

NNK07189729R

INSTITUTIONAL SERVICES CONTRACT

REQUEST FOR PROPOSAL

Attachment J-1

Performance Work Statement (PWS)

NOTICE:

1. All Tech Exhibits referenced in the PWS are located in Appendix J-1-1.
2. All Performance Standards (PS) are contained in Appendix J-1-2.
3. The Data Requirements List (DRL) and Data Requirements Descriptions (DRD) dictated in the PWS are contained in Appendix J-1-3.
4. All Workload Indicators (WLIs) are contained in Attachment L-8.

Performance Work Statement (PWS)
Work Breakdown Structure (WBS)

<u>WBS</u>	<u>Page</u>
Contract Overview	5
1.0 Program Management.....	6
1.1 Business Management.....	9
1.1.1 Contract and Procurement Management.....	9
1.1.2 Financial Management.....	9
1.2 Safety and Health.....	11
1.2.1 Safety Compliance.....	12
1.2.2 Occupational Safety.....	12
1.2.3 Operational Safety.....	14
1.3 Mission Assurance.....	15
1.3.1 System Safety.....	16
1.3.2 Reliability and Maintainability.....	17
1.3.3 Quality Assurance (QA).....	18
1.3.4 Government Industry Data Exchange Program (GIDEP).....	19
1.4 Management Information Systems.....	19
1.4.1 Information Technology (IT) Security.....	21
1.5 Work Management.....	22
1.5.1 Planning, Scheduling, and Work Control.....	22
1.5.2 Outage Coordination and Processing.....	23
1.6 Mission Support and Launch Readiness Management.....	24
1.7 Configuration Management.....	25
1.8 Geographic Information System (GIS).....	27
1.9 Training.....	28
1.10 Environmental Management.....	28
1.10.1 USAF-unique Environmental Requirements.....	30
1.11 Security.....	31
1.11.1 Physical Security.....	31
1.11.2 Export Control.....	31
1.11.3 Audit/Investigation Support.....	31
1.12 Emergency Preparedness.....	32
1.13 Workmanship and Materials.....	33
2.0 FSEU OM&E.....	33
2.1 Electrical.....	36
2.1.1 Power Systems.....	36
2.1.2 Lightning Protection.....	42
2.1.3 Site-Specific Control Systems.....	42
2.1.4 Kennedy Complex Control System (KCCS).....	43
2.1.5 Protective Systems.....	45
2.1.6 Fire Alarms.....	48
2.2 Mechanical.....	49
2.2.1 HVAC and Compressed Air.....	49

2.2.2	Elevators/Cranes/Chairlifts.....	50
2.2.3	Fire Suppression.....	51
2.2.4	Plumbing.....	53
	2.2.4.1 Sump Pumps previously assigned to Space Program Operations Contract (SPOC).....	54
2.3	Structural.....	54
2.3.1	Facility Interiors.....	55
2.3.2	Facility Exteriors.....	56
2.3.3	Towers.....	57
2.3.4	Bridges.....	57
2.4	Civil.....	58
2.4.1	Potable Water.....	58
2.4.2	Wastewater Collection and Treatment.....	60
2.4.3	Storm Water.....	61
2.4.4	Roads, Paved Surfaces, Waterways and Related Services.....	62
2.4.5	Fences and Gates.....	64
2.4.6	Landfill.....	64
2.4.7	Borrow Pits.....	65
2.4.8	Sound Suppression Water System previously assigned to SPOC..	66
2.4.9	Pad Holding Pond System and Pad Environmental Function Previously assigned to SPOC.....	67
2.5	Special Purpose and Heavy Equipment.....	67
2.6	Painting and Corrosion Control.....	68
3.0	Propellants and Life Support.....	69
3.1	Propellants Management.....	71
3.2	Propellants Operations, Maintenance and Engineering.....	73
	3.2.1 Hazardous Waste Operations, Maintenance and Engineering.....	75
3.3	Life Support Operations, Maintenance and Engineering.....	76
3.4	Pressure Vessels/Systems Management.....	77
4.0	Engineering Services.....	78
4.1	Sustaining Engineering.....	78
4.2	Facility Projects.....	80
	4.2.1 Institutional Facility Project Planning.....	81
	4.2.2 Facility Project Management.....	82
	4.2.2.1 Design Engineering Services.....	82
	4.2.2.2 Facility Project Implementation.....	83
4.3	Production Budget and Capital Equipment Projects.....	83
	4.3.1 Propellants and Life Support Production Budget Projects.....	84
	4.3.2 Capital Equipment Projects.....	84
4.4	Master Planning Support.....	84
4.5	Real Property Accountability.....	85
4.6	Facility Space Utilization.....	86
4.7	Facility Condition Assessments (FCA).....	87
4.8	Construction Support Services.....	88

4.9	Activation and Turnover.....	89
4.10	Specifications-kept-Intact (Specsintact).....	90
4.11	Energy and Water Conservation.....	90
4.12	Asbestos Management Program.....	92
5.0	Logistics.....	93
5.1	Logistics Engineering.....	94
5.2	Logistics Operations.....	94
5.2.1	Property Management.....	95
5.2.2	Material Management.....	95
5.2.3	Redistribution, Utilization and Disposal.....	97
5.3	Transportation Support.....	98
5.3.1	Vehicle Management.....	98
5.3.2	Railroad Operations and Maintenance.....	99
5.3.2.1	Locomotive/Railcar Operations and Maintenance.....	99
5.3.2.2	Rail Maintenance.....	100
5.3.3	Aircraft Operations and Maintenance.....	100
5.3.4	Airfield Services.....	102
5.3.4.1	NASA Requirements.....	102
5.3.4.2	USAF Requirements.....	104
5.3.4.2.1	Cape Canaveral Air Force Station.....	104
5.3.4.2.2	Patrick Air Force Base.....	105
5.3.5	Bus Service Operations.....	105
5.3.5.1	Route Bus Shuttle Service Operation.....	106
5.3.5.2	Pad Bus Service Operation.....	107
5.3.5.3	NASA Tour Bus Service Operations.....	107
5.3.5.4	Launch and Landing Bus Services.....	107
6.0	Laboratories.....	108
6.1	Standards and Calibration.....	108
6.2	Nondestructive Evaluation.....	110
6.3	Sampling and Analysis.....	112
6.4	Component Cleaning and Refurbishment.....	113

CONTRACT OVERVIEW

The purpose of the Institutional Services Contract (ISC) is to provide mission-focused institutional support to the National Aeronautics and Space Administration (NASA) and United States Air Force (USAF) programs and projects. This support includes operations, maintenance, and engineering (OM&E) of assigned facilities, systems, equipment, and utilities (FSEU); OM&E of propellants and life support services; institutional logistics; transportation services; and laboratory services to NASA Kennedy Space Center (KSC), KSC contractors, tenants, and some support to the USAF 45th Space Wing (45 SW) at Cape Canaveral Air Force Station (CCAFS), Patrick Air Force Base (PAFB), Jonathan Dickinson Missile Tracking Annex (JDMTA), and downrange. As operational installations for launches of human space flight and expendable launch vehicles (ELVs), KSC and CCAFS require support 24 hours a day, 7 days a week.

The Government's primary objectives for ISC are to provide:

- Safe and reliable FSEU to support NASA and USAF
- Efficient and effective responses to multiple concurrent customer needs
- Flexibility to changing programmatic requirements
- Innovative approaches to meeting contract requirements and controlling costs in a budget constrained environment

The Contractor shall ensure the necessary management emphasis is placed on safety and health through a comprehensive safety and mission assurance program as well as high expectations inherent to all company policies, standard practices and procedures. In parallel to the safety and mission performance requirements, the Contractor shall employ the proper management emphasis on energy conservation and environmental stewardship throughout all functional areas of this contract.

The ISC serves a prominent role in executing and supporting Program mission requirements. The Government views the ISC as a full partner with Programs to execute mission requirements. The Contractor shall ensure a level of performance requisite with the rigors and real-time nature of Program operations and milestones. In order to achieve the expected level of technical excellence and responsiveness, the Contractor shall develop and execute strategies to attract and retain highly-qualified employees. The Contractor shall employ technology and process improvements to maximize efficiencies while maintaining reliable capabilities.

During the period of performance of the ISC, the Government will phase-out the Space Shuttle Program (SSP), transition-in the Constellation Program, and phase-down the International Space Station Program (ISSP). As a result, the Government will transition the FSEU OM&E responsibilities (not including ground support equipment or flight hardware), that are currently performed by the existing Program support contracts, to ISC. Many potential synergies exist in consolidating these FSEU OM&E functional areas; therefore, the Government expects the Contractor to leverage these efficiencies to maximize productivity. The Contractor shall ensure successful, seamless transition and efficient integration of this additional content.

The Contractor is challenged with sustaining an aging infrastructure in support of current and future mission requirements. The Contractor shall work closely with the Government to develop and implement innovative strategies to maximize performance and availability of the NASA and USAF infrastructure in a budget constrained setting. The Contractor is encouraged to benchmark with other Governmental and commercial institutions to implement facility engineering best practices.

The Contractor shall establish and maintain team-oriented working relationships with the Government at all levels in the organization. Through frequent interaction, both formal and informal, the Contractor shall work with Government counterparts to ensure requirements are clearly communicated, mutually understood, and satisfied. The Contractor shall ensure timely, accurate, and thorough response to the Government's requests for information. The Contractor shall work cooperatively with other KSC contractors to ensure timely and effective execution of Program mission requirements. The Contractor shall develop overarching Associate Contractor Agreements (ACAs) and detailed Memorandums of Understanding (MOU) and Memorandums of Agreement (MOA) to facilitate integrated working relationships.

1.0 Program Management

The Contractor shall provide all labor, materials, supervision, equipment, transportation, and management, except as otherwise specified in the contract, necessary to successfully perform the requirements set forth in this ISC PWS. The required work to be performed under this contract includes OM&E of assigned FSEU; OM&E of propellants and life support services; logistics and transportation support services; and laboratory services. The Contractor shall provide these services to NASA KSC, KSC contractors, tenants, and support to the USAF 45 SW at CCAFS, PAFB, JDMTA, and downrange.

Throughout this contract, the term "assigned FSEU" applies to the Contractor's OM&E responsibility for all FSEU, as identified in the Tech Exhibits. In addition, the term "assigned" also applies to the Contractor's FSEU that has been temporarily turned-over to the Government for modification, repair, or is a part of new construction. In the case of new construction, the Government will formally communicate to the Contractor those FSEU that are anticipated to be turned-over to the Contractor for OM&E upon project completion.

Other institutional contracts are referenced throughout this contract. Requirements associated with these other contracts apply to the current contract as well as any successor contracts.

Specific Work Requirements:

The Contractor shall:

1. Provide all program management including technical and business functions to plan, implement, track, report, and deliver the required products and services described in this PWS.
2. Develop and maintain performance data per DRD 1.0-1, *Contract Performance Metrics and Workload Indicator Report*.
3. Present a *Monthly Program Management Status Review* to the Government per DRD 1.0-2.
4. Implement a planned, strategic approach to maintaining and improving the condition of the KSC infrastructure to execute current and future requirements. Ensure a Reliability Centered Maintenance (RCM)-based approach is developed and utilized to maximize FSEU availability, while minimizing life cycle cost.
5. Ensure successful implementation of contract requirements through the utilization of a highly-qualified workforce. Develop and implement a sound management approach to ensure a strong technical foundation including the management structure which stresses adaptability and flexibility.
6. Implement effective and efficient strategies to establish and sustain amicable relations with labor unions while using prudent business practices to ensure best value to the Government.
7. Provide responsive customer-focused services through communication and coordination with other contractors and the Government. Prioritize scheduling and performance of work to support program milestones. Manage contract resources to maintain the required flexibility to respond to surge, one-of-a-kind, and unforeseen requirements.
8. Ensure an integrated management information system (MIS), including Maximo (ref. WBS 1.4, *MIS*), is developed, tested, deployed, and maintained to effectively and efficiently plan, implement, track, report, and deliver the required products and services in this PWS.
9. Unless otherwise specified elsewhere in the PWS, adhere to existing work processes at contract effective date, and subsequently review for continued applicability. Update and maintain these processes, or where warranted, develop and maintain new processes for improved effectiveness and efficiency. Coordinate with the Government on any content changes or new processes.

10. Examine operations to consolidate work efforts, eliminate duplication of effort, identify underutilized FSEU, and reduce operational costs. Perform cost-trade and make-buy analyses on inefficient functions and capabilities. Identify and implement improvements in coordination with the Government.
11. Develop and implement a risk management approach for identifying, analyzing, tracking, controlling, documenting, communicating, and mitigating risks consistent with NASA Procedural Requirement (NPR) 8000.4, *Risk Management Procedural Requirements*. Develop and maintain DRD 1.0-3, *Risk Management Plan*.
12. Minimize NASA involvement required to meet planned requirements from other KSC contractors. Provide timely insight to NASA on support being provided to KSC contractors and any associated issues. Ensure compliance with existing MOUs and MOAs until new agreements are entered into. Review existing MOUs/MOAs for continued applicability and where warranted, update these agreements prior to expiration or within one year of contract effective date, whichever occurs first.
13. Develop a detailed plan, organize, manage, schedule, and execute efficient and effective transition and integration of additional Program FSEU identified in Tech Exhibits 2.0-2, *Former SPOC OMEU* and 2.0-3, *Former Checkout Assembly and Payload Processing Services (CAPPS) OMEU* per Options 6A-6H and Options 7A-7I, respectively.
14. Make trade-off recommendations to the Government for new or changing requirements to avoid cost impacts.
15. Ensure all Contractor personnel data including name, title, phone numbers, supervisor, mail code, fax number, location, regular work week, work start time/work end time, any special needs, launch/landing assignments/locations, team leads, and employee delegates are maintained in NASA Self Service Management Tool (SSMT).
16. Participate in KSC institutional working groups and councils.
17. Develop, maintain, and implement a records management plan per DRD 1.0-4, *Records Management Program Plan*. Manage legacy Federal records (data created for Government use and delivered to, or falling under the legal control of, the Government) inherited from the predecessor contractor. At the completion or termination of this contract, deliver all Government-owned data to NASA-KSC per DRD 1.0-4. Provide NASA or authorized representatives access to all Government records.
18. Notify the Government in writing 15 days prior to applying proprietary markings to any technical data, including engineering, operations or maintenance related documentation, plan, processes, or procedures.

1.1 Business Management

1.1.1 Contract and Procurement Management

Specific Work Requirements:

The Contractor shall:

1. Maintain management and technical control and visibility of intra-company, subcontractor, and major vendor activities that are used to fulfill contract requirements. Maintain accountability for the quality and timeliness of the goods and services that are subcontracted under this contract.
2. Provide business and procurement analysis and input to the Government, as requested.
3. Respond to Government contract change requests with quality proposals within established time periods.
4. Provide and maintain a management system capable of capturing and reporting the data per DRD 1.1.1-1, *Advance Notification of Workforce Reductions Report*.
5. Provide and maintain a management system capable of capturing and reporting the data per DRD 1.1.1-2, *Quarterly Contractor Workforce Reports*.
6. Provide and maintain a management system capable of capturing and reporting the data per DRD 1.1.1-3, *Quarterly Summary of 3rd Step Grievances and Arbitrations Report*.

1.1.2 Financial Management

Specific Work Requirements:

The Contractor shall:

1. Track expenditures and workforce utilization by Government specified customers, WBS down to the lowest level, unique project/activity/event identifiers (Job Order Number or equivalent), unique task identifiers (Work Order Numbers or equivalent), and elements of cost including labor hours, other direct costs, fringe, overhead, General and Administrative (G&A), fee, and Work Year Equivalents (WYEs) for both Contractor and major subcontractors.
2. Provide on-going financial analysis and respond to requests from the Government related to budget, schedule, and cost performance.

3. Utilize accounting procedures capable of monthly collection, distribution, and reporting of Government-identified cost pool charges for multiple customers. Provide cost pool reporting in accordance with DRD 1.1.2-1, *Shared Cost Pool Analysis Report*.
4. Provide data in support of multi-year budget calls and other special budget requests.
5. Develop and maintain a financial management system with automated data transfer capability from MIS and other applications to ensure complete data integrity and eliminate duplicative data entry. At a minimum, provide planned and actual costs and labor hours with the ability to query by the following data fields: charge date, facility number, customer number, WBS element, unique project and task identifiers, direct and indirect elements of costs, type or categories of work, Government fiscal year, and for all major subcontractors. Provide network accessible, on-line query capability for the Government.
6. Develop and maintain a cost accounting system with adequate internal checks, balances and audit steps to isolate and identify erroneous, incomplete data and procedural deviations. Upon detection of significant errors, implement required corrective actions, and notify the Government per DRD 1.1.2-2, *Reconciliation of Incurred Costs to Reported Costs Report*.
7. Provide a cost correction (or error) tracking feature as part of the cost collection system. Log entries individually, validate entries, correct errors, and show disposition of reported errors. Enable the Government and Contractor employees to enter items on the error log.
8. Participate in monthly financial reviews with the Government to discuss cost performance. These reviews shall include both formal and informal reviews with multiple customers requiring multiple products/reports, sometimes due concurrently.
9. Develop and maintain the following financial DRDs. Ensure all DRDs are auditable and reconcilable to the Contractor's financial management systems.
 - i. DRD 1.1.2-1 *Shared Cost Pool Analysis Report*
 - ii. DRD 1.1.2-2, *Reconciliation of Incurred Costs to Reported Costs Report*
 - iii. DRD 1.1.2-3, *Contractor Financial Management Analysis, NASA Form 533M & NASA Form 533Q Reports*
 - iv. DRD 1.1.2-4, *NF533M Flat File*
 - v. DRD 1.1.2-5, *Annual Phased Contract Operating Plan*
 - vi. DRD 1.1.2-6, *Rate-Volume Variance Analysis Report*
 - vii. DRD 1.1.2-7, *Direct and Indirect Rates Report and Review*
 - viii. DRD 1.1.2-8, *Prime and Subcontractor Contract Value (CV) Status Report and Review*
 - ix. DRD 1.1.2-9, *Contractor Financial Facilities Services Report*
 - x. DRD 1.1.2-10, *Phased Negotiated Estimated Cost (NEC) Baseline Report*
 - xi. DRD 1.1.2-11, *NASA Aircraft Cost Report*

- xii. DRD 1.1.2-12, *Government Owned Contractor Held Capital Asset Report*
- xiii. DRD 1.1.2-13, *Annual IT NASA Headquarters and Special IT Budget Report*
- xiv. DRD 1.1.2-14, *45 SW Weekly Job Ordered Costs Report*
- xv. DRD 1.1.2-15, *Job Order Estimates*

1.2 Safety and Health

General Work Requirements:

The Contractor shall:

1. Maintain safe and healthful operating locations and be proactive in the protection of personnel and property, in accordance with NASA Federal Acquisition Regulations (FAR) Supplement NFS 1852.223-75, *Major Breach of Safety or Security*.
2. Incorporate safety and health measures in performing this contract to assure the protection of the public, astronauts, pilots, and NASA and contractor workforce and equipment and property as described in NFS 1852.223-70, *Safety and Health*.
3. Provide the Government, or authorized Government representatives, immediate access to the sites or areas where work under this contract is being performed in order to conduct surveillance activities and determine the adequacy of the safety, health and mission assurance programs. Provide all necessary records, including internal audit and assessment results and surveillance activities, to the Government for review.
4. Establish and maintain a comprehensive safety and health program that meets requirements as defined in Kennedy NASA Procedural Requirement (KNPR) 8715.3, *KSC Safety Practices Procedural Requirements*; and Air Force Space Command Manual (AFSPCMAN) 91-710 V6, *Ground and Launch Personnel, Equipment, Systems, and Materials Operations Safety Requirements*.
5. Ensure the safety organization maintains independence from the performing organization. Support Government audit and surveillance activities of Contractor safety and health programs.
6. Develop and implement a risk assessment process for the evaluation and prioritization of work orders. Assign a risk code to all routine trouble calls (RTCs), service orders (SOs), and facility projects consistent with NPR 8715.3, *NASA General Safety Program Requirements*, Section 3.6, *Hazard Assessment*.
7. Maintain technical cognizance of proposed and implemented changes to all applicable safety and health Federal, State, and local laws, regulations, policies, and directives as well as industry standards. Identify impacts to Contractor safety and health requirements, processes, and practices.

1.2.1 Safety Compliance

Specific Work Requirements:

In addition to the general work requirements listed in 1.2, the Contractor shall:

1. Establish a Safety and Health Program throughout all organizations of the contract including major subcontractors to comply with the Occupational Safety and Health Administration (OSHA) Voluntary Protection Program (VPP) Star Program requirements per DRD 1.2.1-1, *VPP Application*. Demonstrate OSHA VPP Star Program compliance throughout all contract organizations within 24 months after contract effective date.
2. Develop and maintain DRD 1.2.1-2, *Safety and Health Plan*, as required by NFS 1852.223-73, *Safety and Health Plan*, and NPR 8715.3, *NASA General Safety Program Requirements*.
3. Prepare and submit a *Safety Program Evaluation* per DRD 1.2.1-3.
4. Ensure all Contractor equipment, including equipment owned, assigned, leased, rented, or obtained from off-site locations is properly assembled, maintained, and safe for use.
5. Ensure each employee receives all required Federal or NASA initial and recurring safety and health training and maintain evidence that this required training has been completed and is current.

1.2.2 Occupational Safety

Specific Work Requirements:

In addition to the general work requirements listed in 1.2, the Contractor shall:

1. Conduct safety and health inspections per OSHA VPP, NASA and KSC safety and health requirements of all Contractor-occupied work areas. At least one inspection per year shall be performed using qualified safety professionals. Document all findings, track to closure, and communicate to appropriate Government entities.
2. Perform safety and health inspections of USAF facilities, as identified in Tech Exhibit 2.0-4, USAF Facilities OMEU, annually and develop inspection reports per DRD 1.2.2-1, *Safety Inspection Reports for USAF Facilities at KSC*.
3. Ensure safety and health requirements, policies, methodology, and procedures are developed for the protection of personnel.

4. Ensure a safe working environment by identifying, documenting mitigating, and preventing workplace hazards per KNPR 8715.3, KSC Safety Practices Procedural Requirements.
5. Document all mishaps, including injuries, property damages, close calls and corrective actions into the NASA mishap-reporting database. Implement mishap reporting methods, timelines and ensure data accuracy per KNPR 8715.3 KSC Safety Practices Procedural Requirements, and per DRD 1.2.2-2, Mishap Reporting.
6. Notify the USAF of any mishap involving USAF personnel, property, or impact to USAF operations per AFSPCMAN 91-710 V6, Ground and Launch Personnel, Equipment, Systems, and Materials Operations Safety Requirements and per DRD 1.2.2-2, Mishap Reporting.
7. Conduct mishap investigations per NPR 8621.1, NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping. In the event of a Government mishap investigation, support the investigation and make available all pertinent documentation and personnel, as requested.
8. Electronically submit initial mishap notifications to the NASA Safety Office. Submit Type A and B mishap notifications within one hour of occurrence. Submit Type C and D mishap and close call notifications within four hours of occurrence.
9. Submit a Safety Statistics Record per DRD 1.2.2-3.
10. Establish and implement a construction safety program to ensure compliance with OSHA, NASA and KSC requirements. Ensure subcontracted construction personnel have the required training and certifications required to perform the task. Develop and maintain a process to coordinate with NASA and other KSC contractors that could be impacted by the construction activity. Review and approve subcontractor safety plans.
11. Provide safety support for NASA launch and landing viewings and other KSC Special Community Events at KSC and CCAFS. Ensure FSEU and services provided by the Contractor are safe and ready for use prior to the public event; and that traffic control and parking plans are adequate and do not pose any hazards to vehicles or pedestrians.
12. Submit a safety variance request for any waiver or deviation from a safety or health requirement to the Government for approval. All variance requests must be processed through the appropriate variance review and approval system in accordance with KNPR 8715.3, KSC Safety Practices Procedural Requirements and AFSPCMAN 91-710 V6, Ground and Launch Personnel, Equipment, Systems, and Materials Operations Safety Requirements. Perform risk assessments for all variances requested to assure the safety of personnel and equipment is not compromised. Evaluate alternate work procedures as a result of a variance prior to implementation.

13. Ensure current Material Safety Data Sheets (MSDS) are readily available and reviewed by employees for materials used in the workplace.
14. Ensure employees are protected from serious workplace injury and/or illness resulting from contact with chemical, radiological, physical, electrical, mechanical, or other workplace hazards per KNPR 8715.5, KSC Personal Protective Equipment (PPE) Program Procedural Requirements.
15. Develop and maintain written procedures for operations and equipment involving the use, exposure to, generation of, or control of occupational health hazards. Identify the hazards in written procedures and include instructions on use of required engineering controls and work practices, including required PPE.
16. Provide employees appropriate training and orientation to identify occupational health hazards in all work places and the protective measures required for safety. Notify employees of any changes or modifications to policies, procedures or systems used to control exposure to health hazards.
17. Monitor and maintain accurate records of employees work hours, including forecasting work schedules, to ensure Maximum Worktime compliance per KNPR 8715.3, KSC Safety Practices Procedural Requirements.

1.2.3 Operational Safety

Specific Work Requirements:

In addition to the general work requirements listed in 1.2, the Contractor shall:

1. Comply with KNPR 8715.3, *KSC Safety Practices Procedural Requirements*, AFSPCMAN 91-710 V6, *Ground and Launch Personnel, Equipment, Systems, and Materials Operations Safety Requirements*, and Federal, NASA, State and local regulatory safety and health requirements.
2. Perform a safety assessment of all hazardous operations, high risk operations, and for first use of new and modified FSEU. Identify all hazards and appropriate mitigation. Submit the new and revised assessments to NASA for concurrence.
3. Develop and maintain technical operating procedures for operations, planned or unplanned, which are hazardous or constitute a potential operational constraint.
4. Comply with 29 Code of Federal Regulations (CFR) 1910.119, *Process Safety Management Requirements*.
5. Ensure compliance with the KSC Lockout/Tagout Program for control of hazardous energy as described in KNPR 8715.4, *KSC Lockout/Tagout Program Procedural Requirements*.

6. Perform and document arc flash hazard analyses and work permits for all work performed on or near energized equipment per National Fire Protection Association (NFPA) 70E, *Standard for Electrical Safety in the Workplace*. Calculations for determining arc flash hazards shall be in accordance with NFPA 70E or Institute of Electrical and Electronics Engineers (IEEE) 1584, *Guide for Performing Arc-Flash Hazard Calculations*.
7. Ensure compliance with NASA-STD-8719.9, *Standard for Lifting Devices and Equipment*.
8. Ensure compliance with NASA-STD-8719.11, *Safety Standard for Fire Protection*.
9. Ensure compliance with NASA-STD-8719.12, *Safety Standard for Explosives, Propellants and Pyrotechnics*.
10. Ensure compliance with applicable laws regarding inspections and markings of motor vehicles, aircraft, railcars, and other vehicles used for transportation of personnel, hardware or material. Ensure all transportation vehicles have passed an inspection for safe operations.

1.3 Mission Assurance

General Work Requirements:

The Contractor shall:

1. Perform Safety, Reliability and Maintainability analyses on all assigned critical and mission essential (ME) FSEU located at KSC and CCAFS.
2. Identify potential constraints and risks related to hazards and critical items in sufficient time to allow corrective action or implementation of acceptable mitigation without program impact. Present identified constraints and risks to the appropriate NASA Center Operations and Safety and Mission Assurance (S&MA) organizations prior to presentation to Program Risk Review Board and Engineering Review Board. Coordinate and communicate risk to affected NASA organizations and other KSC contractors.
3. Ensure all Contractor equipment, including equipment owned, assigned, leased, rented, or obtained from off-site locations, meets the applicable system safety and reliability analysis requirements.
4. Submit system safety, reliability and maintainability, and quality engineering analysis documentation to NASA for review and concurrence and then release documentation into the Engineering Documentation Center (EDC).

5. Develop and maintain a system safety, reliability and maintainability analysis schedule of all assigned critical and ME FSEU. Include the type of analysis to be performed, systems and design engineering interfaces, and a completion date. Update the schedule weekly and present to NASA.

1.3.1 System Safety

Specific Work Requirements:

In addition to the general work requirements listed in 1.3, the Contractor shall:

1. Develop a system safety approach to include both quantitative and qualitative analytical methods, as appropriate, to assess system and subsystem hazards of critical and ME FSEU and other hazardous systems.
2. Identify system criticality per National Space Transportation System (NSTS) 22206, *Space Shuttle Requirements for Preparation and Approval of Failure Modes and Effects Analysis (FMEA) and Critical Items List (CIL)*. Develop hazard analysis for new and modified critical, ME and hazardous FSEU per NSTS 22254, *Methodology for Conduct of Space Shuttle Program Hazard Analyses*, and KNPR 8715.3, *KSC Safety Practices Procedural Requirements*.
3. Develop preliminary hazard analyses for the 45% or 60% design review meeting for design projects involving assigned critical and ME FSEU. Provide early identification for correction of all hazards, common cause hazards, and critical items inherent of the proposed design. Finalize analyses during the construction phase considering as-built and shop drawings.
4. Develop and process hazard analysis documentation in accordance with NSTS 07700, Volume V, *Information Management Requirements, Appendix C.4*.
5. Implement a process for NASA Program approval of exceptions, deviations or waivers from design or safety requirements or other requirements with safety or mission success impact per NSTS 22254, *Methodology for Conduct of Space Shuttle Program Hazard Analyses*.
6. Establish a process for the identification, elimination and control of hazards and integrated hazards throughout the complete life cycle of FSEU, materials, and processes before introducing them into the work environment. All hazards shall be traceable from the initial identification through its resolution and any updates, using a continuous risk management approach.

1.3.2 Reliability and Maintainability

Specific Work Requirements:

In addition to the general work requirements listed in 1.3, the Contractor shall:

1. Develop and maintain a reliability and maintainability (R&M) program per KNPR 8720.1, *KSC Reliability, Maintainability, and Quality Assurance Procedural Requirements*. Support NASA programs in the development of system R&M analyses for assigned FSEU.
2. Develop and maintain FMEA and CIL on assigned FSEU per NSTS 22206, *Space Shuttle Requirements for Preparation and Approval of Failure Modes and Effects Analysis (FMEA) and Critical Items List (CIL)*. Develop and maintain FMEA/CIL for new and modified critical and ME assigned FSEU.
3. Develop and process the CIL in accordance with NSTS 07700, Volume V, *Information Management Requirements, Appendix C.4*.
4. Develop preliminary FMEA/CIL for the 45% or 60% design review meeting for design projects involving critical and ME assigned FSEU. The FMEA/CIL shall provide early identification for correction of all single failure points inherent of the proposed design. Finalize the analysis during the construction phase considering as-built and shop drawings.
5. Integrate the reliability and system safety analyses into a single document referred to as System Assurance Analysis (SAA). Develop and maintain SAAs for new and existing assigned critical and ME FSEU.
6. Develop and maintain Operations and Maintenance Requirements Specifications Document (OMRSD) per NSTS 08171, *Operations Maintenance Requirements Specification Document* for new assigned critical and ME FSEU. Update existing OMRSDs as assigned critical and ME FSEU are modified. Equipment appearing on a CIL shall be given special attention in establishing hardware specifications and qualification requirements, and in the formulation of operating and maintenance procedures.
7. Assess new design projects on assigned FSEU to assure that NASA program requirements are met per NSTS 5300.4 (1D-2), *Safety, Reliability, Maintainability and Quality Provisions for the Space Shuttle Program*.

1.3.3 Quality Assurance (QA)

Specific Work Requirements:

The Contractor shall:

1. Comply with KNPR 8730.2, *Quality Assurance Procedural Requirements*. Ensure existing, new and modified systems, and sub-systems include comprehensive quality surveillance. Perform QA activities per NSTS 5300.4 (1D-2), *Safety, Reliability, Maintainability and Quality Provisions for the Space Shuttle Program*.
2. Assure Contractor-procured products and services meet the appropriate quality requirements.
3. Develop and maintain procedures that effectively control nonconforming supplies and services, including activities for the identification, segregation, disposition, and disposal of the supplies.
4. Ensure that the Quality Assurance (QA) Organization maintains independence from the performing organization. Ensure all QA personnel are qualified, and when required, certified to perform QA inspections prior to work being performed.
5. Develop and maintain a *Quality Plan* per DRD 1.3.3-1. Develop and maintain quality control metrics to be included in this plan for approval by the Government. Comply with the requirements of American National Standards Institute (ANSI)/International Organization for Standardization (ISO)/American Society for Quality (ASQ) Q9001-2000, *Quality Management Systems (QMS) Requirements*.
6. Establish and maintain a calibration program that complies with ANSI/National Conference Standards Laboratory (NCSL)/Z540.3, *Requirements for the Calibration of Measuring and Test Equipment*.
7. Prepare and submit a *Quality Program Evaluation* per DRD 1.3.3-2.
8. Identify Government Source Inspection for procurements and services based on the criticality (1, 1R, 1S, and 2 as referenced in NSTS 22206, *Space Shuttle Requirements for Preparation and Approval of Failure Modes and Effects Analysis (FMEA) and Critical Items List (CIL)*) of the procurement for FSEU, cryogenic/hypergolic propellant ME equipment, and other procurements identified by the Government based on system interface and vendor performance history.
9. Plan and conduct product assurance actions, including inspections, tests, records review, which demonstrate contract, drawing and specification requirements have been met on all articles and materials produced for NASA programs.

10. Utilize the Government-provided Problem Reporting and Corrective Action (PRACA) system for problem and failure reporting of assigned critical and ME FSEU. Track all problem and failure histories and document corrective action per NSTS 5300.4 (1D-2), *Safety, Reliability, Maintainability and Quality Provisions for the Space Shuttle Program*.

1.3.4 Government Industry Data Exchange Program (GIDEP)

Specific Work Requirements:

The Contractor shall:

1. Participate in the GIDEP in accordance with the requirements of NPR 8735.1, *Procedures for Exchanging Parts, Materials, and Safety Problem Data Utilizing the Government-Industry Data Exchange Program and NASA Advisories*, and KNPR 8730.2, *Quality Assurance Procedural Requirements*.
2. Review all Failure Experience Data Reports (FEDR), to determine if any affect the Contractor products produced for NASA's projects and programs. Take action to eliminate or mitigate any negative effect to an acceptable level, as determined by NASA.
3. Generate the appropriate FEDR whenever failed or nonconforming items, available to NASA or other buyers are discovered. Coordinate all failure experiences and reporting of failures with the NASA-KSC GIDEP Coordinator.

1.4 Management Information Systems (MIS)

Specific Work Requirements:

The Contractor shall:

1. Develop, maintain, and utilize an integrated architecture for MIS, including Contractor-owned and Government-furnished applications to enable the effective and efficient preparation, management, control, and dissemination of information and data. With the exception of Kennedy Complex Control System (KCCS) and other building control systems, Contractor server-based IT systems shall be housed in the KSC Data Center, unless otherwise approved by the KSC Chief Information Officer (CIO).
2. Provide MIS links to IT applications and enable sharing and integration of data from multiple functional areas to facilitate efficient data utilization, analysis and reporting, and minimize duplicative data entry.

3. Provide MIS interoperability among all management, operations, administrative, and financial systems.
4. Utilize Maximo version 6.2 or later to manage and integrate all ISC work control functions. The Information Management and Communication Support (IMCS) Contractor is responsible for providing and administering the server and network for Maximo.
5. Obtain required licenses, administer, manage, and maintain any Contract-provided IT resources, or any inherited from the predecessor contractor, including system software, applications, test applications, firmware, Commercial-off-the-Shelf (COTS) capabilities, displays, databases, data storage, and documentation.
6. Ensure that Government-furnished applications linked to the Contractor's MIS are coordinated with the IMCS.
7. Develop and maintain documentation that reflects the current configuration of Contractor's MIS architecture, including both Contractor-provided and Government-furnished applications. Provide insight to the Government upon request.
8. Provide the Government with full on-line, network accessible, read-only access to the Contractor's MIS, except where "write" capability is otherwise specified in the PWS.
9. Provide query capability for the MIS.
10. Provide a customer interface that requires minimal formal user training.
11. Provide the required formal and informal training as well as user guides needed for Contractor personnel, customers, and the Government to efficiently and effectively utilize the Contractor's MIS.
12. Respond to customers' questions, problems, and requests for access associated with the Contractor's MIS. Provide problem-tracking capability for continuous improvement of MIS performance.
13. Ensure the data contained in the Contractor's MIS shall be compatible with Microsoft products and shall be current, accurate, and complete.
14. Develop and maintain hierarchical data structure for all assigned FSEU. The data structure shall start at the highest level and logically flow down to the equipment-level or to component-level, where warranted. Designate systems and associated equipment as critical and ME, consistent with Configuration Management Data System (CMDS) records (Ref.: WBS 1.7, *Configuration Management*). Participate in NASA Institutional Maximo Configuration Control Board (CCB) to ensure consistency in data field utilization across NASA's institutional contracts.

15. Ensure the MIS provides a data warehouse capability to access historical system and equipment data files on assign FSEU to track and analyze trends and to plan upcoming OM&E activities.
16. Provide closed-loop tracking for all the work through completion. Enable on-line, network accessible, customer visibility into status during work phase, including estimated/actual costs and schedule.
17. Perform continuous assessment and improvement of MIS performance and architecture to ensure maximum efficiency and performance. Periodically assess the Government-furnished applications as applied to ISC and submit any alternative proposals to the Government for approval prior to implementation.

1.4.1 IT Security

Specific Work Requirements:

In addition to the general work requirements listed in 1.4, the Contractor shall:

1. Ensure IT Security compliance for all Contractor-provided IT systems and Government-furnished property that the Contractor is responsible for operating and maintaining.
2. Develop, document, and manage operational and technical IT security plans, procedures, and controls for all Contractor-provided IT applications per DRD 1.4.1-1, *IT Security Plans*. Update and maintain existing IT Security Plans for IT resources inherited from the predecessor contractor per DRD 1.4.1-1, *IT Security Plans*. Test and annually review these plans, procedures, and controls for adequacy and compliance. For Government-furnished IT services, the Government is responsible for developing and maintaining IT security plans and systems' configuration. Comply with the Government-developed IT security plans.
3. Comply with NPR 2810.1A, *Security of Information Technology*, as supplemented by Tech Exhibit 1.4.1-1, *IT Security Implementation Guide*.
4. Develop and maintain DRD 1.4.1-2, *Continuity of Operations Plan (COOP)*, and DRD 1.4.1-3, *COOP Annual Test Report*.
5. Provide technical support to NASA IT Security and IMCS for IT security incidents, investigations, and other IT security-related actions.

1.5 Work Management

1.5.1 Planning, Scheduling, and Work Control

Specific Work Requirements:

The Contractor shall:

1. Develop and utilize a Maximo work management system, including planning, control, scheduling, integrating, executing, monitoring, and improving all contract functions and activities, to satisfy internal and external customer requirements.
2. Operate a work control center (WCC) to receive, assess, input, categorize, prioritize, schedule, track, and document internal and external work requests associated with the contract. Implement and maintain WCC operational procedures and practices to provide accurate, timely, and professional responses to customer requests, and to permit tracking of work in progress.
3. Plan and schedule work to ensure all labor, equipment, and materials are available to complete work requirements within the specified or negotiated time limits and within established standards.
4. Provide personnel to immediately receive, schedule, classify, coordinate and initiate ISC responses to trouble calls, service orders, and real-time support requirements 24 hours per day, 7 days per week:
 - i. Emergency Trouble Call (ETC): issued for situations that require immediate action to eliminate hazards to personnel, equipment, or environment; prevent loss of or damage to Government property; or to restore essential services that have been interrupted by an unplanned event. Examples of ETC include unscheduled outages or hazardous situation for power, water, wastewater, Heating, Ventilation, and Air Conditioning (HVAC); wastewater, plumbing, roof or building exterior leaks; inoperable draw bridge.
 - ii. Routine Trouble Call (RTC): issued for situations which do not immediately endanger personnel or threaten to damage property or the environment, but would soon inconvenience and affect the health or well being of personnel or disrupt operational missions or projects.
 - iii. Service Order (SO): issued for FSEU-related work that supports operations, facility projects or discretionary work, and is not repair or recurring maintenance.
5. Provide personnel to immediately receive and communicate work requirements, 24 hours per day, 7 days per week, to other Institutional contractors including IMCS, NASA-managed Desktop Services, Medical and Environmental Support Contract (MESOC), NASA Protective Services Contract (NPSC) (Non-911 only), Janitorial, and Grounds Maintenance. Develop effective and efficient interfaces with these other

contractors to ensure maximum responsiveness. For emergency-type calls consistent with ETC definition above, notify the appropriate responder within 5 minutes. For all other calls, communicate the work requirement within 30 minutes.

6. Notify the CCAFS Duty Office and Power Coordinators office immediately on all unscheduled utility outages affecting USAF Facilities, as identified in Tech Exhibit 2.0-4, *USAF Facilities OMEU*. Report scheduled and unscheduled utility outages to 45 SW Civil Engineering Office, in accordance with Air Force Space Command Instruction (AFSPCI) 32-1010, *Utility Outage and Incident Reporting*.
7. Serve as central clearinghouse for dissemination of Institutional-related announcements, pages, and anomaly reporting, 24 hours per day, 7 days per week. Communicate to KSC workforce any hazardous or anomalous conditions such as power outages, equipment failures, weather warnings, security issues, and traffic accidents or road closures. Maintain and utilize the existing process, MCSS-UG-13, *Mission and Customer Support System E-Log*, to automate primary coordination activities and to automate and distribute real-time duty logs.
8. Review and schedule ISC work requirements into KSC Integrated Console Schedule (KICS) and the Payload Operations Support Schedule (POSS) to plan, schedule and issue work authorization documents to initiate required support. Participate in daily integrated scheduling meeting with the Programs for providing information concerning ISC support and coordinating real-time requests for program operations.

1.5.2 Outage Coordination and Processing

Specific Work Requirements:

The Contractor shall:

1. Schedule, coordinate, and perform outages for assigned FSEU, including high and low voltage, KCCS, protective systems, fire alarm and suppression, HVAC, chilled water, high temperature hot water, compressed air, pneumatics, potable water, elevators, and roadways and bridges.
2. Develop and maintain processes and procedures for outage scheduling and coordination.
3. Coordinate, negotiate, and manage approvals for outages with the requestor, facility manager, subcontractors, any affected customers, and functional managers. For USAF-owned facilities, as identified in Tech Exhibit 2.0-4, *USAF Facilities OMEU*, also coordinate with CCAFS Duty Office 10 working days in advance for impacts and approval.
4. Minimize impacts and accommodate program operations when scheduling outages.

5. Analyze outage requests, assess associated impacts, and participate in outage planning meetings.

1.6 Mission Support and Launch Readiness Management

The Contractor shall support NASA, USAF and Commercial mission requirements, including infrastructure and support service readiness for human space flight, expendable launches and other programmatic milestones at KSC and CCAFS. These services shall include planning in preparation for launches; support during launch operations; and requirements following launches, as prescribed in the Shuttle Integrated Operations and Maintenance Instructions (IOMIs) and other program-specific documentation, mentioned throughout the PWS.

Specific Work Requirements:

The Contractor shall:

1. Provide ISC Support Console (JSTC console) monitoring and coordinate with NASA Test Team during all integrated operations for all Contractor support functions and other Institutional contracts functions, including Fire Services, Security, Environmental Health, Medical Services, Communications, and Grounds Maintenance.
2. Support 24-hour turn-around time between launch configurations and the ability to support four launch attempts over a five day period, with no more than three launch attempts in a row.
3. Develop and maintain a launch readiness assessment system to status all Contractor launch support elements, supporting the mission milestones in Table 1.6-1. The launch readiness system shall provide status on the availability and maintenance of all assigned critical and ME FSEU; critical and ME spares; FSEU validations and critical checks; open documentation and work; and any concerns or constraints. The Contractor's launch readiness system shall be compatible with or incorporated within Maximo.
4. Provide *Launch Readiness Briefings* per DRD 1.6-1.
5. Support NASA launch readiness reviews, including integrated Ground Systems review, for each SSP mission milestone per Table 1.6-1. Prepare and submit *Launch Readiness Statements* per DRD 1.6-2. Prepare and submit NASA Payload Processing Facility (PPF) Statements of Readiness upon request.

#	Event/Milestone
1	S5023 - Orbiter Rollover and Flow Readiness (MAJOR)
2	A5214 – Rollout
3	S0024 – Propellant Load
4	S0017 – Terminal Countdown Demonstration Test
5	S5009 – Ordnance Installation
6	S0037 – Tanking Test
7	S0007 - Launch Countdown/Return to Launch Site (RTLS) (MAJOR)
8	S0028 - Landing – End of Mission

Table 1.6-1, SSP Milestones

6. Starting four weeks prior to Milestone #1 and through #8 in Table 1.6-1, provide weekly meetings with NASA to address the status of assigned critical and ME FSEU including, availability, maintenance status, open work, documentation status, issues, concerns, and risk assessment.
7. Report Contractor’s readiness and submit a Launch Readiness Letter to the 45 SW for ELV launches per DRD 1.6-2, *Launch Readiness Statements*. Attend 45 SW Launch Readiness Reviews and report Contractor readiness.
8. Attend NASA, USAF, and commercial post launch briefings, and provide status on any Contractor support issues. Report any corrective actions to the Government.
9. Comply with KNPR 8630.3, *KSC Shuttle Processing Flight Readiness/Certification Review and Mission Management Team Support Plan*, and *Universal Documentation System 501-97*.

1.7 Configuration Management

Specific Work Requirements:

The Contractor shall:

1. Develop and maintain a configuration control process per KNPR 8040.1, *KSC Configuration Management Procedural Requirements*, for all assigned FSEU.
2. Develop and implement a FSEU CCB process. Develop and maintain *FSEU Configuration Control Board Plan* per DRD 1.7-1. NASA will co-chair the CCB with the Contractor.
3. Analyze repairs and modifications to assigned FSEU to determine the effects to documentation, engineering analyses, and software. Documentation includes drawings, instructions, and specifications; System Assurance Analyses/System Criticality Analyses (SAAs/SCAs) and other Risk/Hazard Analysis Packages; Spare Parts

Analysis (SPAs); Pressure Vessel/System (PV/S) and Department of Transportation (DOT) compliance reports; OMRSDs, Operations and Maintenance Instructions (OMIs), and Preventive Maintenance (PM) Job Plans. Engineering analyses include Electrical Transient Analyzer Program (ETAP), Pipe-Flo and Carrier E20. Software includes KCCS; Central Fire Monitoring System (CFMS) and GIS.

4. Maintain configuration control of system drawings and documents, identified by NASA in the CMDS, on assigned FSEU that change as a result of maintenance, repair or construction activities. No more than 10 Engineering Orders (EOs), unless otherwise required by program requirements or directed by the Government, shall be issued on any one configured drawing/document. All existing EOs on configured drawing/document shall be incorporated into a new drawing/document revision within two years of contract effective date or two years of original EO release date.
5. Reduce pre-existing backlog of configured drawings and Operations and Maintenance Documentation (OMD). Obtain FSEU CCB approval prior to accumulating any additional OMD backlog.
6. For Contractor-initiated modifications that impact other KSC contractors' configured FSEU, submit proposed drawings, specifications and other documentation to the appropriate contractor or program CCB for review and approval.
7. Maintain and update the CMDS database, including the OMEU matrix, for assigned FSEU. Update the CMDS database for non-ISC assigned FSEU data as provided by NASA. Obtain NASA approval for any changes to the existing FSEU classifications (critical, ME and configured).
8. Within 90 days of contract effective date, update CMDS/OMEU database to match OMEU and critical/ME/configured fields, as identified in Tech Exhibits 2.0-1, *OMEU Matrix* and 2.0-4, *USAF Facilities OMEU*. Within 90 days of contract award of Options 6A-6H and Options 7A-7I, update CMDS/OMEU database to match OMEU and critical/ME/configured fields identified in Tech Exhibits 2.0-2, *Former SPOC OMEU* and 2.0-3, *Former CAPPs OMEU*. Upon completion each of these CMDS updates, the Government will review and approve these products. The CMDS/OMEU database will then be used as the baseline and will supersede the Tech Exhibits for technical and contract management purposes.
9. Develop and maintain a System Documentation List (SDL) for each assigned configured system baseline. The SDL shall contain all of the associated OMD.
10. Release Contractor-developed or acquired documentation in support of NASA requirements including facility project drawings and specifications, SAAs, OMRSDs, formal studies, in accordance with KDP-KSC-P-1537, *Document Release Authorization Process*.

11. Release Contractor-developed or adopted documents required for ISC internal work performance into NASA Technical Documentation Center (TechDoc). Documents in TechDoc may include ISC plans, procedures, instructions, forms, MOU/MOAs, and OMIs.
12. Perform annual configuration audits on 5 % of documentation for assigned FSEU configured systems. Report findings of configuration audits to NASA. Establish and maintain a schedule of all configuration documentation audits for each contract year.

1.8 Geographic Information System (GIS)

The GIS is an existing integrated system of hardware and ArcView/ArcInfo software packages with associated applications linking topographic, demographic, utility, facility, image and other resource data that is geographically referenced data for KSC. The purpose of the GIS is to capture, store, retrieve, analyze, and display spatial and non-spatial information. The GIS hardware and software will be maintained by the IMCS or the successor contractor.

Specific Work Requirements:

The Contractor shall:

1. Maintain and update KSC spatial and non-spatial data including all GIS sub-applications, as FSEU requirements are identified, for input into the GIS from sources including schematics, maps, photos, surveys, and as-built drawings.
2. Maintain all feature classifications and attribute entries consistent with the Spatial Data Standards for Facilities, Infrastructure and Environment.
3. Utilize GIS to develop and process site plans, excavation permits, and comprehensive planning studies.
4. Utilize GIS to provide cartographic support for comprehensive map packages in print format or electronic media format.
5. Participate in GIS CCB. Identify and propose enhancements for the KSC utilization of GIS.

1.9 Training

Specific Work Requirements:

The Contractor shall:

1. Provide a trained, certified, and licensed, competent, experienced, and reliable workforce to meet all contract requirements. Ensure that the Contractor workforce is knowledgeable of the applicable laws, regulations, and Government directives.
2. Utilize Government-furnished training as stated in Attachment J-3, *Government Furnished Services*. Provide technical input, as the subject matter experts, to the Kennedy Institutional Support Services (KISS) contract to ensure the accuracy of the material.
3. Develop and maintain a Training and Certification Plan. The Plan shall be made available to the Government upon request.
4. Use the Government-provided Training Certification Record System (TCRS) to document all technical training and certification of Contractor personnel. Retain individual employee training and certification records for at least five years after employment ends and provide to the Government upon request.
5. Offer, on a space available basis, all Contractor training courses to Government and other KSC contractor personnel.
6. Record all Contractor-developed training in digital format.
7. Develop a forecast for Government-furnished training required by the Contractor per DRD 1.9-1, *Training Needs Assessment*.
8. All hazardous material (HAZMAT) employees (this includes all employees associated with hazardous waste) must receive the appropriate level of DOT training.

1.10 Environmental Management

Specific Work Requirements:

The Contractor shall:

1. Support NASA and USAF environmental program requirements applicable to the Contractor, including response to environmental data calls; support to internal and external inspections and audits; providing support to required permit applications and environmental permits; and providing technical support to Contractor operations to meet environmental permit and regulatory requirements.

2. Ensure that operations and assigned FSEU maintain compliance with all environmental regulations, permits and licenses required by the Federal, State or local Governments or a subdivision thereof, or of any duly constituted public authority in performance of work.
3. Comply with NASA environmental requirements per KNPR 8500.1, *KSC Environmental Requirements*, for ISC operations of assigned NASA FSEU at KSC and CCAFS.
4. Develop and maintain DRD 1.10-1, *Environmental Management Plan* which outlines internal policies, procedures, and guidelines for environmental compliance.
5. Perform continuous environmental engineering review of Contractor operations including hazardous and controlled waste management requirements.
6. Ensure that all employees who are responsible for hazardous waste management activities receive annual hazardous waste training and, where applicable, have job descriptions that meet the requirements of 40 CFR 265.16 and Air Force Instruction (AFI) 32-7042, paragraphs 2.6 and 1.10.1.11 respectively.
7. Identify, interpret, and apply new and existing environmental requirements with respect to Contractor operations.
8. Prepare environmental reports for permitted activities and regulatory requirements.
9. Participate in Contractor-managed project design reviews to ensure that environmental aspects are given the proper consideration during design. Provide guidance and monitoring of Contractor-managed construction for proper implementation of environmental requirements.
10. Identify innovative environmental permit strategies and environmental permit development and implementation for Contractor operations.
11. Provide chemical usage and storage records for each calendar year. Comply with data call from Government requesting the data and input data into electronic database/spreadsheet provided by the Government.
12. Perform waste minimization and pollution prevention opportunity assessments such as reducing toxic releases inventory (TRI) chemical releases and hazardous waste.
13. Ensure natural and cultural resource awareness and protection.
14. Comply with NASA's Affirmative Procurement Program and USAF's Green Procurement Program for Contractor procurements at the respective facilities.

15. Support NASA's Environmental Management System (Reference KSC-PLN-1912, *KSC Environmental Management Plan*).

16. Promote environmental awareness within the Contractor workforce.

Note: The NASA and USAF Environmental Offices are the single points of contact with all regulatory agencies concerning NASA and USAF issues, respectively, such as: regulatory interpretation, compliance reporting, inspections and spills or releases.

1.10.1 USAF-unique Environmental Requirements:

Specific Work Requirements:

In addition to the other environmental requirements noted above, for USAF-owned FSEU or ISC operations performed on USAF property, the Contractor shall:

1. Comply with USAF requirements as listed in Attachment J-7, *Compliance Documents*, for ISC operations on assigned USAF FSEU at KSC, CCAFS and PAFB.
2. Complete all appropriate training necessary to meet the requirements of all USAF environmental programs. The USAF will provide web-based environmental training not specific to Federal and State license/certification requirements.
3. Enroll in and comply with the requirements of the 45 SW HAZMAT Pharmacy program, AFI-32-7086, Chapter 2, section 1.5, paragraph 2.5.5 and the 45 SW HAZMAT Guide.
4. Comply with the designated HAZMAT barcode system to track all HAZMAT from purchase to disposal.
5. Notify the USAF ten working days prior to required State notifications for installations, changes, or modifications for registered storage tank system, when applicable. For one hour notification requirements to the State, a one day prior notification to the USAF is required.
6. Participate in the 45 SW Recycling Program. The program recycles all paper, cardboard, plastic bottles and aluminum drink containers, glass, used oil filters, and toner cartridges.
7. Ensure all employees receive initial USAF provided Environmental Safety and Occupational Health Management System (ESOHMS) training within 90 days of employment and annual ESOHMS refresher training. All training shall be documented and maintained for the duration of the contract.

1.11 Security

1.11.1 Physical Security

Specific Work Requirements:

The Contractor shall:

1. Comply with NPR 1600.1, *NASA Security Program Procedural Requirements* and the 45 SW Instruction 31-101, *Eastern Range Security Program*.
2. Properly mark all developed and updated material that requires protection from disclosure.

1.11.2 Export Control

Specific Work Requirements:

The Contractor shall:

1. Assign an Export Control Point of Contact (POC) to interface with the KSC Center Export Administrator (CEA). Participate in the KSC Export Control Working Group (ECWG).
2. Comply with 15 CFR Parts 730-774, *Commerce and Foreign Trade*, and 22 CFR Parts 120-130, *International Traffic in Arms Regulations (ITAR)*.
3. Develop and maintain DRD 1.11.2-1, *Export Control Plan*.
4. Apply for all required export licenses within 30 days of contract effective date.
5. Recommend the requirements of a license and/or license exception when appropriate; coordinate with the NASA KSC CEA when necessary, properly complete all required documentation, and forward to the responsible NASA office.
6. Classify and apply the proper markings on Contractor-generated documentation for hardware, software, and technology.

1.11.3 Audit/Investigation Support

Specific Work Requirements:

The Contractor shall provide support and information to internal and external auditing and investigations performed by NASA and other agencies, including General Accounting

Office (GAO), Inspector General (IG), Defense Contracting Audit Agency (DCAA), Defense Contract Management Agency (DCMA), Federal Bureau of Investigation (FBI), and Office of Management and Budget (OMB).

1.12 Emergency Preparedness

Specific Work Requirements:

The Contractor shall:

1. Develop and maintain an *Emergency Preparedness Plan and Report* per DRD 1.12-1. Emergency preparedness plans shall address accidents involving missile/space vehicles, toxic fuels, explosives, pyrotechnics, radiological materials, and other hazardous substances, natural disasters, and terrorist incidents.
2. Develop and maintain detailed hurricane preparedness plans for all of the Contractor's operational areas. These plans shall include work area specific detailed actions to be carried out to protect assigned FSEU from the effects of a hurricane or tropical storm. The plan shall include the support to NASA, other KSC contractors and tenants who rely upon ISC assistance for storm preparations.
3. Support hurricane preparation and recovery. Participate in the KSC and CCAFS (for functional areas located at CCAFS) Ride-Out Crew. Provide fresh water, Meals-Ready-to-Eat (MRE), cots, and blankets for the Ride-Out Crew. Provide a Damage Assessment Review Team as directed by the NASA Emergency Preparedness Officer upon "Weather Safe" call.
4. Provide support at the Emergency Operations Center (EOC) as a liaison to the Incident Command Staff.
5. Plan for and participate in drills and implement the Emergency Preparedness Plan for declared emergencies.
6. Designate a Contractor Emergency Coordinator responsible for supporting emergency preparedness planning and implementation and interface with the NASA Emergency Preparedness Officer.
7. Following a declared emergency condition, take immediate action to eliminate hazards to personnel, equipment or environment; prevent loss of or damage to Government property; and restore essential services.

1.13 Workmanship and Materials

Specific Work Requirements:

The Contractor shall:

1. Provide professional quality work conforming to all applicable regulations and standards. All specified work items including checkpoints, servicing, repairs, and reporting shall be performed completely, correctly, and neatly in a safe manner. Lack of required parts, other materials, or staffing shall not be an acceptable cause for non-performance of scheduled work. Eliminate any need for re-work.
2. Ensure all personnel performing work are properly trained, certified, and qualified for the work requirements including recognition of job hazards for the specific equipment. All replacement material and parts shall either be original equipment manufacturer or at a minimum meet the salient specifications of the original equipment manufacturer and match existing finish and color. Specialized tools and equipment utilized for all work shall be operated in accordance with manufacturer instructions and be operated under valid calibration, if applicable. During performance of work, debris shall not be allowed to spread into adjacent areas nor accumulate in the work area itself. All such debris, excess material, and parts shall be removed upon completion of work or at the end of each workday, whichever occurs first.
3. Perform other incidental work in the vicinity of the work area, identified by the requester or by the crew during the job.

2.0 FSEU OM&E

General Work Requirements:

The Contractor shall:

1. Perform requirements specified in WBS 2.0 through 2.6 on the assigned FSEU as identified in the following Tech Exhibits:
 - i. Tech Exhibit 2.0-1, *OMEU Matrix*,
 - ii. Tech Exhibit 2.0-2, *Former SPOC OMEU*,
 - iii. Tech Exhibit 2.0-3, *Former CAPPS OMEU*,
 - iv. Tech Exhibit 2.0-4, *USAF Facilities OMEU*,
 - v. Tech Exhibit 2.0-5, *Special Purpose and Heavy Equipment List*,
 - vi. Tech Exhibit 2.0-6, *Former SPOC Special Purpose and Heavy Equipment List*,
 - vii. Tech Exhibit 2.0-7, *Former CAPPS Special Purpose and Heavy Equipment List*.

Note: Tech Exhibits 2.0-1, 2.0-4, and 2.0-5 depict assigned FSEU as of contract effective date. Tech Exhibits 2.0-2, 2.0-3, 2.0-6, and 2.0-7 depict assigned FSEU per Options 6A-6H and Options 7A-7I.

2. Respond immediately to ETCs for all assigned FSEU and be on the job site and working within 30 minutes following notification. Stabilize the situation assuring the emergency will not recur and restore essential services that have been interrupted. Permanent repairs shall be completed within 7 calendar days of notification unless otherwise coordinated with the Government.
3. Respond to RTCs for all assigned FSEU within 14 calendar days following notification, unless specified otherwise when issued. Permanent repairs shall be completed within 30 calendar days of notification unless otherwise coordinated with the Government.
4. Operate and maintain all assigned critical and ME FSEU in accordance with the applicable OMRSD.
5. Perform permanent repairs to meet design intent and equipment specifications on all assigned FSEU. Where economically feasible, repairs shall consider upgraded design or equipment specifications for improved operational performance capabilities. For any repairs to NASA critical, ME or configured FSEU, as identified in Tech Exhibits that deviate from original design or form, fit, and function of FSEU; the Contractor's FSEU CCB shall review and approve proposed repair plans prior to implementation. For USAF FSEU, obtain approval from USAF 45 CES/CEL prior to any changes to system configuration.
6. Develop and maintain a *Maintenance Plan* per DRD 2.0-1. Upon Government approval of the *Maintenance Plan*, develop new OMIs and PM Job Plans or update existing OMIs and PM Job Plans. As PM Job Plans are developed or updated, a step shall be added to identify the equipment condition assessment code (5-excellent, 4-good, 3-fair, 2-poor, 1- bad), consistent with NPR 8831.2, *Facilities Maintenance Management*.
7. Perform maintenance on all assigned FSEU in accordance with existing documentation, as identified in Tech Exhibit 2.0-8, *OMIs* and Tech Exhibit 2.0-9, *PM Job Plans* until the DRD 2.0-1, *Maintenance Plan* is approved and OMIs and PM Job Plans are updated. Once updated, perform maintenance in accordance with the updated OMIs and PM Job Plans.
8. For Options 6A-6H and Options 7A-7I, perform maintenance on all assigned FSEU in accordance with existing documentation, as identified in Tech Exhibit 2.0-10, *Former SPOC OMIs and PM Job Plans* and Tech Exhibit 2.0-11, *Former CAPPS PM Job Plans* until the DRD 2.0-1, *Maintenance Plan* has been updated and approved by the Government. Upon Government approval on the updated *Maintenance Plan*, update OMIs and PM Job Plans. Once updated, perform maintenance in accordance with the updated OMIs and PM Job Plans.

9. Maintain PM Job Plans and OMIs as equipment or maintenance requirements are added, deleted, or modified. Obtain NASA and USAF approval (for respective FSEU) in advance, through electronic means, for any changes to existing critical/ME/life safety PM Job Plan and OMI requirements that reduce the level of maintenance, to include lessening the frequency of maintenance or rescheduling past the due date.
10. Develop and maintain a trending analysis database for the recommended trending of Predictive Testing and Inspection (PT&I) in accordance with the approved *Maintenance Plan* per DRD 2.0-1. Continuously update the database and provide full access (read only) to the Government. Evaluate all trending data for adjusting equipment maintenance requirements/frequencies, or for any necessary equipment replacement or repair before its projected end-of-life.
11. Perform engineering assessments and evaluations of operations, maintenance and repair findings that indicate potential degrading reliability and maintainability trends, and safety hazards, and communicate any findings to NASA and USAF, as applicable, and initiate corrective actions.
12. Document in Maximo, findings identified on assigned FSEU during Operations and Maintenance (O&M) activities. Take required corrective maintenance action to prevent disruption to operation of assigned FSEU.
13. Process and document in PRACA, anomalies and equipment failures of assigned critical and ME FSEU. Obtain NASA approval in advance, through electronic means, for disposition and closure of all problems documented in PRACA.
14. Identify future project requirements, in support of project planning activities in WBS 4.2.1, *Institutional Facility Project Planning*, to resolve findings from maintenance activities or FCAs, or to provide operational and reliability improvements.
15. Coordinate and submit AF Form 332, *Base Civil Engineer Work Request*, to the facility manager for USAF facilities for any facilities work on USAF facilities that is considered new construction or requires detailed planning and/or capitalization of USAF real property records.
16. Participate in engineering design reviews of NASA and USAF-managed projects on assigned FSEU and provide comments for the purposes of assessing sustainability, constructability and O&M requirements.
17. Support program requirements for mission processing activities, mission milestones, launches, and associated IOMIs. Provide on-site standby coverage for applicable critical and ME systems during mission milestones, as identified in Table 1.6-1, *SSP Milestones*.

18. Provide O&M Support to NASA and USAF-managed construction projects including switching, isolation, securing and activation of assigned FSEU systems.
19. Preserve working-level system engineering documentation related to the development phase, regulatory compliance, configuration, operational characteristics, anomalies, informal studies/results, and manufacturer's literature for all assigned FSEU.
20. Participate in the KSC Indoor Air Quality (IAQ) Working Group chaired by the MESC. Develop remediation action plans required to manage the IAQ issues in occupied facility space, as identified by the MESC. Remediation work related to IAQ will be performed either as a facility project per WBS 4.2.2.2, *Facility Project Implementation* or will be initiated with a SO.
21. Provide services in support of WBS 1.12, *Emergency Preparedness*, required to secure assigned FSEU prior to emergency event including installation of shutters, tarps, and generators as well as mitigating damages and restoring assigned FSEU. Provide required support for all Contractor hurricane preparedness plans for specific work areas prior to arrival of hurricane or tropical storm to protect assigned FSEU.
22. Tag "Out-of-Service" equipment in accordance with PPS-I-0033, *Use of Out-of-Service Tags*.
23. Develop and maintain DRD 2.0-2, *Fire Alarm, Electronic Security, Fire Suppression, Traffic, and Tornado Area Warning Systems Out-of-Service Log*.
24. Develop and maintain DRD 2.0-3, *Utilities Outage Report*.
25. Develop and maintain DRD 2.0-4, *FSEU Maintenance Execution Summary Report*.

2.1 Electrical

2.1.1 Power Systems

System Descriptions:

1. **High Voltage Distribution:** The high voltage distribution system, above 600 volts, includes all distribution hardware and associated controls and instrumentation between facility substation transformers secondary bushing terminals and the local utility company power, Florida Power and Light (FPL), interface. The high voltage distribution system is comprised of primarily underground duct bank and cable distribution and to a lesser extent, aerial and overhead cable distribution. KSC has two major distinct high voltage distribution areas with 115kV interfaces to FPL: (1) Launch Complex 39 (LC-39) area fed by the C5/C5A Substation and (2) Industrial Area fed by the Orsino Substation. Six additional interfaces (13.2/13.8 kV) also exist at the high

voltage distribution level with FPL. Reference the 79K17429, *KSC Power Single Line Drawing* for additional details.

2. Low Voltage Distribution: The low voltage distribution system, 600 volts and below, includes all distribution hardware and associated controls and instrumentation between the facility substation transformer secondary bushing terminals and convenience receptacles or facility-type electrical loads within the associated facility.

For assigned low voltage systems, as identified in Tech Exhibits 2.0-1, *OMEU Matrix*, and 2.0-4, *USAF Facilities OMEU*, Contractor is responsible for low voltage systems from contract effective date for all power distribution equipment and wiring between the transformer secondary bushing terminal and the facility power receptacle or the first installed power interruption device immediately preceding customer end equipment. Program (former SPOC and CAPPs) low voltage systems transitioned to the ISC in later contract years per Options 6A-6H and Options 7A-7I are identified in OMEU Tech Exhibits 2.0-2, *Former SPOC OMEU* and 2.0-3, *Former CAPPs OMEU*. For the Program low voltage systems transitioned to the ISC; the interface will change from the facility transformer secondary bushing to the facility power receptacle or first installed power interruption device immediately preceding customer end equipment.

Reference Figure 2.1.1, *KSC Power System Interfaces* for the ISC areas of responsibility for KSC power systems.

3. Lighting Systems: The lighting systems include both interior and exterior lighting systems. Interior lighting systems include all permanently installed lighting within facilities. Examples of interior lighting include office area lighting, exit sign lighting, and emergency egress lighting. Exterior lighting systems include all lighting affixed to the exteriors of facilities, and surrounding area. Examples of exterior lighting include street lighting, parking lot lighting, area and security lighting. Lighting systems for both interior and exterior include the associated wiring, switches, on/off automated controls, batteries, lamps, ballasts, and fixtures. Power is provided to lighting from the low voltage distribution system of the facility.
4. KSC Shuttle Landing Facility (SLF) Airfield Lighting System: The SLF airfield lighting system provides the required Federal Aviation Administration (FAA) lighting for air traffic at the SLF runway. The Air Field Lighting System includes the Edge Lights and Distance Remaining Markers (Edge/DRM), the Centerline Lighting, Approach and Threshold Lighting, Elevated Strobe Lights, Taxiway Lighting, and Precision Approach Path Indicator (PAPI) Lights (required for FAA, not those required for Space Shuttle). The airfield lighting system operational equipment is located in four facilities at the SLF which are: J6-2313 Landing Aids Control Building (LACB), J6-2363 Airfield Lighting Vault (ALV), K6-0261 Approach Lighting System-33 (ALS-33), and H5-2176 Approach Lighting System-15 (ALS-15).
5. Emergency Power Plant (EPP): The EPP, Facility K6-1091 is located adjacent to the C5/C5A Substation, Facility K6-1141. The 10 Mega-Watt (MW) (consisting of five 2

MW generators) EPP is designated to provide power to specific LC-39 area facilities during a utility power outage of the C5 Substation. The EPP is also a major element of KSC's participation in FPL's Commercial/Industrial Load Control (CILC) Program. The EPP contains an independent Supervisory Control and Data Acquisition (SCADA) system located at the EPP facility and also remotely interconnected at the C3 Console in Launch Control Center (LCC) Room 1P9. Reference 79K35138, *As-built Emergency Power Plant Drawing* for additional details.

6. Uninterruptible Power Supply (UPS): The UPS systems at KSC provide continuous conditioned power to critical loads sensitive to power loss and/or power fluctuations. UPS range in size from small single digit kVA units with disposable batteries to 500 kVA units with large wet cell battery banks. Each UPS is typically monitored by KCCS for current operational status.
7. Fixed Facility Generators: Emergency standby generators and ancillary components including fuel tanks, switchgear, and controls permanently installed at facilities at KSC.
8. Photovoltaic (PV) Systems: PV systems assigned to the Contractor are located at Film Storage Building, M6-0639; KSC Landfill, L7-0031; Field Mill Site #18, USAF Facility #95361; and Fiber Optic Intrusion Detection System (FOIDSs) at the LC-39 Pads.
9. Special Purpose Equipment: Includes portable generators, loadbanks, pedestal fans, tower lighting, and food processing equipment.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Perform all work on electrical systems in accordance with NFPA 70, *National Electrical Code (NEC)*.
2. Perform switching operations in accordance with MOU SFOC-GEN-005/JBOSC-MULTI-005, *Power Switching Limitation Policy at KSC/CCAFS Spaceport*, until a new agreement is established.
3. Prepare switching orders and perform associated switching activities on low voltage, and high voltage distribution required to support Contractor, other KSC contractors, and FPL maintenance, modification, and construction activities.
4. Operate the C5/C5A Substation in accordance with PPS-P-0030, *C-5/C-5A Substation Operation*.
5. In coordination with WBS 1.5.2, *Outage Coordination and Processing*, assess the collateral effects of scheduled power outages including: determining the appropriate switching configuration to minimize collateral outages, reporting which facilities and

what sections of those facilities will be impacted by the planned switching, reporting impacts to the impacted customers and integrating them into an outage request.

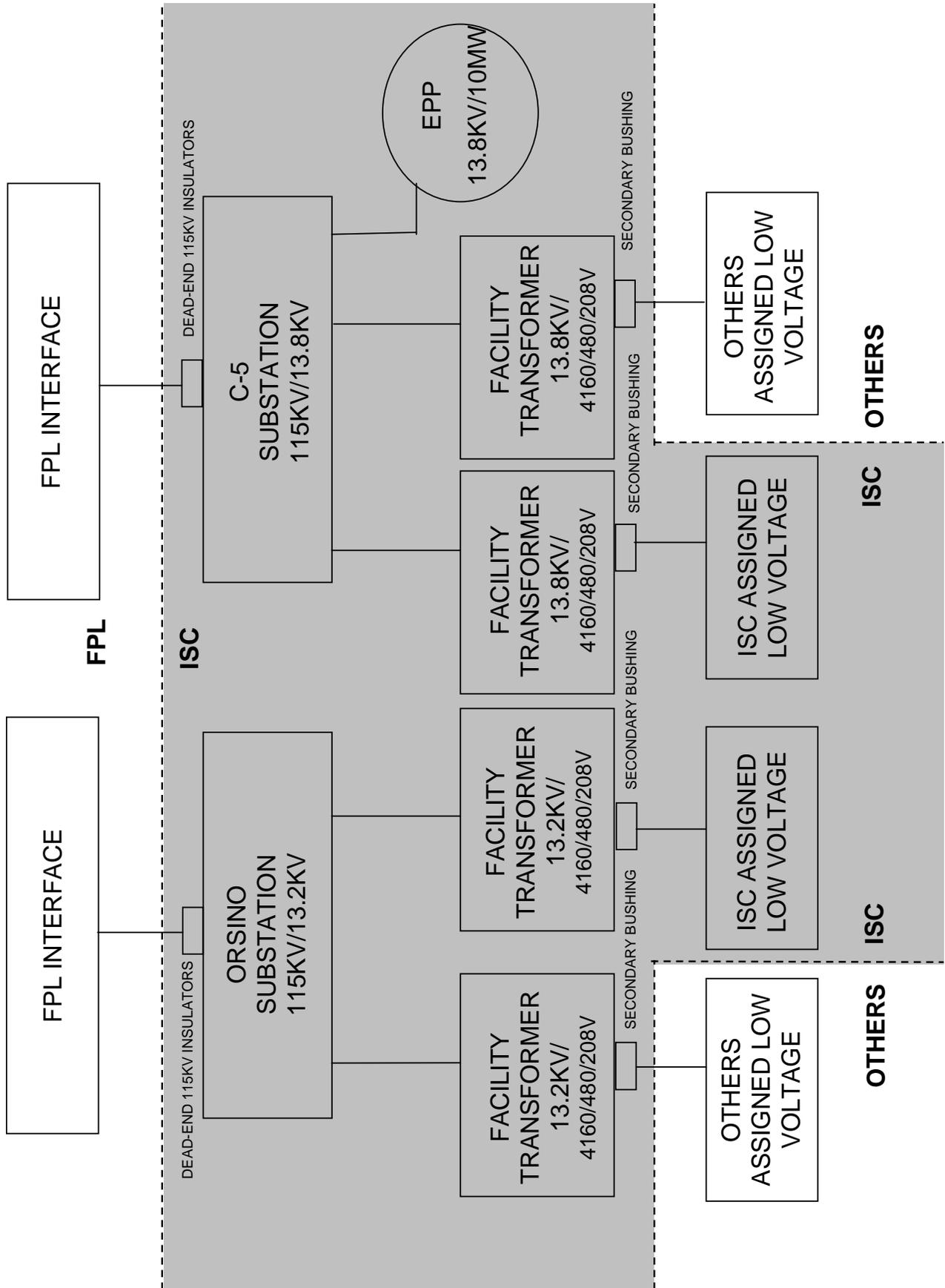
6. Respond to all unscheduled power outages on the high voltage distribution system as an ETC. Respond to unscheduled power outages on the low voltage distribution that affect availability of critical and ME FSEU or impacts facility essential services including lighting, HVAC, and fire alarms as an ETC. Restore power to affected facilities in a safe, structured, and timely manner so as to minimize further disruptions. Restoration may occur through primary power switching operations or emergency generators (fixed or mobile). Coordinate with the other KSC responsible contractor on required emergency generator support, if low voltage for the affected facility is assigned to another KSC contractor.
7. Maintain and operate mobile generators in a ready state for use. Operations include transport to/from location of use, connection, operation, fueling and switching back to utility power for KSC customers, as requested.
8. Transport, connect, and operate tower lights in support of KSC customer requests.

Note: Xenon searchlighting in support of the SSP at KSC and Transatlantic landing sites is operated and maintained by the USAF Infrastructure Operations and Maintenance Services (IOMS) contractor.

9. Maintain emergency egress lighting in accordance with NFPA 101, *Life Safety Code*.
10. Maintain electronic signs at KSC main gates, including Gate 2 (M6-1730), Gate 3 (M6-0225) and Gate 4 (H5-2145).
Note: Messages conveyed on electronic signs will be performed by others.

11. Maintain emergency power systems in accordance with NFPA 110, *Standard for Emergency and Standby Power Systems*. In addition to NFPA 110 requirements, operate the EPP and the Press Site Generators in accordance with the *Commercial/Industrial Load Control Agreement (CILC) Interconnect Agreement between FPL and NASA*.
12. Maintain UPS systems including associated battery systems. Respond to KCCS alarms or customer calls on malfunctioning UPS as an ETC.
13. Maintain and update existing Power System Analysis (PSA) on all KSC high voltage systems. Utilize the ETAP/5000 Windows by Operation Technology, Inc or equivalent capability to perform required PSAs.
 - i. Review and approve protective device coordination studies for all new and existing protective device field changes in support of maintenance, repair, and construction activities prior to electrical equipment activation. Ensure overall circuit coordination between upstream and downstream electrical devices.

- ii. Review, update and maintain the existing KSC PSA (short circuit, load flow, and protective device coordination) program. Update the KSC PSA data files as a result of maintenance, repair, or construction activities performed by Contractor or NASA-managed activities.
 - iii. Maintain and update *Power System Analysis Reports* per DRD 2.1.1-1.
14. Perform operations, maintenance and engineering on SLF Airfield Lighting System in accordance with applicable FAA regulations.
15. Provide on-site standby coverage at Central Telemetry Tel-4 Facility (USAF Facility #95151) to ensure immediate response to electrical outage conditions on launch days. A normal launch day is defined as 8 hours before launch and 1 hour after launch.
16. For USAF facilities with fixed facility generators, operate and maintain generators in accordance with AFI 32-1062, *Electrical Power Plants and Generators*, and AFI 32-1063, *Electrical Power Systems*.



2.1.2 Lightning Protection

System Description: Facilities and structures including substations, towers, antennas, masts, fuel storage tanks, metal buildings, metal sheds, and stacks at KSC have lightning protection systems. The system extends from the connection point of the earth electrode subsystem to the highest point of the lightning protection system. The components of the lightning protection system include air terminals, roof conductors, down conductors, ground rods, bonded roof-mounted metal equipment and systems, exothermically welded connections, lightning masts, all separately mounted shielding systems, overhead ground wires, grounding conductors, counterpoise, and test wells.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Perform OM&E on all assigned lightning protection systems on NASA facilities in accordance with NFPA 780, *Standard for the Installation of Lightning Protection Systems* and KSC-STD-E-0012, *KSC Grounding and Lightning Protection Standard*.
2. Perform OM&E on all assigned lightning protection systems on USAF facilities in accordance with AFI 32-1065, *Grounding Systems*.

2.1.3 Site-Specific Control Systems

System Description: Site-specific control systems include those control systems utilized for Energy Management and Control Systems (EMCS) of HVAC and lighting systems or site specific control facility processes such as those utilized for motor controls associated with facility elevators, bridge controls, lift stations, pump stations, chlorination stations, process control systems, and electrical systems including substations and generator controls. System architecture and components include microprocessor based controls referred to as Direct Digital Controls (DDCs), Programmable Logic Controllers (PLCs), Application Specific Controllers (ASCs), and associated end-item sensors (including flow, pressure, temperature, level, electrical meters) from numerous control manufacturers including Andover, Johnson Controls, Allen Bradley, Siemens, Modicon, General Electric (GE) Fanuc, Trane, Carrier, and Honeywell. Microprocessor based control systems typically have user interfaces consisting of local control panels, laptops, or workstations. In addition to micro-processor based control systems, site specific control systems include some relay-based control systems, and pneumatic controllers.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Maintain control systems to meet original design intent based on original design documentation and operational requirements.

2. Develop and maintain a current back-up electronic copy of the loaded control programs of each microprocessor based control system in EDC within one year of contract effective date.
3. Maintain a current back-up electronic copy and hard copy of the control system drawings in EDC.
4. Perform incidental software programming necessary to accomplish changes to existing loaded control programs such as facility work schedules, daylight savings time updates, or changes in operational requirements.
5. Maintain and calibrate end-item sensors in accordance with manufacturer instructions.
6. Develop and maintain DRD 2.1.3-1, *Site Specific Control Systems Inventory*.

2.1.4 Kennedy Complex Control System (KCCS)

System Description: The KCCS is a SCADA system that provides central control and monitoring of various facility power systems, utility systems and energy management systems throughout KSC. Examples of power equipment monitored and/or controlled by KCCS include substations, switchgear, automatic transfer switches, power meters, UPS units, intelligent power panels, trip units, PLCs, oxygen analyzers, protective relays, vacuum fault interrupters and generators. Examples of utilities equipment monitored and/or controlled by KCCS include HVAC units, lift stations, British Thermal Units (BTU) meters, PLCs, DDCs, ASCs, pneumatic systems, water pressure monitors, potable/waste water, Firex, and sound suppression. The KCCS system is comprised of Citect SCADA software, PLC configuration and programming software, input/output (I/O) and alarm servers, trend servers, time servers, workstations, communication cables, network switches, network cards, keyboard-video-mouse (KVM) switches, Ethernet Connection Points (ECPs), Intelligent Electronic Devices (IEDs), Field Interface Controllers (FICs), and associated end-item sensors (including flow, pressure, temperature, level, electrical meters). Reference KSC-DD-804, *KCCS Design Guide*, and 80K02209, *KCCS Network Diagram*, for additional details on the KCCS architecture.

Note: Communications cables and associated cable plant hardware upstream of the Ethernet connection point is the responsibility of the IMCS contractor.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Develop and maintain training and certification for ISC KCCS console and workstation operators and ensure certification of operators within six months of

contract effective date. Include participation in S0044, *Shuttle Final Countdown Phase Simulation*, and S0017, *Terminal Countdown Demonstration Test (TCDT)*, for each Shuttle mission as requirements for certification.

2. Operate the ISC KCCS Power Console, located in the Complex Control Center (CCC) at the LCC (K6-900), for monitoring and controlling assigned power systems 24 hours per day, 7 days a week. Initiate work order for inspection and troubleshooting of observed anomalous conditions. Serve as KSC Power Coordinator of all high voltage and assigned low voltage power distribution. Maintain system configuration of the KSC Power Mapboard displayed in the LCC (K6-900) Room 1P9 as field equipment is deleted, added or modified, and as circuit breakers and switches are opened and closed. Issue and track work permits (KSC form 26-400, *Work Permit*) for all work being performed by any KSC contractor on assigned high and low voltage distribution system.
3. For Options 6A-6H, operate the former-SPOC KCCS Power and Utility Consoles, located in the CCC, for monitoring and controlling assigned systems 24 hours per day, 7 days a week. Initiate work order for inspection and troubleshooting of observed anomalous conditions.
4. Provide operators to monitor and control all of the following assigned utility systems 24 hours per day, 7 days a week:
 - i. LC-39 HVAC and hot water measurements and commands from Utility Annex (UA) (K6-947) workstation.
 - ii. Industrial Area HVAC measurements and commands from Industrial Area Chiller Plant (IACP) (M7-407) workstation.
 - iii. Industrial Area hot water measurements and commands from Central Heat Plant (CHP) (M6-0595) workstation.
 - iv. Potable water and waste measurements and commands from Water and Waste Support Bldg (M7-0555) workstation.

Note: Other KCCS workstations exist in other locations, as specified in the OMEU Tech Exhibits, but are utilized by the Contractor and Government personnel as required.

5. Perform operations and development in accordance with MOU SFOC-JBOSC-006, *KCCS Development and Operations* until a new agreement is established.
6. Maintain and upgrade assigned KCCS hardware/software (operational and development) including patches to operating system, revisions to Citect SCADA software, revisions to PLC programming software, patches to anti-virus software, workstations, servers, printers, and monitors. Perform regression test of Citect operational software after any operating system patches to ensure continued functionality of operational software load.

7. Integrate and test modified or new software code in the KCCS development and simulation lab LCC (K6-900) Room 1P12 prior to deployment in the KCCS operational system.
8. Develop and maintain KCCS Citect code and Graphical User Interface (GUIs) as field changes occur to assigned FSEU consistent with Operating Procedure USA002432, *Application Software Development*.
9. Provide technical support for new Citect code and GUIs developed by other contractors in support of construction activities.
10. Ensure that all KCCS Citect software adheres to the standards outlined in 80K02217, *KCCS Software Architecture Standard*.
11. Compile, load, and test all modified and new Citect code and GUIs.
12. Maintain assigned KCCS Field Interface Controllers (FICs) including firmware upgrades, I/O module upgrade/replacement and central processing unit (CPU) upgrade/replacement.
13. Maintain and calibrate KCCS end-item sensors in accordance with manufacturer instructions.

2.1.5 Protective Systems

System Descriptions:

1. **Electronic Security System (ESS)**: The ESS architecture is predominantly comprised of the Lenel Enterprise System and the tactical intrusion detection system is a deployable electronic security system capable of providing intrusion detection perimeters at three sites simultaneously with each perimeter assumed to be a maximum of 6000 linear feet.
2. **Tornado Area Warning System (TAWS)**: The TAWS is predominantly comprised of Sentry Siren Model 10V sirens.
3. **Traffic Signaling System (TSS)**: The TSS is mainly comprised of PEEK Traffic controllers, VideoTrak, and malfunction management equipment.

Reference Figure 2.1.5, *ESS, TAWS and Fire Alarm System Interfaces* for the ISC areas of responsibility.

4. **Oxygen Deficiency Monitoring Systems (ODMS)**: The ODMS monitors the atmospheric oxygen (O₂) concentration level in various potentially hazardous areas at KSC. Each individual unit includes an O₂ analyzer assembly, alarm output assembly,

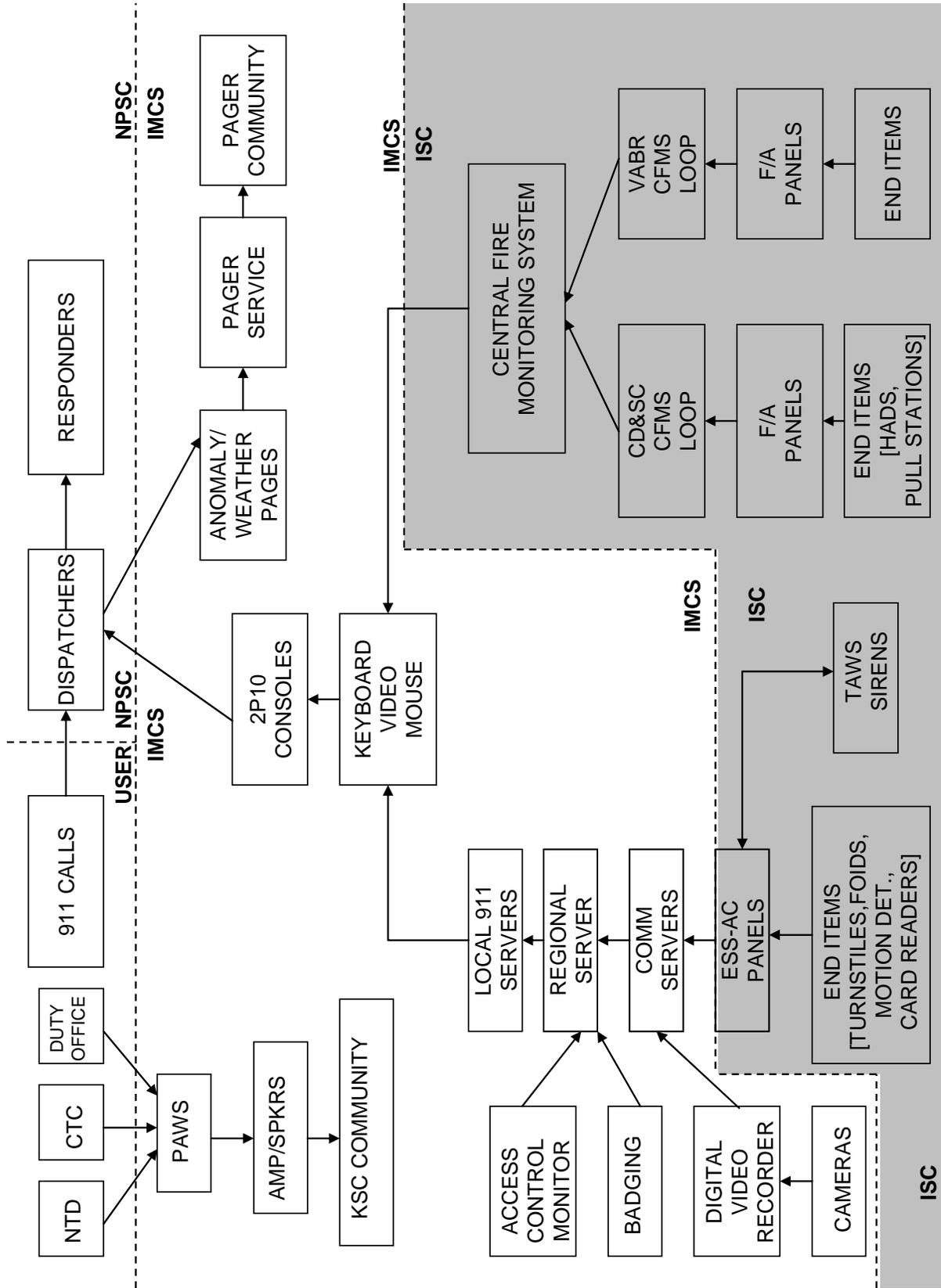
one to four sample lines, high volume air pump, red/amber beacon(s) and audible horn(s). The function of each unit is to alert personnel via beacon and/or horn to evacuate the area upon a low oxygen level or a unit failure. The area shall be secured upon unit failure to protect personnel. Each unit provides both local and remote (via KCCS) oxygen level and alarm status.

5. Area Warning Beacon System: The system is utilized to identify areas where potentially hazardous conditions exist. The system can be a standalone lighting system or can be locally or remotely controlled, typically by a 28 Vdc control system.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Perform OM&E on ESS in accordance with NFPA 731, *Installation of Electronic Premises Security Systems*.
2. Perform OM&E on TAWS in accordance with manufacturer's recommendations.
3. Perform OM&E on TSS in accordance with the Manual on Uniform Traffic Control Devices (MUTCD).
4. Respond to inoperable TSS as an ETC.
5. Ensure technicians working on TSS have an Associates Degree in Electronics with a minimum two years of relevant system specific experience or possess International Municipal Signal Association (IMSA) Level I Traffic Signal Technician Certification within one year of contract effective date.
6. For Options 6A-6H and Options 7A-7I, perform maintenance including required calibrations on ODMS units.
7. Perform maintenance on area warning beacon systems and perform operational check prior to hazardous operations.



ESS, TAWS and Fire Alarm System Interfaces

Figure 2.1.5

2.1.6 Fire Alarms

System Description: Fire Alarm systems include the CFMS, multiple vendor fire alarm control panels (FACP), and their associated end items to include all initiating devices analog and addressable types (manual pull stations, heat detectors, duct smoke detectors, spot type smoke detectors, beam smoke detection pressure switches, flow switches, low air pressure switches, tamper switches, air sampling smoke detection systems, optical flame detectors), all notification appliances (bells, strobes, speakers, voice evacuation systems), all auxiliary control devices (magnetic door holders, auxiliary relays, solenoid valves), all KSC network reporting systems software and hardware and all conduit, wiring, disconnect switches, UPS, batteries, transient surge suppressors associated with each assigned fire alarm system. The fire alarm systems are mainly comprised of Simplex model 4002, 4020, 4100, 4120 and Simplex CFMS equipment, Siemens MXL, MXL-IQ and Fire Finder and Siemens CFMS equipment and the Digitize 3500 CFMS equipment.

Communications cables and associated cable plant hardware upstream of the facility FACP is the responsibility of the IMCS contractor.

Note: The CFMS work stations will be monitored for emergency/protective services response by NPSC, 24 hours per day, 7 days a week.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Perform OM&E on all assigned fire alarm systems in accordance with NFPA 72, *National Fire Alarm Code*.
2. Ensure all Contractor modifications to NASA facilities that impact assigned fire alarm systems are performed in accordance with KSC-STD-F-0004, *Standard for Fire Protection Design*.
3. Maintain and upgrade assigned CFMS equipment including patches to operating system, revisions to central station software, workstations, servers, printers, and monitors.
4. Perform back-up electronic copies of the CFMS programs on a weekly basis and release an electronic copy monthly in EDC.
5. Perform fire alarm systems re-acceptance testing, inspections and minor repairs. To the maximum extent possible, conduct these types of activities on off-shift hours.
6. Support and witness final acceptance testing of all NASA-managed construction projects on new or modified fire alarm systems assigned to the Contractor.
7. Perform preliminary and final acceptance testing for Contractor-managed fire alarm projects in accordance with PPS-F-0005, *Fire Alarm Construction Checklist*, for

preliminary testing and PPS-F-0006, *Fire System Final Test Construction Checklist*, for final testing.

8. Develop and maintain DRD 2.1.6-1, *KSC False Alarms and Evacuations Monthly Report*.
9. Ensure technicians working on fire alarm systems have an Associates Degree in Electronics with a minimum two years of relevant system specific experience or possess National Institute for Certification of Engineering Technologies (NICET) Level II Fire Alarm Certification within one year of contract effective date.
10. Provide Shuttle launch countdown support in accordance with OMI H3005, *Shuttle Countdown (S0007)/Flight Readiness Firing (S0014)*, KSC.
11. For assigned USAF facilities, maintain all fire alarm systems in accordance with Unified Facilities Criteria (UFC) 3-600-02, *O&M: Inspection, Testing, Maintenance of Fire Protection Systems*.
12. Ensure all Contractor modifications to assigned USAF facilities are performed in accordance UFC 3-600-01, *Fire Protection Engineering for Facilities* and obtain concurrence from 45 CES Fire Chief or designated representative.
13. Coordinate with USAF regarding outages, testing and modifications to all assigned USAF facility fire alarm systems.

2.2 Mechanical

2.2.1 HVAC and Compressed Air

System Descriptions:

1. **HVAC Systems:** The HVAC system includes: two central distribution chilled water generating plants and associated above and below ground distribution piping, two high temperature water generating plants and associated distribution piping and heat exchangers, fixed and portable package boilers, and fixed and portable chillers and Direct Expansion (DX) units. The building systems include heating and cooling piping, valves, air handlers, and controls in assigned facilities. The interface point for buildings not assigned to the Contractor shall be at the first isolation valve outside of the building or the first isolation valve inside the building. The interface points between the ISC and other KSC contractors for the LC-39 area and Vehicle Assembly Building (VAB) (K6-848) are as depicted on Drawing 81K00738, Sheet M1, *HVAC and Compressed Air Piping Distribution Diagram*.
2. **Compressed Air Systems:** The compressed air system includes fixed and portable air compressors, control air compressors, compressed air distribution piping and building supply piping.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Perform OM&E of HVAC and compressed air systems in accordance with industry standard practices, unless otherwise specified.
2. Provide portable HVAC support to facilities during outages as requested by KSC customers.
3. Operate and maintain the IACP in accordance with MOU JBOSC-CAPPS-0010, *Industrial Area Heating, Ventilation, and Air Conditioning (HVAC) and Compressed Air Systems and the Space Station Processing Facility (SSPF) HVAC System Operations and Maintenance*, until a new agreement is established.
4. Operate and maintain the Utility Annex (UA) in accordance with MOU SFOC-JBOSC-017, *Operations Agreement for Launch Complex 39 Area HVAC and Compressed Air*, until a new agreement is established.
5. Provide certified onsite personnel 24 hours per day, 7 days per week to operate each of the following: UA High Temperature Water Generation Plant (K6-947), UA Chilled Water Generation Plant (K6-947), Heating Plant (M6-595), and Industrial Area Chiller Plant (M7-407).

2.2.2 Elevators/Cranes/Chairlifts

System Descriptions:

1. Elevators: Electric, traction, and hydraulic elevators are vertical transportation systems designed for the movement of personnel and freight between the various floors, or working levels of multi-story buildings.
2. Cranes: Generally, a system shall be defined as a crane if it has been so designed with the capability, not only to lift a load in the vertical axis but also to move the load along a horizontal axis.
3. Chairlifts: Chairlifts are vertical transportation systems designed for the movement of a single person in a wheel chair between the various floors or working levels. Types of chairlifts include stair lifts that ride a rail up the stairs, two-floor chairlift systems with doors and shaft, and raise floor lifts that move only a few feet.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Perform O&M on elevators in accordance with American Society of Mechanical Engineers (ASME) A17.1, *Safety Code for Elevators and Escalators*. Perform maintenance on elevator recall functions in accordance with ASME 17.1 and NFPA 72, *National Fire Alarm Code*.
2. Provide certified inspections through an independent Qualified Elevator Inspector (QEI-1) in accordance with ASME A17.2, *Guide for Inspection of Elevators, Escalators, and Moving Walks*. Post all elevator certifications in all elevator cabs.
3. Perform maintenance on all chairlift systems in accordance with ASME A18.1, *Safety Standard for Platform Lifts and Stairway Chairlifts*, and ASME A120.1, *Safety Requirements for Powered Platforms and Traveling Ladders and Gantries for Building Maintenance*.
4. Provide TCDT, launch, and landing support in accordance with IOMI A5204, *Astronaut Crew Support and Transfer*.
5. Operate, maintain and inspect cranes and hoists in compliance with:
 - i. 29 CFR Part 1910.179, *Overhead and Gantry Cranes*
 - ii. ANSI/ASME B30.2, *Overhead and Gantry Cranes*
 - iii. ANSI/ASME B30.11, *Monorail Systems and Underhung Cranes*
 - iv. ANSI/ASME B30.16, *Overhead Hoists*
 - v. NASA-STD-8719.9, *Standard for Lifting Devices and Equipment*
6. Provide personnel certification for crane and hoist operators for assigned FSEU on KSC in accordance with NASA-STD 8719.9, *Standard for Lifting Devices and Equipment*.

2.2.3 Fire Suppression

System Descriptions: Fire suppression systems include special suppression systems and gaseous suppression systems including wet pipe systems, dry pipe systems, fire pumps (diesel driven and electric driven), pre-action systems, deluge systems, standpipe systems fixed water spray systems, high speed water spray systems, KSC specific Type I, Type II and Type III manual and automatic deluge suppression systems, Carbon Dioxide (CO₂) total flood systems, Inergen total flooding systems, Novec 1230 total flooding systems, wet chemical suppression systems, dry chemical suppression, FM 200 and Halon 1301 total flooding and extended discharge systems. Fire suppression systems include the associated control systems.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, Contractor shall:

1. Perform maintenance on the CO₂ total flood systems in accordance with NFPA 12, *Carbon Dioxide Extinguishing Systems*.
2. Perform maintenance on the water-based suppression systems in accordance with NFPA 25, *Inspection, Testing and Maintenance of Water-Based Fire Protection Systems*.
3. Perform maintenance on the gaseous suppression systems in accordance with NFPA 2001, *Clean Agent Fire Extinguishing Systems*.
4. Perform maintenance on the fire pumps in accordance with NFPA 20, *Installation of Stationary Pumps for Fire Protection*.
5. Perform maintenance on the Halon 1301 systems in accordance with NFPA 12A, *Halon 1301 Fire Extinguishing Systems*.
6. Perform maintenance on the standpipe systems in accordance with NFPA 14, *Installation of Standpipe and Hose Systems*.
7. Perform maintenance on the water spray fixed systems in accordance with NFPA 15, *Water Spray Fixed Systems for Fire Protection*.
8. Perform maintenance on the dry chemical suppression systems in accordance with NFPA 17, *Dry Chemical Extinguishing Systems*.
9. Perform maintenance on the wet chemical suppression systems in accordance with NFPA 17A, *Wet Chemical Extinguishing Systems*.
10. Ensure all Contractor modifications to assigned NASA facilities are performed in accordance with KSC-STD-F-0004, *Standard for Fire Protection Design*.
11. Support and witness any construction project final acceptance testing of all new or modified fire suppression systems assigned to the Contractor.
12. Provide Shuttle launch countdown support in accordance with OMI H3005, *Shuttle Countdown (S0007)/Flight Readiness Firing (S0014)*, KSC.
13. For USAF facilities, maintain all fire suppression systems in accordance with UFC 3-600-02, *O&M: Inspection, Testing, Maintenance of Fire Protection Systems*.
14. Ensure all Contractor modifications to assigned USAF facilities are performed in accordance UFC 3-600-01, *Fire Protection Engineering for Facilities*, and obtain concurrence from 45 CES Fire Chief or designated representative.

15. Coordinate with USAF regarding outages, testing and modifications to all assigned USAF facility fire suppression systems.
16. Ensure that technicians working on special suppression systems have completed a recognized apprenticeship program as a sprinkler fitter with a minimum two years of relevant system specific experience; or possess NICET Level II Certification in Special Hazards Suppression Systems within one year of contract effective date.
17. Ensure technicians working on water-based suppression systems have completed a recognized apprenticeship program as a sprinkler fitter with a minimum two years of relevant system specific experience; or possess NICET Level II Certification in Water-Based Suppression Systems within one year of contract effective date.

2.2.4 Plumbing

System Description: The plumbing system includes all waste water collection, and potable water supply and distribution pipes, including plumbing fixtures, traps, drainage, and vent pipes, and all building drains and sump pumps including their respective joints and connections, devices, receptacles, and associated end-items within the building and typically to a point of five feet outside each building which shall include potable water piping, water heaters and heat exchangers, and vents for the same.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Upon receipt of TC on plumbing break (flowing water), overflowing plumbing fixture, loss of water pressure, or plugged waste water drain, respond to call as an ETC.
2. Perform maintenance on plumbing items including cleaning out sluggish sinks and sink traps; replacing parts including valves and traps; re-caulk various plumbing fixtures; resetting toilets, urinals, sinks, fixture stops, supply lines; repairing or replacing flush valve assemblies, continuous waste arm assemblies, auxiliary valves, pistons, diaphragms, and handles to flush valves; and flush valves; replacing shower heads and necks; replacing plumbing brass, stops, toilet seats, and water tank covers; repairing drinking fountains; and repairing hot water heaters.
3. Pump and clean grease traps in food preparation areas of assigned KSC facilities and Kennedy Space Center Visitor Center (KSCVC) concessionaire facilities.
4. Perform inspections and maintenance on water tank level sensors in the VAB (K6-848) upper floor tanks and water distribution pipes in VAB.
5. Maintain safety showers and eye wash stations per ANSI Z 358.1, *Emergency Eyewash and Showers*.

6. Maintain sump pumps to ensure that pumps remain operational and to prevent water damage to facilities or equipment. Treat malfunctioning sump pumps in rooms with electronic equipment as an ETC. Ensure sump pumps do not discharge to surface waters or stormwater conveyance systems, do not cause erosion, and no contamination of discharge water exists.

2.2.4.1 Sump Pumps previously assigned to SPOC

System Description: Approximately 120 sump pumps exist across KSC, as shown in drawing 80K60215, *USA Maintained Sump Pump Installations*. In general, the pumps are located in pits/vaults in the VAB, in manholes and tunnels along the crawlerway to Shuttle Launch Pads A & B (J7-0337 & J8-1708), in vaults and manholes at the Shuttle Launch Pads, and in pits/vaults in communication buildings K6-1193, M6-790, M6-0138, and N6-1118.

Specific Work Requirements:

For Options 6A-6H, the Contractor shall:

1. Inspect and verify operation of sump pumps protecting communications equipment in K6-1193, M6-790, M6-0138, and N6-1118 on a weekly basis.
2. Remove water on a weekly basis from tunnels and pits through which Shuttle Launch Pads A and B high flow 150 psig Gaseous Nitrogen (GN2) pipelines are routed and which do not have power (CWC-1 & CWC-2) and from valve pits 9, 10, & 11 (locations are shown on 80K60215, sheet M-6).

2.3 Structural

System Description: The structural system include the primary load bearing elements including foundation, beams, columns, and associated connections that make up a facility. In addition to the primary load bearing elements, structural systems include facility interiors and facility exteriors.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Maintain primary load bearing elements to ensure structural integrity.
2. Identify future project requirements for defective primary load bearing elements in support of project planning activities in WBS 4.2.1, *Institutional Facility Project Planning*.

2.3.1 Facility Interiors

System Description: The facility interiors system provides the architectural structure that allows KSC occupants and equipment to fully function in the performance of their duties. The system components include: computer flooring and associated support grid, floor surfaces including surface coatings, carpet tiles, floor tiles, ceiling tiles and support grid, walls, acoustical panels, handrails, steps/stairs, floors, ceilings, chair rails, cove base molding, whiteboards, bulletin boards, cabinets, countertops, interior glass windows, window treatments, interior doors, and door hardware. Locksmith services are provided by NPSC.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Identify future project requirements for defective facility interior components in support of project planning activities in WBS 4.2.1, *Institutional Facility Project Planning*.
2. Replace defective or stained ceiling tiles, identified during maintenance activities.
3. Mount whiteboards, bulletin boards, window treatments, and pictures as requested by KSC customers.
4. Abate damaged Asbestos Containing Material (ACM) identified during maintenance activities or in support of facility projects, either by repair or removal of the damaged ACM, to eliminate the potential hazard. All ACM work shall be in accordance with the requirements of 29 CFR 1926.1101, *Asbestos in Construction*; 40 CFR Subpart M, *National Emission Standard for Asbestos*; and KNPR 1840.19, *KSC Industrial Hygiene Programs, Chapter 3.3 Asbestos Management Program*. Each asbestos removal project shall be conducted under the direction of a State of Florida licensed Asbestos Consultant.
5. Perform preparation and painting of approximately 360,000 square feet per year of KSC facilities interior common areas. Identify future project requirements for interior painting in support of project planning activities in WBS 4.2.1, *Institutional Facility Project Planning*. Facilities paint color scheme shall be as directed by the Government.
6. Perform quarterly inspections and maintenance of all VAB (K6-848) debris nets and metal deck. In addition, perform inspections of VAB debris nets prior to arrival of flight hardware in associated high-bay. Remove debris and repair concrete spalls.
7. Take required corrective actions to mitigate damages caused by water intrusion to facility interior spaces consistent with guidelines identified in KSC-UG-1903, *Facilities Management Guidance for Mold Remediation*.

8. Perform personnel moves for NASA, ISC, and other institutional contractors including setting up cubicle parts and configuring furniture in support of office modification and personnel moves.
9. Preserve KSC historic properties in accordance with 36 CFR 800, *Protection of Historic Properties*.

2.3.2 Facility Exteriors

System Description: The facility exterior system provides an architectural protection from the elements and prevents the internal environment from being adversely affected. This system provides weatherproofing of the facility from rain and inclement weather. Facility exteriors typically include roofing system, exterior wall system, and penetration seals (doors, windows, vents, roof drains, etc), all exterior glass systems, windows, surface painting, window seals and frames, sheet metal siding, fasteners, other miscellaneous wall construction, parapets, associated roof hoods, roof appurtenances, and exterior power-operated, manual roll-up and personnel doors. Locksmith services are provided by NPSC.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Respond to and mitigate all facility exterior leaks as ETCs. Protect building interior, furnishings, equipment, and personnel by safely mitigating incoming water. Perform temporary repairs under wet conditions, if necessary, to protect personnel and Government property. Complete durable permanent repairs as soon as conditions allow. Note that some roofing may contain asbestos and require special handling and disposal by the Contractor in accordance with WBS 2.3.1-5, *Facility Interiors*.
2. Perform corrective actions on facility exterior components to prevent disruption to operation or prevent personnel hazard.
3. Maintain seams between window or door frames and exterior walls to a serviceable, structurally sound, water-tight, and weather-tight condition.
4. Perform preparation and painting of approximately 50,000 square feet per year of KSC facilities. Identify future project requirements for exterior painting in support of project planning activities in WBS 4.2.1, *Institutional Facility Project Planning*. Facilities paint color scheme shall be as directed by the Government.
5. Preserve KSC historic properties in accordance 36 CFR 800, *Protection of Historic Properties*.

2.3.3 Towers

System Description: Structural system including foundation, anchors, guy wires, and obstruction tower lighting for supporting elevated water storage tanks, observation posts, weather towers, lightning protection system, and communications equipment.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Inspect assigned towers every three years utilizing experienced personnel. Report to the Government any findings and recommendations of required maintenance and repairs.
2. Perform OM&E on towers consistent with ANSI/Electronics Industries Association (EIA)/Telecommunications Industry Association (TIA) 222-G, *Structural Standards for Steel Antenna Towers*.

2.3.4 Bridges

System Description: The following bridges are part of the KSC Infrastructure: Indian River Bridge (State Road (SR) 405 eastbound and westbound, also known as Addison Point Bridge) over the Indian River, NASA Parkway overpass highway bridge (eastbound and westbound) over Kennedy Parkway, Roy D. Bridges Bridge (Banana River Bridge), Banana River Relief Bridge, Haulover Canal Bridge, and Jay Jay Railroad Bridge. Bridge systems include fixed and movable portions of bridges.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Maintain bridges in conformance with all applicable Federal, State, and Local laws, regulations, policies and directives.
2. Perform safety inspections of each KSC bridge every two years in conformance with Florida Statute 335.074, *Safety Inspection of Bridge*. Inspect both above water and subsurface aspects, including superstructure and scour.
3. Develop and maintain DRD 2.3.4-1, *Bridge Inspections Report*, for each of the KSC bridges.
4. Implement corrective actions on deteriorated or deficient bridge components identified in the bridge inspection report. Prioritize, plan, implement, and track maintenance items through completion.
5. Respond to inoperable bridges as an ETC.

6. Establish controls to preclude exceeding bridge loading capacity. Maintain signage in compliance with all applicable Federal, State, and Local laws, regulations, policies and directives. Perform engineering to analyze and make recommendations for transportation configurations on bridge structure.
7. Perform operations on KSC bridges in accordance with U.S. Code of Regulations 117.261, *Bridge Regulations*; OMI Q3903, *Haulover Canal Bridge, Operating Instructions*; OMI Q3905, *Indian River Bridge, Operating Instructions*; and OMI Q3906, *Banana River Bridge, Operating Instructions*.
8. Perform KSC bridge operations to meet the following requirements:
 - i. Operate the Indian River Bridge and the Haulover Canal Bridge, 24 hours a day, 7 days a week. At any time that the bridge is not operational and impacts the Intracoastal Waterway Traffic, immediately notify NASA and the U.S. Coast Guard in Miami, Florida.
 - ii. Document bridge openings/closings on KSC Form 28-1061 NS, *Report of Drawbridge Openings Kennedy Space Center*, for the Indian River Bridge and the Haulover Canal Bridge. Report shall be made available to the Government upon request.
 - iii. Operate the Roy D. Bridges Bridge upon request through the Contractor's WCC.

2.4 Civil

2.4.1 Potable Water

System Description: The potable water system consists of, but is not limited to, distribution piping from the KSC property line to typically the 5-foot building line and the 16-inch water supply line which interfaces at NASA Causeway East, and the 10-inch water supply line between Space Launch Complex 41 and Pad A, fire hydrants, elevated storage tanks, booster pumps, and water treatment system.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Provide a certified operator licensed in accordance with Florida Administrative Code (FAC) Chapter 62-602, *Water or Domestic Wastewater Treatment Plant Operators and Distribution System Operators*.
2. Perform OM&E on the KSC potable water treatment and distribution system in accordance with UTI-P-0004, *JBOSC Water Treatment Plant Operations Plan*, the requirements set forth by the Florida Department of Environmental Protection (FDEP), and the KSC Consumptive Use Permit # 50054. Obtain or renew all permits or similar documentation through the NASA Environmental Program Branch, as

required by Federal, State or County agencies for the O&M of the water systems at KSC.

3. Maintain potable water booster pumps within assigned KSC facilities including the VAB Utility Annex (K6-0947), SSPF (M7-0360), Operations Support Building (OSB)-1 (K6-1096), OSB-2 (K6-1249), and Air Traffic Control Tower (J5-1197).
4. Report system anomalies such as line breaks and system outages to NASA and FDEP within 24 hours of identification.
5. Provide notification to NASA and FDEP on the status of the potable water system following any severe weather events including hurricanes and tropical storms.
6. Notify NASA and USAF, as applicable, immediately upon discovery of any sabotage, abnormal operating condition or off-nominal circumstance in accordance with FAC Rule 62-555.350 (10), *Operation and Maintenance of Public Water Systems*.
7. Maintain all fire hydrants connected to the KSC potable water distribution system in accordance with NFPA 20, *Installation of Stationary Pumps for Fire Protection*, and NFPA 25, *Inspection, Testing and Maintenance of Water Based Fire Protection Systems*.
8. Maintain Limited Use Water Wells in accordance with FAC Rule Chapter 64E-8, *Drinking Water Systems*. Perform monthly water meter readings and maintain meter reading reports of KSC water service meters and limited use well meters.
9. Maintain backflow preventers on all assigned facilities.
10. Perform monthly microbiological compliance samples on water systems utilizing FDEP Standard Operating Procedures to assure system is within State and Federal requirements. Samples shall be taken by operator licensed in accordance with FAC Rule Chapter 62-602 or by persons under the direct supervision of a licensed operator. Provide completed monthly operating reports and quarterly disinfectant residual reports to the NASA Environmental Program Branch by the fifth of every reporting month. NASA will submit the required forms to FDEP.

Note: The MESC will provide analysis of microbiological samples to the ISC upon request. The MESC will be responsible for all other chemical and microbiological samples and analysis on water systems to assure compliance with State and Federal requirements.

11. Monitor potable water measurements and alarms on the KCCS workstation located in M7-0555, Water and Waste Support Building and take appropriate corrective actions as required.
12. Maintain backflow preventers in accordance with AFI 32-1067, *Water Systems*, Paragraphs 4.3, 12.1, and AFI 32-1066, *Plumbing Systems*, Section C for Central Telemetry Tel 4 Facility (USAF Facility #95151). Maintain documentation of all

testing of the backflow prevention devices at the Central Telemetry Tel 4 Facility and the Central Telemetry Tel 4 Sewage Pumping Station (USAF Facility # 95149).

2.4.2 Wastewater Collection and Treatment

System Description: The wastewater collection and treatment system safely collects, treats, and disposes of the wastewater streams from KSC. Wastewater is collected via facility plumbing, flows by gravity mains to lift stations that pump the wastewater through force mains to the Regional Wastewater Treatment Facility (RWWTF) on CCAFS. The KSC Wastewater Collection and Treatment system consists of approximately 46 miles of sewer mains, 73 lift stations, 25 septic systems, one package sewage treatment plant (STP), and four pre-treatment facilities. KSC STPs #1, #4, #5, and #6 were converted to high-capacity lift stations that pump wastewater to the RWWTF.

Note: The RWWTF is operated and maintained by the IOMS contractor.

STP #3 is a package STP located at Central Telemetry Facility Tel 4.

The four KSC pre-treatment facilities consist of the following:

- i. Propellant Waste Tank Farm (PWTF), M6-946. Provides pre-treatment for oxidizer (Nitrogen Tetroxide) waste rinsates and waste scrubber solutions. An automated pH controller allows acid and hydroxide buffers to be added to solutions to derive a balanced pH level between 7.0 and 8.0.
- ii. RAYOX Facility, M6-897. Provides pre-treatment of hydrazine rinsates into nitrate and reduces hydrazine levels to fifty parts per million, an acceptable level for intake into the wastewater system.
- iii. Heavy Equipment Wash Facility, M6-534. Provides pre-treatment of wash water for heavy equipment, such as fire trucks, tractors, and forklifts that functions similar to a carwash recycle system. Using absorbent material, the system separates oil and grease from wash water.
- iv. Grease Pre-treatment at STP #4. Provides pre-treatment of grease from grease-traps throughout KSC by breaking it down before it is mixed into the wastewater collection system.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Operate and maintain all KSC wastewater collection and treatment systems in accordance with the requirements set forth by the FDEP. Obtain or renew all permits or similar documentation through the NASA Environmental Program Branch, as required by Federal, State or County agencies for the O&M of the waste water collection systems at KSC.

2. Respond to waste water spill or leak as an ETC.
3. Notify NASA and the USAF IOMS contractor (operator of waste water treatment plant) within 90 minutes of all domestic waste water malfunctions that may create environmental compliance issues or can adversely affect the operation of the CCAFS waste water treatment plant or disrupt operations at KSC.
4. Monitor the waste water measurements and alarms on the KCCS workstation located in M7-0555, Water and Waste Support Building; and monitor workstations located in STP #1 and #4 and take appropriate corrective actions as required.
5. Perform OM&E for all KSC waste water collection systems in accordance with the FDEP requirements set forth in FAC Rule Chapter 62-604, *Collection Systems and Transmission Facilities*.
6. Comply with the latest requirements of FLA010287, *The Central Telemetry Facility Tel 4 STP #3 (USAF Facility #95149) permit*.
7. Operate and maintain sewage system (treatment/disposal units, sewer lines/force mains, lift stations and all associated equipment) at the Tel 4 installation in accordance with permit and wastewater regulations.

2.4.3 Storm Water

System Description: The storm water retention systems consist of ditches, weirs, headwalls and other drainage structures throughout KSC and three diesel pumps. These pumps provide control of water levels on KSC during extreme periods of rain. KSC has 360 miles of ditch centerlines.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Operate and maintain all KSC storm water retention systems in accordance with the St. Johns River Water Management District (SJRWMD) requirements set forth in FAC Rule Chapter 40C-4, *Environmental Resource Permits: Surface Water Management Systems*.
2. Perform system inspections and Professional Engineer certifications of compliance every two years for KSC storm water retention systems. Report the results of inspections and certifications to NASA Environmental Program Branch.
3. Maintain and repair storm water drainage systems including roadway and street drainage retention areas, main outfall drainage canals, culverts, storm drains, gutters, dykes, concrete curbs, weirs and headwall structures, flumes, spillways, holding ponds, and ground cover on banks and flow lines for continued efficient operation.

4. Perform annual assessment of all KSC ditches and culverts to ensure proper operation and determine necessary maintenance. Perform maintenance cleaning of up to 50 miles ditches and culverts per year. As required, remove any debris from ditches impeding the flow of water.

Note: Grounds Maintenance Contract will provide herbicide treatment of ditches at KSC.

5. Maintain all inlets, headwalls and culverts clear at all times to allow adequate drainage. Maintain all open water drainage systems protected from erosion.
6. Operate and maintain the two diesel pumps on west Ransom Road and the diesel pump on west Schwartz Road to prevent flooding on KSC.

2.4.4 Roads, Paved Surfaces, Waterways, and Related Services

System Description: KSC has approximately 160 miles of paved roads, and 34 miles of unimproved roadway, in addition to parking lots, sidewalks, and concrete paved areas for aircraft operations. KSC has approximately 18 miles of waterways (i.e. Saturn Channel) utilized for delivery and recovery of spacecraft flight hardware. The Saturn Channel begins at a point just west of the Port Canaveral Lock on the Banana River portion of the Indian River/Port Canaveral Barge Canal (at the centerline) and proceeds northerly in the Banana River, having terminals at the LC-39 Unloading Facility and Hangar AF. The Saturn Channel has been dredged to a design depth of 12 feet below mean low water and is 125 feet wide at this depth.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Maintain the SLF runway, taxiway, tarmac, and tow way from the SLF to the Orbiter Processing Facility (OPF) (K6-894), and the VAB, (K6-848). Sweep, vacuum, and maintain the concrete SLF runway and parking aprons as required for maintaining the runway and parking aprons free of foreign object debris.
2. Inspect SLF runway in accordance with FAA regulations on a bi-annual basis. Report findings and recommendations of required maintenance and repairs to the Government.
3. For Options 6A-6H, perform maintenance on the LC-39 crawlerway including addition of rock, controlling of weeds, raking, and grading.
4. For Options 6A-6H, perform annual hydrographic waterway surveys of Saturn Channels consistent with Operating Procedure USA003365, *Waterway Surveys*, to ensure proper depths are maintained.

5. For Options 6A-6H, develop and maintain DRD 2.4.4-1, *Saturn Channel Waterway Surveys Report*.
6. For Options 6A-6H, perform maintenance dredging (approximately 120,000 cubic yards) of the entire Saturn southern channel (south of NASA Causeway) on a routine maintenance schedule of no less than once every 5 years. Perform maintenance dredging (approximately 280,000 cubic yards) of the entire Saturn northern channel (north of NASA Causeway to VAB) on a routine maintenance schedule of no less than once every 10 years. Dredging of smaller areas of concern in Saturn channels shall be performed on a more frequent basis to maintain design depths as identified by annual hydrographic surveys.
7. For Options 6A-6H, maintain the three spoil disposal sites located at KSC in a condition that allows for their continued use throughout the contract.
8. Maintain and repair unimproved roads, parking lots, storage areas, and power substations. Stockpile marl, shell, and other material at the Roads and Ground Maintenance Shop (K6-2196) or KSC borrow pit. Grade potholes, ruts, and maintain proper slope for drainage. Remove sand pockets that occur in these roads and stabilize these areas with the proper material.
9. Maintain and repair paved roads and parking lots. Repair shoulders, road edge ruts, slopes, potholes, turnouts, and pavement settlements at various areas of KSC.
10. Identify future project requirements for repairing existing pavements in support of project planning activities in WBS 4.2.1, *Institutional Facility Project Planning*.
11. Install and maintain traffic control road signs and barricades.
12. Install all signs in compliance with the Florida Department of Transportation (FDOT) manual.
13. Provide road and parking lot striping in accordance with FDOT.
14. Grade and replenish all sand areas and ensure sidewalks are clean and free of debris at the Pad A and B slide wire bunker areas for launch, test, or training exercises.
15. Remove debris following launches at Pad A and B in grassed areas, paved areas, and fenced areas, excluding the Pad apron and surface.
16. Remove all broken wood and pallets from the vicinity of dumpsters on KSC and deliver to a designated area that will allow for recycling.
17. Set-up and remove rope, stanchion, and trash barrels at all launch and landing viewing sites, as requested by NASA, including Banana Creek Viewing site, Banana River Viewing site, Turn Basin Viewing site, SLF Midfield Viewing Site, OSB-2 Viewing site, KARS Park 1 Viewing Site, and Gates 2, 3, 4TT and 6TT. Other sites

can be designated as required by NASA. Maintain an adequate supply of sandbags to stabilize stanchions and barrels.

18. Provide grounds support to KSC customers as requested including digging, soil removal and replacement, hauling material, and preparing work sites.
19. Empty and dispose cigarette debris in and around smoke receptacles located around the facilities of KSC as required to prevent overflow.
20. Provide road surveillance starting at 0900, of all KSC roads in search of animal carcasses during week days and all Shuttle launch countdown and landing days. Remove and dispose of all animal carcasses and roadway trash on KSC roads and shoulders. Double-bag and place the animal carcasses in designated dumpsters.

2.4.5 Fences and Gates

System Description: KSC has approximately 60 miles of fences and gates. The system components include fixed security bollards and associated chains, security staple bollards, chain link fencing, mounting and support hardware, barbed wire and all components associated with the operation of gates including locking mechanisms and automated operating mechanisms. Locksmith services are provided by NPSC.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Inspect and repair all fencing at LC-39 Pad A and B perimeter following every launch.
2. Repair all fencing and gates at KSC, as required to maintain integrity.

2.4.6 Landfill

System Description: KSC has an operating landfill and a closed landfill. The operating landfill is a Class III construction and demolition debris landfill that does not have a liner; therefore, no Class I or Class II type materials are allowed. The closed landfill is adjacent to the operating landfill.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Operate and maintain the KSC operating landfill in accordance with SO05-0150308-004, *KSC/Schwartz Road Landfill – Class III Permit*, and SO05-0150308-004, *Environmental Operating Permit, the Landfill Operating Plan*.

2. Provide FDEP certified operators and technicians during normal operating hours, first shift Monday - Friday. Maintain records of all materials that enter the landfill for disposal or diversion to the Diverted Aggregate Recycling and Collection Yard (DARCY). Comply with state permit requirements. Witness all tipping and sign off on manifests as appropriate. Visually check all vehicles that enter the landfill to ensure permit compliance.
3. Maintain the landfill to comply with FDEP permit and ensure maximum design life. Maintain the roads in and around the landfill in a usable state free of ruts, potholes, and wash-outs. Ensure adequate cover material is stored at the landfill. Cover non-friable asbestos cell on a daily basis.
4. Maintain the drainage system in and around the landfill.
5. Operate and maintain landfill weigh station, scales and grounds. Calibrate scales semiannually and document calibration.
6. Verify that the contents of each load contain only allowable materials in accordance with SO05-0150308-004, *KSC/Schwartz Road Landfill – Class III Permit*, and SO05-0150308-004, *Environmental Operating Permit, the Landfill Operating Plan*. Although the *Environmental Operating Permit* allows for asbestos, ensure that only non-friable asbestos is allowed.
7. Manage the diversion of recyclable wood products (including pallets, vegetation from land clearing operations, and other wood material) to a designated area in the landfill. Mulch this material as to optimize costs and landfill operations. Mulched material shall be mixed with cover material to a ratio not to exceed 50%. Maintain records of the amounts of material diverted, mulched and used as cover.
8. Manage the KSC DARCY adjacent to the KSC Landfill (10 acres). Weigh incoming and outgoing concrete material, direct incoming loads of segregated concrete to the DARCY, manage the concrete pile and maintain the area including stormwater controls.
9. Operate and maintain the KSC closed landfill in accordance with SF05-0150308-005, *KSC/Schwartz Road Landfill – Class III – Closure Permit*.

2.4.7 Borrow Pits

System Description: KSC has an operational borrow pit on the southern half of KSC located at the west end of Jerome Road, off of State Road 3 south.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Maintain control of the permitted area and coordinate the usage of the borrow pits by outside contractors as authorized by NASA.
2. Maintain water levels at all times to prevent unnecessary runoff.
3. Maintain the access roads in and around the borrow pit area in a usable state free of ruts, potholes, and wash-outs.
4. Secure the gates to the borrow pit with locks at all times when the borrow pit is not in use.

2.4.8 Sound Suppression Water System previously assigned to SPOC

System Description: LC-39 Launch Pads A and B each have a special purpose Sound Suppression Water System, which is used during launches to reduce the magnitude of the ignition overpressure transient when the Solid Rocket Boosters (SRBs) are ignited, and to provide continuing reduction of acoustics reflected from the Mobile Launcher Platform (MLP) back toward the launch vehicle during ascent. When in use, the system provides high volume water flows to the MLP and main flame deflector (MFD) to provide acoustic and ignition overpressure reduction. The system consists of an elevated water tank (approx 300,000 gallons), a 114-inch diameter elevated tank riser, six main control valves (48-inch pneumatically-operated butterfly valves), and distribution piping (two 84-inch diameter main lines supply the pad, MLP, and MFD). There are no pumps in the system - water flows due to gravity only from the elevated water tank. This tank shall be maintained in a dry configuration and only filled with water immediately prior to a launch or as a preparation for an approaching hurricane. The Pad Firex pumping system is utilized for filling the elevated water tanks.

Specific Work Requirements:

For Options 6A-6H, in addition to the general work requirements listed in 2.0, the Contractor shall:

1. Maintain the structure of the elevated tank in accordance with American Water Works Association (AWWA) requirements for Elevated Tanks for Water Storage and the requirements for elevated water tanks in WBS 2.3.3, *Towers*.
2. Perform corrosion control and maintenance on the Sound Suppression Water System piping and other components as necessary to maintain the system in a configuration that preserves the system intact for potential future use.
3. Prepare the Sound Suppression Water System for an approaching hurricane, including filling the Sound Suppression elevated tank at LC-39 Launch Pads A and B.
4. Perform operations, maintenance, and engineering of the Sound Suppression Water System in support of the Constellation Program. In support of this effort, develop, document, and perform O&M processes/procedures, working with contractor and

Government representatives of the Constellation program. During development of processes/procedures, refer to the documentation developed for the SSP when such documentation is applicable for the Constellation Program.

2.4.9 Pad Holding Pond System and Pad Environmental Function previously assigned to SPOC

System Description: LC-39 Launch Pads A and B (J7-0337 & J8-1708) each have a holding pond system that collects the Sound Suppression and Pad washdown water. The holding pond system consists of two in-ground concrete tanks (with liners). A concrete flume leads from the pad surface and slopes to each tank. Each flume has a diversion gate that can be configured so that rainwater falling on the pad can be diverted away from the holding ponds. Contaminated water is treated to bring the pH to neutral, and the water is then pumped to percolation ponds at the launch pad. The percolation ponds are grassy bermed areas that have been permitted by the FDEP as an area where water from the holding ponds can be pumped and allowed to seep into the ground. The water is not allowed to directly enter surface waters.

The pad environmental function encompasses the O&M of the pad percolation ponds, stormwater management systems, stormwater management valves located in ditches at pad perimeter, and environmental clean-up related to any potentially contaminated soil that may be disturbed as part of these O&M activities.

Specific Work Requirements:

For Options 6A-6H, in addition to the general work requirements listed in 2.0, the Contractor shall:

1. Maintain, and renew as required, Pad A and Pad B Industrial Wastewater facility permits associated with the Pad A and Pad B Holding Pond System.
2. Perform O&M of the Pad A and Pad B Holding Pond System consistent with Operating Procedure USA004794, *Industrial Wastewater Requirements*.
3. Inspect the liners in the holding ponds annually. Perform repairs to any holes, tears, or other defects found in the liners upon identification.

2.5 Special Purpose and Heavy Equipment

System Description: KSC has numerous items of special purpose and heavy equipment identified in Tech Exhibit 2.0-5, *Special Purpose and Heavy Equipment List*, Tech Exhibit 2.0-6, *Former SPOC Special Purpose and Heavy Equipment List*, and Tech Exhibit 2.0-7, *Former CAPPs Special Purpose and Heavy Equipment List*. Heavy equipment includes cranes, high-rangers, forklifts, sweepers, and other items maintained and operated by the ISC for performance of contract services.

Some heavy equipment items, including fire trucks, boats, and geo-probe sampling machines, are maintained by the Contractor, operated by others and are Government Furnished Property on other NASA contracts.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Provide heavy equipment support for Contractor O&M responsibilities as well as other KSC contractors for payload offloads and transportation within KSC, and other KSC contractors for post-emergency spill response.
2. Provide slings, lifting assemblies, and specialized handling fixtures in support of heavy equipment operations. Maintain and proof load as required slings, lifting assemblies, specialized handling fixtures, and lifting equipment that are man-rated or rated as critical or ME.
3. Maintain and repair all assigned heavy equipment and specialized vehicles, including those operated by other contractors.
4. Provide operators and riggers for cranes, high-rangers, forklifts, and other equipment in support of assigned activities.
5. Maintain the Government furnished test weights, slings, and pallets of various sizes, for load testing cranes and hoists as shown in Tech Exhibit 2.5-2, *Heavy Equipment Test Weights and Slings*. Test weights shall be shared with other KSC contractors on a non-interference basis.
6. Provide Government-owned heavy equipment to other KSC and CCAFS contractors or other Government agencies on an as-available non-interference short term basis.
7. Provide required personnel certification for Contractor operators and other KSC operators that borrow equipment, in accordance with KNPD 8719.9, *Examination and Licensing of KSC Operators of Special Heavy Equipment, Facility Cranes or Hoists*, and NASA-STD-8719.9, *Standard for Lifting Devices and Equipment*.

2.6 Painting and Corrosion Control

System Description: Includes FSEU painting, cleaning, abrasive blasting and protective coating services, as well as cathodic protection systems maintenance.

Specific Work Requirements:

In addition to the general work requirements listed in 2.0, the Contractor shall:

1. Develop and implement a corrosion prevention and control program and incorporate it into the *Maintenance Plan*, DRD 2.0-1. This program shall include corrosion control inspections of critical and ME infrastructure including electrical distribution

equipment, towers, pipelines, water and fuel tanks, and cathodic protection systems consistent with UFC 3-570-06 *Operation and Maintenance: Cathodic Protection Systems, Chapter 4 Preventive Maintenance*.

2. Perform all corrosion-control work in accordance with NASA-STD-5008, *Protective Coating of Carbon Steel, Stainless Steel, and Aluminum on Launch Structures, Facilities, and Ground Support Equipment*.
3. Provide abrasive blasting and protective coating services for assigned FSEU and equipment transported to the corrosion control area (M6-1623 through M6-1628) and as requested by any other KSC customer. Perform abrasive blasting and spray painting services in accordance with MOU SFOC-JBOSC-024, *Corrosion Control Services KSC* until a new agreement can be established.
4. Repair or remove hazardous paints and other surface coatings that contain lead, cadmium, chromium, Polychlorinated Biphenyls (PCBs), or other hazardous materials in support of facility projects. All work shall be compliant with the requirements within those applicable portions of 29 CFR 1910 *General Industry*, 29 CFR 1926 *Construction*, and KNPR 1840.19, *KSC Industrial Hygiene Programs, Chapter 3.4 Corrosion Control Operation*.
5. Perform all protective coating services under the supervision of a National Association of Corrosion Engineers (NACE) Certified Coating Inspector - Level 3.
6. Provide scaffolding support including the set-up, erection, OSHA required "competent person" inspections, and dismantling of scaffolding to KSC customers, as requested.
7. Provide fabrication of signs and banners to KSC customers, as requested.

3.0 Propellants and Life Support

General Work Requirements:

The Contractor shall:

1. Provide propellant and life support services, and manage and provide propellants and related resources for KSC, CCAFS, PAFB and local-area commercial spacecraft processing facilities.
2. Operate, maintain and provide engineering for the assigned FSEU identified in Tech Exhibit 2.0-1, *OMEU Matrix*. Develop, document and implement process procedures and controls for operations, maintenance, engineering, and anomaly resolution. Operate, maintain and provide engineering for the assigned FSEU identified in Tech Exhibit 2.0-2, *Former SPOC OMEU* and 2.0-3, *Former CAPPS OMEU* for Options 6A-6H and Options 7A-7I respectively.

3. Establish and maintain an ongoing maintenance, refurbishment, and overhaul program that ensures the safety and operational readiness of propellants and life support FSEU.
4. Maintain propellants and life support FSEU in accordance with existing OMIs and Job Plans. Obtain NASA approval in advance, through electronic means, for any changes to existing OMI and Job Plan requirements that reduce the level of maintenance, to include lessening the frequency or rescheduling past the due date. A list of existing operations and maintenance OMIs is presented in Tech Exhibit 3.0-1, *Propellants and Life Support OMIs*. Lists of OMIs and job plans for Options 6A-6H and Options 7A-7I are presented in Tech Exhibit 2.0-10, *Former SPOC OMIs and PM Job Plans*; and Tech Exhibit 2.0-11, *Former CAPPs PM Job Plans*.
5. Ensure preservation of working-level system engineering documentation related to the development phase, regulatory compliance, configuration, operational characteristics, anomalies, informal studies/results, and manufacturer's literature for all assigned FSEU.
6. Provide in-depth evaluations, studies and development of design criteria for changes or additions to the assigned FSEU, accommodations to changes in use, enhancements in safety and reliability, efficiency or improvements in maintainability.
7. Ensure all personnel, propellants, and FSEU are certified and available to support program requirements for mission processing activities, mission milestones, launches, and associated IOMIs. Provide on-site standby coverage for applicable critical and ME systems during mission milestones as identified in Table 1.6-1, *SSP Milestones*.
8. Provide and present DRD 3.0-1, *Propellants and Life Support System Level Review* to NASA.
9. Provide planning support for new programs at KSC and CCAFS and provide assessments of support capability including impacts to existing FSEU and supply systems. Make recommendations on how to support new program requirements without impacting existing programs and customers.
10. Provide technical expertise, engineering, training, loaned equipment and supporting operations for unique capabilities in hypergolic propellant handling and/or life support to other NASA centers and Government agencies as directed by NASA.
11. Monitor the status and condition of equipment on loan to other NASA centers and Government agencies.
12. Manage and update the data in the Kennedy Mobile Equipment Database (KMED), a Government-provided, web-based database for propellants and life support capabilities. The database contains equipment descriptions, inventory, operating characteristics and other descriptive/illustrative information.

13. Develop and maintain DRD 3.0-2, *Propellants and Life Support Equipment Utilization and Optimization Plan*.

3.1 Propellants Management

Specific Work Requirements:

In addition to the general work requirements listed in 3.0, the Contractor shall:

1. Provide planning, scheduling, acquisition (in accordance with Tech Exhibit 3.1-1, *Types of Propellants*), engineering, storage and distribution for propellants to KSC, CCAFS and PAFB customers including those propellants obtained from other Government agencies.
2. Serve as the POC for propellant ordering information including pricing, available containers, and commodity specifications. Communicate future requirements to the supply vendors with sufficient advanced notice to produce and deliver the required fluids on time.
3. Serve as the on-site manager of the Defense Energy Support Center (DESC) Defense Fuels Storage Point (DFSP) and provide controlled storage functions to include receiving, storing, issuing, reporting, forecasting, and accounting for propellants, oxidizers, pressurants, and other related DESC-owned inventory. Serve as the POC between designated supply vendors and various customers. The POC shall interface with supply vendors, customers, NASA and DESC to place orders and coordinate deliveries.
4. Establish, implement and maintain a process to collect and consolidate near-term customer requirements, and identify requirements and coordinate all deliveries with the respective supply vendors.
5. Collect and update forecasts/requirements, consumption data, and cost information for major propellants (helium, hydrogen, hypergols, nitrogen, oxygen, and solvents). Periodically review forecasted vs. actual consumption and adjust propellant models for improved accuracy of future projections.
6. Inspect vendor deliveries for Government-procured, direct-delivery propellants. Document pre- and post-shipment anomalies involving vendor and Government provided equipment to the equipment owners and NASA. Determine and implement corrective actions and track related issues until closure.
7. Validate propellant billings for Government and Contractor procured propellants within 14 days of invoice receipt and process all acquisition, receipt, and inventory documents.
8. Analyze sole source propellant supply situations, perform risk assessments and recommend mitigations.

9. Maintain, control, and inventory aerospace fuels including commodity sampling and implementing procedures to ensure contamination control and product integrity. Implement a product integrity program to ensure that commodities issued meet customer specifications.
10. Manage the GN2 and Gaseous Helium (GHe) pipeline systems and coordinate test and contingency support with the customers and the GN2 vendor production facility. Notify the GN2 vendor in writing of major tests and launch requirements a minimum of seven days prior to each event specifying dates, times, flowrates, and pressure requirements. Update as required and review annually PRO-P-0015, *KSC/CCAFS GN2 Pipeline Contingency Support Agreement for Space Transportation System (STS) Launches*. Update as required and review annually PRO-P-0022, *NASA/JBOSC and Air Liquide Interface Agreement*.
11. Provide requirements and technical procurement information to NASA and DESC for establishing propellant contracts.
12. Use NASA, Military, or other referenced specifications for fluid procurements and use.
13. Provide life-cycle engineering for propellant logistics. Develop, recommend, and implement reliable and cost-effective support procedures and methodologies for current and future programs. Evaluate “make vs. buy” options for efficiency/cost reduction. Perform market research; monitor current and new technologies; perform engineering trade studies for propellant production, transportation, and storage; and recommend changes in existing processes to improve efficiencies and/or reliability.
14. Maintain and update the existing *Fluids Handbook* per DRD 3.1-1.
15. Maintain and update the existing *Launch Support Plans* per DRD 3.1-2.
16. Maintain and update the existing *KSC/CCAFS Propellants/Pressurants Sampling Plan* per DRD 3.1-3.
17. Maintain and update the existing *GN2 and GHe Contingency Plans for Launch Complex 39* per DRD 3.1-4
18. Provide DRD 3.1-5, *DESC Reports*.
19. Provide DRD 3.1-6, *Three Year Propellants Forecast Report*.
20. Provide DRD 3.1-7, *Propellant Cost Estimate Reports and Cost Tracking Reports*.
21. Develop and maintain DRD 3.1-8, *Propellants and Pressurants Master Plan*.

3.2 Propellants Operations, Maintenance and Engineering

Specific Work Requirements:

In addition to the general work requirements listed in 3.0, the Contractor shall:

1. Operate and maintain specialized propellants facilities, fixed and mobile equipment and associated testing and servicing systems. Provide propellants and propellants services to NASA Programs and all Government and commercial ELV programs operating at CCAFS; and Payload Customers at KSC, CCAFS and local-area commercial spacecraft processing facilities.
2. Provide propellant services to include operating, maintaining, engineering and constructing assigned fixed and portable propellant FSEU. Major functions include: drive prime mover; transport trailers/tankers; operate facility regulation and distribution panels; monitor fixed propellant systems; offload, load, deliver and weigh propellant; operate miscellaneous pumps; transfer equipment and portable containers; run compressors; inspect and operate high pressure gas pipelines; operate propellant railcars; produce deionized water; manufacture liquid air; thermally condition and purify hypergolic propellants; test, certify and fill cylinders; mix gases; and consolidate, treat/neutralize hypergol related wastes and chemicals. Propellants systems assigned to the Contractor are identified in Tech Exhibit 2.0-1, *OMEU Matrix*, and in Tech Exhibit 2.0-2, *Former SPOC OMEU* and Tech Exhibit 2.0-3, *Former CAPPS OMEU* for Options 6A-6H and Options 7A-7I respectively.
3. Operate and maintain propellant equipment, listed in Tech Exhibit 3.2-1, *Propellants Equipment*, as well as other miscellaneous propellant related equipment including dewars, k-bottles, hypergol cylinders, molecular sieves, flex hoses, pumps, and regulation panels.
4. Provide technical assistance to customers receiving propellants deliveries and services.
5. Operate user-provided servicing equipment to support servicing/de-servicing operations.
6. Provide specialized hypergolic services to include thermal conditioning of Delta II hypergolic propellants, nitrogen oxide (NO) enrichment of nitrogen tetroxide (N₂O₄), and purification of N₂O₄ through a molecular sieve.
7. Inspect and service transient propellant equipment staged at KSC and CCAFS. Inspect and certify (pre- and post-shipping) equipment loaned off-base, drain propellant systems, weigh cargo tanks, and store and move user-owned hypergolic equipment.
8. Supply propellant handling equipment to accommodate facility on-site storage, anomaly and malfunction testing, and off-site hardware re-certification and overhaul.

9. Document and report to NASA all DOT compliance issues associated with propellant fleet operation before propellant equipment is used for propellant handling. Maintain all required exemptions and waivers.
10. Provide propellant deliveries and processing to customers in accordance with customers' documented quality, quantity, and schedule requirements and contained within conveyances appropriate for the intended use.
11. Provide engineering test conductor support to the Pneumatics Console (GSPN console) at Converter Compressor Facility-39 during integrated GN2 and GHe high flow operations and at FSA #1 during Self-Contained Atmospheric Protective Ensemble (SCAPE) operations. GSPN post-launch debriefings shall be conducted for NASA launches. Maintain and update, as required, the existing PRO-I-0006, *GSPN Console Operator's Handbook* and PRO-P-0004 *Test Conductor Procedure, FSA #1, CCAFS*. For Options 6A-6H, provide engineering test conductor support to the C-1 Pneumatics Console (JBPN console) at the LCC during integrated GN2 and GHe high flow operations.
12. Provide support at CCAFS wharves to include pumping bilges of ships and missile tubes, and providing compressed air to submarines.
13. Support 45 SW downrange activity including delivery and pick up of compressed gas cylinders to the CCAFS wharves for shipment downrange by others.
14. Provide vacuum pump overhaul and vacuum system servicing for KSC and CCAFS users.
15. Maintain the PAFB flight line liquid oxygen carts.
16. Provide all propellant services at KSC SLF, refueling at the Occupational Health Helipad, and refueling of NASA aircraft and helicopters at the CCAFS Skid Strip.
17. Support commercial customers as directed by the Government.
18. Develop and maintain a system to manage the propellants mobile equipment to include managing inventory, determining equipment utilization, documenting inventory problems, and predicting required inventory levels
19. Provide certification for propellant packaging to ensure compliance with DOT and shipping requirements when equipment is shipped off of Government installations.
20. Maintain and update existing FSA #1 Process Hazard Analysis (PHA) in compliance with OSHA regulation 29 CFR 1910.119, *Process Safety Management of Highly Hazardous Chemicals* (PSM) for qualifying processes.

3.2.1 Hazardous Waste Operations, Maintenance and Engineering

Specific Work Requirements:

In addition to the general work requirements listed in 3.0, the Contractor shall:

1. Perform hazardous and controlled waste operations, maintenance and engineering tasks at Propellants South FSA #1 for hypergol related wastes and bulk wastewater. Tasks include recovery, consolidation, handling, processing, storage and onsite treatment of wastes generated at FSA #1 as well as those generated elsewhere and transferred to FSA #1. Offsite hazardous waste disposal will be provided by and arranged through the MESC. Waste characterization services and authorization for onsite treatment and disposal of hazardous and controlled wastes will be provided by MESC.
2. Neutralize mixed hydrazine fuel wastes for offsite transportation and disposal.
3. Manage waste hydrazine (fuel) and nitrogen tetroxide (oxidizer) solids.
4. Manage off-specification full strength hydrazine fuels.
5. Manage and consolidate hydrazine-based fuel wastes at FSA #1 and transport to the RAYOX holding tank located at the Industrial Waste Water Treatment Facility (M6-897).
6. Manage and consolidate fuel and oxidizer samples to maximize recovery of specification product. Near-specification product shall be reprocessed or recycled where possible. Off-specification product shall be handled as hazardous waste. Sample containers shall be triple-rinsed prior to returning to the sampling organizations.
7. Pickup, manage and process fuel toxic vapor scrubber liquors.
8. Pickup and manage waste oxidizer toxic vapor scrubber liquors.
9. Manage oxidizer component rinsing and safing.
10. Manage the neutralization of waste nitrogen tetroxide and oxidizer rinsates.
11. Manage residual jet fuel (JP-8) and rocket propellant (RP-1).
12. Maintain bulk waste handling equipment operated by the MESC, as listed in Tech Exhibit 3.2-1, *Propellants Equipment*
13. Provide bulk wastewater support to include transportation and pumping sumps.
14. Provide records containing the dates and quantities of waste disposed of onsite to the MESC on a monthly basis.

15. Coordinate with MESC to receive authorization for waste disposal at the Federally Operated Treatment Works (FOTW).
16. Provide environmental technical expertise for the management of hypergolic fuel and oxidizer waste handling at FSA #1.

3.3 Life Support Operations, Maintenance and Engineering

Specific Work Requirements:

In addition to the general work requirements listed in 3.0, the Contractor shall:

1. Operate and maintain specialized personal protective clothing, respirators, associated testing and servicing systems and mobile equipment. Provide life support equipment and services to the Space Shuttle, Constellation and Payload Contractor programs at KSC; the Government and commercial ELV programs at CCAFS; and KSC, CCAFS and local-area commercial spacecraft processing facilities.

Note: The SPOC and CAPPS) contractors operate on-site life support equipment provided by the Contractor. SPOC and CAPPS will transport and set-up required equipment, suit personnel, fill liquid air backpacks and perform the OSHA-mandated inspections of the equipment required while it is in their possession. The life support equipment will be returned to the Contractor for recycle/maintenance.

2. Provide life support equipment, PPE, respiratory protection equipment and associated operational services to personnel working in hostile propellant or oxygen deficient environments, or during emergency breathing operations. Equipment types consist of protective clothing including SCAPE suits, Supplied Air Respirators (SAR), Liquid Air Packs (LAPs) and Astronaut Rescue Air Packs (ARAPs), Self-Contained Breathing Apparatus (SCBAs), Emergency Life Support Apparatus (ELSAs), and Medical resuscitators. Life support equipment assigned to the Contractor is listed in Tech Exhibit 3.3-1, *Life Support Equipment*. Life Support systems assigned to the Contractor are based on Life Support Systems (LS) code, in Tech Exhibit 2.0-1, *OMEU Matrix*.
3. Manage, fabricate, inspect, test, certify, operate, maintain, store, and provide engineering for assigned life support FSEU.
4. Provide life support equipment and setup necessary support to include assisting user personnel in donning and doffing protective gear, filling backpacks, manning communications equipment, and operating various support equipment used in life support operations.
5. Maintain a continuing maintenance, refurbishment, and overhaul program that ensures the safety and operational readiness of life support equipment, compliance

with Government standards, and assures related certifications/exemptions are established and maintained.

6. Perform SCAPE suit testing during each recycle to include high intensity light inspection, functional testing of the relief valves, air flow rate testing, and a final leak check on the suit.
7. Establish a program to test SCAPE suit fabric and components based on age and number of uses to monitor and project suit life expectancy.
8. Maintain and update DRD 3.3-1, *SCAPE Suit Performance and Reliability Reports*.
9. Develop and maintain a system to manage inventory, delivery and pickup of life support equipment.
10. Develop and maintain DRD 3.3-2, *Life Support Master Plan*.
11. Inspect and test hazardous material suits, to include those provided by other KSC and CCAFS contractors.
12. Maintain the ELSAs and ELSA boxes staged for emergency use in such condition that the equipment can perform reliably under extreme environmental and emergency conditions.
13. Provide inspections of emergency breathing equipment staged for use in compliance with 29 CFR 1910.134, *OSHA Respiratory Protection Standard*.
14. Provide inspection, testing, maintenance and minor modifications services for Life Preserver Units used on KSC aircraft in accordance with the applicable sections of USAF Technical Order (TO) 14S-1-102, *USAF Flotation Equipment*.
15. Develop and implement a training program to ensure Contractor personnel are trained, qualified and certified to maintain and operate life support equipment. The program shall consist of specific courses for protective clothing, cryogenic equipment and respirators in compliance with 29 CFR 1910.134, *OSHA Respiratory Protection Standard* and all applicable KSC and CCAFS standards. Vendor certifications are required to work on some life support equipment.
16. Provide equipment and support to other contractor training organizations to assist in training their personnel on life support equipment.

3.4 Pressure Vessels/Systems Management

Specific Work Requirements:

In addition to the general work requirements listed in 3.0, the Contractor shall:

1. Manage a PV/S certification program for all assigned fixed and mobile PV/S.

2. Implement and maintain Certification and Inservice Inspections (ISI) Plans for fixed PV/S assigned to the Contractor.
3. Perform required PV/S ISIs, certifications and re-certifications for fired and unfired vessels/systems, as listed in Tech Exhibit 3.4-1, *Pressure Vessels/Systems*, to applicable ASME pressure vessel or piping standards, KNPR 8715.3 Attachment E, *KSC Safety Practices Procedural Requirements* and in accordance with current national consensus codes, standards and guidelines. Perform required PV/S ISIs, certifications and re-certifications for fired and unfired vessels/systems, as listed in Tech Exhibit 3.4-2, *Former SPOC Pressure Vessels/Systems*, and Tech Exhibit 3.4-3, *Former CAPPS Pressure Vessels/Systems*, for Options 6A-6H and Options 7A-7I respectively.
4. Update configuration drawings and documentation to reflect findings and changes noted during ISIs, certifications and re-certifications.
5. Perform periodic inspections and tests, maintain operating records, reevaluate certification status when changes occur, maintain certification data packages as official quality records, perform stress analysis, perform material evaluation, perform non-destructive tests including ultrasonic, penetrant, radiographic evaluation, and acoustic emission testing in accordance with KNPR 8715.3, Attachment E, *KSC Safety Practices Procedural Requirements*.
6. Maintain the existing NASA PV/S database for assigned vessels/systems.
7. Implement and maintain a *DOT Compliance Plan* for propellants and life support mobile and portable equipment.
8. Revise and maintain mobile and portable equipment marking plans in accordance with Part 49 CFR, *Transportation*.
9. Prepare renewal packages for DOT special permits listed in Tech Exhibit 3.4-4, *DOT Special Permits*.
10. Review Part 49 CFR, *Transportation* for changes and determine the effect of applicable changes in the Federal Register on the Contractor's PV/S program.

4.0 Engineering Services

4.1 Sustaining Engineering

The Contractor shall provide continuous engineering services for assigned FSEU that optimizes availability and costs for critical launch facilities, launch support facilities, and institutional infrastructure to meet both existing and changing mission needs. The Contractor shall ensure assigned FSEU continues to fulfill the original design intent and

are compatible with current operational use; upgrade operational performance capabilities through product improvement; redesign for more safe, efficient or cost effective operations; and provide other required engineering support.

Note: IOMS contractor will provide Engineering Services, as described in WBS 4.0 through 4.9, 4.11 and 4.12, for the USAF facilities at KSC, as identified in Tech Exhibit 2.0-4, *USAF Facilities OMEU*.

Specific Work Requirements:

The Contractor shall:

1. Conduct engineering studies to define project plans and requirements, including thorough supporting justification and clear, accurate and complete project scope.
2. Review, assess, and validate project requirements on assigned FSEU with consideration given to the following impacts and drivers: safety, reliability (redundancy and mean-time-between-failures), performance specifications, operational constraints, site conditions, life-cycle cost (sustainability, maintainability, constructability) and environmental regulations.
3. Perform engineering analysis of out-of-family problems on assigned FSEU that may or may not result in major outage or disruption to operations, but warrants proactive action by the Contractor.
4. Perform root-cause analysis and present findings to NASA on in-service problems that result in disruption to KSC program operations, high-visibility anomalies or as requested by the Government. Develop and utilize root-cause analysis techniques consistent with those identified in NPR 8621.1, *Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping*.
5. Develop and maintain an engineering review process that utilizes peer review techniques and incorporates senior level review/approval of technical decisions, including major design changes to assigned critical/ME FSEU, anomaly resolution and associated corrective actions, and return-to-service following major modification or anomaly. Enable integral Government participation in the engineering review process.
6. Perform the engineering Computer Aided Design (CAD) drafting, and associated services to maintain (and develop, as required) configured drawings and documents per WBS 1.7, *Configuration Management*.
7. Utilize CAD drafting for all design drawings compatible with AutoCAD or MicroStation. Other equivalent software may be utilized if pre-approved by NASA. Ensure drawing conventions follow industry drawing standards.
8. Release all revisions and EOs to configured system drawings and documentation into EDC. For revisions, release native file format in addition to signed original.

9. Perform required incidental design changes (field changes) for assigned FSEU to resolve operational, performance, maintainability, or safety-related issues.
10. Participate in Contractor and NASA-managed facility project design reviews of assigned FSEU to ensure design packages are in compliance with KSC standards and mission requirements.
11. Perform required engineering services in support of activation of new FSEU being turned-over to the Contractor, as a result of NASA-managed construction activities.
12. Maintain technical cognizance of proposed and implemented changes to all applicable Federal, State, and local laws, regulations, policies, and directives as well as industry standards. Identify impacts to Contractor OM&E requirements, processes, and practices.

4.2 Facility Projects

The Contractor shall provide thorough and comprehensive requirements for facility project plans for NASA-owned assigned FSEU. These requirements will be incorporated into annual funding requests in the Institutional Construction of Facilities (CoF) and Local Authority (LA) Programs.

The CoF Program is an Agency-level annual budget process and includes new facility construction, demolition, major repair, or rehabilitation projects with an estimated value of \$500,000 or greater. While the Contractor shall generate institutional facility project requirements to be incorporated into the annual Institutional CoF plans, the project management and implementation of these projects will typically be performed by NASA Facilities Division.

The LA Program is funded at the KSC-level and consists of projects with estimated costs less than \$500,000 each. The LA Program includes Backlog of Maintenance and Repair (BMAR) projects, Institutional-funded projects, program-funded projects, energy and environmental projects, and office modifications.

The Contractor shall design and implement the facility projects, as approved by the Government. The approved LA projects will be implemented within scope of the ISC. On occasion, a CoF-level facility project may be appropriate for design and/or implementation by the Contractor, in which case the project will be initiated by contract change requests.

4.2.1 Institutional Facility Project Planning

Specific Work Requirements:

The Contractor shall:

1. Develop and maintain a structured, risk-based, prioritization process for assessing project requirements for assigned FSEU.
2. Develop, prioritize, coordinate and integrate annual facility project plans, including five years worth of projected requirements. Submit these plans per DRD 4.2.1-1, *CoF and Local Authority Program Plans*. Ensure project requirements are aligned with the KSC Master Plan. All projects included in the CoF and LA Program plans shall meet the minimum estimated cost thresholds, as stated in Table 4.2-1.

Project Categories	Minimum Estimated Project Cost
CoF – All	\$500,000
LA – BMAR	\$50,000
LA – Safety	\$20,000
LA - Office Modifications	\$15,000
LA – General/New Requirements	\$15,000
LA – Energy and Environmental	\$2,000

Table 4.2-1 – Facility Project Minimum Cost Thresholds

3. Develop and maintain supporting project documentation consistent with the requirements of NPR 8820.2, *Facility Project Implementation Guide*. For the LA Program, supporting documentation typically includes fact sheets describing the project scope, justification, estimated cost and schedule; risk assessment codes; NASA Form 1509, *Facility Project - Brief Project Document*; and NASA Form 1510, *Facility Project Cost Estimate*. For the CoF Program, in addition to LA Program supporting documentation, develop Facility Engineering Requirements Documents (FERD).
4. Ensure CoF and LA Programs are cross-referenced to avoid duplicating scope, and to coordinate project sequencing to preclude rework.

4.2.2 Facility Project Management

Specific Work Requirements:

The Contractor shall:

1. Manage the design engineering services and implementation of facility projects in accordance with NPR 8820.2, *Facility Project Implementation Guide*; and KDP-KSC-P-1319, *Facility Project Approval and Implementation Guidance for Local Authority Projects*. Maintain a copy of the approved NASA Form 1509 authorizing the project.
2. Develop project plan agreements, which document the customer's project requirements.
3. Manage the scope, cost, and schedule as identified in the approved project plan agreements between the Contractor and customer. Coordinate with the customer on the information and format to be conveyed in the project plan agreements. Manage the successful completion of projects from formulation through implementation.
4. Report project status, including project baseline changes and required corrective action plans, to NASA on a monthly basis.

4.2.2.1 Design Engineering Services

Specific Work Requirements:

The Contractor shall:

1. Perform design engineering services in accordance with the applicable Federal, State, and local laws, regulations, policies and directives as well as industry standards.
2. Perform all design engineering services under the supervision of a registered professional engineer in the technical disciplines of mechanical, electrical, civil, and structural engineering. Ensure final reports and design drawings include the signature(s) of the responsible registered engineer(s) that supervised and approved the final product for each technical discipline. Release all deliverables (signed originals and native file formats) into EDC.
3. Perform studies including feasibility studies, office layouts, field investigations, computer aided engineering analysis, environmental studies, existing condition studies, analysis of future requirements, conceptual project design studies, energy conservation studies, research of master facility drawings, and all engineering necessary to produce reports.

4. Perform facility project designs including upgrades and repairs to existing FSEU, office modifications, safety initiatives, energy and water efficiency improvements, and new facility construction (typically not greater than 5,000 square feet).
5. Ensure all permits and exhibits to be submitted to Florida regulatory agencies bear the seal and signature of the responsible State of Florida registered engineer.
6. Utilize CAD drafting for all design drawings compatible with AutoCAD or MicroStation. Other equivalent software may be utilized if pre-approved by NASA. Ensure drawing conventions follow industry drawing standards.

4.2.2.2 Facility Project Implementation

Specific Work Requirements:

The Contractor shall:

1. Perform facility project implementation services in accordance with the applicable Federal, State, and local regulations and standards.
2. Minimize impacts and accommodate mission operations during facility project implementation.
3. Ensure subcontracted construction services are performed by State of Florida licensed contractors and utilize trained, qualified, and experienced personnel for the specific type of construction work being performed.
4. Perform required construction surveillance, inspection, and quality assurance of all facility projects to ensure compliance with safety, environmental, and technical requirements.

4.3 Production Budget and Capital Equipment Projects

General Work Requirements:

The Contractor shall develop and maintain a structured, risk-based, prioritization process for assessing project requirements.

4.3.1 Propellants and Life Support Production Budget Projects

Specific Work Requirements:

The Contractor shall:

1. Develop a production budget planning process for propellants and life support FSEU, including the replacement, refurbishment or remanufacturing of existing hardware, new equipment purchases, and other related projects, to ensure safe and reliable operation.
2. Perform the following functions required to support the production budget planning and execution, including project identification, justification and prioritization; engineering studies and designs; procurement; project management; construction management; quality assurance; validation/activation and documentation.
3. Develop, prioritize, coordinate and integrate project plans, including a five year projection of requirements. Present to the Production Budget Working Group all projects for final prioritization and approval prior to implementation.

4.3.2 Capital Equipment Projects

Specific Work Requirements:

The Contractor shall:

1. Develop a planning process for replacement of capital equipment, including the refurbishment or remanufacturing of existing hardware, new equipment purchases, and other related projects, to ensure safe and reliable operation. Include plans for Contractor Property as well as requirements for Government-funded replacement of Government Furnished Equipment (GFE).
2. Perform the following functions required to support the Capital Equipment planning and execution including project identification, justification and prioritization; engineering studies and specifications development; procurement; quality assurance; validation/activation; and documentation.
3. Update and maintain per DRD 4.3.2-1, *Capital Equipment Assessment Report*.

4.4 Master Planning Support

The KSC Master Plan addresses the existing and projected real property assets and how these assets support the present and future Programmatic needs of the Center, the Agency, and national policy as well as the interrelationship between KSC and the surrounding area, including the local communities.

Specific Work Requirements:

The Contractor shall:

1. Provide studies, maps, and reports to Government in support of KSC property development, as required.
2. Provide technical input to update and maintain the existing web-based KSC Master Plan in accordance with NPR 8810.1, *Master Planning Procedural Requirements*, as well as the KSC Institutional Capital Investment Program Plan on an annual basis. Utilize the facility and equipment condition assessments, as well as project submissions by the Contractor's Operations, Maintenance, and Engineering groups and customer organizations in the analysis, maintenance and update of the KSC Master Plan.

Note: KSC Master Plan and Capital Improvement Plans are developed and updated by NASA Architect & Engineering contractors.

3. Track, analyze, and process KSC site plans in compliance with the KSC Master Plan. Validate excavation permits having an approved site plan, utilizing existing site plan database.
4. Ensure personnel have proper training, relevant experience in master planning best practices and stay current on the latest techniques.

4.5 Real Property AccountabilitySpecific Work Requirements:

The Contractor shall:

1. Support the NASA Real Property Officer (RPO) in the management of NASA-accountable real property in accordance with NPR 8800.15, *Real Estate Management Program Implementation Manual*.
2. Perform Real Property Inventories once every three years for all NASA facilities at KSC and CCAFS, consistent with NPR 8800.15. Develop and maintain schedule indicating planned and completed dates for Real Property Inventories for all NASA facilities.
3. Perform the necessary research and assessment to complete the following NASA Forms on all completed projects and inventory assessments, as applicable. Ensure that the forms contain complete and accurate data. Provide all documentation to the RPO or file records, as required.
 - i. NASA Form 844 *Real Property Record – Land*
 - ii. NASA Form 845 *Real Property Record – Buildings*

- iii. NASA Form 845A *Transactions Completed - Additions/Deletions (Continuation Sheet for Item 26 NASA Form 845)*
 - iv. NASA Form 1515 *Disposal*
 - v. NASA Form 846 *Real Property Record - Other Structures and Facilities*
 - vi. NASA Form 846A *Transactions Completed-Additions/Deletions (Continuation Sheet for Item 18 NASA Form 846)*
 - vii. NASA Form 847 *Real Property Record - Leasehold Improvements*
 - viii. NASA Form 1046 *Real Property Transfer and/or Notification of Acceptance of Accountability of RP*
 - ix. NASA Form 1045 *Real Property Transaction Voucher*
4. Maintain system for tagging collateral equipment to include bar coding the items and creating an equipment receipt record with supporting documentation. Input equipment records into the NASA Equipment Management System (NEMS).

4.6 Facility Space Utilization

Specific Work Requirements:

The Contractor shall:

1. Categorize, administer, and document all NASA/KSC real property space assignments in accordance with KNPR 8830.1, *Facilities and Real Property Management Handbook*. The NASA Facility Utilization Officer (FUO) will determine all space assignments.
2. Maintain and update office utilization data in the existing Facility Space Utilization Application (FSUA), including:
 - i. Facility space assignments by category, organization, and facility
 - ii. Office space graphical layouts for all assigned office areas.
 - iii. GIS based integrated data and application for planning and coordination

Upon completion of office modifications and associated personnel moves, update FSUA within ten days. Establish associated data management process to ensure data integrity and accuracy.

3. Develop or update office space graphical layouts, using MicroStation Architecture module or equivalent capability.
4. Manage space request database tracking system from request through implementation. Complete the following fields on all space requests: (1) date of request; (2) customer/requester; (3) class of space; (4) square footage; (5) justification(s); (6) need date; (7) closure date of request, with results, as directed by the FUO.

5. Analyze KSC facility capabilities and space utilization data in support of FUE space assignment studies. Provide assessments and propose cost-effective solutions to the NASA FUE.
6. Develop and maintain project schedules for all office modifications and personnel moves, including those in-work or in the planning phase. Report project status, including project baseline changes and required corrective action plans, to NASA on a weekly basis.
7. Serve as the Secretariat for the NASA Facility Management Board (FMB). Duties include recording proceedings of the meetings, preparing the minutes of the meeting, tracking action items, provide coordination for and prepare meeting agendas, integrate presentation packages, and other related activities to facilitate an effective FMB.

4.7 Facility Condition Assessments (FCA)

Specific Work Requirements:

The Contractor shall:

1. Perform FCA once every five years for all NASA facilities at KSC and CCAFS. Utilize Maximo data on assigned FSEU (TC, PM, and PT&I historical info), statistical equipment age analysis, and facility manager input to develop the FCA condition index (5-excellent, 4-good, 3-fair, 2-poor, 1-bad) consistent with NPR 8831.2, *Facilities Maintenance Management*. Database shall contain as a minimum the following fields for each facility:
 - i. Condition assessment code for each facility subsystem. Facility subsystem fields shall be coordinated with NASA and as a general guideline, shall closely follow those subsystems identified in WBS 2.1 through WBS 2.4.
 - ii. Condition index for entire facility. Methodology for determining overall facility condition index score shall be coordinated with NASA.
 - iii. Recommended corrective actions and estimated Rough Order of Magnitude (ROM) costs by facility subsystem(s). Submit projects to the appropriate project planning activities identified in WBS 4.2.1, *Institutional Facility Project Planning*.

Develop and maintain schedule indicating planned and completed dates for FCAs for all NASA facilities.

2. Develop and maintain an online database compatible with or within Maximo of all completed FCAs. Update the database as FCAs are completed. Provide full access (read only) to NASA.
3. Support NASA Headquarters annual KSC and CCAFS facilities condition audit.

4.8 Construction Support Services

Specific Work Requirements:

The Contractor shall:

1. Provide on-site surveillance, field inspection, quality assurance, documentation, record-keeping, cost engineering, and schedule analysis, of all NASA-managed construction projects in accordance with ENG-P-0011, *Construction Services for NASA CoF Projects*.
2. Complete daily log of construction reports to document contractor activities including: manpower on site, actual progress, acceptance testing and activation results, problem reporting, and non-compliance issues.
3. Witness and document all specified system acceptance testing and mandatory inspection points. Prepare non-conformance reports (NCR) for government signature to document non-conforming materials or installations. Support final inspections, compile punch lists and track all open items to completion.
4. Provide qualified inspectors with specialized experience in the different construction disciplines including structural, electrical, civil, mechanical, architectural, roofing, fire detection and fire suppression. Ensure inspectors assigned to construction projects have the qualifications and specialized experience to inspect construction work for conformance to design drawings and specifications.
5. Coordinate O&M shop support for outages and activation of assigned FSEU, and for witnessing acceptance testing of fire alarm and fire suppression systems.
6. Coordinate with the NASA Construction Safety and Environmental offices on upcoming field activities. Provide immediate notification of safety and environmental compliance violations to NASA.
7. Provide a quality check of final marked drawings, submitted by construction contractor, to verify all changes made during construction have been recorded.
8. Provide tracking and distribution support for shop drawings and other submittals. Maintain shop drawing log, and maintain shop drawing records as official Government contract files. Assemble shop drawings/data submittals documentation and prepare Document Release Authorization (DRA) for release into the EDC. Provide cost engineering and schedule analysis support, including review and analysis of contractor progress schedules and updates, pay requests, change order proposals and cost claims.
9. Maintain a tracking number log of all change order correspondence between NASA and the construction contractor(s) including requests for information, deviation/waivers, requests for equitable adjustment, with estimated, proposed and settled costs for any resulting change orders.

10. Submit to NASA Construction Contracting Officer all project documentation (not including shop drawings) including all inspector logs, punchlist records, and project correspondence.
11. Provide land surveying support for verification of required elevations and grades for projects assigned to the Contractor for construction support services and minor data collection support for customer use. Ensure surveying is performed under direct supervision of a Florida-licensed land surveyor. Ensure GIS standards are utilized to support real estate data for the GIS maintenance function.
12. Provide utility locate services in support of all KSC customers and contractors. Perform on-site utility locates prior to any excavation.

4.9 Activation and Turnover

Specific Work Requirements:

The Contractor shall:

1. Implement facility activation plans for all Contractor-managed and NASA-managed projects to ensure new or modified FSEU are coordinated, reviewed, and accepted by the Contractor for engineering, operations, and maintenance responsibility.
2. Ensure all O&M documentation including vendor O&M manuals, vendor as-built drawings, point-to-point wiring diagrams, PLC and DDC software programs, and equipment parts list has been properly processed and distributed to Contractor-assigned O&M organizations.
3. Prepare and submit O&M and real property turnover documentation (KSC 21-136, *Turnover of O&M and/or Sustaining Engineering Responsibility for KSC Facilities, Systems, and Equipment*, and NASA Form 1046, *Real Property Transfer and/or Notification of Acceptance of Accountability of RP*).
4. Ensure all assigned critical and ME FSEU is validated as operational for first use in support of launch or program milestones in accordance with ENG-P-0021, *Interim Readiness Assessment (IRA) and Institutional Design Certification Review (IDCR) Preparation*. Process and complete the IRA or IDCR without impact to program milestones.
5. Provide technical assessments and trade analysis to assist the Government in defining the end-state (active, standby, mothball, abandoned) of SSP FSEU to be turned-over to the KSC Institution. Technical assessments include analyzing the impacts to other FSEU as a result of desired facility end-state as well as required resources to implement it.

4.10 Specifications-kept-Intact (Specsintact)

Specsintact is a software program utilized NASA-wide and by the Army, Navy and USAF to develop construction contract specifications. The software program provides quality assurance features to ensure that the final project specifications are complete and compliant with industry references and standards.

Note: The Specsintact software program is maintained by the IMCS contractor.

Specific Work Requirements:

The Contractor shall:

1. Coordinate with the IMCS, and establish the necessary processes and agreements for overall management of the Specsintact system within 90 days after contract effective date.
2. Maintain the Mastertext database (NASA and KSC local). Continuously review and update the specifications to incorporate and to comply with latest industry reference standards, federal regulations, and Executive Orders. Maintain Mastertext data compliant with MIL-STD-3007, *Standard Practice for Unified Facilities Criteria and Unified Facilities Guide Specifications*; and UFC 1-300-02, *Unified Facilities Guide Specifications (UFGS) Format Standard*.
3. Maintain, update, and disseminate the Unified Master Reference List (UMRL).
4. Ensure that all Mastertext data sections (NASA and KSC local) are reviewed and updated with the latest technical content at least once every three years. Perform formatting and typographical corrections to database information and publish (make available to the public) within 30 days of reported error.
5. Support NASA Specsintact Configuration Control and Coordinating Board (NS-CCCB) meetings.

4.11 Energy and Water Conservation

Specific Work Requirements:

The Contractor shall:

1. Comply with Executive Order 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, and Department of Energy (DOE) Supplemental Guidance to the Instructions for Implementing EO 13423, *Establishing Baseline and Meeting Water Conservation Goals of Executive Order 13423*.
2. Comply with 10 CFR 433, *Energy Efficiency Standard for Design and Construction of New Federal Commercial and Multi-Family High-Rise Residential Buildings*; NPR

8570.1, *Energy Efficiency and Water Conservation*; KSC-PLN-1906, *KSC Energy Management Five Year Plan*; KNPR 8500.1 *KSC Environmental Requirements*; and KSC-PLN-1913, *KSC Water Management Plan*.

3. Operate all assigned systems, including office lighting and HVAC systems, in an efficient manner, minimizing energy and water waste and accounting for occupied and unoccupied periods.
4. Review and update O&M procedures and practices in order to reduce energy and water waste, improve energy efficiency in buildings and utility plants, and minimize facilities life-cycle costs.
5. Utilize to the maximum extent feasible the KSC advance networked metering system, composed of electrical and BTU meters for monitoring energy consumption trends and identifying areas for improvement. Ensure that all assigned meters are performing their intended functions, and if not, take the necessary corrective action to bring the system back into acceptable operation.
6. Develop and maintain an *Energy and Water Conservation Plan* per DRD 4.11-1.
7. Establish and promote a water and energy conservation awareness program directed to the KSC workforce.
8. Develop and maintain an *Energy Use Index Metric* per DRD 4.11-2.
9. Procure energy efficient and water efficient products including Energy Star, WaterSense, Federal Energy Management Program (FEMP) approved products and energy efficient standby power devices where life cycle cost effective.
10. Perform the following tasks to meet the goals of Executive Order 13423:
 - i. Consider life cycle costs in planning and decisions regarding investments in all capital assets, services and procurements which will lower the Government's costs; apply sustainable design principles; reduce energy and water consumption; and reduce the environmental impact of government operations.
 - ii. Advocate using off-grid generation systems, including solar electric, solar outdoor lighting, and other alternatives where life cycle cost effective and consistent with KSC's environmental practices.
 - iii. Conduct annual energy and water audits for assigned NASA facilities that comprise approximately 10% of total energy consumption. Develop annual audit plan and coordinate with KSC Energy Manager prior to executing audits. Audits shall be consistent with the guidelines provided in ASHRAE RP-669, SP-56, *Procedures for Commercial Building Energy Audits, Level II, Energy Survey and Engineering Analysis*.
11. Maintain the monthly Energy Utilization and Consumption Report (EUCR), using the Automated Utility Database Reporting & Information System (AUDRIS), as the main distribution and utility reporting tool. Perform energy meter readings and enter

consumption and cost data for all energy sources, including electrical, natural gas and fuel oil for all metered facilities at KSC and only NASA metered facilities at CCAFS.

Note: AUDRIS and its web interface are maintained and operated by MESC.

12. Submit life cycle cost effective energy, water conservation, and renewable energy projects to the appropriate project planning activities identified in WBS 4.2.1, *Institutional Facility Project Planning*.
13. Enter accurate quarterly cost and consumption data and annual accomplishments into the NASA Environmental Tracking System (NETS).
14. Provide annual input to NASA in support of the Budget Exhibit 55 and the KSC Energy Management Five Year Plan.
15. Provide *Natural Gas Spreadsheets* per DRD 4.11-3.
16. Support the KSC Energy Working Group (EWG) monthly meetings. Chair approximately two meetings a year, which includes setting up the meeting, preparing agenda and minutes, and distributing electronically to the EWG membership. Use EWG meetings as a forum to discuss issues encountered in meeting energy reduction goals, sharing energy conservation ideas, lessons learned, and success stories.
17. Support the CCAFS Energy Management Steering Group (EMSG) for assigned USAF FSEU.
18. Participate in Contractor and NASA-managed facility project design reviews to ensure that energy and water conservation features are given the proper consideration during design.
19. Ensure personnel directly involved in energy conservation are knowledgeable of DOE programs as well as have the expertise in the respective energy management areas including HVAC, lighting, renewable energy systems, and efficient building envelopes.

4.12 Asbestos Management Program

Specific Work Requirements:

The Contractor shall:

1. Update and maintain existing FAM-P-0053, *Asbestos Management and Operation Plan*. The plan shall describe the Contractor's approach to management of ACM in assigned facilities; and other facility maintenance activities requiring work with ACM; as well as interfaces with NASA, MESC, IMCS contractors and other KSC contractor facilities management organizations.

2. Perform condition assessments, on the same frequency as the FCAs, of ACM in mechanical rooms and other locations included in the FCA. Update the data fields within the Asbestos Management Information System (AMIS) to show the location, quantities, and condition assessment of ACM in NASA facilities following any abatement action, room reconfiguration, construction, demolition or observed changes in condition assessment.

Note: AMIS and its web interface are maintained and operated by the IMCS contractor.

3. Provide special reports in support of facility project planning, as requested by NASA, describing ACM quantity, content, and condition assessments.

Note: MESC provides sampling and analysis of suspect ACM.

4. Plan and program asbestos abatement projects to correct deficiencies found during ACM condition assessments. Incorporate asbestos abatement into facility maintenance, repair or renovation projects where feasible. Submit asbestos abatement projects to the appropriate project planning activities identified in WBS 4.2.1, *Institutional Facility Project Planning*.

5.0 Logistics

General Work Requirements:

The Contractor shall:

1. Develop, maintain, and implement work instructions, processes, and procedures to ensure that all resources are operationally ready to perform scheduled support.
2. Develop and maintain DRD 5.0-1, *Logistics Support Plan* per NPD 7500.1, *Program and Project Logistics Policy*.
3. Present the Logistics Milestone Readiness Reviews (MRR) to NASA per DRD 5.0-2, *Logistics Milestone Readiness Review (MRR) Report*.
4. Present a *Logistics Operations Assessment Report (LOAR)* to NASA per DRD 5.0-3.

5.1 Logistics Engineering

Specific Work Requirements:

In addition to the general work requirements listed in 5.0, the Contractor shall:

1. Provide logistics engineering expertise to facility projects in WBS 4.2.2, *Project Management* and all Institutional CoF projects. Analyze design drawings and provide supportability assessments to design teams.
2. Develop and maintain SPAs for assigned FSEU, as new requirements are identified and update existing SPAs as assigned critical and ME FSEU are modified. Release all new and updated SPAs into Tech Doc.
3. Assess, maintain, and update the existing list of Launch Critical and ME Spares as shown in Tech Exhibit 5.1-2, *Launch Critical Spares (LCS)/Mission Essential Spares (MES) List*. Obtain concurrence from NASA regarding any deviations or recommended changes to the list. Ensure the minimum Critical/ME spare parts are on-hand to support on-going operations.
4. Initiate the acquisition of all parts, materials, and services to support new or modified FSEU. Utilize a Spares Acquisition Integrated with Production (SAIP) approach in accordance with NPR 5900.1, *NASA Spare Parts Acquisition*.
5. Monitor and document trends in maintenance and inventory history, and implement support changes as required.
6. Develop and maintain a Supply Chain Management (SCM) capability to monitor the health of the supplier base and obsolescence issues to ensure continuous, non-interrupted support from supply vendors and service providers. Perform supportability risk assessments and implement corrective actions to mitigate disruptions to supply chain availability or capability that pose a threat to inventory levels due to obsolescence, loss of skills, and environmental issues.

5.2 Logistics Operations

General Work Requirements:

The Contractor shall perform standard logistics operations functions to include property management, receiving and inspection, inventory management, warehousing, kitting, staging and issue, shipping and transportation, and disposal per Tech Exhibit 5.2-1, *Logistics Customer Support Matrix*. Provide supply and equipment services in accordance with the KNPR 4000.1, *Supply and Equipment System Manual*; NPR 4100.1, *NASA Materials Inventory Management Manual*, NPR 4200.1, *NASA Equipment Management Procedural Requirements*; and KNPR 6000.1, *Kennedy Transportation and General Traffic Management*.

5.2.1 Property Management

Specific Work Requirements:

In addition to the general work requirements listed in 5.0 and 5.2, the Contractor shall:

1. Utilize the NASA NEMS database or succeeding NASA system to account for and track all Government property from receipt to turn-in for disposal to include inventory management, archival documentation, processing property losses, tagging/detagging, and distributing all requested and system-generated reports. The Government will provide bar code scanners, NASA Equipment Control Number (ECN) tags, and decals required for control of property. Continuously update NEMS and provide full access to the Government.
2. Input property accountability data into the NASA Logistics Information Management System (LIMS) or succeeding NASA system to support property reporting requirements.

5.2.2 Material Management

Specific Work Requirements:

In addition to the general work requirements listed in 5.0 and 5.2, the Contractor shall:

1. Provide receiving services including the in-processing of materials and equipment, verifying proper receipt documentation, performing count-and-condition inspections, resolving receipt discrepancies, processing documents to ensure accountability, and using a material management system to support receiving functions.
2. Provide a material management system compatible with or within the Contractor's MIS for the tracking, processing, management, and issuing of spares, parts, supplies, materials, and shipping containers which maximizes the use of technology to improve efficiency and data integrity. Continuously update the material management system and provide full access (read only) to the Government.
3. Ensure adequate levels of materials in support of contract requirements. Maintain and replenish bench stocks.
4. Manage, plan, schedule, assemble, and deliver material requirements for work order kitting per the Contractor's integrated work control schedules.
5. Obtain from SPOC all transducers, pyrotechnic connectors, KC fittings, butt-weld fittings (KSC designed), and stainless steel tubing. Provide an *Inventory Control Point (ICP) Forecast* per DRD 5.2.2-1. Purchase these items directly from approved sources of supply, upon the expiration of the SPOC.

6. Order and store propane, diesel, and gasoline fuel for mobile/portable equipment and fixed tanks. Deliver fuel to site locations on customer scheduled intervals per OMI Q3218, *Crawler Transporters, Refueling, KSC* and OMI Q3230, *Fueling, KSC and CCAFS*.
7. Provide, organize, track, and manage storage, including temporary space, for the purpose of safely and securely storing materials. Manage Petroleum, Oils, and Lubricants (POL) hazardous materials storage facilities and collection sites.
8. Identify and assess available storage space in assigned and managed logistics facilities per DRD 5.2.2-2, *Warehouse Usage, Forecast, and Layout Report*.
9. Perform all packing, packaging, marking, labeling, and crating in accordance with applicable military and federal regulations, standards and specifications as well as NASA requirements for domestic and international shipments by all modes of transportation. Conduct Performance Oriented Package (POP) testing on packages to be used to transport HAZMAT by all modes of transportation for domestic and international shipments.
10. Provide life-cycle tracking of contractor-acquired hazardous materials per KNPR 8500.1, *KSC Environmental Requirements*.
11. Provide delivery and pick-up service of materials and equipment to customers and vendors to include transportation to required locations and tracking through the acceptance by user at time of delivery.
12. Provide freight transportation services to include the issuing of Government/Commercial Bill of Ladings (GBL/CBL) which consists of the control the custody, accounting, preparation, correction, and conversion, determining correct freight classifications, and providing documentation, liaison, and coordination of shipments through Customs.
13. Provide counter-to-counter delivery of launch film shipments to designated locations in accordance with LSV-P-5124, *Shipment of Post Launch Films*.
14. Serve as liaison between the Transportation Service Provider (TSP) and the customer to coordinate all information required about a shipment.
15. Provide transportation support for flight hardware and payloads shipments and arrivals as directed by the NASA Transportation Officer.
16. Coordinate and integrate all institutional support to NASA-KSC Public Affairs Office for launch and landing viewings and other KSC special events.
17. Provide Port-o-let service; shredder service; linen service; and bottled water pick-up and delivery.

18. Receive, issue, repair, inventory, and track NASA procured office furniture and carpeting.
19. Receive new (or returned) furniture and warehouse to ensure furniture is available for issue and is stored safely. Receive and store furniture returned from the field and segregate as useable, needing repair, or excess, and take appropriate action. Assemble, clean, and polish furniture to ensure it is serviceable and available for delivery prior to the scheduled delivery date. All office furnishing and carpeting issue requests are generated by NASA.
20. Receive, issue, inventory, and track all gas cylinders including propane, Halon, and acetylene. Segregate empty cylinders and coordinate transportation. Segregate unserviceable cylinders from serviceable cylinders to ensure only serviceable cylinders are issued. Return vendor owned cylinders when no longer required at KSC.
21. Manage NASA office supply procurements including validation, purchasing, accounting, reporting, tracking, and delivery.

5.2.3 Redistribution, Utilization, and Disposal

Specific Work Requirements:

In addition to the general work requirements listed in 5.0 and 5.2, the Contractor shall:

1. Perform Redistribution, Utilization, and Disposal functions in accordance with NPR 4300.1, *NASA Personal Property Disposal Procedural Requirements*; NPR 4310.1, *Identification and Disposition of NASA Artifacts*; and 41 CFR 101, *Federal Property Management Regulation*, and 41 CFR 102, *Federal Management Regulation*.
2. Operate the Recycle, Reutilization, and Marketing Facility (RRMF) during the nominal work hours of 0700 -1530, Monday through Friday. Provide personnel during all hours of operation. Provide support outside of nominal work hours during sales and auctions.
3. Utilize the NASA Property Disposal Management System (NPDMS) or succeeding NASA system for the purpose of accounting for and tracking all disposal activities from initial receipt to final disposition. Continuously update NPDMS.
4. Provide pick-up and delivery of excess materials for authorized organizations and contractors.
5. Screen and excess hazardous materials in compliance with all applicable Federal, State, and local laws, regulations, policies and directives and transfer, donate or sell, and remove from the in-place location.
6. Perform activities necessary to support Government sales contracts for scrap metal pick ups.

7. Process GSA or NASA sales, and exchange sales for reutilization of property. Inventory all property scheduled for sale and provide resolution to all discrepancies prior to lotting. Reconcile all sales listings with the inventory to ensure all items are captured for the sale in NPDMS. Provide sales scheduling, advertising, pictures, staging, security, customer assistance, auctioneer, petty cash, loading out, financial reconciliation with NASA Finance, and support the Sales Contracting Officer. Establish customer financial accounts to enable the performance of packing and shipping of sale items to off-site buyers to include Federal and State recipients. Capture and provide records of all costs associated with preparations of sales to the NASA Property Disposal Officer.

5.3 Transportation Support

5.3.1 Vehicle Management

Specific Work Requirements:

In addition to the general work requirements listed in 5.0, the Contractor shall:

1. Perform Vehicle Management functions in accordance with NPR 6200.1, *NASA Transportation and General Traffic Management*; and KNPR 6000.1, *Transportation Support System*, and Executive Order 13423, *Strengthening Federal, Environmental, Energy, and Transportation Management*.
2. Furnish and maintain all general purpose vehicles in support of contract requirements. At the discretion of the Contractor, GSA schedules may be utilized to satisfy the requirements for motor vehicles.
3. Operate and maintain all vehicles identified in Attachment J-5, Part II. Utilize the KSC on-site service and fueling stations for fueling general purpose vehicles and government furnished vehicles.
4. Ensure that all drivers have proper state licenses, with the applicable endorsements, for requisite equipment being operated.
5. Input the required data into the Federal Automotive Statistical Tool (FAST) for any contractor-acquired or leased and NASA-owned vehicles annually, as scheduled by the NASA Fleet Manager.
6. Develop and maintain a vehicle maintenance program to comply with the vehicle manufacturer's normal service schedule for all Government-owned vehicles, identified in Attachments J-4, *Government Furnished Property* and J-5, *Contractor Property*, and take full advantage of manufacturer warranty repairs when applicable.

7. Record all vehicle use, maintenance, and fuel data per DRD 5.3.1-1, *Vehicle Operations and Maintenance Report*.

5.3.2 Railroad Operations and Maintenance

General Work Requirements:

In addition to the general work requirements listed in 5.0, the Contractor shall:

1. Ensure that all personnel supporting railroad O&M have the required training, certifications, and licenses.
2. Manage rail operations for the tracks shown in Tech Exhibit 5.3.2-1, *KSC Railroad System Map*. Conduct operations in accordance with NASA and Association of American Railroads (AAR) requirements and obtain AAR certification per M-1003, *AAR Manual of Standards and Recommended Practices, Specification of Quality Assurance*.
3. Provide O&M data per DRD 5.3.2-1, *Railroad Operations and Maintenance Schedule and Report*.

5.3.2.1 Locomotive/Railcar Operations and Maintenance

Specific Work Requirements:

In addition to the general work requirements listed in 5.0 and 5.3.2, the Contractor shall:

1. Operate, maintain, and perform any required modifications to all Government-owned locomotives, railcars, and associated equipment listed in Tech Exhibit 5.3.2-2, *Railroad Equipment*.

Note: The Contractor has no repair responsibility for Government-owned railcars when the operation is off-Center in an interchange service. NASA will assume responsibility for all such repairs in accordance with the Interchange Agreement of the AAR.

2. Perform on-site railcar repairs and modifications requested by other Government agencies per the direction of the NASA Railroad Manager.
3. Perform pre- and post-movement inspections of the tracks and railcars. Move railcars from Jay-Jay Yard or other storage areas to on-site customer locations and support loading/off-loading. Perform hazardous operations per OMI Q3772, *Railroad Operations, Transporting of Propellants, Fluids, Gases, and Other Hazardous Commodities, KSC*.

4. Perform PM inspections in accordance with existing Job Plans HER001Q, *Quarterly Locomotive Railroad Equipment*; HER001SA, *Semiannual Locomotive Railroad Equipment*; HER001A, *Annual Locomotive Railroad Equipment*; and HER002SA, *Semiannual Railcars*. Obtain NASA approval in advance, through electronic means, for any changes to existing Job Plan requirements that reduce the level of maintenance, to include lessening the frequency or rescheduling past the due date.

5.3.2.2 Rail Maintenance

In addition to the general work requirements listed in 5.0 and 5.3.2, the Contractor shall:

1. Inspect, maintain, and repair the railway tracks, switches, grade crossings, signal systems, bridge track and attached walkways, and right of ways in accordance with TM 5-628/AFR 91-44, *Handbook of Railroad Track Standards* and UFC 4-860-03, *Unified Facilities Criteria*.
2. Maintain all tracks as Track Category A/Condition Level I, except for tracks from Schwartz Road south to the Off-Load ramp in the KSC Industrial area which shall be maintained as Track Category C.

Note: the Beach track are abandoned in place and are not maintained

3. Provide yearly grounding inspection of all designated Reusable Solid Rocket Motor (RSRM) segment staging tracks and monthly turn-out switch lubrication.
4. Respond to crossing signal malfunction and derailments.

5.3.3 Aircraft Operations and Maintenance

System Description: The NASA aircraft includes four Bell Huey II helicopters assigned to KSC that are stationed at PAFB. The Huey II aircraft are “public use” aircraft that support security, public affairs, and fire, rescue and wildlife operations.

General Work Requirements:

The Contractor shall:

1. Operate and maintain the aircraft and associated equipment identified in Tech Exhibit 5.3.3-1, *Aircraft and Equipment List*. Ensure that KSC assigned aircraft are mission ready. Provide day-to-day scheduled and unscheduled diagnostic checks and PM to ensure airworthiness and availability of the helicopters.
2. Obtain NASA approval prior to executing a mission. Provide schedules to NASA for approval per DRD 5.3.3-1, *Aircraft Mission Schedule*. Obtain NASA approval of new pilot hires and crew position selections.

3. Perform maintenance, rebuilding, quality assurance insight, and alterations using experienced personnel with FAA airframe and power plant licenses. Provide personnel with an inspection authorization (IA) to support all maintenance activities. Provide authorized personnel and process controls to ensure that approved aircraft components are utilized for maintenance, rebuild, and alteration activities.
4. Perform all required work at PAFB. Contact NASA for direction and authorization when NASA aircraft are at an off-site location and repairs are required for the safe continuation of flight mission or return to home station. Upon return to PAFB, prepare the necessary follow-up documentation.
5. Perform major overhaul and repair on NASA aircraft as directed and funded by NASA. Submit timely and detailed written proposals including recommended course of action, analyses, cost estimate, schedule, options, and list of vendor sources.
6. Support servicing, troubleshooting, and minor repairs to other NASA aircraft, as directed by NASA-KSC Aircraft Operations Manager.
7. Establish and maintain a training program to ensure all pilot and maintenance personnel are trained, qualified, and certified. Maintain training records including: certified record of ratings held; certified record of all formal training; record indicating that the maintenance and inspection procedures have been read and understood; other pertinent records relating to maintenance enrichment training; and a copy of FAA Medical Certificate.
8. Participate in NASA-provided pilot currency and maintenance certification training.
9. Utilize the NASA Aircraft Management Information System (NAMIS) to capture and report on all aircraft spares requisitions, receipts, issues, turn-ins and due in from maintenance (DIFM) transactions; track all aircraft maintenance actions for scheduled and unscheduled aircraft maintenance, including calibration items, inspections, overhauls, and configuration changes; schedule all flights by all aircraft and all aircrew; and capture all flight times, cycles, and aircrew currency events and for all aircraft operations, maintenance, and logistics support services. Utilize NAMIS to produce reports as requested by NASA and provide full access to the Government.”
10. Provide aircraft operations data per DRD 5.3.3-2, *Aircraft Operations Report*.
11. Operate and maintain NASA helicopters in accordance with GSA FMR 102-33, *Management of Government Aircraft*; KNPR 7900.3, *Aircraft Operations Management*; Bell airframe and Honeywell maintenance manuals and service bulletins; FAA Federal Aviation Regulation (FAR)/Airworthiness Directive (AD), and part number of discrepant items for Huey II aircraft.
12. Perform all unscheduled maintenance with material costs up to \$10K; otherwise, provide an estimate and repair methodology to NASA for authorization.

13. Perform helicopter operations in support of flight missions per the approved schedules. These missions may include: off-shift, weekends, or holidays; multiple missions over a 24-hour period or exceed the crew duty-day for a single crew; and missions ranging from three to ten hours. Accommodate changes in the schedule up to 24 hours prior to the mission.
14. Provide a pilot and flight mechanic to operate NASA helicopters to support alert missions at the SLF during specified Program mission support. When a launch vehicle is on Launch Pad 39 A and/or B, provide an eight hour security alert (with sorties within that alert) per day with operations based at the SLF. Perform NASA helicopter operations on launch day, including one helicopter on alert at the SLF four hours prior to launch, one helicopter on alert at the Occupational Health Facility (OHF) (M6-0495A, Helipad #7) 2 hours prior to launch, and 1 helicopter on alert at the SCAPE building (J7-1338, Helipad #8) 72 hours prior to launch; 24 hours per day.
15. Provide a flight mechanic aboard the helicopter missions when operation of ancillary on-board aircraft systems is required to satisfy mission requirements.
16. Perform helicopter fire fighting missions, including Bambi Bucket operations, at KSC and the local areas by direction of NASA.

5.3.4 Airfield Services

5.3.4.1 NASA Requirements

Specific Work Requirements:

The Contractor shall:

1. Provide airfield services to all NASA customers at the SLF to include airfield management, control tower operations, flight operations, and ground operations.
2. Operate and maintain the KSC SLF ready for aircraft operations during nominal airfield operating hours, 0700-2200 daily, excluding federal holidays, through the final Space Shuttle mission. Upon completion of the SSP manifest, the nominal airfield operating hours shall be 0700 - 1530 Monday through Friday. Provide off-shift support as SLF schedule requires. Ensure that airfield services are available during all requested periods for aircraft arrivals, departures, servicing periods based on Prior Permission Required (PPR), and as mission requirements dictate. Support astronaut flight crew rescue and emergency medical response training activities.
3. Maintain and update procedures to support airfield services operations. Develop new procedures as required.

4. Maintain readiness for FAA-sanctioned evaluations of air traffic system safety in accordance with FAA Order (FAAO) 7110.65, *Air Traffic Control*.
5. Manage and perform the Air Traffic Control Tower operations, using FAA certified Tower Controllers with current FAA Class II physical status, for all aircraft operations. Operate Air Traffic Control Tower in accordance with FAAO 7110.65, and FAAO 7210.3, *Facility Operations and Administration*.
6. Perform the duties of a Military Radar Unit (MRU) in accordance with FAAO 7610.4, *Special Military Operations* 24 hours a day, seven days a week through the final Space Shuttle mission. Perform MRU functions at either the Range Operations Control Center (ROCC) or SLF. Upon completion of the SSP Manifest, MRU operations are not required and will no longer be an ISC requirement.

Note: Consistent with FAA regulations, the Tower Controller cannot perform tower control duties concurrent with MRU duties.

7. Provide ground handling servicers for all aircraft traffic on the SLF parking ramp area. Ensure servicers are trained in refueling/de-fueling procedures, uploading of liquid oxygen, and other commodities as may be necessary for aircraft support. Servicers shall have a minimum of 1 year experience working with aircraft ground operations.
8. Operate and maintain a flight planning room by providing applicable aeronautical publications, access to current weather information, and Notices to Airmen (NOTAM) to assist aircrews in their flight planning duties at the SLF. Provide the capability for remote access to Johnson Space Center (JSC) aircraft maintenance and operations system.
9. Operate and maintain an aircrew and passenger waiting area and facilities to accommodate arrivals and departures.
10. Operate and maintain Aerospace Ground Equipment (AGE) identified in Tech Exhibit 5.3.4.1-1, *SLF AGE List* for routine NASA and authorized transient aircraft operations.
11. Support other governmental agency and commercial aircraft and other NASA-sponsored commercial projects on a non-interference basis.
12. Ensure all payload operations have a central POC to coordinate all necessary support for the payload operation including Heavy Equipment, Security, Roads and Grounds, and Safety. Coordinate with the NASA Transportation Officer to ensure that the payload customer has an established POC for each operation. Arrange Customs and Border Protection services as necessary for international arrivals at the SLF.
13. Establish, maintain, and implement a flight line driving program.

14. Implement a Foreign Object Debris (FOD) prevention and wildlife management program per FAA Part 139, *Certification and Operations: Land Airports Serving Certain Carriers*.
15. Provide 24-hour on-call capability in support of aircraft crash recovery and contingency operations with a response time no more than one hour after notification.

5.3.4.2 USAF Requirements

General Work Requirements:

The Contractor shall:

1. Comply with USAF support agreements as identified in Tech Exhibit 5.3.4.2-1, *USAF Support Agreements*.
2. Provide 24-hour on-call capability in support of aircraft crash recovery and contingency operations with a response time no more than one hour after notification.
3. Comply with AFI 23-201, *Fuels Management*, paragraph 3.3 and AFI 23-204, *Organizational Fuel Tanks* for two-person policy for organizational tanks and generators
4. Maintain and operate AGE identified in Tech Exhibit 5.3.4.2-2, *CCAFS and PAFB AGE List*.
5. Comply with Air Force Manual (AFMAN) 23-110, *Standard Air Force Base Supply System* for the requisition, replacement, or repair of AGE equipment.
6. Support fueling operations performed by the USAF aircraft refueling contractor per USAF TO 00-25-172, *Ground Servicing of Aircraft and Static Grounding/Bonding*.
7. Support Department of Defense (DoD) sanctioned air field service evaluations and investigations.

5.3.4.2.1 Cape Canaveral Air Force Station

Specific Work Requirements:

In addition to the general work requirements listed in 5.3.4.2, the Contractor shall:

1. Provide transient alert services at the CCAFS Skid Strip with nominal airfield operating hours, 0730-1600 Monday - Friday. Provide extended hours of operations at the direction of the 45 SW Operational Support Squadron (OSS).

2. Provide transient alert and ground servicing (including minor maintenance) for aircraft/equipment per USAF TO 00-25-172, *Ground Servicing of Aircraft and Static Grounding/Bonding* and AFI21-101, Section 5.11.5, *Aircraft and Equipment Maintenance Management*.
3. Perform all aspects of aircraft launch/recovery support, follow-me service, FOD control, crash recoveries and simulations, and marshaling.
4. Provide airfield services at the CCAFS Skid Strip in accordance with 45 SWI 13-201, *Eastern Range Air Space Management Procedures*.

5.3.4.2.2 Patrick Air Force Base

Specific Work Requirement:

In addition to the general work requirements listed in 5.3.4.2, the Contractor shall:

1. Provide transient alert services at PAFB with nominal airfield operating hours, 0800-2400 Monday - Sunday. Provide extended hours of operations at the direction of the 45 OSS.
2. Provide transient alert and ground servicing (excluding fuel servicing), identified by the USAF Airfield Manager, including minor maintenance for aircraft/equipment per USAF TO 00-25-172, *Ground Servicing of Aircraft and Static Grounding/Bonding* and AFI 21-101, Section 5.11.5, *Aircraft and Equipment Maintenance Management*.
3. Coordinate servicing of AGE as appropriate. Ensure AGE is available to support transient aircraft off-base support requests as approved by USAF. Maintain historical records, supply records, and technical operating data in accordance with AFMAN 37-139, *Records Disposition Schedule*.
4. Perform all aspects of aircraft launch/recovery support, follow-me service, FOD control, crash recoveries and simulations, and marshaling.
5. Service transient aircraft including oils, hydraulics, pneumatics, liquid/gaseous oxygen, nitrogen, and water.
6. Maintain transient aircraft documentation and coordinate maintenance and supply activities with home base when required.

5.3.5 Bus Service Operations

The Contractor shall provide all Bus Service Operations at KSC. These services include route bus shuttle, pad shuttle bus, tour and special event buses, and launch/landing support services. Bus operations for the KSCVC are not included.

General Requirements:

The Contractor shall:

1. Provide, coordinate, schedule and manage the utilization of bus services, including the identification of non-recurring requirements for tours and launch support such as POC, dates, durations, number of passengers, vehicle type and size, and locations for tours, special events, launches, and landings. Participate in NASA Guest Operations planning meetings. Develop and maintain DRD 5.3.5-1, *Bus Service Operations Schedule*. The Government will provide a nominal 24 hour lead time for non-recurring requirements.
2. Provide bus service operations data per DRD 5.3.1-1, *Vehicle Operations and Maintenance Report*.
3. Provide a vehicle dispatch operation.
4. Ensure all vehicles are clean and inspected prior to use. Ensure proper operation of air conditioning, radio and public address system, wheelchair lift, and bathroom (if applicable) prior to use. Monitor and report any related damage to a vehicle per DRD 5.3.1-1.
5. Coordinate with NPSC to perform security sweeps of all commercially leased charter buses.
6. Assist the Government in the monitoring and directing of buses in the parking lots and loading passengers on buses. Coordinate and manage assignments of escorts on buses.
7. Ensure drivers wear a standard uniform. Coordinate uniform with the Government for approval.
8. Receive and maintain the I-9 Form, *Employment Eligibility Verification* for each driver. Drivers without an I-9 Form shall not be permitted to drive on Government property. Ensure that all drivers' credentials are displayed in view of bus passengers.

5.3.5.1 Route Bus Shuttle Service OperationSpecific Work Requirements:

In addition to the general requirements identified in 5.0 and 5.3.5, the Contractor shall:

1. Operate a route bus shuttle service to transport KSC workers within and between the Industrial and LC-39 areas per Technical Exhibit 5.3.5.1-1, *Shuttle Bus Route Map*. Operate 0730 to 1600, Monday through Friday, except for holidays.

2. Develop and maintain shuttle bus route schedules, and communicate to the KSC workforce.

5.3.5.2 Pad Bus Service Operation

Specific Work Requirements:

In addition to the general requirements in 5.0 and 5.3.5, the Contractor shall provide bus service to transport personnel from the pad operations buildings (J8-2190 and J7-698) to inside the perimeter of Launch Pads 39A and 39B. The Contractor shall provide this service five days per week per Table 5.3.5.2-1, *Pad Bus Service Schedule*, below with weekends and holidays as requested. The Contractor shall provide bus service from the VAB area to the launch pads as dispatched.

Shift	Active Pad Support (Launch Vehicle at the Pad)			Inactive Pad Support (No Launch Vehicle at Pad)		
	Start Time	Ending Time	Bus Size (Pax)	Start Time	Ending Time	Bus Size (Pax)
1 st	0700	1530	29	0700	1530	12
2 nd	1500	2330	29	1500	2330	12
3 rd	2300	0730	12	N/A	N/A	N/A

Table 5.3.5.2-1, Pad Bus Service Schedule

5.3.5.3 NASA Tour Bus Service Operations

In addition to the general requirements in 5.0 and 5.3.5 above, the Contractor shall provide bus services in support of NASA official tours and special events. Requirements may occur during off-shift hours, weekends, and holidays and duration will vary. The number of drivers and the number and type of vehicles required to support this service also varies with each activity.

5.3.5.4 Launch and Landing Bus Services

In addition to the general requirements in 5.0 and 5.3.5 and above, the Contractor shall provide bus support for manned and unmanned NASA launches (including launch attempts following scrubs) and Space Shuttle landings. Requirements may occur during off-shift hours, weekends, and holidays. Bus support services for launches are initiated at L-4 days through launch.

6.0 Laboratories

General Work Requirements:

The Contractor shall:

1. Perform laboratory services to include nondestructive evaluation (NDE), standards and calibration, sampling and analysis, component cleaning and refurbishment, and other incidental services.
2. Maintain critical skills for all laboratory services.
3. Develop and maintain laboratory capabilities manuals and test procedures.

6.1 Standards and Calibration

Specific Work Requirements:

In addition to the general work requirements listed in 6.0, the Contractor shall:

1. Provide calibration services, including related repairs, for Standards, and Test, Measurement and Diagnostic Equipment (TMDE) at KSC, PAFB, CCAFS, JDMTA, and downrange. KSC customers entitled to calibration services include NASA, CAPPS, other NASA-authorized customers, and other NASA contractors with the appropriate calibration support clause in their contracts. USAF customers entitled to support include the 45 SW, 45 SW contractors with the appropriate calibration support clauses in their contracts, and other Government agencies with Host Tenant Support Agreements that specify calibration support. For any required travel downrange, the Government will provide the air transportation.
2. Provide reference standards calibration and maintenance, and metrology engineering services to NASA, and KSC contractors, 45 SW, 45 SW contractors with the appropriate calibration support clauses in their contracts, and other Government agencies with Host Tenant Support Agreements that specify calibration support with approval of Air Force Metrology and Calibration (AFMETCAL).
3. Provide standards and calibration services in accordance with USAF TO 00-20-14, *Air Force Metrology and Calibration Program* for USAF customers, or per ANSI/NCSL Z540.3, *Requirements for the Calibration of Measurement and Test Equipment* for NASA customers. If USAF customers are entitled as specified in base support agreements, perform calibration services per ANSI/NCSL Z540.3. Maintain compliance with ANS/ISO/IEC 17025:2005, *General Requirements for the Competence of Testing and Calibration Laboratories* and the operational requirements contained in KNPR 8730.1, *KSC Metrology and Calibration Procedural Requirements*.

4. Provide laboratory and in-place calibrations for required technical disciplines and instruments. Provide in-place calibration only for items embedded in systems too large to move or whose accuracy would be affected by movement after calibration.
5. Provide equipment repair if within the current laboratory capability and the time spent attempting or performing the repair will not exceed routine calibration time.
6. Provide cleaning incidental to calibration.
7. Maintain KSC reference standards and provide working standard measurement data traceable to National Institute of Standards and Technology (NIST) or intrinsic standards for KSC, and procure NIST traceable standards and standard reference materials.
8. Serve as pivot laboratory for Measurement Assurance Programs (MAPs) and participate and support other MAPs as required.
9. Calibrate “Items Not Entitled to Precision Measurement Equipment Laboratory (PMEL) Service” per USAF TO 00-20-14, *Air Force Metrology and Calibration Program* or USAF TO 33K-1-100-2, *Reference Guide and Work Unit Code Manual* to include instruments defined in the referenced documents as “USER”, “NCR”, or “Non-TMDE.”
10. Provide engineering services to USAF PMEL customers’ Non-TMDE assets to include: providing customers with the technical knowledge and support required to understand measurement, calibration, and laboratory processes; providing technical information on the care, capabilities and limitations of the customers TMDE; helping to determine calibration frequency and ranges; and performing uncertainty analysis.
11. Operate and maintain a Metrology Information System to recall and control standards and test equipment systems. Provide NASA full access (read only) to the Metrology Information System to include information on TMDE found to be more than 30 days overdue for calibration and for TMDE found to be out of tolerance when received for calibration.
12. Operate and maintain a NASA Shared Resources Management System, used to control automated calibration work stations.
13. Operate PMEL Automated Management System (PAMS), the USAF-provided data collection system in support of USAF requirements to provide appropriate information to AFMETCAL. Provide the 45 SW TMDE overdue calibration list to 45 SW each month.
14. Provide 45 SW launch contractors information regarding out-of-tolerance data and action taken for TMDE when requested by the customer. Notify the customer when out-of-tolerance conditions are 200 percent or more. Provide calibration data sheets or charts for TMDE as a result of an out-of-tolerance condition or on other TMDE as required by the customer.

15. Maintain and update the existing CAL-P-1CTG, *PMEL TMDE Coordinator Training* document.
16. Provide *Standards and Calibration Management Indicator Reports* per DRD 6.1-1.
17. Maintain and update the existing CAL-P-0001, *KSC Standards and Calibration Laboratory Capabilities Document* per DRD 6.1-2.
18. Operate and maintain the KSC Standards and Calibration Equipment and the PMEL Equipment listed in Tech Exhibit 6.1-1, *KSC Standards and Calibration Equipment* and Tech Exhibit 6.1-2, *PMEL Equipment* respectively, as well as other related equipment. The Standards and Calibration facilities which will be provided to the Contractor consist of the Central Instrumentation Facility (CIF) on KSC, PMEL Electronic Lab on PAFB, and PMEL Physical Lab on CCAFS.

6.2 Nondestructive Evaluation

Specific Work Requirements:

In addition to the general work requirements listed in 6.0, the Contractor shall:

1. Provide NDE services and related engineering/administrative support services for NASA, USAF and their contractors at KSC, CCAFS and PAFB, and others when authorized by NASA. Provide only radiographic services and associated engineering support for the SPOC and CAPPS.
2. Provide laboratory and in-place NDE services for evaluating the quality and integrity of components/parts, systems, and structures related to facilities, ground support equipment (GSE), payloads and flight vehicles.
3. Operate and maintain NDE equipment, listed in Tech Exhibit 6.2-1, *NDE Equipment*, as well as other related equipment.
4. Provide surface and near-surface inspections including visual, certified welding inspection (CWI), magnetic particle, liquid penetrant, eddy current, and infrared testing.
5. Provide volumetric inspections using leak testing, radiography (computed tomography, gamma, x-ray, microfocus real-time), and ultrasonic inspection methods. Computed tomography and microfocus real-time radiography are only provided in the lab.
6. Implement a program to replace film radiography with digital radiography where practicable.

7. Conduct pre-inspection meetings with the customer when necessary to define the requirements and objectives of the inspection, the physical and design features of the item, the test acceptance criteria, and the NDE methods to be employed. Receive, inspect, and evaluate (or alternately, inspect in-place) individual items scheduled for NDE services. Prepare a report presenting the inspection results and appropriate recommendations. Ensure report is reviewed and approved by engineering or supervision prior to being forwarded to the customer.
8. Conduct NDE examinations in accordance with applicable American Society for Testing Materials (ASTM), American Welding Society (AWS), ASME, and NASA specifications, or contractor specifications where requirements are consistent with industry standards. Coordinate with the customer to inform them of required secondary support elements for access or safing of the work area.
9. Operate and maintain an electronic NDE Work Control System which incorporates provisions for creating, processing and archiving external and internal jobs. Maintain the database to provide tracking and reporting level of effort, personnel qualification/certification status, and equipment maintenance. Provide the Government full access (read only) to the work control system.
10. Implement and maintain an NDE personnel certification program including training courses, examinations and maintenance of qualification/certification records. Maintain qualification and certification requirements in accordance with; NAS-410, *NAS Certification and Qualification of Nondestructive Test Personnel*; American Society for Non-Destructive Testing (ASNT)-SNT-TC-1A, *Personnel Certification and Qualification in Nondestructive Testing*; ANSI/ASNT CP-189, *ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel*; ANSI/AWS QC1, *Standard for AWS Certification of Welding Inspectors* and related regulatory requirements. Certify NDE Level III Engineers in accordance with the ASNT National examination.
11. Provide Level III certified personnel in each NDE method. Provide at least one Level II or higher certified person in the performance of all NDE examinations of critical GSE or flight hardware.
12. Implement an equipment preventive/corrective maintenance program in accordance with equipment manufacturer's recommendations and in compliance with requirements of State and Federal regulations.
13. Implement and administer a Radiation Safety Program for conducting industrial radiography with gamma and x-ray sources which complies with NASA, USAF, State of Florida, the United States (US) Nuclear Regulatory Commission, and DOT requirements. Provide a qualified Radiation Safety Officer responsible for maintaining licenses/authorizations, supporting regulatory audits, maintenance of current rules and regulations, and oversight of the Radiation Safety Program per the following requirement documents: 49 CFR, Chapter 1 *Research and Special Programs Administration*, DOT Parts 100-185; KNPR 1860.1, *KSC Ionizing Radiation Protection Program*; AFI 40-201, *Radiation Protection Program*; FAC

Rule 64E-5.434, *Training, Testing, Certification, and Audits*; 10 CFR Chapter 1 Part 34.43, *US Nuclear Regulatory Commission*.

6.3 Sampling and Analysis

Specific Work Requirements:

In addition to the general work requirements listed in 6.0, the Contractor shall:

1. Provide sampling services and related engineering support to customers at KSC, CCAFS and PAFB. Provide analysis services to KSC customers only. These services include sampling and analysis of gases, fuels, oxidizers, cryogenics, hypergolics, coolants, solvents; delivering controlled samples; compatibility studies for hypergolic fluids; and Toxic Vapor Detector (TVD) calibration and repair.

Note: Environmental sampling and analysis, including Toxicity Characteristic Leachate Procedure (TCLP) analysis, will be provided by MESC contractor and is not in the scope of this contract.

2. Perform specifications analyses on propellants and other chemical commodities per the requirements of NASA, Military, or other referenced specifications.
3. Maintain an Aspect Listing in the laboratory detailing each particular analyte in a specification matrix along with its minimum and maximum reporting limits, and minimum and maximum specification limits.
4. Provide other laboratory and in-field analytical tests including moisture, pH, conductivity, dissolved oxygen, temperature, airflow rate, particulate and fallout counts, and Non-Volatile Residue (NVR) determinations.
5. Provide TVD calibration and minor repair for instrumentation used in detecting hydrazine fuel and nitrogen tetroxide/nitrogen dioxide, Refrigerant-21, Dimethylethoxysilane (DMES), ammonia, oxygen, hydrogen/combustibles, carbon monoxide, and CO₂.
6. Provide sustaining engineering and support developmental efforts including evaluation and acceptance testing of new instruments and the development of new calibration and detection methodologies.
7. Perform permeability and compatibility studies of materials used in conjunction with hypergolic fluids.
8. Maintain sampling equipment in a certified, ready-to-support posture.
9. Return sample residuals, when appropriate, to the requesting agency for disposal.

10. Prepare laboratory analysis reports documenting sample history, analytical results versus specification limits by sample control number and maintain records in accordance with regulatory and quality requirements.
11. Collect, manage, and dispose of all laboratory generated wastes.
12. Perform mercury spill cleanup and waste disposal in support of MESC.

6.4 Component Cleaning and Refurbishment

Specific Work Requirements:

In addition to the general work requirements listed in 6.0, the Contractor shall:

1. Provide cleaning and refurbishment services for fluid mechanical systems hardware and components including those used in both GSE and flight systems. Provide laboratory support for component hardware delivered to the Contractor by customers at KSC, CCAFS and PAFB. In-place cleaning support shall be provided to customers at KSC and CCAFS.
2. Perform all cleaning and packaging operations in accordance with KSC-C-123, *Specification for Surface Cleanliness of Fluid Systems*. Upon request, cleanliness shall be certified to levels specified in NASA, Military, or other contractor specifications that are comparable to KSC-C-123.
3. Perform all cleaning and packaging operations using non-ozone depleting substances. CFC-113 (chlorofluorocarbon-113) is allowed where specifically called out in specifications and approved by NASA. Provide engineering services for existing non-CFC cleaning and verification processes.
4. Disassemble functional components to facilitate cleaning, to allow for the removal of standard replacement parts and soft goods, and to allow for inspection for damaged parts.
5. Provide decontamination of hypergol system components.
6. Perform rough cleaning to remove corrosion, dirt, grease, scale, or other contaminants from critical surfaces of systems and individual component parts.
7. Perform surface treatment such as passivation, pickling, and electropolishing.
8. Perform precision cleaning in a clean room environment using approved fluids. Testing shall be performed to ensure particulate and NVR levels are in conformance with the cleanliness level specified on the customer's work order. Cleanliness levels range from visually clean to 10A.

9. Perform refurbishment of functional components to a “like new” condition in conformance with Government, other contractor or vendor drawings, specifications and standards. Upon request, perform component modifications in compliance with approved drawings.
10. Perform functional testing of components to ensure that performance standards specified in Government, contractor or vendor drawings are met. Perform hydraulic (0-6,000 psi) and pneumatic (0-14,000 psi) testing. In special circumstances, perform cryogenic (LN2) testing.
11. Perform packaging of cleaned components and hardware to ensure that cleanliness is maintained.
12. Clean large bore hoses, tubing and piping at the cleaning facility and in the field.
13. Perform hydrostatic and pneumastatic testing of tubing, hoses, and compressed gas cylinders.
14. Maintain and update procedures required for component cleaning, refurbishment, inspection, and testing. Develop new procedures as required.
15. Set up a controlled area and coordinate with all personnel in the vicinity of the cleaning operations area before initiating field cleaning operations.