellant trailers, and certain aircraft ground support equipment. (It does not cover general-purpose vehicle, house trailers, or portable shop equipment, such as welders.) In gray areas the NASA Transportation Officer, will make the final determination as to whether or not equipment will be treated as SPME.

Special Test Equipment (STE): This designator is assigned by test programs to differentiate between facility systems that are configuration controlled and systems and/or equipment that is used uniquely for specific testing of test article. As a general rule, STE is not configured and can be changed frequently to accommodate unique requirements of the testing program. Interface points between facility and STE are normally shown in SSC Interface Control Drawings which are part of the SORD Drawing system or by memorandum of agreement. The FAMRP will also designate system responsibility and in some areas define STE system responsibility. All work accomplished by the FOS Contractor on STE will be by demand work order.

Staff and Operate: This term is used for systems that require continuous staffing during the operational period. Personnel may also operate other systems within the immediate vicinity.

Standard Operating Procedure (SOP): This is a standing procedure that provides step-by-step instructions to operate systems. It is used for activities that commonly occur. The SOP requires CO review and shall be maintained in electronic format easily accessible to the Government. Documents shall become Government property and shall be stored at CEF (See DR 5-GA09).

Structures: A structure is a constructed unit established for a designated objective. Structures that are part of or inside a facility are included with the facility. For purposes of this contract, structures are generally described as:

(1) Allowing pedestrian and vehicular transportation. Includes roads and parking areas, paved or gravel surfaces, curbs, shoulders, guard rails, medians, wheel stops, walkways, bridges, sidewalks, and associated hardware.

(2) Preventing access and maintaining privacy. Includes fences, gates, barbed wire, grounding systems, planters, bollards, chains, and associated hardware and attachments.

(3) Retaining or directing natural elements. Includes culverts, drainage systems, gravity storm water systems, retaining wall, bulkheads, landscaped borders, head walls, rip rapped areas, retention/detention ponds, spillways, canals, navigational lock, catch basins, and oil/water separators.

(4) Providing information. Includes signs, pavement markings, flag poles, displays, historical markers, monuments and associated equipment.

(5) Other. Boat ramps, docks, landfill, and associated equipment.

System/Subsystem: Groups/subgroups of equipment forming a network serving a common purpose.

Test Complex: For the purpose of this contract, all facilities, equipment and land east of a line parallel to and nominally 1000 feet west of D road and extended to the ARMY complex.

Training/Certification: The Contractor shall define the methods to train and certify new and existing employees in areas that require certification and address how the contractor will handle attrition.

Utilities: For purposes of Annex 5, consist of 13.8KV Electrical System, Potable Water System, Sanitary Sewage System, EMCS System, and the Natural Gas System as defined and described in Table 5.1-1.

Utility Process Plan (UPP): This is a one time per operation. Contractor generated, document that provides step-by-step instructions that establish responsibility and control system configuration changes. It provides details such as lockout/tagout, switch operation, valve operation, coordination, etc. Documents shall become Government property. (See DR 5-FA05)

Utility Systems: A utility is a system for collecting or distributing services between a common point and specific locations both above and below ground. See Annex 5.1, Table 5.1-1 for descriptions of utility systems.

5.1.7 Acronyms

The following are acronyms used in Annex 5. See Annex 1 for additional information.

BHMA - Building Hardware Manufacture's Association
BOHS - Building Operating Hours Summary
CEF - Central Engineering Files
CM - Corrective Maintenance
CMMS - Computerized Maintenance Management System
CO - Contracting Officer
COTR - Contract Officers Technical Representative
CSBR - Critical Systems Breakdown Report
EGFE - Essential Government Furnished Equipment
EMCS – Energy Management Control System
FCPF - Fluid Component Processing Facility
FID - Field Interface Device
GEE - Government Essential Equipment
GMAW - Gas Metal Arc Welding
GTAW - Gas Tungsten Arc Welding
GPD - Gallons Per Day
GPH - Gallons Per Hour
HVAC - Heating, Ventilation and Air Conditioning
IVTEL - Inventory of Vertical Transportation Equipment List
IAGP - Installation-Accountable Government Property
MPCo - Mississippi Power Company
MBC - Modular Building Controller
MSDH - Mississippi State Department of Health
MTS - Maintenance Task Sheet
NDE - Non-Destructive Evaluation
NDT - Non-Destructive Testing
NFPA - National Fire Protection Association
OEM - Original Equipment Manufacturer
O&M - Operations & Maintenance
PAM - Proactive Maintenance
PLC - Programmable Logic Controller
PT&I - Predictive Testing and Inspection
RCM - Reliability Centered Maintenance
ROW - Right-of-Way
SCD - Specification Control Document
SCU - System Control Units
SFUSS - Structures, Facilities, Utilities, System/Subsystem
SMAW - Shielded Metal Arc Welding
SOP - Standard Operating Procedure
SPME - Special Purpose Mobile Equipment
SSC - Stennis Space Center
TRL - Technical Reference Library
UC - Unitary Controller
UPP - Utility Process Plan
VAV - Variable Air Volume

NUMBER	TYPE	SYSTEM	NONMENCLATURE
E1	**Electrical**	**Site Electrical 13.8 kV Main Substation**	
		A. Description	**Two Mississippi Power Company (MPCo) 115 kV distribution lines serve a split bus through two 115 kV/13.8 kV power step/down transformers with automatic load tap changers. The tubular aluminum split bus has eight 2000 A vacuum circuit breakers. Each circuit breaker can be bypassed and isolated by air break switches and a bypass bus. The split busses can be tied by a motor operated switch. The controls and protective relaying are located in an adjacent building. All maintenance of the SSC main substation is the responsibility of MPCo.**
		B. Output	**The site electrical 13.8 kV main substation is an integral part of the SSC 13.8 kV distribution system. This MPCo owned and joint NASA/MPCo operated substation provides electricity to the site from the MPCo grid. The split bus is configured to provide a method of isolating sections with either manual switching or through coordinated protective relaying circuits. The output of this system is continuous since it is located on the utility grid between two generating plants and can be isolated from either in the event of a fault on the utility. The output of the two primary transformers is continuous and regulated.**
		C. Components	**Components including bus, circuit breakers, air break switches, transformers, transformer grounding resistors, automatic load tap changers, protective relaying circuits, control wiring, switches, control panels, meters, connecting and structural bus supports PTs, CT's, CT & PT supports, batteries, battery chargers, manual transfer switches, automatic transfer switches, grounding mat, lightning masts, fence and gates. All components, except the power transformers, two low side breakers, and automatic load tap changers, are the property of MPCo.**
E2	**Electrical**	**Site 13.8 kV Electrical Distribution System**	
		A. Description	**Input to the site 13.8 kV electrical distribution system is provided from the main substation. The system is configured as a 13.8 kV delta system, with overhead static wires on all above ground feeders.** **Two overhead power lines (one from each bus) serve the SSME Test Area underground 13.8 kV network. The overhead power lines feeding the SSME Test area are mounted on concrete poles. The SSME Test Area underground 13.8 kV network is configured as a double radial with multiple tie points.** **Two overhead power lines (one from each bus) serve the Test Support Area. The Test Support Area**

NUMBER	TYPE	SYSTEM	NONMENCLATURE
			is configured as a double radial, mostly overhead on double circuit wood poles. **Two overhead power lines (one from each bus) serve the Administrative and Industrial Areas on a combination of wood poles, concrete poles, and concrete encased ductbanks. The Admin/Industrial Area is configured as a loop, with each end of the loop fed by a different main substation bus.** **The distribution system extends to the main disconnecting means at each facility, and includes the facility transformer(s) and metering.**
		B. Output	**Provide electrical power to facility main disconnecting means. The output of the system is continuous since each area of the site is served by two feeders or a looped feed and has provisions for isolating faulted components. System switching is accomplished through phased closed transition of loads between feeders.**
		C. Components	**Components include, but are not limited to, switchgear, circuit breakers, bus, meters, control wiring, batteries, battery chargers, transfer switches, control panels, capacitors/switches, cable, cable splices, duct banks, cable trays, manholes, sump pumps, poles, cross arms, insulators, fuses, distribution switches, service/control power/instrument transformers, grounding system relays, transducers, fences, reactors. fused disconnects, lightning arrestors, static wires, ground rods, power monitors, splice shields, strip heaters.**
E3	**Electrical**	**Exterior Lighting System**	
		A. Description	**The exterior lighting system provides lighting for roadways, parking areas, safety and security.** **(See General Site Plan Exterior Lighting Drawings and Master Utility Plans in CEF.)**
		B. Output	**Provide lighting to reduce risk of injury, theft, or property damage. Foot-candle levels shall be maintained in accordance with SSC 50-002, and IES Lighting Handbook, 8th edition (1993).**
		C. Components	**This system is defined to include, but is not limited to: lamps, reflectors, ballasts, lens, light poles, conductors, conduit, photocells, timers, and associated hardware.**
E4	**Electrical**	**13.8 kV Switching Facilities**	
		A. Description	**Air, gas or oil 13.8 kV switch assemblies.**
		B. Output	**Provide switching capability between multiple 13.8 kV feeders to the facility transformer(s)**
		C. Components	**This system is defined to include, but is not limited to: Air, gas or oil 13.8 kV switches, fuse enclosures, fuses, fuse holders, heater strips, secondary breakers, thermostat controls, control circuits, monitoring circuits, and associated hardware.**

NUMBER	TYPE	SYSTEM	NONMENCLATURE
E5	**Electrical**	**Medium Voltage Transformers**	
		A. Description	**13.8 kV transformers**
		B. Output	**Provide step down from site electrical 13.8 kV distribution to the secondary distribution level facility voltages.**
		C. Components	**This system is defined to include, but is not limited to: 13.8 kV transformers (dry type, mineral oil filled, silicon oil filled), gauges, fans, fan motors, heater strips, meters, nitrogen tanks, secondary breakers, control circuits, thermostat controls, monitoring circuits, and associated hardware.**
E6	**Electrical**	**Service Entrance Systems**	
		A. Description	**The systems which provide a current path for service entrance between the facility transformer secondary bushings or subfeed from another source/facility and the facility main disconnecting means.**
		B. Output	**Operate at assigned ratings to carry energy reliably without exceeding the maximum hot-spot temperature rise of 55 degrees Centigrade for 60 cycle systems, providing for the given indoor and outdoor environmental conditions. Service entrances must maintain the ability to dissipate heat losses.**
		C. Components	**These systems are defined to include, but are not limited to: air or sandwich busduct, busway, cablebus, multiplex conductor assemblies, conduit/wire systems, busbar, straight lengths, elbows, tees, tap boxes, power take offs, plugs, housings, insulation, hangers, and other associated hardware.**
E7	**Electrical**	**Main Disconnecting Means**	
		A. Description	**The main disconnecting means are comprised of 480/277 Volt or 120/208 Volt, protection and switching, including tie-breakers at double ended substations.**
		B. Output	**Operate, control and protect low voltage distribution equipment, and provide service entrance, power, and lighting distribution. Faults must be isolated by the overcurrent protective device closest to the fault.**
		C. Components	**These systems are defined to include, but are not limited to: assembled indoor or outdoor equipment, switching, interrupting, control, metering, protective, and regulating devices, together with their supporting structure(s), enclosure(s), conductors, electric interconnections and accessories; grounding, bus, bus supports, heaters, and associated hardware. Examples of these systems are switchboards; indoor, outdoor, drip-proof, protected aisle and common aisle variety of metalclad switchgear; motor control centers; loadcenters; meter panels or centers; and molded-case circuit**

NUMBER	TYPE	SYSTEM	NONMENCLATURE
			breaker distribution panels (PP, MDP, DP classified panels) and their components for voltage transformation, metering, circuit switching, and system protection in the Secondary Electrical Distribution System.
E8	**Electrical**	**Secondary Distribution Equipment**	
		A. Description	**The secondary distribution equipment systems are comprised of 480/277 Volt or 120/208 Volt distribution, protection and switching equipment within the various facilities at SSC.**
		B. Output	**Operate at assigned ratings without exceeding the maximum hot-spot temperature rise of 55 degrees Centigrade at 60 cycles, providing for the given indoor and outdoor environmental conditions. The ratio of load current to the ampere rating of the overcurrent protective device determines it operating temperature shall be used for panelboards.**
		C. Components	**These systems are defined to include, but are not limited to: assembled indoor or outdoor equipment, switching, interrupting, control, metering, protective, and regulating devices, together with their supporting structure(s), enclosure(s), conductors, electric interconnections and accessories; grounding, bus, bus supports, heaters, protective devices, enclosures, busbar and terminal connections, disconnects, fuses, contactors, motor overload relays, pilot and miscellaneous control devices, interlocks, and associated hardware. Examples of these systems are switchboards; indoor, outdoor, drip-proof, protected aisle and common aisle variety of metalclad switchgear; motor control centers; loadcenters; meter p anels or centers; and molded-case circuit breaker distribution panels (PP, MDP, DP classified panels) and their components for voltage transformation, metering, circuit switching, and system protection in the Secondary Electrical Distribution System other than service entrance equipment.**
E9	**Electrical**	**Lighting System (Interior)**	
		A. Description	**That system which comprises the building or facility interior general area lighting from the lighting panel board to the end-user.**
		B. Output	**Operate at recommended minimum building illumination levels in accordance with SSC 50-002, and IES Lighting Handbook, 8th Edition (1993).**
		C. Components	**These systems are defined to include, but are not limited to: fixtures, lamps, reflectors, ballasts, lens, diffusers, fuses, switches, mounting hangers and hardware, conductors, conduit, controls and associated hardware. This includes systems in general office, hi-bays, laboratories, cafeteria's, etc…Lamp types vary and include incandescent, compact fluorescent, fluorescent, and HID (mercury, metal-halide, high pressure sodium, and low pressure sodium).**
E10	**Electrical**	**Emergency Lighting**	

TABLE 5.1-1 SYSTEM DEFINITIONS

NUMBER	TYPE	SYSTEM	NONMENCLATURE
		System	
		A. Description	**That system which comprises the life safety lighting including, but not limited to emergency lighting units exit lighting, stairwell and egress lighting.**
		B. Output	**Emergency lighting for evacuation purposes must energize automatically upon loss of power or normal lighting. Emergency lighting must be maintained for at least 1 ½ hours for battery-powered units. The maximum tolerated duration of power failure is up to 10 seconds, preferably not more than 3 seconds, in accordance with ANSI/IEEE Std 446-1987. Light levels must be maintained to provide enough illumination to allow easy and safe egress from the area involved. Comply with ANSI/NFPA 70-1996, Article 700 for the operation and maintenance requirements and ANSI/NFPA 101-1985 for emergency lighting specific to life safety lighting.**
		C. Components	**This systems is defined to include, but is not limited to, lamps, reflectors, ballaslts, lens, emergency power supplies, conduits, wiring, and associated hardware.**
E11	**Electrical**	**Obstruction and Warning Lighting Systems**	
		A. Description	**That system which comprises the aircraft warning lights on water towers and other facilities at SSC.**
		B. Output	**Operate at recommended building illumination levels in accordance with FAA circular XXX.**
		C. Components	**This system is defined to include, but not limited to: lamps, reflectors, ballasts, lens, conduits, wiring, masts, and associated hardware.**
E12	**Electrical**	**Lightning Protection System**	
		A. Description	**That system which comprises the lightning protection systems for all buildings and structures including substation, technical equipment buildings, towers, antennas, and masts.**
		B. Output	**Provide current path to ground system for lightning strokes.**
		C. Components	**These systems are defined to include, but not limited to: air terminals, roof conductors, down conductors, all separately mounted shielding systems, overhead static wires, and associated hardware.**
E13	**Electrical**	**Grounding System**	
		A. Description	**That system which comprises the facility ground systems. Contractor shall maintain chronological records of all tests and observations. Any measurement not meeting the specified or recommended values shall be investigated, a major discrepancy report prepared and delivered to the COTR annually. Contractor shall include these updates in the facility historical files.**

NUMBER	TYPE	SYSTEM	NONMENCLATURE
		B. Output	**Provide means to limit voltages due to lightning, line surges, or unintentional contact with higher voltage lines, and to stabilize the voltage to ground during normal operation. Reference ANSI/IEEE 142-1982, and for ground-fault protection reference ANSI/IEEE std 242-1986. Earth resistance shall be maintained at resistance levels specified in Mil Handbook 419A Vol I and II.**
		C. Components	**The components which comprise this requirement include but are not limited to: ground rods, grounding conductors and/or counterpoise, bonds, connections, test wells, and associated hardware.**
E14	**Electrical**	**Emergency Power Backup Systems**	
		A. Description	**That system which serves as an emergency source for supplying power loads in the event of loss of a service interruption or loss of power.**
		B. Output	**Provide emergency backup power that, upon failure or outage of the normal source, automatically provides power within a specified time to critical devices and equipment whose failure to operate satisfactorily would jeopardize health and safety of personnel or cause equipment damage.**
		C. Components	**The components which comprise this requirement include but are not limited to: storage batteries, generator sets, UPS (energy storage batteries, rectifiers, inverters, and associated controls), transfer switching devices, relay synchronizing, protective and auxiliary devices, alarms and controls, conductors, wiring components, grounds and associated hardware.**
E15	**Electrical**	**Fire Detection and Security Systems**	
		A. Description	**The alarm systems for fire detection and security in various facilities throughout the site.**
		B. Output	**Provide reliable operation of SSC fire detection and security systems. Provide adequate alarm capabilities in accordance with SSC 50-008, NFPA 70, NFPA 72, NFPA 101 and the ADA.**
		C. Components	**This system is defined to include, but is not limited to: fire and security alarm control panels, manual and automatic initiating devices, audible alarm devices, visual alarm devices, interface devices, signaling circuitry, radio frequency (RF) transceivers, cable, cable clamps, antennas, auxiliary relays and devices, annunciator panels, and associated equipment.**
E16	**Electrical**	**Facility Fire Protection System**	

TABLE 5.1-1 SYSTEM DEFINITIONS

NUMBER	TYPE	SYSTEM	NONMENCLATURE
		A. Description	**The facility water fire protection system provides for fire protection water at the facilities.**
		B. Output	**The system shall provide for the continuous supply of fire protection water to the facilities as designed.**
		C. Components	**The facility fire protection system includes, but is not limited to: piping, valves, sprinkler heads, booster pumps, wet pipe sprinkler systems, dry sprinkler systems, deluge systems, flow switches, tamper switches, pipe hangers/supports, fire hydrants and associated hardware.**
C1	**Civil**	**SSC Utility Potable Water Distribution System**	
		A. Description	**The utility system that provides for the distribution of potable and fire water to a point five feet outside all facilities at SSC. It includes appurtenances that the water system supplies that are not considered facilities or fire protection devices. It does not include the system inside facilities such as rest rooms, sinks, showers, drinking fountains, etc.**
		B. Output	**The system shall provide base facilities with a continuous supply of potable/fire water at 55 to 65 psig referenced at wells No.1 and No. 2. It shall provide test facilities with a continuous supply of potable/fire water at 75 to 85 psig referenced at the base of elevated storage tank No. 3.**
		C. Components	**The distribution system is defined to include, but is not limited to, the following components: all piping, valves, fittings, valve boxes, valve and pipeline markers, and insulation. Also, associated appurtenances outside facilities such as eye washes, safety showers, hose reels, wash racks, truck fill lines, and gages.**
C2	**Civil**	**SSC Utility Potable Water Pumping System**	
		A. Description	**The utility system that provides for the pressurization of the SSC potable water system.**
		B. Output	**During normal operations the pump system shall maintain the base side pressure at 55 to 65 psig referenced at wells No. 1 and No. 2. It shall maintain the test site pressure at 75 to 85 psig referenced at the base of elevated storage tank No. 3. For emergency operations pressure can be provided by connection to the Mississippi Army Ammunition Plant water system, and/or well No. 3 could be activated from its standby status and support pressure at a somewhat reduced pressure.**
		C. Components	**The utility potable water pumping system is defined to include, but is not limited to, the following components: centrifugal pumps, electric motors, water meters, gages, pressure tank, and associated appurtenances inside the pump houses.**
C3	**Civil**	**SSC Utility Potable**	

NUMBER	TYPE	SYSTEM	NONMENCLATURE
		Water Generation System	
		A. Description	**The utility system that provides for the generation of potable water for SSC potable water system.**
		B. Output	**The generation system shall provide the designed quantity of water to meet designed peak needs for regular usage plus fire protection.**
		C. Components	**The utility potable water generation system is defined to include, but is not limited to, the following utility components: two active and one inactive artesian wells that supply water to the well head at approximately 18 psig from an approximate depth of 1000 feet.**
C4	**Civil**	**SSC Utility Potable Water Storage System**	
		A. Description	**The utility system that provides for the elevated storage of potable water.**
		B. Output	**The elevated tanks maintain head pressure within the designed pressures and provide approximately 850,000 gallons of storage.**
		C. Components	**The utility potable water storage system is defined to include, but is not limited to, the following components: two 300,000 gallon elevated tanks and one 250,000 gallon elevated tank., Components include associated structural framing, gages drain pipes, screens, vents, and cathodic protection. The piping inside the elevated storage tank is also included.**
C5	**Civil**	**SSC Utility Potable Water Treatment System**	
		A. Description	**The utility system that provides for the treatment of SSC potable water.**
		B. Output	**The chemical treatment system located in each pump house shall provide the quality of water that meets Mississippi Department of Environmental Quality standards for chemical dosages and quality control of bacteria.**
		C. Components	**The utility potable water treatment system is defined to include, but is not limited to, the following components: chlorinators, chlorine cylinders, scales, piping, fittings, valves, insulation, chlorine alarm detection system, and associated hardware to inject gaseous chlorine.**
C6	**Civil**	**Primary Sanitary Sewage Collection Systems**	
		A. Description	**The Sanitary Sewage Collection Systems consist of a combination of gravity lines, lift stations and**

NUMBER	TYPE	SYSTEM	NONMENCLATURE
			forced feed lines which transport waste water from a site facility to a waste water treatment lagoon. The Sanitary Sewage Collection Systems begin five feet outside of the served facility and end at the inlet connection to the weir which discharges into a treatment lagoon (Exception: If pumping stations are located within a facility, the system begins two feet upstream of the pumping station inlet check valve.).
		B. Output	**The systems shall be maintained free of excessive leakage and shall provide continuous service as designed and required to accomplish transport of wastewater from facilities to treatment systems.**
		C. Components	**The Sanitary Sewage Collection System is defined to include, but is not limited to piping, valves, check valves, wet wells, dry wells, manholes, pumps, pump motors, sump pumps, vents, blowers, compressors, grinders/comminutors, controls, and other appurtenances required to provide a complete system for transferring sewage from site facilities to a treatment system.**
C7	**Civil**	**Sanitary Sewage Treatment Lagoons**	
		A. Description	**The Sanitary Sewage Treatment Lagoons consist of two separate lagoon systems which serve the function of retention and removal of objectionable characteristics of the sewerage through natural interaction between the decomposing organic matter, vegetation life (duck weed, water hyacinths, and other water vegetation) and natural lagoon oxidation. In each system, wastewater passes from the main lagoon into an adjoining shallow polishing marsh and is discharged through an Ultra Violet (UV) Reactor for final disinfection.** **Micro-processor based controls are used to control the treatment process flow; A Landis & Gyr Modular Building Controller (MBC), accepts input from lagoon and polishing marsh level sensors, influent and effluent flow rates, UV reactor intensity. Output signals from the MBC governs outflow of the lagoon through a crossover valve , and outflow of the polishing marsh is regulated by an actuator controlled slide gate. Influent and effluent flow rates are logged and stored by the Energy Management and Control System (EMCS), through the MBC.** **Each Sanitary Sewage System begins at, and includes, the main lagoon inlet weir, and ends immediately downstream of the final discharge weir.**
		B. Output	**The system shall be maintained in such a manner as to provide wastewater treatment and discharge water quality in compliance with state regulations and permit requirements, without interruption to SSC site operations. Independent laboratory sampling analysis, in accordance with permit requirements, will be provided by the Government through another contract mechanism.**
		C. Components	**Each Sanitary Sewage Treatment System consists of a main lagoon, a polishing marsh and a UV**

NUMBER	TYPE	SYSTEM	NONMENCLATURE
			disinfection reactor. The systems include all berms, levies, piping, valves, wiers, controls, reactors, and appurtenances required to provide a complete functional treatment system.
C8	**Civil**	**Rock-Reed Sanitary Sewage Systems**	
		A. Description	**The Rock-Reed Sanitary Sewage Treatment Systems consist of two separate Rock/Reed systems which serve the function of retention and removal of objectionable characteristics of the sewage through natural interaction between the decomposing organic matter, vegetation life and natural oxidation. In each system, waste water passes through a septic-settling tank and into the rock/reed filter, then is disinfected by a UV reactor and discharged into the environment.** **The system begins at the facility discharge point, which is defined as five feet from the facility, and ends immediately downstream of the discharge weir.**
		B. Output	**The system shall be maintained in such a manner as to provide wastewater treatment and discharge water quality in compliance with state regulations and permit requirements, without interruption to SSC site operations. Independent laboratory sampling analysis will be provided by the Government through another contract mechanism.**
		C. Components	**Each Sanitary Sewage Treatment System consists of a septic tank, rock-reed filtration system, UV reactor. The system includes all berm, levies, piping, valves, vegetation and other appurtenances required to provide a complete functional system.**
C9	**Civil**	**Septic Tank/Field Drain Sanitary Sewage Systems**	
		A. Description	**This utility consists of four separate Septic Tank and Field Drain Systems, which serve four separate facilities. The system begins five feet outside of the served facility and ends at the end-run of field drain.**
		B. Output	**The system shall be free of leaks and shall provide continuous availability of sewage flow and treatment from facilities, during normal working hours.**
		C. Components	**Each System consists of piping, a septic tank, and a field drain with aggregate.**
C10	**Civil**	**Site Utility Natural Gas Distribution System**	
		A. Description	**The Facility system that provides for the distribution of natural gas from the supplier's metering**

NUMBER	TYPE	SYSTEM	NONMENCLATURE
			station to the point of utilization. The point of utilization is a) at the facility service valve, b) 5 feet from the facility, or c) at the outlet connection to the gas meter or regulator, whichever is closest to the facility.
		B. Output	**The system shall provide for natural gas to the facilities at the designed rate and pressure based on the designated regulator settings.**
		C. Components	**The natural gas system is defined to include, but is not limited to, the piping and pipe wrapping, fittings, gages, valves and associated identification markers and labels, blow offs, regulators, valve stations, relief valves, cathodic protection system, and associated isolation unions and anodes and meters.**
I1	**Instrumentation**	**Energy Management and Control System**	
		A. Description	**The Energy Management and Control System (EMCS) is a distributed network of stand-alone controls, which interface with a central console for monitoring and operator adjustment. The system is used to control and monitor a wide variety of equipment and processes.** **The Energy Management and Control System (EMCS) Central Console serves as the central control point for real-time monitoring, operation and management of facility systems and utilities throughout the entire SSC site. The system acts as an effective tool for energy management, management reporting, data archiving and analysis for equipment control operations and maintenance. As such, this system (both the machine and human elements) is of vital importance for SSC missions operations and shall be operated and maintained in a dependable configuration and manner. The Central Console System operation includes the EMCS as well as the Fuel Monitoring System and the Main Substation Monitoring System; these systems are defined separately in this table.**
		B. Output	**Provide all services necessary to maintain and operate the entire EMCS, including central console, field cabinets, instrumentation, and wiring in a reliable, continuous and accurate, operational state as specified in this contract. Work includes continuous staffing and operating of the console, performing database management and backup required to protect software, real-time management and support of the site facilities in regard to site mission specific requirements, and coordination and notification of site utility outages/activities, repair of EMCS equipment, wiring, instrumentation and controllers.**
		C. Components	**The System 600 central console consists of a Digital Equipment Corporation PDP 11/93 Processor, 2 console PC terminals which operate on EMU-TEK emulation packages. The System 600 is linked to approximately 50 Modular Building Controllers (MBC), 88 System Control Units (SCU) and 35 Unitary Controllers (UC), which contain the algorithms for input/output control of approximately 13,000 field points (See Workload Data in applicable line items of Annex 5 for actual quantities of**

NUMBER	TYPE	SYSTEM	NONMENCLATURE
			components). **The Host logs alarms into A PC, which acts as an electronic printer of alarms. The Central Host is defined to begin at the ADI line connection and include all interconnected wiring, connections, keyboards, monitors, printers, tape/disk drives, power protection devices, hardware, firmware, software and other appurtenances required to have a completely functional and maintainable Central Host.** **EMCS field components include instrumentation, signal cables and wiring, programmable controllers and components (MBCs, SCUs and UCs), and network wiring up to the point of interface with the telecommunication links (EMCS includes the ADI).**
I2	**Instrumentation**	**Fuel Management Monitoring System**	
		A. Description	**The Fuel Monitoring System consists of a Veeder-Root fuel management system which monitors fuel storage tank conditions at six locations, and reports status and alarm conditions to a PC Host/Central Console. Alarms are recorded through the EMCS alarm logging PC. The central controller operates on Trak Engineering software, and includes management of the Fuel Sentry, which dispenses automotive fuel (Diesel and Gasoline) at SSC. Fuel Sentry access keys are also programmed and managed from the host.**
		B. Output	**Provide all services necessary to maintain and operate the entire Central Console System in a reliable, continuous and accurate operational state as specified in this contract. Work includes manning of the console, performing database management and backup required to protect software (For Host and Field Microprocessors), and management and support of the site fuel dispensing and reporting requirements.**
		C. Components	**The Central Host is defined to begin at the ADI line connection and include all interconnected wiring, connections, keyboards, monitors, tape/disk drives, power protection devices, hardware, firmware, software and other appurtenances required to provide complete functions described for monitoring and operating the fuel management/monitoring system. The system monitors 6 fuel storage tank systems, and 2 fuel sentry systems that dispense and track automotive fuel.**
I3	**Instrumentation**	**Main Substation Monitoring System**	
		A. Description	**The Main Substation Monitoring System consists of a PC Host that operates on Starview, and provides visibility of the main substation breaker operations and status.**
		B. Output	**Operate and monitor the PC Host. Provide immediate notification of any concerns or problems.**

NUMBER	TYPE	SYSTEM	NONMENCLATURE
		C. Components	**The system host components consist of a PC. All components are the property and maintenance responsibility of Mississippi Power.**
M1	**Mechanical**	**Site HVAC**	
		A. Description	**Site Heating Ventilation and Air Conditioning (HVAC) consists of a variety of equipment and systems used for the purpose of maintaining temperature, humidity and air quality conditions within design limits.**
		B. Output	**HVAC systems shall be capable of providing design conditions during occupied and operational hours. Output shall be sufficient to meet the following requirements:** **1. Human Comfort HVAC Systems shall be capable of maintaining spaces at set point +/- 2F, within Comfort Envelope defined by ASHRAE Standard 55-74.** **2. Computer Room, Switch-Gear Room, Programmatic and specialty HVAC Systems shall be capable of maintaining conditions as defined by designs.** **3. Ventilating Systems shall be capable of ventilating at design rates to prevent buildup of contaminants and heat (within design limits).** **4. Heating units shall be capable of heating spaces within +/- 2F of set point (within design limits).** **5. Refrigeration equipment shall be capable of operating to design conditions.** **6. Chilled Water Systems and Heating Water Systems shall be capable of maintaining system temperatures as defined by designs.**
		C. Components	**HVAC includes chillers, boilers, air handling equipment, piping systems, pumps, cooling towers, exhaust systems, refrigeration equipment, instrumentation and controls, and peripheral equipment required to control temperatures, humidity conditions and air quality.**
MO1	**Marine**	**Site Marine**	
		A. Description	**Marine Systems are defined as a series of canals and associated structures, that are required to move propellants and devices from one place to another at SSC and to provide water access to the Site from Pearl River System. In addition, marine systems are defined as the NASA Tugboat and barges which are used extensively on site and off site to move material from one place to another and to perform maintenance on water structures.**
		B. Output	**Marine Systems shall be capable of providing on-time service for the: delivery of propellant barges as required by programmatic requirements; support to the Navy, Customs and other tennant agencies; and provide timely maintenance of systems.**
		C. Components	**Marine Systems include: The NASA Tugboat (Clairmont II) Bascule Bridge, Navigation Lock, Canal system, Docks, Water Structures, Navigation aids, Work Barges, Piers, Safety Equipment, Operating supplies and equipment, Marine warehouse and office space, Canal pumping station, Spillway system, Canal banks and drainage into canal, river system to the entrance from the Pearl River system, All tug specific equipment, Navigation aids, Traffic barriers and Special lighting.**

TABLE 5.1-1 SYSTEM DEFINITIONS

NUMBER	TYPE	SYSTEM	NONMENCLATURE
O1	**Other**	**Site Other**	
		A. Description	**Other Systems include Elevators, Built In Cranes, Hoists, Backflow Preventers and Roofs.**
		B. Output	**Other Systems shall be capable of operating as follows:** **1. Elevators: Accomplish all operations necessary to meet availability requirements and operational hours as designated in Annex 5.5 and the Operating Hours Summary.** **2. Built In Cranes and Hoists: The contractor is responsible for providing operations where the Inventory List shows the contractor as responsible operators. An provide these operations in accordance with NSS/Go-1740.9** **3. Roofs: Meet requirements of Annex 5.7**
		C. Components	**Other Systems include: All Elevators, Built In Cranes, Hoists, Backflow Preventers and Roofs.**