

**REAL PROPERTY USE PERMIT
BETWEEN
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,
KENNEDY SPACE CENTER
AND
SPACE FLORIDA
FOR
THE USE OF THE ORBITER PROCESSING FACILITY 3,
THE SPACE SHUTTLE MAIN ENGINE PROCESSING FACILITY,
AND THE
PROCESSING CONTROL CENTER**

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**JOHN F. KENNEDY SPACE CENTER
FACILITY USE PERMIT**

This Facility Use Permit (the "Permit") is made as of the date set forth below by the signatories, by and between the NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, an agency of the United States, John F. Kennedy Space Center, Kennedy Space Center, Florida, as the permitting agency (hereinafter "NASA KSC"), and Space Florida, an independent special district, a body politic and corporate, and subdivision of the state of Florida, located at Kennedy Space Center, Florida, as the permittee (hereinafter "SPFL").

RECITALS

- A. Whereas, NASA KSC has determined that the facilities identified for out-grant in this Permit are not required for any current NASA mission support requirement after the conclusion of their use by the Space Shuttle program under 14 CFR §1204.504(e)(1)(i); and,
- B. Whereas, it is among NASA's statutory purposes to encourage and foster to the greatest extent possible the fullest commercial use of space; and,
- C. Whereas, the Nation's space policy and associated NASA Authorization Act of 2010 direct NASA to support the development of United States commercial space capabilities and to use commercial services, as appropriate and available, for space transportation; and,
- D. Whereas, SPFL was established by the state of Florida to foster and enable the growth of a sustainable space industry, among other purposes, and is chartered to seek Federal support and develop partnerships to renew and upgrade the infrastructure and technologies at NASA KSC to enhance space and military programs of the Federal Government and improve access for commercial launch activities; and
- E. Whereas, SPFL has identified an opportunity to repurpose the space flight processing and support facilities included in this Permit for uses that are consistent with NASA's purpose, supportive of its missions, compatible with NASA KSC operations, and aligned with the Center's long-range development plans; and
- F. Whereas, NASA KSC has determined and certified that the out-grant of these facilities to SPFL for the uses defined and governed by this Permit will not adversely affect NASA's current or future missions under 14 CFR §1204.504(e)(1)(ii); and

Now therefore, NASA KSC and SPFL (hereinafter the "Parties") enter into this Permit pursuant to the terms and conditions set forth herein.

ARTICLE 1 – AUTHORITY

1.1 This Permit is granted by the National Aeronautics and Space Administration (NASA), John F. Kennedy Space Center (KSC), an agency of the United States Government, located at Kennedy Space Center, Florida 32899, pursuant to authority of Section 315 of the National Aeronautics and Space Act (51 U.S.C. §20113(f)), and Space Florida, an independent special district, a body politic and corporate, and subdivision of the state of Florida.

ARTICLE 2 – DEDICATED PROPERTIES

2.1 NASA KSC hereby grants to SPFL, for the Term and subject to the covenants hereinafter set forth, the exclusive use of building K6-0696, the Orbiter Processing Facility 3 (OPF 3); the Space Shuttle Main Engine Processing Facility (SSMEPF), also part of K6-0696); and K6-1094, the Processing Control Center (PCC) (hereinafter “the Properties”), and associated support facilities located on the Kennedy Space Center and fully described in Exhibit A and as listed below in Article 4.1.

2.2 SPFL accepts the Properties in their “as is” condition. SPFL agrees that, with the exception of KSC’s representation of the environmental condition of the land and facilities contained in the Environmental Baseline Survey (Exhibit B) of this Permit, NASA KSC has made no covenant, representation, or warranty of any kind or nature whatsoever, expressed or implied (including with respect to the suitability of the Properties or any utility or other systems serving the Properties for SPFL’s purposes), and SPFL executes this Permit relying solely on its own investigation and knowledge of the Properties. SPFL further agrees that NASA KSC has made no agreement or promise to alter, improve, adapt, repair, or keep in repair the Properties or any portion thereof, and NASA KSC shall have no obligation to construct or install or in other way provide any improvements on the Properties. NASA shall provide SPFL with a deferred maintenance list and other facility-related information upon request for the Properties identified in this Permit.

ARTICLE 3 – USE OF THE PROPERTIES

3.1 In accordance with all other terms and conditions of this Permit, SPFL’s use of the Properties is for the following uses and activities incidental to such uses (hereinafter the “Permitted Uses”):

- A. Space flight hardware manufacturing, assembly, processing, or testing required to develop and operate a commercial or Government service for delivery of humans or cargo to space;
- B. Flight crew and space flight participant training and flight simulation activities;
- C. Mission control and other associated engineering, technical, and administrative support activities associated with the provision of a commercial or Government human or cargo space flight program;

- D. Design and construction of facility modifications required to enable, sustain, and operate these permitted activities.

No other uses are permitted without an amendment to this Permit formally negotiated and executed by the Parties.

3.2 Subject to the prior written approval of NASA KSC, SPFL may allow a third party or parties (hereinafter "Occupant(s)") to occupy and use the Properties solely for the purposes and activities permitted by this agreement and under a written subpermit entered into between SPFL and the Occupant(s). NASA KSC shall retain the right to approve, approve with conditions, or disapprove any subpermit(s), or other agreements proposed by SPFL. SPFL's request for NASA KSC's consent and approval shall be accompanied by a copy of the intended subpermit or other agreement and any other information that NASA KSC may require. NASA KSC shall provide approval or disapproval with appropriate rationale within twenty-one (21) calendar days. All such subpermit(s) or other agreements shall contain a flow-down provision incorporating, at a minimum, the requirements under Articles, 3, 4.1, 6-11, 13, 15.6, 18-20 of this Permit. If NASA KSC approves a proposed subpermit(s) or other agreement(s) with or without conditions, SPFL will ensure that a current and complete copy of that subpermit(s) is provided to NASA KSC within thirty (30) days of its final signature(s), and SPFL further agrees to provide any updates or amendments to the subpermit(s) or other agreement(s) within thirty (30) days of its issuance. Supporting documentation, such as proof of applicable insurance coverage, as required by Article 12, shall be included with the submission.

3.3 If the scope of work to be performed by SPFL at the Properties to accommodate their use is determined to be subject to the requirements of the Davis-Bacon Act, SPFL and its contractor(s) shall comply with all wage determinations and other applicable provisions.

ARTICLE 4 – TERM OF PERMIT

4.1 The effective date of the Parties' obligations pursuant to this Permit and occupancy by SPFL (hereinafter "Occupancy Dates") will be phased to ensure that the existing NASA user, the Space Shuttle program, has sufficient time to complete its activities within each facility. The Occupancy Dates for the Properties will be as follows:

Upon execution of this Permit:

K6-0696—OPF 3 High Bay (with the exception of certain areas on first and second floors of the low bay as depicted at the end of Exhibit A.)

No later than January 1, 2012:

K6-1094—PCC, including the parking areas associated with the PCC as shown in Exhibit A

No later than May 1, 2012:

K6-0696A—Gate House

K6-0696B—Turnstile Shelter West

K6-0696D—Environmental Control Building
K6-0696E—Turnstile Shelter East
K6-0696F—Chilled Water Pump House
K6-0696H—OPF 3 Hazardous Waste Staging Building/Portable
K6-0696J—K-Bottle Storage Area
K6-0696—SSMEPF

All parking areas associated with the OPF 3/SSMEPF as shown on Exhibit A

4.2 This Permit becomes effective upon the date of the last signature executed hereunder and shall continue in full force and effect for a term of approximately sixteen (16) years after transfer of all Properties under this Permit has been completed. Regardless of actual date of occupancy, the Permit term for all the Properties will expire June 1, 2027. Upon mutual agreement of the Parties, this Permit may be extended for up to an additional five (5) years for individual facilities or all Properties covered herein. Any extension will be for a minimum of one (1) year and shall be documented in writing by the Parties, and all reasonable attempts shall be made to document that extension no later than one (1) year prior to the original expiration date of this Permit.

ARTICLE 5 – CONSIDERATION

5.1 In consideration of the significant NASA and other Federal agency mission benefits to be realized during the term of this Permit as a result of the activities, investments, and obligations assumed by SPFL pursuant to this agreement, NASA hereby waives any cash consideration payments that might otherwise be required by Federal regulations for fair market value (FMV); however, Center Management and Operations (CMO) charges are applicable (section C below). The benefits that NASA will receive for consideration include:

- A. Cost Savings: By implementing this Use Permit, NASA saves the costs associated with the Operations and Maintenance (O&M), energy and other utilities, and the costs of safing the Properties and ultimate demolition/removal of the Properties. The total cost savings from these activities is estimated at \$9.11 million in 2011 dollars. As these costs are estimated and the actual date and cost for demolition is not known, this dollar value does not limit the obligation on SPFL as described in Article 16.1.
- B. Support for the Development of Commercial Space Activities: Given NASA's mandate to enable the commercial space industry, providing these Properties to Space Florida reduces overall costs and risks while improving service in the support of both Government and commercial space transportation.
- C. Support of CMO Services: SPFL will directly contribute to reducing institutional overhead through the purchase of reimbursable services such as protective services (including security, fire, and emergency medical support) and other services associated with the overall management of the Center. The Level of Service for these services will be 24 hours a day, 7 days a week, 365 days a year. The charge for these

services will be calculated using the FMV, currently determined to be \$13.35 million in 2011 dollars, times 8 percent, times the current CMO rate of 14.2 percent. These costs will be adjusted annually by an escalation factor of 2.6 percent or optionally, at SPFL's request and expense, by establishing a new FMV every five (5) years, and the CMO rate as established each year. The rates will be calculated each year in September so as to be established prior to the Federal Fiscal Year (FY).

- D. SPFL will also directly contribute the institutional overhead associated with other services such as utilities and communications and other specific support services as requested. The remuneration for these services will be obtained through a companion Reimbursable Space Act Agreement (RSAA), KCA-4312.

5.2 If the purposes and uses identified in this Permit are materially changed in a subsequent amendment or the conditions in the Permit are not satisfied, then unless otherwise provided in a subsequent amendment, an FMV payment in cash shall become due to NASA from SPFL commencing from the date of such occurrence, based upon a market value determination and good faith negotiations of the Parties. If the Parties are unable to reach agreement on the terms of consideration pursuant to this clause, the Permit will terminate without obligation by NASA KSC to compensate SPFL for any capital improvements made to the Properties or for any losses incurred by SPFL in association with such termination.

5.3 In no event shall NASA KSC transfer any United States Government funds to SPFL under this Permit. Advance payments shall be scheduled to ensure that funds are resident with NASA before Federal obligations are incurred in support of this Permit. Thus, full payment for annual costs must be made by SPFL in advance of use for the initial year and at least sixty (60) days in advance for each of the following years. The initial payment shall be in the amount of \$95,780, which shall cover costs for the remaining two (2) months of FY 2012 and the estimated costs of FY 2012 and is due upon execution of this Permit. NASA KSC shall provide a billing report for said charges to SPFL on a quarterly basis. NASA KSC will also provide a request for additional funding as required on a quarterly basis.

5.4 Payment shall be payable to the National Aeronautics and Space Administration through [choose one form of payment: U.S. Treasury FEDWIRE Deposit System, Federal Reserve Wire Network Deposit System, pay.gov at <https://www.nssc.nasa.gov/customerservice/> or check]. A check should be payable to NASA John F. Kennedy Space Center and sent to: NASA Shared Services Center; FMD – Accounts Receivable; Bldg 1111, C Road; Stennis Space Center, MS 39529.

5.5 NASA KSC will not provide services or incur costs beyond the available funding amount. Although NASA KSC has made a good faith effort to accurately estimate its costs, it is understood that NASA KSC provides no assurance that the proposed effort under this Permit will be accomplished for the above estimated amount. Should the effort cost more than the estimate, SPFL will be advised by NASA KSC as soon as possible. SPFL shall pay all costs incurred and

have the option of canceling the remaining effort or providing additional funding in order to continue the proposed effort under the revised estimate. Should this Permit be terminated, or the effort completed at a cost less than the agreed-to estimated cost, NASA KSC shall account for any unspent funds within one (1) year after completion of all effort under this subagreement and, promptly thereafter, return any unspent funds to SPFL.

5.6 Late Payment. Pursuant to 14 CFR 1261.412, all payments due under the terms of this Permit must be paid on or before the date they are due in order to avoid the mandatory sanctions imposed by the Debt Collection Act of 1996 (31 U.S.C. §3717). This statute requires the imposition of an interest charge for the late payment of debts owed to the United States, an administrative charge to cover the costs of processing and handling delinquent debts, and the assessment of an additional penalty charge on any portion of a debt that is more than ninety (90) days past due. The provisions of the statute will be implemented as follows:

5.6.1 The United States will impose an interest charge, the amount to be determined by law or regulation, on late payment of applicable charges. Interest will accrue from the due date. An administrative charge not to exceed \$100 to cover the cost of processing and handling each late payment will also be imposed.

5.6.2 In addition to the interest charges set forth above, the United States will impose a penalty charge of 6 percent per annum on any payment, or portion thereof, for debt more than ninety (90) days past due. The penalty shall accrue from the date of delinquency and will continue to accrue until the debt is paid in full.

5.6.3 All payments received will be applied first to any accumulated interest, second to administrative and penalty charges, and then to any unpaid occupancy or other payment balance. Interest will not accrue on any administrative or late payment penalty charge.

5.6.4 Amounts shall be due upon the earliest one of (a) the date fixed pursuant to this Permit or (b) the date of the first written demand for payment, consistent with this Permit, including demand upon default.

ARTICLE 6 – OPERATIONS AND MAINTENANCE

6.1 SPFL shall be responsible for all O&M of the Properties to commercial standards unless otherwise specified elsewhere in this Permit for the entire Term of the Permit. SPFL shall, at all times during the Term of this Permit and at SPFL's sole cost and expense, maintain and repair the Properties and every part thereof (including, but not limited to, the buildings, parking lots, towers, antennas, fixtures, and other facility systems existing at the time this Use Permit is signed, as well as any additional construction or installation by SPFL) and keep all of the foregoing safe; clean; reasonably free from rubbish, waste, and debris at all times; and in good order and operating condition, ordinary wear and tear excepted, until such time as the Properties are demolished or otherwise restored to a condition acceptable to the Government. SPFL shall, at SPFL's expense, promptly repair any damage to the Properties (including SPFL's

buildings, towers, antennas, fixtures, and other facility systems) caused by SPFL or any employee, agent, contractor, subcontractor, assignee, licensee, invitee, or guest of SPFL. SPFL shall ensure that the Properties retain their functionality for uses as identified in Article 3 throughout the Term of the Permit.

SPFL will be responsible for all O&M activities at the Properties, to include janitorial services, grounds maintenance, pest control, and refuse disposal.

Utility interfaces (that is, the points at which NASA KSC O&M responsibilities stop and SPFL O&M responsibilities start) between the Properties and KSC are as follows:

1. Potable water: at the downstream side of the outlet valve of the back flow preventer
2. Low voltage: at the load side of the secondary bushings of the transformer
3. Chilled water: at the downstream side of the outlet valve of the tertiary pumps
4. Hot water: at the downstream side of the secondary valve of the heat exchanger
5. Compressed air: at the downstream side of the isolation valve closest to the building perimeter
6. Deluge water: at the downstream side of the isolation valve closest to the building perimeter
7. Suppression water: at the downstream side of the outlet valve of the back flow preventer
8. Fire alarm system: at the customer side of the advanced encryption standard radio transceiver (compatible with KSC central monitoring system)
9. Gaseous Nitrogen 2 and Gaseous Helium: at the downstream side of the isolation valve closest to the building perimeter
10. Kennedy Complex Control System: at customer side of the facility Field Interface Controller
11. Sewer: at a point five (5) feet outside the facility foundation/exterior wall
12. Road/parking lot: property line perimeter
13. Outside Cable Plant - Fiber: customer fiberoptic interface panel
14. Outside Cable Plant - Copper: facility main distribution frame
15. Transmission Services: interfaces in the customer's equipment rack at the end of the circuits
16. Timing/Countdown: interfaces in the customer's equipment rack at the end of the circuits or display clock
17. BCDS (Cable TV): electrical output signal of C-COR amplifier
18. Paging: audio output of the paging control tray

Upon execution of this Permit, SPFL will designate a Facility Manager. SPFL shall participate in the annual NASA Deferred Maintenance Assessment performed by NASA. This will consist of a site visit and dialog with the responsible facility manager.

6.2 SPFL shall be responsible for funding any and all repairs to the Properties resulting from natural disasters such as hurricanes and severe weather conditions occurring during the

term of this Permit. Should the Properties and/or towers, antennas, fixtures, or other facility systems owned by NASA KSC or SPFL, or any part thereof, be damaged by fire or other casualty during the Term of this Permit, then SPFL shall diligently undertake to repair or replace such Properties and shall complete such repair or replacement work within six (6) months of the date of the damage or other casualty. If such damage causes the facility(s) to be beyond repair or economically infeasible to replace, SPFL will contact NASA KSC at the earliest possible opportunity to mutually assess the options available to the parties.

6.3 NASA KSC will manage a daily Launch Complex 39 (LC-39) integrated schedule to track resources, major hazards, outages, and other relevant information throughout LC-39. SPFL shall participate in the overall integrated scheduling process to coordinate all hazardous operations that extend outside the Properties. A daily LC-39 integration meeting will be held to discuss the LC-39 integrated schedule SPFL shall participate in the meeting as needed to identify and resolve resource conflicts between facilities and coordinate major hazards and outages.

ARTICLE 7 – LOAN OF PERSONAL PROPERTY

7.1 This Use Permit includes the loan of certain NASA KSC personal property (hereinafter “equipment”) associated with the infrastructure of the Properties referenced in Article 2 herein and necessary for the habitability and operability of those Properties consistent with this Use Permit. The equipment is defined in Exhibit C of this Permit. Equipment may be added to or removed from the Exhibit without revision to this Use Permit with written approval by the Technical Point of Contact (POC) in Article 18. NASA KSC equipment will be used for activities occurring within the facilities only. The equipment listed in Exhibit C is not being provided to SPFL as a substitute for the purchasing of the same type of equipment by SPFL under any existing or future contract or grant that SPFL has, or may have, with a third party. The equipment is not excess to NASA requirements.

7.2 The equipment shall be made available to SPFL on a no-charge basis for use consistent with the Use Permit. NASA retains accountability for, and title to, the equipment, and SPFL assumes all user responsibilities set forth in this Article. SPFL shall establish and adhere to a system of written procedures for compliance with specified user responsibilities. Such procedures must include holding employees and related entities liable, when appropriate, for loss, damage, or destruction of Government equipment.

7.3 SPFL shall operate and maintain all equipment in Exhibit C at its own expense. SPFL will furnish all utilities (e.g., water, electricity), fuels, consumables, and operating materials required for the O&M of the equipment. SPFL shall bear all costs associated with the authorized use of the equipment under the terms of this Use Permit.

7.4 SPFL shall identify, mark, and record each item of equipment promptly upon receipt, and maintain such identity until the equipment is returned to NASA KSC. That record shall be provided to NASA within thirty (30) days of receipt. This record shall be maintained for all items of equipment in Exhibit C.

7.5 The official record keeping, financial control, and record keeping of the equipment subject to the Article shall be retained by NASA and accomplished by the KSC Supply and Equipment Management Officer (SEMO) and Chief Financial Officer. SPFL shall allow NASA personnel access to all facilities and records for the purpose of assuring the existence of management controls, records, and practices sufficient to protect the Government property from loss, damage, destruction, or misuse.

7.6 SPFL shall assume responsibility for loss or damage to the equipment, reasonable wear and tear excepted, and with the same limitation for wear and tear, return the equipment to NASA KSC in the same functional condition as when received. It is understood that SPFL is financially responsible for any damage to the equipment while it is in the care, custody, and control of SPFL, its employees, subpermittees, contractors, subcontractors, agents, or principal investigators. SPFL shall notify NASA KSC of any loss, damage, or destruction of the equipment immediately upon said loss, damage, or destruction. SPFL shall assume the cost for replacement of any lost, damaged, or destroyed personal property.

7.7 Certify pressure vessels, tanks, and other applicable equipment prior to use at SPFL'S expense. Certification will be to NASA KSC requirements as applicable or required.

7.8 SPFL shall make equipment safe and ready for transport once the equipment is no longer needed and/or is being relocated and make all necessary disconnections and protect open ports prior to Property being removed and transported. SPFL shall identify, by written notice to the Personal Property POC, any affixed property that will be severed from the Properties prior to severing. As a minimum, the written notice shall contain the following: description of each piece of personal property to be removed, identification number, date(s) of disposal, condition, and location.

7.9 As required for economic and efficient use in commercial space launch applications, SPFL may refinish, repair, rebuild, refurbish, reinforce, or modify listed items of equipment, provided that modifications do not prevent any equipment from performing the same type of function for which it was originally designed. Modifications of equipment shall be approved in writing by the Personal Property POC prior to implementation. SPFL shall submit to the NASA Personal Property POC a NASA Form 1617, Request for Cannibalization/Modification of Controlled Equipment, to ensure records accurately reflect changes in equipment values. For any modification that may affect the operational parameters or procedures or safety considerations, SPFL shall maintain documentation of all modifications and provide such documentation to NASA with any modified equipment on its return. Documentation shall be in accordance with commercial standards. After approval by NASA, SPFL may grant permission to refinish, repair, rebuild, refurbish, reinforce, or modify equipment items in accordance with the terms of this Use Permit to any Occupant(s) to which SPFL may provide equipment items.

7.10 Use of any equipment at an offsite location (outside the Properties) requires advance approval of the Technical POC and notification of the SEMO. SPFL shall assume

accountability and financial reporting responsibility for such equipment. SPFL shall establish records and property control procedures and maintain the equipment in accordance with Exhibit C to this Use Permit until its return to the installation. As a minimum, such records shall show description, identification number, quantity, dates of receipt, condition upon receipt, and location.

7.11 SPFL shall perform an inventory of the equipment for one (1) year from the effective date of this Permit and every year thereafter, if the Permit is still in effect, and send such inventory report to the NASA SEMO. Further, SPFL shall provide to NASA, upon reasonable request, records sufficient to disclose the date of inspections, any deficiencies discovered as a result of inspections, and any maintenance actions performed. This inventory report and equipment modification requests shall be submitted to:

Supply and Equipment Management Officer
David Banks
Mail Code: TA-A5A
NASA John F. Kennedy Space Center
Kennedy Space Center, FL 32899

7.12 Any NASA KSC equipment still remaining in the Properties at the time the Use Permit is signed, that is not specifically loaned to SPFL, remains NASA KSC equipment. Should SPFL determine that such equipment needs to be moved, altered, changed, modified, or disposed of, SPFL must coordinate any such request with the NASA KSC SEMO prior to taking any action affecting that equipment. All other equipment procured by SPFL or its contractor shall be deemed the personal property of SPFL, title to which shall remain in SPFL, unless during the term of this Permit said title is transferred to NASA KSC pursuant to the terms of a separate agreement between the parties. NASA KSC hereby acknowledges and agrees that SPFL may grant, to a lender or the vendor of such personal property installed on the Properties, a security interest in the equipment owned by SPFL as long as such security interest does not create any lien or encumbrance of any kind whatsoever upon the Properties or any other property, real or personal, of NASA KSC that is loaned to SPFL or otherwise.

ARTICLE 8 – FACILITY IMPROVEMENTS

8.1 The term “Improvements,” as used in this Permit is defined as any addition, alteration, or other modification of any kind to Properties under this Permit, and excludes the actions required by SPFL under Article 6. For the purpose of this Article, the term “facility systems” shall include those systems that are installed in, or provide service to, building or other real property owned by NASA KSC at the Properties as listed in Exhibit D. For the purpose of this Article, “equipment” refers to all property that is not related to a facility system and is considered personal property.

8.2 SPFL acknowledges that the Properties are located within the secured perimeter of the Kennedy Space Center property thereby requiring NASA KSC to maintain control over

development of, and improvements to, all real property of the KSC, including the Properties subject to this Permit and the Properties located thereon. Accordingly, SPFL agrees that, prior to commencing any Improvements to the Properties that would potentially impact or affect KSC infrastructure or systems outside the Properties or would significantly change the overall functionality of the Properties as defined in Article 3.1 of this Permit, SPFL must first request and obtain NASA KSC's written approval for any such Improvements. Pursuant to this requirement, SPFL shall provide, upon NASA KSC's request, any drawings or other design information that will assist NASA KSC in responding to SPFL's request. Such information shall be provided to the NASA KSC Technical POC as described in Article 18.1 of this Permit. NASA KSC shall provide any comments or conditions to such requests within thirty (30) days of their receipt. SPFL shall follow KSC policies when implementing construction projects such as switching out coordination, limitation policy, excavation permit and utility locate procedures, trailer/equipment tie-down requirements, and movement of oversize loads.

8.3 A listing of the facility systems located at the Properties is provided in Exhibit D. On an annual basis, SPFL shall update this list and provide the update to the NASA KSC Technical POC at the address located in Article 18.1. SPFL shall develop and maintain a configuration management system to ensure facility systems configuration changes are recorded and tracked over the life of this Permit. SPFL shall display the facility number in the front and back of the facility.

ARTICLE 9 – SAFETY AND SECURITY

9.1 SPFL acknowledges full responsibility for the safety and health of its own employees and that of others who may be impacted by the condition of the Properties and the execution of operations within them. As such, SPFL shall provide and maintain a safe and healthful facility and perform operations in a manner that minimizes risks to life and health in accordance with their Safety and Health Plan. NASA will have no responsibility for ensuring SPFL compliance with Occupational Safety and Health Administration (OSHA), Federal, state, and local laws.

SPFL shall provide to NASA KSC Safety and Mission Assurance (SMA) a Safety and Health Plan, or similar documentation, describing how SPFL intends to ensure the safety and health of personnel and protect property from damage. The Safety and Health Plan, or similar documentation, shall include detailed descriptions of policies, procedures, and techniques for all anticipated working conditions that will be encountered throughout the Permit. The Safety and Health Plan, or similar documentation, shall include a Concept of Operations detailing planned major events within the facility, including an explanation of hazardous operations addressing location, hardware involved, required personnel certifications, and detailed plans for controls and mitigation. Hazardous operations are defined as any operation or other work activity that, without implementation of proper mitigations, has a potential to result in loss of life, serious injury to personnel or public, or damage to property due to the material or equipment involved or the nature of the operation/activity itself.

9.2 NASA KSC SMA will use the Safety and Health Plan, or similar documentation (as described in Article 9.1, above), to help evaluate SPFL capability to control hazards. In cases where NASA KSC SMA assesses that hazards resulting from SPFL's activities may affect personnel and property outside of the Properties and the hazard controls are not adequate to protect personnel and property outside the Properties, SPFL shall work with NASA KSC SMA to provide further clarification and implement additional controls, as necessary.

Operations may commence once NASA KSC SMA Director has formally documented that the controls are appropriate to protect personnel and property outside the Properties. NASA KSC SMA reserves the right to review the operations and the associated hazards at any time to ensure the safety of personnel and property outside the Properties. SPFL shall provide this information to NASA KSC SMA upon request. Unresolved issues will be elevated to SPFL Safety Director and the NASA KSC SMA Director.

9.3 Any planned Improvements to the Properties or supporting operations associated with the construction of those Improvements that have the potential to increase the risk level to personnel or property outside the Properties shall require documentation to NASA KSC SMA that the Improvements do not reduce the controls that protect personnel and property outside the Properties before implementation. The Improvements cannot be made until NASA KSC SMA has formally documented that the controls are appropriate to protect personnel and property outside the Properties.

9.4 SPFL shall provide to NASA KSC SMA the maximum/minimum quantities and locations of all hazardous materials to be stored or used on the Properties.

9.5 SPFL shall provide explosive commodity data with appropriate information for NASA KSC SMA to create an Explosive Site Plan in accordance with NASA-STD-8719.12, a supplemental standard to OSHA Regulation 29 CFR 1910.109. The completed site plan will be documented on the KSC Facilities Master Plan.

9.6 For mishap reporting, the term "KSC-Reportable Mishap" shall mean: An unplanned event arising from the acts or omissions of SPFL or its employees, agents, contractors, Occupant(s), or invitees that results in at least one of the following: (1) the death of an individual, or the hospitalization for inpatient care of three (3) or more individuals/employees; (2) damage to property outside the Properties; (3) injury to any individual that is not employed by SPFL agents, contractors, Occupant(s), or invitees; and/or (4) high-visibility or high-public-interest event.

SPFL shall report all KSC-Reportable Mishaps to NASA KSC as soon as the event is known (after appropriate emergency/medical response is notified) by telephoning the NASA KSC Center Safety Office at 321-867-7233 (321-867-SAFE). In addition, SPFL shall report any unsafe conditions/acts that could lead to a KSC-Reportable Mishap to the NASA KSC Center Safety Office.

NASA KSC SMA reserves the right, to exercise at its sole discretion, to investigate any KSC-Reportable Mishap in accordance with NASA KSC SMA's policies and procedures. SPFL shall cooperate in any such investigation. If SPFL conducts an independent mishap investigation, SPFL shall provide NASA KSC SMA with a copy of the final mishap report and will ensure that all corrective/preventive actions are implemented and completed.

9.7 SPFL shall comply with instructions provided by NASA KSC personnel during emergency situations. Emergency situations include, but are not limited to, facility or Center evacuations, hurricane preparations, hazardous substance releases, security threats, and fire alarms.

9.8 If NASA KSC SMA personnel observe an operation within the Properties (access in accordance with Article 10.3) that they consider has imminent danger of death or serious physical harm, they shall have the authority to stop work.

9.9 SPFL operations conducted outside the Properties (including transportation of large equipment/hazardous items and tours of KSC operated facilities) shall comply with NASA and KSC requirements.

9.10 SPFL shall not enter a controlled area other than a designated SPFL controlled area that is set up outside the Properties.

9.11 SPFL shall clearly mark any safety controlled areas that extend outside the Properties to indicate the control boundary and shall control access to these control areas. NASA KSC identifies restricted/clear areas as follows:

- A. Flashing safety warning lights, warning signs, and public address systems shall be used on the exterior of the facility for appropriate work areas or facilities where hazardous operations exist as a part of routine work. Warning light designations with adjacent warning signs at KSC are:
- B. Flashing red light when a danger period exists and personnel shall be cleared from the controlled area immediately. The adjacent sign reads, "EMERGENCY SITUATION EXISTS – CLEAR AREA IMMEDIATELY."
- C. Flashing amber light when a hazard period exists and entry to the controlled area shall be limited to essential personnel. The adjacent sign reads, "ENTRY ON CONTROLLED BASIS – HAZARDOUS MATERIAL/OPERATIONS PRESENT – ESSENTIAL PERSONNEL ONLY."

9.12 SPFL and NASA KSC shall notify affected third parties prior to shutting down and locking out a system that may affect those parties.

9.13 The fire and life safety systems for each facility shall be installed and maintained in accordance with the provisions of NASA-STD-8719.11, Revision A, provided as Exhibit E. Any facility modifications, upgrades, system replacements, or combination thereof shall meet these same provisions. The Authority Having Jurisdiction (AHJ) as defined in National Fire Protection Association, Florida Building Code, American Society of Mechanical Engineers, American National Standards Institute, NASA-STD-8719.11, and all applicable fire and life safety documents is the KSC AHJ. Fire and life safety system outages and impairments shall be brought to the attention of the KSC AHJ. If at any time a matter of compliance is brought to the attention of the AHJ, a determination will be made by the AHJ as to its resolution. This may include, but is not limited to, a written warning, cessation of operations, or potential fine. Should SPFL desire to use electronic access control, security, and fire alarms, SPFL will utilize the current NASA KSC Center-wide systems. These systems will be monitored at the KSC Protective Services Communication Center (PSCC) and will dispatch appropriate response. SPFL will be notified by the PSCC of alarms in their facilities.

9.14 SPFL will provide immediate access, limited to the AHJ and/or designated fire inspection personnel, to Properties for the purpose of performing fire and life safety inspections. SPFL will provide a Code Compliance Report annually of the facility systems that must meet code compliance requirements. This report will identify which facility systems currently meet code requirements and an abatement program for those not in compliance. NASA shall provide a current Code Compliance Report of the Properties (included as Exhibit F).

9.15 Use of ionizing or nonionizing radiation sources on KSC shall be in compliance with Kennedy NASA Procedural Requirements (KNPR) 1860.1 and KNPR 1860.2.

9.16 SPFL shall coordinate with NASA KSC to develop emergency response plans and procedures for accidental releases of hazardous materials. SPFL shall participate in KSC emergency response planning exercises and emergency response as described in the KSC Comprehensive Emergency Management Plan, as defined in KNPR 8715.2

9.17 SPFL will be responsible for developing a fire drill plan and providing it to KSC Protective Services Office (PSO) for review.

9.18 KSC PSO will provide 911 call service, emergency fire fighting response, and emergency medical response to the Properties. SPFL will ensure all personnel receive instructions on KSC emergency response procedures.

9.19 SPFL shall comply with NASA regulations that prohibit weapons or dangerous materials from being carried, transported, introduced, stored, or used without specific authorization by the KSC Chief of Security. SPFL personnel are also subject to inspection when inside the secure perimeter gates of KSC in accordance with 14 CFR 1204.1003.

9.20 The KSC PSO security office will provide 24-hours-a-day, 7-days-a-week routine security patrols and emergency response to 911 calls, security incidents, and traffic crashes to the

Properties and for SPFL personnel. KSC PSO will provide security escorts for SPFL hazardous or oversize movements. SPFL may hire proprietary unarmed security personnel inside the Properties at their discretion. SPFL will, without delay, report all acts of workplace violence to the PSO; this includes any employee who exhibits behaviors of concern. SPFL will immediately notify the PSO when an employee is terminated for any issue relating to workplace violence. The PSO will support upon request any assistance with any terminations to include escorting employees from the Center. SPFL personnel are encouraged to participate in various KSC PSO security- and safety-related training and seminars as are from time to time offered to KSC and contractor employees, e.g., Prevention of Workplace Violence.

9.21 SPFL will comply with the requirements of Homeland Security Presidential Directive 12 and KSC administrative procedures for access to KSC. The Occupant(s) will participate in the current NASA Identity, Credential, and Access Management system, badging process, and automated access control. SPFL will be charged a processing fee estimated for each employee requiring access for more than one hundred seventy-nine (179) days (charges will be assessed under KCA-4312).

9.22 In addition to maintaining a current Federal Communications Commission station license, the Permittee and Occupant(s) shall obtain a KSC Radio Frequency (RF) Authorization for all radio frequency transmitters prior to operation of those transmitters. NASA KSC will provide this authorization within two (2) weeks after receipt of all required data.

9.23 To ensure compatibility with the KSC RF environment, the Permittee and Occupant(s) shall obtain an RF Transmitter Permit from the KSC Electromagnetic Environmental Effects Working Group prior to operation of any RF transmitters. NASA KSC will provide this authorization within two (2) weeks after receipt of all required data.

9.24 Asbestos-Containing Building Materials (ACBM) may be present in facilities assigned under the scope of this Permit. NASA KSC will provide information regarding the location and quantity of known ACBM to SPFL through the Medical and Environmental Services Contract (MESC) Environmental Health Office.

Special requirements, coordination, and precautions will apply to any work taking place under the Permit that involves disturbance of ACBM. Contractors whose contracts require work involving ACBM are required to provide a written program for such work as part of their health and safety plan, which is consistent with the requirements of 29 CFR 1926.1101. SPFL shall coordinate any such work involving ACBM with MESC Environmental Health, Institutional Support Contract Fire Services, and any other resident Government or contractor organization whose employees may have access to the work location.

**ARTICLE 10 – ENVIRONMENTAL CONDITION, MANAGEMENT, AND
COMPLIANCE REQUIREMENTS**

10.1 SPFL shall ensure that all Permitted Activities, as defined below, are in compliance with all applicable Federal, state of Florida, and local environmental laws, statutes, regulations, and ordinances. Unless otherwise stated in this Permit, SPFL shall be solely responsible for compliance with aforementioned environmental regulatory requirements, including environmental permits relating to SPFL's Permitted Activities. SPFL shall be considered independent from NASA KSC and responsible for its own actions for the purposes of environmental compliance and permitting matters relating to SPFL's Permitted Activities. NASA KSC shall cooperate with SPFL and its developers, contractors, Occupant(s), and facility owners performing Permitted Uses upon the Permitted property as necessary to provide data and information as requested to facilitate SPFL's performance of this requirement.

10.2 Environmental Definitions: As used in this Permit, "**Hazardous Material**" shall mean any substance that is (a) defined under any Environmental Law (as defined below) as a hazardous substance, hazardous waste, hazardous material, pollutant, or contaminant; (b) a petroleum hydrocarbon, including crude oil or any fraction or mixture thereof; (c) hazardous, toxic, corrosive, flammable, explosive, infectious, radioactive, carcinogenic, or a reproductive toxicant; or (d) otherwise regulated pursuant to any Environmental Law. As used in this Permit, "**Environmental Law**" shall mean all applicable Federal, state, and local laws, statutes, ordinances, regulations, rules, judicial and administrative orders and decrees, permits, licenses, approvals, authorizations, and similar requirements of all Federal, state, and local governmental agencies (including applicable NASA KSC) or other Governmental authorities pertaining to the protection of human health and safety or the environment, now existing or later adopted (if said later adopted Environmental Law expressly states or is otherwise found by a court of last resort to operate retroactively) during the Term. As used in this Permit, "**Permit Activities**" shall mean the lawful activities of SPFL that are part of the ordinary course of SPFL's business in accordance with the Permitted Uses. The term "**Permit Activities**" shall include SPFL authorized activities, operations, equipment, and facilities located on the Property. As used in this Permit, "**Materials**" shall mean the materials handled, used, or stored by SPFL in the ordinary course of conducting Permit Activities. For the purposes of this Permit, "**Local Laws**" shall mean the applicable ordinances specifically relating to environmental matters, if any, of Brevard County, Florida.

10.3 SPFL is responsible for funding, implementing, and maintaining any environmental mitigation measures identified in applicable National Environmental Policy Act (NEPA) documentation developed by NASA after the Commencement Date associated with the Permit Activities. Should Permit Activities trigger the need for NEPA documentation during the Term of the Permit that did not already exist prior to commencement of the specific Permit Activity, SPFL is responsible to fund those NEPA requirements and assist NASA KSC throughout the process as necessary.

10.4 SPFL shall not remove or disturb, or cause or permit to be removed or disturbed, any archaeological or other cultural artifacts, relics, vestiges, remains, or objects of antiquity. In

the event such items are discovered on the Properties, SPFL shall cease its activities at locations on the Property that may cause the removal or disturbance of the objects subject to this provision and immediately notify the NASA Environmental Program Office and protect the immediate vicinity where the objects are situated, and shall protect the objects and surrounding material from further disturbance until the NASA Environmental Program Office gives clearance to proceed. Any costs resulting from this delay shall be the responsibility of SPFL. NASA will perform all investigations required of it by law for protection of any archaeological or other cultural artifacts, relics, vestiges, remains, or objects of antiquity present at the Premises and provide copies of reports generated to SPFL.

10.5 NASA KSC shall, at its own expense, prepare an Initial Environmental Baseline Survey (EBS) for the Properties, to be reviewed, acknowledged, and signed by representatives of NASA KSC and SPFL as acceptable for purposes of baselining the condition of the properties at the time of SPFL's occupancy under the Use Permit. See Exhibit B. NASA KSC will also consider any supplemental data collected by SPFL or its Occupant(s), at their sole expense, for the purpose of verifying and/or supplementing the EBS. The EBS, including any supplemental data collected by SPFL or its Occupant(s) and subsequently accepted by NASA KSC, shall set forth those environmental conditions and matters affecting the Properties known as of the Commencement Date as determined from records of the Properties and the analysis reflected therein. See Exhibit E. SPFL shall not be responsible to remedy any environmental conditions and matters affecting the Properties that are documented in the EBS. If the EBS identifies potential soil, surface water, or groundwater contamination requiring further investigation, NASA KSC will perform such investigations and append the findings to the EBS. Upon completion of the restoration or demolition of the Properties by SPFL pursuant to Article 17, SPFL shall prepare, at its own expense, and submit to NASA KSC an updated EBS, to be reviewed, acknowledged, and signed by representatives of NASA KSC and SPFL as acceptable for purposes of baselining the condition of the properties after restoration or demolition. The EBS update shall set forth those environmental conditions and matters affecting the Properties known as of the restoration or demolition date, based on all known activities that have occurred at the Properties as well as information contained in the records of the Properties and the analysis reflected therein. NASA KSC may require sampling of soil and/or surface and groundwater to verify environmental conditions. SPFL shall not be obligated to remedy any environmental conditions and matters affecting the Properties that were not a result of SPFL's Permit Activities. SPFL shall be liable for and required to remedy any environmental conditions and matters affecting the Properties to the extent that they are found to be directly caused by SPFL's Permit Activities on the Properties.

10.6 SPFL shall ensure that all environmental compliance requirements as defined in this Article are communicated to all developers, contractors, Occupant(s), and others performing Permitted Uses upon the Properties under a subpermit or any other agreement with SPFL. SPFL shall be liable for any environmental contamination and any noncompliance with environmental requirements, including all associated penalties and/or fines to the extent resulting from such activities and not Baseline Conditions or a result of the activities of NASA KSC, regardless of NASA KSC's consent to such activities, and all such activities shall be deemed Permit Activities.

10.7 All wastes generated by SPFL must be properly containerized, stored, labeled, manifested, shipped, and disposed of by SPFL in full regulatory compliance. Hazardous wastes

generated by SPFL must be manifested, shipped, and disposed of under SPFL's or its Occupant(s)' Environmental Protection Agency identification number for the Premises. SPFL shall maintain copies of waste management records and manifests onsite and make them available for review by NASA upon request.

10.8 SPFL shall maintain copies of all required environmental reports and notifications to regulatory agencies onsite and make them available for review by NASA upon request. Reports and notifications include, but are not limited to, permit operating reports, Emergency Planning and Community Right-To-Know Act reports, storage tank notifications, stormwater/National Pollutant Discharge Elimination System notifications, and asbestos abatement/demolition notifications.

10.9 SPFL shall obtain all required environmental permits, licenses, registrations, and approvals for Permit Activities. SPFL shall prepare or cause to be prepared all permit applications and pay or cause to be paid any application or registration fees. The NASA Environmental Assurance Branch will sign environmental permit applications as the landowner or utility system owner if legally permitted. SPFL shall submit courtesy copies of all applications and registration forms to the NASA Environmental Assurance Branch within five (5) working days after submission to the regulatory agency. SPFL shall submit courtesy copies of all permits, licenses, registrations, and approvals to the NASA Environmental Assurance Branch within five (5) working days after receipt from the regulatory agency. SPFL shall ensure that all operations, activities, equipment, and facilities are in full compliance with all permit conditions. SPFL shall maintain copies of all records required to demonstrate compliance with the permit, license, or registration onsite and make them available for review by NASA upon request.

In certain instances, NASA may modify an existing permit to incorporate an SPFL activity, obtain a new permit for an SPFL activity, or allow SPFL's activity to be covered under an existing NASA permit. If both NASA and SPFL agree to this arrangement, SPFL shall prepare any required permit applications or registrations, submit those documents to the NASA Environmental Assurance Branch for processing with the regulatory agency, and pay any application or registration fees. SPFL shall assist NASA in obtaining the permit or registration by responding to regulatory agency questions, preparing formal request-for-additional-information responses, preparing briefings, attending meetings, etc. SPFL shall ensure that all operations, activities, and facilities are in compliance with all permit conditions which may include conducting inspections, performing sampling/testing, maintaining records, performing facility/infrastructure maintenance or repair, and preparing operating reports. SPFL shall maintain copies of all records required by or used to demonstrate compliance with any permit, license, registration, or approval onsite and make them available for review by NASA upon request. SPFL shall prepare all required regulatory submittals or reports and submit them to the NASA Environmental Assurance Branch for submission to the regulatory agency. All communication and interface with regulatory agencies regarding activities conducted under a NASA-held permit or registration must be coordinated through and performed by the NASA Environmental Assurance Branch. SPFL shall be responsible for immediately correcting all

violations, findings, and deficiencies arising after the Commencement Date and identified by a regulatory agency or NASA at SPFL's expense. If formal enforcement actions are taken against NASA for environmental violations due to SPFL operations, activities, or facilities, SPFL shall reimburse NASA for any fines or penalties assessed. SPFL shall reimburse NASA for any costs for corrective or other actions taken to avoid environmental noncompliance or an enforcement action. At the termination of this Permit, SPFL shall provide copies of all records required by or used to demonstrate compliance with any permit, license, registration, or approval to the NASA Environmental Assurance Branch.

In certain instances, NASA may retain an existing environmental permit, such as a regional stormwater management permit, that includes the Properties. SPFL shall not conduct operations or modify any infrastructure that would violate the permit conditions. SPFL shall allow NASA (and NASA's contractors) to enter the Property to conduct inspections, perform monitoring, conduct sampling, and perform maintenance/repair activities to maintain permit compliance. Existing permits that will be retained for the Properties are:

- A. Environmental Resource Permit for Stormwater Management, Permit #42-009-1506NG, Runoff From Parking Lot East of OPF 3 and SSMEPF
- B. Environmental Resource Permit for Stormwater Management, Permit #40-009-0315G, Runoff From SRM Road and Correct Deficiencies With Past Stormwater Retention Construction Around OPF 3 and SSMEPF
- C. Environmental Resource Permit for Stormwater Management, Permit #40-009-491G, Runoff From SSMEPF and Surrounding Paved Area
- D. Environmental Resource Permit for Stormwater Management, Permit #40-009-81302-2, Runoff From Expansion of Parking Lot Southwest of OPF 3
- E. Environmental Resource Permit for Stormwater Management, Permit #40-009-0377GM, Runoff From VAB Area Stormwater Sub-Basin 11 (includes PCC)

Upon request by SPFL, NASA shall provide copies of any existing environmental permit or approval listed above. NASA shall provide SPFL with courtesy copies of all Permit modifications as they are approved.

10.10 SPFL shall take measures to prevent the release of hazardous materials on, about, or beneath the Properties. SPFL shall immediately report all spills, releases, and emissions of hazardous materials to the environment (air, soil, surface water, groundwater, sediments, etc.) to KSC emergency responders by calling 321-867-7911. SPFL shall also immediately report the release to the NASA Environmental Assurance Branch by calling 321-867-9005. SPFL is responsible for performing any required release reporting to appropriate offsite authorities (such as National Response Center, State Emergency Response Commission, Florida Department of Environmental Protection, etc.). For all releases, SPFL shall complete a KSC Pollution Incident Reporting and Notification (Form KSC 21-555) and submit it to the NASA Environmental Assurance Branch within three (3) calendar days after the incident.

Once the release has been controlled and declared safe by KSC emergency responders, the KSC postemergency spill team will respond to clean up the spill. SPFL shall reimburse NASA for the emergency response and spill cleanup support or establish support agreements directly with those NASA contractors. SPFL shall be responsible for proper disposal of any cleanup waste and contaminated media except to the extent remediation was required due to conditions documented in the EBS as arising before the Commencement Date. NASA KSC shall bear the cost to remediate such baseline conditions documented in the EBS. If environmental contamination remains after the KSC postemergency spill team response, SPFL, at its own expense, shall promptly remediate the site to state of Florida residential standards unless otherwise approved by the NASA Environmental Assurance Branch Chief. All remediation activities and regulatory agency communication and reporting shall be coordinated through the NASA Environmental Assurance Branch. The liability of SPFL under this section of this Permit shall survive the termination of this Permit with respect to acts or omissions that occur before such termination.

10.11 For all facility projects; construction; demolition; excavation; land clearing; land grading; dewatering; connecting, disconnecting, or modifying the configuration or operation of a NASA-owned system or utility; discharging of waste water to a NASA utility system; changes in operations and activities; or any other operation or action, SPFL shall complete a KSC Environmental Checklist (KSC Form 21-608) and submit it to the NASA Environmental Management Branch as early in the planning process as possible for evaluation. SPFL shall comply with all the environmental requirements set out in the response to the checklist which will be provided to SPFL prior to commencement of the project.

10.12 SPFL shall allow NASA personnel full access to conduct internal inspections of all facilities, systems, materials, records, and wastes for compliance with environmental laws, regulations, and permits. SPFL shall attend all internal inspections. SPFL shall deliver corrective action responses for all identified violations, findings, and deficiencies to the inspector by the due date in the inspection letter. NASA shall provide SPFL reasonable time to prepare corrective action responses. SPFL shall be responsible for correcting all violations, findings, and deficiencies identified in the inspection letter at SPFL's expense, upon receipt of all applicable Federal, state, and local government approvals.

10.13 Upon termination of this Permit, SPFL shall cancel all permits, registrations, or licenses held by SPFL, remove permitted or registered equipment, and return the Properties to original condition as documented in the 2011 EBS. If an SPFL activity is incorporated into a NASA-held permit, NASA will decide if the permit should be modified to remove SPFL's activity.

10.14 Upon expiration of this Permit, NASA environmental staff shall perform a facility walk-down with SPFL personnel to ensure the removal of all hazardous materials and hazardous wastes and the proper closures of regulated activities and equipment.

10.15 This Article shall survive the termination of this Permit with respect to any environmental noncompliance condition identified by NASA KSC or SPFL and shall continue

until such noncompliance condition is fully mitigated, remediated, abated, or otherwise remedied to the satisfaction of NASA KSC and any Federal, state, or local regulators having jurisdiction over the noncompliance condition.

ARTICLE 11 – ACCESS TO DEDICATED PROPERTIES

11.1 SPFL acknowledges that the Properties are located within the confines of a secured Federal facility which is subject to the requirements of laws, regulations, NASA directives, Executive orders, and/or declarations of national emergency or war made by the United States Government which may affect SPFL's access to the Properties. SPFL agrees to comply at all times with said requirements and to require its duly authorized employees, agents, contractors, subcontractors, assignees, licensees, invitees, and guests to do the same. Subject to said requirements, SPFL, its employees, agents, contractors, subcontractors, assignees, licensees, invitees, and guests shall have access at all times to the Properties for the intended purposes of this Permit, and except as provided in this Permit, SPFL will have possession of the Properties. NASA and its contractors shall retain security control and access to the areas within the OPF 3/SSMEPF fence until the transfer of the SSMEPF, or the last facility, occurs in accordance with Article 4.1. Upon transfer of the complex to SPFL as indicated in Article 4.1, SPFL or its Occupant(s) shall assume responsibility for security control and access.

11.2 During the Term of this Permit, SPFL has the nonexclusive right to use those areas on or adjacent to the Properties (such as driveways, sidewalks, parking areas, loading areas, and access roads) that are designated by NASA KSC as common areas and not permitted to or allocated for the use of another permittee or user. NASA KSC shall have the right from time to time to change the size, location, configuration, character, or use of any such common areas, construct additional improvements or facilities in any such common areas, or close any such common areas, provided that SPFL has reasonable access to the Properties at all times during the Term of this Permit. SPFL shall not interfere with the rights of NASA KSC and other users of the Properties to use such common areas.

11.3 NASA KSC shall have the right to enter the Properties, preferably with an advance twenty-four (24) hours notice to SPFL, to schedule an accompanied tour to (a) inspect, (b) determine whether SPFL is performing all of its obligations, (c) supply any service to be provided by NASA KSC, (d) post notices, and (e) make any repairs to any adjoining space or utilities, or make any repairs, alterations, or improvements to any other portion of the Properties, provided all such work shall be done as promptly as reasonably practicable and so as to cause as little interference to SPFL as reasonably practicable. NASA KSC also specifically reserves the following rights: (i) to control ingress to and egress from the Properties, to erect and maintain gates, and to regulate or prevent traffic and (ii) on behalf of NASA KSC, the United States Environmental Protection Agency, the state of Florida, and other entities and Governmental agencies that are involved in the remediation of, or that are responsible to remediate, existing contamination on or about the Properties, the right to have unobstructed access to known or suspected areas of contamination or other areas upon which any containment system, treatment system, monitoring system, or other environmental response action is installed or implemented,

or to be installed or implemented, for the purpose of complying with Environmental Law and requirements.

11.4 SPFL shall manage its use of the Properties, and any Occupant(s) construction and operations, so as to avoid interference with NASA KSC programmatic needs or operations. If SPFL or NASA identifies any potential or actual interference, SPFL shall be obligated to take immediate action to correct the situation. In the event that NASA KSC determines any activity of SPFL or its related entities constitutes a threat to any ongoing programmatic need or operation, NASA KSC shall have the right to temporarily order immediate cessation of the activity, and SPFL shall immediately comply. NASA KSC and SPFL will coordinate as necessary to expeditiously resolve the identified interference. Any such identification of interference or order of cessation as described here shall not be construed as an Event of Default by NASA KSC under Article 14 of this Permit. It is understood that normal day-to-day operations of the Properties by the approved Occupant(s) and their associated uses in compliance with Permit terms should not create an impact to ongoing programmatic needs or operations.

11.5 SPFL or its Occupant(s) shall use the KSC Locksmith for management of locks within the facilities. The use of this service will aid KSC first responders in the event of their need to enter the facilities. The charges for the use of the KSC Locksmith will be detailed in KCA-4312.

ARTICLE 12 – UTILITIES AND INSTITUTIONAL SERVICES

12.1 NASA KSC shall provide the following services to the Properties, subject to the capabilities of the infrastructure, delivery systems, facility systems, or fixtures existing as of the effective date of this Permit: fire and rescue and security services; electricity; potable water; sewer service; and telecommunications connections as requested by SPFL. SPFL may also request support for facilities O&M services and propellant services. SPFL shall pay for all costs, assessments, fees, and other expenses in accordance with the terms and conditions of RSAA KCA-4312. Should SPFL desire NASA KSC to increase those utilities or services provided by NASA KSC beyond the capabilities of the infrastructure, delivery systems, facility systems, or fixtures existing as of the effective date of this Permit, SPFL may request, and NASA KSC may agree, to undertake such an increase, provided that SPFL shall pay for all costs, assessments, fees, and other expenses related thereto.

12.2 SPFL agrees that it is responsible for obtaining any other utility or municipal service not expressly provided for under Article 12.1, and SPFL shall bear the costs of obtaining such services. Prior to requesting any such service, SPFL shall first obtain from NASA KSC any necessary approvals, easements, or licenses. SPFL at its option may request these additional services from NASA KSC, and the costs of providing these services will be established under RSAA KCA-4312.

12.3 NASA KSC shall not be in default under this Permit or be liable for any damage or loss directly or indirectly resulting from, nor shall a constructive or other eviction be deemed to

have occurred by reason of, any interruption of or failure to supply or delay in supplying any utilities or services under this Article 12.

**ARTICLE 13 – INDEMNIFICATION, LIMITATION OF
LIABILITY, AND INSURANCE**

13.1 SPFL shall be responsible for any damage or destruction that may be caused to any properties of the United States by the activities of SPFL, its employees, agents, Occupant(s), contractors, subcontractors, assignees, licensees, invitees, or guests under this Permit. NASA KSC shall not be liable to SPFL, and SPFL hereby waives and releases all claims against NASA KSC for any damage to, or loss or theft of, any property or for any bodily or personal injury, illness, or death of any person in, on, or about the Properties arising at any time and from any cause whatsoever, except to the extent the same is caused solely by the willful misconduct or gross negligence of NASA KSC. Any properties of the United States so damaged or destroyed shall be promptly repaired or replaced by SPFL to a condition substantially the same as the prior condition, or at NASA KSC's election, reimbursement made therefore by SPFL in an amount necessary to restore or replace the properties to a condition substantially the same as the prior condition.

13.2 To the extent permitted by law, SPFL shall indemnify and defend NASA KSC against, and hold NASA KSC harmless from, all claims, demands, liabilities, damages, losses, costs, and expenses, including reasonable attorneys' fees and disbursements, caused by (a) any use or occupancy of the Properties by SPFL, its employees, agents, contractors, subcontractors, Occupant(s), assignees, licensees, invitees, or guests; (b) any condition of the Properties; (c) any breach of SPFL's obligations under this Permit; or (d) any damage to any property (including property of SPFL and its employees, agents, contractors, subcontractors, Occupant(s), assignees, licensees, invitees, or guests) or any bodily or personal injury, illness, or death of any person (including property of SPFL and its employees, agents, contractors, subcontractors, Occupant(s), assignees, licensees, invitees, or guests) occurring in, on, the Properties or any part thereof arising at any time and from any cause whatsoever (except to the extent the same is caused solely by the willful misconduct or gross negligence of NASA KSC), or occurring in, on, or about any part of the Properties when such damage, bodily or personal injury, illness, or death is caused by any act or omission of SPFL or its agents, employees, contractors, subcontractors, assignees, Occupant(s), licensees, invitees, or guests.

13.3 To the extent authorized by the Federal Tort Claims Act, the Contract Disputes Act, the Equal Access to Justice Act, and other applicable laws of the United States, NASA KSC shall be responsible for defending against and/or paying claims, demands, liabilities, damages, losses, costs, and expenses, including reasonable attorneys' fees and disbursements, arising from the NASA KSC's actions or inactions as they relate to this Permit.

13.4 To the extent permitted by law, SPFL's tort obligations arising from conduct of its obligations hereunder are subject to the limitations of liability as provided in Section 768.28,

Florida Statutes, as amended, and nothing herein shall act as a waiver of Partner's entitlement of sovereign immunity as a matter of statutory or common law.

13.5 NASA KSC and SPFL each hereby expressly, irrevocably, fully, and forever release, waive, and relinquish any and all right to receive punitive, exemplary, and consequential damages from the other (or any past, present, or future member, trustee, director, officer, employee, agent, representative, or advisor of the other) in any claim, demand, action, suit, proceeding, or cause of action in which NASA KSC and SPFL are parties, which in any way (directly or indirectly) arises out of, results from, or relates to, any of the following, in each case whether now existing or hereafter arising and whether based on contract or tort or any other legal basis: this Permit; any past, present, or future act, omission, conduct, or activity with respect to this Permit; any transaction, event, or occurrence contemplated by this Permit; the performance of any obligation or the exercise of any right under this Permit; or the enforcement of this Permit. To the extent permitted by law, NASA KSC and SPFL reserve the right to recover actual damages, with interest, attorneys' fees, costs, and expenses as provided in this Permit, for any breach of the Permit.

13.6 SPFL shall obtain and keep insurance coverage in the type and amounts described in paragraph 12.6 from its local government insurance pool carrier or by a commercial carrier meeting the rating requirements of Article 13.8a, below. Except for NASA KSC, SPFL shall also cause its Occupant(s) or other entities with ownership of Improvements made to the Properties to obtain and maintain casualty insurance in an amount equal to the replacement value of such Improvements.

13.7 SPFL acknowledges that any contractors or Occupant(s) working at the Properties shall obtain and keep the following insurance: (a) commercial general liability insurance, including contractual liability, broad form property damage liability, fire legal liability, products and completed operations, and medical payments, with limits not less than \$2 million per occurrence and aggregate, insuring against claims for bodily injury, personal injury, and property damage arising from the use, occupancy, or maintenance of the Properties; (b) business auto liability insurance with limits not less than \$1 million per accident covering owned, hired, or nonowned vehicles; (c) workers' compensation insurance for all of its employees in statutory limits as required by Florida law; and (d) employers liability insurance which affords not less than \$500 thousand for each coverage. SPFL at its option may maintain all risk property insurance for all real or personal property, fixtures, and equipment of SPFL installed by SPFL in the Properties. Any assignees under this Permit shall also be required to obtain and keep the foregoing insurance with such coverage amounts. Assignees, subpermittees, and Occupant(s) of SPFL under this Permit shall also be required to obtain and keep the foregoing insurance coverage and amounts unless NASA KSC consents to different coverages and amounts pursuant to its review and approval of Occupant(s).

13.8 Insurance Requirements

- A. Except as otherwise provided herein, all insurance and all renewals thereof shall be issued by companies with a rating of at least "A-VIII" (or its equivalent successor) or better in the current edition of Best's Insurance Reports (or its equivalent successor or, if there is no equivalent successor rating, otherwise acceptable to NASA KSC) and be licensed to do and be doing business in Florida.
- B. Except as otherwise provided herein, each policy shall be endorsed to provide that the policy shall not be canceled or materially altered with respect to coverage afforded to NASA KSC hereunder without thirty (30) day's prior written notice to NASA KSC and shall remain in effect notwithstanding any such cancellation or alteration until such notice shall have been given to NASA KSC and such period of thirty (30) days shall have expired.
- C. Except as otherwise provided herein, the commercial general liability and any automobile liability insurance shall be endorsed to name NASA KSC (and any other parties designated in writing by NASA KSC) as an additional insured, shall be primary and noncontributing with any insurance which may be carried by NASA KSC, and shall afford coverage for all claims based on any act, omission, event, or condition that occurred or arose (or the onset of which occurred or arose) during the policy period.
- D. In the event that SPFL assigns the Permit or creates a subpermit, then such subpermittee or Occupant(s) shall deliver certificates of insurance and endorsements to NASA KSC at least ten (10) days before the transfer date between SPFL and the assignee or subpermittee or Occupant(s) and at least ten (10) days before expiration of each policy. Each certificate of insurance shall list the certificate holder as follows:

National Aeronautics and Space Administration
John F. Kennedy Space Center
Attn: Office of the Chief Counsel
Mail Code: CC
Kennedy Space Center, FL 32899

- E. All of the insurance amounts specified in Article 13.7 shall be evaluated every fifth year by NASA KSC to generally ensure that the amounts keep up with currency inflation.

13.9 Subrogation. In the event that SPFL assigns the Permit or creates a subpermit, the assignees or subpermittee or Occupant(s) shall waive, under all policies of insurance now or hereafter carried by the assignees or subpermittees or Occupant(s) or covering the Properties or any operation thereof, all rights of subrogation which any such insurer may have to any claims of the assignees or subpermittees or Occupant(s) against NASA KSC. Assignees or subpermittee or Occupant(s) shall procure from each of the insurers under all such policies of insurance a waiver

of all rights of subrogation which the insurer might otherwise, if at all, have to any claims of assignees or subpermittees or Occupant(s) against NASA KSC by obtaining from the insurer the following statement: "The insurer waives any right of subrogation against the United States of America which may arise by reason of any payment under the policy."

13.10 Performance and Payment Bonds. Prior to beginning work on the Properties under any contract for construction pursuant to this Permit, SPFL shall cause the construction contractor to provide, in a form acceptable to SPFL and NASA KSC, two (2) bonds for each contract; specifically, a performance bond and a payment bond, each with a good and sufficient surety or sureties acceptable to NASA KSC and SPFL. SPFL and NASA KSC shall be named on such bonds as co-payees. Bonds shall not be required for any construction project with a value of less than \$100 thousand.

The penal amount for each performance bond shall be 100 percent of the contract value at the time of award. Performance bonds shall be submitted in the form and following the procedures in Federal Acquisition Regulation (FAR) 52.228-15 and FAR Part 28, or equivalent procedures under Florida law if NASA KSC, in its sole discretion, determines it is appropriate.

Payment bonds shall be submitted in the form and following the procedures in FAR 52.228-15 and FAR Part 28, or equivalent procedures under Florida law if NASA KSC, in its sole discretion, determines it is appropriate. In addition:

- A. When the contract value is \$1 million or less, the penal sum will be fifty (50) percent of the contract value.
- B. When the contract value is in excess of \$1 million but not in excess of \$5 million, the penal sum shall be forty (40) percent of the contract value.
- C. When the contract value is more than \$5 million, the penal sum shall be \$2.5 million.

SPFL shall promptly furnish additional bond security required to protect NASA KSC and persons supplying labor and materials under any contract for construction entered into pursuant to this Permit if:

- A. Any surety upon any bond furnished under the above paragraphs becomes unacceptable to NASA in the reasonable exercise of its discretion;
- B. Any surety fails to furnish reports on its financial condition as reasonably required by NASA; or
- C. The contract value of any contract for construction entered into pursuant to this Permit is increased so that the penal sum of any bond becomes inadequate in the reasonable opinion of NASA KSC.

While SPFL has sole responsibility for ensuring that the appropriate performance and payment bonds are in place for all construction contracts, if SPFL has a concern about a particular bond prior to award of a contract, SPFL may request that NASA KSC provide a

courtesy review of the bonding documents. This review will create no liability on the part of NASA KSC, and acceptance of the bond documentation remains the sole responsibility of SPFL. Should an event occur that requires SPFL to exercise its rights under either the payment bond or the performance bond of any construction contractor at the Properties, SPFL shall notify the POC identified in Article 17 of the event, and the steps that SPFL is taking to correct the event. Though SPFL is primarily responsible for resolving all bonding issues at the Properties, should SPFL request assistance from NASA KSC in resolving the event, NASA KSC will provide reasonable assistance within applicable laws and regulations.

ARTICLE 14 – DEFAULT AND REMEDIES

14.1 The occurrence of any one or more of the following events (“Event of Default”) shall constitute a breach of this Permit by SPFL or NASA KSC, as applicable:

14.1.1 SPFL or NASA KSC fails to perform or breaches any other agreement or covenant of this Permit to be performed or observed by SPFL/NASA KSC as and when performance or observance is due and such failure or breach continues for more than thirty (30) days after the nondefaulting party gives written notice thereof to the defaulting party; provided, however, that if, by the nature of such agreement or covenant, such failure or breach cannot reasonably be cured within such period of thirty (30) days, an Event of Default shall not exist as long as the defaulting party commences with due diligence and dispatch the curing of such failure or breach within such period of thirty (30) days and, having so commenced, thereafter prosecutes with diligence and dispatch and completes the curing of such failure or breach; or

14.1.2 SPFL (a) files, or consents by answer or otherwise to the filing against it of, a petition for relief or reorganization or arrangement or any other petition in bankruptcy or for liquidation or to take advantage of any bankruptcy, insolvency, or other debtors’ relief law of any jurisdiction; (b) makes an assignment for the benefit of its creditors; or (c) consents to the appointment of a custodian, receiver, trustee, or other officer with similar powers of SPFL or of any substantial part of SPFL’s Properties; or

14.1.3 Without consent by SPFL, a court or Government authority enters an order, and such order is not vacated within thirty (30) days, (a) appointing a custodian, receiver, trustee, or other officer with similar powers with respect to SPFL or with respect to any substantial part of SPFL’s Properties; or (b) constituting an order for relief or approving a petition for relief or reorganization or arrangement or any other petition in bankruptcy or for liquidation or to take advantage of any bankruptcy, insolvency, or other debtors’ relief law of any jurisdiction; or (c) ordering the dissolution, winding up, or liquidation of SPFL; or

14.1.4 This Permit or any Properties of SPFL associated with this Permit are levied upon under any attachment or execution and such attachment or execution is not vacated within thirty (30) days; or

14.1.5 SPFL fails to repair or replace the Properties or equipment owned by SPFL, unless otherwise agreed by the Parties within six (6) months after damage by fire or other casualty, or SPFL otherwise abandons the Properties for a period of six (6) months unless such repair is not feasible as defined in Article 6.2 of this Permit. In the event of said failure to make repairs/replacements, or in the event of said abandonment, all of SPFL's existing facilities and Improvements on the Properties shall be deemed to be abandoned. Upon such abandonment, the Properties shall be restored in accordance with Article 17.1 of this Permit. Should any part of the abandoned Properties include personal property owned by SPFL, NASA KSC may retain the same, or at the option of NASA KSC, sell or otherwise dispose of the same in any commercially reasonable manner.

14.2 CMO services will be provided to SPFL on a nondiscriminatory basis. NASA KSC shall not be in default under this Permit or be liable for any damage or loss directly or indirectly resulting from, nor a constructive or other eviction be deemed to have occurred by reason of, any interruption of or failure to supply or delay in supplying any CMO services referenced in this Permit. To the extent there are planned or scheduled outages of CMO Services, those will be communicated to SPFL or its Occupant(s) through participation in the LC-39 integration meetings as described in Article 6.3. For unexpected outages of CMO services during routine operating conditions, NASA KSC will provide information to SPFL regarding that outage within a reasonable time after notification that such an outage as occurred. For outages associated with hurricanes or other severe conditions, any outage will be resolved in accordance with NASA policies and procedures for restoring operations at NASA KSC when the severe condition has passed. Should NASA KSC determine that it will no longer be providing a CMO service or services to SPFL, NASA KSC will use its reasonable efforts to provide advance notice of the termination of the service or services with sufficient time for SPFL to establish those services with an alternate provider.

14.3 The waiver by NASA KSC or SPFL of any breach of any covenant in this Permit shall not be deemed to be a waiver of any subsequent breach of the same or any other covenant in this Permit, nor shall any custom or practice which may grow up between NASA KSC and SPFL in the administration of this Permit be construed to waive or to lessen the right of NASA KSC or SPFL to insist upon the performance by NASA KSC or SPFL in strict accordance with this Permit.

14.4 This Permit is subject to such laws, regulations, NASA directives, Executive orders, and/or declarations of national emergency or war made by the United States Government (or its designated representatives) affecting the Permit, use, or occupancy of Federal properties and/or facilities. SPFL may submit written requests to NASA for waivers of such provisions in cases where NASA regulations, policies, or guidelines conflict with commercially reasonable standards.

ARTICLE 15 – TERMINATION, EXPIRATION, AND SURRENDER

15.1 If SPFL or NASA KSC is responsible for an Event of Default, the nondefaulting party shall have the right at any time to give a ninety (90) -day written termination notice to the other party, and on the date specified in such notice, SPFL's right to possession shall terminate. Upon such termination due to default by SPFL, NASA KSC shall have the full and immediate right to possession of the Properties, and NASA KSC shall have the right to recover from SPFL all amounts necessary to compensate NASA KSC for all the detriment caused by SPFL's failure to perform all of SPFL's obligations under this Permit of which in the ordinary course of things would be likely to result therefrom. Upon such termination due to default by the NASA KSC, SPFL shall be relieved of all further obligations under this Permit, including the payment of consideration, if applicable.

15.2 If SPFL is responsible for an Event of Default, this Permit shall continue in effect for so long as NASA KSC does not terminate SPFL's right to possession, and NASA KSC shall have the right to enforce all its rights and remedies under this Permit, including the right to recover any consideration as it becomes due under this Permit.

15.3 Upon the occurrence of an Event of Default by either SPFL or the NASA KSC, the nondefaulting party shall have the right to exercise and enforce all rights and remedies granted or permitted by law. The remedies provided for in this Permit are cumulative and in addition to all other remedies available to NASA KSC or SPFL at law or in equity by statute or otherwise. Exercise by NASA KSC of any remedy shall not be deemed to be an acceptance or surrender of the Properties by SPFL, either by agreement or by operation of law. Surrender of the Properties can be effected only by the written agreement of NASA KSC and SPFL.

15.4 Neither Party shall be deemed to be in default by reason of any delay or failure in performance of this Permit, in accordance with its terms and conditions, if such delay or failure arises out of causes beyond the control of such party, including but not restricted to, acts of God, acts of Government, insurrections, fires, floods, accidents, epidemics, quarantines, restrictions, strikes, freight embargoes, inability to secure raw materials or transportation facilities, acts or omissions of carriers, or any and all causes beyond the control of such party, and the period of performance of any term or condition shall be extended for the period of delay. Upon conclusion of the delay, the requirements of Article 14 apply with respect to curing the default.

15.5 Notwithstanding any other provision of this Permit, SPFL may terminate this Permit at any time by giving NASA KSC at least ninety (90) day's prior written notice. Should SPFL choose to terminate this Permit, they shall still be responsible for restoration or demolition of the Properties as described in Article 17 of this Permit, as determined by NASA KSC in its sole discretion.

15.6 Termination by NASA

- A. NASA's commitment under this Permit to make available Government property and services required by SPFL may be terminated by NASA, in whole or in part, (a) upon a declaration of war by the Congress of the United States, or (b) upon a declaration of a national emergency by the President of the United States, or (c) upon a NASA determination, in writing, that NASA is required to terminate such services for reasons beyond its control. For purposes of this Section 15.6, reasons beyond NASA's control are reasons which make impractical or impossible NASA's or its contractors' or subcontractors' performance of this Permit. Such reasons include, but are not limited to, acts of God or of the public enemy, acts of the United States Government other than NASA, in either its sovereign or contractual capacity (to include failure of Congress to appropriate sufficient funding), fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, or unusually severe weather. In the event of termination under this paragraph, NASA will seek to provide reasonable advance notice and will seek to mitigate the effect of such termination, if possible, and will enter into discussions with SPFL for that purpose.
- B. If, during the term of the Permit, NASA develops a programmatic requirement for the Properties (or any portion thereof), NASA reserves the right to terminate the Permit as to the affected assets after providing SPFL no less than six (6) month's written notice. NASA's right to terminate this Permit under this paragraph is contingent upon NASA's reasonable determination that alternate facilities are either not suitable or not available and that SPFL's continued use is incompatible with NASA's programmatic requirements. Notwithstanding the minimum six (6) -month notice prior to any termination under this paragraph, NASA agrees that it will take reasonable efforts to notify SPFL as soon as it is aware of a potential NASA requirement for the Properties and to cooperate with SPFL to working toward a solution that to the greatest extent accommodates the needs of both parties.
- C. NASA shall not be liable for any costs, loss of profits, revenue, or other direct, indirect, or consequential damages incurred by SPFL, its contractors, subcontractors, subpermittees, or others in privity with SPFL as a result of the termination by NASA pursuant to this Section 15.6. In the event that NASA exercises its right under this Section 15.6, SPFL's obligation to demolish the facility, and maintain an escrow account for that purpose, or restore it to the condition received, is extinguished.

15.7 This Permit will terminate in the event that NASA KSC pursues and concludes a transfer of ownership of the Properties covered by this Permit through a "Public Benefit Conveyance" or "Negotiated Sale" facilitated by the General Services Administration under applicable Federal statutes and property disposal processes governing assets that are in excess to the Government's needs.

ARTICLE 16 – DISPUTE RESOLUTION AND GOVERNING LAW

16.1 The provisions of this section shall be used to resolve disputes between the Parties which have not, after reasonable effort, been resolved informally. Any Party to this Permit may invoke this section to resolve a dispute. The procedures under this section may be modified through mutual consent of the Parties.

16.2 NASA Manager, Center Planning and Development Office, and SPFL President shall be the principal POCs for resolution of disputes arising under this Permit. If a dispute cannot be resolved informally within thirty (30) working days after the specific written notice that a disagreement exists to which this clause applies, the matter shall be submitted, in writing, to the principal POCs identified above. The principal POCs will then have ten (10) working days within which to resolve the dispute.

16.3 If the principal POCs are unable to resolve a dispute within ten (10) working days, the dispute shall be referred to the Director of KSC on behalf of NASA, and SPFL President on behalf of SPFL, for resolution. If these two parties are unable to resolve the dispute, the Director, KSC, will issue an Agency decision which will be final as to all issues raised by the dispute.

16.4 It is the intent of both Parties that all reasonable efforts are made to resolve disputes informally prior to invoking the provisions of this section.

16.5 If the Parties are unable to resolve amicably any dispute arising out of or in connection with this Permit, each shall have all remedies available at law or in equity. United States Federal Law governs this Permit for all purposes, including, but not limited to, determining the validity of this Permit, the meaning of its provisions, and the rights, obligations and remedies of the Parties. NASA KSC and SPFL consent and agree that any legal proceeding involving this Permit or the activities conducted under this Permit, which involve the United States, NASA KSC, its Administrator, or any of its officials or employees shall be brought in an Federal Administrative Court or Federal Court of competent jurisdiction. SPFL shall, at its sole cost and expense, promptly comply with all applicable Federal, state, and local laws.

ARTICLE 17 – END STATE OF PROPERTIES

17.1 At the end of the Term of the Permit, SPFL shall fund and implement the demolition of the Properties, including all Improvements to the land both existing and those made as a result of the implementation of this Permit as described in Article 7. SPFL shall provide NASA KSC with a demolition plan for each facility no later than twenty-four (24) months prior to the end of the Permit Term for each of the Properties for review and approval. The demolition plan shall include a statement of work for the project, along with a detailed schedule and a description of how SPFL will manage the demolition project if the work is done by a third party contractor with SPFL. All aspects of the demolition plan are subject to review and approval of NASA KSC, and approval will not be unreasonably withheld. The parties

recognize that due to the location of the facility on KSC, careful coordination of all demolition work will be required. This coordination may include other NASA KSC Occupant(s), NASA KSC contractors, or other parties as may be necessary.

17.2 While demolition is the anticipated end state of the facilities, should NASA KSC determine that the property should be left intact and restored to the Government, NASA KSC shall make reasonable attempts to provide notice to SPFL at least twenty-four (24) months prior to the end of the Permit Term. Thereafter, those Improvements made by SPFL to the Properties, whether temporary or permanent in character and not required by NASA KSC, shall be removed by SPFL, and SPFL shall restore the Properties to a condition satisfactory to NASA KSC by the end of the Permit Term, or whenever the parties mutually agree that restoration should occur. Should SPFL fail or neglect to remove said Improvements and restore the Properties within the agreed upon time, then, at the option of the NASA KSC, the Properties shall either become the Properties of the United States without compensation to SPFL therefore, or the NASA KSC may cause the Properties to be removed at the expense of SPFL, and SPFL shall have no claim for damages against the United States, its officers, or agents, on account of such removal and restoration work. SPFL shall pay the United States on demand any reasonable sum which may be expended by the United States in accomplishing the restoration of the Properties pursuant to this paragraph.

17.3 SPFL shall establish an Escrow Account with an independent trustee for purposes of ensuring that funding necessary for demolition of the facilities will be available when that event occurs. The Escrow Account shall include terms and conditions that prevent partial or full liquidation of the account for any purpose other than demolition of the Properties, regardless of the status of SPFL. NASA KSC shall have the right to review the proposed trustee agreement and/or Escrow Account provisions prior to execution to ensure they are adequate for providing the necessary financial guarantee for demolition. A copy of the fully executed agreement(s) shall be provided to NASA KSC within ten (10) days of establishment of the Escrow Account. SPFL shall fully fund the Escrow Account within five (5) years from the date of the last signature to this permit, and shall provide documentation to NASA KSC at that time that clearly shows the Escrow Account is fully funded. The estimated cost of demolition is estimated to be \$4.85 million in 2011 dollars.

ARTICLE 18 – NOTICES AND PRINCIPAL POINTS OF CONTACT

18.1 All correspondence and notices to be given pursuant to this Permit shall be addressed, if to SPFL, to:

Mr. Mark Bontrager
Vice President, Spaceport Operations
SPFL Building M6-306
State Road 405
Kennedy Space Center, FL 32899

Phone: 321-730-5301, ext 235
Fax: 321-730-5307
E-Mail: mbontrager@spaceflorida.gov

If to the NASA KSC, to:
Administrative Contact:

Ms. Sheryl Chaffee
KSC Real Property Accountable Officer
NASA Kennedy Space Center
Mail Code: TA-B4-C
Kennedy Space Center, FL 32899

Phone: 321-867-8047
Fax: 321-861-7946
E-mail: Sheryl.L.Chaffee@nasa.gov

Business Contact:

Ms. Vicki Johnston
Partnership Development Manager
NASA Kennedy Space Center
Mail Code: AA-D
Kennedy Space Center, FL 32899

Phone: 321-867-3722
Fax: 321-867-1670
E-mail: Vicki.C.Johnston@nasa.gov

Technical Contact:

Mr. Michael Bruder
OPF 3 Operations and Planning
NASA Kennedy Space Center
Mail Code: GP-02
Kennedy Space Center, FL 32899

Phone: 321-867-6035
Fax: 321-861-0182
E-mail: Michael.D.Bruder@nasa.gov

or as may, from time to time, otherwise be directed by the parties.

18.2 All written requests, approvals, consents, and notices under this Permit shall be addressed properly, and either deposited in the United States mail, postage prepaid, or delivered by hand, or sent via facsimile or electronic mail to the applicable party. Such requests,

approvals, consents, notices, and other communications shall be effective on the date of receipt (evidenced by the certified mail receipt) if delivered by United States mail. If any such request, approval, consent, notice, or other communication is not received or cannot be delivered due to a change in the address of the receiving party, of which notice was not previously given to the sending party or due to a refusal to accept by the receiving party, such request, approval, consent, notice, or other communication shall be effective on the date delivery is attempted. Each Party shall recognize successor POCs and shall provide appropriate and timely notification when such changes occur.

ARTICLE 19 – DISCLAIMER OF NASA FINANCIAL LIABILITIES

19.1 NASA KSC's ability to perform its obligations under this Permit is subject to the availability of appropriated funds. Nothing in this Permit commits the United States Congress to appropriated funds for the purposes stated herein (pursuant to the Anti-Deficiency Act, 31 U.S.C. Section 1341).

19.2 Except for any lien or encumbrance that may attach to the personal Properties owned by SPFL and installed on the Properties pursuant to Article 8.1 of this Permit, SPFL shall keep the Properties free from mechanic's, materialman's, and all other liens arising out of any work performed, labor supplied, materials furnished, or other obligations incurred by SPFL. SPFL shall promptly and fully pay and discharge all claims on which any such lien could be based. SPFL shall have the right to contest the amount or validity of any such lien, provided SPFL gives prior written notice of such contest to NASA KSC, prosecutes such contest by appropriate proceedings in good faith and with diligence, and upon request by NASA KSC, furnishes such bond as may be required by law or such security as NASA KSC may require to protect the Properties from such lien. NASA KSC shall have the right to post and keep posted on the Properties any notices that may be provided by law or which NASA KSC may deem to be proper for the protection of NASA KSC and the Properties from such liens and to take any other action NASA KSC deems necessary to remove or discharge liens or encumbrances at the expense of SPFL.

ARTICLE 20 – MISCELLANEOUS

20.1 In accordance with SPFL's policy with respect to contractor relationships, it is hereby stipulated by the undersigned representative of the NASA KSC that to the best of his/her knowledge and belief, the NASA KSC has not employed, retained, induced, or directed any person employed by SPFL to solicit or secure this Permit, by any offer, understanding, or implication involving any form of remuneration whatsoever.

20.2 If any provisions of this Permit shall be held to be invalid, void, or unenforceable, the remaining provisions hereof shall in no way be affected or impaired, and such remaining provisions shall remain in full force and effect.

20.3 SPFL or its Occupant(s) shall not represent itself or permit itself to be represented to the public as an agent of, or part of, the United States Government or NASA by use of words or symbols implying identification with the United States Government, KSC, or NASA (e.g., on any letterhead or billhead or on any signs, displays, or in any other manner whatsoever).

20.4 SPFL or its Occupant(s) shall not use the Properties for funds solicitations of any kind.

20.5 Use of NASA emblems/devices (i.e., NASA Seal, NASA Insignia, NASA logotype, NASA Program Identifiers, and the NASA Flag) are governed by 14 CFR Part 1221. SPFL agrees that any proposed use of such emblems/devices shall be submitted to NASA Public Affairs for review and approval in accordance with such regulations.

20.6 SPFL shall pay, to the applicable taxing authority upon written demand and prior to delinquency, all taxes, assessments, excises, levies, fees, and charges, including all payments related to the cost of providing facilities or services, of every kind and description, general or special, ordinary or extraordinary, foreseen or unforeseen, secured or unsecured, whether or not now customary or within the contemplation of NASA KSC and SPFL (collectively "Taxes"), that are levied, assessed, charged, confirmed, or imposed by any public or Government authority upon or against, or measured by, or reasonably attributable to, the Properties or any part thereof or any Improvements constructed thereon. SPFL may contest the legal validity or amount of any Taxes for which it is responsible under this Permit and may institute such proceedings as it considers necessary to recover or reduce its Taxes, provided that SPFL shall bear all expenses in pursuing such contest or proceeding. If a determination is made that local ad valorem taxes are assessable for Improvements constructed upon the Properties, NASA KSC will cooperate with SPFL to minimize any resulting duplication of services or fees.

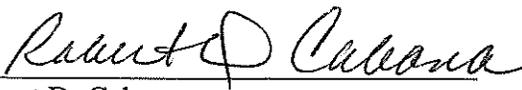
20.7 NASA KSC is the sole owner of the Properties and has the unrestricted right and authority to sign this Permit and to grant SPFL the rights granted in this Permit. There are no mortgages or liens encumbering the Properties. NASA KSC represents, to the best of its actual knowledge without having conducted any investigations, upon which representations SPFL has relied in the execution of this Permit, that the party named herein as NASA KSC is the owner of the Properties in fee simple absolute, subject to all covenants, conditions, restrictions, and easements of record, and that it has full right, authority, and power to grant a Permit to use the Properties to SPFL for the Term hereof.

20.8 SPFL shall not assess any Occupant(s) a rent payment or any other similar consideration payment for a right to use the Properties based upon a market-based determination of the value to the Occupant(s) for using the NASA's facilities, except for recoupment of facilities O&M costs and recoupment in capital Improvements to the facilities funded solely by SPFL. Any such charges by SPFL to Occupant(s) for any and all O&M costs or recoupment of capital Improvements funded by SPFL shall be reasonable, including both direct and administrative costs associated with O&M activities.

**IN WITNESS WHEREOF, THE PARTIES HAVE EXECUTED THIS PERMIT AS OF
THE DATE LAST SET FORTH BELOW.**

JOHN F KENNEDY SPACE CENTER
NATIONAL AERONAUTICS AND SPACE
ADMINISTRATION, an Agency of the United
States

SPACE FLORIDA, AN INDEPENDENT
SPECIAL DISTRICT, of the State of Florida

By 
Robert D. Cabana
Director, John F. Kennedy Space Center

By 
Frank DiBello
President, Space Florida

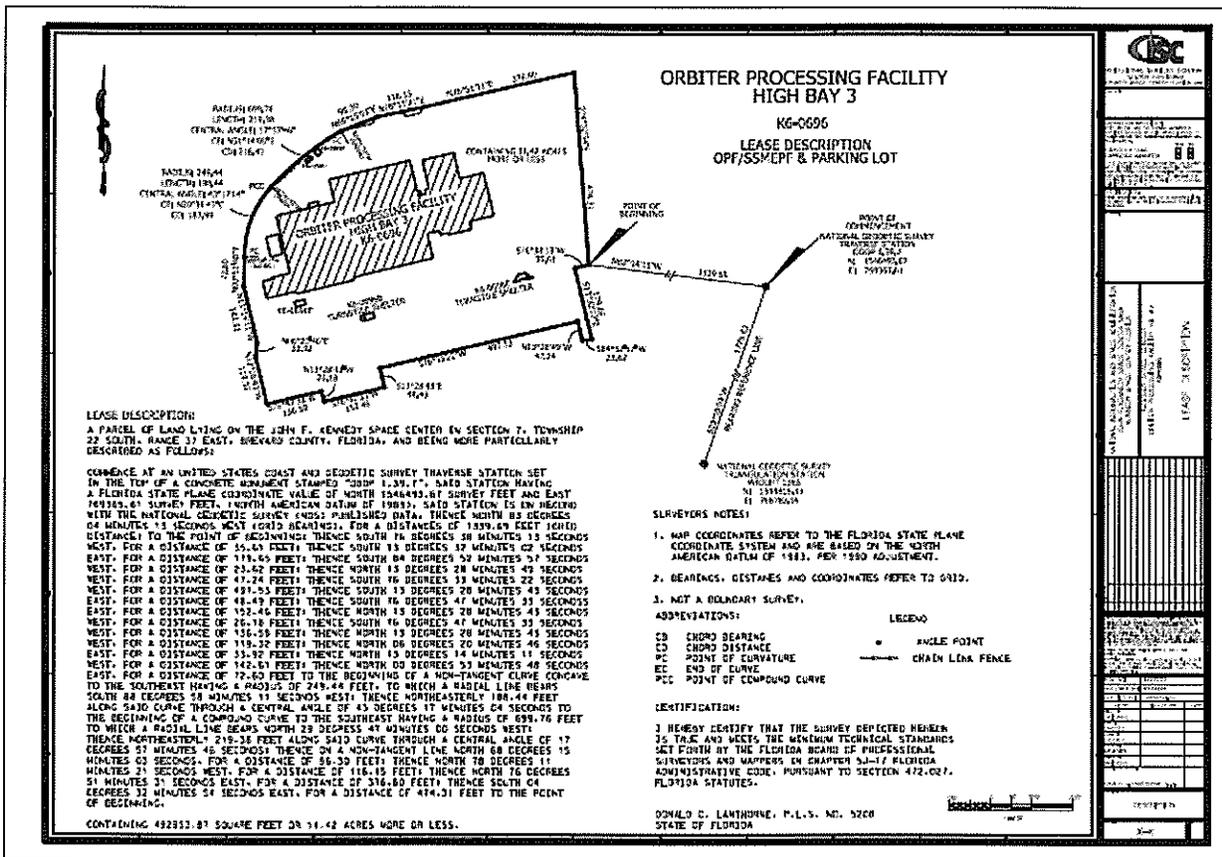
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Date 10/6/11

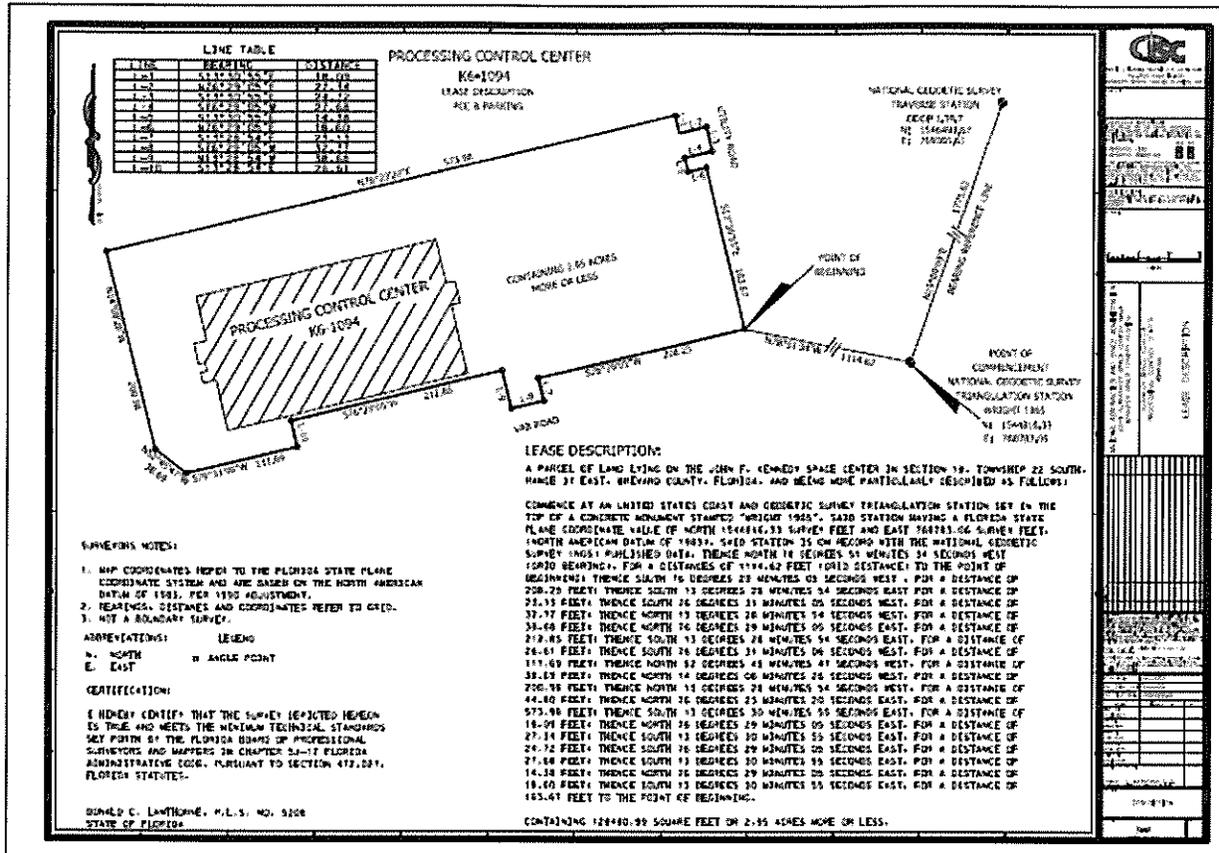
EXHIBIT A
PLAN(S) OUTLINING THE PROPERTIES

This site plan is used solely for the purpose of identifying the approximate location and size of the Properties. Site dimensions, access, common and parking areas, and existing locations are subject to change at NASA KSC's discretion.

Orbiter Processing Facility 3 (OPF 3/Space Shuttle Main Engine Process Facility (SSMEPF))



Processing Control Center (PCC)



Legal Descriptions

OPF/SSMEPF FENCE

A PARCEL OF LAND LYING ON THE JOHN F. KENNEDY SPACE CENTER IN SECTION 7, TOWNSHIP 22 SOUTH, RANGE 37 EAST, BREVARD COUNTY, FLORIDA, AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCE AT AN UNITED STATES COAST AND GEODETIC SURVEY TRAVERSE STATION SET IN THE TOP OF A CONCRETE MONUMENT STAMPED "ODOP 1.39.7", SAID STATION HAVING A FLORIDA STATE PLANE COORDINATE VALUE OF NORTH 1546493.67 SURVEY FEET AND EAST 769365.61 SURVEY FEET, (NORTH AMERICAN DATUM OF 1983), SAID STATION IS ON RECORD WITH THE NATIONAL GEODETIC SURVEY (NGS) PUBLISHED DATA, THENCE NORTH 83 DEGREES 04 MINUTES 13 SECONDS WEST (GRID BEARING), FOR A DISTANCES OF 1339.69 FEET (GRID DISTANCE) TO THE POINT OF BEGINNING; THENCE SOUTH 76 DEGREES 38 MINUTES 13 SECONDS WEST, FOR A DISTANCE OF 833.88 FEET; THENCE NORTH 13 DEGREES 14 MINUTES 11 SECONDS WEST, FOR A DISTANCE OF 142.61 FEET; THENCE NORTH 00 DEGREES 53 MINUTES 48 SECONDS EAST, FOR A DISTANCE OF 72.60 FEET TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE TO THE SOUTHEAST HAVING A RADIUS OF 249.44 FEET, TO WHICH A RADIAL LINE BEARS SOUTH 88 DEGREES 58 MINUTES 11 SECONDS WEST; THENCE NORTHEASTERLY 188.44 FEET ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 43 DEGREES 17 MINUTES 04 SECONDS TO THE BEGINNING OF A COMPOUND CURVE TO THE SOUTHEAST HAVING A RADIUS OF 699.76 FEET TO WHICH A RADIAL LINE BEARS NORTH 47 DEGREES 44 MINUTES 45 SECONDS WEST; THENCE NORTHEASTERLY 219.38 FEET ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 17 DEGREES 57 MINUTES 46 SECONDS; THENCE ON A NON-TANGENT LINE NORTH 68 DEGREES 15 MINUTES 03 SECONDS, FOR A DISTANCE OF 96.30 FEET; THENCE NORTH 78 DEGREES 11 MINUTES 21 SECONDS WEST, FOR A DISTANCE OF 116.15 FEET; THENCE NORTH 76

DEGREES
51 MINUTES 31 SECONDS EAST, FOR A DISTANCE OF 376.80 FEET; THENCE SOUTH
04
DEGREES 32 MINUTES 54 SECONDS EAST, FOR A DISTANCE OF 474.31 FEET TO THE
POINT
OF BEGINNING.

CONTAINING 376806.07 SQUARE FEET OR 8.65 ACRES MORE OR LESS.

OPF/SSMEPF & PARKING

A PARCEL OF LAND LYING ON THE JOHN F. KENNEDY SPACE CENTER IN SECTION
7, TOWNSHIP
22 SOUTH, RANGE 37 EAST, BREVARD COUNTY, FLORIDA, AND BEING MORE
PARTICULARLY
DESCRIBED AS FOLLOWS:

COMMENCE AT AN UNITED STATES COAST AND GEODETIC SURVEY TRAVERSE
STATION SET
IN THE TOP OF A CONCRETE MONUMENT STAMPED "ODOP 1.39.7", SAID STATION
HAVING
A FLORIDA STATE PLANE COORDINATE VALUE OF NORTH 1546493.67 SURVEY
FEET AND EAST
769365.61 SURVEY FEET, (NORTH AMERICAN DATUM OF 1983), SAID STATION IS
ON RECORD
WITH THE NATIONAL GEODETIC SURVEY (NGS) PUBLISHED DATA, THENCE
NORTH 83 DEGREES
04 MINUTES 13 SECONDS WEST (GRID BEARING), FOR A DISTANCES OF 1339.69
FEET (GRID
DISTANCE) TO THE POINT OF BEGINNING; THENCE SOUTH 76 DEGREES 38
MINUTES 13 SECONDS
WEST, FOR A DISTANCE OF 35.61 FEET; THENCE SOUTH 13 DEGREES 32 MINUTES
02 SECONDS
EAST, FOR A DISTANCE OF 179.65 FEET; THENCE SOUTH 84 DEGREES 52 MINUTES
57 SECONDS
WEST, FOR A DISTANCE OF 23.62 FEET; THENCE NORTH 13 DEGREES 28 MINUTES
49 SECONDS
WEST, FOR A DISTANCE OF 47.24 FEET; THENCE SOUTH 76 DEGREES 33 MINUTES
22 SECONDS
WEST, FOR A DISTANCE OF 497.53 FEET; THENCE SOUTH 13 DEGREES 28 MINUTES
43 SECONDS
EAST, FOR A DISTANCE OF 48.49 FEET; THENCE SOUTH 76 DEGREES 47 MINUTES
33 SECONDS
EAST, FOR A DISTANCE OF 152.46 FEET; THENCE NORTH 13 DEGREES 28 MINUTES
43 SECONDS

WEST, FOR A DISTANCE OF 26.18 FEET; THENCE SOUTH 76 DEGREES 47 MINUTES
33 SECONDS
WEST, FOR A DISTANCE OF 136.58 FEET; THENCE NORTH 13 DEGREES 28 MINUTES
43 SECONDS
WEST, FOR A DISTANCE OF 119.32 FEET; THENCE NORTH 06 DEGREES 20 MINUTES
46 SECONDS
EAST, FOR A DISTANCE OF 33.92 FEET; THENCE NORTH 13 DEGREES 14 MINUTES
11 SECONDS
WEST, FOR A DISTANCE OF 142.61 FEET; THENCE NORTH 00 DEGREES 53 MINUTES
48 SECONDS
EAST, FOR A DISTANCE OF 72.60 FEET TO THE BEGINNING OF A NON-TANGENT
CURVE CONCAVE
TO THE SOUTHEAST HAVING A RADIUS OF 249.44 FEET, TO WHICH A RADIAL LINE
BEARS
SOUTH 88 DEGREES 58 MINUTES 11 SECONDS WEST; THENCE NORTHEASTERLY
188.44 FEET
ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 43 DEGREES 17 MINUTES
04 SECONDS TO
THE BEGINNING OF A COMPOUND CURVE TO THE SOUTHEAST HAVING A RADIUS
OF 699.76 FEET
TO WHICH A RADIAL LINE BEARS NORTH 29 DEGRESS 47 MINUTES 00 SECONDS
WEST;
THENCE NORTHEASTERLY 219.38 FEET ALONG SAID CURVE THROUGH A
CENTRAL ANGLE OF 17
DEGREES 57 MINUTES 46 SECONDS; THENCE ON A NON-TANGENT LINE NORTH 68
DEGREES 15
MINUTES 03 SECONDS, FOR A DISTANCE OF 96.30 FEET; THENCE NORTH 78
DEGREES 11
MINUTES 21 SECONDS WEST, FOR A DISTANCE OF 116.15 FEET; THENCE NORTH 76
DEGREES
51 MINUTES 31 SECONDS EAST, FOR A DISTANCE OF 376.80 FEET; THENCE SOUTH
04
DEGREES 32 MINUTES 54 SECONDS EAST, FOR A DISTANCE OF 474.31 FEET TO THE
POINT
OF BEGINNING.

CONTAINING 492953.87 SQUARE FEET OR 11.42 ACRES MORE OR LESS.

PCC BUILDING

A PARCEL OF LAND LYING ON THE JOHN F. KENNEDY SPACE CENTER IN SECTION
18, TOWNSHIP 22 SOUTH, RANGE 37 EAST, BREVARD COUNTY, FLORIDA, AND
BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCE AT AN UNITED STATES COAST AND GEODETIC SURVEY
TRIANGULATION STATION SET IN THE TOP OF A CONCRETE MONUMENT
STAMPED "WRIGHT 1965", SAID STATION HAVING A FLORIDA STATE PLANE
COORDINATE VALUE OF NORTH 1544816.33 SURVEY FEET AND EAST 768783.06
SURVEY FEET, (NORTH AMERICAN DATUM OF 1983), SAID STATION IS ON
RECORD WITH THE NATIONAL GEODETIC SURVEY (NGS) PUBLISHED DATA,
THENCE NORTH 82 DEGREES 58 MINUTES 00 SECONDS WEST (GRID BEARING),
FOR A DISTANCES OF 1369.56 FEET (GRID DISTANCE) TO THE POINT OF
BEGINNING; THENCE SOUTH 76 DEGREES 29 MINUTES 05 SECONDS WEST , FOR A
DISTANCE OF
184.01 FEET; THENCE SOUTH 13 DEGREES 28 MINUTES 54 SECONDS EAST FOR A
DISTANCE OF
26.61 FEET; THENCE SOUTH 76 DEGREES 31 MINUTES 06 SECONDS WEST, FOR A
DISTANCE OF
89.61 FEET; THENCE NORTH 13 DEGREES 28 MINUTES 54 SECONDS WEST, FOR A
DISTANCE OF
26.61 FEET; THENCE NORTH 76 DEGREES 31 MINUTES 06 SECONDS EAST, FOR A
DISTANCE OF
22.12 FEET; THENCE NORTH 13 DEGREES 28 MINUTES 54 SECONDS WEST, FOR A
DISTANCE OF
51.00 FEET; THENCE SOUTH 76 DEGREES 31 MINUTES 06 SECONDS WEST, FOR A
DISTANCE OF
13.00 FEET; THENCE NORTH 13 DEGREES 28 MINUTES 54 SECONDS WEST, FOR A
DISTANCE OF
49.90 FEET; THENCE NORTH 76 DEGREES 31 MINUTES 06 SECONDS EAST, FOR A
DISTANCE OF
13.00 FEET; THENCE NORTH 13 DEGREES 28 MINUTES 54 SECONDS WEST, FOR A
DISTANCE OF
44.80 FEET; THENCE NORTH 76 DEGREES 31 MINUTES 06 SECONDS EAST, FOR A
DISTANCE OF
251.50 FEET; THENCE SOUTH 13 DEGREES 28 MINUTES 59 SECONDS EAST, FOR A
DISTANCE OF
44.18 FEET; THENCE NORTH 76 DEGREES 29 MINUTES 12 SECONDS EAST, FOR A
DISTANCE OF
8.75 FEET; THENCE SOUTH 13 DEGREES 30 MINUTES 48 SECONDS EAST, FOR A
DISTANCE OF
32.11 FEET; THENCE SOUTH 76 DEGREES 29 MINUTES 12 SECONDS WEST, FOR A
DISTANCE OF

8.77 FEET; THENCE SOUTH 13 DEGREES 28 MINUTES 59 SECONDS EAST, FOR A
DISTANCE OF
69.27 FEET TO THE POINT OF BEGINNING.

CONTAINING 39945.87 SQUARE FEET OR 0.92 ACRES MORE OR LESS.

PCC PARKING

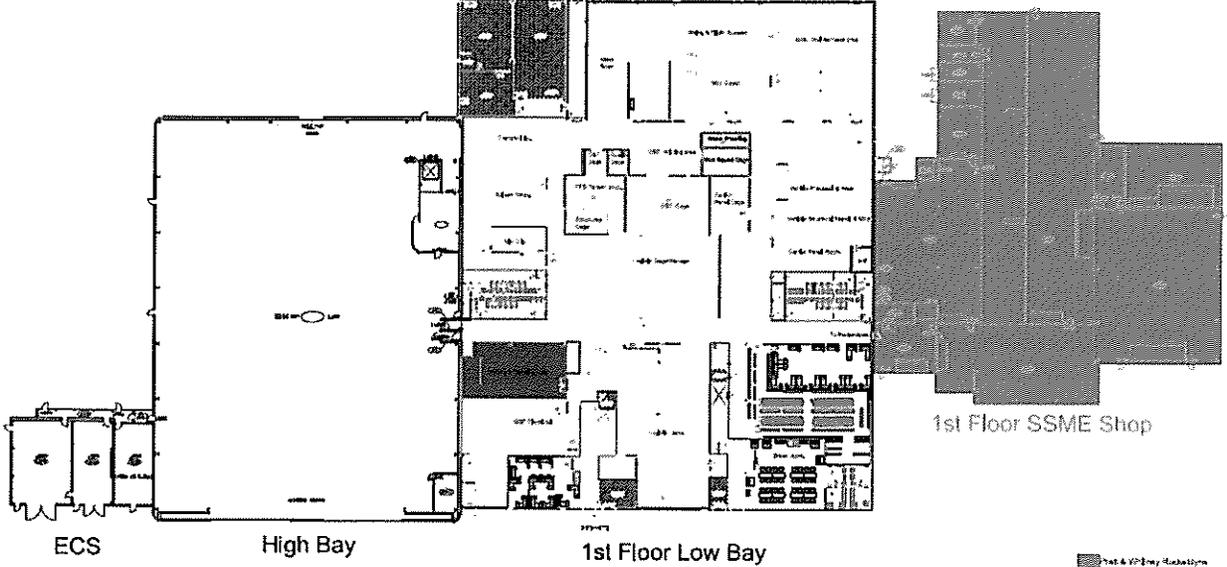
A PARCEL OF LAND LYING ON THE JOHN F. KENNEDY SPACE CENTER IN SECTION 18, TOWNSHIP 22 SOUTH, RANGE 37 EAST, BREVARD COUNTY, FLORIDA, AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCE AT AN UNITED STATES COAST AND GEODETIC SURVEY TRIANGULATION STATION SET IN THE TOP OF A CONCRETE MONUMENT STAMPED "WRIGHT 1965", SAID STATION HAVING A FLORIDA STATE PLANE COORDINATE VALUE OF NORTH 1544816.33 SURVEY FEET AND EAST 768783.06 SURVEY FEET, (NORTH AMERICAN DATUM OF 1983), SAID STATION IS ON RECORD WITH THE NATIONAL GEODETIC SURVEY (NGS) PUBLISHED DATA, THENCE NORTH 78 DEGREES 51 MINUTES 34 SECONDS WEST (GRID BEARING), FOR A DISTANCES OF 1114.62 FEET (GRID DISTANCE) TO THE POINT OF BEGINNING; THENCE SOUTH 76 DEGREES 29 MINUTES 05 SECONDS WEST , FOR A DISTANCE OF 208.25 FEET; THENCE SOUTH 13 DEGREES 28 MINUTES 54 SECONDS EAST FOR A DISTANCE OF 23.13 FEET; THENCE SOUTH 76 DEGREES 31 MINUTES 05 SECONDS WEST, FOR A DISTANCE OF 32.77 FEET; THENCE NORTH 13 DEGREES 28 MINUTES 54 SECONDS WEST, FOR A DISTANCE OF 38.68 FEET; THENCE NORTH 76 DEGREES 29 MINUTES 05 SECONDS EAST, FOR A DISTANCE OF 212.85 FEET; THENCE SOUTH 13 DEGREES 28 MINUTES 54 SECONDS EAST, FOR A DISTANCE OF 26.61 FEET; THENCE SOUTH 76 DEGREES 31 MINUTES 06 SECONDS WEST, FOR A DISTANCE OF 111.69 FEET; THENCE NORTH 52 DEGREES 45 MINUTES 47 SECONDS WEST, FOR A DISTANCE OF 38.69 FEET; THENCE NORTH 14 DEGREES 08 MINUTES 26 SECONDS WEST, FOR A DISTANCE OF 200.98 FEET; THENCE NORTH 13 DEGREES 28 MINUTES 54 SECONDS WEST, FOR A DISTANCE OF 44.80 FEET; THENCE NORTH 76 DEGREES 23 MINUTES 20 SECONDS EAST, FOR A DISTANCE OF 573.98 FEET; THENCE SOUTH 13 DEGREES 30 MINUTES 55 SECONDS EAST, FOR A DISTANCE OF 18.09 FEET; THENCE NORTH 76 DEGREES 29 MINUTES 05 SECONDS EAST, FOR A DISTANCE OF 27.34 FEET; THENCE SOUTH 13 DEGREES 30 MINUTES 55 SECONDS EAST, FOR A DISTANCE OF 24.72 FEET; THENCE SOUTH 76 DEGREES 29 MINUTES 05 SECONDS EAST, FOR A DISTANCE OF

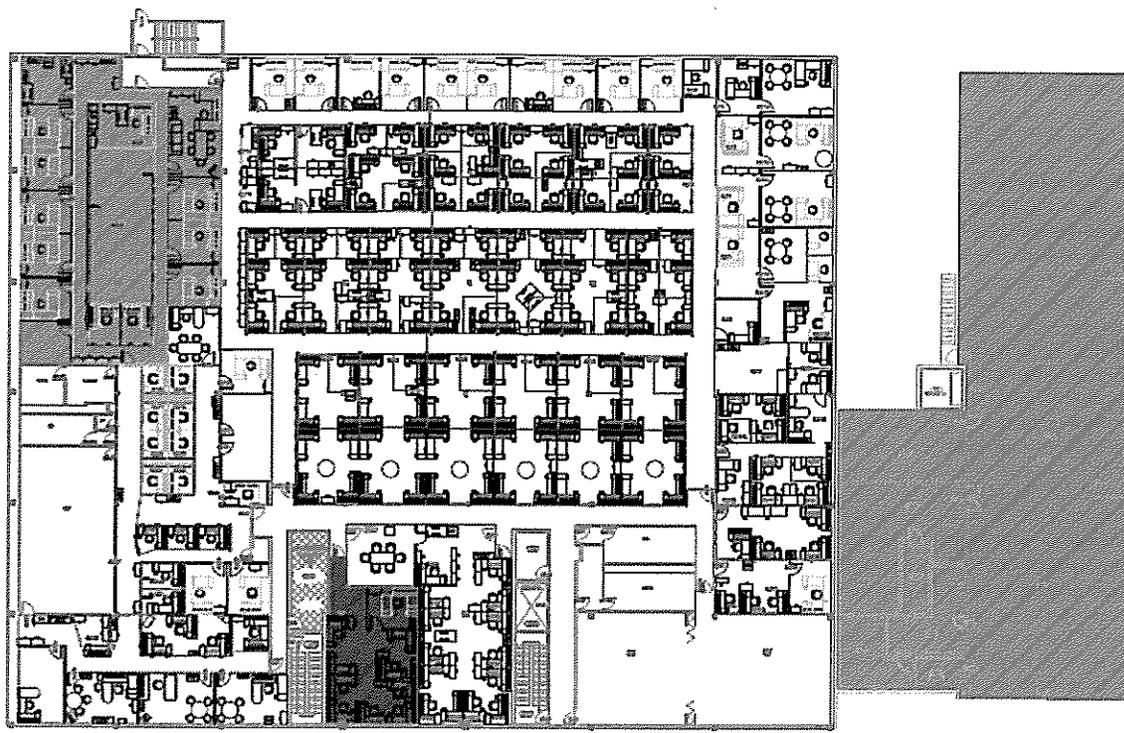
27.68 FEET; THENCE SOUTH 13 DEGREES 30 MINUTES 55 SECONDS EAST, FOR A
DISTANCE OF
14.38 FEET; THENCE NORTH 76 DEGREES 29 MINUTES 05 SECONDS EAST, FOR A
DISTANCE OF
18.60 FEET; THENCE SOUTH 13 DEGREES 30 MINUTES 55 SECONDS EAST, FOR A
DISTANCE OF
163.67 FEET TO THE POINT OF BEGINNING.

CONTAINING 128480.99 SQUARE FEET OR 2.95 ACRES MORE OR LESS.

Floor Plans for K6-0696, first and second floors of the Low Bay indicate those areas within this facility that will continue to be available for use by NASA contractors until the SSMEPF is transferred to Space Florida.



K6-0696



2nd Floor Low Bay

2nd Floor SSME Shop

K6-0696

Pratt & Whitney Rockaklyno
USA

EXHIBIT B
ENVIRONMENTAL BASELINE SURVEY (EBS) OF THE PROPERTIES

FINAL
REPORT

**ENVIRONMENTAL BASELINE SURVEY
FOR
ORBITER PROCESSING FACILITY 3, SPACE SHUTTLE MAIN ENGINE
SHOP, AND PROCESSING CONTROL CENTER
KENNEDY SPACE CENTER, FL**

Prepared for:



**National Aeronautics and Space Administration
Kennedy Space Center, Florida**

May 27, 2011

**Prepared by:
Medical and Environmental Support Contract (MESC)
Innovative Health Applications, LLC
Environmental Services Branch
IHA-022
Kennedy Space Center, Florida 32899**

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**ENVIRONMENTAL BASELINE SURVEY
FOR
ORBITER PROCESSING FACILITY 3, SPACE SHUTTLE MAIN ENGINE
SHOP, AND PROCESSING CONTROL CENTER
KENNEDY SPACE CENTER, FL**

May 2011

Prepared for:

Environmental Management Branch
TA-A4C
National Aeronautics and Space Administration
John F. Kennedy Space Center, Florida 32899

Prepared by:

Medical and Environmental Support Contract (MESC)
CLIN10 Environmental Projects
IHA Environmental Services Branch

IHA-022
Kennedy Space Center, Florida 32899



ENVIRONMENTAL BASELINE SURVEY FOR THE ORBITER PROCESSING FACILITY 3, THE SPACE SHUTTLE MAIN ENGINE SHOP, AND THE PROCESSING CONTROL CENTER

KENNEDY SPACE CENTER, FLORIDA

EXECUTIVE SUMMARY

This Environmental Baseline Survey (EBS) was conducted for the National Aeronautics and Space Administration (NASA) at Kennedy Space Center (KSC), Florida to identify existing or potential environmental conditions of the properties located at the Orbiter Processing Facility 3 (OPF 3)/K6-0696, the Space Shuttle Main Engine (SSME) Shop/K6-0696, and the Processing Control Center (PCC)/K6-1094. The intended use of this property is to be determined by NASA. The purpose of the EBS is to assess and document the existing environmental conditions of this real property as required for all NASA real property transactions under 40 CFR 312. This EBS was conducted in general accordance with the scope and limitations of American Society for Testing Materials (ASTM) Practice E 1527-05 for conducting a Phase I Environmental Site Assessment, and the Innovative Health Applications (IHA), LLC document EVS-I-4109. However, the EBS includes the additional assessments of non-scope issues (i.e. asbestos, radon, cultural and historic resources, natural resources, etc.). The independent conclusions represent the best professional judgment of the IHA environmental professionals based on the conditions that existed and the information and data available to us during the course of this assignment.

Site History

The OPF 3, SSME Shop, and PCC are located in the Vehicle Assembly Building (VAB) Area of KSC, east of Kennedy Parkway and north of Saturn Causeway. This is a highly industrial area of operational and support facilities for Space Shuttle processing activities. The OPF 3 and SSME Shop are both situated in facility K6-0696, off Shuttle Road, just northwest of the VAB. Facility K6-0696 consists of three sections: the “High Bay” Orbiter Processing Section on the west end of the building, the Space Shuttle Main Engine (SSME) Shop on the east end of the building, and a center section referred to as the “Low Bay”. The construction of all three sections consists of built-up roofs, aluminum siding walls, and a concrete slab foundation with the surrounding area consisting of paved asphalt roadways enclosed by a perimeter chain link fence. For the purposes of this EBS, the collective components of building K6-0696 will hereafter be referred to on an individual basis as the OPF 3 and the SSME shop. The OPF 3 reference will consist of the high and low bays combined, as well as include supporting facilities that lay within the surveyed boundary (see Figure 1). The SSME shop will be considered a separate entity unto itself.

Orbiter Processing Facility 3

The basic structure of the OPF 3, previously known as the Orbiter Maintenance and Refurbishment Facility (OMRF), was completed in 1987. It was upgraded to the current configuration in 1991. Like OPF High Bays 1 and 2, it is used for post-flight de-servicing, testing, modification, and preflight processing of Space Shuttle Orbiters. Other supporting structures to the OPF 3 included within the survey site are turnstile shelters, a chilled water pump house, environmental control building, hazardous waste staging areas, a k-bottle storage site, fuel and oxidizer scrubber pads, and a sewage lift station (see map in Appendix B).

Space Shuttle Main Engine Shop

The SSME Shop was originally housed in the VAB. The construction adding the SSME shop to OPF 3 was completed in 1998, and provided space to increase the capacity and efficiency of engine operations. The new 34,600 SF SSME shop is now located on the east side of facility K6-0696. The SSME shop provides the capabilities for post-flight inspections and maintenance as well as functional checkout of all engine systems prior to installation on the Orbiters. Movement of this operation out of the VAB was prompted by safety considerations in order to minimize the number of personnel and activities in this building, where the Space Shuttle components are assembled.

The Processing Control Center

The Processing Control Center (K6-1094) is located on the north side of VAB Road and west of Utility Road (reference Figure 2). Construction of the subject property began in 1991 and was completed by June of 1992. The facility was originally constructed and dedicated to Space Shuttle Orbiter testing, launch team training and Launch Processing System (LPS) maintenance, and consists mostly of offices and lab areas. The building provides Space Shuttle engineers and technicians with state-of-the-art areas to improve and maintain their skills during pre- and post-flight Orbiter processing flows. For the purposes of this EBS, building K6-1094 will be referred to as the PCC.

Findings

This survey was conducted on the OPF 3, SSME Shop, and PCC facilities to determine whether the structures have any Recognized Environmental Conditions (RECs). The results of this survey conclude one REC exists at facility K6-0696. Groundwater in this area is contaminated with volatile organic compounds (VOCs) and ammonia above residential Groundwater Cleanup Target Levels (GCTLs). A REC also exists at facility K6-1094 where vinyl chloride (VC) in the groundwater exceeded cleanup target levels. No other RECs were identified at facilities K6-0696 or K6-1094.

Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

The OPF 3 and SSME facilities are located in a highly developed industrial area of Kennedy Space Center, as shown in Figure 1. The OPF 3 structure consists of a high bay where the Orbiters and payloads are serviced, and a low bay support area which consists of processing shops, logistics areas, flight hardware storage areas, locker rooms and break rooms. The OPF 3 structure houses a 30-ton crane for the moving of payloads, as well as a bridge bucket hoist system to allow personnel to work over and around the payload on the Orbiter. The SSME structure houses the main engine pedestals, pneumatic panels, hydraulic test equipment and the engines themselves. A 10-ton crane and 15-ton crane are also housed inside of the SSME section to maneuver the engines around.

The OPF 3 and SSME Shop property is located within the boundary of SWMU #83 (see map in Appendix B). A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) was performed at the OPF 3 site in 2004, and identified 16 Locations of Concern (LOCs), with 15 of these inside the OPF 3/SSME Shop survey site boundary. The LOCs include: hazardous waste storage buildings, an abandoned oxidizer scrubber pad, a hypergol exhaust vent, abandoned electrical transformers, an abandoned fuel scrubber pad, an earthen stormwater retention pond, the fuel scrubber pad and oxidizer scrubber pad, stormwater discharge points, a stormwater overflow discharge point, the oxidizer waste drum and fuel waste drum staging areas, a stormwater sump, and the outside stormwater retention pond perimeter swale.

Previous asbestos surveys were performed for facility K6-0696, Orbiter Processing Facility 3 (OPF 3) and include SSME and K6-0696D (Environmental Control Building). Asbestos was identified in the high bay of OPF 3, Room 1104. The asbestos is 10% Chrysotile and consists of miscellaneous black tar/putty located on Firex lines in the bay. No other asbestos has been identified at facility K6-0696 or K6-0696D.

The SSME Shop side of K6-0696 has water stained ceiling tiles in Control Room 1050. Active roof leaks are being reported in the high bay of the SSME Shop and in the Command and Data Simulation Room 2194. There was an active leak observed during the walkthrough of the high bay area (reference photographs in Appendix C). Facility personnel stated the roof leaks have been an ongoing problem since the opening of the facility.

A small building (K6-0696D) located on the west side of the OPF 3 houses the fixed Environmental Control System (ECS) for the facility. The purpose of the fixed ECS equipment is to provide a continuous source of filtered, dehumidified & reheated air to the various compartments of the Orbiters.

Multiple 90-day and Satellite Accumulation Areas (SAA) associated with facility K6-0696, are staged throughout both the OPF 3 and SSME shop areas. The locations of these sites are as follows:

1. 90 day site – K6-0696H
2. 90 day site – K6-0696 Fuel Pad
3. 90 day site – K6-0696 Oxidizer Pad
4. Non-Regulated site – K6-0696 Hydraulic Pumper Unit
5. SAA site – OPF 3 Low Bay Room 1148
6. SAA site – OPF 3 Mix Crib
7. SAA site – OPF 3 High Bay
8. SAA site – SSMEPF GSE Area (1st floor)
9. SAA site – SSMEPF High Bay (2nd floor)

The contingency plan for these 90-day, SAAs, and non-regulated waste sites, along with the wastes generated and stored there, can be referenced in Appendix D.

There are wildlife concerns regarding this facility which include 1) the potential of nesting or roosting migratory/threatened/endorsed birds, and 2) external lighting controls necessary to reduce light pollution on KSC related to disorientation of nearby nesting sea turtles.

The Processing Control Center

The PCC facility is located in a highly developed industrial area of KSC, as shown in Figure 1, and consists mostly of offices and laboratory areas. This survey identified one REC for facility K6-1094. Groundwater at the site is contaminated with vinyl chloride at concentrations above residential GCTLs.

The PCC property is located within the boundary of SWMU #101 (Processing Control Center Area), formerly PRL #145 (see map in Appendix B). Previous asbestos surveys were performed for the PCC and no asbestos has been identified.

During the walkthrough of the PCC, a musty odor was detected in HVAC Mechanical Rooms 3085 and 3085A. Possible mold was visible on the air vents located in Room 3085A, as well as on the piping located in the compressor room 1103 (see photographs in Appendix C). An Indoor Air Quality (IAQ) evaluation was recently completed on April 19, 2011, by IHA to identify the source of musty odor complaints on the second floor (Report #201103-1198). Water intrusion into the facility occurred during heavy storms in the past and the damaged areas have since been repaired. No roof leaks or water intrusion from windows were observed. The facility manager stated there were no open work orders or complaints about water intrusion or leaks in the facility. No additional indoor air quality or asbestos concerns were observed within the PCC.

A Satellite Accumulation Site (SAA) for wastes was located in Room 1060. The contingency plan and wastes generated at these sites may be found in Appendix D.

Applicable Regulatory Compliance Issues

Future activities undertaken by the recipient of the facilities included in this EBS are subject to all applicable federal, state, and local regulations, and NASA environmental requirements. Compliance issues associated with the transfer of the subject site include but may not be limited to the following:

- ACM/LBP abatement/reporting
- Endangered Species Act of 1973, Section 7
- State of Florida Wildlife Code (protection of State Listed Species of Special Concern)
- Migratory Bird Treaty Act
- Clean Water Act
- Clean Air Act
- National Environmental Policy Act
- Resource Conservation and Recovery Act (RCRA) Corrective Action

Recommendations

Based on the findings and conclusions of this EBS and supporting documentation, it is recommended that the transfer of the subject property proceed and that future NASA tenants maintain proper documentation of hazardous materials used or stored during the life of the lease to support a future exit EBS.

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ACRONYMS

ACM	Asbestos-Containing Material
AMIS	Asbestos Management Information System
BLS	Below Land Surface
ASTM	American Society for Testing Materials
CCAFS	Cape Canaveral Air Force Station
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CHW	Chilled Water
CFR	Code of Federal Regulations
CS	Confirmatory Sampling
COC	Contaminant of Concern
EBS	Environmental Baseline Survey
ECS	Environmental Control System
ECLSS	Environmental Control and Life Support System
EFR	Environmental Functional Review
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
ESA	Endangered Species Act
FDEP	Florida Department of Environmental Protection
FWCC	Florida Fish and Wildlife Conservation Commission

ACRONYMS

(Continued)

FRCS	Forward Reaction Control System
GCS	Ground Cooling System
GCTL	Groundwater Cleanup Target Level
GSE	Government Sponsored Enterprise
HABS	Historic American Buildings Survey
HAER	Historic American Engineering Record
HEPA	High Efficiency Particulate Air
HHE	Human Health and the Environment
HVAC	Heating, Ventilating, and Air Conditioning
HX	Heat Exchange
IAQ	Indoor Air Quality
IM	Interim Measures
IMWP	Interim Measures Work Plan
IHA	Innovative Health Applications, LLC
KICS	Kennedy Integrated Communications Services
KSC	Kennedy Space Center
LBP	Lead Based Paint
LOC	Location of Concern
LPS	Launch Processing System
MDL	Method Detection Limit
MESC	Medical and Environmental Support Contract
MLP	Mobile Launch Platform

ACRONYMS

(Continued)

MMH	Monomethyl Hydrazine
MSDS	Material Safety Data Sheets
MSL	Mean Sea Level
N ₂ H ₄	Nitrogen Tetroxide
NASA	National Aeronautics and Space Administration
NFA	No Further Action
NRHP	National Register of Historic Places
OMRF	Orbiter Maintenance and Refurbishment Facility
OMS	Orbiter Maneuvering System
OPF 3	Orbiter Processing Facility 3
PAHs	Polynuclear Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PCC	Processing Control Center
PCCA	Processing Control Center Area
PIR	Pollution Incident Report
POL	Petroleum, Oil, and Lubricants
PRE	Preliminary Risk Evaluation
PRL	Potential Release Location
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
RFI	RCRA Facility Investigation
SAA	Satellite Accumulation Area
SAR	SWMU Assessment Report

ACRONYMS

(Continued)

SCTL	Soil Cleanup Target Levels
SF	Square Feet
SPCC	Spill Prevention, Control, and Countermeasures
SPLP	Synthetic Precipitation Leaching Procedure
SRM	Solid Rocket Motor
SSME	Space Shuttle Main Engine
SSMEPF	Space Shuttle Main Engine Processing Facility
STP	Sewage Treatment Plant
SWMU	Solid Waste Management Unit
TRP	Technical Response Package
USA	United Space Alliance
USAF	United States Air Force
USFWS	United States Fish and Wildlife Service
UST	Underground Storage Tank
VAB	Vehicle Assembly Building
VC	Vinyl Chloride
VOCs	Volatile Organic Compounds
VSTAB	Vertical Stabilizer

1.0 Purpose of the Environmental Baseline Survey

The purpose of this Environmental Baseline Survey (EBS) is to assess and document the existing environmental condition of select real property associated with the Orbiter Processing Facility 3 (OPF 3)/K6-0696, the Space Shuttle Main Engine Shop (SSME)/K6-0696, and the Processing Control Center (PCC)/K6-1094 at Kennedy Space Center, Florida. This effort is in support of the National Aeronautics and Space Administration (NASA). This EBS has been prepared in advance of a proposed real estate transaction in accordance with 40 CFR 312, and was conducted in general accordance with the scope and limitations of American Society for Testing Materials (ASTM) Practice E 1527-05 for conducting a Phase I Environmental Site Assessment, and the Innovative Health Applications, LLC document EVS-I-4109. However, the EBS includes the additional assessments of non-scope issues (i.e. asbestos, radon, cultural and historic resources, natural resources, etc.). This report describes the results of an initial due diligence investigation to identify the presence of significant environmental liabilities and recognized environmental conditions which materially affect the subject properties.

1.1 Boundaries of the Property and Survey Area

KSC is centrally located on the east coast of Florida, to the north and west of Cape Canaveral (Figure 1). It is situated in Brevard and Volusia Counties between the Merritt Island Barge Canal to the south, the town of Oak Hill to the north, the Atlantic Ocean and Cape Canaveral Air Force Station (CCAFS) to the east, and the Indian River to the west. A large portion of the area, between the Indian River and the Atlantic Ocean, is situated in the northern part of Brevard County on Merritt Island, with the extreme northern boundary extending approximately 7 miles into Volusia County.

The boundaries of the site survey for OPF 3 and the SSME shop have been outlined in Figure 2. The OPF 3 and SSME Shop combined make up facility K6-0696, located at KSC, off Shuttle Road, just northwest of the Vehicle Assembly Building (VAB). Other supporting structures to the OPF 3 which are included within the survey site boundary are turnstile shelters, a chilled water pump house, an environmental control building, hazardous waste staging areas, a k-bottle storage site, fuel and oxidizer scrubber pads, and a sewage lift station (see Appendix B for map).

The boundary of the site survey for the PCC is also outlined in Figure 2, and encompasses the PCC facility including the grassy area immediately surrounding the building, portions of the parking area in close proximity to the facility on the north and east sides, all sidewalks immediate to the facility, and the electrical substations and transformers located directly south of the facility. The PCC (K6-1094) is located on the north side of VAB Road and west of Utility Road.

1.2 Structures Representing the Areas Surveyed

1.2.1 Orbiter Processing Facility 3

The basic structure of the OPF 3, previously known as the Orbiter Maintenance and Refurbishment Facility (OMRF), was completed in 1987. It was upgraded to the current configuration in 1991. OPF 3 is currently an active facility consisting of a 29,000 SF high bay used for post-flight de-servicing, testing, modifications and preflight processing of the Space Shuttle Discovery Orbiter, and an 87,000 SF low bay support area which consists of processing shops, logistics areas, flight hardware storage areas, locker rooms and break rooms. Other facilities and structures are located within the OPF 3 site boundary security perimeter, and were also surveyed. These include turnstile shelters (K6-0696B&E), a chilled water pump house (K6-0696F), an environmental control building (K6-0696D), hazardous waste staging areas (K6-0696H&K), k-bottle storage site (K6-0696J), fuel and oxidizer scrubber pads, and a sewage lift station (K6-0696G) (see Appendix B for map).

The construction of the main facility K6-0696 consists of built-up roofs, aluminum siding walls, and concrete slab foundations with the surrounding area consisting of paved asphalt roadways enclosed by a perimeter fence. For the purposes of this EBS, the collective components of building K6-0696 may hereafter be referred to on an individual basis as the OPF 3 and the SSME Shop. OPF 3 refers to the high and low bays combined, as well as supporting facilities that lay within the surveyed boundary, and the SSME Shop will be considered a separate entity unto itself. The SSME Shop has also been referred to as the SSMEPF (Space Shuttle Main Engine Processing Facility) in past reports reviewed for this EBS.

Descriptions of the supporting facility structures are as follows (see photograph in Appendix C):

1. K6-0696A (OPF 3 Gate House) is the entrance control building on the south side of the OPF 3. This facility consists of a small interior room with a roof overhang on the west side of the facility. The facility is constructed with a steel frame, metal siding, and a metal roof.
2. K6-0696B (Turnstile Shelter) is used for access into a limited access building. The facility is constructed with a steel frame, metal siding, and a metal roof.
3. K6-0696D (Environmental Control Building) is the building that houses the Environmental Control System (ECS). The facility is constructed of concrete block with a built-up roof consisting of tar and gravel.
4. K6-0696E (Active Turnstile Shelter) is the east gate entrance into the OPF 3 perimeter. The facility consists of a concrete foundation, steel frame, and metal roof.
5. K6-0696F (Chilled Water Pump House) houses the pumps to the chilled water system. The facility is constructed of a concrete foundation, steel frame, metal siding, and metal roof.
6. K6-0696G (Sewage Lift Station) is located just outside the perimeter fencing on the southwest corner, in a grassy area. The lift station's construction consists of a concrete

block below ground structure that contains two pumps, an electrical panel, and a 3/4" freshwater backflow preventer (BFP) for wash down purposes.

7. K6-0696H (Hazardous Waste Storage Facility) is a portable facility used as a 90-day storage facility for staging of waste products until they can be picked up for proper disposal.
8. K6-0696J (K-Bottle Storage) is located on the north side of OPF 3, and is constructed with a steel frame, metal siding, and a metal roof.
9. K6-0696K (Hazardous Waste Staging Facility) is a permanent hazardous waste storage area that is currently used to store empty waste drums. This facility is constructed with a concrete foundation, metal frame, metal roof, and chain link sides for securing the facility contents.

1.2.2 SSME

The SSME Shop was originally housed in the Vehicle Assembly Building (VAB) at KSC. The construction to add the SSME Shop to OPF 3 (K6-0696) was completed in 1998. This addition of 34,600 SF provided space to increase the capacity and efficiency of engine operations. Movement of this operation out of the VAB was prompted by safety considerations in order to minimize the number of personnel and activities in this building where the Space Shuttle components are assembled.

1.2.3 PCC

Construction of the subject property began in 1991 and was completed by June of 1992. The PCC is a three story building totaling 99,000 square feet (SF), with the building construction consisting of a concrete slab foundation, concrete block exterior walls, gypsum wallboard interior walls, a built-up roof, and double personnel entry doors located on the east and west ends of the building. This is an active facility that was originally constructed and dedicated to Space Shuttle Orbiter testing, launch team training and Launch Processing System (LPS) Maintenance, and consists mostly of offices and lab areas. The building provides Space Shuttle engineers and technicians with state-of-the-art areas to improve and maintain their skills during pre- and post-flight orbiter processing flows. For the purposes of this EBS, building K6-1094 will be referred to as the PCC.

Figure 1. Vicinity Map of the Kennedy Space Center within Peninsular Florida and the Location of the Orbiter Processing Facility 3, Space Shuttle Main Engine Shop, and the Processing Control Center.

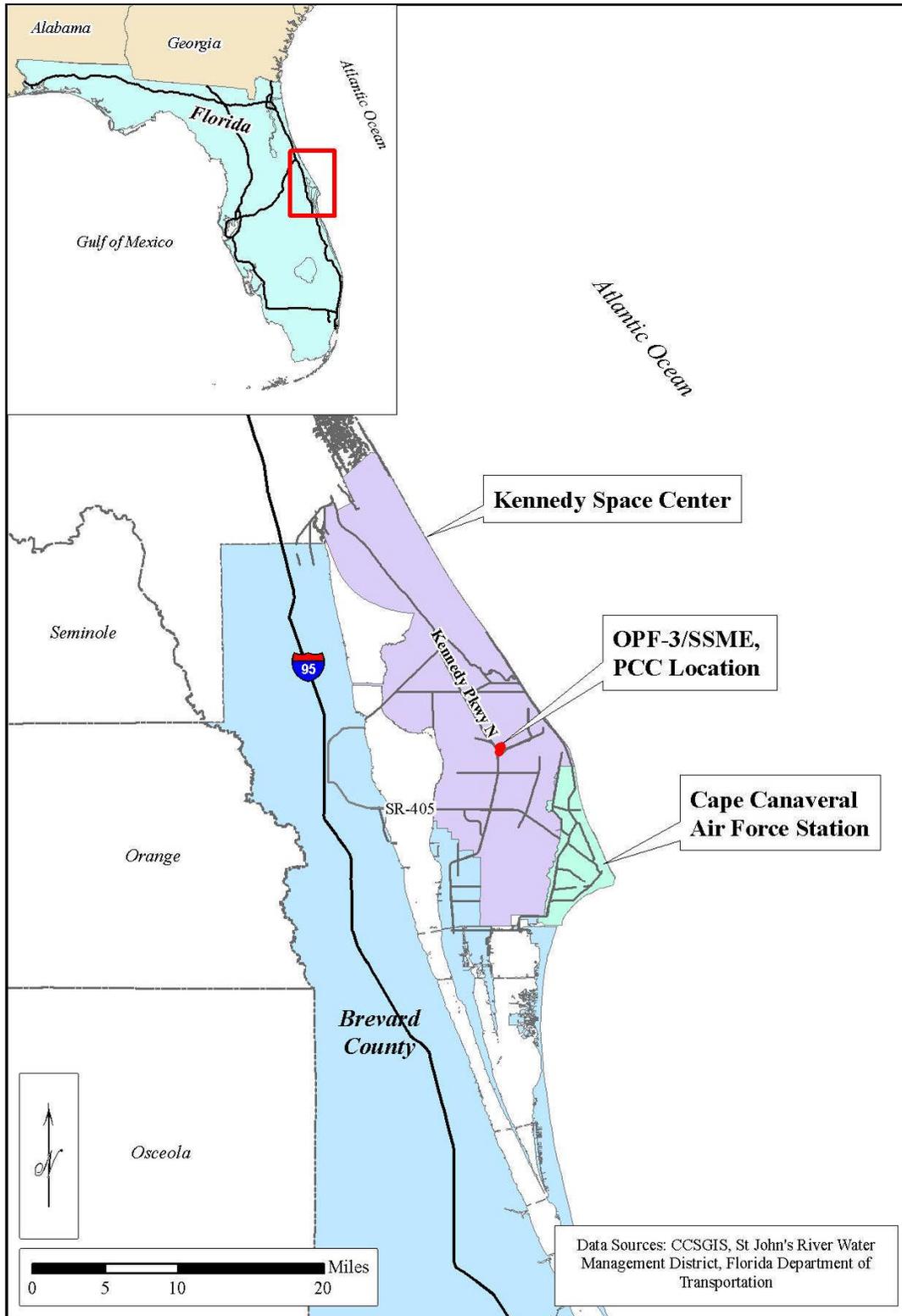
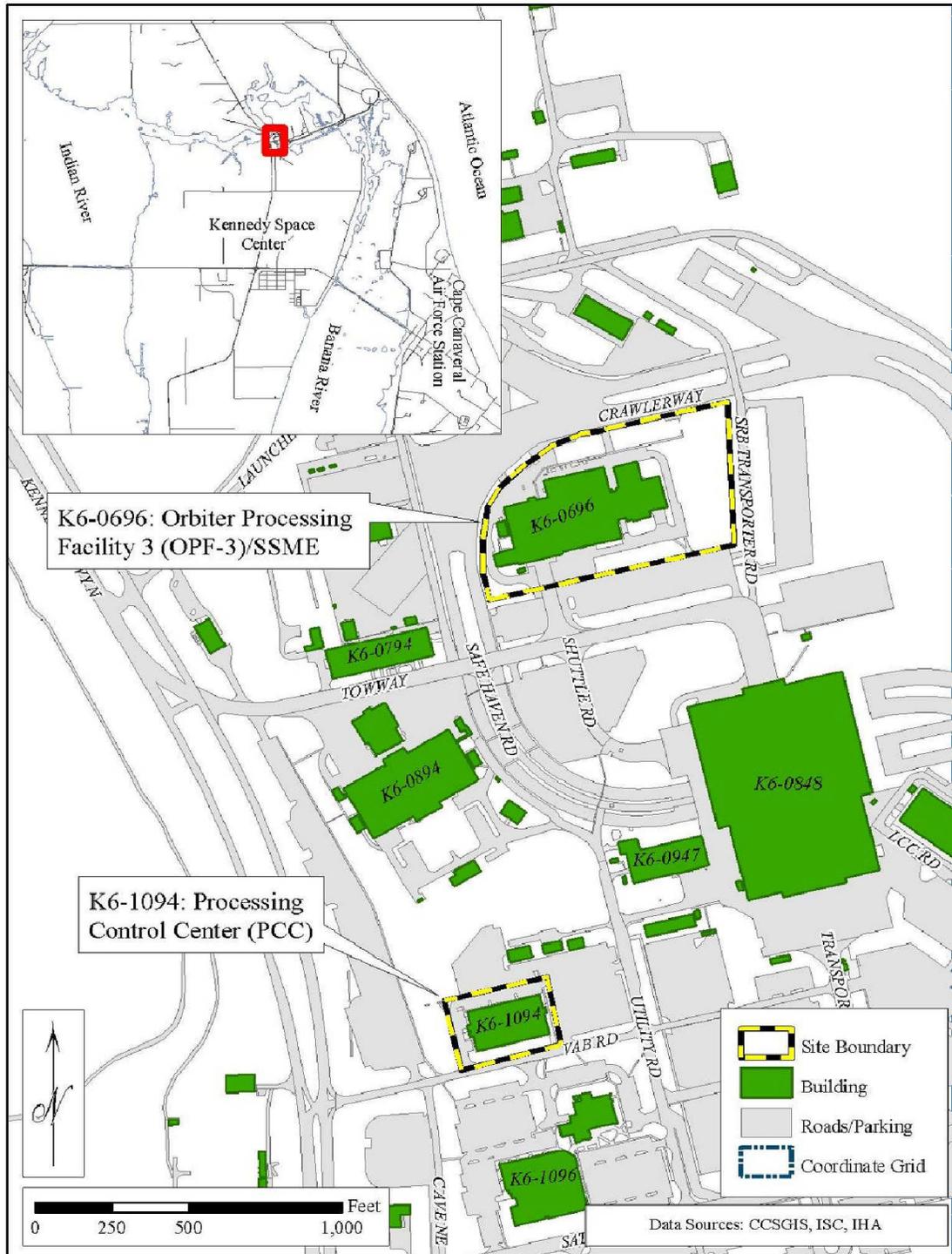


Figure 2. Location of the Orbiter Processing Facility 3, Space Shuttle Main Engine Shop, and the Processing Control Center.



2.0 Survey Methodology

The methodology used to complete this EBS is in accordance with 40 CFR 312, and in general conformance with the scope and limitations of ASTM Practice E 1527-05 for conducting an EBS. This report is designed to satisfy the requirements for the innocent landowner defense to CERCLA liability as defined in 42 USC 9601 (34)B. All of the investigative reports as stated in ASTM E 1527-05 have been satisfied by this assessment. Performance of an EBS in accordance with these documents is intended to reduce, but not eliminate uncertainty with respect to the potential for Recognized Environmental Conditions (RECs) associated with the Orbiter Processing Facility 3, Space Shuttle Main Engine shop, and Processing Control Center.

This report was prepared by Michelle Ramsey and Patrice Hall with assistance from Dan Sciarini, Jewell Brannigan, Jane Provanca, Michelle Cielukowski, Greg Powers, and Robin Cosker (IHA/MESC).

Limitations and Exceptions

This assessment was accomplished by, and limited to, document review and the use of site reconnaissance to observe existing conditions. A review of presently and readily available information on past and current land use was conducted for indications of the manufacture, generation, use, storage and/or disposal of petroleum or hazardous substances at the site. This report does not constitute a legal position as IHA does not provide legal advice. An EBS is limited by the availability and quality of site documentation. Undocumented, unauthorized releases of hazardous materials, the remains of which are not readily identifiable by visual inspection, are very difficult and often impossible to detect within the scope of such an investigation.

Much of the information provided in this report is based upon review of existing environmental reports prepared by others, personal interviews and research of available documents, records, and maps held by the appropriate government and private agencies. This information is, therefore, subject to the limitations of historical documentation, availability and accuracy of pertinent record, and the personal recollection of those persons contacted. IHA did not attempt to independently verify the accuracy of all information reviewed or received during the course of this EBS. IHA disclaims any and all liability for any errors, omissions or inaccuracies in information provided by these sources.

The site drawings provided within this report are used to present the general, relative location of features of interest on and surrounding the facilities. Unless otherwise indicated, they are not meant to be accurate engineering drawings.

The findings of this report are valid as of the date of this report. Changes in the condition of a property can occur with the passage of time, whether due to natural processes or to the works of

man on this or adjacent sites. In addition, changes in state-of-the-art procedures or government regulations may occur. Such changes, which are beyond IHA's control, may render the findings of this report invalid, wholly or in part.

The final assessment of the potential for the existence of hazardous material at the subject property should be considered professional opinion based upon the data obtained during the investigations. It should not be considered a definitive statement that hazardous material is or is not present in the area of study.

Records from local, state and national sources were used to complete this evaluation. Local records were obtained from the environmental offices of NASA and their contractors.

The independent conclusions represent the best professional judgment of the IHA environmental scientists and engineers based on the conditions that existed and the information and data available to us during the course of this assignment. Factual information regarding operations, conditions, and test data provided by the owner, their representative and previous occupants have been assumed to be correct and complete. Reliance on the information and conclusions presented in this report by other parties are not authorized by IHA.

2.1 Approach and Rationale

The survey included reviews of available current and historic reports, data, analyses, records, and photographs pertaining to the subject site. Inspections of the property and interviews with knowledgeable personnel regarding the history and environmental condition were also conducted.

2.1.1 Description of Documents Reviewed

Research conducted for the preparation of this EBS included a review of Real Property records, current and historic photographs and maps, spills and releases records, environmental compliance files, Remediation Program files and other government resources. Documents reviewed include:

1. ASTM E 1527-05, Standard Practice for Environmental Site Assessments: Phase I
2. Standard Practice for Conducting Environmental Baseline Surveys, 2005
3. KSC Archives, historical photographs
4. KICS, historical photographs
5. RCRA Facility Investigation (OPF3 RFI Report 2004)
6. OPF 3 SWMU Assessment Report (OPF3_SAR Report 2001)
7. Processing Control Center Area RCRA Facility Investigation (PCCA RFI 2008)
8. Processing Control Center Area Confirmatory Sampling (CS) Report (PCCA CSR 2007)
9. Processing Control Center Area Interim Measure Report (PCCA IMR 2009)
10. AMIS Database

11. 2003 Facility Inspection Report (K6-0696)
12. 2005 Facility Inspection Report (K6-0696A)
13. 2002 Facility Inspection Report (K6-0696B)
14. 2006 Facility Inspection Report (K6-0696E)
15. 2003 Facility Inspection Report (K6-0696G)
16. 2001, 2004, 2007 and 2010 EFR Findings
17. EPCRA Tier II Chemical List 1999-2010
18. Land Use Control Implementation Plan (LUCIP)/SWMU 56 (KSC-TA-6664)

2.1.2 Property Inspections

A brief inspection and preliminary project meeting was conducted by Jane Provancha and Don Dankert/NASA on February 28, 2011. The EBS visual inspections of the OPF 3 and SSME areas were conducted on March 9th and 10th. The visual inspection for the PCC was conducted on March 18th by Patrice Hall, Michelle Ramsey, Dan Sciarini, Greg Powers, and Michelle Cielukowski. The scope of this inspection included visual review of the exterior and interior of the OPF 3, SSME, and PCC. All rooms and structures were inspected, and the concerns were documented in photographs provided in Appendix C.

2.1.3 Personal Interviews

Interviews were conducted in person, by telephone and email with multiple personnel having knowledge of the facilities/rooms/structures included in this EBS. The following individuals were contacted and questioned to obtain information regarding the previous and current land use and/or environmental condition of the subject facilities/structures:

Table 1: List of individuals interviewed for the EBS and their affiliations.

Name	Organization	Information Area
Justin Strynchuk	IHA	Stormwater
Mark Barnes	USA	Facility Manager, K6-0696
Jeffrey Lindgren	USA	Environmental
Charlie Venuto	USA	Environmental
Lisa Waters	USA	Safety/Environmental
Jill Vogel	USA	Environmental
Gene Harm	USA	Environmental
Linda Boehmer	USA	Industrial Hygiene

Amy Mangiacapra	USA	Environmental
Rodney Nickell	IHA	Health Physics
Chris Vanaman	IHA	Air-Title V
Mike Williamson	Wiltech	Sampling for USA
Sarah Hausman	IHA	Sampling
Meagan Hrenko	Nelson Engineering	USA Waste Sampling Requestor
Gina Parrish	IHA	Waste Management
Tim Tyndall	IHA	SPCC/Tanks
Doug Younger	NASA	SPCC/Tanks
Hien Nguyen	NASA	EPCRA Tier II
Chris Cronwell	IHA	Waste
John Matthews	NASA	EFR Findings
Pat Lynn	NASA	EFR Findings
Melissa Wetherington	USA Security	Facility Access
Vince Nichols	USA	OPF 1&2 Facility Manager
Elaine Liston	Abacus Technology	Historical Archives
Tom Price	IHA	Water
Ken Bair	Rocketdyne	SSME Shop Safety
Jewell Brannigan	IHA	GIS
Sue Tzareff	IHA	SWMU/PRL
Jermaine Johnson	USA	PCC Facility Manager
Don Mayer	USA	Backup Facility Manager, K6-0696
Barbara Naylor	NASA	Historical Properties
Lee Hill	USA	PCC Alt. Facility Manager/SAA Operator

Pete Eggert	Dynamac	SPCC
John Smith	URS	PCC Roof system
Erica Williams	IHA	PRL/SWMU Maps
Patrick Renna	MEI	Safety

2.1.4 Sampling

No sampling was conducted as part of this EBS. However, previous sampling information from past investigations was reviewed during this survey, and the results are as follows.

2.1.4.1 Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

Previous asbestos surveys were performed for facility K6-0696, which includes OPF 3 and the SSME, as well as facilities K6-0696A, K6-0696B and K6-0696D, and are all associated with the K6-0696 site survey. Asbestos was identified in the high bay of OPF 3, Room 1104. The asbestos is 10% Chrysotile and is in black tar/putty located on Firex lines in the bay. No other asbestos has been identified at facility K6-0696, K6-0696A, K6-0696B, or K6-0696D. Results of AMIS findings are available in Appendix D.

OPF 3 was previously identified as Potential Release Location (PRL) #103 and a Solid Waste Management Unit (SWMU) Assessment was conducted in August 2001. During this time, sampling was performed on several media including soil, groundwater, sediment and surface water, to determine the presence or absence of contamination at this site. The results of this investigation identified 12 LOCs within the K6-0696 site survey boundary for the OPF 3 and SSME. The status of PRL #103 was officially changed to SWMU #83.

2.1.4.2 Processing Control Center

Previous asbestos surveys were performed for facility K6-1094 (PCC). No asbestos has been identified at this facility. Results of AMIS findings are available in Appendix D.

An Indoor Air Quality (IAQ) evaluation is currently being conducted by IHA to identify the source of musty odor complaints on the second floor. Water intrusion into the facility occurred during heavy storms in the past and the damaged areas have since been repaired. No roof leaks or water intrusion from windows was observed. No other indoor air quality or asbestos concerns were found within the facility.

The PCC was previously identified as PRL #145 and a SWMU assessment was conducted in 2006, officially changing the status to SWMU #101. During this time, sampling was performed on several media including soil, groundwater, sediment and surface water, to determine the presence or absence of contamination at this site. As a result of the SWMU Assessment Report (SAR), there were 6 LOCs identified, 2 of which fall within the site survey boundary for the PCC.

3.0 Findings for the Subject Property

3.1 History and Current Use

3.1.1 Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

The OPF 3 (K6-0696), previously known as the Orbiter Maintenance and Refurbishment Facility (OMRF) was constructed in 1987. It was upgraded to the current configuration in 1991, and consists of a 29,000 SF high bay and an 87,000 SF low bay. After Shuttle landing, the Orbiter is transported to this facility where residual fuel, oxidizer, ordnance, and returning payloads are removed. The Orbiter is then inspected, tested, refurbished, and new payloads are installed and inspected at the OPF 3.

The SSME shop was originally housed in the Vehicle Assembly Building (VAB) at KSC. The SSME shop provides the capabilities for post-flight inspections and maintenance as well as functional checkout of all engine systems prior to installation on the Orbiters. The construction to add the SSME shop to OPF 3 was completed in 1998, providing space to increase the capacity and efficiency of engine operations. The new 34,600 SF SSME shop is now located on the east side of facility K6-0696. Movement of this operation out of the VAB was prompted by safety considerations to minimize the number of personnel and activities in this building where the Space Shuttle components are assembled prior to rollout to the launch pad. Both the OPF 3 and SSME shop sections of facility K6-0696 are currently active.

Descriptions of the supporting facility structures included in this EBS are provided below and photos of the associated structures listed above can be found in Appendix C.

1. K6-0696A (OPF 3 Gate House) is the entrance control building on the south side of the OPF 3. This facility consists of a small interior room with a roof overhang on the west side of the facility. The facility is constructed with a steel frame, metal siding, and a metal roof.
2. K6-0696B (Turnstile Shelter) is used for entry into a limited access building. The facility is constructed with a steel frame, metal siding, and a metal roof.
3. K6-0696D (Environmental Control Building) is the building that houses the Environmental Control System (ECS). The facility is constructed of concrete block with a built-up roof consisting of tar and gravel.
4. K6-0696E (Active Turnstile Shelter) is the east gate entrance into the OPF 3 perimeter. The facility consists of a concrete foundation, steel frame, and metal roof.
5. K6-0696F (Chilled Water Pump House) houses the pumps to the chilled water system. The facility is constructed of a concrete foundation, steel frame, metal siding, and metal roof.
6. K6-0696G (Sewage Lift Station) is located just outside the perimeter fencing on the southwest corner, in a grassy area. The lift station's construction consists of a concrete

block below ground structure that contains two pumps, an electrical panel, and a ¾” freshwater backflow preventer (BFP) for wash down purposes.

7. K6-0696H (Hazardous Waste Storage Facility) is a portable storage facility used as a 90-day storage area for staging of waste products until they can be picked up for proper disposal.
8. K6-0696J (K-Bottle Storage) is located on the north side of OPF 3, and is constructed with a steel frame, metal siding, and a metal roof.
9. K6-0696K (Hazardous Waste Staging Facility) is a permanent hazardous waste storage area that is currently used to store empty waste drums. This facility is constructed with a concrete foundation, metal frame, metal roof, and chain link sides for securing the facility contents.

Photographs of the associated structures listed above can be found in Appendix C for reference.

3.1.2 Processing Control Center

The Processing Control Center (K6-1094) is located on the north side of VAB Road and west of Utility Road (Figure 2). Construction of the subject property began in 1991 and was completed by June of 1992. This is a 99,000 square foot (SF), three story building, with the building construction consisting of a concrete slab foundation, concrete block exterior walls, gypsum wallboard interior walls, a built up roof, and double personnel entry doors located on the east and west ends of the building. The facility was originally constructed and dedicated to Space Shuttle Orbiter testing, launch team training and Launch Processing System (LPS) maintenance, and consists mostly of offices and laboratory areas. The building provides Space Shuttle engineers and technicians with state-of-the-art areas to improve and maintain their skills during pre- and post-flight Orbiter processing flows, and is currently an active facility.

3.2 Environmental Setting

Kennedy Space Center is surrounded by the Merritt Island National Wildlife Refuge which manages all areas outside of the “industrial zones” of KSC. The facilities described herein are all within the industrial zones.

3.2.1 Natural Resources

The presence of federally and state protected species must be disclosed to the Grantee during the real property transaction and can be identified by contacting the NASA Environmental Management Branch (EMB) at KSC. Endangered Species Act (ESA) Section 7 Consultation with the USFWS would be required through the EMB for any activities that may adversely affect federally listed species. All proposed mission and work scopes must be evaluated by the NASA EMB in order to prevent violations of state and federal wildlife rules and regulations. Most common concerns within the KSC industrial zone include occasional nesting of protected birds and photo-pollution caused by exterior lighting.

3.2.1.1 Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

State protected species were observed within the survey site boundary during field reconnaissance for facility K6-0696. There is an osprey nest located at K6-0696 in the northeast corner of the site security perimeter, just south of the fuel scrubber pad (see Appendix C). Prior to any work commencing at these facilities, a KSC Environmental Checklist (KSC Form 21-608V2 NS) should be submitted to the NASA Environmental Management Branch for assessment of potential wildlife impacts.

Facility K6-0696 has a built up roof of tar and gravel. State threatened least terns and protected black skimmers (Species of Special Concern) have been known to nest on rooftops. Least Terns do not construct typical nests but use the existing contours, cracks, and seams of the roof structures or any place the stone covering has been disturbed, making the identification of eggs very difficult, especially on roofs such as these.

3.2.1.2 Processing Control Center

State protected species were observed within the survey site boundary during field reconnaissance for facility K6-0696. There is an osprey nest located within the survey boundary of K6-1094 in the parking lot of the PCC facility (see Appendix C). Aside from the osprey nest, a smaller bird nest (unknown species) was observed inside the exhaust vent of the 1st floor lab ventilation hood (see Appendix C for photograph).

Facility K6-1094 has a built up roof covered by a membrane surface. Threatened least terns and black skimmers (Species of Special Concern) have been known to nest on rooftops. As described for the OPF 3, Least Terns use the existing contours, cracks, and seams of the roof structures or any place the stone covering has been disturbed, making the identification of eggs very difficult. Prior to any work commencing at this facility, a KSC Environmental Checklist (KSC Form 21-608V2 NS) should be submitted to the NASA Environmental Management Branch for assessment of potential wildlife impact.

3.2.2 Cultural Resources

3.2.2.1 Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

Facility K6-0696 is eligible for listing on the National Register of Historic Places in the context of the Space Shuttle Program. NASA determined that the facility meets the criteria guidelines established within 36 CFR Part 60.4, National Register Criteria for Evaluation, and the Florida State Historic Preservation Officer concurred. The list of Historical Properties is referenced in Appendix D. The facility is currently being recorded for historic preservation (e.g., Historic American Engineering Record) and the final report should be complete by December 2011.

3.2.2.2 Processing Control Center

The PCC has been determined ineligible for listing on the National Register of Historic Places under the criteria established within 36 CFR Part 60.4, National Register Criteria for Evaluation. At the end of the current lease agreement, the facility will have to be re-evaluated.

3.3 *Hazardous Substances*

3.3.1 Hazardous Materials and Petroleum Products

3.3.1.1 *Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop*

Historically, the fuels used on the Orbiters include hydrazine (N₂H₄), monomethyl hydrazine (MMH), and unsymmetrical dimethyl hydrazine (UDMH). The oxidizer used on the Orbiters is nitrogen tetroxide (N₂O₄). When the Orbiter is brought into the high bay after landing, it is serviced and drained of all residual fuels through hoses that connect directly to the Orbiter and run under the facility through cable trays and out to the fuel and oxidizer scrubber pads.

An oxidizer scrubber pad and a fuel scrubber pad are located on the north side of the facility. The oxidizer scrubber pad is located in the central area of the north side of OPF 3 and the fuel scrubber is located approximately 300 ft northeast. An abandoned fuel scrubber area is located immediately outside the northwest corner of the fuel scrubber pad (see Appendix B for map showing locations and Appendix C for photographs of structures). Each current scrubber consists of four towers and a 650-gallon scrubber liquid tank. Both the oxidizer and fuel scrubbers are located on sealed concrete pads. An earthen stormwater retention pond is located immediately southeast of the fuel scrubber pad. The retention pond was reconfigured in 1998 from a narrow, rectangular shaped structure to a larger rectangular structure. An emergency overflow structure was installed on the northeast side of the pond when it was reconfigured. Stormwater runoff from the fuel and oxidizer scrubbers enters the retention pond through the northwest corner and the west side, respectively.

The ground cooling system (GCS) system is comprised of a single primary circulation control module (PMN S70-1203) containing 3 pumps, two secondary circulation modules [(PMN S70-0509) each containing a single pump], two refrigeration modules [(PMN S70-0510) each containing a 5-ton Copeland compressor] and a facility-supplied chilled water (CHW) heat exchanger.

Facility K6-0696 falls under the Spill Prevention, Control, and Countermeasures (SPCC) plan. The site specific SPCC plan for this area can be found in Appendix D. Oil storage associated with this facility includes 55-gallon drums containing new and used oil, compressor condensate collected in a polyethylene tank, and hydraulic oil associated with elevators, cranes, and other hydraulic equipment (see photographs in Appendix C).

NASA EPCRA Tier II lists dating back to 1998 were reviewed during this EBS, and a list of reported chemicals stored at facility K6-0696 included: Citric Acid, Sodium Hydroxide, and Ammonia (see Appendix D). In addition to the above listed chemicals, the following were also observed in POL and flammable lockers during the site visit: Deionized water, isopropyl alcohol, methyl ethyl ketone, acetone, trichloroethane, cans of spray paint, hydrochloric acid, anodic etch, oxalic acid, phosphoric acid, sulfuric acid, and nitric acid.

There are also two battery rooms on the first floor associated with K6-0696 communication (see photographs in Appendix C), which contain several sulfuric acid batteries.

3.3.1.2 Processing Control Center

Facility K6-1094 falls under the SPCC plan and the site specific SPCC plan for this area is found in Appendix D. Oil storage associated with this facility includes compressor condensate collected inside Room 1103 located on the first floor on the west side of the facility, and hydraulic oil associated with the elevators (see photographs in Appendix C).

NASA EPCRA Tier II lists dating back to 1998 were reviewed during this EBS, and no chemicals were listed for this facility (see Appendix D). However, during the site visit, POL and corrosive lockers were observed in the laboratory area (see Appendix C for photographs). The chemicals stored in these lockers consisted of the following: insect repellent, cleaner/disinfectant, heat sink compound, adhesives, keyboard dust cleaner, WD-40, and Staticide.

There is one communication/battery room on the first floor associated with K6-1094 communication which contains several sulfuric acid batteries. Next to the battery stack is a neutralizing kit kept on hand in the event of a spill.

3.3.2 Hazardous and Petroleum Waste

3.3.2.1 Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

Two hazardous waste storage buildings were identified on the northwest corner of the site, southwest of the oxidizer scrubber. Oil, paint, solid, and liquid wastes associated with the thermal protection system for the Orbiter, as well as aerosol can waste generated at facility K6-0696 are being stored in the portable facility, K6-0696H (see Appendix C for photographs). Empty drums are also being stored in facility K6-0696K at this time.

Multiple 90-day and Satellite Accumulation Areas (SAA) are located at facility K6-0696, and contain wastes generated at the facility. The SAA sites are staged throughout both the OPF 3 and SSME shop areas. Controlled and hazardous wastes are temporarily stored at these locations until they can be relocated to the respective 90-day site (K6-0696H). The wastes are properly containerized and labeled prior to transport. Waste support requests are then issued to the Medical and Environmental Support Contract's Hazardous Waste Management Office by the waste generators for pickup and proper disposal. Individual lists of the wastes stored at each of these sites may be referenced in Appendix D. There are a total of (3) 90 day sites, (5) SAA sites, and (1) non-regulated waste site at facility K6-0696.

The locations of these sites are as follows:

1. 90 day site – Location K6-0696H
2. 90 day site – Location K6-0696 Fuel Pad

3. 90 day site – Location K6-0696 Oxidizer Pad
4. Non-Regulated site – Location K6-0696 Hydraulic Pumper Unit
5. SAA site – Location OPF 3 Low Bay Room 1148
6. SAA site – Location OPF 3 Mix Crib
7. SAA site – Location OPF 3 High Bay
8. SAA site – Location SSMEPF GSE Area (1st floor)
9. SAA site – Location SSMEPF High Bay (2nd floor)

The contingency plan for these 90-day, SAAs, and non-regulated waste sites, along with the wastes generated and stored there, can be referenced in Appendix D. A TRP list of all active wastes accumulated at facility K6-0696 is also available in Appendix D for review.

Pollution Incident Reports (PIRs) provided by USA Environmental personnel, as well as the MESCs spill database report dating back to 1999, show multiple spill incidents of different commodities have occurred over the years (see Appendix D for copies of PIRs). Although in most cases spill cleanup practices were executed, there were a couple of instances in which the spilled commodity evaporated rapidly from the surface where the spill occurred. Therefore, cleanup of the commodity was not feasible, although cleanup response measures along with PIR forms were still initiated.

3.3.2.2 Processing Control Center

There is currently a satellite accumulation site (SAA) located on the first floor in the lab area, Room 1060. The wastes generated consist of various aerosol cans, fluorescent light bulbs, and various nickel and lithium batteries. Historically, there were two SAA sites within the facility. The second site was consolidated into the first site several years ago according to the alternate facility manager and current USA SAA operator. A copy of the active SAA site's contingency plan, with a listing of the wastes stored there, is located in Appendix D for review.

Reference of Pollution Incident Reports (PIRs) provided by USA environmental personnel, as well as the MESCs spill database report which dates back to 1999, show multiple spill incidents of different commodities have occurred over the years (see Appendix D for copies of PIRs). In most cases, spill cleanup remediation was able to be performed. In some instances, the commodity may have evaporated quickly from the surface where the spill occurred. Therefore, physical cleanup of the area was not required, although cleanup response measures along with PIR forms were still initiated.

3.4 Remediation Program

3.4.1 Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

OPF 3 is located in what was previously known as Potential Release Location (PRL) #103. It was identified as a PRL due to procedures that occur in OPF 3, including removal of residual fuels, oxidizer, and explosive ordnance items conducted after landing. A Solid Waste

Management Unit (SWMU) assessment was conducted as a result of this identification in August 2001. During this time, sampling was performed on several media including soil, groundwater, sediment and surface water, to determine the presence or absence of contamination at this site. The results of this investigation indicated that operations at the OPF 3 facility have negatively impacted the environment in the area. The investigation identified the presence of contaminants in excess of human health and ecological screening criteria in various media and locations at the OPF 3. Confirmatory sampling (CS) was recommended at that time. The status of PRL #103 was officially changed to SWMU #83. There were 12 LOCs identified (see Appendix B for map) in the SWMU Assessment Report (SAR) investigation, and are as follows:

1. LOC 1 – Hazardous Waste Storage Buildings
2. LOC 2 – Abandoned Oxidizer Scrubber
3. LOC 3 – Hypergol Vent and Catchment Tank
4. LOC 4 – Abandoned Electrical Transformers
5. LOC 5 – Abandoned Fuel Scrubber
6. LOC 6 – Earthen Stormwater Retention Pond
7. LOC 7 – Oxidizer Scrubber Pad and Transformer Area Stormwater Discharge
8. LOC 8 – Fuel Scrubber Pad Stormwater Discharge
9. LOC 9 – Stormwater Pond Overflow Discharge Point Outside Pond
10. LOC 10 – Oxidizer Waste Drum Staging Area
11. LOC 11 – Fuel Waste Drum Staging Area
12. LOC 12 – Stormwater Pond Overflow Discharge Point Inside Pond

As a follow up to the SAR, sampling was conducted in association with a RCRA Facility Investigation at OPF 3 to: (i) evaluate the presence and extent of arsenic and cadmium in surficial soil (ground surface to 1 ft depth); and (ii) ammonia and polynuclear aromatic hydrocarbons (PAHs) in shallow groundwater at depths above 30 ft below land surface (BLS). The soil results produced from screening the analytical data against human health criteria indicated that neither arsenic nor cadmium exceed their respective residential Soil Cleanup Target Levels (SCTLs). Previous PAH detections in groundwater were not confirmed in the OPF 3 area. Ammonia exceeding the FDEP GCTL was confirmed to be present in shallow groundwater north of OPF 3 at well OPF 3-IW6S. This RCRA Facility Investigation confirmed the same LOCs as listed above, with the addition of the following LOCs (see Appendix D):

1. LOC 13, 14, 15 – Outside Stormwater Perimeter
2. LOC 16 – Oxidizer Area Discharges to Stormwater Swale

OPF 3 and the SSME Shop are also located in a larger designated SWMU known as the MLP Park Site/VAB Area, SWMU #56. Groundwater in this area contains VOCs and ammonia above residential GCTLs. Benzo(a)pyrene and PCBs above residential SCTLs are found in the surface

soil in the area northwest of the VAB, just outside the site surveyed boundary. Land use controls have been implemented at this site to prohibit the use of groundwater and exposure to surface soil (LUCIP SWMU 56).

3.4.2 Processing Control Center

The PCC was previously identified as PRL #145 and a SWMU Assessment was conducted in 2006, officially changing the status to SWMU #101. As a result of the 2007 PCC Confirmatory Sampling Report and the 2008 SAR, there were six LOCs identified, two of which fall within the site survey boundary for the PCC. These LOCs include a former hydraulic oil spill (LOC 5) and a former transformer location (LOC 6). LOC 5 was sampled and the results indicated that the concentrations of vinyl chloride in groundwater at LOC 5 were above screening criteria. An institutional land use control is necessary and has been implemented to prohibit groundwater use in the PCC area. The former transformer location (LOC 6) was inside the footprint of the existing PCC facility (K6-1094). Based on the earth moving associated with constructing the existing PCC facility, it is unlikely that any potentially affected soil remained at this LOC. No further action for soil is recommended for the Processing Control Center Area and no land use controls for soil are required.

3.5 Storage Tanks

3.5.1 Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

An abandoned 10,000 gallon double wall underground catchment tank, which was designed to contain spills of fuel or oxidizer occurring within the bay areas, is located southeast of the hypergol vent and northeast of the oxidizer scrubber. According to interviewed personnel, the tank was initially installed in 1990 as an emergency spill tank, and was abandoned 5 years later. USA had the tank sampled, cleaned, and placed out of service in 1995.

Compressor condensate from the chiller system is collected in a polyethylene tank which is located on the southwest corner of the facility. This tank is listed under the SPCC plan for the facility (see Appendix D).

3.5.2 Processing Control Center

There are no existing, or historic evidence of, storage tanks located at the subject property. However, the PCC facility is adjacent to a series of water tanks (structures labeled K6-0946, K6-0994, and K6-0995) which reside to the northeast of the PCC (see Appendix B).

3.6 Pipelines, Hydrant Fueling and Transfer Systems

3.6.1 Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

Historically, the fuels used on the Orbiters include hydrazine (N₂H₄), monomethyl hydrazine (MMH), and unsymmetrical dimethyl hydrazine (UDMH). The oxidizer used on the Orbiters is nitrogen tetroxide (N₂O₄). When the Orbiter is brought into the high bay after landing, it is

serviced and drained of all residual fuels through hoses that connect directly to the Orbiter and run under the facility through cable trays and out to the fuel and oxidizer scrubber pads.

The Environmental Control Building (K6-0696D), associated with the OPF 3 high bay, houses the Environmental Control System/Environmental Control and Life Support System (ECS/ECLSS) (ID# PMN S70-1310-00-003). The purpose of the fixed ECS equipment is to provide a continuous source of filtered, dehumidified and reheated air to the various compartments of the Orbiters, which minimizes accumulation of hazardous gases inside compartments as well as environmental comfort to personnel working inside the spacecraft. The ECS is comprised of a filtered air intake, a dual-staged blower, finned-coils (supplied with chilled water circulated through a refrigeration chiller package) for dehumidifying the air, computer-controlled flow valves, hot-water reheat coils and filter chambers housing both activated charcoal filters and high-efficiency particulate air (HEPA) filters. System hard-line ductwork is split into four (4) circuits that provide conditioned air to the forward Orbiter Maneuvering System pods, the Forward Reaction Control System module, and the Vertical Stabilizer compartment (OMS/FRCS/VSTAB), aft, and payload/wing glove compartments. The forward purge circuit also provides conditioned air to the forward cavity of the Orbiters that surround the crew module.

K6-0696 has an external Ground Cooling System (ID# PMN S70-1203-00-001) located on the external west side of the facility. The purpose of the fixed GCS is to provide a continuous source of chilled liquid refrigerant R124 to the on-board GSE heat exchanger to aid in transferring heat from the two closed loop R21 refrigerant systems that provide cooling to various electrical “black boxes” in the Orbiters. The GCS system is comprised of a single primary circulation control module (ID# PMN S70-1203) containing 3 pumps, two secondary circulation modules [(ID# PMN S70-0509) each containing a single pump], two refrigeration modules [(ID# PMN S70-0510) each containing a 5-ton Copeland compressor] and a facility-supplied chilled water (CHW) heat exchanger. One of the three redundant pumps in the S70-1203 module operates to circulate refrigerant from the reservoir through the CHW heat exchanger, then returns it to the S70-1203. From there, the liquid R124 refrigerant flows through a sequence of motorized valves and measuring instrumentation before it is supplied to the Orbiters, where it passes through the Government Sponsored Enterprise Heat Exchange (GSE) HX and returns to the S70-1203 reservoir for the cycle to continue.

3.6.2 Processing Control Center

No known pipelines, hydrant fueling or transfer systems have been used at the PCC.

3.7 Oil/Water Separators

3.7.1 Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

Historically, an oil/water separator existed on the west side of the facility, which has since been removed. A past spill was reported in this area when the oil/separator was active. A copy of the

PIR filed when the incident took place on 7/16/2003 can be referred to in Appendix D. Currently, there are no active oil/water separators located at the facility.

3.7.2 Processing Control Center

There are no existing, or historic evidence of, oil water separators at or immediately adjacent to the subject property.

3.8 Pesticides

There is no record or evidence of the handling, storage, release or disposal of pesticides within or immediately adjacent to the facilities surveyed under this EBS. Use of pesticides by licensed applicators for normal pest control purposes within and immediately adjacent to facilities is likely to have occurred.

3.9 Medical or Biohazardous Waste

No known medical or biohazardous wastes have been stored, disposed, or otherwise released at the facilities surveyed under this EBS.

3.10 Ordnance

3.10.1 Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

Ordnance was stored intermittently in small quantities inside the high bay of OPF 3. Locations of storage are either on the ground floor in a small metal cabinet, or in the aft of the shuttle. Explosive Ordnance Disposal (EOD) personnel delivered the ordnance to this facility for storage in the metal cabinet, for later mounting on the Orbiters. Safety personnel accompanied EOD personnel and kept logs of this cabinet once the ordnance was delivered. The ordnance is mounted into the aft of the Orbiters prior to departure, with the sole purpose of blowing off the tail parachute hatch once the Orbiters land on the runway.

3.10.2 Processing Control Center

No documentation was located indicating storage or disposal of ordnance at or adjacent to the PCC property included in this EBS.

3.11 Radioactive Wastes

There was no documentation of radioactive waste, storage, disposal, or release at or adjacent to facilities K6-0696 or K6-1094 located during this survey.

3.12 Solid Waste

There are no records or evidence of solid waste disposal at or adjacent to the facilities which were surveyed under this EBS.

3.13 Ground Water

3.13.1 Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

The OPF 3 and SSME property fall under SWMU #83 (see Map in Appendix B). A RCRA Facility Investigation (RFI) was performed at the OPF 3 site in 2004, to confirm and delineate the presence and extent of ammonia and PAHs in groundwater. Characterization activities performed during this investigation included (i) installation and sampling of monitoring wells to confirm the presence and extent of ammonia in groundwater; and (ii) installation and sampling of monitoring wells to confirm the presence of PAHs in groundwater. The data were compared to human health screening criteria. Previous PAH detections in groundwater were not confirmed in the OPF 3 area. Ammonia exceeding the FDEP Groundwater Cleanup Target Level (GCTL) was confirmed to be present in shallow groundwater north of OPF 3 at well OPF3-IW6S. Recommendation was made that ammonia concentrations in this well be monitored as part of the MLP/VAB monitoring program.

3.13.2 Processing Control Center

The PCC property falls under SWMU #101 (see Appendix B). According to the June 2008 RCRA Facility Investigation of the PCC area, the concentration of vinyl chloride in groundwater exceeded the groundwater cleanup target level at that time, but was below the natural attenuation default concentration. Vinyl chloride has been retained as a contaminant of concern (COC) and poses an elevated risk over FDEP groundwater cleanup target levels (GCTLs) if site groundwater is used as a potable drinking water supply (see plume map in Appendix B). However, no current or future exposure pathways are anticipated for groundwater at the PCC. Therefore, long-term natural attenuation monitoring of VOCs in groundwater was recommended for the site.

3.14 Stormwater Treatment, Collection and Discharge

3.14.1 Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

Facility K6-0696 and most associated area structures are covered under the following overlapping individually permitted stormwater management systems: SRM Roadway Modification (40-009-0315G), OPF 3 Parking Lot Expansion (40-009-81302-2), and Mod to OPF 3 for SSME Processing (40-009-0491G-ERP). These permits do not cover K6-0696H, K6-0696J, and K6-0696K, which are all located in the northwest corner of the site, and are below permitting thresholds.

3.14.2 Processing Control Center

Facility K6-1094 is not covered by a facility specific stormwater system, but it is part of, and drains into, the Sub-Basin 11 regional stormwater system which drains westerly to ditches along the east side of Kennedy Parkway.

3.15 Wastewater Treatment, Collection and Discharge

3.15.1 Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

A domestic wastewater collection/transmission system located in the VAB area provides service to K6-0696. Raw wastewater is transported by this system to the CCAFS Regional Plant located on the Cape Canaveral Air Force Station. Sewage lift station K6-0696G was constructed in 2000 and serves OPF 3 and the Thermal Protection System Facility (K6-0794).

An earthen stormwater retention pond is located immediately southeast of the fuel scrubber pad. The retention pond was reconfigured in 1998 from a narrow, rectangular shaped structure to a larger rectangular structure. An emergency overflow structure was installed on the northeast side of the pond when it was reconfigured. Runoff from the fuel and oxidizer scrubbers enters the retention pond through the northwest corner and the west side, respectively. After testing the stormwater for the presence of fuel or oxidizer, it is routed into the earthen stormwater retention pond located on the northeast corner of the low bay area. There is a Technical Response Package (TRP) on file with USA which authorizes discharge of this stormwater to grade, as long as the water is inspected prior to discharge, and no sheen is evident on the surface of the water.

3.15.2 Processing Control Center

A domestic wastewater collection/transmission system located in the VAB area provides service to K6-1094. Raw wastewater is transported by this system to the CCAFS Regional Plant located on the Cape Canaveral Air Force Station. A lift station serving the PCC is located on the south side of the facility.

3.16 Potable Water

The facilities surveyed under this EBS, are provided potable water purchased from the City of Cocoa municipal water system through a NASA owned and operated consecutive water distribution system.

3.17 Asbestos and Indoor Air Quality

3.17.1 Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

Previous asbestos surveys were performed for facilities K6-0696, K6-0696A, and K6-0696D. Asbestos was identified in the high bay of OPF 3, Room 1104. The asbestos is 10% Chrysotile and is found in miscellaneous black tar/putty located on Firex lines in the bay. No other asbestos has been identified at these facilities.

The site survey of facility K6-0696 revealed multiple ceiling tiles with water stains, though no active leaks were noted during the walkthrough or reported by facility personnel in the office areas. Areas with stained ceiling tiles included the logistics area on the first floor, and Rooms 1111, 1113, 1138, 1146, 1157, 1162, 1180, 1191, 1193, 2119, and 2121.

The SSME side of K6-0696 has water stained ceiling tiles in the Control Room 1050. Personnel reported active roof leaks in the high bay of the SSME and in the Command and Data Simulation Room 2194. Facility personnel stated the roof leaks have been an ongoing problem since the opening of the facility.

3.17.2 Processing Control Center

Previous asbestos surveys were performed for facility K6-1094. No asbestos was identified at the facility during that time.

During the walkthrough of the PCC, a musty odor was detected in HVAC Mechanical Rooms 3085 and 3085A. Possible mold was visible on the air vents located in Room 3085A, as well as on the piping located in the Compressor Room 1103 (see photographs in Appendix C). An Indoor Air Quality (IAQ) evaluation was just completed on April 19, 2011, by IHA to identify the source of musty odor complaints on the second floor (Report #201103-1198). Water intrusion into the facility occurred during heavy storms in the past and the damaged areas have since been repaired. No roof leaks or water intrusion from windows were observed. The facility manager stated there were no open work orders or complaints about water intrusion or leaks in the facility. No additional indoor air quality or asbestos concerns were observed within the PCC.

3.18 Polychlorinated Biphenyls

PCB oil was used well into the 1970s in large transformers as a dielectric fluid because they are not flammable. Since the late 1970s, concerns regarding the toxicity of PCBs has led to their banning in many countries.

3.18.1 Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

Several electrical transformers were reportedly installed to support the initial construction of OPF 3, and have since been abandoned. The transformers are located approximately 75 ft west of the fuel scrubber pad, east of the hypergol vent. According to the 2004 SAR investigation of SWMU #83, the transformers currently contain oil but reportedly had been tested and determined not to contain PCBs. However, no sampling information was provided to confirm this. Since the 2004 SAR investigation, no confirmation of whether the transformers still contain oil could be provided from interviewed personnel.

3.18.2 Processing Control Center

There is currently an electrical substation (see Appendix C) located on the southwest corner of facility K6-1094. According to the high voltage shop, these transformers were installed in 1992 and have silicone as insulating fluid. No PCB testing was required or conducted for these transformers.

According to the Processing Control Center Area (PCCA) RCRA Facility Investigation performed in June 2008, soil sampling results at that time revealed one kind of PCB, Aroclor

1254, detected above the laboratory MDLs. However, an Interim Measures Work Plan (IMWP) was prepared and approved by the KSC Remediation Team in March 2008. The IMWP was to be implemented and affected soils were to be excavated upon completion. Therefore, PCBs and lead in soil were not retained as contaminants of concern (COCs) in the report, and were not evaluated as part of the preliminary risk evaluation (PRE). It was recommended that an RFI Addendum should be prepared following the implementation of the IM recommending NFA for soil.

3.19 Radon

Testing for radon on KSC took place beginning in March of 1991 with sampling from 56 facilities over a period of three months. A total of 368 samples were taken using alpha-track detectors, and resulted in the finding that there is a low probability of occurrence of indoor radon at KSC. No samples had a radon concentration of greater than 1 picocuries per liter (pCi/l). Per EPA guidelines, radon concentrations of greater than 4 picocuries per liter should take corrective follow up actions.

3.20 Lead-Based Paint

3.20.1 Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

Referencing the AMIS database, no surveys for heavy metal paint have been conducted at this facility (see Appendix D). It is recommended that samples be collected from suspect areas prior to any construction/renovation work and analyzed for hazardous metals to determine appropriate disposal requirements.

3.20.2 Processing Control Center

Referencing the AMIS database, no surveys for heavy metal paint have been conducted at this facility (see Appendix D). It is recommended that samples be collected from suspect areas prior to any construction/renovation work and analyzed for hazardous metals to determine appropriate disposal requirements.

3.21 Air Emissions

The Florida Department of Environmental Protection classifies KSC as a Title V major source for emissions. The Title V Permit provides a list of emissions units and also lists insignificant emissions units and/or activities.

3.21.1 Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

Facility K6-0696 contains a major source for emissions, and is listed on KSC Title V Air Permit #0090051-018-AV as part of Emission Unit 089 Hypergol Servicing Operations and Activities. Specifically, the Oxidizer Purging System (scrubber) and Fuel Purging System (scrubber) are sources (see Appendix D for copy of permit). Included in the insignificant classification are the following: fume hood, central vacuum system #1 and #2, and a pattern shop dust collector.

A hypergol exhaust vent, which is connected to fans, is used to purge the breathing zone inside the building during and after operations involving fuel or oxidizer. The hypergol vent is located on the east side of the oxidizer scrubber pad. Contaminated air is routed to the scrubbers for hypergol vapor removal. After processing through the scrubber, the “cleaned” air is vented to the environment through the hypergol exhaust vent, approximately fifty feet above the ground surface.

3.21.2 Processing Control Center

The Emergency Generator Building contains a central vacuum system. This central vacuum system falls under the insignificant classification. There are no regulated items listed in the KSC Title V Air Permit for facility K6-1094.

3.22 Soils

Facilities K6-0696 and K6-1094 are both classified as having Urban Land soils. Urban land consists of areas that are 60 to more than 75 percent covered with streets, buildings, large parking lots, shopping centers, industrial parks, airports, and related facilities. Unoccupied areas, mostly lawns, parks, and vacant lots, are comprised of Astatula, Paola, Myakka, St. Lucie, Immokalee, Pomello, Cocoa, and Canaveral soils in tracts that are too small to be mapped separately.

3.22.1 Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

According to the latest OPF 3 RCRA Facility Investigation Report conducted in December of 2004, the surficial soil samples (0 to 1 ft BLS) collected in the immediate vicinity of the locations and at the depths where exceedances were previously detected, did not contain arsenic or cadmium at concentrations exceeding residential SCTLs as detected in past reports. Arsenic or cadmium were not detected at concentrations exceeding applicable screening criteria. Synthetic Precipitation Leaching Procedure (SPLP) analyses for arsenic or cadmium were not performed as part of these investigations.

3.22.2 Processing Control Center

As described above under the Polychlorinated Biphenyls section, there were soils of concern related to the PCC. However, Interim Measures (IM) were taken to excavate the contaminated soil, which was then properly disposed of. Based on the implementation of the IM and the removal of lead and PCB impacted soil, NFA for soil is recommended for the Processing Control Center Area and no land use controls for soil are required.

4.0 Findings for Adjacent Properties

Below is a summary of the findings for adjacent properties.

4.1 Land Uses

Land use on adjacent industrial properties includes: Crawler Park site, Orbiter Processing Facilities 1 & 2, VAB Utility Annex, Oil/Water Separator, Processing Control Center Area, MLP Park Sites/VAB Area, Vehicle Assembly Building, C-5 Electrical Substation, and a Sewage Treatment Plant.

4.2 Surveyed Properties

While these additional properties were not explicitly surveyed as they are not included in the extent of this EBS, information was collected for sites on adjacent properties being investigated by the NASA Remediation Group.

There are PRL and SWMU sites in the vicinity of the K6-0696 and K6-1094 facilities (Appendix B). The OPF 1 & 2 are both located in SWMU #72 which is just north of K6-1094, and southwest of K6-0696. The Oil/Water Separator site (SWMU #24C) and VAB Utility Annex site (SWMU #35) are located northeast of K6-1094. The sewage treatment plant is located in SWMU #4, west of K6-0696. The C-5 electrical substation (SWMU #66) is located on the west side of S.R. 3, which is directly west of facility K6-1094. A minor impact from adjacent properties was identified for the OPF 3. A dissolved groundwater plume contaminated with vinyl chloride runs under the facility, and can be referenced in Appendix B. In summary, no other significant impacts from adjacent properties were identified at this site.

No off-site impacts from the OPF 3, SSME, and PCC facilities were identified.

5.0 Applicable Regulatory Compliance Issues

5.1 List of Compliance Issues

Future activities undertaken by the recipient are subject to all applicable federal, state, and local regulations and KSC environmental requirements. A KSC Environmental Checklist (KSC Form 21-608V2 NS) must be submitted for any proposed construction, renovation, or maintenance activity at these facilities. Compliance issues associated with the transfer of the subject site includes but may not be limited to the following:

- ACM/LBP abatement/reporting
- KSC Exterior Lighting Guidelines
- Clean Water Act
- Clean Air Act
- Migratory Bird Treaty Act

- National Environmental Policy Act
- RCRA Corrective Action

5.2 *Description of Corrective Actions*

Based upon the list of compliance issues observed at the building/rooms/structures included in this EBS, corrective actions required are asbestos abatement and paint testing for determination of proper waste management and disposal methods should any construction/renovation be proposed. Also, mold remediation efforts should be made for the health of the workers housed in the facilities. Reviewing records of exterior lighting surveys will determine the most recent concerns and recommendations related to photo-pollution episodes at the OPF 3.

5.3 *Estimates of Various Alternatives*

Cost estimates of various alternatives to address the potential areas of concern were not prepared as part of this EBS.

6.0 **Conclusions**

Review of all pertinent historic and recent records, reports, as well as visual site inspections, as identified in Section 2.1.1 and Appendix D of this EBS, indicate that facilities/structures included in this EBS have only limited environmental concerns.

6.1 *EBS Structures and Findings*

A summary of findings and potential concerns for structures at the OPF 3/SSME Shop and PCC sites is provided in Table 2.

Table 2. List of Structures and Findings.

Facility/Structure Number	Structure Name	Finding
K6-0696	OPF 3 / SSME	IAQ /Active roof leaks in SSME/Asbestos/ Possible PCBs in abandoned transformers
K6-0696	Site Groundwater	VOCs, ammonia
K6-0696A	OPF 3 Gate House	N/A
K6-0696B	Turnstile Shelter	N/A
K6-0696D	Environmental Control Building	N/A
K6-0696E	Turnstile Shelter	N/A
K6-0696F	Chilled Water Pump House	N/A
K6-0696G	Sewage Lift Station	N/A
K6-0696H	Active Hazardous Waste Staging Building/Portable	Hazardous wastes stored here
K6-0696J	K-Bottle Storage Facility	N/A
K6-0696K	Active Hazardous Waste Storage Facility	N/A – used as storage for empty drums only at this time
K6-1094	PCC	IAQ
K6-1094	Site Groundwater	VC

6.2 Resources Map

A discussion of the resources and potential impacts are provided in the text and depicted in resource maps found in Appendix B. Items of concerns are asbestos in suspect materials,

potential for RCRA metals in paints, soil and groundwater contamination, and potential wildlife impact.

6.3 Data Gaps

The data gaps associated with this investigation included: 1) lack of information on RCRA metals of facility paint coatings as previously described in this report, 2) lack of information on suspect asbestos material, specifically in the facilities which have not had previous asbestos surveys performed, and 3) lack of supporting sampling data to confirm the OPF 3 transformers do not contain PCBs. Prior to disturbance of suspect material at any of the surveyed facilities for the purpose of proposed construction/renovation work, these surfaces should be sampled for potential RCRA metals and ACM to determine appropriate disposal requirements and worker protection methods. In addition, at the time of this report we await details of compliance issues related to exterior lighting which can trigger ESA non-conformance.

7.0 Recommendations

7.1 Orbiter Processing Facility 3 and the Space Shuttle Main Engine Shop

Based on the findings and conclusions of this EBS and supporting documentation, it is recommended that the transfer of the subject property proceed. The following recommendations should be implemented to protect potential worker exposure:

- Where ACM occurs, workers should be informed to avoid ACM. If disturbance to any of the facilities is anticipated, appropriate worker protection and disposal practices must be implemented, along with notifications to appropriate agencies as necessary if ACM is to be disturbed.
- Workers should be informed of areas with potential heavy metal paints. If disturbance to the painted surfaces is anticipated, appropriate worker protection and disposal practices must be implemented.
- Existing paint should be sampled and analyzed for heavy metal content in order to determine appropriate disposal requirements.
- Mold in areas within the facilities should be remediated and the source of water intrusion responsible for mold formation should be addressed to prevent further occurrence.
- Transformer oil should be sampled for PCB content.

7.2 Processing Control Center

Based on the findings and conclusions of this EBS and supporting documentation, it is recommended that the transfer of the subject property proceed. The following recommendations should be implemented to protect potential worker exposure:

- Workers should be informed of areas with potential heavy metal paints. If disturbance to the painted surfaces is anticipated, appropriate worker protection and disposal practices must be implemented.
- Existing paint should be sampled and analyzed for heavy metal content in order to determine appropriate disposal requirements.
- Mold in areas within the facility should be remediated and the source of water intrusion responsible for mold formation should be addressed to prevent further occurrence.

8.0 Certification of the Environmental Baseline Survey

Innovative Health Applications, LLC (IHA) has conducted this Environmental Baseline Survey (EBS) on behalf of the National Aeronautics and Space Administration (NASA). Upon completion of a records search, appropriate records were selected for analysis, and a visual site inspection of the subject property was conducted. The information contained in this EBS is based primarily on records made available and, to the best of IHA's knowledge, is correct as of May 26, 2011.

Certified By: Patrice Hall 5-27-11

Patrice Hall
Environmental Engineer
Innovative Health Applications, LLC
Date

Michelle Kanyo 05/27/11
Jane Provancha
Jane Provancha
Environmental Projects Manager
Innovative Health Applications, LLC
Date

Concurrence By: Denise Thaller 6/1/11

Denise Thaller, Chief
NASA Environmental Management Branch
Date

APPENDIX A

TERMS

De minimis - Refers to conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be de minimis are not recognized environmental conditions.

Hazardous Waste - Is defined by RCRA as “a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may – (A) cause, or significantly contribute to an increase in mortality or any increase in serious irreversible, or incapacitating reversible illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.”

Practically Reviewable - Means that the information is provided by the source in the manner and in a form that, upon examination, yields information relevant to the property without the need for extraordinary analysis of irrelevant data.

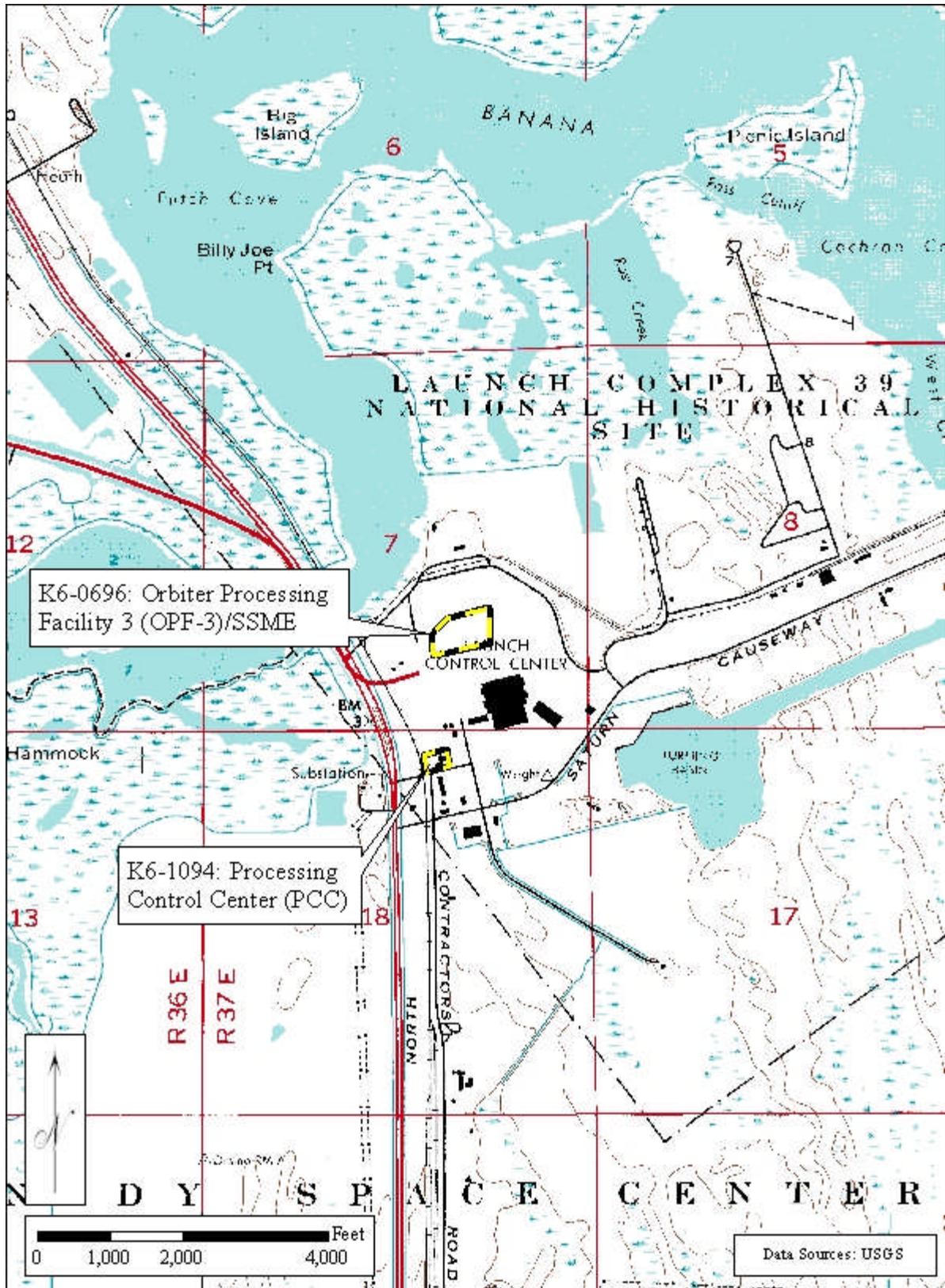
Property - Is identified as the real property that is the subject of environmental assessment including improvements, buildings, and other fixtures located on the property and affixed to the land.

Reasonably Ascertainable - Refers to information that is publicly available, obtainable from its source within reasonable time and cost restraints, and practically reviewable.

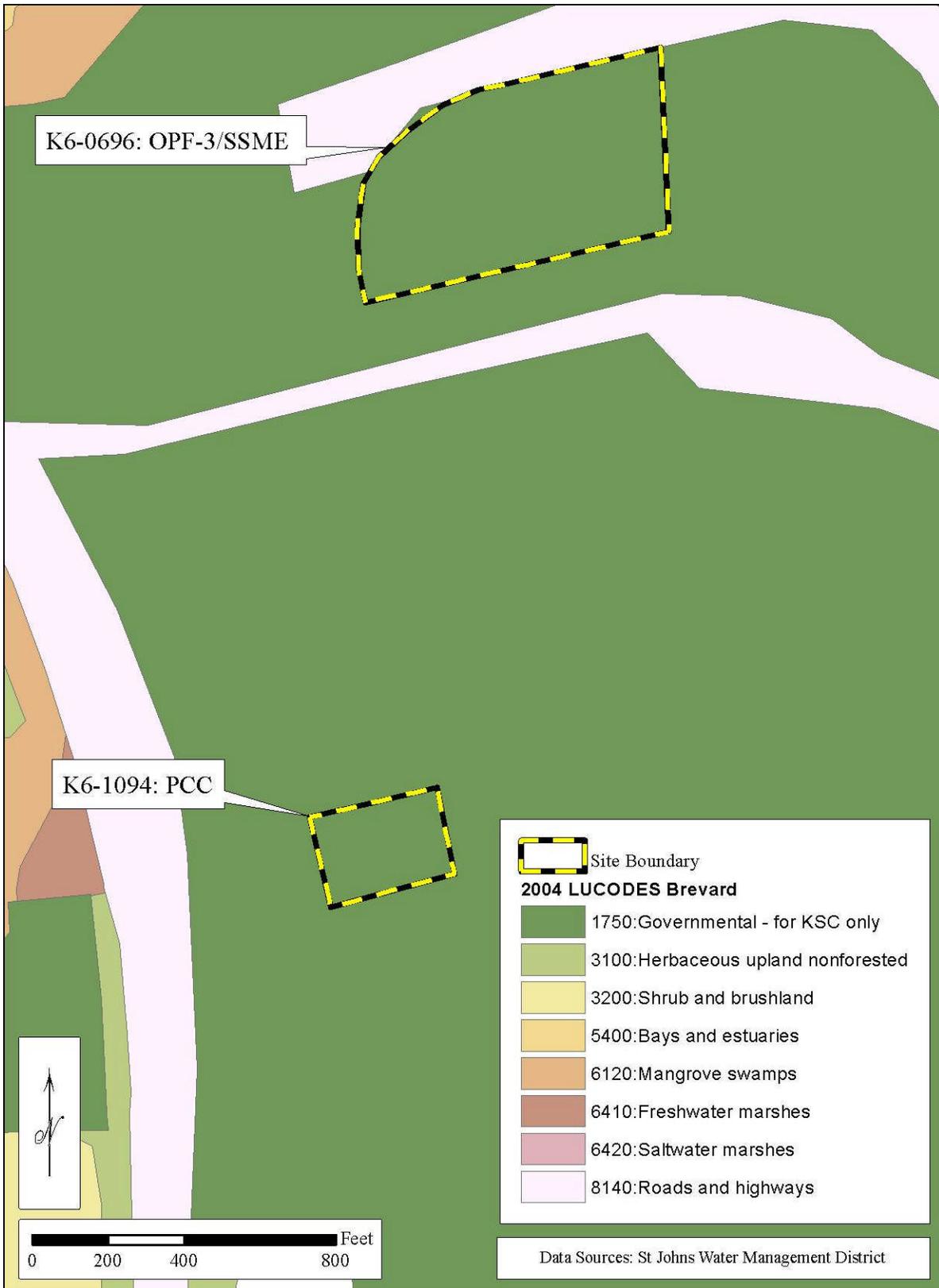
Recognized Environmental Condition - Refers to the presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. Conditions determined to be de minimis are not recognized environmental conditions.

**APPENDIX B
MAPS**

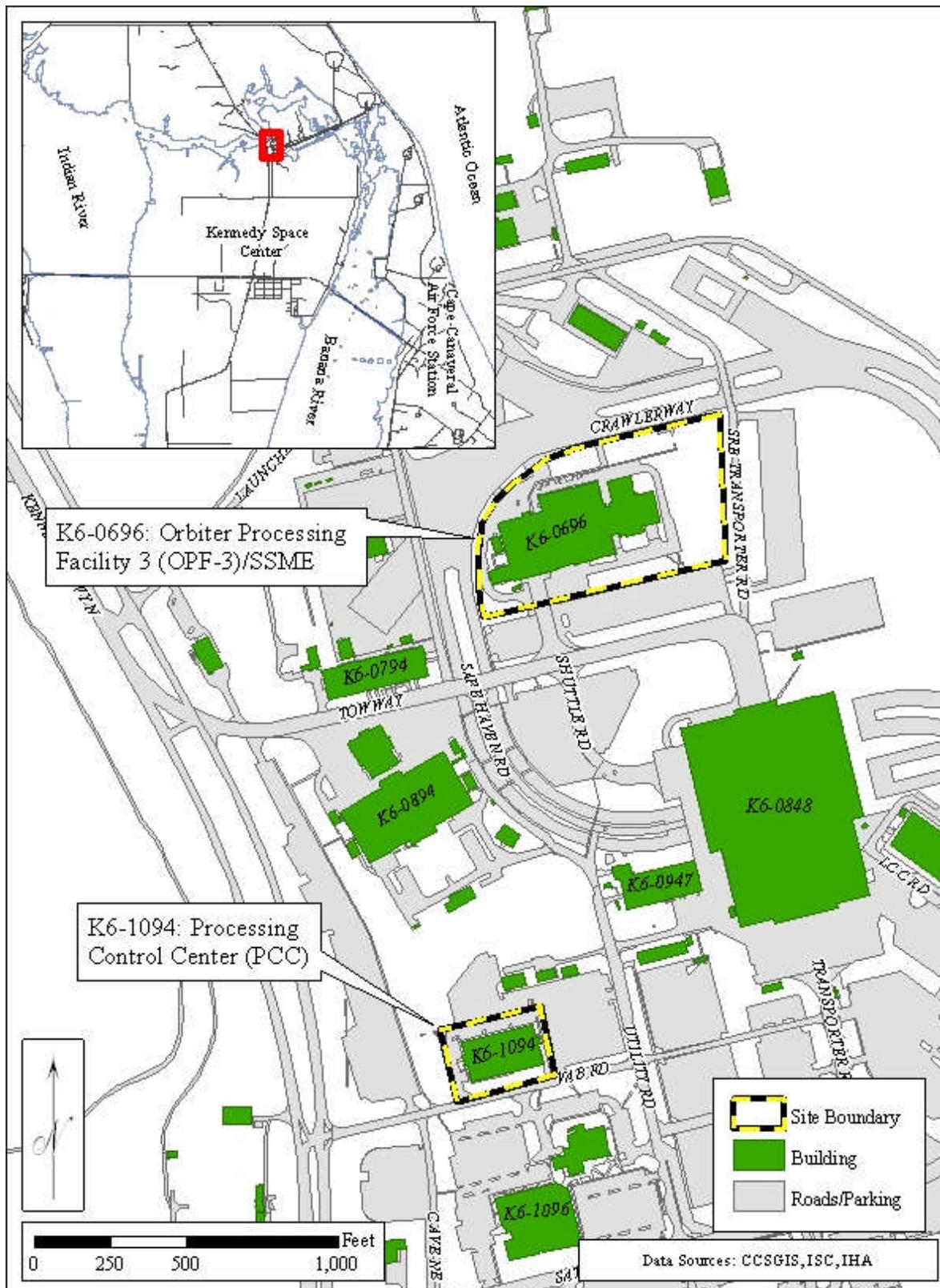
**TOPOGRAPHIC, LAND USE CODE, SITE BOUNDARY, CUP_ERP, SOILS,
UTILITY MAPS, PRL #083 AND PRL #101, LOCATIONS OF CONCERN, AND
SUPPORTING STRUCTURES FOR THE OPF 3, SSME SHOP, AND PCC**



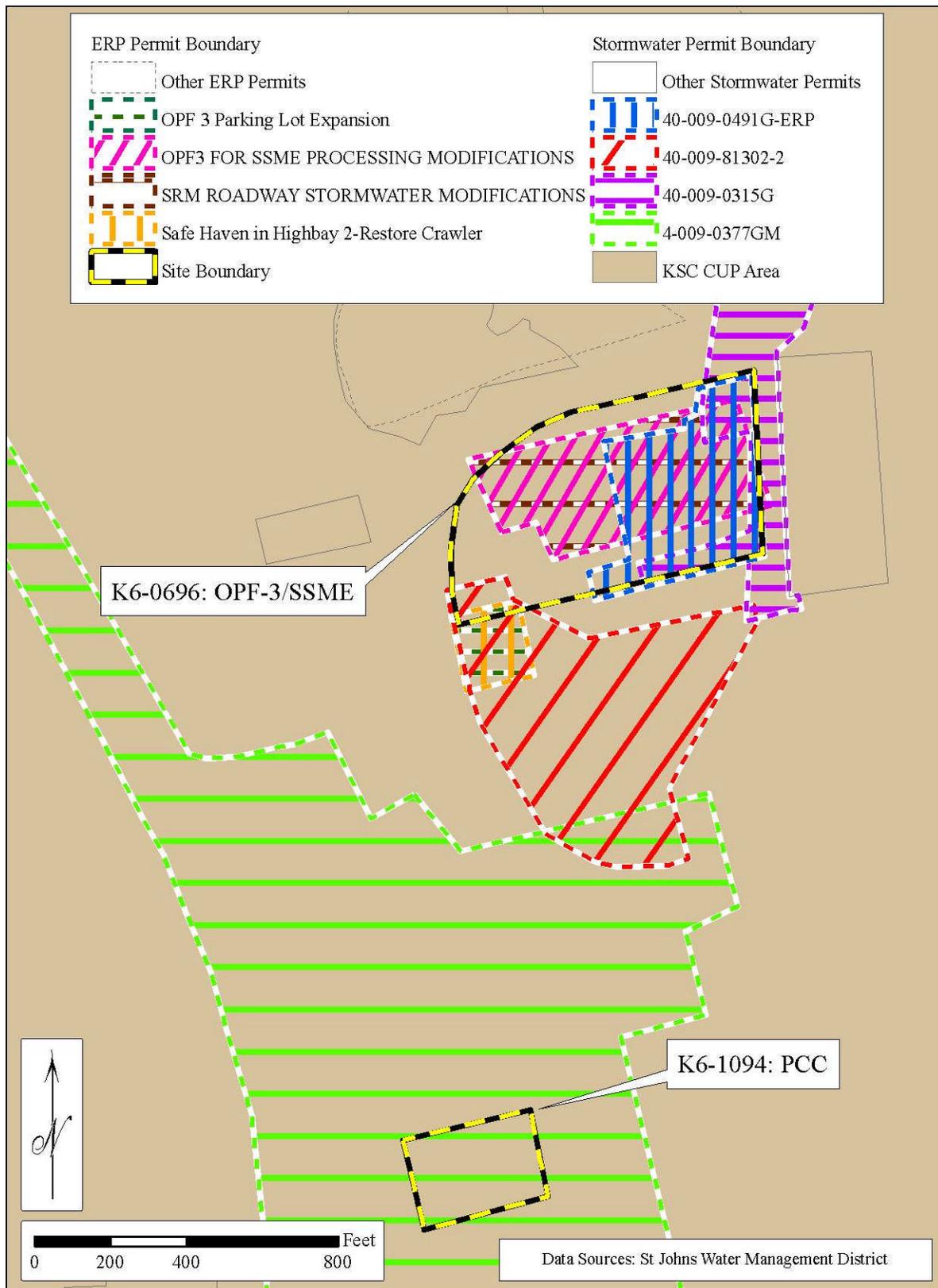
Topographic Representation of OPF 3, SSME Shop, and PCC at Kennedy Space Center, FL



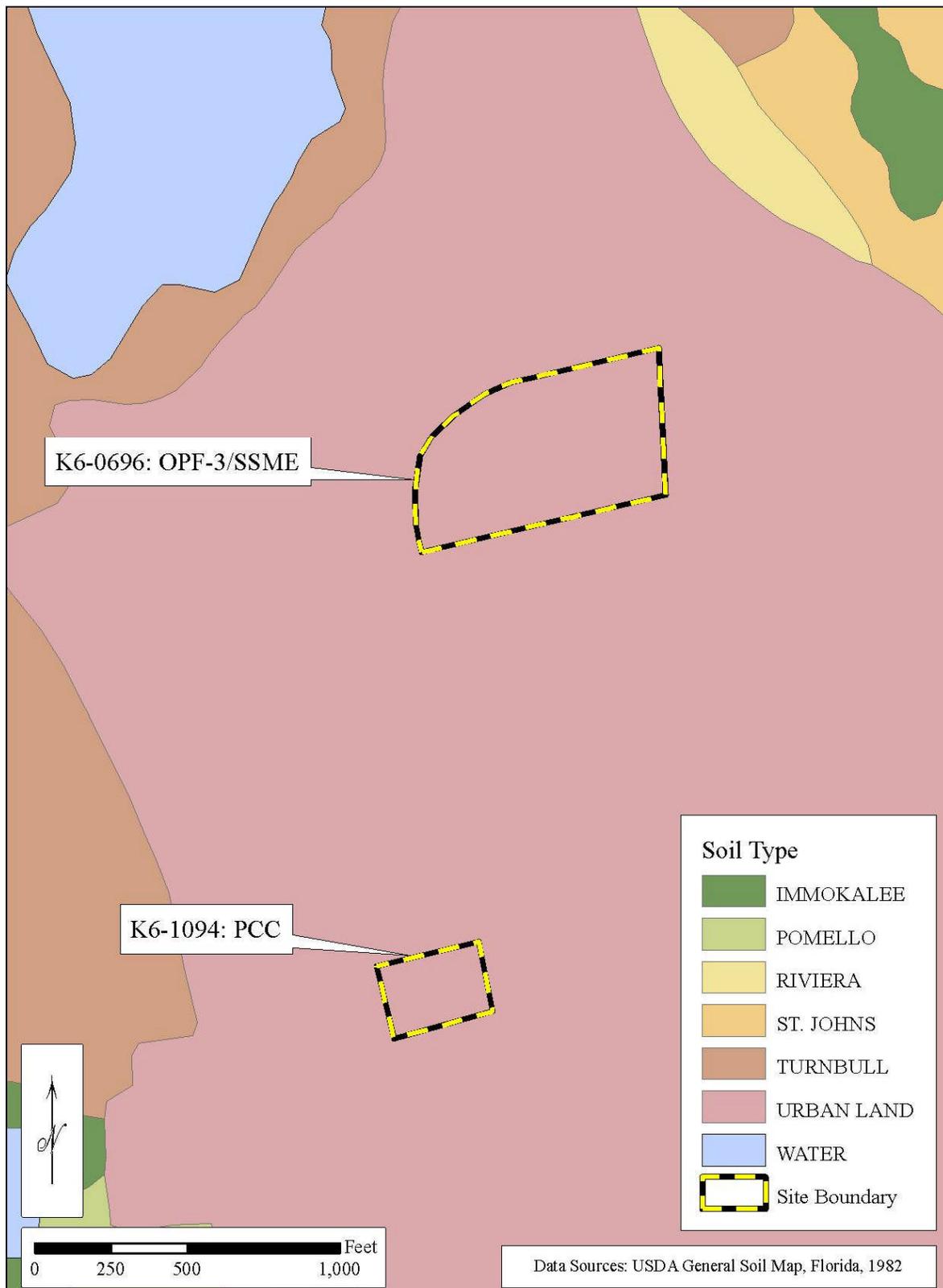
Land Use Codes for OPF 3, SSME Shop, and PCC at Kennedy Space Center, FL



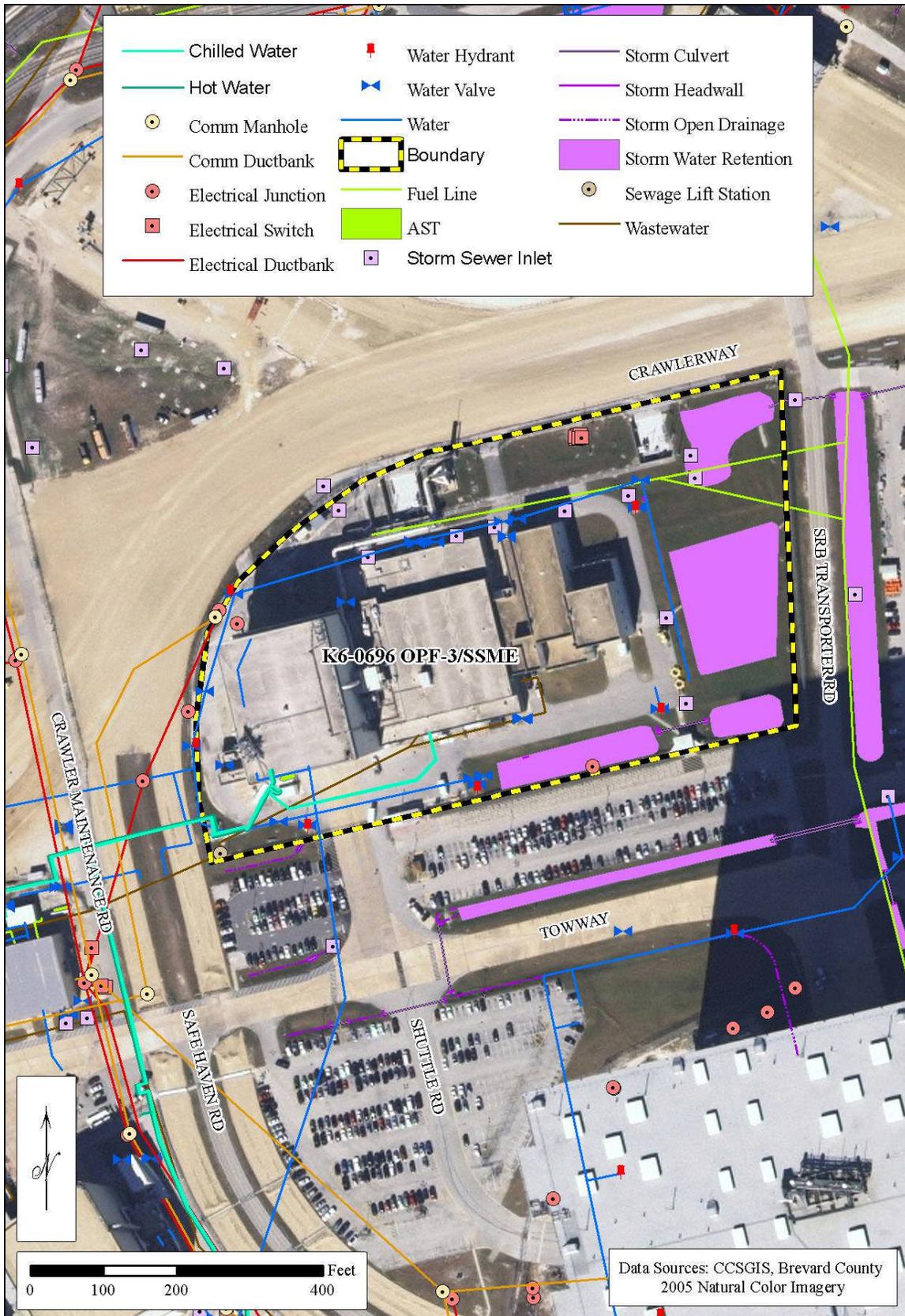
Site Boundaries of OPF 3, SSME Shop, and PCC at Kennedy Space Center, FL



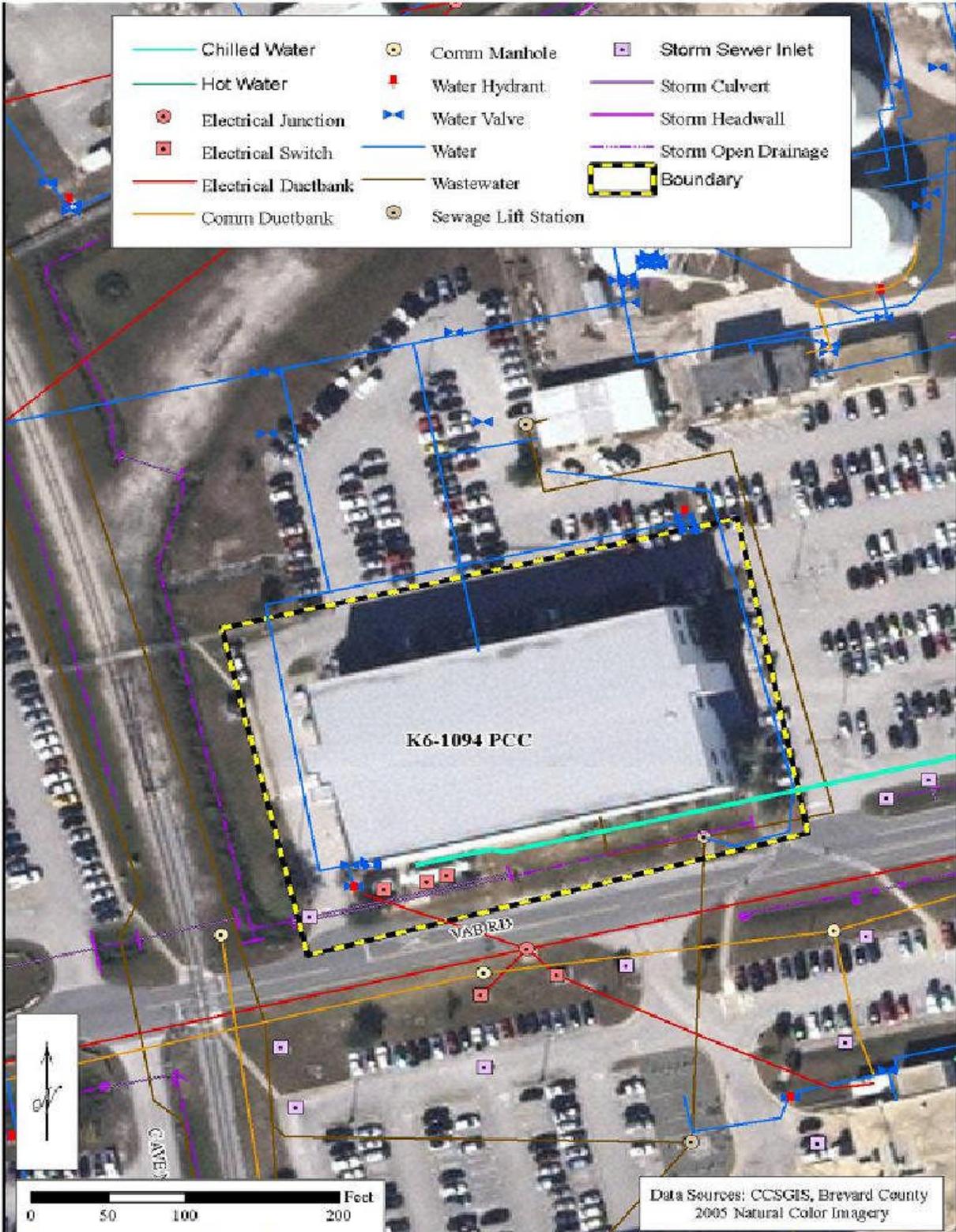
Stormwater ERPs and CUP Area for OPF 3, SSME Shop, and PCC at Kennedy Space Center, FL



Soil types for OPF 3, SSME Shop, and PCC site boundaries and the surrounding areas.



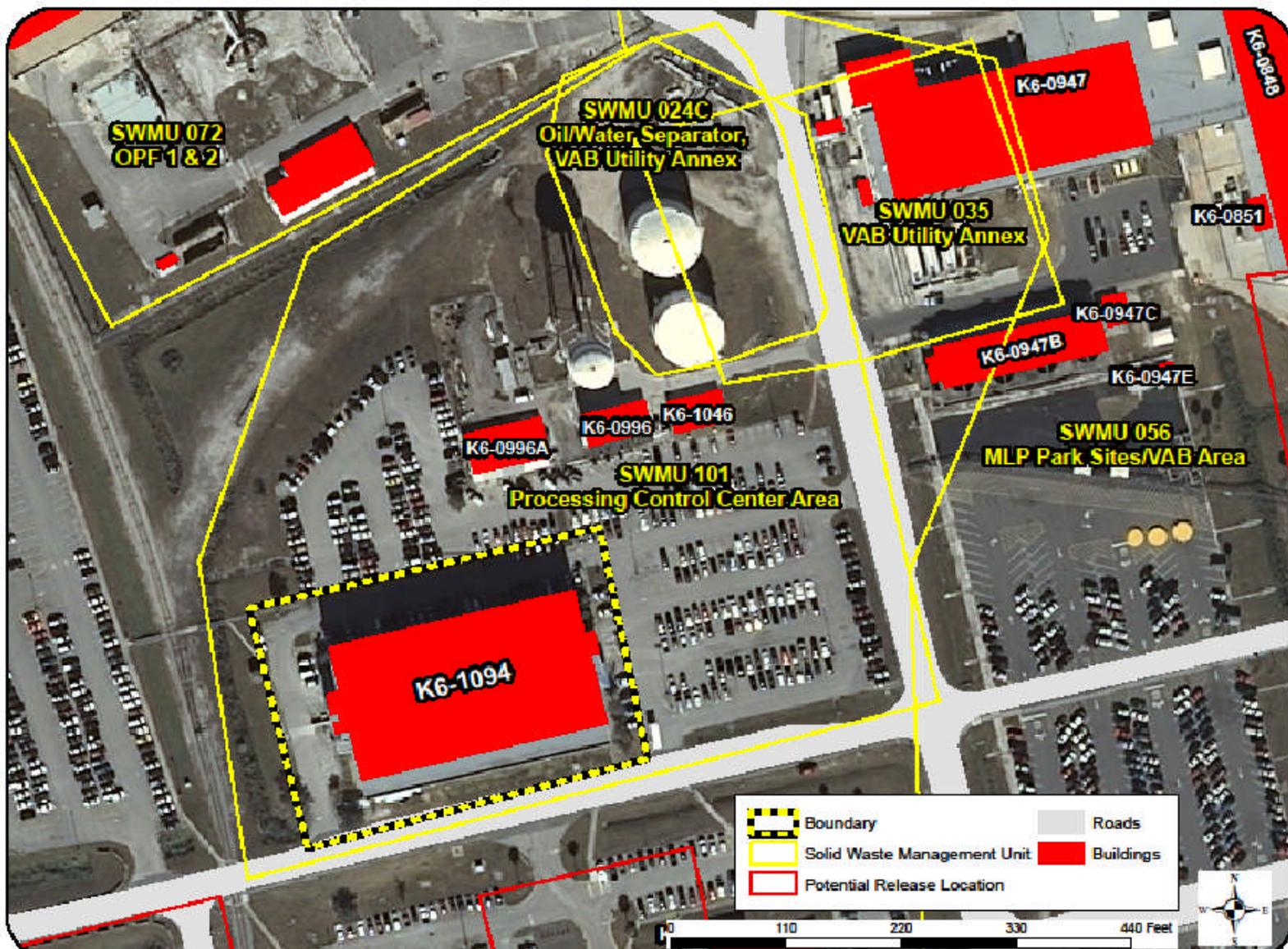
Utility Map of the OPF 3 and SSME Shop at Kennedy Space Center, FL.



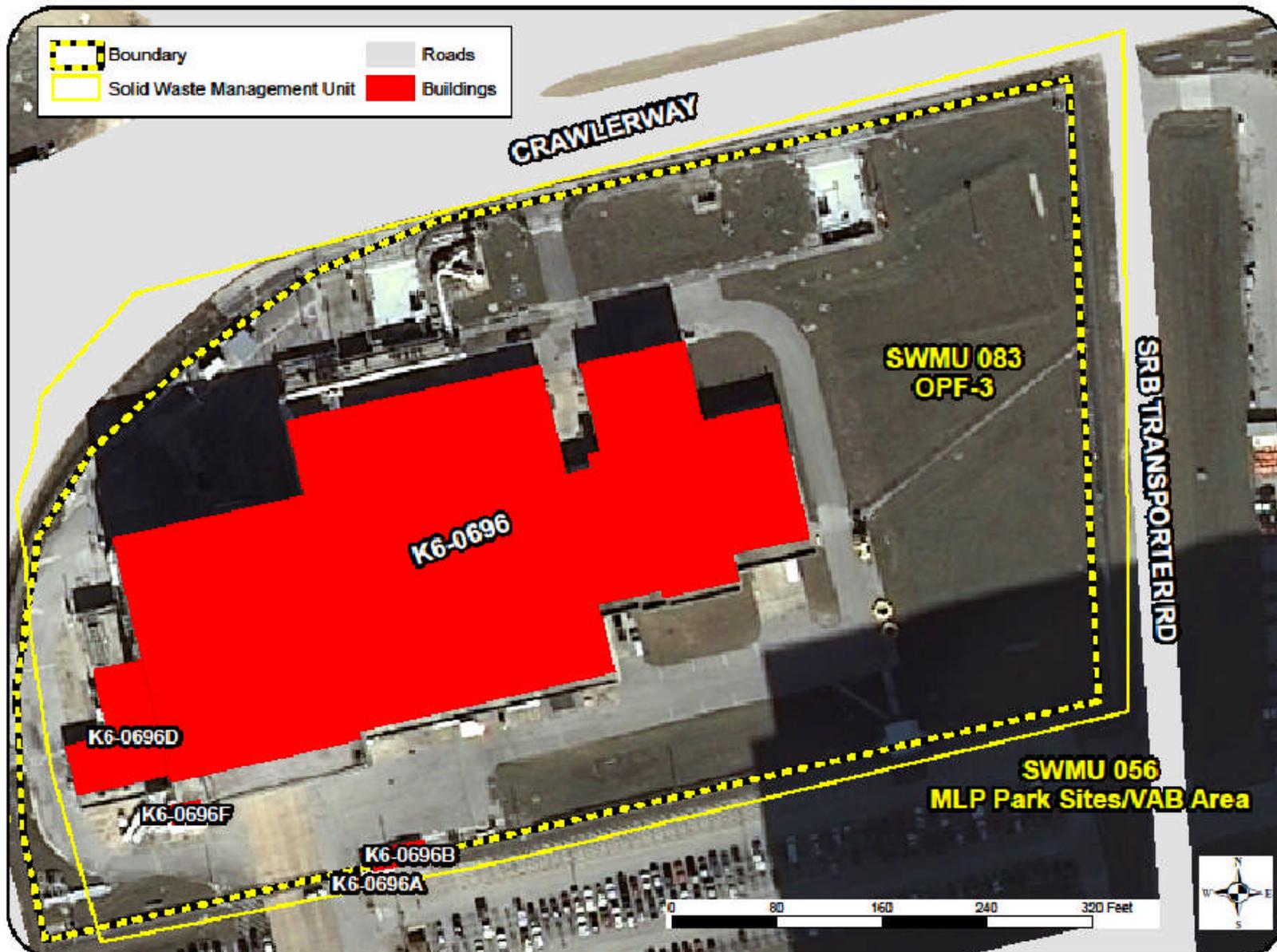
Utility Map of the Processing Control Center, Kennedy Space Center, FL.



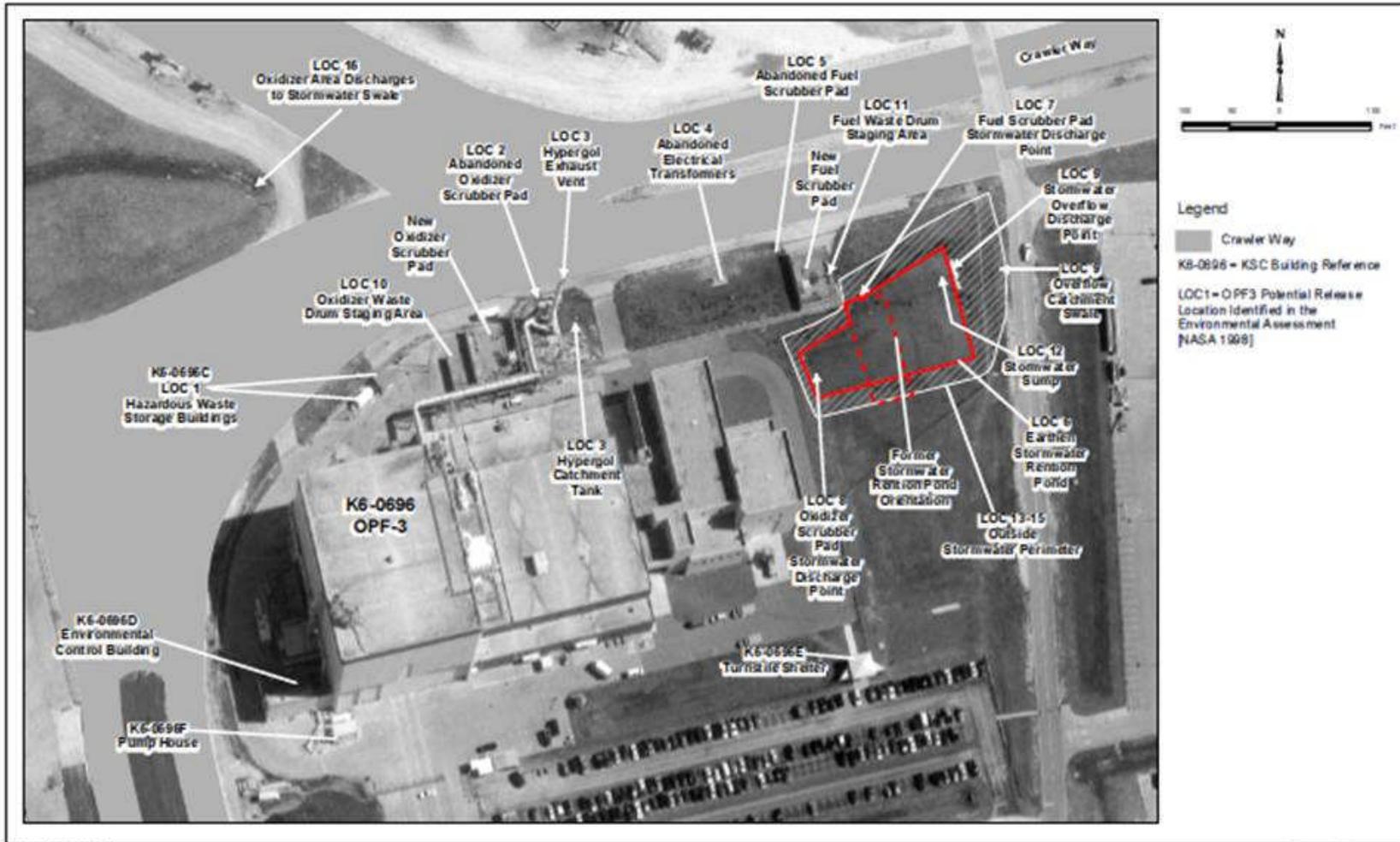
Supporting Structures of the Orbiter Processing Facility and Space Shuttle Main Engine Shop at Kennedy Space Center, FL.



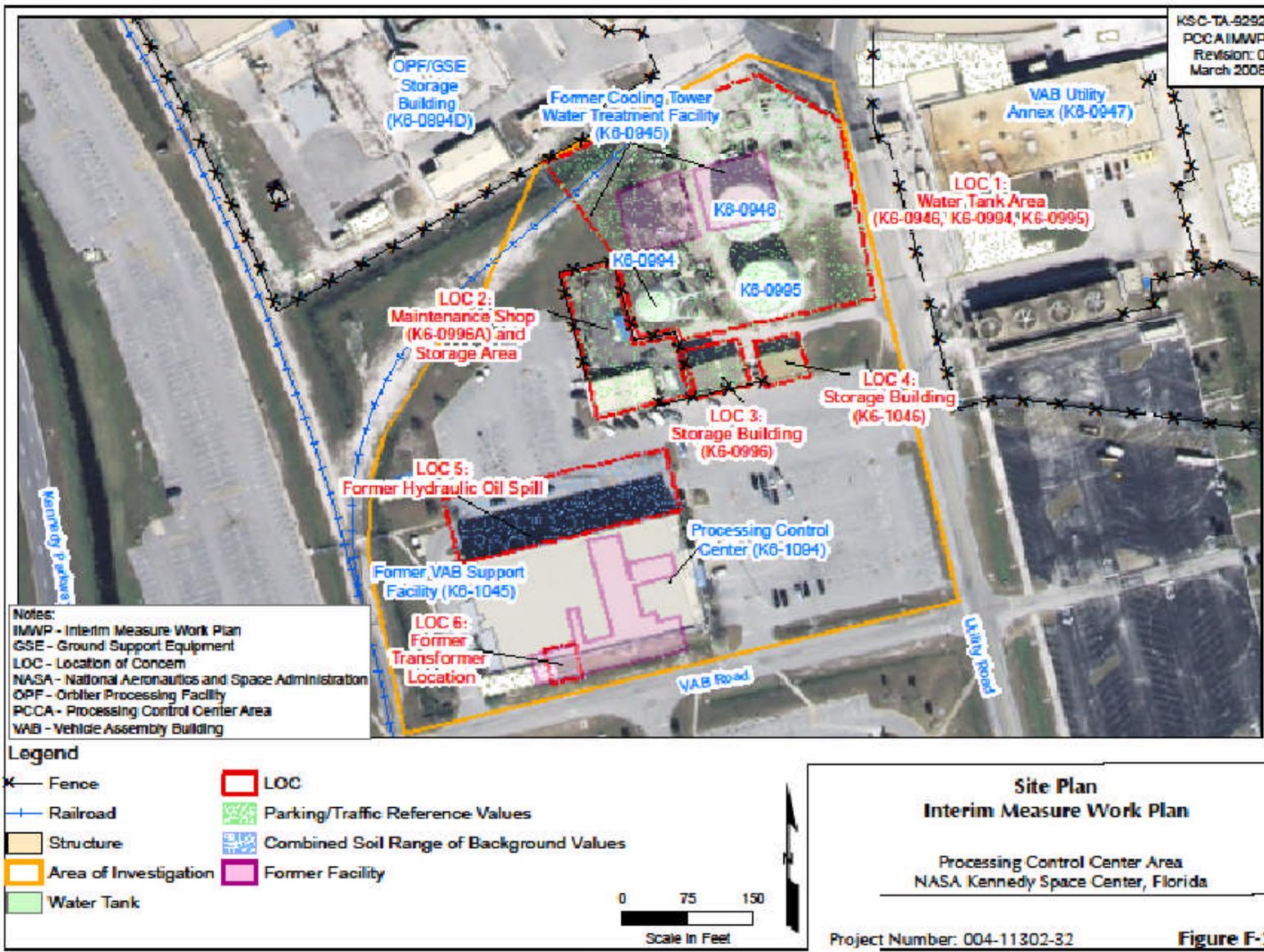
Solid Waste Management Unit (SWMU) #101 and other areas of interest in the vicinity of the Processing Control Center.



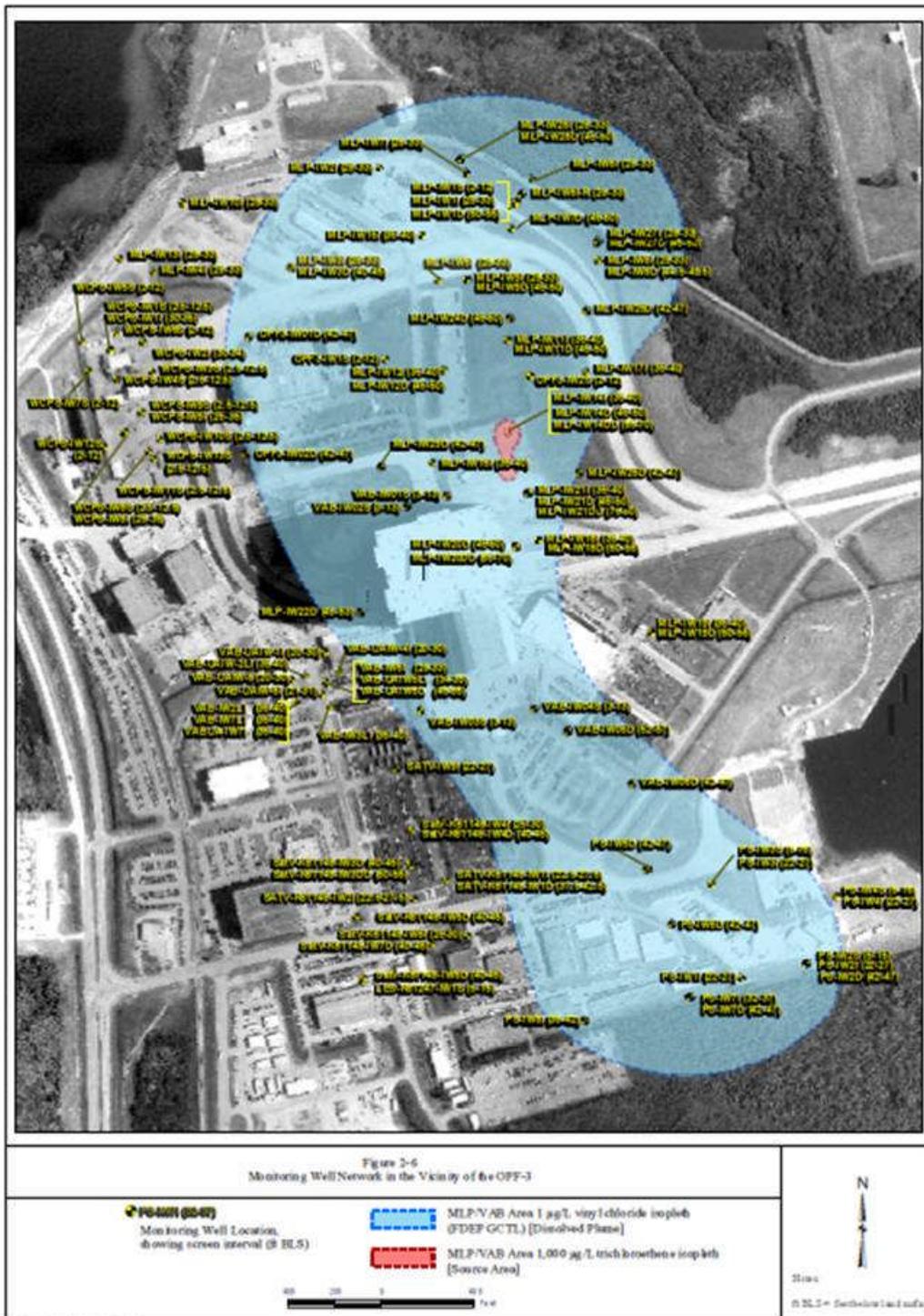
Solid Waste Management Unit (SWMU) #83 and other areas of interest in the vicinity of the Processing Control Center.



Locations of Concern (LOCs) within the Orbital Processing Facility 3 Survey Boundary.



Locations of Concern (LOCs) within the Processing Control Center Area.



Vinyl chloride groundwater plume in the VAB Industrial Area which affects the OPF 3 and SSME Shop area.

APPENDIX C

HISTORICAL AERIALS AND SITE PHOTOGRAPHS

OPF 3 and SSME Facilities K6-0696



SSME SHOP



1st floor Satellite Accumulation Area

SSME SHOP



1st floor Satellite Accumulation Area



1st floor Satellite Accumulation Area Waste Descriptions

SSME SHOP



Battery Charging Area



1st floor Hydraulic Room



Elevator on SPCC List

SSME SHOP



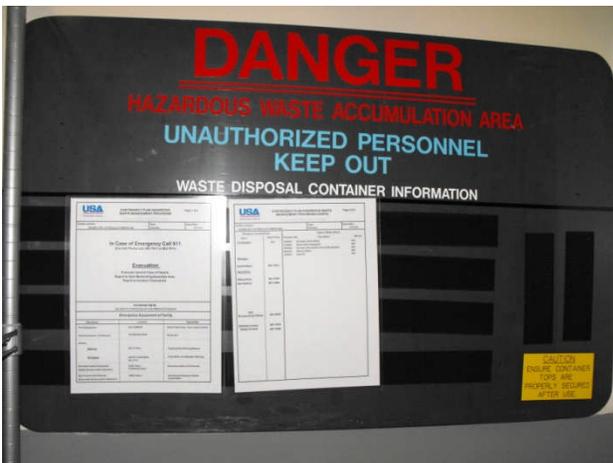
2nd floor Satellite Accumulation Area

OPF 3

Rm 1193A Chemical Lab – POL & Flammable Cabinets

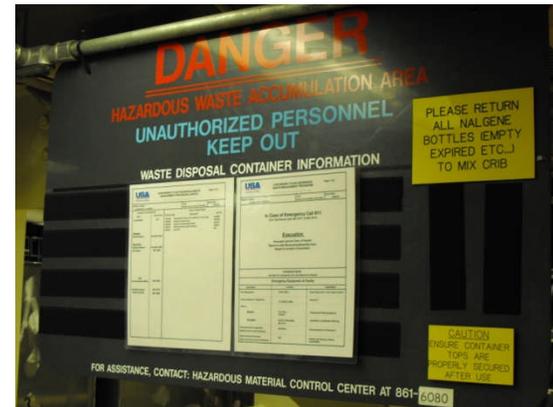
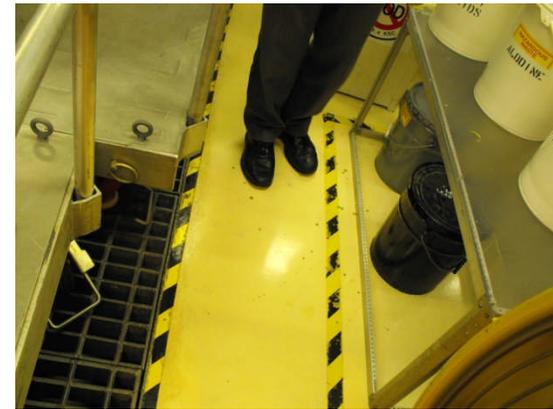


OPF 3



Room 1203/1204 Satellite Accumulation Area

OPF 3 High bay



OPF 3 High Bay Satellite Accumulation Area

Interior and Exterior of Hazardous Waste Staging Area K6-0696K



Interior and Exterior of Hazardous Waste Staging Area K6-0696H



K6-0696
Supporting Structures



K6-0696D



Damaged flashing on K6-0696D



Built-up roof of K6-0696D



K6-0696E



K6-0696F



K6-0696G

K6-0696
Supporting Structures



K6-0696H – Hazardous Waste Staging Conex



K6-0696 – Hazardous Waste Storage



K6-0696J – K-bottle Storage

K6-0696



Breathing Air Tank Associated with ECLSS System



Hypergol Exhaust Vent



Central Vacuum System supporting battery room



Central Vacuum System supporting high bay



Oxidizer Scrubber Pad



Oxidizer Scrubber Pad

K6-0696



Compressor Condensate tank



Fuel Scrubber Pad



Osprey nest south of Fuel Pad



Stained ceiling tile in low bay break room

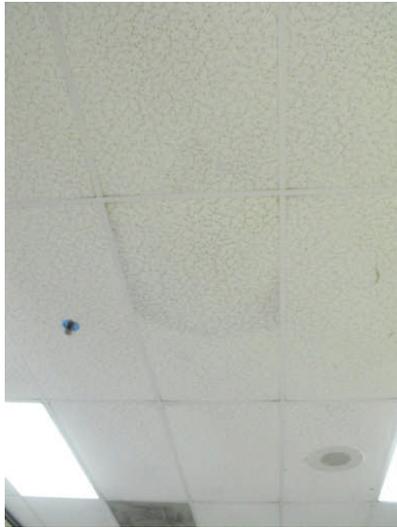


Stained tile outside Rm 1138



Moldy ceiling tile in NW corner of low bay annex

K6-0696



Stained ceiling tile in low bay logistic cage area



Stained tile above exit next to low bay break room



Hydraulic oil reservoir for elevator in high bay



Missing laminate in Mod Squad area – low bay annex

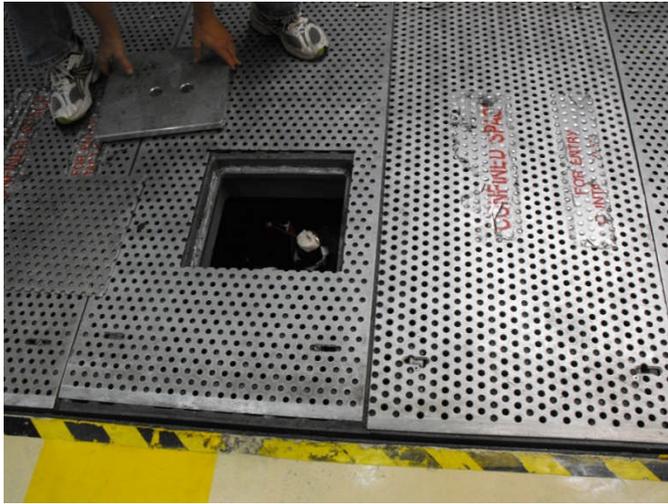


Possible mold around pipe in Rm 1204



Possible mold around pipe in Rm 1204

K6-0696



High bay floor grating



Fuel draining nozzles



Battery Room

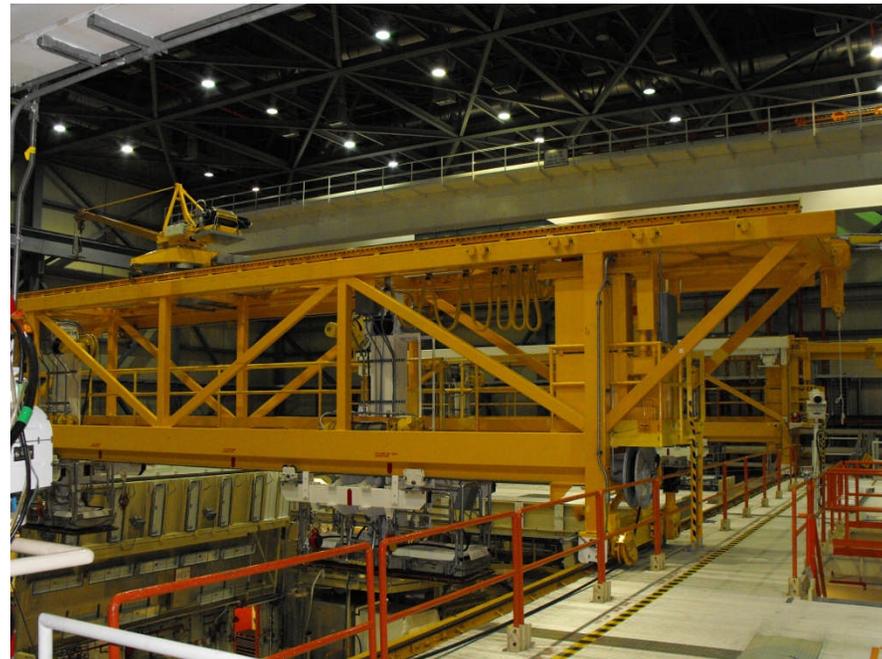


Sulfuric Acid Batteries



Sulfuric Acid Batteries

K6-0696



Bridge Bucket System with JIB Hoist in OPF 3 high bay

K6-0696



SSME Vertical Processing Area 15-ton crane



30-ton crane in high bay

Processing Control Center

K6-1094

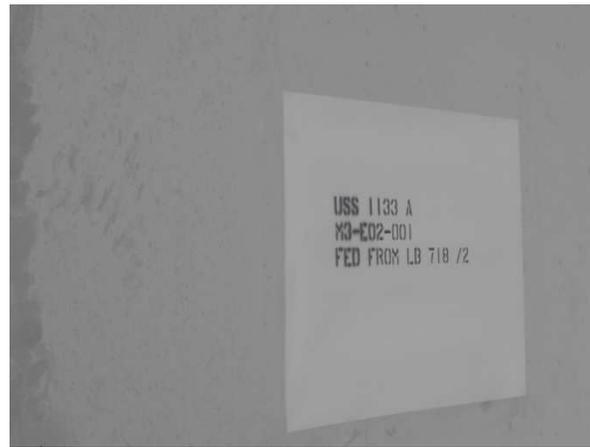
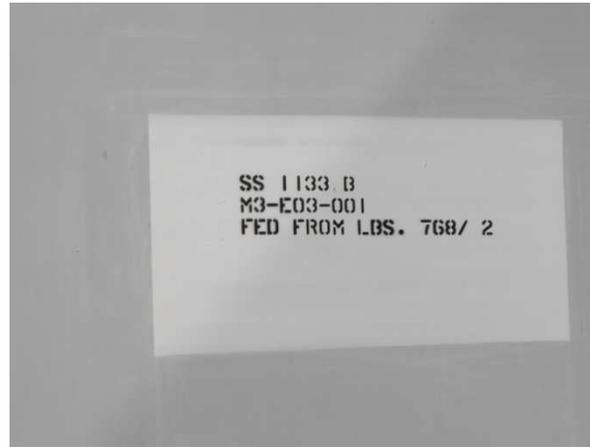


Exterior
Photos



K6-1094

Substation on southwest corner of facility



K6-1094



Vent on south side of facility for elevator room



Peeling paint on west exterior



Possible mildew exterior joints of facility



Drain from elevator room



Osprey nest north parking lot



Osprey nest north parking lot

K6-1094



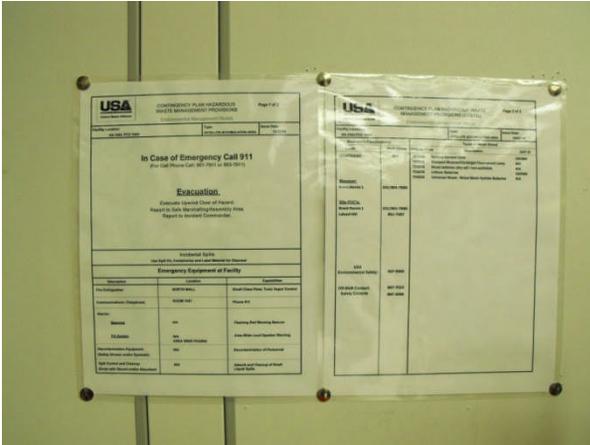
Exterior exhaust vent from
lab hood

Nest on platform of
exhaust vent



K6-1094

Satellite Accumulation Area, POL and Flammable Locker



K6-1094

Stained ceiling tiles throughout different rooms within the facility



Mechanical Room #3085 and #3085A



K6-1094

Rm 3085A – mold on vents, water stain on walls,
peeling ceiling paint



Historical Photographs – VAB Industrial



01/19/76 - Aerial of the Vehicle Assembly Building [VAB] and the immediate surrounding area, which shows future locations of both K6-0696 and K6-1094.

Historical Photographs – K6-0696



03/17/87 - Construction of the New OPF/TPS Facility (ORMF)



05/04/87 – The New Shuttle Orbiter Modification & Refurbishment Facility (ORMF)

Historical Photographs – K6-0696



08/20/87 – Aerial View of ORMF



08/11/97 – OPF 3 Bay Open for Rollout

Historical Photographs – K6-0696

08/01/97 – Taken from VAB roof showing SSME shop under Construction



Historical Photographs – K6-0696

03/16/98 – Photographs of Completed SSME shop that was constructed in 1997



Historical Photographs – K6-1094

10/25/91 – Construction photographs of the Processing Control Center



Historical Photographs – K6-1094

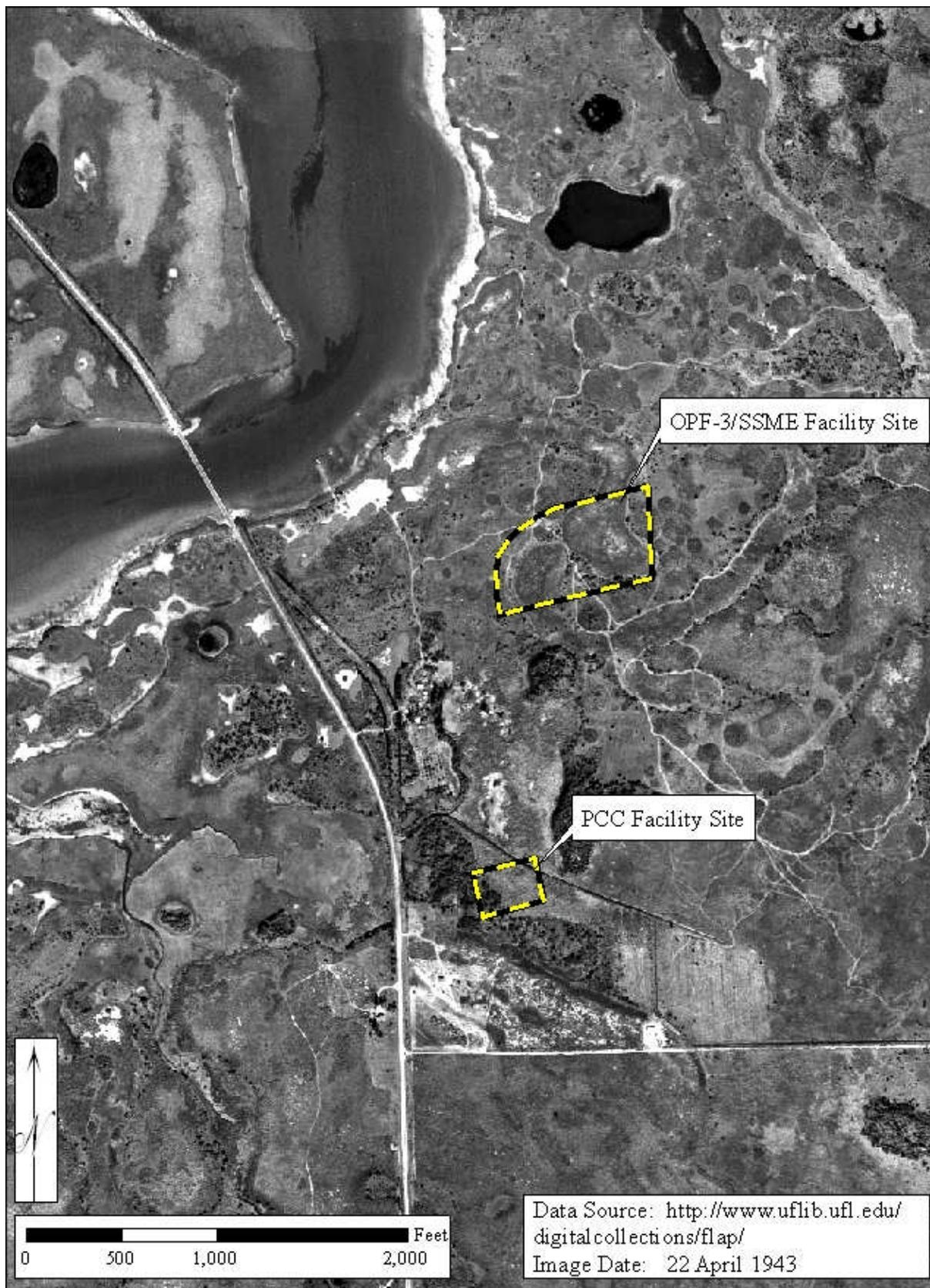
04/28/92 - This aerial view takes in the LC 39 Industrial Area includes the Processing Control Center



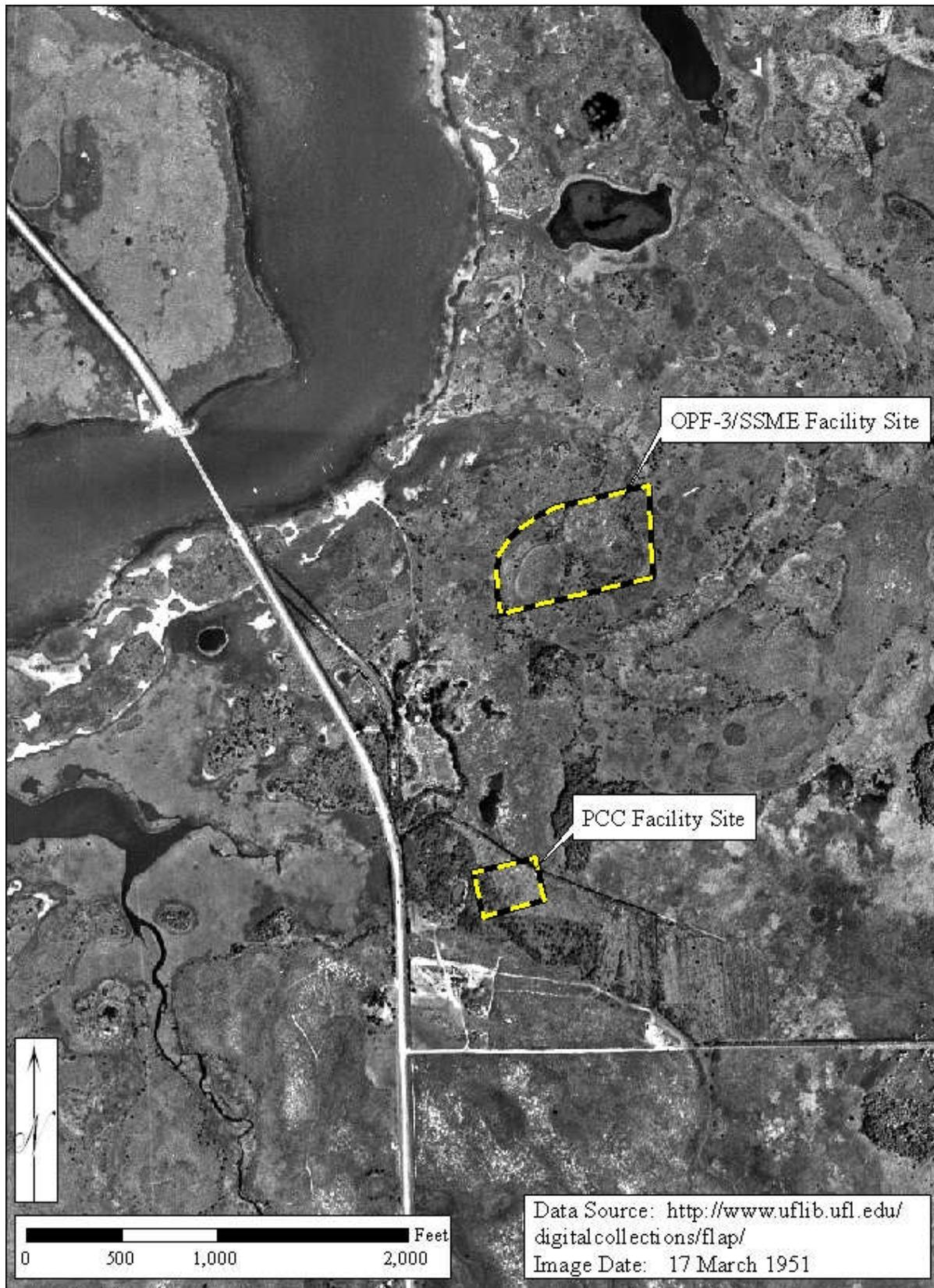
Historical Photographs – K6-0696 & K6-1094

08/06/98 – This aerial view shows the immediate area that surrounds the Vehicle Assembly Building [VAB]. In view are: Thermal Protection System Facility, OPF 1,2 & 3, Crawler Transporter Maintenance Area, OPF Modular Office Building and the Processing Control Center.

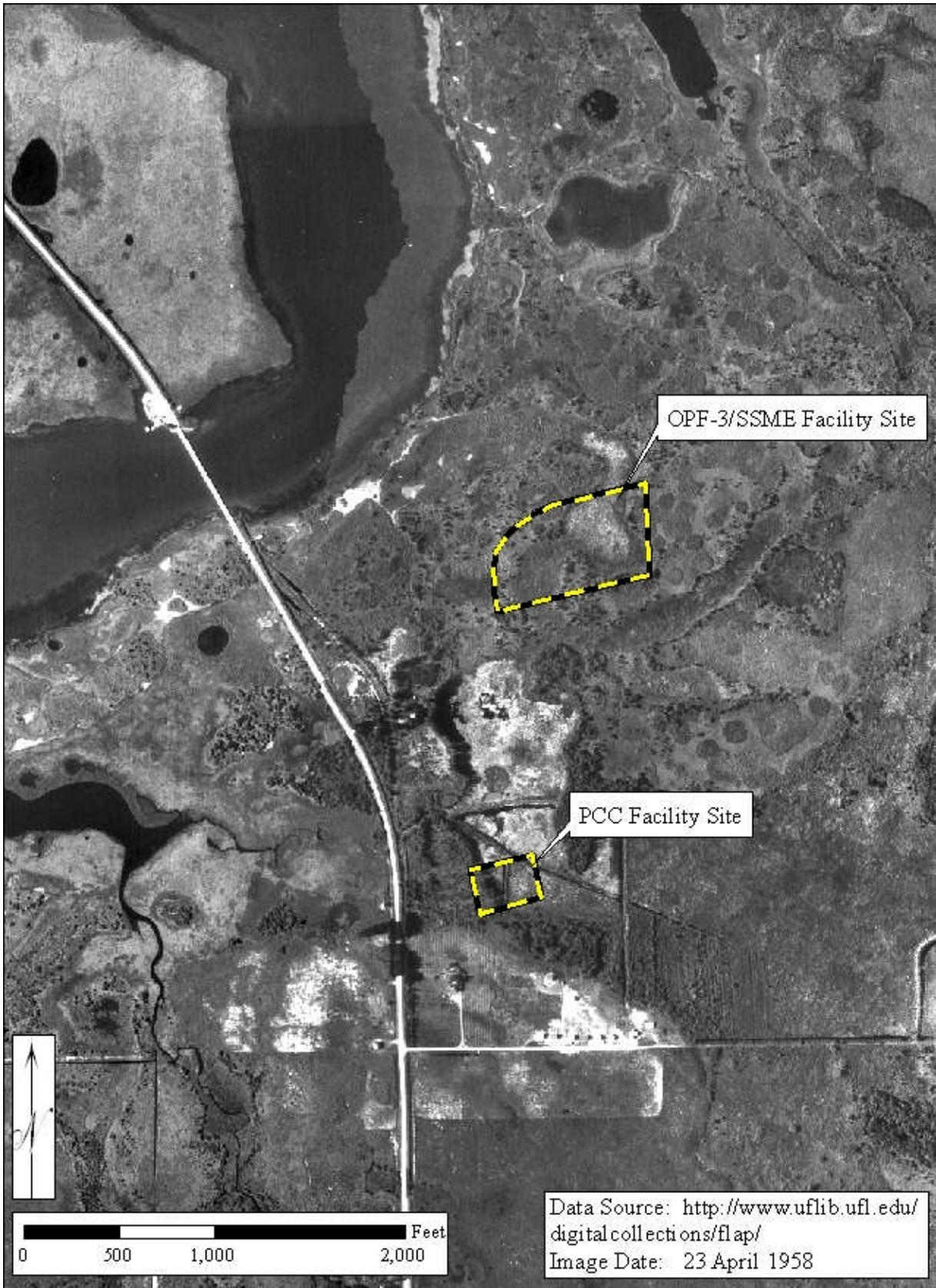




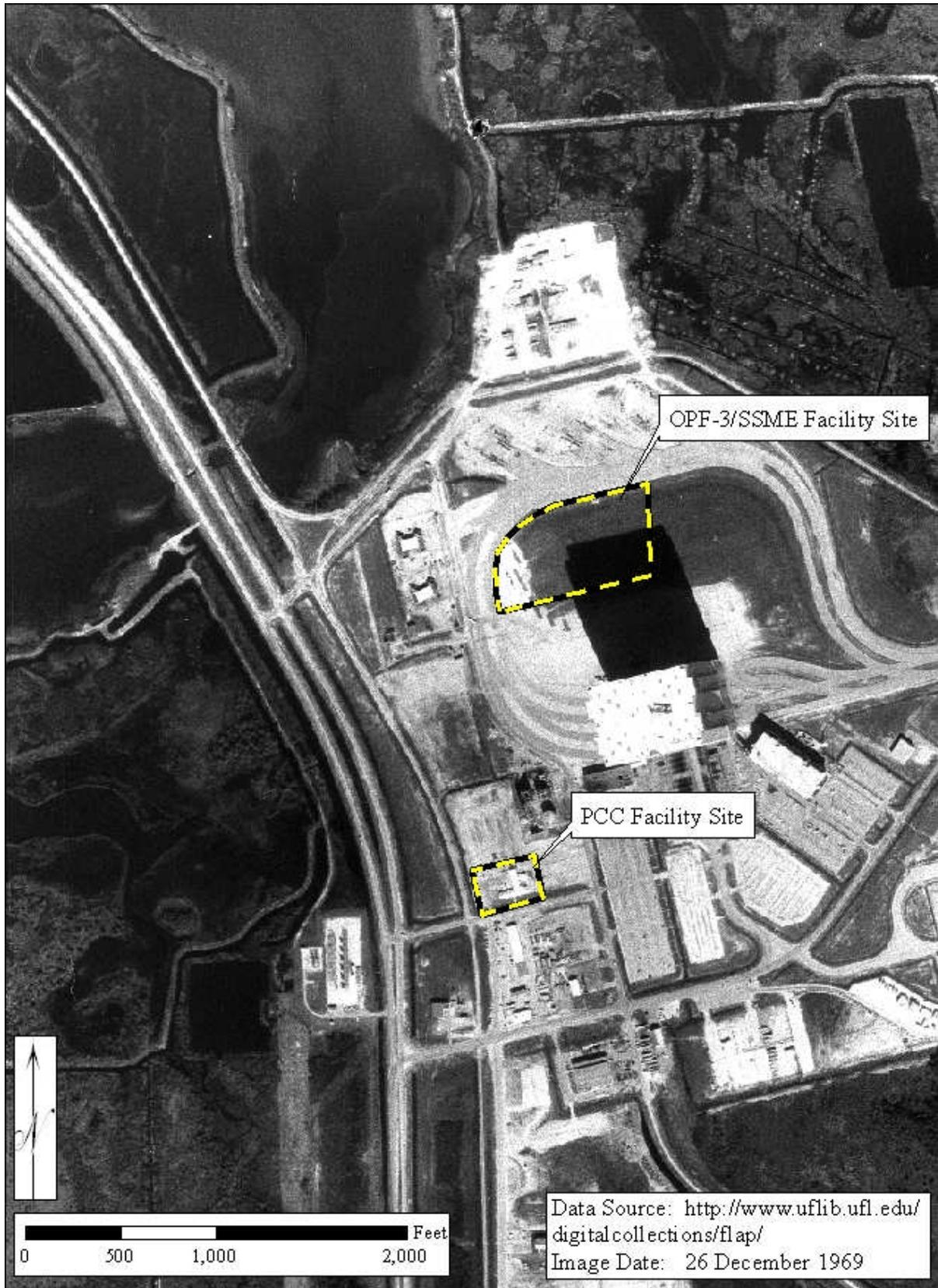
Aerial photograph of future K6-0696 and K6-1094 sites in 1943.



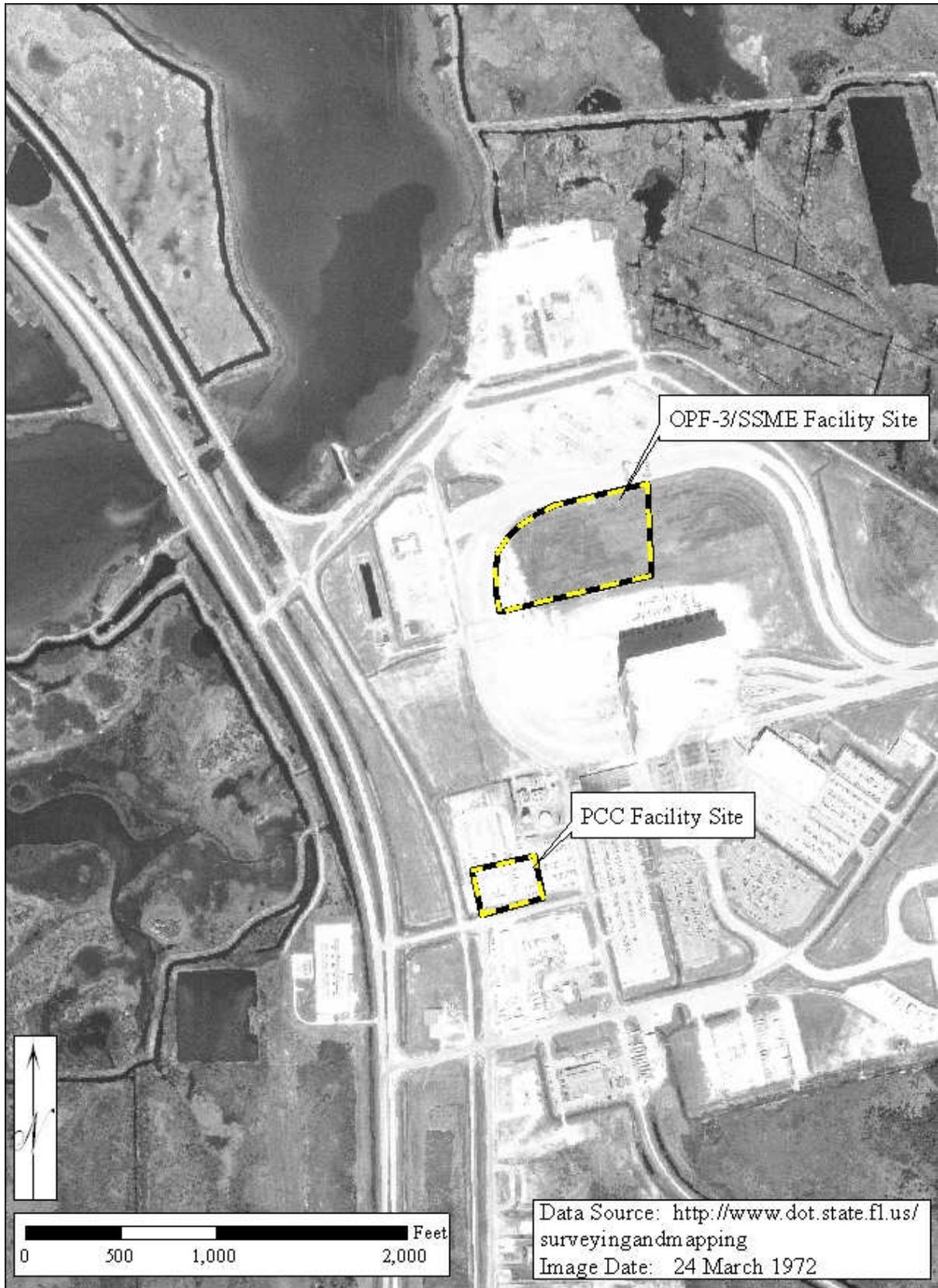
Aerial photograph of future K6-0696 and K6-1094 sites in 1951.



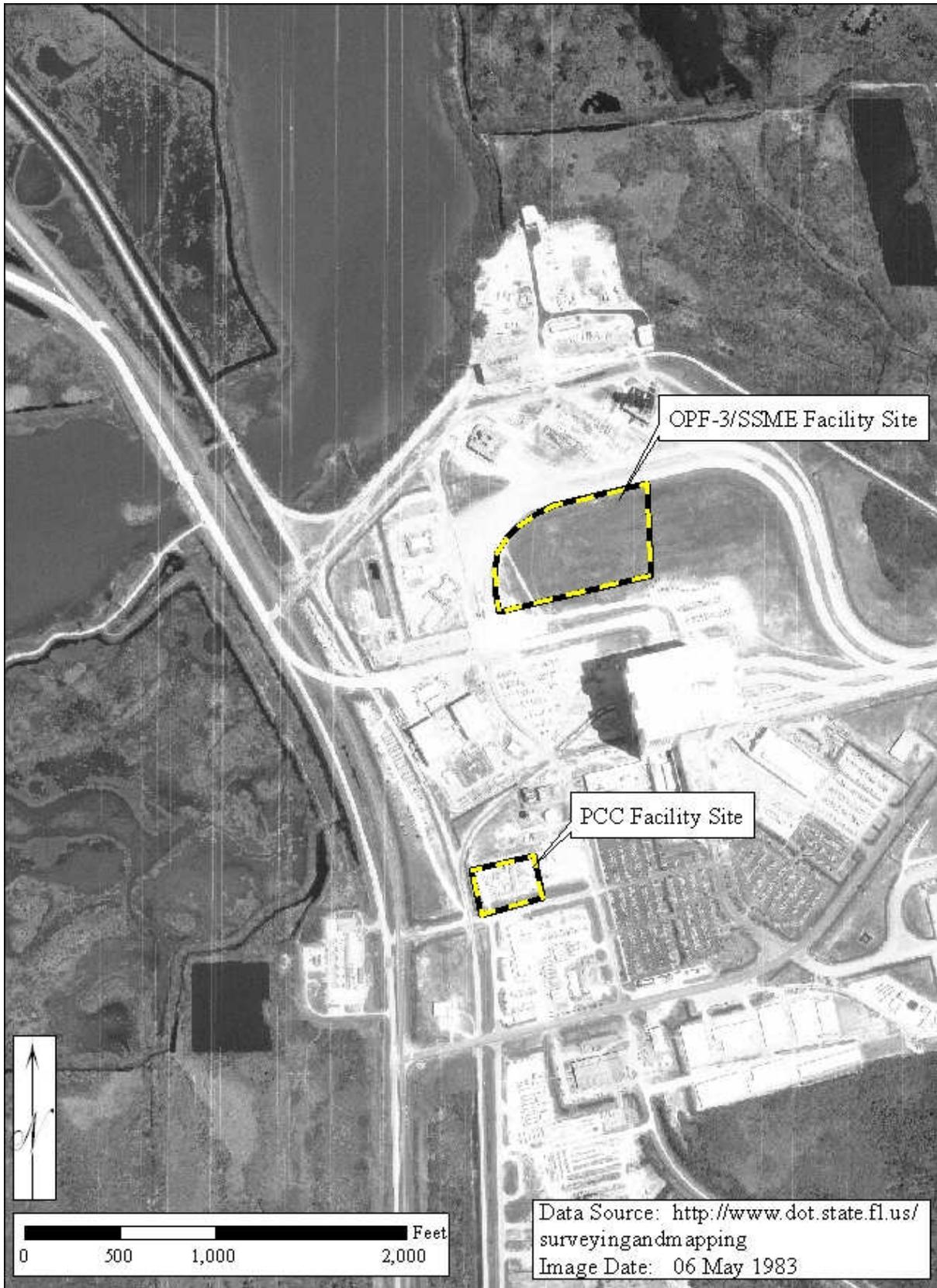
Aerial photograph of future K6-0696 and K6-1094 sites in 1958.



Aerial photograph of future K6-0696 and K6-1094 sites in 1969.



Aerial photograph of future K6-0696 and K6-1094 sites in 1972.



Aerial photograph of future K6-0696 and K6-1094 sites in 1983.



Aerial photograph of K6-0696 and K6-1094 site boundaries in 1993.



Aerial photograph of K6-0696 and K6-1094 site boundaries in 2000.

APPENDIX D

REPORT ATTACHMENTS

*** Note: This Room link lists all friable and non friable materials and can take up to many minutes to generate.**

**** FCA Date and Inspector pertain to the Facility Condition Assessment that includes the validation of identified asbestos and its condition.**

Assessed Facilities 4/20/2011 2:56:41 PM									
Demolished	Facility	Description	FCA Date**	Inspector	Survey Summaries Asbestos			Survey Summaries Metals/PCB	
					Rooms	Materials	Rooms*	Rooms	Materials
	K6-0696	OPF3			Rooms	Materials	Rooms*	Rooms	Materials
	K6-0696A	GATE HOUSE (OPF#3)			Rooms	Materials	Rooms*	Rooms	Materials
	K6-0696B	TURNSTILE SHELTER			Rooms	Materials	Rooms*	Rooms	Materials
	K6-0696D	ENVIRONMENTAL CONTROL BUILDING			Rooms	Materials	Rooms*	Rooms	Materials

[AMIS Home](#)

*Print-outs of the inspection should be used for planning purposes only.
To request detailed reports for facility project planning email [Justin Gilman](#).
All survey information should be verified as accurate and complete at the time facility and/or system modifications actually occur.*

*For assistance with regulatory compliance or health protection requirements
Contact IHA Environmental Health Services, 867-2400.*



*** Note: If *Calculating...* is displayed in the ACM field, then this building is currently being updated. You MUST refresh your browser to get the latest data.**

Material Details - Asbestos

4/20/2011 2:59:02 PM

Facility: [K6-0696](#)
Facility Description: OPF3

Material ID: MP05



Material Type: Miscellaneous Material (Putty)
Material Description: BLACK TAR/PUTTY

Asbestos: Yes
Friable: No
Percent Asbestos: 10% Chrysotile
Comments: None

Sample Number	Location
N13697	1104,W4 15
N13698	1104,W4 15
N13699	1104,W4 15

Room Number	Qty	Unit	Condition
1104	10	SF	Good

[AMIS Home](#)

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Homogeneous Materials Summary - Metals/PCB

Facility: K6-0696, OPF3

4/20/2011 3:13:56 PM

HMID	Type	Description	Metals	PCB	Photo
FS02	Floor Covering (Sheet/Linoleum)	FADED YELLOW WITH BLUE SPECKS - FLOOR COVERING SHEET FOR OPF 3 COMMON AREAS	Yes	No	

[AMIS Home](#)

Metals & PCB limited survey data is representative of the specific materials tested and does not indicate a comprehensive survey of all coating materials. Disturbance of materials with detectable levels present must be in accordance with Local, State and Federal regulatory requirements. If additional materials are discovered or found not specifically identified above, further testing is recommended.

Print-outs of the inspection should be used for planning purposes only.

To request detailed reports for facility project planning email [Justin Gilman](#).

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Contact IHA Environmental Health Services, 867-2400.*

*** Note: This Room link lists all friable and non friable materials and can take up to many minutes to generate.**
**** FCA Date and Inspector pertain to the Facility Condition Assessment that includes the validation of identified asbestos and its condition.**

Assessed Facilities 4/20/2011 3:09:02 PM									
Demolished	Facility	Description	FCA Date**	Inspector	Survey Summaries Asbestos			Survey Summaries Metals/PCB	
					Rooms	Materials	Rooms*	Rooms	Materials
	K6-1094	P.C.C.							
<p>AMIS Home</p> <p><i>Print-outs of the inspection should be used for planning purposes only. To request detailed reports for facility project planning email Justin Gilman.</i></p> <p><i>All survey information should be verified as accurate and complete at the time facility and/or system modifications actually occur.</i></p> <p><i>For assistance with regulatory compliance or health protection requirements Contact IHA Environmental Health Services, 867-2400.</i></p> 									

*** Note: If *Calculating...* is displayed in the Asbestos Column for any room, then this building is currently being updated. You MUST refresh your browser to get the latest data.**

Room Summary - Asbestos

Facility: K6-1094, P.C.C.

4/20/2011 3:09:36 PM

Room Number	Asbestos	Hazard Rating	Recommended Action	Comments
hall by 1084	No	No hazard detected.	No action required.	None
ROOF	No	No hazard detected.	No action required.	None

[AMIS Home](#)

*Print-outs of the inspection should be used for planning purposes only.
To request detailed reports for facility project planning email [Justin Gilman](#).
All survey information should be verified as accurate and complete at the time facility and/or system modifications actually occur.*

*For assistance with regulatory compliance or health protection requirements
Contact IHA Environmental Health Services, 867-2400.*



No material records identified for facility K6-1094, P.C.C.

[Return](#)

ACTIVE LIST

OPF-3_TRPs

03/15/2011

PCN	WASTENAME	LOCATION
HA0008	Sulfuric Acid and Chromic Acid	OPF-3 CONEX
HA0018	Mixed Acid	OPF-3 CONEX
HA0019	Nitric/chromic acid mixture	OPF-3 CONEX
HA0019	Nitric/chromic acid mixture	OPF-3 MIX CRIB
HB0002	Discarded Excess Fuel/Non-recoverable	OPF-3 FUEL PAD
HB0013	Oxidizer Scrubber Liquor	OPF-3 OXIDIZER PAD
HC0005	Neutralized Chromic Acid Debris w/ Free Liquids	OPF-3 LOW BAY WEST END
HC0005	Neutralized Chromic Acid Debris w/ Free Liquids	OPF-3 CONEX
HC0005	Neutralized Chromic Acid Debris w/ Free Liquids	OPF-3, HIGHBAY
HC0005	Neutralized Chromic Acid Debris w/ Free Liquids	OPF-3 MIX CRIB
HD0008	Blasting waste with metals	OPF-3 CONEX
HF0007	Solids Contaminated w/Hydrazine	OPF-3 FUEL PAD
HF0023	Solids Contaminated w/ MIMH	OPF-3 FUEL PAD
HF0024	Isopropanol Rinse (P068)	OPF-3 FUEL PAD
HF0025	Isopropanol Rinse (P068)	OPF-3 FUEL PAD
HF0026	Isopropanol Rinse (P068)	OPF-3 FUEL PAD
HG0004	Various Aerosol Cans	OPF-3, HIGHBAY
HG0004	Various Aerosol Cans	OPF-3 CONEX
HG0004	Various Aerosol Cans	OPF-3 MIX CRIB
HJ0004	Isopropanol	OPF-3 CONEX
HJ0021	Flammable Mixed Solvents, PGII	OPF-3 MIX CRIB
HJ0022	Flammable Mixed Solvents/Cleaning, PGIII	OPF-3 MIX CRIB
HJ0023	Combustible Mixed Solvents/Cleaning, PGIII	OPF-3 MIX CRIB
HJ0024	Non-flammable Mixed Solvents/Cleaning, PGIII	OPF-3 MIX CRIB
HJ0038	Mixed Halogenated Solvents	OPF-3 MIX CRIB
HJ0052	Dimethylethoxysilane	OPF-3 MIX CRIB
HJ0052	Dimethylethoxysilane	OPF-3 CONEX
HJ0053	Petroleum Distillate, 141> FP > 73	OPF-3 CONEX
HJ0055	Spent Paint Solvents	OPF-3 CONEX
HJ0058	Waste Paint, PGII	OPF-3 CONEX

PCN	WASTENAME	LOCATION
HJ0058	Waste Paint, PGII	OPF-3 MIX CRIB
HJ0059	Waste Paint, PGIII	OPF-3 MIX CRIB
HJ0059	Waste Paint, PGIII	OPF-3 CONEX
HK0009	Solvent Contaminated Debris	OPF-3 LOW BAY WEST END
HK0009	Solvent Contaminated Debris	OPF-3 CONEX
HK0009	Solvent Contaminated Debris	OPF-3, HIGHBAY
HK0009	Solvent Contaminated Debris	OPF-3 MIX CRIB
HK0015	Paint Strip Solids	OPF-3 CONEX
HK0017	Debris with toxic paint residues	OPF-3 CONEX
HK0017	Debris with toxic paint residues	OPF-3 LOW BAY WEST END
HK0017	Debris with toxic paint residues	OPF-3 MIX CRIB
HK0017	Debris with toxic paint residues	OPF-3, HIGHBAY
HL0084	Lab Pack - Hazardous	OPF-3 CONEX
HX0002	Ox Solids	OPF-3 OXIDIZER PAD
HX0022	OX SOLIDS IN SODIUM BICARB SOLUTION (P078)	OPF-3 OXIDIZER PAD
HX0023	DESSICANT TUBES	OPF-3 OXIDIZER PAD
NC0008	Miscellaneous Industrial Wastewater	OPF-3 FUEL PAD
ND0002	Debris Contaminated with Beryllium	OPF-3 CONEX
ND0003	Petroleum Solid Waste	OPF-3 CONEX
ND0003	Petroleum Solid Waste	OPF-3 HYDRAULIC PUMPER UNIT
ND0003	Petroleum Solid Waste	OPF-3 LOW BAY WEST END
ND0006	Filtration Media	OPF-3 FUEL PAD
ND0009	Petroleum Contaminated Soil	OPF-3 CONEX
ND0016	Non-hazardous blast media	OPF-3 LOW BAY WEST END
NF0001	Fuel Vapor Scrubber Liquor, Product Processing	OPF-3 FUEL PAD
NF0002	Wastewater Containing Hydrazine	OPF-3 FUEL PAD
NF0007	Oil Contaminated with Fuel Vapors	OPF-3 FUEL PAD
NF0012	Isopropanol/Hydrazine	OPF-3 FUEL PAD
NF0013	Isopropanol/Hydrazine	OPF-3 FUEL PAD
NF0018	Bleach Solution Containing Aerozine-50	OPF-3 FUEL PAD

PCN	WASTENAME	LOCATION
NJ0002	Recyclable Glycol Solution (Coolant)	OPF-3 MIX CRIB
NJ0004	Organic Detergent Solutions	OPF-3 MIX CRIB
NJ0009	Silicone Emulsion	OPF-3 MIX CRIB
NJ0011	Polymeric Isocyanate	OPF-3 CONEX
NJ0045	Glycol Ether Detergents	OPF-3 HYDRAULIC PUMPER UNIT
NJ0045	Glycol Ether Detergents	OPF-3 CONEX
NK0005	Unused Hydrocarbon semi-solids (grease)	OPF-3 HYDRAULIC PUMPER UNIT
NK0007	Oil/Fuel Filters	OPF-3 HYDRAULIC PUMPER UNIT
NX0002	Dilute Nitrate Solution	OPF-3 OXIDIZER PAD
NX0003	Solids in Solution with Nitrogen Tetroxide Vapors	OPF-3 OXIDIZER PAD
TD0001	Straight Fluorescent Lamps	OPF-3 CONEX
TD0002	Plastic Coated Fluorescent Lamps	OPF-3 CONEX
UR0001	Used Oil	OPF-3 HYDRAULIC PUMPER UNIT
UR0001	Used Oil	OPF-3 CONEX
UR0001	Used Oil	OPF-3, HIGHBAY

Waste and SPCC Sites at Facilities K6-0696 & K6-1094

SAA	K6-0696	OPF 3, GSE, ROCKETDYNE
SAA	K6-0696	OPF 3, SSME, ROCKETDYNE
90 Day	K6-0696	OPF 3, Waste Connex
90 Day	K6-0696	OPF 3, Oxidizer Pad
90 Day	K6-0696	OPF 3, Fuel Pad
SAA	K6-0696	OPF 3, High Bay
SAA	K6-0696	OPF 3, Mix Crib
SAA	K6-0696	OPF 3, Room 1148 (Low Bay)
Controlled	K6-0696	OPF 3, Hydraulic Pump Room
SPCC	K6-0696	OPF 3, up to 10 - 55 gal product/used oil, K6-0696-1
SPCC	K6-0696	OPF 3, up to 2 - 55 gal product, K6-0696-2
SPCC	K6-0696	OPF 3, 190 gal double wall elevator tank, K6-0696-3
SPCC	K6-0696	OPF 3, 125 gal single wall elevator tank, K6-0696-4
SPCC	K6-0696	OPF 3, 170 gal single wall elevator tank, K6-0696-5
SPCC	K6-0696	OPF 3, 500 gal double wall condensate tank, K6-0696-6
SPCC	K6-0696	OPF 3, 100 gal hydraulic reservoir (S70-0805-00-001), K6-0696-7
SPCC	K6-0696	OPF 3, 100 gal hydraulic reservoir (S70-0805-00-002), K6-0696-8
SPCC	K6-0696	OPF 3, 100 gal hydraulic reservoir (S70-1204-01-002), K6-0696-9
SPCC	K6-0696	OPF 3, 100 gal hydraulic reservoir (S70-1204-01-003), K6-0696-10
SPCC	K6-0696	OPF 3, 100 gal hydraulic reservoir (S70-1204-01-001), K6-0696-11
SPCC	K6-1094	Processing Control Center, 55 gal condensate drum, K6-1094-3
SPCC	K6-1094	Processing Control Center, 183 gal single wall elevator tank, K6-1094-1
SPCC	K6-1094	Processing Control Center, 287 gal single wall elevator tank, K6-1094-2



**CONTINGENCY PLAN HAZARDOUS
WASTE MANAGEMENT PROVISIONS**

Environmental Management Florida

Facility Location: K6-0696 OPF-3 HYDRAULIC PUMPER UNIT	Type: NON-REG	Issue Date: 11/24/10
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In Case of Emergency Call 911
(For Cell Phone Call: 867-7911 or 853-7911)

Evacuation

Evacuate Upwind Clear of Hazard.
Report to Safe Marshalling/Assembly Area.
Report to Incident Commander.

Incidental Spills

Use Spill Kit, Containerize and Label Material for Disposal

Emergency Equipment at Facility

Description	Location	Capabilities
Fire Extinguisher	N/E CORNER	Small Class Fires: Toxic Vapor Control
Communications: (Telephone)	K6-696 BUILDING	Phone 911
Alarms: <u>Beacons</u> <u>PA System</u>	SOUTH WALL NOTIFY OPS DESK 861-7172	Flashing Red Warning Beacon Area-Wide Loud Speaker Warning
Decontamination Equipment: (Safety Shower and/or Eyewash)	EAST WALL EYEWASH ONLY	Decontamination of Personnel
Spill Control and Cleanup: (Drum with Shovel and/or Absorbent)	WEST WALL	Absorb and Cleanup of Small Liquid Spills



**CONTINGENCY PLAN HAZARDOUS WASTE
MANAGEMENT PROVISIONS (CONTD)**

Environmental Management Florida

Facility Location: K6-0696 OPF-3 HYDRAULIC PUMPER UNIT	Type: NON-REG	Issue Date: 11/24/10
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Emergency Coordinator(s)		Types of Waste Stored		
Name	Work Phone	Process Code	Description	DOT ID
CCAFS/KSC	911	ND0003	Petroleum Solid Waste	N/A
		NJ0045	Glycol Ether Detergents	N/A
		NK0005	Unused Hydrocarbon semi-solids (grease)	N/A
		NK0007	Oil/Fuel Filters	N/A
		UR0001	Used Oil	N/A
<u>Manager:</u>				
Donald Mayer	861-7063			
<u>Site POC's</u>				
William Pace	861-7184			
Dan Cochran	867-4690			
USA Environmental Safety:	867-9965			
Off-Shift Contact: Safety Console	867-7523 867-3588			



**CONTINGENCY PLAN HAZARDOUS
WASTE MANAGEMENT PROVISIONS**

Environmental Management Florida

Facility Location: K6-0696 OPF-3 CONEX	Type: 90-DAY	Issue Date: 11/24/10
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In Case of Emergency Call 911
(For Cell Phone Call: 867-7911 or 853-7911)

Evacuation

Evacuate Upwind Clear of Hazard.
Report to Safe Marshalling/Assembly Area.
Report to Incident Commander.

Incidental Spills

Use Spill Kit, Containerize and Label Material for Disposal

Emergency Equipment at Facility

Description	Location	Capabilities
Fire Extinguisher	E. OF POL SHELTER ON WIND SOCK POLE	Small Class Fires: Toxic Vapor Control
Communications: (Telephone)	N/ W CORNER K6-696	Phone 911
Alarms: <u>Beacons</u> <u>PA System</u>	AT SITE NOTIFY OPS DESK 861-7172	Flashing Red Warning Beacon Area-Wide Loud Speaker Warning
Decontamination Equipment: (Safety Shower and/or Eyewash)	PORTABLE OUTSIDE CONEX	Decontamination of Personnel
Spill Control and Cleanup: (Drum with Shovel and/or Absorbent)	AT SITE	Absorb and Cleanup of Small Liquid Spills



**CONTINGENCY PLAN HAZARDOUS
WASTE MANAGEMENT PROVISIONS**

Environmental Management: Florida

Facility Location: K6-0696 OPF-3 FUEL PAD	Type: 90-DAY	Issue Date: 12/03/10
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In Case of Emergency Call 911
(For Cell Phone Call: 867-7911 or 853-7911)

Evacuation

**Evacuate Upwind Clear of Hazard.
Report to Safe Marshalling/Assembly Area.
Report to Incident Commander.**

Incidental Spills

Use Spill Kit, Containerize and Label Material for Disposal

Emergency Equipment at Facility

Description	Location	Capabilities
Fire Extinguisher	N/A	Small Class Fires: Toxic Vapor Control
Communications: (Telephone)	N.E. CORNER OF K6-696	Phone 911
Alarms: <u>Beacons</u> <u>PA System</u>	AT SITE NOTIFY OPS DESK 861-7172	Flashing Red Warning Beacon Area-Wide Loud Speaker Warning
Decontamination Equipment: (Safety Shower and/or Eyewash)	NORTHWEST WALL	Decontamination of Personnel
Spill Control and Cleanup: (Drum with Shovel and/or Absorbent)	NORTHEAST CORNER	Absorb and Cleanup of Small Liquid Spills



**CONTINGENCY PLAN HAZARDOUS WASTE
MANAGEMENT PROVISIONS (CONTD)**

Environmental Management Florida

Facility Location: K6-0696 OPF-3 FUEL PAD	Type: 90-DAY	Issue Date: 12/03/10
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Emergency Coordinator(s)		Types of Waste Stored		
Name	Work Phone	Process Code	Description	DOT ID
CCAFS/KSC	911			
Manager:				
Barati, George J	321/861-5324	HB0002	Discarded Excess Fuel/Non-recoverable	UN1244
		HF0007	Solids Contaminated w/Hydrazine	NA3077
		HF0023	Solids Contaminated w/ MMH	NA3077
		HF0024	Isopropanol Rinse (P068)	UN1993
		HF0025	Isopropanol Rinse (P068)	UN1993
		HF0026	Isopropanol Rinse (P068)	UN1993
Site POC's		NC0008	Miscellaneous Industrial Wastewater	N/A
Cochran Daniel D	321/867-4690	ND0006	Filtration Media	N/A
Tim Keyser	867-4559	NF0001	Fuel Vapor Scrubber Liquor, Product Processin	N/A
		NF0002	Wastewater Containing Hydrazine	N/A
		NF0007	Oil Contaminated with Fuel Vapors	N/A
		NF0012	Isopropanol/Hydrazine	UN1993
		NF0013	Isopropanol/Hydrazine	NA1993
		NF0018	Bleach Solution Containing Aerozine-50	N/A
USA Environmental Safety:	867-9965			
Off-Shift Contact:	867-7523			
Safety Console	867-3588			



**CONTINGENCY PLAN HAZARDOUS
WASTE MANAGEMENT PROVISIONS**

Environmental Management Florida

Facility Location:

K6-0696 OPF-3 OXIDIZER PAD

Type:

90-DAY

Issue Date:

12/03/10

In Case of Emergency Call 911

(For Cell Phone Call: 867-7911 or 853-7911)

Evacuation

Evacuate Upwind Clear of Hazard.

Report to Safe Marshalling/Assembly Area.

Report to Incident Commander.

Incidental Spills

Use Spill Kit, Containerize and Label Material for Disposal

Emergency Equipment at Facility

Description	Location	Capabilities
Fire Extinguisher	N/A	Small Class Fires: Toxic Vapor Control
Communications: (Telephone)	N.E. CORNER OF K6-696	Phone 911
Alarms: <u>Beacons</u> <u>PA System</u>	AT SITE NOTIFY OPS DESK 861-7172	Flashing Red Warning Beacon Area-Wide Loud Speaker Warning
Decontamination Equipment: (Safety Shower and/or Eyewash)	AT SITE	Decontamination of Personnel
Spill Control and Cleanup: (Drum with Shovel and/or Absorbent)	AT SITE	Absorb and Cleanup of Small Liquid Spills



**CONTINGENCY PLAN HAZARDOUS WASTE
MANAGEMENT PROVISIONS (CONTD)**

Environmental Management Florida

Facility Location: K6-0696 OPF-3 OXIDIZER PAD	Type: 90-DAY	Issue Date: 12/03/10
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Emergency Coordinator(s)		Types of Waste Stored		
Name	Work Phone	Process Code	Description	DOT ID
CCAFS/KSC	911	HB0013	Oxidizer Scrubber Liquor	UN1824
		HX0002	Ox Solids	NA3077
		HX0022	OX SOLIDS IN SODIM BICARB SOLUTION (P078	NA3082
		HX0023	DESSICANT TUBES	NA3077
		NX0002	Dilute Nitrate Solution	N/A
		NX0003	Solids in Solution with Nitrogen Tetroxide Vapo	N/A
Manager: Barati, George J	321/861-5324			
Site POC's Cochran Daniel D	321/867-4690			
Tim Keyser	867-4559			
USA Environmental Safety:	867-9965			
Off-Shift Contact: Safety Console	867-7523 867-3588			



**CONTINGENCY PLAN HAZARDOUS
WASTE MANAGEMENT PROVISIONS**

Environmental Management Florida

Facility Location: K6-0696 SSMEPF HIGH BAY	Type: SATELLITE ACCUMULATION AREA	Issue Date: 11/23/10
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In Case of Emergency Call 911
(For Cell Phone Call: 867-7911 or 853-7911)

Evacuation

Evacuate Upwind Clear of Hazard.
Report to Safe Marshalling/Assembly Area.
Report to Incident Commander.

Incidental Spills

Use Spill Kit, Containerize and Label Material for Disposal

Emergency Equipment at Facility

Description	Location	Capabilities
Fire Extinguisher	WEST WALL-FIRE HOSE CABINET	Small Class Fires: Toxic Vapor Control
Communications: (Telephone)	SUPPORT BEAM SOUTH OF SAA	Phone 911
Alarms: <u>Beacons</u> <u>PA System</u>	N/A AREA WIDE PAGING 867-2316	Flashing Red Warning Beacon Area-Wide Loud Speaker Warning
Decontamination Equipment: (Safety Shower and/or Eyewash)	NORTH WALL	Decontamination of Personnel
Spill Control and Cleanup: (Drum with Shovel and/or Absorbent)	IN ACCUMULATION AREA	Absorb and Cleanup of Small Liquid Spills



**CONTINGENCY PLAN HAZARDOUS WASTE
MANAGEMENT PROVISIONS (CONTD)**

Environmental Management Florida

Facility Location: K6-0696 SSMEPF HIGH BAY	Type: SATELLITE ACCUMULATION AREA	Issue Date: 11/23/10
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Emergency Coordinator(s)		Types of Waste Stored				
Name	Work Phone	Process Code	Description	DOT ID		
CCAFS/KSC	911	HC0005	Neutralized Chromic Acid Debris w/ Free Liquid	NA3082		
		HG0004	Various Aerosol Cans	UN1950		
		HJ0021	Flammable Mixed Solvents, PGII	UN1993		
		HJ0022	Flammable Mixed Solvents/Cleaning, PGIII	UN1993		
		HJ0023	Combustible Mixed Solvents/Cleaning, PGIII	NA1993		
		HJ0024	Non-flammable Mixed Solvents/Cleaning, PGIII	NA3082		
		HJ0038	Mixed Halogenated Solvents	NA3082,		
		BAIR, KEN	861-1692	HK0009	Solvent Contaminated Debris	NA3077
		Site POC's		HK0013	Solid debris from painting with low merc and le	NA3077
				HK0017	Debris with toxic paint residues	NA3077
Dan Bode	861-5052	HL0307	Lab Pack - Hazardous	NA3077		
BAIR, KEN		ND0002	Debris Contaminated with Beryllium	N/A		
	861-1692	ND0003	Petroleum Solid Waste	N/A		
		UR0001	Used Oil	N/A		
USA Environmental Safety:	867-9965					
Off-Shift Contact: Safety Console	867-7523					
	867-3588					



**CONTINGENCY PLAN HAZARDOUS
WASTE MANAGEMENT PROVISIONS**

Environmental Management Florida

Facility Location: K6-0696 SSMEPF GSE AREA	Type: SATELLITE ACCUMULATION AREA	Issue Date: 11/23/10
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In Case of Emergency Call 911
(For Cell Phone Call: 867-7911 or 853-7911)

Evacuation

Evacuate Upwind Clear of Hazard.
Report to Safe Marshalling/Assembly Area.
Report to Incident Commander.

Incidental Spills

Use Spill Kit, Containerize and Label Material for Disposal

Emergency Equipment at Facility

Description	Location	Capabilities
Fire Extinguisher	NORTHWEST CORNER OF ROOM	Small Class Fires: Toxic Vapor Control
Communications: (Telephone)	NORTH WALL	Phone 911
Alarms: <u>Beacons</u> <u>PA System</u>	N/A AREA WIDE PAGING 867-2316	Flashing Red Warning Beacon Area-Wide Loud Speaker Warning
Decontamination Equipment: (Safety Shower and/or Eyewash)	FIXED EYEWASH NORTH OF SAA	Decontamination of Personnel
Spill Control and Cleanup: (Drum with Shovel and/or Absorbent)	IN ACCUMULATION AREA NEXT TO SAA	Absorb and Cleanup of Small Liquid Spills



**CONTINGENCY PLAN HAZARDOUS WASTE
MANAGEMENT PROVISIONS (CONTD)**

Environmental Management Florida

Facility Location: K6-0696 SSMEPF GSE AREA	Type: SATELLITE ACCUMULATION AREA	Issue Date: 11/23/10
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Emergency Coordinator(s)		Types of Waste Stored		
Name	Work Phone	Process Code	Description	DOT ID
CCAFS/KSC	911	HC0005	Neutralized Chromic Acid Debris w/ Free Liquid	NA3082
		HG0004	Various Aerosol Cans	UN1950
		HK0009	Solvent Contaminated Debris	NA3077
		HK0017	Debris with toxic paint residues	NA3077
		ND0003	Petroleum Solid Waste	N/A
		UR0001	Used Oil	N/A
Manager:				
BAIR, KEN	861-1692			
Site POC's				
Dan Bode	861-5052			
BAIR, KEN	861-1692			
USA Environmental Safety:	867-9965			
Off-Shift Contact:	867-7523			
Safety Console	867-3588			



**CONTINGENCY PLAN HAZARDOUS
WASTE MANAGEMENT PROVISIONS**

Environmental Management Florida

Facility Location:

K6-0696 OPF-3, HIGHBAY

Type:

SATELLITE ACCUMULATION AREA

Issue Date:

12/03/10

In Case of Emergency Call 911

(For Cell Phone Call: 867-7911 or 853-7911)

Evacuation

**Evacuate Upwind Clear of Hazard.
Report to Safe Marshalling/Assembly Area.
Report to Incident Commander.**

Incidental Spills

Use Spill Kit, Containerize and Label Material for Disposal

Emergency Equipment at Facility

Description	Location	Capabilities
Fire Extinguisher	EAST WALL	Small Class Fires: Toxic Vapor Control
Communications: (Telephone)	AT FRONT DESK	Phone 911
Alarms: <u>Beacons</u> <u>PA System</u>	N.W. WALL, CENTER NOTIFY OPS DESK 861-7172	Flashing Red Warning Beacon Area-Wide Loud Speaker Warning
Decontamination Equipment: (Safety Shower and/or Eyewash)	N/E WALL	Decontamination of Personnel
Spill Control and Cleanup: (Drum with Shovel and/or Absorbent)	N/A	Absorb and Cleanup of Small Liquid Spills



**CONTINGENCY PLAN HAZARDOUS WASTE
MANAGEMENT PROVISIONS (CONTD)**

Environmental Management Florida

Facility Location: K6-0696 OPF-3, HIGHBAY	Type: SATELLITE ACCUMULATION AREA	Issue Date: 12/03/10
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Emergency Coordinator(s)		Types of Waste Stored		
Name	Work Phone	Process Code	Description	DOT ID
CCAFS/KSC	911	HC0005	Neutralized Chromic Acid Debris w/ Free Liquid	NA3082
		HG0004	Various Aerosol Cans	UN1950
		HK0009	Solvent Contaminated Debris	NA3077
		HK0017	Debris with toxic paint residues	NA3077
		UR0001	Used Oil	N/A
Manager: Barati, George J	321/861-5324			
Site POC's Cochran Daniel D Tim Keyser	321/867-4690 867-4559			
USA Environmental Safety:	867-9965			
Off-Shift Contact: Safety Console	867-7523 867-3588			



**CONTINGENCY PLAN HAZARDOUS
WASTE MANAGEMENT PROVISIONS**

Environmental Management Florida

Facility Location:

K6-0696 OPF-3 MIX CRIB

Type:

SATELLITE ACCUMULATION AREA

Issue Date:

12/03/10

In Case of Emergency Call 911

(For Cell Phone Call: 867-7911 or 853-7911)

Evacuation

Evacuate Upwind Clear of Hazard.

Report to Safe Marshalling/Assembly Area.

Report to Incident Commander.

Incidental Spills

Use Spill Kit, Containerize and Label Material for Disposal

Emergency Equipment at Facility

Description	Location	Capabilities
Fire Extinguisher	S/E CORNER OF ROOM 1193	Small Class Fires: Toxic Vapor Control
Communications: (Telephone)	ROOM 1193	Phone 911
Alarms: <u>Beacons</u> <u>PA System</u>	N/A NOTIFY OPS DESK 861-7172	Flashing Red Warning Beacon Area-Wide Loud Speaker Warning
Decontamination Equipment: (Safety Shower and/or Eyewash)	WEST WALL, ROOM 1193	Decontamination of Personnel
Spill Control and Cleanup: (Drum with Shovel and/or Absorbent)	NORTH WALL, BETWEEN POL's	Absorb and Cleanup of Small Liquid Spills



**CONTINGENCY PLAN HAZARDOUS WASTE
MANAGEMENT PROVISIONS (CONTD)**

Environmental Management Florida

Facility Location:

K6-0696 OPF-3 MIX CRIB

Type:

SATELLITE ACCUMULATION AREA

Issue Date:

12/03/10

Emergency Coordinator(s)		Types of Waste Stored		
Name	Work Phone	Process Code	Description	DOT ID
CCAFS/KSC <u>Manager:</u> Barati, George J <u>Site POC's</u> Cochran Daniel D William Pace	911	HA0019	Nitric/chromic acid mixture	UN3264
		HC0005	Neutralized Chromic Acid Debris w/ Free Liquid	NA3082
		HG0004	Various Aerosol Cans	UN1950
		HJ0021	Flammable Mixed Solvents, PGII	UN1993
		HJ0022	Flammable Mixed Solvents/Cleaning, PGIII	UN1993
		HJ0023	Combustible Mixed Solvents/Cleaning, PGIII	NA1993
		HJ0024	Non-flammable Mixed Solvents/Cleaning, PGIII	NA3082
		HJ0038	Mixed Halogenated Solvents	NA3082,
		HJ0052	Dimethylethoxysilane	UN1993
		HJ0058	Waste Paint, PGII	UN1263
		HJ0059	Waste Paint, PGIII	UN1263
		HK0009	Solvent Contaminated Debris	NA3077
		HK0017	Debris with toxic paint residues	NA3077
		NJ0002	Recyclable Glycol Solution (Coolant)	N/A
		NJ0004	Organic Detergent Solutions	N/A
	NJ0009	Silicone Emulsion	N/A	
USA Environmental Safety:	867-9965			
Off-Shift Contact: Safety Console	867-7523 867-3588			



**CONTINGENCY PLAN HAZARDOUS
WASTE MANAGEMENT PROVISIONS**

Environmental Management Florida

Facility Location:

K6-0696 OPF 3 LOW BAY ROOM 1148

Type:

SATELLITE ACCUMULATION AREA

Issue Date:

12/03/10

In Case of Emergency Call 911

(For Cell Phone Call: 867-7911 or 853-7911)

Evacuation

Evacuate Upwind Clear of Hazard.

Report to Safe Marshalling/Assembly Area.

Report to Incident Commander.

Incidental Spills

Use Spill Kit, Containerize and Label Material for Disposal

Emergency Equipment at Facility

Description	Location	Capabilities
Fire Extinguisher	OUTSIDE DOOR	Small Class Fires: Toxic Vapor Control
Communications: (Telephone)	DESK	Phone 911
Alarms:		
<u>Beacons</u>	N/A	Flashing Red Warning Beacon
<u>PA System</u>	NOTIFY OPS DESK 867-4512	Area-Wide Loud Speaker Warning
Decontamination Equipment: (Safety Shower and/or Eyewash)	IN ROOM 1147	Decontamination of Personnel
Spill Control and Cleanup: (Drum with Shovel and/or Absorbent)	MIX CRIB	Absorb and Cleanup of Small Liquid Spills



**CONTINGENCY PLAN HAZARDOUS WASTE
MANAGEMENT PROVISIONS (CONTD)**

Environmental Management Florida

Facility Location: K6-0696 OPF 3 LOW BAY ROOM 1148	Type: SATELLITE ACCUMULATION AREA	Issue Date: 12/03/10
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Emergency Coordinator(s)		Types of Waste Stored		
Name	Work Phone	Process Code	Description	DOT ID
CCAFS/KSC	911	HC0005	Neutralized Chromic Acid Debris w/ Free Liquid	NA3082
		HK0009	Solvent Contaminated Debris	NA3077
		HK0017	Debris with toxic paint residues	NA3077
		ND0003	Petroleum Solid Waste	N/A
		ND0016	Non-hazardous blast media	N/A
<u>Manager:</u> Barati, George J	321/861-5324			
<u>Site POC's</u> Cochran Daniel D Tim Keyser	321/867-4690 867-4559			
USA Environmental Safety:	867-9965			
Off-Shift Contact: Safety Console	867-7523 867-3588			



**CONTINGENCY PLAN HAZARDOUS
WASTE MANAGEMENT PROVISIONS**

Environmental Management Florida

Facility Location:

K6-1094 PCC 1060

Type:

SATELLITE ACCUMULATION AREA

Issue Date:

12/22/10

In Case of Emergency Call 911

(For Cell Phone Call: 867-7911 or 853-7911)

Evacuation

Evacuate Upwind Clear of Hazard.
Report to Safe Marshalling/Assembly Area.
Report to Incident Commander.

Incidental Spills

Use Spill Kit, Containerize and Label Material for Disposal

Emergency Equipment at Facility

Description	Location	Capabilities
Fire Extinguisher	NORTH WALL	Small Class Fires: Toxic Vapor Control
Communications: (Telephone)	ROOM 1047	Phone 911
Alarms: <u>Beacons</u> <u>PA System</u>	N/A N/A AREA WIDE PAGING	Flashing Red Warning Beacon Area-Wide Loud Speaker Warning
Decontamination Equipment: (Safety Shower and/or Eyewash)	N/A	Decontamination of Personnel
Spill Control and Cleanup: (Drum with Shovel and/or Absorbent)	N/A	Absorb and Cleanup of Small Liquid Spills



**CONTINGENCY PLAN HAZARDOUS WASTE
MANAGEMENT PROVISIONS (CONTD)**

Environmental Management Florida

Facility Location: K6-1094 PCC 1060	Type: SATELLITE ACCUMULATION AREA	Issue Date: 12/22/10
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Emergency Coordinator(s)		Types of Waste Stored		
Name	Work Phone	Process Code	Description	DOT ID
CCAFS/KSC <u>Manager:</u> <u>Site POC's</u> Leland Hill USA Environmental Safety: Off-Shift Contact: Safety Console	911 861-7687 867-9965 867-7523 867-3588	HG0004	Various Aerosol Cans	UN1950
		TD0004	Compact Modular/Circlelight Fluorescent Lamp	N/A
		TD0010	Nicad batteries (dry cell / non-spillable)	N/A
		TD0016	Lithium Batteries	UN3090
		TD0024	Universal Waste - Nickel Metal Hydride Batteries	N/A

Kennedy Space Center Site-Specific SPCC Plan Data

1.0 IDENTIFYING DATA

Building/Site Number: K6-0696

Description: Oil storage associated with this facility includes 55-gallon drums containing new and used oil, compressor condensate collected in a polyethylene tank, and hydraulic oil associated with elevators and other hydraulic equipment.

Building/Site Name: ORBITOR PROCESS FAC HIGH BAY 3

Operator: SPOC

Environmental Contact: 861-5762

2.0 DESCRIPTION OF OIL STORAGE

Container: K6-0696-1

Container Type: 55-Gallon Drum

Container Capacity: Up to 10 - 55 Gallons

Materials Stored: New and used oil

Fail Safe Features: None

Construction Details: Steel or plastic drum

Date Installed: N/A

Integrity Test Method: Visual inspections are conducted on a monthly basis in accordance with Section 4.3 of the SPCC Plan.

55-gallon drums used to store oil are replaced within 10 years and/or when they show signs of visual degradation.

Secondary Containment Details: Closed containment sump within building

Secondary Containment Volume: >55 Gallons

Piping Type: N/A

Corrosion Protection: N/A

Piping Details: N/A

Oil Fill and Transfer Details: Used oil is transferred to and from this facility in 55-gallon drums.

Secondary Containment Drainage Procedure: Any liquid accumulated in the floor of the secondary containment sump is inspected for oil odor or sheen.

If deemed to be free of oil, accumulated liquid is discharged to the ground surface.

If determined to be contaminated with oil, accumulated liquid is containerized and picked up by the KSC used oil/oily wastewater contractor for recycling and/or disposal in accordance with applicable regulations.

Kennedy Space Center Site-Specific SPCC Plan Data

The date and time of drainage and presence or absence of oil is documented in the Secondary Containment and Drainage Log, or similar form provided in Table 4-5 of the SPCC Plan

Spill Route Details: A spill or leak from a drum would flow out onto the concrete floor of the building and travel northwest towards a blind sump located in the immediate vicinity. Spilled oil would not exit the building.

Maximum Refueling/Vacuum Truck Capacity: N/A

Container: K6-0696-2

Container Type: 55-Gallon Drum

Container Capacity: Up to 2 - 55 Gallons

Materials Stored: Hydraulic oil

Fail Safe Features: None

Construction Details: Steel or plastic drum

Date Installed: N/A

Integrity Test Method: Visual inspections are conducted on a monthly basis in accordance with Section 4.3 of the SPCC Plan.

55-gallon drums used to store oil are replaced within 10 years and/or when they show signs of visual degradation.

Secondary Containment Details: Secondary containment pallet

Secondary Containment Volume: >55 Gallons

Piping Type: N/A

Corrosion Protection: N/A

Piping Details: N/A

Oil Fill and Transfer Details: Hydraulic oil is transferred to this facility in 55-gallon drums.

Secondary Containment Drainage Procedure: Any liquid accumulated in the floor of the secondary containment is inspected for oil odor or sheen.

If deemed to be free of oil, accumulated liquid is discharged to the ground surface.

If determined to be contaminated with oil, accumulated liquid is containerized and picked up by the KSC used oil/oily wastewater contractor for recycling and/or disposal in accordance with applicable regulations.

The date and time of drainage and presence or absence of oil is documented in the Secondary Containment and Drainage Log, or similar form provided in Table 4-5 of the SPCC Plan

Kennedy Space Center Site-Specific SPCC Plan Data

Spill Route Details: A spill or leak from a drum would be contained within the secondary containment pallet. Overflows would flow out onto the concrete floor and travel southeast towards a blind sump located in the immediate vicinity. Spilled oil would not exit the building.

Maximum Refueling/Vacuum Truck Capacity: N/A

Container: K6-0696-3

Container Type: Elevator (Highbay)

Container Capacity: 190 Gallons

Materials Stored: Hydraulic oil

Fail Safe Features: N/A

Construction Details: Double walled steel tank

Date Installed:

Integrity Test Method: Visual inspections are conducted on a quarterly basis in accordance with Section 4.3 of the SPCC Plan.

Secondary Containment Details: Elevator located within building

Secondary Containment Volume: >190 Gallons

Piping Type: N/A

Corrosion Protection: N/A

Piping Details: N/A

Oil Fill and Transfer Details: Small amounts of oil are added to this reservoir on an infrequent and as-needed basis.

Secondary Containment Drainage Procedure: Not applicable. Elevator unit is located within a building.

Spill Route Details: A leak from the hydraulic reservoir would discharge to the secondary containment of the tank. Leaks from the piston would be contained within the "car pit".

Maximum Refueling/Vacuum Truck Capacity: N/A

Container: K6-0696-4

Container Type: Elevator (Rm. 1133)

Container Capacity: 125 Gallons

Materials Stored: Hydraulic oil

Fail Safe Features: N/A

Kennedy Space Center Site-Specific SPCC Plan Data

Construction Details: Double walled steel tank

Date Installed:

Integrity Test Method: Visual inspections are conducted on a quarterly basis in accordance with Section 4.3 of the SPCC Plan.

Secondary Containment Details: Elevator located within building

Secondary Containment Volume: >125 Gallons

Piping Type: N/A

Corrosion Protection: N/A

Piping Details: N/A

Oil Fill and Transfer Details: Small amounts of oil are added to this reservoir on an infrequent and as-needed basis.

Secondary Containment Drainage Procedure: Not applicable. Elevator unit is located within a building.

Spill Route Details: A leak from the hydraulic reservoir would be contained by the secondary containment.

Maximum Refueling/Vacuum Truck Capacity: N/A

Container: K6-0696-5

Container Type: Elevator (SSME Lowbay)

Container Capacity: 170 Gallons

Materials Stored: Hydraulic oil

Fail Safe Features: N/A

Construction Details: Single walled steel tank

Date Installed:

Integrity Test Method: Visual inspections are conducted on a quarterly basis in accordance with Section 4.3 of the SPCC Plan.

Secondary Containment Details: Elevator located within building

Secondary Containment Volume: >170 Gallons

Piping Type: N/A

Corrosion Protection: N/A

Piping Details: N/A

Oil Fill and Transfer Details: Small amounts of oil are added to this reservoir on an infrequent and as-needed basis.

Kennedy Space Center Site-Specific SPCC Plan Data

Secondary Containment Drainage Procedure: Not applicable. Elevator unit is located within a building.

Spill Route Details: A leak in the hydraulic oil reservoir would flow out onto the concrete floor surface and be contained within the building. There are no floor drains in the immediate vicinity.

Maximum Refueling/Vacuum Truck Capacity: N/A

Container: K6-0696-6

Container Type: Aboveground Tank

Container Capacity: 550 Gallons

Materials Stored: Compressor condensate

Fail Safe Features: Call for pump out at 75% full
Visual Level indication (manually stick tank)

Construction Details: Double walled polyethylene tank

Date Installed: N/A

Integrity Test Method: Visual inspections are conducted on a monthly basis in accordance with Section 4.3 of the SPCC Plan.

Annual walk around inspections are conducted in accordance with Section 4.3 of the SPCC Plan.

Secondary Containment Details: Double walled tank

Secondary Containment Volume: >550 Gallons

Piping Type: Aboveground

Corrosion Protection: N/A

Piping Details: Single walled steel

Oil Fill and Transfer Details: Compressor blowdown water generated in Building K6-0696 is directed to this polyethylene tank. The tank is pumped out as needed.

Secondary Containment Drainage Procedure: Any liquid accumulated in the floor of the secondary containment is inspected for oil odor or sheen.

If deemed to be free of oil, accumulated liquid is discharged to the ground surface.

If determined to be contaminated with oil, accumulated liquid is containerized and picked up by the KSC used oil/oily wastewater contractor for recycling and/or disposal in accordance with applicable regulations.

The date and time of drainage and presence or absence of oil is documented in the Secondary Containment and Drainage Log, or similar form provided in Table 4-5 of the SPCC Plan

Kennedy Space Center Site-Specific SPCC Plan Data

Spill Route Details: Overflows will percolate to grade.

Maximum Refueling/Vacuum Truck Capacity: 2000 gallons

Container: K6-0696-7

Container Type: Hydraulic reservoir (S70-0805-00-001)

Container Capacity: 100 Gallons

Materials Stored: Hydraulic oil

Fail Safe Features: None

Construction Details: Single walled steel tank

Date Installed:

Integrity Test Method: Visual inspections are conducted on a quarterly basis in accordance with Section 4.3 of the SPCC Plan.

Secondary Containment Details: N/A

Secondary Containment Volume: N/A

Piping Type: N/A

Corrosion Protection: N/A

Piping Details: N/A

Oil Fill and Transfer Details: Small amounts of oil are added to this reservoir on an infrequent and as-needed basis.

Secondary Containment Drainage Procedure: N/A

Spill Route Details: A spill or leak in the hydraulic reservoir would flow onto the concrete surface and be contained within the building.

Maximum Refueling/Vacuum Truck Capacity: N/A

Container: K6-0696-8

Container Type: Hydraulic reservoir (S70-0805-00-002)

Container Capacity: 100 Gallons

Materials Stored: Hydraulic fluid

Fail Safe Features: None

Construction Details: Single walled steel tank

Date Installed:

Integrity Test Method: Visual inspections are conducted on a quarterly basis in accordance

Kennedy Space Center Site-Specific SPCC Plan Data

with Section 4.3 of the SPCC Plan.

Secondary Containment Details: N/A

Secondary Containment Volume: N/A

Piping Type: N/A

Corrosion Protection: N/A

Piping Details: N/A

Oil Fill and Transfer Details: Small amounts are transferred to the reservoir on an infrequent and as-needed basis.

**Secondary Containment
Drainage Procedure:** N/A

Spill Route Details: A spill or leak in the hydraulic reservoir would flow onto the concrete surface and be contained within the building.

**Maximum Refueling/Vacuum Truck
Capacity:** N/A

Container: K6-0696-9

Container Type: Process Equipment (S70-1204-01-002)

Container Capacity: 100 Gallons

Materials Stored: Hydraulic oil

Fail Safe Features: None provided

Construction Details: Single walled steel tank

Date Installed: N/A

Integrity Test Method: Visual inspections are conducted on a quarterly basis in accordance with Section 4.3 of the SPCC Plan.

Secondary Containment Details: Metal containment tray

Secondary Containment Volume: 137 Gallons

Piping Type: N/A

Corrosion Protection: N/A

Piping Details: N/A

Oil Fill and Transfer Details: Small amounts of hydraulic oil are added to this tank on an as-needed basis by USA facility personnel.

**Secondary Containment
Drainage Procedure:** Any liquid accumulated on the floor of the secondary containment is removed using absorbent materials, containerized, and properly disposed.

Kennedy Space Center Site-Specific SPCC Plan Data

Spill Route Details: A leak from the tank would be contained within the secondary containment tray located beneath the tank. Overflows from the tray would flow out onto the concrete floor of the building and travel toward a blind sump located in the immediate vicinity. Spilled oil would not exit the building.

Maximum Refueling/Vacuum Truck Capacity: 2500 gallons

Container: K6-0696-10

Container Type: Process Equipment (S70-1204-01-003)

Container Capacity: 100 Gallons

Materials Stored: Hydraulic oil

Fail Safe Features: None provided

Construction Details: Single walled steel tank

Date Installed: N/A

Integrity Test Method: Visual inspections are conducted on a quarterly basis in accordance with Section 4.3 of the SPCC Plan.

Secondary Containment Details: Metal containment tray

Secondary Containment Volume: 137 Gallons

Piping Type: N/A

Corrosion Protection: N/A

Piping Details: N/A

Oil Fill and Transfer Details: Small amounts of hydraulic oil are added to this tank on an as-needed basis by USA facility personnel.

Secondary Containment Drainage Procedure: Any liquid accumulated on the floor of the secondary containment is removed using absorbent materials, containerized, and properly disposed.

Spill Route Details: A leak from this tank would be contained within the secondary containment tray beneath the tank. Overflows would flow out onto the concrete floor of the building towards a blind sump located in the immediate vicinity. Spilled oil would not exit the building.

Maximum Refueling/Vacuum Truck Capacity: 2500 gallons

Container: K6-0696-11

Container Type: Process Equipment (S70-1204-01-001)

Container Capacity: 100 Gallons

Kennedy Space Center Site-Specific SPCC Plan Data

Materials Stored: Hydraulic oil

Fail Safe Features: None provided

Construction Details: Single walled steel tank

Date Installed: N/A

Integrity Test Method: Visual inspections are conducted on a quarterly basis in accordance with Section 4.3 of the SPCC Plan.

Secondary Containment Details: Metal containment tray

Secondary Containment Volume: 137 Gallons

Piping Type: N/A

Corrosion Protection: N/A

Piping Details: N/A

Oil Fill and Transfer Details: Small amounts of hydraulic oil are added to this tank on an as-needed basis by USA facility personnel.

Secondary Containment Drainage Procedure: Any liquid accumulated on the floor of the secondary containment is removed using absorbent materials, containerized, and properly disposed.

Spill Route Details: A leak from this tank would be contained within the secondary containment tray located beneath the tank. Overflows would flow onto the concrete floor of the building and travel towards a blind sump located in the vicinity. Spilled oil would not exit the building.

Maximum Refueling/Vacuum Truck Capacity: 2500 gallons

Container: K6-0696-12

Container Type: Aboveground Tank (Rm 1080)

Container Capacity: 60 Gallons

Materials Stored: Hydraulic fluid

Fail Safe Features: Direct vision gauge

Construction Details: Single walled steel tank

Date Installed:

Integrity Test Method: Visual inspections are conducted on a quarterly basis in accordance with Section 4.3 of the SPCC Plan.

Secondary Containment Details: Concrete basin under equipment

Secondary Containment Volume: 138 Gallons

Piping Type: Aboveground

Kennedy Space Center Site-Specific SPCC Plan Data

Corrosion Protection: N/A

Piping Details: Single walled stainless steel

Oil Fill and Transfer Details: Hydraulic oil is added to this tank on an as-needed basis from 55 gallon drums.

Secondary Containment Drainage Procedure: Any liquid accumulated in the containment is inspected for the presence of a sheen or odor.

If deemed to be free of oil, accumulated liquid is discharged to the ground surface.

If determined to be contaminated with oil, accumulated liquid is containerized and picked up by the KSC used oil/oily wastewater contractor for recycling and/or disposal in accordance with applicable regulations.

The date and time of drainage and presence or absence of oil is documented in the Secondary Containment and Drainage Log, or similar form provided in Table 4-5 of the SPCC Plan

Spill Route Details: A spill or leak from this tank would flow out onto the floor of the containment. Spills during oil transfer operations or from the piping network would be contained within the building.

Maximum Refueling/Vacuum Truck Capacity: 2000 gallons

3.0 SITE-SPECIFIC SPILL PREVENTION

The following site specific spill prevention measures are utilized at this building:

1. Secondary containment is provided for all tanks storing oil.
2. All personnel with oil handling responsibilities at the facility will receive training in the management and handling of oil.
3. Containers are kept closed except when in use.
4. Formal documented inspections are conducted as described in Section 4.0 of the SPCC Plan.

4.0 SITE-SPECIFIC SPILL RESPONSE PROCEDURES

The following site specific spill response procedures are implemented at this building:

1. Personnel safety takes precedence over all other considerations. Upon discovering a spill, determine if spill is an emergency to Safety, Health, or Environment. If yes, secure the site and initiate site evacuation.
2. Restrict all sources of ignition when flammable substances are involved.

If spill is determined to be an Emergency. Then:

1. Report an "emergency spill" via 911 (867-7911 from a cellular phone on KSC, or 853-0911 on CCAFS), radio, OIS, or fire alarm pull station.
2. Notify Supervisor.
3. Fire, Security, EHS, and HazMat Team will be dispatched, as required.

Kennedy Space Center Site-Specific SPCC Plan Data

4.0 SITE-SPECIFIC SPILL RESPONSE PROCEDURES

If spill is determined to be “non-emergency” and within facility’s capability, call 911 (867-7911 from a cellular phone on KSC, or 853-0911 on CCAFS) and report a “non-emergency spill”.

Then:

1. Notify supervisor or facility manager who will follow the procedures outlined below.
2. Attempt to identify the type of oil that is spilled (gasoline, diesel, transmission fluid, etc.). Refer to MSDSs to obtain detailed information on properties of the spilled material.
3. If safe, attempt to limit or stop the flow of oil from failed tanks, equipment, or transfer operations.
4. Contain spill near the source area, if possible, to limit the area impacted by the spill incident.
5. Use absorbents of other material to clean up the spill. Request a Spill Cleanup Team if additional assistance is required.
6. Promptly dispose of any waste derived from the spill cleanup in accordance with KNPR 8500.1 KSC Environmental Requirements

5.0 SPILL RESPONSE MATERIALS

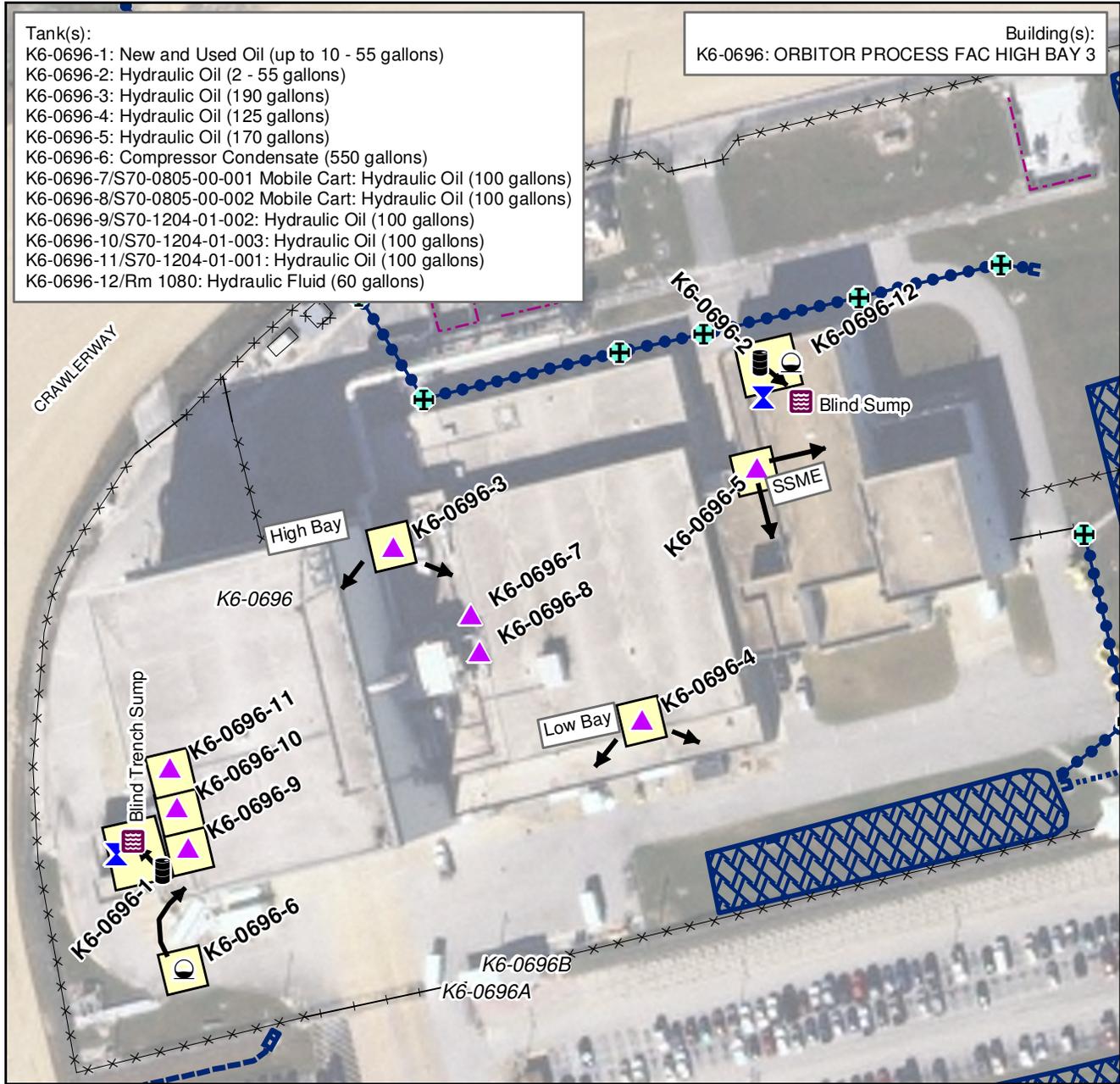
The following spill response materials are located at this building

Spill Kit: Adjacent to storage area K6-0696-1

Small Spill Kit: Adjacent to storage area K6-0696-2

Absorbent Material: Within elevator rooms

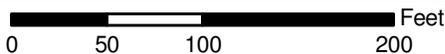
Kennedy Space Center Site-Specific SPCC Plan Data



Tank(s):
 K6-0696-1: New and Used Oil (up to 10 - 55 gallons)
 K6-0696-2: Hydraulic Oil (2 - 55 gallons)
 K6-0696-3: Hydraulic Oil (190 gallons)
 K6-0696-4: Hydraulic Oil (125 gallons)
 K6-0696-5: Hydraulic Oil (170 gallons)
 K6-0696-6: Compressor Condensate (550 gallons)
 K6-0696-7/S70-0805-00-001 Mobile Cart: Hydraulic Oil (100 gallons)
 K6-0696-8/S70-0805-00-002 Mobile Cart: Hydraulic Oil (100 gallons)
 K6-0696-9/S70-1204-01-002: Hydraulic Oil (100 gallons)
 K6-0696-10/S70-1204-01-003: Hydraulic Oil (100 gallons)
 K6-0696-11/S70-1204-01-001: Hydraulic Oil (100 gallons)
 K6-0696-12/Rm 1080: Hydraulic Fluid (60 gallons)

Building(s):
 K6-0696: ORBITOR PROCESS FAC HIGH BAY 3

Kennedy Space Center SPCC Plan Detail Map



MAP #19
 Dec 21, 2010

Kennedy Space Center Site-Specific SPCC Plan Data

1.0 IDENTIFYING DATA

Building/Site Number: K6-1094

Description: Oil storage associated with this facility includes hydraulic oil associated with building elevators.

Building/Site Name: PROCESSING CONTROL CENTER

Operator: SPOC

Environmental Contact: 861-5762

2.0 DESCRIPTION OF OIL STORAGE

Container: K6-1094-1

Container Type: Elevator (Rm. 1002)

Container Capacity: 183 Gallons

Materials Stored: Hydraulic oil

Fail Safe Features: N/A

Construction Details: Single walled steel tank

Date Installed:

Integrity Test Method: Visual inspections are conducted on a quarterly basis in accordance with Section 4.3 of the SPCC Plan.

Secondary Containment Details: Elevator located within building

Secondary Containment Volume: >183 Gallons

Piping Type: N/A

Corrosion Protection: N/A

Piping Details: N/A

Oil Fill and Transfer Details: Small amounts of oil are added to this reservoir on an infrequent and as-needed basis.

Secondary Containment Drainage Procedure: Not applicable. Elevator unit is located within a building.

Spill Route Details: A leak in the hydraulic oil reservoir would flow out onto the uncoated concrete floor surface of the room, and potentially onto the tile floor in the building lobby. There are no floor drains in the vicinity. A piston leak would flow into the elevator pit.

Maximum Refueling/Vacuum Truck Capacity: N/A

Container: K6-1094-2

Kennedy Space Center Site-Specific SPCC Plan Data

Container Type: Elevator (Rm. 1101)

Container Capacity: 287 Gallons

Materials Stored: Hydraulic oil

Fail Safe Features: N/A

Construction Details: Single walled steel tank

Date Installed:

Integrity Test Method: Visual inspections are conducted on a quarterly basis in accordance with Section 4.3 of the SPCC Plan.

Secondary Containment Details: N/A

Secondary Containment Volume: N/A

Piping Type: N/A

Corrosion Protection: N/A

Piping Details: N/A

Oil Fill and Transfer Details: Small amounts of oil are added to this reservoir on an infrequent and as-needed basis.

**Secondary Containment
Drainage Procedure:** N/A

Spill Route Details: A leak in the hydraulic oil reservoir would flow out onto the uncoated concrete floor surface of the room. Larger spills could potentially exit the elevator room and flow outside the building. A piston leak would flow into a sump within a concrete eleva

**Maximum Refueling/Vacuum Truck
Capacity:** N/A

Container: K6-1094-3

Container Type: 55-Gallon Drum (Rm 1103)

Container Capacity: 55 Gallons

Materials Stored: Compressor condensate

Fail Safe Features: None

Construction Details: Stainless steel drum

Date Installed: N/A

Integrity Test Method: Visual inspections are conducted on a monthly basis in accordance with Section 4.3 of the SPCC Plan.

55-gallon drums used to store oil are replaced within 10 years and/or when they show signs of visual degradation.

Kennedy Space Center Site-Specific SPCC Plan Data

Secondary Containment Details: Secondary containment tub

Secondary Containment Volume: >55 Gallons

Piping Type: Aboveground

Corrosion Protection: N/A

Piping Details: Single walled steel

Oil Fill and Transfer Details: Compressor condensate is automatically discharged to this drum by the operation of an air compressor. This drum is emptied on an as-needed basis by JBOSC.

Secondary Containment Drainage Procedure: Any liquid accumulated in the floor of the containment is inspected for the presence of a sheen or odor.

If deemed to be free of oil, accumulated liquid is discharged to the ground surface.

If determined to be contaminated with oil, accumulated liquid is containerized and picked up by the KSC used oil/oily wastewater contractor for recycling and/or disposal in accordance with applicable regulations.

The date and time of drainage and presence or absence of oil is documented in the Secondary Containment and Drainage Log, or similar form provided in Table 4-5 of the SPCC Plan

Spill Route Details: Overflows from secondary containment flow into a floor drain. The floor drain discharges to sanitary sewer.

Maximum Refueling/Vacuum Truck Capacity: N/A

3.0 SITE-SPECIFIC SPILL PREVENTION

The following site specific spill prevention measures are utilized at this building:

1. All personnel with oil handling responsibilities at the facility will receive training in the management and handling of oil.
2. Formal documented inspections are conducted as described in Section 4.0 of the SPCC Plan.

4.0 SITE-SPECIFIC SPILL RESPONSE PROCEDURES

The following site specific spill response procedures are implemented at this building:

1. Personnel safety takes precedence over all other considerations. Upon discovering a spill, determine if spill is an emergency to Safety, Health, or Environment. If yes, secure the site and initiate site evacuation.
2. Restrict all sources of ignition when flammable substances are involved.

If spill is determined to be an Emergency. Then:

1. Report an "emergency spill" via 911 (867-7911 from a cellular phone on KSC, or 853-0911 on CCAFS), radio, OIS, or fire alarm pull station.
2. Notify Supervisor.

Kennedy Space Center Site-Specific SPCC Plan Data

4.0 SITE-SPECIFIC SPILL RESPONSE PROCEDURES

If spill is determined to be an Emergency. Then:

3. Fire, Security, EHS, and HazMat Team will be dispatched, as required.

If spill is determined to be “non-emergency” and within facility’s capability, call 911 (867-7911 from a cellular phone on KSC, or 853-0911 on CCAFS) and report a “non-emergency spill”.

Then:

1. Notify supervisor or facility manager who will follow the procedures outlined below.
2. Attempt to identify the type of oil that is spilled (gasoline, diesel, transmission fluid, etc.). Refer to MSDSs to obtain detailed information on properties of the spilled material.
3. If safe, attempt to limit or stop the flow of oil from failed tanks, equipment, or transfer operations.
4. Contain spill near the source area, if possible, to limit the area impacted by the spill incident.
5. Place spill containment devices between the spill and the nearest storm drainage channel.
6. Use absorbents of other material to clean up the spill. Request a Spill Cleanup Team if additional assistance is required.
7. Promptly dispose of any waste derived from the spill cleanup in accordance with KNPR 8500.1 KSC Environmental Requirements

5.0 SPILL RESPONSE MATERIALS

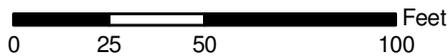
The following spill response materials are located at this building

No spill response materials were identified for this location.

Kennedy Space Center Site-Specific SPCC Plan Data



Kennedy Space Center SPCC Plan Detail Map



MAP #35
Dec 20, 2010

KSC Pollution Incident Reporting and Notification

Date of Incident 04/29/2010	Time of Incident 02:30 AM	Reported By Jill Vogel	Organization/Company Name USA	Phone 861-5762
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Substance / Material Involved City of Cocoa Water	Amount Released (<i>Estimated</i>) < less than 10 gallons per hour
------------------------------------------------------	-------------------------------------------------------------------------

Location of Incident (*Include Facility Number*)
Utility Road between the PCC and the Utility Annex

Environmental Impact (*Check all that apply*) (*If Other, please explain*)

<input type="checkbox"/> Stormwater Ditch	<input type="checkbox"/> Paved Area	<input type="checkbox"/> Air Emission
<input type="checkbox"/> Stormwater Sewer	<input checked="" type="checkbox"/> Grass/Soil	<input type="checkbox"/> Direct Discharge to Surface Water body
<input type="checkbox"/> Domestic Sewer	<input type="checkbox"/> Secondary Containment	<input type="checkbox"/> Abandoned Waste/Materials
<input type="checkbox"/> Other (Explain below)		

Description of Incident (*Explain*)
The post indicator valve IPV-18-1 leaked potable water at a rate of less than 10 gallons per minute. A dig permit has been obtained and the valve will be repaired. Until repairs tomorrow morning the release is being monitored

Cause of Incident if Known (*Check all that apply and provide details below*)

Equipment Failure Operator Error Transportation Accident Unknown Other

Action Taken to Contain Incident and Clean-up (*Explain*)
No clean up. A dig permit has been obtained and the valve will be repaired. Until repairs tomorrow morning the release is being monitored

Notifications Made
Call: 911 NASA Environmental Spill Line (867-9005) Other (Explain below)

Jill Vogel - Environmental Mangement 861-5762
Keith Wey - Water Department second line manager

Was the spill cleaned-up or contained within 24 hours? No Cleaned-up By N/A

DO NOT WRITE BELOW THIS LINE - NASA ENVIRONMENTAL OFFICE USE ONLY

Material Identified As City of Cocoa Water Unable to Identify

Clean-up By _____ No Clean-up Required Clean-up Required

Follow-up Assigned to _____ No Follow-up Required

Notifications: FDEP Brevard County SJRWMD NRC SWP NASA HQ RQ

Comments/Followup

Closed ✓	Incident Reviewed By (Name/Organization) Erica Williams/IHA-200	Date 06/03/2010
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KSC Pollution Incident Reporting and Notification

Date of Incident 05/06/2010	Time of Incident 09:44 AM	Reported By Antonio Bologna	Organization/Company Name FSEU OM&E	Phone 867-3042
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Substance / Material Involved Wastewater	Amount Released (<i>Estimated</i>) Less than 100 gallons
---------------------------------------------	---------------------------------------------------------------

Location of Incident (*Include Facility Number*)
K6-0696D, Lift Station 4A4

Environmental Impact (*Check all that apply*) (*If Other, please explain*)

<input type="checkbox"/> Stormwater Ditch	<input type="checkbox"/> Paved Area	<input type="checkbox"/> Air Emission
<input type="checkbox"/> Stormwater Sewer	<input checked="" type="checkbox"/> Grass/Soil	<input type="checkbox"/> Direct Discharge to Surface Water body
<input type="checkbox"/> Domestic Sewer	<input type="checkbox"/> Secondary Containment	<input type="checkbox"/> Abandoned Waste/Materials
<input type="checkbox"/> Other (Explain below)		

Description of Incident (*Explain*)
While being operated with back-up power to support an electrical outage, the pumps failed to keep up with flow for an unknown reason. An estimated volume of less than 100 gallons of raw sewage was discharged to grade.

Cause of Incident if Known (*Check all that apply and provide details below*)

Equipment Failure Operator Error Transportation Accident Unknown Other

The pumps for lift station 4A4 failed to keep up with flow for an unknown reason.

Action Taken to Contain Incident and Clean-up (*Explain*)
USA personnel hooked up a generator. When Water & Waste personnel arrived, the lift station was operating on generator power; all pumps were operating and wet well was at normal level. Liquid chlorine solution was applied to the spill area.

Notifications Made
Call: 911 NASA Environmental Spill Line (867-9005) Other (Explain below)

A malfunction report for this incident was submitted to FDEP by ISC Water & Waste on 5/7/10.

Was the spill cleaned-up or contained within 24 hours? Yes Cleaned-up By ISC Water & Waste

DO NOT WRITE BELOW THIS LINE - NASA ENVIRONMENTAL OFFICE USE ONLY

Material Identified As Wastewater Unable to Identify

Clean-up By ISC Water & Waste No Clean-up Required Clean-up Required

Follow-up Assigned to _____ No Follow-up Required

Notifications: FDEP Brevard County SJRWMD NRC SWP NASA HQ RQ

Comments/Followup

Closed ✓	Incident Reviewed By (Name/Organization) Erica Williams/IHA-200	Date 06/03/2010
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KSC Pollution Incident Reporting and Notification

Date of Incident	Time of Incident	Reported By	Orgn	Phone
07-16-2003	09:45 AM	Mike Hobson	USA	7-9979

Substance / Material Involved	Quantity / Amount (Estimated)
Oily wastewater. Effluent from oil-water separator (air compressor condensate)	Unkown. Visual evidence of stained soil.

Location of Incident (Explain)
 OPF3 "Atrium" area adjacent to ECLSS. Stained soil located beneath discharge pipe from oil-water separator.

Pollutant Effects

<input type="checkbox"/> Personal Injury/First Aid	<input type="checkbox"/> Domestic Sewer	<input type="checkbox"/> Secondary Containment
<input type="checkbox"/> Stormwater Ditch	<input type="checkbox"/> Paved Area	<input type="checkbox"/> Waterway Affected
<input type="checkbox"/> Stormwater Sewer	<input type="checkbox"/> Grass Area	<input type="checkbox"/> Air Emission
<input checked="" type="checkbox"/> Other (Explain)		

Soil.

Description of Incident (Explain)
 Mike Hobson responded to a report of stained soil adjacent to an oil-water separator. It was observed that soil was stained beneath the aqueous phase discharge pipe from the oil-water separator.

Cause of Incident if Known (Explain)
 Root cause and corrective action are being investigated and tracked per ESHATS #336-03.

Action to Contain Incident and Clean-up (Explain)
 It is planned to begin containerization of the effluent from the oil-water separator.

Notifications Taken

Call: 911 Support Operations (853-5211) Environmental Program Office (867-4556) Environmental Health (867-7138)

Contamination/Removal by: SGS/CHS Spill Team Clean-up within 24 Hours?

Other: (Explain)

DO NOT WRITE BELOW THIS LINE - OFFICE USE ONLY

1. <input checked="" type="checkbox"/> Source Identified As <u>Oil (petroleum contaminated soil)</u>	<input type="checkbox"/> Unable to Identify Source
2. <input checked="" type="checkbox"/> Clean-up By <u>SGS/CHS Spill Team</u>	<input type="checkbox"/> No Clean-up Required <input checked="" type="checkbox"/> Clean-up 24 Required
3. <input checked="" type="checkbox"/> Follow-up Assigned to <u>Mike Hobson, USA Environmental</u>	<input type="checkbox"/> Emergency <input checked="" type="checkbox"/> Non-Emergency

Notifications: FDEP Brevard County NRC FSWP NASA HQ

Comments
 Regulator notification not required. USA Environmental Office will work with USA Phneumatics Shop to ensure proper management of oi-water seperators and compressor condensate.

Closed	Incident Closed By (Name/Organization)	Date
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KSC Pollution Incident Reporting and Notification

Date of Incident	Time of Incident	Reported By	Orgn	Phone
10-11-2007	10:30 AM	SGS Duty Office	USA/C. Venuto	867-9965

Substance / Material Involved	Quantity / Amount (Estimated)
Domestic Wastewater	300 Gallons

Location of Incident (Explain)
 Lift Station 4A4, OPF #3
 Spill# 2.01E+08

Pollutant Effects

<input type="checkbox"/> Personal Injury/First Aid	<input type="checkbox"/> Domestic Sewer	<input type="checkbox"/> Secondary Containment
<input type="checkbox"/> Stormwater Ditch	<input checked="" type="checkbox"/> Paved Area	<input type="checkbox"/> Waterway Affected
<input type="checkbox"/> Stormwater Sewer	<input checked="" type="checkbox"/> Grass Area	<input type="checkbox"/> Air Emission
<input type="checkbox"/> Other (Explain)		

Description of Incident (Explain)
 Outage of Lift Station 4A4 was extended without proper notification resulting in an overflow.

Cause of Incident if Known (Explain)
 Overfill

Action to Contain Incident and Clean-up (Explain)
 Sewage was pumped using pumper truck to stop the overflow and recover excess spill adjacent to Lift Station. A portable generator was set up to operate the Lift Station during the remainder of the outage. Approximately 300 gallons of sewage were soaked into the ground around the area. The area was treated with chlorine solution for disinfection.

Notifications Taken

Call: 911 Support Operations (853-5211) Environmental Program Office (867-4556) Environmental Health (867-7138)

Contamination/Removal by: SGS WW Clean-up within 24 Hours?

Other: (Explain)

DO NOT WRITE BELOW THIS LINE - OFFICE USE ONLY

1. Source Identified As Domestic Sewage Unable to Identify Source

2. Clean-up By SGS WW No Clean-up Required Clean-up 24 Required

3. Follow-up Assigned to _____ Emergency Non-Emergency

Notifications: FDEP Brevard County NRC FSWP NASA HQ

Comments
 The appropriate notifications to FDEP have been made by SGS WW/Ellen Feeney.

Closed ✓	Incident Closed By (Name/Organization) P. Lynn/TA-C3	Date 10-16-2007
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KSC Pollution Incident Reporting and Notification

Date of Incident	Time of Incident	Reported By	Orgn	Phone
11-12-2007	12:15 PM	Jill Vogel	USA	861-5762

Substance / Material Involved	Quantity / Amount (Estimated)
antifreeze and rusty water	3 gallons

Location of Incident (Explain)
OPF High Bay 3 west parking lot

Pollutant Effects

<input type="checkbox"/> Personal Injury/First Aid	<input type="checkbox"/> Domestic Sewer	<input type="checkbox"/> Secondary Containment
<input type="checkbox"/> Stormwater Ditch	<input checked="" type="checkbox"/> Paved Area	<input type="checkbox"/> Waterway Affected
<input type="checkbox"/> Stormwater Sewer	<input checked="" type="checkbox"/> Grass Area	<input type="checkbox"/> Air Emission
<input type="checkbox"/> Other (Explain)		

Description of Incident (Explain)
POV radiator leaked all contents to pavement and grass

Cause of Incident if Known (Explain)
Rusted radiator plug

Action to Contain Incident and Clean-up (Explain)
Absorbent material spread onto pavement. Grass and soil removed. All containerized and removed by SGS spill team

Notifications Taken

Call: 911 Support Operations (853-5211) Environmental Program Office (867-4556) Environmental Health (867-7138)

Contamination/Removal by: SGS spill team Clean-up within 24 Hours?

Other: (Explain)
USA Environmental Management - Jill Vogel 561-5762

DO NOT WRITE BELOW THIS LINE - OFFICE USE ONLY

1. Source Identified As Anti- freeze Unable to Identify Source

2. Clean-up By JBOSC No Clean-up Required Clean-up 24 Required

3. Follow-up Assigned to NA Emergency Non-Emergency

Notifications: FDEP Brevard County NRC FSWP NASA HQ

Comments
NA

Closed ✓	Incident Closed By (Name/Organization) Rodney Brown	Date 12-19-2007
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KSC Pollution Incident Reporting and Notification

Date of Incident	Time of Incident	Reported By	Orgn	Phone
01-24-2008	06:30 PM	Jill Vogel	USA	861-5762

Substance / Material Involved	Quantity / Amount (Estimated)
diesel fuel	20 gallons

Location of Incident (Explain)
 The south side of the road between OPF 3 and the north side of the VAB just prior to the corner

Pollutant Effects

<input type="checkbox"/> Personal Injury/First Aid	<input type="checkbox"/> Domestic Sewer	<input type="checkbox"/> Secondary Containment
<input type="checkbox"/> Stormwater Ditch	<input checked="" type="checkbox"/> Paved Area	<input type="checkbox"/> Waterway Affected
<input type="checkbox"/> Stormwater Sewer	<input checked="" type="checkbox"/> Grass Area	<input type="checkbox"/> Air Emission
<input type="checkbox"/> Other (Explain)		

Description of Incident (Explain)
 broken sight glass on heavy equipment crane #202-017 caused a spill from the fuel tank.

Cause of Incident if Known (Explain)
 equipment failure (broken sight glass)

Action to Contain Incident and Clean-up (Explain)
 Fire responded and worked to temporarily stop the leak, covered the roadway and grass area with absorbent litter. Heavy Equipment moved the crane to the Heavy Equipment yard. JBOSC removed the soil, containerized it and disposed of it with like waste.

Notifications Taken

Call: 911 Support Operations (853-5211) Environmental Program Office (867-4556) Environmental Health (867-7138)

Contamination/Removal by: JBOSC Clean-up within 24 Hours?

Other: (Explain)
 Management: Tom Hackett 861-6311

Root cause and corrective/preventive action plan requested by Environmental Mgt.

DO NOT WRITE BELOW THIS LINE - OFFICE USE ONLY

1. Source Identified As diesel fuel Unable to Identify Source

2. Clean-up By JBOSC No Clean-up Required Clean-up 24 Required

3. Follow-up Assigned to N/A Emergency Non-Emergency

Notifications: FDEP Brevard County NRC FSWP NASA HQ

Comments

Closed ✓	Incident Closed By (Name/Organization) Rodney Brown	Date 04-03-2008
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KSC Pollution Incident Reporting and Notification

Date of Incident	Time of Incident	Reported By	Orgn	Phone
05-22-2008	09:00 AM	Jill Vogel	USA	861-5762

Substance / Material Involved	Quantity / Amount (Estimated)
Diesel Fuel	1 quart

Location of Incident (Explain)
 OPF 3 - Space Shuttle Main Engine Processing Facility (SSMEPF) Hyster Bay (K6-696)

Pollutant Effects

<input type="checkbox"/> Personal Injury/First Aid	<input type="checkbox"/> Domestic Sewer	<input type="checkbox"/> Secondary Containment
<input type="checkbox"/> Stormwater Ditch	<input type="checkbox"/> Paved Area	<input type="checkbox"/> Waterway Affected
<input type="checkbox"/> Stormwater Sewer	<input type="checkbox"/> Grass Area	<input type="checkbox"/> Air Emission
<input checked="" type="checkbox"/> Other (Explain)		

Leaked onto the SSMEPF epoxy sealed floor

Description of Incident (Explain)
 A rubber hose running from the fuel tank to the engine of the SSME Horizontal Installer (Hyster Fork Truck) had a small hole in it and this resulted in the fuel leaking onto the SSMEPF floor. It was released onto the epoxy sealed concrete floor in the SSMEPF Hyster Bay.

Cause of Incident if Known (Explain)
 A small hole in the rubber hose

Action to Contain Incident and Clean-up (Explain)
 The PWR technicians used Pig Mats and disposed of the waste in a ND0003 (petroleum solids) waste stream drum located in the SSMEPF SAA. The hose was immediately repaired.

Notifications Taken

Call: 911 Support Operations (853-5211) Environmental Program Office (867-4556) Environmental Health (867-7138)

Contamination/Removal by: Rocketdyne technicians Clean-up within 24 Hours?

Other: (Explain)
 Management Susan Johnson 861-4215
 Environmental Jill Vogel 861-5762
 Safety Bubba Howard 867-3532

DO NOT WRITE BELOW THIS LINE - OFFICE USE ONLY

1. Source Identified As Diesel Fuel Unable to Identify Source

2. Clean-up By USA No Clean-up Required Clean-up 24 Required

3. Follow-up Assigned to _____ Emergency Non-Emergency

Notifications: FDEP Brevard County NRC FSWP NASA HQ

Comments
 Hose replaced.

Closed ✓	Incident Closed By (Name/Organization) Rodney Brown	Date 07-15-2008
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KSC Pollution Incident Reporting and Notification

Date of Incident	Time of Incident	Reported By	Orgn	Phone
06-24-2008	02:00 PM	Jill Vogel	USA	861-5762

Substance / Material Involved	Quantity / Amount (Estimated)
Freon 124	190 lbs over 30 days (6.3 lbs/day)

Location of Incident (Explain)
 OPF 3 High Bay, S70-1203-00-001 System

Pollutant Effects

<input type="checkbox"/> Personal Injury/First Aid	<input type="checkbox"/> Domestic Sewer	<input type="checkbox"/> Secondary Containment
<input type="checkbox"/> Stormwater Ditch	<input type="checkbox"/> Paved Area	<input type="checkbox"/> Waterway Affected
<input type="checkbox"/> Stormwater Sewer	<input type="checkbox"/> Grass Area	<input checked="" type="checkbox"/> Air Emission
<input type="checkbox"/> Other (Explain)		

Description of Incident (Explain)
 A trending dip in OPF3 GCU reservoir quantities was noticed and continued to drop even after vehicle connect. Data retrievals showed freon has been lost since top-off during the open bay at about 1 gallon every 2 days. During vehicle power ups and the freon starts circulating, the quantity lost increases to roughly 1.5 gallons/day on average.

Cause of Incident if Known (Explain)
 Probable cause of R-124 leak: Leaking Quick Disconnect (QD) at Flight/Ground interface of OV-103. Location: In OPF-3 High Bay at Platform 11L.

Action to Contain Incident and Clean-up (Explain)
 See attachment for corrective action

Notifications Taken

Call: 911 Support Operations (853-5211) Environmental Program Office (867-4556) Environmental Health (867-7138)

Contamination/Removal by: N/A Clean-up within 24 Hours?

Other: (Explain)
 Doug Hercules 861-0317

DO NOT WRITE BELOW THIS LINE - OFFICE USE ONLY

1. Source Identified As Freon 124 Unable to Identify Source

2. Clean-up By N/A No Clean-up Required Clean-up 24 Required

3. Follow-up Assigned to N/A Emergency Non-Emergency

Notifications: FDEP Brevard County NRC FSWP NASA HQ

Comments
 Air Emission - Doug Durham

Closed ✓	Incident Closed By (Name/Organization) Rodney Brown	Date 07-15-2008
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KSC Pollution Incident Reporting and Notification

Date of Incident 04/16/2010	Time of Incident 03:00 PM	Reported By Jeff Lindgren	Organization/Company Name United Space Alliance	Phone 867-8627
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Substance / Material Involved R-124	Amount Released (Estimated) 756 lbs
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Location of Incident (Include Facility Number)
OPF HB-3

Environmental Impact (Check all that apply) (If Other, please explain)

<input type="checkbox"/> Stormwater Ditch	<input type="checkbox"/> Paved Area	<input checked="" type="checkbox"/> Air Emission
<input type="checkbox"/> Stormwater Sewer	<input type="checkbox"/> Grass/Soil	<input type="checkbox"/> Direct Discharge to Surface Water body
<input type="checkbox"/> Domestic Sewer	<input type="checkbox"/> Secondary Containment	<input type="checkbox"/> Abandoned Waste/Materials
<input type="checkbox"/> Other (Explain below)		

Description of Incident (Explain)
Loss of R-124 from OPF-HB3 Ground Coolant System (S70-1203).

Cause of Incident if Known (Check all that apply and provide details below)

Equipment Failure Operator Error Transportation Accident Unknown Other

The reservoir overpressure protection device, A505252, failed calibration. A new back pressure regulator (BPR) was obtained, and the work instructions to replace that item was prepared and relased. When preparing to replace the failed BPR the next day, the technicians noticed the failed BPR was cold, and a faint noise was heard. When the failed BPR was isloatee from the system for replacement, the hissing stopped, and the failed component was removed. A news BPR was installed in that locaiton.

Action Taken to Contain Incident and Clean-up (Explain)
New BPR was installed and initial GN2 leak check was performed and the new BPR was successfully calibrated. Follow-up leak checkage of BPR was successful. Refill of S70-12-3 after replacing the failed BPR showed that 756 lbs of R-124 had been lost through the failed component. No further action required.

Notifications Made
Call: 911 NASA Environmental Spill Line (867-9005) Other (Explain below)

Called at 15:30 on 4/16/2010, to report release of R-124.

Was the spill cleaned-up or contained within 24 hours? Yes Cleaned-up By United Space Alliance

DO NOT WRITE BELOW THIS LINE - NASA ENVIRONMENTAL OFFICE USE ONLY

Material Identified As R-124 Unable to Identify

Clean-up By United Space Alliance No Clean-up Required Clean-up Required

Follow-up Assigned to N/A No Follow-up Required

Notifications: FDEP Brevard County SJRWMD NRC SWP NASA HQ RQ

Comments/Followup

Closed ✓	Incident Reviewed By (Name/Organization) Erica Williams/IHA-200	Date 04/20/2010
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KSC Pollution Incident Reporting and Notification

Date of Incident 07/15/2010	Time of Incident 07:00 AM	Reported By Jill Vogel	Organization/Company Name USA	Phone 861-5762
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Substance / Material Involved water and petroleum based compressor oil	Amount Released (Estimated) 1 qt water with trace amounts of oil
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Location of Incident (Include Facility Number)
OPF3 (K6-0696) near the front door

Environmental Impact (Check all that apply) (If Other, please explain)

<input type="checkbox"/> Stormwater Ditch	<input checked="" type="checkbox"/> Paved Area	<input type="checkbox"/> Air Emission
<input type="checkbox"/> Stormwater Sewer	<input type="checkbox"/> Grass/Soil	<input type="checkbox"/> Direct Discharge to Surface Water body
<input type="checkbox"/> Domestic Sewer	<input type="checkbox"/> Secondary Containment	<input type="checkbox"/> Abandoned Waste/Materials
<input type="checkbox"/> Other (Explain below)		

Description of Incident (Explain)
Approximately 1 qt of water contaminated with trace amounts of oil leaked onto the concrete in front of OPF 3. A 40 ton mobile crane (HE202219) air brake accumulator sprang a leak. HEMS cleaned up with the spill.

Cause of Incident if Known (Check all that apply and provide details below)

Equipment Failure Operator Error Transportation Accident Unknown Other

Action Taken to Contain Incident and Clean-up (Explain)
USA HEMS personnel cleaned up the spill and bulked it with like waste for disposal. The crane will be repaired.

Notifications Made
Call: 911 NASA Environmental Spill Line (867-9005) Other (Explain below)

USA Safety - 867-3588 Usa Environmental Mgt - Jill Vogel 861-5762
HE Mgr - Mark Smith 698-1590

Was the spill cleaned-up or contained within 24 hours? Yes Cleaned-up By USA HEMS personnel

DO NOT WRITE BELOW THIS LINE - NASA ENVIRONMENTAL OFFICE USE ONLY

Material Identified As water and petroleum based compressor oil Unable to Identify

Clean-up By USA HEMS personnel No Clean-up Required Clean-up Required

Follow-up Assigned to _____ No Follow-up Required

Notifications: FDEP Brevard County SJRWMD NRC SWP NASA HQ RQ

Comments/Followup

Closed ✓	Incident Reviewed By (Name/Organization) Erica Williams/IHA-200	Date 07/20/2010
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KSC Pollution Incident Reporting and Notification

Date of Incident 12/07/2010	Time of Incident 01:30 PM	Reported By Jill Vogel	Organization/Company Name USA	Phone 861-5762
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Substance / Material Involved Rando 32 Hydraulic Oil MSDS #17124	Amount Released (<i>Estimated</i>) < 1 gallon
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Location of Incident (*Include Facility Number*)
OPF3 Low Bay K6-0696 elevator pit

Environmental Impact (*Check all that apply*) (*If Other, please explain*)

<input type="checkbox"/> Stormwater Ditch	<input type="checkbox"/> Paved Area	<input type="checkbox"/> Air Emission
<input type="checkbox"/> Stormwater Sewer	<input type="checkbox"/> Grass/Soil	<input type="checkbox"/> Direct Discharge to Surface Water body
<input type="checkbox"/> Domestic Sewer	<input type="checkbox"/> Secondary Containment	<input type="checkbox"/> Abandoned Waste/Materials
<input checked="" type="checkbox"/> Other (Explain below) Oil was contained in the elevator pit		

Description of Incident (*Explain*)
Hydraulic oil was released into the OSB3 Low Bay elevator pit due to a leaking victaulic fitting. The elevator has been tagged out and all the victaulic fittings are to be replaced in the system. Pig mats and a boom are in place until the repairs are made.

Cause of Incident if Known (*Check all that apply and provide details below*)

Equipment Failure Operator Error Transportation Accident Unknown Other

leaking victaulic fitting

Action Taken to Contain Incident and Clean-up (*Explain*)
The oil was contained in the elevator pit. USA elevator technicians used absorbent material to clean up the spill. It was containerized with like waste for disposal.

Notifications Made
Call: 911 NASA Environmental Spill Line (867-9005) Other (Explain below)

USA Safety - Doug Freeman 861-0448 USA Environmental Mgmt - Jeff Lindgren 867-8627
Elevator Mgr - Rick Gilbert - 861-5939

Was the spill cleaned-up or contained within 24 hours? Yes Cleaned-up By USA elevator technicians

DO NOT WRITE BELOW THIS LINE - NASA ENVIRONMENTAL OFFICE USE ONLY

Material Identified As Rando 32 Hydraulic Oil MSDS #17124 Unable to Identify

Clean-up By USA Elevator Technicians No Clean-up Required Clean-up Required

Follow-up Assigned to _____ No Follow-up Required

Notifications: FDEP Brevard County SJRWMD NRC SWP NASA HQ RQ

Comments/Followup

Closed ✓	Incident Reviewed By (Name/Organization) Erica Williams/IHA-200	Date 12/08/2010
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KSC Pollution Incident Reporting and Notification

Date of Incident	Time of Incident	Reported By	Orgn	Phone
02-19-2002	02:00 PM	E. L. Coyle	SGS/CHS Waste Mg	861-5319

Substance / Material Involved	Quantity / Amount (Estimated)
Gasoline	13 Oz.

Location of Incident (Explain)
 Parking Lot at the OPF Highbay 3

Pollutant Effects

<input type="checkbox"/> Personal Injury/First Aid	<input type="checkbox"/> Domestic Sewer	<input type="checkbox"/> Secondary Containment
<input type="checkbox"/> Stormwater Ditch	<input checked="" type="checkbox"/> Paved Area	<input type="checkbox"/> Waterway Affected
<input type="checkbox"/> Stormwater Sewer	<input type="checkbox"/> Grass Area	<input type="checkbox"/> Air Emission
<input type="checkbox"/> Other (Explain)		

Description of Incident (Explain)
 A five gallon container of gasoline overturned in the back of a JBOSC Security pick up truck. The fuel spilled in the pick up bed and ran onto the pavement.

Cause of Incident if Known (Explain)

Action to Contain Incident and Clean-up (Explain)
 JBOSC Security applied absorbent clay at the time of spill. The JBOSC Post Emergency Spill Cleanup Team followed up and completed the clean up, and disposed of the waste with like material.

Notifications Taken

Call: 911 Support Operations (853-5211) Environmental Program Office (867-4556) Environmental Health (867-7138)

Contamination/Removal by: JBOSC Post Emergency Spill Cleanup Team Clean-up within 24 Hours?

Other: (Explain)

DO NOT WRITE BELOW THIS LINE - OFFICE USE ONLY

1. Source Identified As Gasoline Unable to Identify Source

2. Clean-up By JBOSC Post Emergency Spill Cleanup Team No Clean-up Required Clean-up 24 Required

3. Follow-up Assigned to _____ Emergency Non-Emergency

Notifications: FDEP Brevard County NRC FSWP NASA HQ

Comments

Closed ✓	Incident Closed By (Name/Organization) P. Lynn/TAC-3	Date 02-27-2002
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KSC Pollution Incident Reporting and Notification

Date of Incident	Time of Incident	Reported By	Orgn	Phone
06-19-2008	04:45 AM	Jill Vogel	USA	861-5762

Substance / Material Involved	Quantity / Amount (Estimated)
Chevron Hydraulic Oil ISO 32 MSDS #17626	1 pint

Location of Incident (Explain)
PCC Elevator #1 (K6-1094)

Pollutant Effects

<input type="checkbox"/> Personal Injury/First Aid	<input type="checkbox"/> Domestic Sewer	<input checked="" type="checkbox"/> Secondary Containment
<input type="checkbox"/> Stormwater Ditch	<input type="checkbox"/> Paved Area	<input type="checkbox"/> Waterway Affected
<input type="checkbox"/> Stormwater Sewer	<input type="checkbox"/> Grass Area	<input type="checkbox"/> Air Emission
<input type="checkbox"/> Other (Explain)		

Description of Incident (Explain)
Hydraulic oil leaked from the hydraulic elevator jack onto the elevator pit floor. It was contained within the PVC line of the elevator jack. Initial report stated this was a 1 gallon spill.

Cause of Incident if Known (Explain)
The leak appears to be a slow leak from the jack which is below grade. Further investigation is needed to determine the exact cause. The elevator is out of service until further notice.

Action to Contain Incident and Clean-up (Explain)
USA technicians used absorbent pads to contain the spill until the JBOSC Response Team could respond the next morning. The absorbent pads were then containerized and magiczorb was applied and swept up. All the solids were containerized and disposed of with like waste.

Notifications Taken

Call: 911 Support Operations (853-5211) Environmental Program Office (867-4556) Environmental Health (867-7138)

Contamination/Removal by: JBOSC Emergency Spill Response Team Clean-up within 24 Hours?

Other: (Explain)
Doug Freeman (USA GSS Safety)861-0448
Jill Vogel (USA Environmental Mgt) 861-5762
Rick Owens (USA Responsible Mgr Elevators) 861-4807

DO NOT WRITE BELOW THIS LINE - OFFICE USE ONLY

1. Source Identified As Hydraulic Oil Unable to Identify Source

2. Clean-up By JBOSC No Clean-up Required Clean-up 24 Required

3. Follow-up Assigned to N/A Emergency Non-Emergency

Notifications: FDEP Brevard County NRC FSWP NASA HQ

Comments
Routine Maintenance.

Closed ✓	Incident Closed By (Name/Organization) Rodney Brown	Date 07-15-2008
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Title V Permit for significant air emissions at K6-0696

FINAL PERMIT No. 0090051-017-AC

Section I. Facility Information.

Subsection A. Facility Description.

This facility is a spacecraft and payload processing and launch facility which contains the following four categories of permitted (significant) air emission units:

- a) Hot Water Generators / Boilers with an individual heat input rating of at least 10 MMBtu / hr (listed in Attachment 1-A)
- b) Surface Coating Operations (listed in Attachment 2-A)
- c) Internal Combustion Engines (listed in Attachments 3-A, 4-A, and 5-A)
- d) Hypergol Fueling and Servicing Activities (listed in Attachment 6-A)

Also included at this facility are miscellaneous insignificant (listed in Appendix I-1) and unregulated (listed in Appendix U-1) emission units and/or activities.

The facility is considered a Title V major source as the potential to emit (PTE) for the criteria pollutants carbon monoxide (CO) and oxides of nitrogen (NO_x) exceed the 100 ton per year (tpy) Title V major source threshold. The facility is considered a minor source for volatile organic compounds (VOC) emissions as the VOC PTE is less than the 100 ton per year Title V major source threshold.

The facility is considered a minor source (i.e., non-major) for the Prevention of Significant Deterioration (PSD) permitting program as the PTE for PSD pollutants is less than the PSD major source threshold (e.g., 250 tpy for CO and NO_x). The facility does not belong to one of the listed source categories that have a lesser PSD major source threshold.

The total combined heat input rating for fossil fuel fired boilers at the facility is approximately 200 million British Thermal Units per hour (MMBtu/hr). This total rating includes permitted (i.e., significant) and unpermitted (i.e., insignificant or exempt) units. This total rating is less than 250 MMBtu/hr, which is the threshold for one of the listed source categories that have a lesser PSD major source threshold (i.e., 100 tpy for criteria pollutants).

The facility is currently considered a minor source (i.e., non-major source) of Hazardous Air Pollutants (HAP). The facility previously was considered a major source of HAP; however, pollution prevention initiatives taken by the facility have allowed the facility to reduce HAP emissions to less than the major source thresholds of 10 tpy for individual HAP, and 25 tpy for combined HAP. The Title V permit renewal application received March 3, 2008 was a combined construction and operating permit application. The construction permit issued pursuant to this application (Permit Number 0090051-017-AC) includes emission limits that restrict the HAP emissions from the facility to less than the major source thresholds of 10 / 25 tpy.

The Title V facility does not include the retail gasoline storage and fueling operations performed on-site.

National Aeronautics and Space Administration
Kennedy Space Center
Facility ID No.: 0090051

FINAL Permit No.: 0090051-018-AV
CONSTRUCTION Permit No.: 0090051-017-AC

Subsection B. Summary of Emissions Unit ID No(s). and Brief Description(s)

E.U. ID No./Brief Description

- 001 Hot Water Generators / Boilers with an individual heat input rating of at least 10 MMBtu / hr
- 091 Surface Coating Operations
- 086 Compression Ignition Stationary Internal Combustion Engines
- 087 Spark Ignition Stationary Internal Combustion Engines
- 088 Launch Complex 39 (LC-39) Compression Ignition Backup Power Plant
- 089 Hypergol Servicing Operations and Activities

Please reference the Permit No., Facility ID No., and appropriate Emissions Unit(s) ID No(s). on all correspondence, test report submittals, applications, etc.

Subsection C. Relevant Documents

The documents listed below are not a part of this permit; however, are specifically related to this permitting action.

These documents are provided to the permittee for information purposes only:
Appendix A-1, Abbreviations, Acronyms, Citations, and Identification Numbers
Appendix H-1, Permit History/I.D. Number Changes

These documents are on file with permitting authority:
Renewal Title V Permit and Construction Permit Application received March 3, 2008.
Additional information requested February 25, 2004 and received March 8, 2004.
Revision Title V Permit Application submitted January 12, 2004 & received January 15, 2004
Renewal Title V Permit Application submitted February 21, 2003 & received February 24, 2003
Additional information received June 2, 1998.
Initial Title V Permit Application received June 7, 1996, revised May 21, 1998.
Additional information requested March 16, 1998.
Additional information received February 19, 1998.
Additional information requested December 8, 1997.

Subsection D. Miscellaneous.

The use of "Permitting Notes" throughout this permit is for informational purposes only and permitting notes are not permit conditions.

Section II. Facility-wide Conditions.

The following conditions apply facility-wide:

1. APPENDIX TV-6, TITLE V CONDITIONS, is a part of this permit.
2. General Pollutant Emission Limiting Standards. Objectionable Odor Prohibited. The permittee shall not cause, suffer, allow, or permit the discharge of air pollutants which cause or contribute to an objectionable odor.
[Rule 62-296.320(2), F.A.C.]
3. General Particulate Emission Limiting Standards. General Visible Emissions Standard. Except for emissions units that are subject to a particulate matter or opacity limit set forth or established by rule and reflected by conditions in this permit, no person shall cause, let, permit, suffer or allow to be discharged into the atmosphere the emissions of air pollutants from any activity, the density of which is equal to or greater than that designated as Number 1 on the Ringelmann Chart (20 percent opacity). EPA Method 9 is the method of compliance pursuant to Rule 62-297, F.A.C.
[Rule 62-296.320(4)(b)1. & 4., F.A.C.]

{Permitting Note: Though the permittee is not required to perform a visible emissions compliance test to demonstrate compliance with the facility-wide limitation annually or before renewal, when the Department believes that the general visible emissions standard is being violated, the Department may require that the owner or operator perform a visible emissions compliance test per Chapter 62-297.310(7)(b), Special Compliance Tests, F.A.C.; or Department personnel who are certified to perform visible emissions test may determine compliance with the general visible emission standard.}
4. Prevention of Accidental Releases (Section 112(r) of CAA).
 - a. The permittee shall submit its Risk Management Plan (RMP) to the Chemical Emergency Preparedness and Prevention Office (CEPPO) RMP Reporting Center when, and if, such requirement becomes applicable. Any Risk Management Plans, original submittals, revisions or updates to submittals, should be sent to:

RMP Reporting Center
Post Office Box 1515
Lanham-Seabrook, Maryland 20703-1515
Telephone: 301/429-5018
 - b. The permittee shall submit to the permitting authority Title V certification forms or a compliance schedule in accordance with Rule 62-213.440(2), F.A.C. [40 CFR 68]
5. Insignificant Emissions Units and/or Activities. Appendix I-1, List of Insignificant Emissions Units and/or Activities, is a part of this permit.
[Rules 62-213.440(1), 62-213.430(6), and 62-4.040(1)(b), F.A.C.]
6. Unregulated Emissions Units and/or Activities. Appendix U-1, List of Unregulated Emissions Units and/or Activities, is a part of this permit.
[Rule 62-213.440(1), F.A.C.]
7. General Pollutant Emission Limiting Standards. Volatile Organic Compounds (VOC) Emissions or Organic Solvents (OS) Emissions. The permittee shall allow no person to store, pump, handle, process, load, unload or use in any process or installation, volatile organic compounds (VOC) or organic solvents (OS) without applying known and existing vapor emission control devices or systems deemed necessary and

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ordered by the Department. To comply, procedures to minimize pollutant emissions shall include the following:

- a) tightly cover or close all VOC containers when they are not in use,
- b) tightly cover, where possible, all open troughs, basins, baths, tanks, etc. when they are not in use,
- c) maintain all piping, valves, fittings, etc. in good operating condition,
- d) prevent excessive air turbulence across exposed VOC,
- e) immediately confine and clean up VOC spills and make sure certain wastes are placed in closed containers for reuse, recycling or proper disposal.

[Rule 62-296.320(1)(a), F.A.C.]

8. When appropriate, any recordings, monitoring, or reporting requirements that are time-specific shall be in accordance with the effective date of the permit, which defines day one.

[Rule 62-213.440, F.A.C.]

9. The permittee shall submit all compliance related notifications and reports required of this permit to the Department of Environmental Protection's Central District office:

Florida Department of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, Florida 32803
Telephone: 407/894-7555

10. Any reports, data, notifications, certifications, and requests required to be sent to the United States Environmental Protection Agency, Region 4, should be sent to:

United States Environmental Protection Agency
Region 4
Air, Pesticides & Toxics Management Division
Air & EPRCA Enforcement Branch, Air Enforcement Section
61 Forsyth Street
Atlanta, Georgia 30303-8960
Telephone: 404/562-9155; Fax: 404/562-9163

{Permitting Note: This condition implements the requirements of Rules 62-210.370(3) F.A.C. (see Condition 24. of APPENDIX TV-6. TITLE V CONDITIONS.)}

11. Certification by Responsible Official (RO). In addition to the professional engineering certification required for applications by Rule 62-4.050(3), F.A.C., any application form, report, compliance statement, compliance plan and compliance schedule submitted pursuant to Chapter 62-213, F.A.C., shall contain a certification signed by a responsible official that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete. Any responsible official who fails to submit any required information or who has submitted incorrect information shall, upon becoming aware of such failure or incorrect submittal, promptly submit such supplementary information or correct information.

[Rule 62-213.420(4), F.A.C.]

12. Reports of the required test report shall be filed with the air compliance section of this office as soon as practical but no later than 45 days after the last test is completed.

[Rules 62-297.310(8)(b), F.A.C.]

13. At least 180 days prior to the expiration date of this operation permit, the permittee shall submit to this office four copies of the air permit application, DEP Form No. 62-210.900(1).
[Rule 62-4.090(1), F.A.C.]

14. The owner or operator shall complete DEP Form 62-210.900(5), F.A.C., "Annual Operating Report for Air Pollutant Emitting Facility" for each calendar year and submit it either electronically using the latest Department Electronic Annual Operating Report software or by hard copy to the air compliance of this office on or before March 1 of the following year or other date as provided by FDEP guidance, in accordance with Rule 62-210.370(3), F.A.C. The emissions shall be computed in accordance with the provisions of Rule 62-210.370(2), F.A.C., for purposes of the annual operating report.

{Permitting Note: This condition implements the requirements of Rules 62-210.370(3) F.A.C. (see Condition 24. of APPENDIX TV-6, TITLE V CONDITIONS.)}

15. Annual Statement of Compliance. The annual statement of compliance pursuant to Rule 62-213.440(3)(a)2., F.A.C., shall be submitted to the Department and EPA within 60 (sixty) days after the end of the calendar year using DEP Form No. 62-213.900(7), F.A.C. The required elements of the compliance certification are listed in 40 C.F.R. Part 70.6(c)(5)(iii) as indicated in Condition Number 51 of Appendix TV-6, Title V Conditions.

[Rules 62-213.440(3) and 62-213.900, F.A.C.]

{Permitting Note: This condition implements the requirements of Rules 62-213.440(3)(a)2. & 3., F.A.C. (see Condition 51. of APPENDIX TV-6, TITLE V CONDITIONS.)}

16. Facility-Wide HAP Emission Limits. The following facility-wide HAP emission limits apply to emissions from permitted and unpermitted (e.g., insignificant and trivial units).

- a) Facility-wide combined HAP emissions are limited to less than 25.0 tons per any twelve consecutive months.
- b) Facility-wide individual HAP emissions are limited to less than 10.0 tons per any twelve consecutive months.

Practical compliance with these limits is achieved as provided in Condition Numbers 17 and 18. These emission limits are accepted by the Permittee to classify the facility as a synthetic minor source of HAP emissions.

17. HAP Emission Limits – Practical Enforceable Emission Limits. The following emission limits are imposed on Emission Unit 091 (Surface Coating Operations) to provide for practical enforceable limits for periodic demonstration of facility-wide HAP emission limits. The HAP emissions from Emission Unit 091 are:

- a) Combined HAP emissions are limited to less than 20.0 tons per any twelve consecutive months.
- b) Individual HAP emissions are limited to less than 8.0 tons per any twelve consecutive months.

The difference between the facility wide emission limits (i.e., 10.0 and 25.0 tpy) and the Emission Unit 091 limits (i.e., 8.0 and 20.0 tpy) are sufficient to provide for reasonably anticipated HAP emissions from the unpermitted activities.

Permit note: The other permitted emission units address sources that are minimal contributors to HAP emissions, i.e., internal and external combustion operations using clean burning fuel, and the hypergol scrubbing operations.

18. HAP Emission Limits – Practical Enforceable Recordkeeping. The permittee shall maintain records of total combined HAP and individual HAP emissions from surface coating operations.

Section III. Emissions Unit(s) and Conditions.

Subsection A. This section addresses the following emissions unit(s).

E.U. ID No./ Brief Description

001 Hot Water Generators / Boilers with an individual heat input rating of at least 10 MMBtu / hr

This emission unit is comprised of fossil fuel fired hot water generators (HWGs) and boilers with an individual heat input rating of at least 10 MMBtu / hr. Attachment 1-A is a list of the existing fossil fuel fired boilers comprising this emission unit.

The following conditions apply to the emissions unit(s) listed above:

Essential Potential to Emit (PTE) Parameters

A1. Methods of Operation - Fuels. Each unit is allowed to fire no. 2 fuel oil, diesel fuel, natural gas, propane (including liquefied propane), biodiesel, jet fuel, and synthetically derived fuel (e.g., produced by the Fischer-Tropsch process). Synthetically derived fuels includes coal-to-liquids (CTL), gas-to-liquids (GTL), biomass-to-liquids (BTL), and syngas (e.g., mixture of carbon monoxide and hydrogen).
[Rule 62-210.200, (PTE), F.A.C., and construction permit 0950051-017-AC]

A2. Hours of Operation. Each unit is allowed to operate continuously.
[Rule 62-210.200, (PTE), F.A.C.]

Emission Limitations and Standards

A3. See facility-wide Condition No. 3 for the visible emission limitation.

Test Methods and Procedures

A4. Emissions of PM, SO₂, NO_x, and CO shall be estimated utilizing either:

- a) EPA's AP-42 emission factors, revision 1/95 or subsequent edition;
- b) Manufacturer supplied emission factors;
- c) Test data measured through the use of EPA Reference Test Methods (RTM); or,
- d) An alternate method using generally accepted engineering techniques that is submitted to the FDEP for review.

[Rule 62-4.070(1), F.A.C.]

A5. Each unit shall demonstrate compliance with its visible emission limit in accordance with DEP Method 9 prior to permit expiration date if:

- a) Burning gaseous fuel(s) in combination with any amount of liquid fuel(s) for 400 hours or more per year,
or,
- b) Burning only liquid fuel(s) for 400 hours or more per year.

The test period shall be a minimum of 30 minutes or the length of the batch/cycle.
[Rules 62-297.401(9)(c), 62-297.310(4)(a)2., 62-297.310(7)(a)4.a., F.A.C.]

A6. At least 15 days prior to the date on which each formal compliance test is due to begin, the permittee shall provide written notification of the test to the air compliance section of this office. The notification must include the following information: the date, time and location of each test; the name and telephone number of the facility's contact person who will be responsible for coordinating the test; and the name, company, and telephone number of the person conducting the test.

[Rule 62-297.310(7)(a)9, F.A.C.]

A7. Testing of emissions shall be conducted with the emissions unit operation at permitted capacity. Permitted capacity is defined as 90 to 100 percent of the maximum operation rate allowed by the permit. If it is impractical to test at permitted capacity, an emissions unit may be tested at less than the minimum permitted capacity; in this case, subsequent emissions unit operation is limited to 110 percent of the test load until a new test is conducted. Once the unit is so limited, operation at higher capacities is allowed for no more than 15 consecutive days for the purpose of additional compliance testing to regain the authority to operate at the permitted capacity.

[Rule 62-297.310(2)& (2) (b), F.A.C.]

Monitoring of Operations

A8. Determination of Process Variables.

(a) **Required Equipment.** The owner or operator of an emissions unit for which compliance tests are required shall install, operate, and maintain equipment or instruments necessary to determine process variables, such as process weight input or heat input, when such data are needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards.

(b) **Accuracy of Equipment.** Equipment or instruments used to directly or indirectly determine process variables, including devices such as belt scales, weight hoppers, flow meters, and tank scales, shall be calibrated and adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value.

[Rule 62-297.310(5), F.A.C.]

Recordkeeping and Reporting Requirements

A9. To demonstrate compliance with Specific Condition Number A1., the permittee shall maintain a monthly log at the facility for a period of at least five years from the date that the data are recorded. The monthly records shall contain for each external combustion unit comprising Emission Unit 001:

- a) Type of fuel(s) used; and,
- b) Total quantity of each fuel combusted during the month.

Monthly logs shall be completed by the end of the following month. The logs and supporting documents shall be maintained at the facility for at least 5 years and made available to the Department upon request.

Note: A consecutive 12 month total is equal to the total for the month in question plus the totals for the eleven months previous to the month in question. A consecutive 12-month total treats each month of the year as the end of a 12-month period. A 12-month total is not a year-to-date total. Facilities that have not been operating for 12 months should retain 12 month totals using whatever number of months of data are available until such a time as a consecutive 12 month total can be maintained each month.

A10. The permittee shall maintain a current copy of Attachment 1-A at facility. The facility shall review the inventory contained in Attachment 1-A annually in conjunction with the AOR preparation. This inventory shall be submitted to the FDEP for review at the specific request of FDEP. This updated copy shall include the following information for equipment meeting this heat input capacity criterion (i.e., at least 10 MMBtu / hr):

- a) The current inventory of operational HWGs and boilers;
- b) Listing of HWGs and boilers removed during the prior five years;
- c) For each HWG and boiler the:
 1. Unique identifier (e.g., number);
 2. Source location (e.g., building number);
 3. Source description (e.g., manufacturer and model number);
 4. Maximum heat input rating in units of MMBtu / hr;
 5. Fuels the boiler is capable of firing;
 6. Date of installation; and,
 7. Date of removal (if applicable).

Permit Applications

A11. If a new HWG or boiler is installed at the facility that meets the criteria of units comprising EU 001 (i.e., at least 10 MMBtu / hr heat input capacity), the Permittee shall submit to this office four copies of a construction permit application for the unit on the appropriate FDEP permit application forms (e.g., FDEP Form No. 62-210.900(1)). The permittee shall obtain a permit to construct the unit prior to the installation and operation of the unit.

A12. After completion of construction of a new unit that is part of EU 001, the Permittee shall update Attachment 1-A. The permittee shall submit a copy of the updated Attachment 1-A to this office within 60 days after completion of construction of the new unit. A Title V operating permit revision is not required upon completion of construction.

A13. The permittee shall submit a current copy of Attachment 1-A with Title V operating permit revision applications that address Emission Unit 001.

A14. The permitted shall submit a current copy of Attachment 1-A with each Title V operating permit renewal application.

Subsection B. This section addresses the following emissions unit.

E.U. ID No./ Brief Description

091 Surface Coating Operations

This emission unit is comprised of surface coating operations performed in paint booths or similar structures located at the facility.

The following conditions apply to the emissions unit listed above:

Essential Potential to Emit (PTE) Parameters

B1. Attachment 2-A is a list of the existing operations that comprise this unit. As required in Condition No. B9., the permittee shall maintain and update a copy of Attachment 2-A at the facility. This updated copy shall include the following information for equipment comprising this Emission Unit:

- a) The current inventory of operational paint booths and similar structures comprising this emission unit;
- b) Listing of paint booths and similar structures removed from this emission unit during the prior five years;
- c) For each paint booth or similar structure, the:
 1. Unique identifier (e.g., number);
 2. Source location (e.g., building number);
 3. Source description (e.g., Corrosion Control Booth Number 1);
 4. Manufacturer and model number (if applicable);
 5. Type of particulate matter control (e.g., filters or water wall);
 6. Date of installation (if installed after June 2008); and
 7. Date of removal (if applicable, and if removed after June 2008).

B2. Hours of Operation. Each unit is allowed to operate continuously.
[Rule 62-210.200, (PTE), F.A.C.]

B3. No person shall circumvent any pollution control device or allow the emissions of air pollutants without the applicable air pollution control device operating properly.
[Rule 62-210.200, (PTE), F.A.C. and Rule 62-210.650, F.A.C.]

Emission Limitations and Standards

B4. The permitted VOC emission rate from Emission Unit 091 is limited to less than 69.0 tons per consecutive twelve months, including the emissions from the air drying of empty cans and excess two-part epoxy paints prior to their disposal. Usage or purchasing records shall be maintained as provided in Specific Condition No. B7.

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B5. The permitted HAP emission rate from Emission Unit 091 are:

- a) Combined HAP emissions are limited to less than 20.0 tons per any twelve consecutive months.
- b) Individual HAP emissions are limited to less than 8.0 tons per any twelve consecutive months.

Usage or purchasing records shall be maintained as provided in Specific Condition No. B7.

B6. See facility-wide Condition No. 3 for the visible emission limitation for each emission unit.

Monitoring of Operations / Test Methods and Procedures

B7. Emissions of VOC and HAP from this emissions unit shall be estimated monthly utilizing any one or combination of the following methods:

- a) Material balance approach based on either:
 1. Purchase data; or
 2. Usage data;
- b) VOC and HAP content as obtained from any of the following methods:
 1. MSDS;
 2. Manufacturer data (e.g., certified product data sheet);
 3. As analytically measured using generally accepted methods; or,
 4. Using default values (e.g., 7.38 lbs / gallon VOC) for low use materials.
- c) An alternate method using generally accepted engineering techniques that is submitted to the FDEP for review.

Monthly logs shall be completed by the end of the following month. The logs and supporting documents shall be maintained at the facility for at least 5 years and made available to the Department upon request. [Rule 62-4.070(1), F.A.C.]

Recordkeeping and Reporting Requirements

B8. To demonstrate compliance with specific Condition No. **B4.**, the permittee shall maintain a log at the facility for a period of at least 5 years from the date the data are recorded. The log, at a minimum, shall contain the following regarding Emission Unit 091:

Monthly

- a) Designation of the month and year of operation for which records are being tabulated;
- b) Consecutive 12-month total of VOC emissions;
- c) Consecutive 12-month total of total HAP emissions; and,
- d) Consecutive 12-month total of individual HAP emissions for each individual HAP with emissions of at least 0.5 ton during the current 12-month period.

[Rules 62-4.070(3), and 62-213.440(1)(b)2., F.A.C]

Note: A consecutive 12 month total is equal to the total for the month in question plus the totals for the eleven months previous to the month in question. A consecutive 12-month total treats each month of the year as the end of a 12-month period. A 12-month total is not a year-to-date total. Facilities that have not been operating for 12 months should retain 12 month totals using whatever number of months of data are available until such a time as a consecutive 12 month total can be maintained each month.

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Logs must document the method, calculations, and formulas used in determining the usage rate and the emission rate. This includes, but is not limited to, the product name, density, individual and total HAP contents, and individual and total VOC content. All calculations, including those used to derive emission credits for mass balance, must be clearly documented, and may be presented in the form of a template of sample calculations, which is filed with the logs required in this specific condition and available for review on site by regulatory inspectors.

[Rule 62-4.070(3), F.A.C.]

B9. The permittee shall maintain a current copy of Attachment 2-A at facility. The facility shall review the inventory contained in Attachment 2-A annually in conjunction with the AOR preparation. This inventory shall be submitted to the FDEP for review at the specific request of FDEP.

Permit Applications

B10. If a new paint booth or similar structure is installed at the facility that meets the criteria of units comprising EU 091, the Permittee shall submit to this office four copies of a construction permit application for the unit on the appropriate FDEP permit application forms (e.g., FDEP Form No. 62-210.900(1)). The permittee shall obtain a permit to construct the unit prior to the installation and operation of the unit.

B11. After completion of construction of a new unit that is part of EU 091, the Permittee shall update Attachment 2-A. The permittee shall submit a copy of the updated Attachment 2-A to this office within 60 days after completion of construction of the new unit. A Title V operating permit revision is not required upon completion of construction.

B12. The permittee shall submit a current copy of Attachment 2-A with Title V operating permit revision applications that address Emission Unit 091.

B13. The permitted shall submit a current copy of Attachment 2-A with each Title V operating permit renewal application.

Subsection C. This section addresses the following emissions unit(s).

E.U. ID No./ Brief Description

086	Compression Ignition Stationary Internal Combustion Engines
087	Spark Ignition Stationary Internal Combustion Engines Units
088	Launch Complex 39 (LC-39) Compression Ignition Backup Power Plant

The following conditions apply to the emissions unit(s) listed above:

Essential Potential to Emit (PTE) Parameters

C1. Unit Description. These emission units (i.e., EU 086, 087, and 088) are comprised of stationary source internal combustion engines at the facility that are used to provide electrical power (i.e., generators) and direct drive backup power for fire suppression pumps. These units are grouped into three separate emission units, two units based on the type of ignition (i.e., spark and compression ignition), and the third unit includes the compression ignition engines that comprise the LC-39 backup power plant.

C2. Unit Description. Emission Unit 086 is comprised of the compression ignition stationary internal combustion engines used throughout the site, with the exception of the compression ignition engines located at Launch Complex 39 which are permitted as Emission Unit 088.

Emissions from Emission Unit 086 are estimated based on the total fuel used by these units. The total fuel use is primary compliance assurance parameter for this EU for the operational limits contained in Condition C5.

For inventory tracking purposes, the compression ignition units are divided into two categories. The first category is for units that are required to be tracked as part of Emission Unit 086, as listed on Attachment 3-A to this permit. The power rating threshold for this inclusion is 480 kW. The second category includes units of less than 480 kW, which are not required to be tracked based on their individual maximum potential emissions being less than the construction permit requirement threshold.

Attachment 3-A is a list of the existing operations that comprise Emission Unit 086 and have an output power rating of at least 480 kW. As required in Condition No. C20., the permittee shall maintain and update a copy of Attachment 3-A at the facility. This updated copy shall include the following information:

- a) The current inventory of operational sources meeting this threshold;
- b) Listing of sources meeting this threshold removed from this emission unit during the prior five years (if removed after June 2008);
- c) For each compression ignition engine meeting this threshold, the:
 1. Unique identifier (e.g., number);
 2. Source location (e.g., building number);
 3. Manufacturer and model number (if applicable);
 4. Date of installation (if installed after April 1, 2006); and
 5. Date of removal (if applicable and removed after June 2008).

C3. Unit Description. Emission Unit 087 is comprised of the spark ignition stationary internal combustion engines used throughout the site.

Emissions from Emission Unit 087 are estimated based on the total fuel used by these units. The total fuel use is primary compliance assurance parameter for this EU for the operational limits contained in Condition C5.

For inventory tracking purposes, the spark ignition units are divided into two categories. The first category is for units that are required to be tracked as part of Emission Unit 087, as listed on Attachment 4-A to this permit. The power rating threshold for this inclusion is 34 kW. The second category includes units of less than 34 kW, which are not required to be tracked based on their individual maximum potential emissions being less than the construction permit requirement threshold.

Attachment 4-A is a list of the existing operations that comprise Emission Unit 087 and have an output power rating of at least 34 kW. As required in Condition No. C20., the permittee shall maintain and update a copy of Attachment 4-A at the facility. This updated copy shall include the following information:

- a) The current inventory of operational sources meeting this threshold;
- b) Listing of sources meeting this threshold removed from this emission unit during the prior five years (if removed after June 2008);
- c) For each spark ignition engine meeting this threshold, the:
 1. Unique identifier (e.g., number);
 2. Source location (e.g., building number);
 3. Manufacturer and model number (if applicable);
 4. Date of installation (if installed after June 2008); and
 5. Date of removal (if applicable and removed after June 2008).

C4. Unit Description. Emission Unit 088 is comprised of the compression ignition stationary internal combustion engines located at Launch Complex 39.

Emissions from Emission Unit 088 are estimated based on the total fuel used by these units. The total fuel use is primary compliance assurance parameter for this EU for the operational limits contained in Condition C5. Hours of operation are the primary compliance assurance parameter for this EU for the operational limits contained in Condition C6.

Attachment 5-A is a list of the existing operations that comprise Emission Unit 088. As required in Condition No. C20., the permittee shall maintain and update a copy of Attachment 5-A at the facility. This updated copy shall include the following information:

- a) The current inventory of operational sources meeting this threshold;
- b) Listing of sources meeting this threshold removed from this emission unit during the prior five years;
- c) For each compression ignition engine meeting this threshold, the:
 1. Unique identifier (e.g., number);
 2. Source location (e.g., building number);
 3. Manufacturer and model number (if applicable);
 4. Date of installation (if installed after April 1, 2006); and
 5. Date of removal (if applicable and removed after June 2008).

C5. Capacity. The annual (consecutive twelve months) fuel usage rates shall not exceed:

- a) E. U. 086 - 305,000 gallons (based on diesel fuel)

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- b) E. U. 087 - 38,000 gallons (based on gasoline)
- c) E. U. 088 - 170,000 gallons (based on diesel fuel)

Should alternate fuels be used in these units that are not the listed fuels in this condition, the total annual usage rates shall be based on a pro-rated basis that is based on the relative fuel heat content value of the alternate fuel.

[Rule 62-210.200, (PTE), F.A.C., exemption letter, permit number 0090051-010-AC, Title V application received 6/7/96, and FDEP Approval Letter, dated 3/31/00]

C6. Hours of Operation.

- a) E.U. 086 and 087 - Each unit is allowed to operate continuously.
- b) E.U. 088 - Total combined generator units operations shall not exceed 1,250 hours per consecutive twelve months.

[Rule 62-210.200, (PTE), F.A.C., permit 0090051-010-AC, and Title V application received 6/7/96]

C7. Emissions Unit Operating Rate Limitation After Testing. See specific Condition No. C14.

[Rule 62-297.310(2), F.A.C.]

C8. Methods of Operation - Fuels. Each unit is allowed to fire no. 2 fuel oil, diesel fuel, biodiesel, jet fuel, gasoline, gasoline and ethanol blends, ethanol, and synthetically derived fuel (e.g., produced by the Fischer-Tropsch process). Synthetically derived fuels includes coal-to-liquids (CTL), gas-to-liquids (GTL), biomass-to-liquids (BTL), and syngas (e.g., mixture of carbon monoxide and hydrogen).

Emission Limitations and Standards

C9. See facility-wide Condition No. 3 for the visible emission limitation. This emission limit applies to Emission Units 086, 087, and 088.

C10. For compression ignition internal combustion engines manufactured after April 1, 2006 (July 1, 2006 for fire pumps), or modified or reconstructed after July 11, 2005, the individual engines are subject to the requirements of the New Source Performance Standard (NSPS) contained at 40 CFR Part 60, Subpart III - *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines* and the Area Source Requirements of the National Emission Standard for Hazardous Air Pollutants (NESHAP) contained at 40 CFR Part 63, Subpart ZZZZ. The following requirements apply to these units:

- a) Each engine shall meet the emissions criteria as stated in this regulation. Compliance with this requirement can be through any one of the following methods. Any of these three methods are presumed effective for the life of the engine (i.e., one-time requirements).
 - i) Be certified by the engine manufacturer as meeting the standards;
 - ii) Based on manufacturer supplied emission test results or emission factors; or,
 - iii) Based on emission testing performed by the permittee.
- b) Prior to October 1, 2010, subject engines using diesel fuel shall use fuel meeting the requirements of 40 CFR §80.510(a), summarized as follows:
 - i) Maximum sulfur content of 500 ppm
 - ii) Cetane index or aromatic content of
 - i) A minimum cetane index of 40; or
 - ii) A maximum aromatic content of 35 volume percent.

- c) Beginning October 1, 2010, subject engines using diesel fuel shall use fuel meeting the requirements of 40 CFR §80.510(b), summarized as follows:
 - i) Maximum sulfur content of 15 ppm
 - ii) Cetane index or aromatic content of
 - i) A minimum cetane index of 40; or
 - ii) A maximum aromatic content of 35 volume percent.
- d) For subject engines classified as emergency stationary engines, the permittee shall install and operate a non-resettable engine hour meter.
- e) For engines equipped with a diesel particulate filter, the permittee shall install and operate a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached.

C11. For stationary spark ignition internal combustion engines manufactured after 1 July 2008 for engines rated at less than or equal to 25 hp and after 1 January 2009 for engines rated at greater than 25 hp, or engines modified or reconstructed after July 12, 2006, the individual engines are subject to the requirements of the New Source Performance Standard (NSPS) contained at 40 CFR Part 60, Subpart JJJJ - *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines* and the Area Source Requirements of the National Emission Standard for Hazardous Air Pollutants (NESHAP) contained at 40 CFR Part 63, Subpart ZZZZ. The following requirements apply to these units:

- a) Each engine shall meet the emissions criteria as stated in this regulation. Compliance with this requirement can be through any one of the following methods. Any of these three methods are presumed effective for the life of the engine (i.e., one-time requirements).
 - i) Be certified by the engine manufacturer as meeting the standards;
 - ii) Based on manufacturer supplied emission test results or emission factors; or,
 - iii) Based on emission testing performed by the permittee.
- b) Subject engines using gasoline fuel shall use fuel meeting the fuel sulfur limit contained in 40 CFR §80.195(a), which is summarized as a maximum of 80 ppm.
- c) For the following subject engines that are used for emergency use only and do not meet the emission standards applicable to non-emergency engines; the permittee shall install a non-resettable hour meter.
 - i) Greater than 500 hp and built on or after July 1, 2010;
 - ii) Greater than or equal to 130 hp and less than 500 hp, and built on or after January 1, 2011; and
 - iii) Less than 130 hp and built on or after July 1, 2008.
- d) Engines used for emergency use are limited to 100 hours per year for operation for the purposes of maintenance checks and readiness testing. This 100 hour per year limit does not include the use of the engine in emergency situations. The permittee may request from the department an additional 100 hours for a specific engine for other operation. This request will be made in accordance with the provisions of the NSPS.
- e) The permittee shall maintain records of maintenance performed on subject engines.

Test Methods and Procedures

C12. Emissions of PM, SO₂, NO_x, and CO shall be estimated utilizing either:

- a) EPA's AP-42 emission factors, revision 1/95 or subsequent edition;
- b) Manufacturer supplied emission factors;

- c) Test data measured through the use of EPA Reference Test Methods (RTM); or,
- d) An alternate method using generally accepted engineering techniques that is submitted to the FDEP for review.

[Rule 62-4.070(1), F.A.C.]

C13. Each unit shall demonstrate compliance with its visible emission limit in accordance with DEP Method 9 prior to permit expiration date by using the largest engine as a representative unit if burning gaseous fuel(s) in combination with any amount of liquid fuel(s) for 400 hours or more per year or burning only liquid fuel(s) for 400 hours or more per year. The test period shall be a minimum of 30 minutes or the length of the batch/cycle.

[Rules 62-297.401(9)(c), 62-297.310(4)(a)2., 62-297.310(7)(a)4.a., F.A.C.]

C14. Testing of emissions shall be conducted with the emissions unit operation at permitted capacity. Permitted capacity is defined as 90 to 100 percent of the maximum operation rate allowed by the permit. If it is impractical to test at permitted capacity, an emissions unit may be tested at less than the minimum permitted capacity; in this case, subsequent emissions unit operation is limited to 110 percent of the test load until a new test is conducted. Once the unit is so limited, operation at higher capacities is allowed for no more than 15 consecutive days for the purpose of additional compliance testing to regain the authority to operate at the permitted capacity.

[Rule 62-297.310(2)& (2) (b), F.A.C.]

C15. By this permit, annual emissions compliance testing for visible emissions is not required for these emissions units while burning:

- a. only gaseous fuel(s); or
- b. gaseous fuel(s) in combination with any amount of liquid fuel(s) for less than 400 hours per year; or
- c. only liquid fuel(s) for less than 400 hours per year.

[Rule 62-297.310(7)(a)4., F.A.C.]

Monitoring of Operations

C16. Determination of Process Variables.

(a) Required Equipment. The owner or operator of an emissions unit for which compliance tests are required shall install, operate, and maintain equipment or instruments necessary to determine process variables, such as process weight input or heat input, when such data are needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards.

(b) Accuracy of Equipment. Equipment or instruments used to directly or indirectly determine process variables, including devices such as belt scales, weight hoppers, flow meters, and tank scales, shall be calibrated and adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value.

[Rule 62-297.310(5), F.A.C.]

Recordkeeping and Reporting Requirements

C17. To demonstrate compliance with specific Condition No. **C5.**, the permittee shall maintain a log at the facility for a period of at least 5 years from the date the data are recorded. The log at a minimum shall contain the following for each of Emission Units 086, 087, and 088:

Monthly

- a) Designation of the month and year of operation for which records are being tabulated; and,
- b) Consecutive 12-month total of fuel consumption by fuel type.

[Rules 62-4.070(3) and 62-213.440(1)(b)2., F.A.C.]

C18. To demonstrate compliance with specific Condition No. C6., the permittee shall maintain a log at the facility for a period of at least 5 years from the date the data are recorded. The log at a minimum shall contain the following for Emission Unit 088:

Monthly

- a) Consecutive 12-month total of hours of operation.

Permit Note: A consecutive 12 month total is equal to the total for the month in question plus the totals for the eleven months previous to the month in question. A consecutive 12-month total treats each month of the year as the end of a 12-month period. A 12-month total is not a year-to-date total. Facilities that have not been operating for 12 months should retain 12 month totals using whatever number of months of data are available until such a time as a consecutive 12 month total can be maintained each month.

Recordkeeping and Reporting Requirements

C19. The permittee shall maintain current copies of Attachment 3-A, Attachment 4-A, and Attachment 5-A at the facility. The facility shall review the inventory contained in Attachment 3-A, Attachment 4-A, and Attachment 5-A annually in conjunction with the AOR preparation. This inventory shall be submitted to the FDEP for review at the specific request of FDEP.

Permit Applications

C20. The permittee is authorized to replace equipment listed in Attachment 3-A, Attachment 4-A, and Attachment 5-A with new or rebuilt unit if the replacement units are rated at the same or less power rating (e.g., horsepower or kilowatt output rating) than the equipment being replaced. A construction permit application is not required for this authorize like kind replacement. For any such like kind replacement, the permittee shall update the affected equipment listing in Attachment 3-A (EU 086), Attachment 4-A (EU 087), or Attachment 5-A (EU 088) within 30 days of the startup (i.e., normal operation) of the replacement equipment. The updated equipment listing is not required to be submitted to this Office.

C21. This condition applies to the installation of new stationary internal combustion engines that are not considered a like kind replacement as addressed in Condition No. C22. For new internal combustion engines installed at the facility that meet the criteria of units required to be listed in Attachment 3-A, Attachment 4-A, and Attachment 5-A (i.e., exceeds the rating thresholds listed in Specific Condition Nos. C2 and C3), the Permittee shall submit to this Office four copies of a construction permit application for the unit on the appropriate FDEP permit application forms (e.g., FDEP Form No. 62-210.900(1)). The permittee shall obtain a permit to construct the unit prior to the installation and operation of the unit.

C22. The permittee shall submit a current copy of Attachment 3-A with Title V operating permit revision applications that address Emission Unit 086.

C23. The permittee shall submit a current copy of Attachment 4-A with Title V operating permit revision applications that address Emission Unit 087.

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C24. The permittee shall submit a current copy of Attachment 5-A with Title V operating permit revision applications that address Emission Unit 088.

C25. The permitted shall submit current copies of Attachment 3-A, Attachment 4-A, and Attachment 5-A with each Title V operating permit renewal application.

Subsection D. This section addresses the following emissions unit(s).

E.U. ID No./ Brief Description

089 Hypergol Servicing Operations and Activities

This emission unit is comprised of hypergol servicing operations and activities. These operations include fueling operations, purging, fume hoods, and scrubbers.

The following conditions apply to the emissions unit(s) listed above:

Essential Potential to Emit (PTE) Parameters

D1. Unit Description. Attachment 6-A is a list of the operations and activities comprising this emission unit. As required in Condition No. D4., the permittee shall maintain and update a copy of Attachment 6-A at the facility. This updated copy shall include the following information for equipment that comprises this Emission Unit:

- a) The current inventory of operations and activities comprising this emission unit;
- b) Listing of operations and activities removed during the prior five years (after June 2008);
- c) For each operation or activity the;
 1. Unique identifier (e.g., number);
 2. Source location (e.g., building number); and
 3. Source description (e.g., manufacturer and model number);

D2. Hours of Operation. Each unit is allowed to operate continuously.

Emission Limitations and Standards

D3. The visible emission limitation for hypergol servicing operations and activities shall be one hundred (100) percent opacity.

{Permitting Note: Given the 100 percent VE limit for this emission unit, compliance is inherent. Hence periodic VE testing is not required.}

Recordkeeping and Reporting Requirements

D4. The permittee shall maintain a current copy of Attachment 6-A at facility. The facility shall review the inventory contained in Attachment 6-A annually in conjunction with the AOR preparation. This inventory shall be submitted to the FDEP for review at the specific request of FDEP.

Permit Applications

D5. Construction permits are not required for the installation and operation of hypergol servicing operations and activities such as fueling operations, purging, and fume hoods. See Condition Numbers **D4., D8., and D9.** for recordkeeping requirements associated with the installation and operation of new hypergol servicing operations and activities.

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D6. For the installation and operation of a new hypergol scrubbing system, the Permittee shall submit to this Office four copies of a construction permit application for the unit on the appropriate FDEP permit application forms (e.g., FDEP Form No. 62-210.900(1)). The permittee shall obtain a permit to construct the unit prior to the installation and operation of the unit.

D7. After completion of construction of a new scrubber that is part of EU 090, the Permittee shall update Attachment 6-A. The permittee shall submit a copy of the updated Attachment 6-A to this office within 60 days after completion of construction of the new unit. A Title V operating permit revision is not required upon completion of construction.

D8. The permittee shall submit a current copy of Attachment 6-A with Title V operating permit revision applications that address Emission Unit 090.

D9. The permittee shall submit a current copy of Attachment 6-A with each Title V operating permit renewal application.

**Historic Properties at Kennedy Space Center
As of November 2008 (Revised December 2010)**

<i>Number of Historic Properties</i>	<i>Facility Number</i>	<i>Site File Number</i>	<i>Facility Name</i>	<i>Listed Under Apollo Program</i>	<i>Contributing Resources to Apollo Program</i>	<i>Eligible Under Space Shuttle Program</i>	<i>Contributing Resources to Space Shuttle Program</i>	<i>Eligible Under International Space Station Program</i>
1	K6-848	8BR1684	Vehicle Assembly Building	X		X		
2	K6-900	8BR1685	Launch Control Center	X		X		
3	UK-008	8BR1689	Crawlerway	X		X		
4/5		8BR1688	Crawler Transporter 1 & 2	X		X		
6		8BR1690	Press Site: Clock and Flagpole	X		X		
7	M6-399	8BR1691	Headquarters Building	X				
8	M7-355	8BR1693	Operations and Checkout Building	X				
9	M6-342	8BR1692	Central Instrumentation Facility	X				
10	L6-247	8BR1998	SRB ARF Manufacturing Building			X		
11	M7-657	8BR2014	Parachute Refurbishment Facility			X		
12	M7-777	8BR2016	Canister Rotation Facility			X		
13/14		8BR2017	Payload Canister 1 & 2			X		
15		8BR2019	Retrieval Ship, Liberty Star			X		
16		8BR2020	Retrieval Ship, Freedom Star			X		
17/18/19		8BR2021	Mobile Launcher Platforms 1, 2, & 3			X		
20	K6-494	8BR1997	Rotation/ Processing Facility			X		
21	M7-0360	8BR2671	Space Station Processing Facility					X
		8BR1686	Launch Complex 39A District					
22	J8-1708	8BR1995	Launch Complex 39A	X		X		
23	J8-1462	8BR2094	High Pressure GH2 Facility		X		X	
24	J8-1502	8BR2095	LOX Facility		X		X	
25	J8-1503	8BR2096	Operations Support Building A-1		X		X	

Note: Listing does not include NHL and Archaeological Sites.

Historic Properties at Kennedy Space Center
As of November 2008 (Revised December 2010) (continued)

<i>Number of Historic Properties</i>	<i>Facility Number</i>	<i>Site File Number</i>	<i>Facility Name</i>	<i>Listed Under Apollo Program</i>	<i>Contributing to Apollo Program</i>	<i>Eligible Under Space Shuttle Program</i>	<i>Contributing to Space Shuttle Program</i>	<i>Eligible Under International Space Station Program</i>
24	J8-1614	8BR2102	Operations Support Building A-2		X		X	
25	J8-1512	8BR2097	Camera Pad A. No. 1		X		X	
26	J8-1714	8BR2105	Camera Pad A. No. 2		X		X	
27	J8-1961	8BR2107	Camera Pad A No. 3		X		X	
28	J8-1956	8BR2106	Camera Pad A No. 4		X		X	
29	J8-1554	8BR2100	Camera Pad A No. 6		X		X	
30	J8-1513	8BR2098	LH2 Facility		X		X	
31	J8-1563	8BR2101	Electrical Equipment Building No. 1		X		X	
32	J8-1553	8BR2099	Electrical Equipment No. 2		X		X	
33	J8-1703	8BR2103	Slidewire Termination Facility		X		X	
34	J8-1707	8BR2104	Water Chiller Building		X		X	
35	J8-1610	8BR2108	Water Tank				X	
36	J8-1611	8BR2109	Flare Stack				X	
37	J8-1811	8BR2110	Electrical Equipment Building No. 3				X	
38	J8-1856	8BR2111	Electrical Building No. 4				X	
39	J8-1906	8BR2113	Hypergol Fuel Facility				X	
40	J8-1862	8BR2112	Hypergol Oxidizer Facility				X	
41	J8-1564		Foam Building		X			
42	J8-1565		Pump House		X			
43	J8-1659		Compressed Air Building		X			
44	J8-1753		Remote Air Intake Building		X			
45	J8-1858		Azimuth Alignment Station		X			

Historic Properties at Kennedy Space Center
As of November 2008 (Revised December 2010) (continued)

<i>Number of Historic Properties</i>	<i>Facility Number</i>	<i>Site File Number</i>	<i>Facility Name</i>	<i>Listed Under Apollo Program</i>	<i>Contributing to Apollo Program</i>	<i>Eligible Under Space Shuttle Program</i>	<i>Contributing to Space Shuttle Program</i>	<i>Eligible Under International Space Station Program</i>
		8BR1687	Launch Complex 39B District					
46	J7-337	8BR2010	Launch Complex 39B	X		X		
47	J7-132	8BR2114	Operations Support Building B-1		X		X	
48	J7-243	8BR2122	Operations Support Building B-2		X		X	
49	J7-140	8BR2115	High Pressure GH2 Facility		X		X	
50	J7-182	8BR2116	LOX Facility		X		X	
51	J7-191	8BR2118	Camera Pad B No. 1		X		X	
52	J7-342	8BR2124	Camera Pad B No. 2		X		X	
53	J7-589	8BR2127	Camera Pad No. 3		X		X	
54	J7-584	8BR2126	Camera Pad B No. 4		X		X	
55	J7-183	8BR2117	Camera Pad B No. 6		X		X	
56	J7-192	8BR2119	LH2 Facility		X		X	
57	J7-241	8BR2121	Electrical Equipment Building No. 1		X		X	
58	J7-231	8BR2120	Electrical Equipment Building No. 2		X		X	
59	J7-331	8BR2123	Slidewire Termination Facility		X		X	
60	J7-385	8BR2125	Water Chiller Building		X		X	
61	J7-240	8BR2128	Flarestack				X	
62	J7-288	8BR2129	Water Tank				X	
63	J7-490	8BR2130	Hypergol Oxidizer Facility				X	
64	J7-491	8BR2131	Electrical Equipment No. 3				X	

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As of November 2008 (Revised December 2010) (continued)

<i>Number of Historic Properties</i>	<i>Facility Number</i>	<i>Site File Number</i>	<i>Facility Name</i>	<i>Listed Under Apollo Program</i>	<i>Contributing to Apollo Program</i>	<i>Eligible Under Space Shuttle Program</i>	<i>Contributing to Space Shuttle Program</i>	<i>Eligible Under International Space Station Program</i>
65	J7-535	8BR2133	Electrical Equipment No. 4				X	
66	J7-534	8BR2132	Hypergol Fuel Facility				X	
67	J7-242		Foam Building		X			
68	J7-338		Compressed Air Building		X			
69	J7-537		Azimuth Alignment Station		X			
70	J7-432		Remote Air Intake Building		X			
		8BR1986	Shuttle Landing Facility District					
71		8BR1987	Shuttle Runway			X		
72	J6-2313	8BR1988	Landing Aids Control Building			X		
73	J6-2262	8BR1989	Mate-Demate Device			X		
		8BR1990	Orbiter Processing Historic District					
74	K6-894	8BR1991	Orbiter Processing Facility			X		
75	K6-696	8BR1992	Orbiter Processing Facility High Bay 3 (includes the Space Shuttle Main Engine Processing Facility)			X		
76	K6-794	8BR1994	Thermal Protection System Facility			X		

Historic Properties at Kennedy Space Center
As of November 2008 (Revised December 2010) (continued)

<i>Number of Historic Properties</i>	<i>Facility Number</i>	<i>Site File Number</i>	<i>Facility Name</i>	<i>Listed Under Apollo Program</i>	<i>Contributing to Apollo Program</i>	<i>Eligible Under Space Shuttle Program</i>	<i>Contributing to Space Shuttle Program</i>	<i>Eligible Under International Space Station Program</i>
		8BR1996	Solid Rocket Booster (SRB) Disassembly and Refurbishment Complex District					
77	66250	8BR2001	Hangar AF				X	
78	66251	8BR2002	High Pressure Gas Facility				X	
79	66240	8BR2003	High Pressure Wash Facility				X	
80	66242	8BR2004	First Wash Building				X	
81	66244	8BR2005	SRB Recovery Slip				X	
82	66310	8BR2006	SRB Paint Building				X	
83	66320	8BR2007	Robot Wash Building				X	
84	66249	8BR2008	Thrust Vector Control Deservicing Building				X	
85	66340	8BR2009	Multi-Media Blast Facility				X	
		8BR2015	Hypergol Maintenance and Checkout Area District					
86	M7-961	8BR1993	Hypergol Module Processing North			X		
87	M7-1061	8BR2000	Hypergol Support Building				X	

Note:

Launch Silo 31B and 32B are also considered eligible historic properties on the CCAFS per survey conducted in 1994 by the U.S. Army Construction Engineering Research Laboratory.

RoomNumber	Aspect	ProcessName	ProcessDescription	Impact	BUILDING_No
N.Ext	Hypergol Ox Scrubber (NaOH)	Ox Pad	Oxidation Pad run scrubber, de	Air Emissions	K6-0696
I-43	Oxidizer Purging System	Oxidizer Purging System	OPF #3	Atmospheric Emissions/Discharges	K6-0696
I-161	Pattern Shop - dust collectors	Pattern Shop - dust collectors	OPF #3	Atmospheric Emissions/Discharges	K6-0696
Rm 1191	Surface Coating Fumehood Rm 1191	Surface Coating Fumehood Rm	OPF #3	Atmospheric Emissions/Discharges	K6-0696
I-118	Acid/Tetra Etching	Acid/Tetra Etching	OPF #3	Atmospheric Emissions/Discharges	K6-0696
I-162	Central Vacuum System 1&2	Central Vacuum System 1&2	OPF #3	Atmospheric Emissions/Discharges	K6-0696
I-119	Coating Mix Crib	Coating Mix Crib	OPF #3	Atmospheric Emissions/Discharges	K6-0696
I-44	Fuel Purging system	Fuel Purging system	OPF #3	Atmospheric Emissions/Discharges	K6-0696
I-73	Fume Hood	Fume Hood	OPF #3	Atmospheric Emissions/Discharges	K6-0696
I-108	High-Bay Operations (DMES)	High-Bay Operations (DMES)	OPF #3	Atmospheric Emissions/Discharges	K6-0696
2157B	Room 215B	Unknown	No Waste Site	Energy Usage	K6-0696
OPF-3 CAN PUNCTURER	OPF-3 CAN PUNCTURER	SAA_OPF3_CANPUNCTURER	SATELLITE	Hazardous Waste	K6-0696
OPF-3, HIGHBAY	OPF-3, HIGHBAY	SAA_OPF3_Highbay	SATELLITE	Hazardous Waste	K6-0696
OPF-3 MIX CRIB	OPF-3 MIX CRIB	SAA_OPF3_MIXCRIB	SATELLITE	Hazardous Waste	K6-0696
SSMEPF GSE AREA	SSMEPF GSE AREA	SAA_SSMEPF_GSE	SATELLITE	Hazardous Waste	K6-0696
SSMEPF HIGH BAY	SSMEPF HIGH BAY	SAA_SSMEPF_HIGHBAY	SATELLITE	Hazardous Waste	K6-0696
N.Ext	Drums	Ox Pad	Oxidation Pad run scrubber, de	Hazardous Waste	K6-0696
OPF-3 CONEX	OPF-3 CONEX	HAZ_OPF3_CONEX	90-DAY	Hazardous Waste	K6-0696
OPF-3 FUEL PAD	OPF-3 FUEL PAD	HAZ_OPF3_FUEL PAD	90-DAY	Hazardous Waste	K6-0696
OPF-3 OXIDIZER PAD	OPF-3 OXIDIZER PAD	HAZ_OPF3_OXIDIZER PAD	90-DAY	Hazardous Waste	K6-0696
highbays	Hazardous waste generation	Cleaning of Highbays and change out room		Hazardous Waste	K6-0696
Hydraulic Bleed Drum	Hydraulic Bleed drum	Hydraulic Bleed Drum	No Waste Site	Impact Soil/Land	K6-0696
highbays	Chemical storage	Cleaning of Highbays and change out room		Other Potential Interaction	K6-0696
N.Ext	OPF3 Chemicals	POL North of OPF3	POL, Chemical storage for OPF	Raw Material Usage	K6-0696
N.Ext	Overhead	Exterior Grounds North	OPF-3 Support	Raw Material Usage	K6-0696
ECS 1024	Glycol	Environmental Control System	Environmental controls for the c	Raw Material Usage	K6-0696
N.Ext	Cylinder rack	Exterior Grounds North	OPF-3 Support	Raw Material Usage	K6-0696
N.Ext	K6-696-OPF-3	Exterior Grounds North	OPF-3 Support	Raw Material Usage	K6-0696
highbays	Wiper reuse program	Cleaning of Highbays and change out room		Recycling	K6-0696
N.Ext	Overhead Dust Collector	Exterior Grounds North	OPF-3 Support	Solid Waste	K6-0696
OPF-3 HYDRAULIC PUMPER	OPF-3 HYDRAULIC PUMPER UNIT	NON_OPF3_HYDRAULIC	NON-REG	Solid Waste Generation	K6-0696
N.Ext	Rainfall	Exterior Grounds North	OPF-3 Support	Storm Water Discharges	K6-0696
N.Ext	OPF3 North trenches	Exterior Grounds North	OPF-3 Support	Surface/Groundwater discharge	K6-0696
N.Ext	NaOH Sumps	Ox Pad	Oxidation Pad run scrubber, de	Surface/Groundwater discharge	K6-0696
N.Ext	Environmental Purge	PPU	Portable Purge Unit	Wastewater Discharge	K6-0696
N.Ext	Chiller	Chiller	North West Exterior Chiller Buil	Wastewater Discharge	K6-0696

EXHIBIT C
PERSONAL PROPERTY EQUIPMENT LIST

LISTED PROCESSING, LAUNCH AND LANDING SUPPORT EQUIPMENT

<u>Equipment Description</u>	<u>Property ID</u>	<u>Model #</u>	<u>Date of Receipt</u>	<u>Date of Disposal/Excess</u>	<u>Condition</u>	<u>Location</u>	<u>Notes From Inventory</u>
OPF Bay 3 Personal Property							
Oxidizer Aspirator S70-1349-02-006	964563	S70-1349-02 / 006	8/1/2011	N/A	Good	K6-0696	See Note 2
[S70-1349-01-009] Eductor Panel	964987	S70-1349-01 / 009	8/1/2011	N/A	Good	K6-0696	See Note 1
[S70-1345-01-002] Panel, APU Deservicing	965255	S70-1345-01 / 002	8/1/2011	N/A	Good	K6-0696	Matches with item found in OPF3
[S70-0865-09-002] Valve, Oxidizer, Right Hand	965649	S70-0865-09 / 002	8/1/2011	N/A	Good	K6-0696	Matches with item found in OPF3
[S70-1349-01-010] Eductor Panel, Oxidizer	965850	S70-1349-01 / 010	8/1/2011	N/A	Good	K6-0696	See Note 1
[S70-0865-07-002] Fuel Valve, APS, Right Hand	965900	S70-0865-07 / 002	8/1/2011	N/A	Good	K6-0696	Matches with item found in OPF3
[S70-1349-01-011] Eductor Panel	966228	S70-1349-01 / 011	8/1/2011	N/A	Good	K6-0696	See Note 1
[S70-1349-02-004] Eductor Panel, Oxidizer	966781	S70-1349-02 / 004	8/1/2011	N/A	Good	K6-0696	See Note 2
[S70-1349-01-005] Eductor, Hypergolic Spill	966920	S70-1349-01 / 005	8/1/2011	N/A	Good	K6-0696	See Note 1
[S70-1349-02-007] Eductor Panel, Oxidizer	967034	S70-1349-02 / 007	8/1/2011	N/A	Good	K6-0696	See Note 2
[S70-1349-01-007] Eductor Panel, Oxidizer	967072	S70-1349-01 / 007	8/1/2011	N/A	Good	K6-0696	See Note 2
[S70-1349-01-008] Eductor Panel	967505	654	8/1/2011	N/A	Good	K6-0696	See Note 1
[S70-1349-01-013] Eductor Panel	969342	S70-1349-01 / 013	8/1/2011	N/A	Good	K6-0696	See Note 1
[S70-1349-02-003] Eductor Panel, Oxidizer	969351	S70-1349-02 / 003	8/1/2011	N/A	Good	K6-0696	See Note 2
[S70-0865-05-002] Valve, PBK Oxidizer	969380	S70-0865-05 / 002	8/1/2011	N/A	Good	K6-0696	Matches with item found in OPF3
[S70-1349-02-009] Eductor Panel, Oxidizer	969851	S70-1349-02 / 009	8/1/2011	N/A	Good	K6-0696	See Note 2
[S70-1349-02-005] Eductor Panel, Oxidizer	970530	S70-1349-02 / 005	8/1/2011	N/A	Good	K6-0696	See Note 2
[S70-1349-02-011] Eductor Panel, Oxidizer	970834	S70-1349-02 / 011	8/1/2011	N/A	Good	K6-0696	See Note 2
[S70-1349-02-008] Eductor Panel	971125	S70-1349-02 / 008	8/1/2011	N/A	Good	K6-0696	See Note 2
[S70-1349-02-010] Eductor Panel	971274	S70-1349-02 / 010	8/1/2011	N/A	Good	K6-0696	See Note 2
[S70-0865-11-002] Valve Complex, APS Fuel, Left Hand	978340	S70-0865-11 / 002	8/1/2011	N/A	Good	K6-0696	Matches with item found in OPF3
[H70-1377-01-002] Bridge Crane, 2 Ton	964187	H70-1377-01 / 002	8/1/2011	N/A	Good	K6-0696	Matches with item found in OPF3
[M70-8309-03] Panel, Communications / Tracking GN2 Purge	964189	M70-8309-03 / 001	8/1/2011	N/A	Good	K6-0696	I did not find a M70-8309-03 in OPF3
[C70-0725-03-001] Line Set, RF Transmission, OPF-3	964370	C70-0725-03 / 001	8/1/2011	N/A	Good	K6-0696	See Note 3
[C70-0834-02-003] GO2 Back Pressure Panel	964789	C70-0834-02 / 003	8/1/2011	N/A	Good	K6-0696	Matches with item found in OPF3
[S70-0695-02-003] Panel, GN2 O2	965133	S70-0695-02 / 003	8/1/2011	N/A	Good	K6-0696	Matches with item found in OPF3
Crane, Bridge, 10 -Ton (Low Bay), OPF HB3	965257	H70-1528 / 001	8/1/2011	N/A	Good	K6-0696	I did not climb up and check bridge cranes. Assume good.
[S70-0679-12-003] System, SSME Dedicated Vent, OPF	965393	S70-0679-12 / 003	8/1/2011	N/A	Good	K6-0696	I did not find a S70-0679-12 S/N 003 in OPF3
[S70-1515-00-001] SSMEPF GN2 & GHE Distribution System	965660	S70-1515 / 001	8/1/2011	N/A	Good	K6-0696	See Note 4
DOOR, K6-0696 OPF-3, HORIZONTAL, SLIDING (PARENT)	966382	K61-0290 / 001	8/1/2011	N/A	Good	K6-0696	I did not check the doors
[S70-0815-03-003] Valve Panel, O2 Cryogenic	966833	S70-0815-03 / 003	8/1/2011	N/A	Good	K6-0696	Matches with item found in OPF3
[S70-0698-02-003] Control Panel, GH2	966852	S70-0698-02 / 003	8/1/2011	N/A	Good	K6-0696	Matches with item found in OPF3
[S70-1216-00-002] GHE/GH2 Panel, SSME Engine Shop	968184	S70-1216 / 002	8/1/2011	N/A	Good	K6-0696	See Note 4
OPF 3 CRANE 2, 30 TON	968247	H70-1379-01 / 002	8/1/2011	N/A	Good	K6-0696	I did not climb up and check bridge cranes. Assume good.
[S70-0679-02-003] Supply Panel, GN2 / GHE	968494	S70-0679-02 / 003	8/1/2011	N/A	Good	K6-0696	Matches with item found in OPF3
SYSTEM, GO2 PIPING (FCSS)	969126	C70-0834 / 003	8/1/2011	N/A	Good	K6-0696	Comes close to matching item found in OPF3. This has incomplete Model number. The one in OPF3 is C70-0834-02 S/N 003
[S70-1231-00-003] Distribution System, WSB Fluid, OPF	969130	S70-1231 / 003	8/1/2011	N/A	Good	K6-0696	I did not find a S70-1231-00 S/N 003 in OPF3
[S70-0695-04A-001] Servicing Panel, GHE / GN2	969134	S70-0695-04A / 001	8/1/2011	N/A	Good	K6-0696	Matches item found in OPF3. Need to confirm S/N. I didn't write down 001
[C70-0724-03-001] Antenna Facility Set, OPF-3	969379	C70-0724-03 / 001	8/1/2011	N/A	Good	K6-0696	See Note 3
[S70-1216-00-001] GHE/GH2 Panel, SSME Engine Shop	969532	S70-1216 / 001	8/1/2011	N/A	Good	K6-0696	See Note 4
[C70-0727-09-002] Checkout Station, GPS Communications and Tracking	969657	C70-0727-09 / 002	8/1/2011	N/A	Good	K6-0696	See Note 3
Crane, Bridge, 15-Ton (Hi-Bay)	969840	H70-1529 / 001	8/1/2011	N/A	Good	K6-0696	I did not climb up and check bridge cranes. Assume good.
SYSTEM, GH2 PIPE DISTRIBUTION, OPF	969899	S70-0698 / 003	8/1/2011	N/A	Good	K6-0696	Assume good

LISTED PROCESSING, LAUNCH AND LANDING SUPPORT EQUIPMENT

Equipment Description	Property ID	Model #	Date of Receipt	Date of Disposal/Excess	Condition	Location	Notes From Inventory
FDS, HARDLINE/FLEXLINE, OPF 1,2,3	970006	K60-0204 / 002	8/1/2011	N/A	Good	K6-0696	Seems like part of facility by the description
[S70-1216-00-003] GHE/GH2 Panel, SSME Engine Shop	970063	S70-1216 / 003	8/1/2011	N/A	Good	K6-0696	See Note 4
OPF 3 CRANE 1, 30 TON	970161	H70-1379-01 / 001	8/1/2011	N/A	Good	K6-0696	I did not climb up and check bridge cranes. Assume good.
[C70-0834-01-003] GO2 Control Panel	970182	C70-0834-01 / 003	8/1/2011	N/A	Good	K6-0696	Matches with item found in OPF3
[H70-1377-01-003] Bridge Crane, 2 Ton	970505	H70-1377-01 / 003	8/1/2011	N/A	Good	K6-0696	S/N wrong. For the 2-ton cranes, OPF3 contains 001 and 002
[S70-0679-04-004] Servicing Panel, ECLSS GN2	971415	S70-0679-04 / 004	8/1/2011	N/A	Good	K6-0696	Matches with item found in OPF3
PANEL, WAVEGUIDE GN2 PURGE	986124	C70-0727-01 / NSN	8/1/2011	N/A	Good	K6-0696	See Note 3
PANEL, GH2 CONTROL	989826	S70-0698-02 / 0015	8/1/2011	N/A	Good	K6-0696	S/N wrong. I found a S/N 003
PANEL, GN2/GH2 REG/CONTROL	989835	S70-0695-02 / FEC0011	8/1/2011	N/A	Good	K6-0696	S/N wrong. I found a S/N 003
ANTENNA, 8FT	990116	PL8-19C / TW2293	8/1/2011	N/A	Good	K6-0696	See Note 3
ANTENNA, 6FT	990117	PL6-19C / TW1450	8/1/2011	N/A	Good	K6-0696	See Note 3
ANTENNA, 6FT	990118	P6-144D / TW1670	8/1/2011	N/A	Good	K6-0696	See Note 3
ANTENNA, 6FT	990119	PL6-17C / TW3160	8/1/2011	N/A	Good	K6-0696	See Note 3
ANTENNA, 6FT	990120	PL6-17C / TW1504	8/1/2011	N/A	Good	K6-0696	See Note 3
ANTENNA, 4 FT	990263	P4-144D / NA	8/1/2011	N/A	Good	K6-0696	See Note 3

Notes

1

Issues: Occupant is asking for 7 Fuel Aspirators (S70-1349-01) said to be located in facility. Walk-thru inventory only found 2 complete units with GPD tag on them. There are a few other "bare units" with no GPD tag.

2

Issues: Occupant is asking for 9 Ox Aspirators (S70-1349-02) said to be located in facility. Walk-thru inventory only found 2 complete units with GPD tag on them. There are a few other "bare units" with no GPD tag.

3

This seems like something that may be in C&T Lab. Did not go in there and did not go up on the roof to look at the antennas

4

Did not inventory the SSME shop.

EXHIBIT D
FACILITY SYSTEMS LIST FOR ORBITER PROCESSING FACILITY 3 AND THE
PROCESSING CONTROL CENTER

This list includes those “Facility Systems” for which Space Florida will be responsible for maintaining configuration control and reporting to NASA KSC under KCA-4311.

- Potable water
- Sewer and lift stations
- Sprinkler
- Firex
- Fire alarm
- Heating, Ventilating, and Air Conditioning (HVAC)
- HVAC control
- Power and electrical systems
- Elevators
- Radio Frequency radiating devices
- Helium distribution
- Gaseous Nitrogen distribution
- Compressed air
- Breathing air
- Hazardous fueling systems
- Lightning protection
- Boiler(s)
- Natural gas distribution structure

EXHIBIT E
NASA SAFETY STANDARD FOR FIRE PROTECTION



**NASA TECHNICAL
STANDARD**

National Aeronautics and Space Administration
Washington, DC 20546

**NASA-STD-8719.11
Revision A**

Approved: 2008-11-19
Superseding NASA-STD-8719.11

SAFETY STANDARD FOR FIRE PROTECTION

**Measurement System Identification:
Metric**

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DOCUMENT HISTORY LOG

Status	Document Revision	Approval Date	Description
Baseline	Change 3	2000-12-19	Initial Release with Change 3
	Revalidated	2006-04-06	Revalidated
Revision A	-	2008-11-19	Various updates and reformatting (JWL4)

This document is subject to reviews per Office of Management and Budget Circular A-119, Federal Participation in the Development and Use of Voluntary Standards (02/10/1998) and NPD 8070.6, Technical Standards (Paragraph 1.k).

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FOREWORD

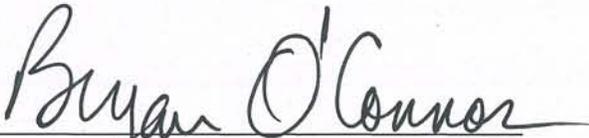
This NASA-STD is published by the National Aeronautics and Space Administration (NASA) to provide a uniform, comprehensive NASA Fire Protection Program. It contains minimum fire safety requirements and guidelines applicable to NASA Headquarters and all NASA Centers.

This NASA-STD is approved for use by NASA Headquarters and NASA Centers, including Component Facilities. This NASA-STD may be applied on contracts per contractual documentation.

This standard expands on the policy and requirements for fire protection listed in Chapter 5 of NPR 8715.3, "NASA General Safety Program Requirements." It is a compilation of pertinent requirements from the Occupational Safety and Health Administration (OSHA), National Fire Protection Association (NFPA), and unique NASA requirements. The intent is to combine the knowledge of all NASA Centers, standardize definitions, and develop uniform requirements. This document is not intended to be a substitute for Federal or applicable State and local government requirements.

Comments and questions concerning the contents of this publication should be referred to the National Aeronautics and Space Administration, Director, Safety and Assurance Requirements Division, Office of Safety and Mission Assurance, Washington, DC 20546.

Requests for information, corrections, or additions to this NASA-STD shall be submitted via "Feedback" in the NASA Technical Standards System at <http://standards.nasa.gov> or to National Aeronautics and Space Administration, Director, Safety and Assurance Requirements Division, Office of Safety and Mission Assurance, Washington, DC 20546.



Bryan O'Connor
Chief, Safety and Mission Assurance

November 19, 2008

Approval Date

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SAFETY STANDARD FOR FIRE PROTECTION

1. SCOPE

1.1 Purpose

This standard establishes requirements and responsibilities related to NASA's Fire Protection Program. It contains requirements for fire prevention, detection, control, and suppression through engineering, inspection, training, and firefighting.

1.2 Applicability

1.2.1 Compliance with this standard is mandatory for all NASA owned/leased and/or occupied facilities, both new and existing. The individual NASA Centers are responsible for implementation and enforcement. This document establishes *minimum* fire and life safety requirements. NASA Centers should apply risk management to processes in order to assess their individual programs and adopt additional requirements as needed. The contracting officer and the responsible NASA Center program fire safety office shall evaluate the need for compliance with this standard at NASA Centers by contractors performing NASA work and establish compliance as a contractual requirement where deemed necessary (Requirement).

1.2.2 This NASA-STD is applicable to all NASA Centers, facilities, and contractor sites.

1.2.3 This NASA-STD has been designed to be cited in contract, program, and other Agency documents as a technical requirement or as a reference for guidance.

1.2.4 Any decision to waive or vary from the requirements in this NASA-STD requires the concurrence of the Chief, Safety and Mission Assurance, Office of Safety and Mission Assurance (Chief/OSMA).

1.2.5 Within this NASA-STD, the word “shall” indicates a mandatory requirement, the word “should” indicates that a statement is strongly recommended for implementation but not required, and the word “may” indicates an optional implementation.

1.3 General Guidance

1.3.1 This document is not a substitute for Occupational Safety and Health Administration (OSHA) requirements. OSHA requirements apply to all NASA operations. This document meets or exceeds Federal OSHA requirements. Some States have their own OSHA programs that must comply with Federal OSHA. It is NASA's policy that where requirements are conflicting, the most stringent applies. All NASA Centers are responsible for keeping up to date with the current Federal and State OSHA requirements that apply to their operations.

1.3.2 Deviations/waivers from the requirements of this document shall be approved as outlined in NPR 8715.3, “NASA General Safety Program Requirements” (Requirement).

1.3.3 Deviations/waivers shall include any alternate or special fire protection criteria or procedures that will be imposed (Requirement).

1.3.4 By agreement with the Director, Facilities Engineering Division, this standard establishes fire protection requirements for NASA facilities.

2. APPLICABLE AND REFERENCE DOCUMENTS

2.1 Applicable Documents

The documents listed in this section contain provisions that constitute requirements of this NASA-STD as cited in the text of Section 4. The latest issuance of cited documents is to be used unless otherwise approved by the assigned Technical Authority. The applicable documents are accessible via the NASA Online Directives Information System at <http://nodis3.gsfc.nasa.gov/>, or directly from the Standards Developing Organizations (SDO) or other document distributors.

2.1.1 GOVERNMENT DOCUMENTS:

Code of Federal Regulations:

24 CFR 3280	Manufactured Home Construction and Safety Standards
29 CFR 1910	Occupational Safety and Health
29 CFR 1910.22	General Requirements
29 CFR 1910.38	Employee Emergency Plans and Fire Prevention Plans
29 CFR 1910.94	Ventilation
29 CFR 1910.106	Flammable and Combustible Liquids
29 CFR 1910.107	Spray Finishing Using Flammable and Combustible Materials
29 CFR 1910.119	Process Safety Management of Highly Hazardous Chemicals
29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
29 CFR 1910.146	Permit Required Confined Spaces
29 CFR 1910.156	Fire Brigades
29 CFR 1910.158	Standpipe and Hose Systems
29 CFR 1910.159	Automatic Sprinkler Systems
29 CFR 1910.161	Fixed Extinguishing Systems/Dry Chemical
29 CFR 1910.162	Fixed Extinguishing Systems/Gaseous Agent
29 CFR 1910.163	Fixed Extinguishing Systems/Water Spray and Foam
29 CFR 1919.164	Fire Detection Systems
29 CFR 1910.165	Employee Alarm Systems
29 CFR 1910.251	Welding, Cutting, and Brazing, Definitions
29 CFR 1910.252	Welding, Cutting, and Brazing, General Requirements
29 CFR 1910.263	Oxygen-Fuel Gas Welding and Cutting

29 CFR 1910.254	Arc Welding and Cutting
29 CFR 1910.1450	Occupational Exposure to Hazardous Chemicals in Laboratories
29 CFR 1960	Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters
29 CFR 1960.12	Construction Work
41 CFR 101	Uniform Federal Accessibility Standards

NASA Documents:

NPR 8715.1	NASA Occupational Safety and Health Programs
NPR 8715.2	NASA Emergency Preparedness Plan Procedural Requirements
NPR 8715.3	NASA General Safety Program Requirements
NPR 8820.2	Facility Project Requirements.
NSS 1740.12	NASA Safety Standard for Explosives, Propellants, and Pyrotechnics (as of Oct 2008, in final review to become NASA-STD 8719.12)

Other Federal Documents:

DOD 6055.9	Department of Defense; Ammunition and Explosives Safety Standard
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2.1.2 NATIONAL STANDARDS:

ACI 318	Building Code Requirements for Reinforced Concrete
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American National Standards Institute (ANSI)

ANSI A17.1	Safety Code for Elevators and Escalators
ANSI A17.3	Safety Code for Existing Elevators and Escalators
ANSI A117.1	Accessible and Usable Buildings and Facilities
ANSI A119.1	Mobile Homes
ANSI RP7	Practices for Industrial Lighting

National Fire Protection Association (NFPA)

NFPA 1	Fire Prevention Code
--------	----------------------

NFPA 10	Standard for Portable Fire Extinguishers
NFPA 11	Low-, Medium-, and High-Expansion Foam
NFPA 12	Standard on Carbon Dioxide Extinguishing Systems
NFPA 12A	Standard on Halon 1301 Fire Extinguishing Systems
NFPA 13	Installation of Sprinkler Systems
NFPA 13D	Standard for the Installation of Sprinkler Systems in One- And Two-Family Dwellings and Manufactured Homes
NFPA 13R	Standard for Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height
NFPA 14	Standard for the Installation of Standpipe, Private Hydrants and Hose Systems
NFPA 15	Standard for Water Spray Fixed Systems for Fire Protection
NFPA 16	Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems
NFPA 17	Standard for Dry Chemical Extinguishing Systems
NFPA 17A	Standard for Wet Chemical Extinguishing Systems
NFPA 20	Standard for the Installation of Stationary Fire Pumps for Fire Protection
NFPA 22	Standard for Water Tanks for Private Fire Protection
NFPA 24	Installation of Private Fire Service Mains and Their Appurtenances
NFPA 25	Inspection Testing and Maintenance of Water-Based Fire Protection Systems
NFPA 30	Flammable & Combustible Liquids Code
NFPA 31	Standard for the Installation of Oil-Burning Equipment
NFPA 33	Standard for Spray Application Using Flammable or Combustible Materials
NFPA 37	Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines
NFPA 45	Standard on Fire Protection for Laboratories Using Chemicals
NFPA 51B	Standard for Fire Prevention During Welding, Cutting and Other Hotwork
NFPA 54	National Fuel Gas Code
NFPA 58	Liquefied Petroleum Gas Code

NFPA 59A	Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG)
NFPA 68	Guide for Venting of Deflagrations
NFPA 70	National Electrical Code
NFPA 72	National Fire Alarm Code
NFPA 75	Standard for the Protection of Electronic Computer/Data Processing Equipment
NFPA 77	Recommended Practice on Static Electricity
NFPA 80	Standard for Fire Doors, Fire Windows
NFPA 80A	Recommended Practice for Protection of Buildings from Exterior Fire Exposures
NFPA 86	Standard for Ovens and Furnaces
NFPA 88B	Standard for Repair Garages
NFPA 90A	Standard for the Installation of Air Conditioning and Ventilating Systems
NFPA 91	Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids
NFPA 92A	Recommended Practice for Smoke-Control Systems
NFPA 92B	Guide for Smoke Management Systems in Malls, Atria, and Large Areas
NFPA 96	Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations
NFPA 101	Life Safety Code
NFPA 101A	Guide on Alternative Approaches to Life Safety
NFPA 170	Fire Safety and Emergency Symbols
NFPA 204	Guide for Smoke and Heat Venting
NFPA 211	Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning, Appliances
NFPA 214	Standard on Water-Cooling Towers
NFPA 221	High-Challenge Fire Walls, Fire Walls, and Fire Barrier Walls
NFPA 241	Standard for Safeguarding Construction, Alteration, and Demolition Operations

NFPA 251	Standard Methods of Tests of Fire Endurance of Building Construction and Materials
NFPA 253	Standard Method of Test for Critical Radiant Flux for Floor Covering Systems Using a Radiant Heat Energy Source
NFPA 255	Standard Method of Test of Surface Burning Characteristics of Building Materials
NFPA 256	Standard Methods of Fire Tests of Roof Coverings
NFPA 291	Fire Flow Testing and Marking of Hydrants
NFPA 307	Marine Terminals, Piers, and Wharves
NFPA 402	Guide for Aircraft Rescue and Fire Fighting Operations
NFPA 403	Standard for Aircraft Rescue and Fire Fighting Services at Airports
NFPA 405	Recurring Proficiency of Airport Fire Fighters
NFPA 409	Standard on Aircraft Hangers
NFPA 410	Aircraft Maintenance
NFPA 412	Standard for Evaluating Aircraft Rescue and Fire Fighting Foam Equipment
NFPA 414	Standard for Aircraft Rescue and Fire Fighting Vehicles
NFPA 418	Heliports
NFPA 424	Airport/Community Emergency Planning
NFPA 450	Emergency Medical Services and Systems
NFPA 471	Recommended Practice for Responding to Hazardous Materials Incidents
NFPA 472	Standard for Professional Competence of Responders to Hazardous Materials Incidents
NFPA 473	Standard for Competencies for EMS Personnel Responding to Hazardous Materials Incidents
NFPA 550	Guide to the Fire Safety Concepts Tree
NFPA 551	Evaluation of Fire Risk Assessments
NFPA 600	Standard on Industrial Fire Brigades
NFPA 701	Standard Methods of Fire Tests for Flame Propagation of Textiles and Films
NFPA 704	Identification of the Hazards of Materials

NFPA 750	Water Mist Fire Protection Systems
NFPA 780	Installation of Lightning Protection Systems
NFPA 801	Facilities Handling Radioactive Materials
NFPA 820	Fire Protection in Wastewater Treatment and Collection Facilities
NFPA 850	Electric Generating Plants
NFPA 853	Stationary Fuel Cell Power Systems
NFPA 901	Standard Classifications for Incident Reporting and Fire Protection Data
NFPA 902	Fire Reporting Field Incident Guide
NFPA 903	Fire Reporting Property Survey Guide
NFPA 906	Guide for Fire Incident Field Notes
NFPA 914	Fire Protection in Historic Structures
NFPA 921	Guide for Fire and Explosion Investigations
NFPA 1001	Standard for Fire Fighter Professional Qualifications
NFPA 1002	Standard on Fire Apparatus Driver/Operator Professional Qualifications
NFPA 1003	Standard for Airport Fire Fighter Professional Qualifications
NFPA 1006	Rescue Technician Professional Qualifications
NFPA 1021	Standard for Fire Officer Professional Qualifications
NFPA 1031	Standard for Professional Qualifications for Fire Inspector and Plan Examiner
NFPA 1033	Standard for Professional Qualifications for Fire Investigator
NFPA 1035	Standard for Professional Qualifications for Public Fire and Life Safety Educator
NFPA 1041	Standard for Fire Service Instructor Professional Qualifications
NFPA 1051	Wildland Fire Fighter Professional Qualifications
NFPA 1061	Public Safety Telecommunicator Qualifications
NFPA 1071	Emergency Vehicle Technicians
NFPA 1081	Industrial Fire Brigade Member Professional Qualifications
NFPA 1123	Code for Fireworks Display
NFPA 1124	Code for the Manufacture, Transportation, and Storage of Fireworks and Pyrotechnic Articles

NFPA 1142	Water Supplies for Suburban and Rural Fire Fighting
NFPA 1143	Wildland Fire Management
NFPA 1144	Protection of Life and Property from Wildfire
NFPA 1145	Class A Foams
NFPA 1150	Foam Chemicals for Fires in Class A Fuels
NFPA 1201	Standard for Developing Fire Protection Services for the Public
NFPA 1221	Standard for the Installation, Maintenance, and Use of Public Fire Service Communication Systems
NFPA 1250	Emergency Service Organization Risk Management
NFPA 1401	Recommended Practice for Fire Service Training Reports and Records
NFPA 1402	Building Fire Service Training Centers
NFPA 1403	Standard on Live Fire Training Evolutions
NFPA 1404	Standard for a Fire Department Self-Contained Breathing Apparatus Program
NFPA 1405	Guide for Land-Based Fire Fighters Who Respond to Marine Vessel Fires
NFPA 1410	Standard on Training for Initial Emergency Scene Operations
NFPA 1451	Fire Service Vehicle Operations Training Program
NFPA 1452	Training Fire Department Personnel to Conduct Dwelling Fire Safety Surveys
NFPA 1500	Standard on Fire Department Occupational Safety and Health Program
NFPA 1521	Standard for Fire Department Safety Officer
NFPA 1561	Standard on Fire Department Incident Management System
NFPA 1581	Standard on Fire Department Infection Control Program
NFPA 1582	Standard on Medical Programs for Fire Departments
NFPA 1583	Health-Related Fitness for Firefighters
NFPA 1584	Rehabilitation of Members Operating at Incident Scene Operations and Training Exercises
NFPA 1600	Disaster/Emergency Management
NFPA 1620	Pre-Incident Planning
NFPA 1670	Operations and Training for Technical Rescue Incidents

NFPA 1851	Structural Fire Fighting Protective Ensembles
NFPA 1852	Open-Circuit Self-Contained Breathing Apparatus (SCBA)
NFPA 1901	Standard for Automotive Fire Apparatus
NFPA 1906	Wildland Fire Apparatus
NFPA 1911	Standard for Service Tests of Fire Pump Systems on Fire Apparatus
NFPA 1912	Fire Apparatus Refurbishing
NFPA 1914	Standard for Testing Fire Department Aerial Devices
NFPA 1915	Fire Department Preventive Maintenance
NFPA 1931	Standard on Design of and Design Verification Tests for Fire Department Ground Ladders
NFPA 1932	Standard on Use, Maintenance and Service Testing of Fire Department Ground Ladders
NFPA 1936	Powered Rescue Tools
NFPA 1951	Protective Ensemble for USAR Operations
NFPA 1961	Standard for Fire Hose
NFPA 1962	Standard for the Care, Use and Service Testing of Fire Hose, Including Couplings and Nozzles
NFPA 1963	Standard for Fire Hose Connections
NFPA 1964	Standard for Spray Nozzles (Shutoff and Tip)
NFPA 1965	Fire Hose Appliances
NFPA 1971	Standard on Protective Ensemble for Structural Fire Fighting and Proximity Fire Fighting
NFPA 1977	Protective Clothing and Equipment for Wildland Fire Fighting
NFPA 1981	Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire and Emergency Services
NFPA 1982	Standard on Personal Alert Safety Systems (PASS)
NFPA 1983	Standard on Fire Service Life Safety Rope and Equipment for Emergency Services
NFPA 1989	Breathing Air Quality for Fire and Emergency Services Respiratory Protection
NFPA 1991	Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies

NFPA 1992	Standard on Liquid Splash-Protective Clothing for Hazardous Materials Emergencies
NFPA 1994	Protective Ensembles for Chemical/Biological Terrorism Incidents
NFPA 1999	Standard on Protective Clothing for Emergency Medical Operations
NFPA 2001	Clean Agent Fire Extinguishing Systems
NFPA 2010	Fixed Aerosol Fire-Extinguishing Systems

National Institute of Standards & Technology

NIST Technical
Note 708 Smoke Density Chamber

National Consensus Standards

Industrial Ventilation: A Manual of Recommended Practice; 25th
Edition, American Conference of Governmental Industrial Hygienists

3. DEFINITIONS AND ACRONYMS

3.1 Definitions

Adequate: When referring to fire protection or life safety, the safeguards necessary to provide facilities and their occupants with protection against all known or recognized hazards.

Authority Having Jurisdiction (AHJ): Refers to the individual(s) at the NASA Centers and Headquarters responsible for implementing the fire safety provisions of NPR 8715.3, "NASA General Safety Program Requirements," and with the authority for "approving/concurring in" associated installations, procedures, and equipment.

Classification of Hazard Contents: Hazard contents of any building or structure are classified as low, ordinary, or high.

- Low Hazard Contents: Such low combustibility that no self-propagating fire therein can occur.
- Ordinary Hazard Contents: Likely to burn with moderate rapidity or to give off a large volume of smoke.
- High Hazard Contents: Likely to burn with extreme rapidity or from which explosions are likely.

Classification Of Occupancies For Fire Suppression: Occupancy classifications for this standard relate to sprinkler installations and their water supplies only. They are not intended to be a general classification of occupancy hazards. For purposes of determining required fire protection systems, occupancies will be protected according to their degree of hazard. Principal classifications, with typical examples, are listed under each category. (Note: The classification of unlisted occupancies will be based on an analysis of the hazards and a comparison with the definition and examples of listed occupancies).

- *Light Hazard Occupancies:* Occupancies or portions of other occupancies where the quantity and combustibility of contents are low and fires with relatively low rates of heat release are expected. The facilities of NASA typically exceed this classification.
- *Ordinary Hazard Occupancies (Group 1):* Occupancies or portions of other occupancies where combustibility of contents is low, quantity of combustibles is moderate, stock piles of combustibles do not exceed a height of 8 feet (2.44 meters), and fires with moderate rates of heat release are expected. Modest, scattered amounts of flammable liquids in closed containers are allowed in quantities up to 20 gallons (75.7 liters). The following are examples of Ordinary Hazard Occupancies (Group 1).
 - Auditoriums
 - Automobile parking garages
 - Cafeteria food preparation areas
 - Cafeteria seating areas
 - Classrooms
 - Clinics
 - Computer rooms
 - Drafting rooms and map making rooms
 - Electronic laboratories not normally using flammable liquids
 - File Rooms (files in metal cabinets)

- Mechanical/electrical equipment room
- Museums
- Offices
- Small storage rooms
- Welding shops
- Ordinary Hazard Occupancies (Group 2): Occupancies or portions of other occupancies where quantity and combustibility of contents are moderate, stockpiles do not exceed 12 feet (3.66 meters), and fires with a moderate rate of heat release are expected. Moderate, scattered amounts of flammable liquids in closed containers are allowable in quantities up to 50 gallons (189.3 liters). Small amount of flammable liquids may be exposed as required by normal operations. The following are examples of Ordinary Hazard Occupancies (Group 2).
 - Libraries
 - Mercantile
 - Magnetic tape libraries (tape in plastic cases and/or on plastic reels)
 - Model preparation areas
 - Piers and Wharves
 - Printing plants using inks having flash points at/or above 100 °F (37.9 °C)
 - Transformer vaults
 - Trash rooms
 - Vehicle repair garages
 - Warehouses (storage of noncombustible contents)
 - Woodworking shops
- Extra Hazard Occupancies: Occupancies or portions of other occupancies where the quantity and combustibility of contents are very high or where flammable and combustible liquids, dust, lint, or other materials are present, introducing the probability of rapidly developing fires with high rates of heat release. The following are examples of Extra Hazard Occupancies:
 - Group 1: Aircraft hangars; Chemical laboratories; Engine test cells; Flammable and combustible liquids storage; Printing plants (using inks having flash points below 100 °F (37.9 °C)); Upholstering with plastic foams; Warehouse with plastic foams; Warehouse (combustible contents stored not greater than 15 feet (4.57 meters) in piles of 12 feet (3.66 meters) in racks
 - Group 2: Flammable liquid spraying; Flow coating; Mobile home or modular building assemblies (where finished enclosure is present); Combustible interiors ; Open oil quenching; Plastics processing; Solvent cleaning; Paint dipping
- Special Occupancies: Special Occupancies are facilities or areas which cannot be assigned a specific classification because of special protection requirements (refer to Chapter 10). This classification includes, but is not restricted to, the following occupancies.
 - High bay/payload processing areas
 - Launch facilities
 - Missile assembly areas
 - Ordnance storage/processing areas
 - Warehouses (high piled or high rack storage)
 - Combustible Liquid: A liquid having a flash point at or above 100 °F (37.9 °C)

Cost-Benefit Analysis: A procedure in which the present value of future expenditures associated with the installation and maintenance of a fire safety system or device is related to the economic benefits of the facility or portion thereof that it is designed to protect. The technique is intended to determine the practicality of the installation of fire protection systems and must be limited to those situations where the possibility of loss of human life is low.

Essential Electronic Equipment: Equipment that meets one or more of the following criteria:

- Is directly related to the NASA mission and which, if lost, would seriously impact the ability of NASA to perform its mission.
- Is necessary to the safety and health of personnel.
- Is essential to the security or health of the Nation.
- Performs an operation that must be continued to completion without termination.
- Performs an operation which could be performed by substitute methods, but where the substitute methods would involve significant additional expenditures for personnel, facilities, and/or equipment or an unacceptable length of time.
- Has a high monetary value to the Federal Government (greater than \$1 million). Electronic equipment includes all equipment and devices that are electrically powered and use the emission of electrons in vacuum tubes, cathode ray tubes, photoelectric cells, transistors, diodes, integrated circuits, and other solid state devices. This includes, but is not limited to, electronic digital and analog computers, telephone communications and switching equipment, and other electronic equipment used for statistics, communication, process control, measurement, guidance, simulation, or supervisory operations.

Egress: A continuous and unobstructed way of travel from any point in a building or structure to a public way. It consists of three separate and distinct parts (a) the exit access, (b) the exit, and (c) the exit discharge. A means of egress comprises the vertical and horizontal ways of travel and includes intervening room spaces, doorways, hallways, corridors, passageways, ramps, stairs, lobbies, horizontal exits, courts, and sidewalks.

Equivalent/Equivalency: When referring to fire protection and life safety, the technology, systems, devices, and designs that, while not meeting the letter of code provisions, will provide comparable levels of fire safety. This determination is to be made by the AHJ after a complete analysis of hazardous conditions and required levels of safety.

Facility: Buildings, structures, and other real property improvements including utilities and collateral equipment.

Fire Partition: A physical barrier to prevent the horizontal spread of fire between areas within buildings, constructed of materials sufficient to achieve a 1- or 2-hour fire-resistance rating as determined by NFPA 251. The barrier must extend from the floor to the floor/roof above the area involved (partitions may extend to a listed membrane ceiling at the discretion of the AHJ). Large openings in partitions must be protected by listed fire doors or fire dampers. "Poke-through" openings must be sealed with noncombustible materials listed for that use. Fire partitions are not to be confused with fire walls which have a greater hourly fire resistance and are capable of independent support. (See definition of firewall.)

Fire-Resistive: A broad range of structural systems capable of withstanding maximum intensity and duration of fire without failure. Common fire-resistive components include masonry load-

bearing walls, reinforced concrete or protected steel columns, and poured or pre-cast concrete floors and roofs.

Fire Wall: A physical barrier to prevent the horizontal spread of fire between buildings, constructed of materials sufficient to achieve at least a 3 or 4 hour fire resistance rating as determined by NFPA 251.

Flammable Liquid: A liquid having a flash point below 100 °F (37.9 °C) and having a vapor pressure not exceeding 40 pounds per square inch (absolute (275.79 kilopascal) at 100 °F (37.9° C)) or a combustible liquid heated to, or above, its flash point.

Fuel Load (a.k.a. Fire Load): Expected maximum quantity of combustible material in a given fire area. In normal facilities, the combustible structural elements and the combustible contents contained within that area. Fire load is usually expressed as weight of combustible material per square foot of area.

Furnishings: Consists of all movable articles, such as tables, chairs, desks, bookcases, draperies, cabinets, and decorations, required for use or as an ornament in a facility.

- **Interior Finish:** Exposed material comprising walls, ceilings, wainscoting, and other interior building surfaces. It includes interior surfacing materials (such as paneling, carpeting, and wall coverings) applied directly to the walls, floors, and ceilings. Exposed insulating and acoustical materials are an interior finish. For purposes of controlling the hazards associated with combustible interior finish, the following classification system applies to **Class A** Materials having a Flame Spread Index not exceeding 25 and a Smoke Developed Index not exceeding 450, as determined by the test method described in NFPA 255. Carpets and rugs will also be Class A, if meeting the following criteria:
 - It has a value of CRF of 0.50 or above, as determined by the method described in NFPA 253.
 - It has a maximum specific optical density of not over 450 (flaming and non-flaming) as determined in NIST Technical Note 708 (Smoke Density Chamber). The critical specific optical density of 16 will not be reached in less than 30 seconds in both the flaming and non-flaming combustion.
- **Class B** - Material having a Flame Spread Index between 26 and 75 and a Smoke Developed Index not exceeding 200, as determined by NFPA 255. Carpets and rugs will also be Class B if meeting the following criteria:
 - CRF between 0.25 and 0.50, as determined by the method described for Class A carpeting, and
 - Maximum specific optical density of not over 450, as described above.
- **Class C** - Materials having a Flame Spread Index between 76 and 200 and a Smoke Developed Index not exceeding 450, as determined by NFPA 255. Carpets and rugs will also be Class C if they meet the following criteria.
 - Department of Commerce Standard for the Surface Flammability of Carpets and Rugs, FF 170, "Pill Test"
 - Maximum specific optical density of not over 450, as described above

Listed Or Approved: When referring to a material or device used in conjunction with fire protection, a product that has been tested by a recognized and independent research laboratory (e.g., Underwriters Laboratories and Factory Mutual), in accordance with generally accepted and

standardized test methods and verified that it will perform adequately and dependably under adverse conditions.

Means of Egress: A means of egress is a continuous and unobstructed way of travel from any point in a building or structure to a public way. A means of egress comprises the vertical and horizontal travel and includes intervening room spaces, doorways, hallways, corridors, passageways, balconies, ramps, stairs, enclosures, lobbies, escalators, horizontal exits, courts, and yards.

Noncombustible: Structures in which the structure itself (exclusive of trim, interior finish, and contents) is noncombustible but not fire-resistive. Common forms include exposed steel beams and columns, and masonry or metal walls.

Occupied Facility: A building or facility occupied by persons on a regular basis and not used for sleeping purposes.

Open Plan: When referring to office space, it denotes large floor areas (greater than 3,000 square feet [279 square meters]) characterized by the lack of fixed, ceiling-high partitions and conventional doorways. Individual workstations are identified by the arrangement of desks, chairs, files, bookcases, and movable partitions. The hazard from a fire safety standpoint is due to the ill-defined nature of means of egress and the lack of a significant physical barrier against the spread of smoke and fire, thus magnifying potential loss.

Ordinary: Masonry exterior load-bearing walls or load-bearing portions of exterior walls that are of noncombustible construction.

Protected Noncombustible: Noncombustible structures enclosed with partitions having a minimum of 1 hour fire-resistance rating.

Senior Fire Officer: A fire department's Fire Chief or his/her designee.

Shall: The word "shall" indicates that the requirement is mandatory and must be followed.

Should: The word "should" indicates that the rule is a recommendation, the advisability of which depends on the facts in each situation.

Smoke Removal System: An interconnected system of fans, ducts, dampers, and automatic and manual controls designed to effectively remove smoke and other products of combustion from select facility areas. Its use is primarily intended to compensate for the lack of a readily available means to ventilate buildings during and after structural fires, such as in below-grade or windowless building areas.

3.2 Acronyms

ac	alternating current
ACGIH	American Conference of Governmental Industrial Hygienists
ACI	American Concrete Institute
AFFF	Aqueous Film Forming Foam
AGA	American Gas Association

AHJ	Authority Having Jurisdiction
ANSI	American National Standards Institute
ARFF	Aircraft rescue and fire-fighting
ASTM	American Society for Testing and Materials
°C	degree Celsius
CoF	Construction of Facilities
CFR	Code of Federal Regulations
CRF	Critical Radiant Flux
dc	direct current
DoD	Department of Defense
EMS	Emergency Medical Service
°F	degree Fahrenheit
FAA	Federal Aviation Administration
FEH	Facilities Engineering Handbook
FDC	Fire Department Connection
FM	Factory Mutual (Data Sheets)
ft	feet
sq ft	square feet
FSI	Flame Spread Index
gal	gallons
gpm	gallons per minute
GSA	General Services Administration
HAD	Heat actuated device
HSPD-5	Homeland Security Presidential Directive
IFSTA	International Fire Service Training Association
in	inches
kg	kilograms
kPa	kilopascal
KVA	kilovoltampere

lb	pounds
L	liters
L/min	liters per minute
m	meters
m²	square meters
min	minutes
mm	millimeter
MMH	Monomethylhydrazine
NASA	National Aeronautics and Space Administration
NEC	National Electrical Code
NFC	National Fire Code
NFPA	National Fire Protection Association
NIMS	National Incident Management System
NIST	National Institute of Standards and Technology (Formerly the National Bureau of Standards)
NPD	NASA Policy Directive
NPR	NASA Procedural Requirements
NTIS	National Technical Information Service
OS&Y	Outside Screw and Yoke
OSHA	Occupational Safety and Health Administration
PA	picoampere
PIV	Post Indicator Valve
PPE	personal protective equipment
psi	pounds per square inch
SDI	Smoke Development Index
SPECSINTACT	Specifications kept intact (guide specification system)
SR&QA	Safety, Reliability, and Quality Assurance
UDMH	Unsymmetrical Dimethylhydrazine
UL	Underwriters Laboratories

4. FIRE PROTECTION REQUIREMENTS

4.1 Responsibilities

NASA responsibilities for fire protection (Director, Safety and Assurance Requirements Division, NASA Center Directors, the NASA Authority Having Jurisdiction) are documented in NPR 8715.3, NASA General Safety Program Requirements, Chapter 5, Fire Safety.

4.2 Legal Requirements, Codes, and Standards

4.2.1 The following requirements shall apply to NASA's fire protection program; where requirements are conflicting the most stringent applies (Requirement).

4.2.1.1 Code of Federal Regulations (CFR), latest revision.

4.2.1.2 NPR 8820.2, "Facility Project Implementation Guide," latest revision.

4.2.1.3 National Fire Protection Association (NFPA) Fire Codes, latest revision (Codes and Standards only). The use of NFPA Recommended Practices (Appendices) contained in the NFC is encouraged, but is not mandatory unless otherwise specified in this document. The NFPA Fire Codes provide a minimum standard of protection (Requirement).

Note: All NASA Centers assess their individual programs and develop additional requirements as needed.

4.2.1.4 Public Law 100-678, "Public Buildings Amendments of 1988."

Public Law 100-678 requires all federal agencies to follow the latest editions of nationally recognized fire and life safety codes. It also requires federal agencies to give local fire protection officials the opportunity to review and comment on projects for compliance with local regulations and compatibility with local fire fighting practices. All reviews by local fire protection officials are to be at no cost to the Government. Designers should meet with local fire authorities during early stages of design to incorporate local requirements to the extent practical; however, recommendations made by local officials should be reviewed for adequacy, cost, and nationally accepted practice before being incorporated into project design.

4.2.1.5 NPR 8715.3, NASA General Safety Program Requirements.

4.2.1.6 Factory Mutual (FM) Data Sheets and Approval Guides, when required by the AHJ.

4.2.1.7 Individual NASA Center-unique requirements.

4.3 Basis for Determining the Level of Fire Protection for Specialized Facilities

Due to the unique nature of NASA's mission, a number of specialized facilities and operations are required. In some cases, conventional fire protection doctrine and existing codes and standards may not be appropriate. Nevertheless, adequate safeguards are to be provided for all facilities and operations (see Section 4.2 for detailed definitions). This can be accomplished by applying the following principles:

4.3.1 Analysis - An analysis shall be conducted to identify all fire hazards and accomplish the following (Requirement).

4.3.1.1 Elimination of hazards - Significant hazards shall be eliminated or reduced to acceptable risk levels (Requirement). (See NPR 8715.3, NASA General Safety Program Requirements.)

4.3.1.2 Relocation of hazards - Where the hazard cannot be eliminated or reduced, it shall be relocated to an area less threatening to people and property as directed by the AHJ (Requirement).

4.3.1.3 Isolation of hazards - Where the hazard cannot be eliminated or removed, it shall be isolated within the facility so as not to pose a danger to the remainder of the structure or its occupants (Requirement).

4.3.1.4 Protection from hazards

4.3.1.4.1 Where the hazard cannot be eliminated, relocated, or isolated, protection shall be provided to ensure adequate levels of human and structural safety (Requirement).

4.3.1.4.2 In the event of a fire occurrence, the occupants of the facility shall be provided with protection to enable them to leave the area safely, with the structure protected to ensure its continued integrity (Requirement).

4.3.2 Consultation - Final decisions regarding fire safety shall be made after consultation with the AHJ (Requirement).

4.4 Required Acceptance Inspection and Tests of Fire Protection and Life Safety Systems

4.4.1 The installing contractor shall submit to the AHJ and to the NASA contracting officer a written statement, indicating that the system has been installed and performs in accordance with design drawings and specifications (Requirement).

4.4.2 The certification in 4.4.1 shall be maintained as part of the system documentation and records (Requirement).

4.4.3 All inspections and tests shall be conducted according to appropriate codes and as specified in contract documents (Requirement). Failure to meet the criteria is sufficient justification for refusal to grant final payment to the installation contractor. In addition, failure to meet the criteria also may represent sufficient justification for refusal to allow permanent occupancy of the facility subject to a decision by the AHJ.

4.4.4 The contract or bid package shall include a requirement for an acceptance test (Requirement).

4.4.4.1 Following installation, the contractor shall verify the proper functioning of the fire protection system prior to scheduling the final acceptance test (Requirement).

4.4.4.2 The final acceptance test shall be conducted by a representative of the installing contractor and witnessed by the AHJ or his/her designee, the NASA contracting officer, and other interested parties (Requirement).

4.5 Equivalency

4.5.1 Concept - The concept of equivalency (see Section 3) is intended to be applied to new or existing facilities. Sound fire protection judgment is necessary to assure that adequate levels of fire and life safety are achieved. Nothing in this Standard is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this standard. The AHJ shall review and formally approve equivalency proposals (Requirement).

4.5.2 Guidelines - Guidelines set forth in NFPA 101A, Alternative Approaches to Life Safety, or a performance-based fire safety design as set forth below shall be used by the AHJ in determining acceptable levels of equivalency (Requirement):

4.5.2.1 It is permissible that performance-based fire safety design methods be applied to the renovation, restoration, remodeling, or modernization of existing facilities to address the evaluation of a subsystem, system, or complete building when it is not possible to meet the provided prescriptive requirements for new construction. New facilities for which established prescriptive criteria exist are not to be permitted to use performance-based fire and life safety design methods. The use of performance-based fire safety design methods is only to be permitted upon authorization by the AHJ for new essential electronic areas or unique facilities, where the user mandates requirements and objectives that are not addressed by established prescriptive requirements of national codes or by NASA standards. Performance-based fire safety design methods may not be used to eliminate required exiting requirements of NFPA 101, nor to eliminate automatic sprinkler systems required by NASA.

4.5.2.2 If performance-based fire safety design is used or permitted by the AHJ, the following requirements apply:

4.5.2.2.1 The performance-based fire safety design approach of the Society of Fire Protection Engineers (SFPE), Introduction to Performance-Based Fire Safety shall be used or an equivalent proven method by any other federal agency (Requirement).

4.5.2.2.2 A fire protection engineer (a licensed professional engineer in the principles and practices of fire protection engineering in the state of the NASA facility) shall perform the performance-based fire safety design (Requirement).

4.5.2.2.3 If the state does not offer a professional engineering exam in the principles and practices of fire protection engineering, the AHJ should review and accept the qualifications of the person submitting the design.

4.5.3 Acceptance - Alternative systems, methods, or devices approved as equivalent by the AHJ shall be recognized as being in compliance with this Standard (Requirement).

5. SITE PLANNING AND CIVIL ENGINEERING CRITERIA

5.1 Siting of Facilities

5.1.1 Exposure Protection Factors shall be used - For minimum fire separation distance between buildings, see NFPA 80A and the applicable building codes (Requirement).

5.1.2 Explosive/Propellant Operations - For facilities that contain, or are exposed to, explosive/propellant operations, the siting distances shall be as prescribed in NASA-STD-8719.12, NASA Safety Standard for Explosives, Propellants, and Pyrotechnics (Requirement).

5.1.3 Trailers and mobile home units shall be located at least 25 feet (7.62 meters) from permanent buildings and at least 25 feet (7.62 meters) apart, unless joined to form a single complex (Requirement).

5.2 Water Supply Requirements for Fire Protection

5.2.1 Water Supply - Water supply shall comply and be capable of meeting both fire protection and domestic demand for that area (Requirement).

5.2.2 Mission essential/critical facilities or areas shall have a looped or "gridded" supply system (Requirement).

5.2.3 Water Storage Capability - The design and installation of water storage tanks shall comply with NFPA 22 (Requirement).

5.2.4 Pump Requirements - Where pumps are required to furnish the necessary fire protection water flow and pressure, the pumps shall be designed and installed in accordance with NFPA 20 and paragraph 8.16 of this standard (Requirement).

5.3 Water Distribution System Criteria

5.3.1 General

5.3.1.1 The design of the water distribution system shall be such that a single electrical or mechanical failure, obstruction, mishap, or other event will not seriously impair the system's capability to deliver an adequate water supply for fire suppression (Requirement).

5.3.1.2 The installation of "dead-end" water mains shall be avoided in favor of a looped distribution system (Requirement).

5.3.1.3 An appropriate number of sectional control valves are required to limit damage affected areas. These valves shall be prominently identified and supervised in the open position by the use of locks or electronic supervisory (tamper) switches (Requirement).

EXCEPTION: *Underground gate valves with road boxes.*

5.3.1.4 Future growth shall be reviewed (See NFPA 24) (Requirement).

5.3.2 Fire Hydrants - Hydrants shall be selected based on local site conditions (Requirement) and be located adjacent to paved areas as follows:

5.3.2.1 Not over 400 feet (121.9 meters) apart in built-up areas and placed so that every permanent facility can be served from not less than two hydrants using not more than 300 feet (91.4 meters) of hose per hydrant outlet (Requirement).

5.3.2.2 Not less than 40 feet (12.19 meters) from a building (Requirement).

5.3.2.3 Not less than 3 feet (0.9144 meters) nor more than 7 feet (2.134 meters) from the roadway shoulder or curb line (Requirement).

5.3.2.4 Not less than 7 feet (2.134 meters) from an obstruction (Requirement).

5.3.2.5 With at least 18 inches (458 millimeters) between the lowest hydrant outlet and grade and not more than 4 feet (1.219 meters) between the operating nut and grade (Requirement).

5.3.2.6 With the principal discharge facing the nearest roadway (Requirement).

5.3.2.7 Where deemed necessary by the AHJ (Requirement).

5.3.2.8 Marked with a blue reflective marker in the roadway as deemed necessary by the AHJ to aid in locating at night (Requirement). In areas that are susceptible to the accumulation of snow, a permanent marker attached to the hydrant can be substituted. This marker should extend to approximately three feet above the hydrant and be flexible to be relocated during an emergency.

5.3.3 A hydrant isolation valve shall be installed (Requirement).

5.3.3.1 The valve shall be an underground gate with a road box and be located at least 5 feet (1.524 meters) from the centerline of the hydrant (Requirement).

5.3.4 Hydrant Specifications

5.3.4.1 Hydrants shall be equipped with one 4.5 inch (114 millimeters) and two 2.5 inch (63.3 millimeters) connections with American National Fire Hose Connection Screw Threads or per local requirements (Requirement).

5.3.4.2 Hydrants shall be of greater than 500 gallons per minute (1,892.5 liters per minute) capacity and comply with NFPA 24 (Requirement).

5.3.4.3 Painting shall be in accordance with NFPA 291 or the current local practice (Requirement).

5.3.4.3.1 In either case, the hydrant tops and caps shall be painted to denote flow capacity of the hydrant (Requirement).

5.3.4.4 Hydrants shall, as a minimum, be connected to a 6 inch (153 millimeter) supply line (Requirement).

5.3.4.5 In situations where a hydrant cannot be located away from traffic (e.g., loading dock and warehouse areas), it shall be equipped with sturdy barriers for mechanical protection (Requirement).

5.3.4.5.1 The arrangement of the barriers shall not interfere with the connection to/or operation of the hydrant (Requirement).

5.3.5 Meters - Where meters are installed in firewater distribution systems, they shall be FM or certified testing laboratory approved or Underwriters Laboratories, Inc. (UL), listed fire flow meters (Requirement).

5.3.5.1 Notification and coordination with the local fire department (and water department where applicable) shall be accomplished prior to installing any meters on the distribution system (Requirement).

5.3.6 Flow Testing

5.3.6.1 At least biennially, an appropriate number of hydrant flow tests shall be conducted in accordance with NFPA 291 to develop a water supply profile for the NASA Center (Requirement). The intent is to verify the ability of the system to deliver the required fire flows at various locations and to discover any degradation of the system due to sedimentation or inadvertent valve closures.

5.3.6.2 Hydrants shall be flushed in accordance with NFPA 25 at least once per year to ensure proper operation and drainage (Requirement).

6. ARCHITECTURAL FIRE PROTECTION CRITERIA

6.1 Life Safety Provisions

6.1.1 All NASA buildings shall comply with the following:

6.1.1.1 Appropriate provisions of NFPA 101 (Requirement).

6.1.1.2 Applicable State and local building codes (Requirement).

6.1.2 Egress routes and exits shall comply with the requirements of NFPA 101 (Requirement).

6.1.2.1 Hallways, corridors, and doorways shall be kept clear at all times (this includes copiers, file cabinets, paper storage, pallets, furniture, lockers, or other material or equipment) (Requirement).

6.1.2.2 Equipment or other objects which protrude into exit routes shall not be installed without prior approval of the AHJ or authorized designee (Requirement).

6.1.2.3 Stairwell doors, fire doors, and other egress doors shall not be blocked or left open (Requirement).

6.1.2.4 Emergency egress and fire doors equipped with an automatic closure mechanism or latching device shall not be rendered inoperative (Requirement).

6.1.3 Rooms, corridors, fire doors, and the like shall not be altered in any manner that would reduce the required level of fire safety (Requirement).

6.1.3.1 Modifications shall be subjected to review/approval by the AHJ or authorized designee (Requirement).

6.1.4 Normally secured rooms shall be placarded with an access contact phone/location or rendered visible to emergency response personnel from the corridor via a vision panel (Requirement).

6.1.4.1 Where a vision panel is installed for this or any other purpose, it shall be maintained free of obstruction (i.e., paint, posters) (Requirement).

6.1.5 The use of exit signs containing Tritium or any other radioactive material must be approved by the AHJ. The AHJ will assure coordination with the installation Radiation Safety Officer (Requirement).

6.2 Segregation of Hazards

6.2.1 A room/area within a facility may present a significantly greater hazard to the facility or its occupants than may be indicated by the occupancy hazard classification of the overall facility. Such rooms/areas shall be separated from the remainder of the structure by a fire partition and/or suppression system according to the following general rules (Requirement):

6.2.1.1 If the room/area to be isolated falls within an occupancy hazard classification, one severity level above that of the overall facility (Requirement). For example, an Ordinary Hazard

Occupancy (Group 2) library in an Ordinary Hazard (Group 1) office building requires separation by a minimum 1-hour fire partition or automatic sprinkler protection.

6.2.1.2 If the room/area to be isolated falls within an occupancy hazard classification, two or more severity levels above that of the overall facility (Requirement). For example, an Extra Hazard Occupancy (Group 1) chemical laboratory in an Ordinary Hazard Occupancy (Group 1), office building requires separation by a minimum 2-hour fire partition or 1-hour separation with automatic sprinkler protection. (Reference Section 3 for detailed definitions.)

6.2.1.3 If a room/area contains high value items or is the location of a critically important operation, it shall be separated from the remainder of the structure by a fire partition having a fire-resistance rating of at least 1 hour and protected by an automatic sprinkler system (Requirement). Criticality is determined and documented by the AHJ.

6.3 Open Plan Office Space

Open plan office space denotes floor areas characterized by the lack of fixed ceiling-high partitions and conventional doorways and is occupied by 30 or more personnel. Every open plan floor area shall have at least two easily identifiable exits in accordance with NFPA 101 (Requirement).

6.4 Interior Finishes

6.4.1 Interior walls, partitions, modular partitions, and ceiling finish materials shall be Class A (Requirement) with the following:

6.4.1.1 A Flame Spread less than 25, in accordance with ASTM E84 (Requirement).

6.4.1.2 A Smoke Development less than 450, in accordance with ASTM E84 (Requirement).

6.4.1.3 No continued propagation of fire as determined by the test method described in NFPA 255 (Requirement).

6.4.2 Interior floor finish materials shall be Class I having a critical radiant flux value of 0.45 W/cm² or above in accordance with NFPA 253 (Requirement).

6.5 Fire Protection for Employees with Disabilities

6.5.1 Facility Design - NASA facility design, in conjunction with emergency planning, shall be structured to assure that individuals with disabilities, who are present in a building at the time of a fire or other emergency, are:

6.5.1.1 Made aware of the conditions (Requirement).

6.5.1.2 Are provided the means to reach an area of safety (Requirement).

6.5.2 Evacuation procedures and design standards shall be in accordance with 29 CFR 1910, Occupational Safety and Health Standards, 41 CFR 101, Uniform Federal Accessibility Standards, NFPA 101, Life Safety Code, ANSI A17.1, Safety Code for Elevators and Escalators, and ANSI A117.1, Accessible and Usable Buildings and Facilities (Requirement).

6.5.3 In facilities where disabled individuals may be present, the required facility emergency action plan shall be structured so as to assign responsible persons (with alternates) the task of

notifying the individual(s) with disabilities of the existence of an emergency situation and assisting them to an area of safety (Requirement).

6.6 Issuance of Use and Occupancy

6.6.1 No new construction or renovation project or portion thereof shall be occupied until the AHJ has approved a Use and Occupancy Certificate - and provide it to the Project Manager or Tenant (Requirement).

6.6.2 Issuance of a Use and Occupancy Certificate shall not be construed as an approval of any violation of a Code or NASA standard (Requirement).

6.6.3 Once the AHJ has ensured that to the best of his or her knowledge all fire protection and life safety systems have been completed, inspected, successfully tested and approved, and all outstanding fire and life safety deficiencies have been corrected to afford a reasonable degree of safety to the building occupants from fire and similar emergencies; the Use and Occupancy Certificate may be issued to the Project Manager or Tenant.

6.6.4 The AHJ is authorized to approve a temporary Use and Occupancy Certificate.

6.6.4.1 This certificate shall allow partial occupancy of specific areas, prior to completion of the project (Requirement).

6.6.4.2 All life safety and fire protection systems serving the areas proposed for occupancy and all floors below shall be completed, inspected, successfully tested, and approved by the AHJ (Requirement).

6.6.4.3 The temporary Use and Occupancy Certificate shall identify the specific area(s) of the project where occupancy is permitted (Requirement).

6.6.4.4 Following the approval of a temporary Use and Occupancy Certificate, the AHJ shall set a time frame for the completion, inspection, testing, and approval of all life safety and fire protection systems for entire project, and the correction of any outstanding life safety and fire protection deficiencies (Requirement).

6.6.4.5 Upon completion, inspection, successful testing, and approval of all fire protection and life safety systems and correction of all outstanding fire and life safety deficiencies, the AHJ shall approve a Use and Occupancy Certificate to the Project Manager or Tenant (Requirement).

7. STRUCTURAL FIRE SAFETY CRITERIA

7.1 General

7.1.1 Structural features of NASA facilities shall be in accordance with this chapter and the requirements and guidelines of NPR 8820.2, Facility Project Requirements and applicable building codes (Requirement).

7.1.2 Where requirements are conflicting, the most stringent shall apply (Requirement).

7.2 Structural Selection

Selection of the basic construction classification of proposed NASA facilities shall be made after a thorough review of anticipated occupancy hazards, occupational exposures, floor area, building height, interior construction, automatic sprinkler systems, and costs (Requirement).

7.3 Fire Resistant Construction

7.3.1 Fire rated walls and barriers shall comply with NFPA 221 and NFPA 251 (Requirement).

7.3.2 Every fire wall shall be of noncombustible material having a fire-resistance rating (Requirement).

7.3.3 Fire partitions (see Section 3) shall be constructed of materials sufficient to achieve a 1 or 2-hour fire-resistance rating with a UL listed method (Requirement).

7.3.4 Fire walls shall extend from the ground or fire-resistive floor through the roof above or to the underside of a fire-resistive slab or noncombustible roof, or an approved fire-resistive ceiling assembly (Requirement).

7.4 Vertical Openings and Shafts

Stairway and elevator enclosures, pipe and electrical chases, heating, ventilation, and air conditioning shafts, atriums, and floor penetrations shall comply with the appropriate provisions of NFPA 101 (Requirement).

7.4.1 Shafts

7.4.1.1 All shafts in buildings up to and including three levels in height shall be constructed of materials having a fire-resistance rating of at least 1 hour (Requirement).

7.4.1.2 Shafts in buildings greater than three levels in height shall be of materials having a fire-resistance rating of at least 2 hours (Requirement).

7.4.1.3 Shafts shall terminate at the top by extending to, or through, the roof or tight against a floor or shaft cover having a fire-resistance rating equal to the shaft itself (Requirement).

7.4.1.4 Shafts shall terminate at the bottom against earth or the surface of the floor (Requirement).

7.4.1.5 Shafts for elevators and dumbwaiters also shall conform to the requirements of ANSI A17.1 (Requirement).

7.4.2 Telephone/Electrical Rooms - When telephone rooms or electrical closets are located one above the other, with unprotected floor penetrations, the enclosure walls are considered to form a shaft and protection shall be in accordance with the requirements contained in this chapter and the National Electrical Code, NFPA 70 (Requirement).

7.4.3 Atriums and Interior Stairwells

The fire hazards associated with atriums and interior stairwells are due to the lack of an effective vertical fire cutoff, similar to open stairways or unprotected vertical shafts. Therefore, the design of atriums and interior stairwells shall comply with NFPA 101 (Requirement) and incorporate the following as determined by the AHJ:

7.4.3.1 Smoke Removal System - When required by building codes, atriums and interior stairwells shall have a smoke removal system capable of venting the products of combustion outside the building without affecting upper floor areas (Requirement).

7.4.3.2 Fire Partitions - Fire partitions shall be installed around an atrium or stairwell used as part of a required exit access corridor (Requirement).

7.4.3.2.1 The fire rating of the separation shall be in accordance with the applicable fire and building codes (Requirement).

7.4.3.2.2 The partitions may feature limited amounts of wired glass vision panels.

7.4.3.2.3 Openings in the fire partitions of an atrium or stairwell shall be limited and must be protected by listed fire dampers, doors, or other assembly approved by the AHJ (Requirement).

7.4.3.2.4 A balcony or walkway may be provided on the atrium side of a fire partition provided that it does not form a portion of an exit access corridor, or the atrium is provided with sprinklers and smoke control systems.

7.5 Ceilings

7.5.1 Suspended ceiling systems provided as part of a listed fire-resistive assembly shall be installed and maintained as required by the listed design at all times (Requirement).

7.5.2 When work activities require access above such systems, the system shall be restored to its original configuration immediately following such work (Requirement).

Note: Suspended ceiling systems of this nature shall be avoided whenever possible due to the difficulty in assuring that the fire-resistance of the assembly is maintained.

7.6 Fire Door and Window Assemblies

7.6.1 Fire door and window assemblies shall be installed in accordance with the requirements of NFPA 80 (Requirement).

7.6.2 All fire door and window assemblies shall be labeled with a UL listing or have FM or other AHJ approved testing laboratory approval for their application (Requirement).

7.7 Fire Stopping

7.7.1 Fire stopping and draft stopping in combustible construction shall comply with the local building codes and NFPA 101 (Requirement).

7.7.2 Openings in fire rated partitions or walls shall be protected by listed fire doors, frames, and fire windows, in accordance with NFPA 80 and 101 (Requirement).

7.7.3 Through-penetrations ("poke-through" openings) shall be protected by sealing the penetration with a "fire stopping assembly" that is UL listed, or is FM or certified testing laboratory approved for that purpose, and is capable of maintaining the fire-resistance rating of the barrier per NFPA 251 (Requirement).

7.7.4 For sealing purposes, all floors shall have a minimum rating of 2 hours (Requirement).

7.8 Fireproofing

7.8.1 All fireproofing shall be installed per the manufacturer's instructions (Requirement).

7.8.2 Where the specification for a fireproofing material is given as an average thickness, the average thickness shall be used as a minimum (Requirement).

7.9 Roofing Materials and Systems

7.9.1 All roofing materials and systems shall be listed/approved type Class A or B as determined by the AHJ (Requirement).

7.9.2 All roofing materials and systems shall meet the test criteria in NFPA 256 (Requirement).

7.10 Labeling Fire Rated Construction

7.10.1 All new fire rated construction shall be labeled (Requirement).

7.10.2 The label shall describe the wall hourly rating (Requirement).

7.10.3 The lettering of the label shall be made with a minimum of 6 inch (152.4 millimeters) red letters and a maximum spacing of 20 feet (6.1 meters) (Requirement).

7.10.4 The labeling is required for both under floor and above ceiling locations (Requirement).

8. MECHANICAL CRITERIA

8.1 General

The purpose of this chapter is to provide the necessary information to properly design and maintain the mechanical aspect of facilities in accordance with the National Fire Codes and Federal and local government codes. All fire protection equipment shall be UL listed or have FM or AHJ approved testing laboratory approval for the intended purpose (Requirement).

8.2 Standpipe Systems

8.2.1 Design and Installation - The design, installation, and maintenance of standpipe and hose systems shall be in accordance with NFPA 14, NPFA 25, 29 CFR 1910.158, and local government codes (Requirement).

8.2.2 Application - Standpipes shall be of the pre-primed type (where temperature conditions permit) and are required for the following types of facilities and areas (Requirement):

8.2.2.1 Buildings with three or more stories or having a level that is 50 feet (15.24 meters) or more above grade (Requirement). (Standpipes are recommended in 2 story buildings.)

8.2.2.2 Windowless or underground buildings or facilities where the dimensions are such that all areas cannot be reached by hose lengths of 300 feet (91.44 meters) (Requirement).

8.2.2.3 Where the interior partition arrangement prevents easy access to all areas within the building using 300 feet (91.44 meters) of exterior fire hose lines (Requirement).

8.2.2.4 Where specified by an occupancy requirement of the Life Safety Code (Requirement).

8.2.2.5 Under special occupancy situations (not covered by this chapter) as determined by the AHJ (Requirement).

8.2.3 Classification - Standpipes shall be equipped for Class 1 service as defined in NFPA 14 (Requirement).

8.2.4 Hose Connections - Hose cabinets with hoses shall not be permitted (Requirement). However, cabinets may be installed and used for portable extinguisher cabinets instead of fire hose.

8.2.5 Standpipe - When standpipe hose stations are mounted on walls, at least 48 inches of clearance shall be maintained between all obstructions and the wall to allow proper use of standpipe hose station access for portable fire extinguishers (Requirement).

8.3 Sprinkler Systems

8.3.1 Sprinkler Locations - Application, Design, Installation, and Maintenance

8.3.1.1 Automatic sprinkler protection shall be provided for all new building/facility construction (Requirement).

8.3.1.2 Sprinklers shall be provided in renovation projects involving over 50 percent of the building (Requirement).

8.3.1.3 Sprinklers shall be considered for renovation projects over 2,500 square feet (232.26 square meters) (Requirement).

8.3.1.4 Sprinklers shall be installed, if required due to occupancy change (Requirement).

8.3.1.5 Small building construction, housing only non-hazardous materials, may not require automatic sprinkler protection if approved by the AHJ.

8.3.2 Design, Installation, and Maintenance

8.3.2.1 The design, installation, and maintenance of sprinkler systems shall be in accordance with NFPA 13, 13D, 13R, 25 and 29 CFR 1910.159, and the additional requirements provided below (Requirement).

8.3.2.2 Partially-sprinklered buildings shall be considered as non-sprinklered (Requirement).

8.3.3 Water Supply Demands

8.3.3.1 Hydraulically designed sprinkler systems should be designed for a supply pressure of at least 10% but not less than 10 psi below the supply curve.

8.3.3.2 The AHJ shall determine the need for the increased or decreased water supply requirements to provide for occupancy flexibility (Requirement).

8.3.4 Design Density

8.3.4.1 The occupancy classification for the design density of a sprinkler system shall be increased by one occupancy classification (Requirement).

8.3.4.2 The increase applies only to light and Ordinary (Group 1) occupancies, as defined by NFPA 13, for all NASA facilities. For example, an Ordinary Hazard (Group 1) NASA Facility shall use the NFPA 13 water supply density requirements specified for Ordinary Hazard (Group 2).

8.3.4.3 The minimum design density for NASA facilities shall be Ordinary Group 1 (Requirement).

8.3.5 Fire Department Connection (FDC)

8.3.5.1 At least one FDC shall be provided for each facility with a sprinkler system and/or standpipe system (Requirement).

8.3.5.2 The FDC should serve the sprinkler system and interior standpipe system in buildings equipped with both. All standpipes and sprinkler systems should be interconnected so that each FDC serves all fire protection needs simultaneously.

8.3.5.3 Explosive hazardous facilities and large heavy fire load facilities shall be provided with a remotely located FDC (Requirement).

8.3.5.4 Each FDC shall be unobstructed and located within 200 feet (60.96 meters) of a fire hydrant. (Requirement)

8.3.5.5 For new construction, the FDC shall be within 100 ft. of the fire hydrant (Requirement).

8.3.5.6 Permanent signs reading, "STANDPIPE AND AUTOMATIC SPRINKLER" shall be provided (Requirement).

8.3.5.7 FDCs shall be provided with protective caps and chains (minimum length of this chain shall be 12 inches (305 millimeters)) (Requirement).

8.3.5.8 If the FDC does not protect 100 percent of the facility, the area protected shall be identified on the FDC (Requirement).

8.3.6 Water flow alarms

8.3.6.1 Water flow alarms, interconnected with the building fire alarm system and central fire reporting system (see Chapter 9), shall be provided for each floor level protected by the automatic sprinkler system (Requirement).

8.3.6.2 For smaller buildings, where the location of a fire would be readily apparent, only one water flow alarm is necessary (Requirement).

8.3.6.3 Dry pipe and pre-action sprinkler systems shall be equipped with an automatic air maintenance device and high/low air pressure alarm (Requirement).

8.3.6.4 The alarm shall be connected to a constantly attended location (Requirement).

8.3.7 All valves on connections to water supplies and on supply pipes to sprinklers shall be of the indicating type with tamper switches that activate a supervisory signal on the building fire alarm system (Requirement).

EXCEPTIONS:

- (1) Valves 2.5 inches (64 millimeters) or less in size,
- (2) standpipe valve outlets,
- (3) drain valves,
- (4) inspector's test valves,
- (5) valves located in areas where the installation of tamper switches is impractical, and
- (6) underground valves that may be secured open by the use of a substantial lock.

8.3.7.1 Sprinkler system control valves shall be inventoried and subjected to periodic visual inspection and maintenance (Requirement).

8.3.8 Existing Facilities

8.3.8.1 If sprinkler protection is not provided throughout an existing facility, the area protected by the sprinkler shall be separated from sections not protected by the sprinkler by a fire partition of at least 1-hour fire-resistance (Requirement).

8.3.8.2 Sprinkler protection shall be provided in accordance with paragraph 8.3 (Requirement).

8.3.9 Drains - In areas protected by sprinklers that are subject to excessive water damage, floor drains with sufficient capacity shall be provided to handle anticipated accumulation of sprinkler system and hose stream discharge (Requirement). (Examples are computer rooms and electronic repair rooms.)

8.3.10 Inspections and Tests

8.3.10.1 Sprinkler systems shall be inspected and tested in accordance with the provisions of NFPA 13 and 25 (Requirement).

8.3.10.2 Inspector test connections should be located in the most hydraulically remote area from the flow or pressure switch and accessible within 7 feet (2.133 meters) of the finished floor.

8.3.10.3 They shall have an outlet size equal to the sprinkler head installed and discharge to a location capable of accepting a full flow from the connection until the water flow switch operates (Requirement).

8.3.10.4 In dry pipe systems, water shall reach the inspector's test pipe within 60 seconds after opening the test valve (Requirement).

8.3.11 The following are minimum sprinkler system performance criteria:

8.3.11.1 Full opening of the valve to the inspector's test pipe shall activate the required water flow indicator within 90 seconds for all sprinkler systems; also activate the local fire alarm system, the central fire alarm monitoring system, and a visual and audible signal on the fire alarm and annunciator panels (Requirement).

8.3.11.2 The closing of a sprinkler system control valve by no more than 2 turns shall activate the required tamper switch and cause a trouble alarm to register on the main fire alarm control panel, annunciator panel (if provided), and the central fire alarm monitoring system, and the system must be capable of being restored to the normal condition when the valve is reopened (Requirement).

8.3.11.3 For dry pipe sprinkler systems, full opening of the valve to the inspector's test pipe shall cause the dry pipe valve to trip and deliver a steady stream of water at the test outlet within 60 seconds (Requirement).

8.3.12 Out-of-Service Sprinkler Systems - The requirements contained in NFPA 101 shall be followed when removing a sprinkler system from service for construction, repair, maintenance, or other reason (Requirement).

8.4 Clean Agents

8.4.1 The United States treaty obligations to help protect stratospheric ozone (The Montreal Protocol), coupled with Environmental Protection Agency (EPA) regulations (Amendments of the Clean Air Act), limit the production and consumption of Halon.

8.4.1.1 NASA Centers shall take action to convert from Halon to alternatives (Requirement).

8.4.1.2 Expansion of any existing or new applications using Halon shall be approved by NASA Headquarters Office of Safety and Mission Assurance (Requirement).

8.4.1.3 Existing systems and extinguishers shall be inspected and maintained per NFPA 10, 12A, and 29 CFR 1910.160 (Requirement).

8.4.1.4 Alternative clean agent systems shall be designed, installed, and maintained in accordance with NFPA 2001 (Requirement).

8.4.2 Essential equipment areas where the maximum possible fire loss exceeds twenty-five (25) million dollars (this would include the construction of the area housing the equipment, the equipment within the area, and the cost to replace any data/information lost due to a fire or water damage) shall be equipped with a gaseous clean agent fire extinguishing system in addition to automatic fire sprinklers (Requirement).

8.4.3 For areas where the installation of these extinguishing systems may not be feasible due to openness of the area, the size of the area, or type of equipment in the area, the AHJ shall be consulted and/or a Performance Based Fire Safety Design shall be conducted in accordance with Section 4.5 of this standard (Requirement).

8.4.4 Sprinklers within these areas may be increased to a standard response sprinkler or higher, as recommended by the AHJ.

8.4.5 Fire extinguishing systems that may cause asphyxiation due to its air displacement properties shall not be installed in occupied areas (Requirement).

8.5 Chemical Extinguishing Systems

Chemical extinguishing systems shall be designed, installed, tested, and maintained in accordance with NFPA 17, 17A and 29 CFR 1910.161 (Requirement).

8.5.1 Chemical extinguishing systems shall be required to protect the following:

8.5.1.1 Kitchen cooking equipment and exhaust systems in accordance with the requirements of NFPA 96 (Requirement).

8.5.1.2 Special hazard areas where a comprehensive engineering analysis reveals that a chemical extinguishing agent would be the most effective and most practical (Requirement).

8.5.2 When installed to protect kitchen equipment, the system shall be designed to discharge the chemical into the plenum area behind grease filters, into the duct work, and onto the cooking surface of deep fat fryers, ranges, and broilers (Requirement).

8.5.3 At least one manual system release shall be located along the normal means of egress from the protected area (Requirement).

8.5.4 Activation of the system shall transmit a signal to the central fire alarm monitoring system, sound a local alarm at the facility, and cutoff/disconnect the gas/electricity to the system (Requirement).

8.6 Fixed Carbon Dioxide

8.6.1 Carbon dioxide systems shall not be used in occupied areas (Requirement).

8.6.2 Carbon dioxide (CO₂) systems are special purpose and shall only be used where automatic sprinklers, chemical, or foam-water would be inappropriate (Requirement).

8.6.3 The design, installation, inspection, maintenance, and testing of CO₂ systems shall be in accordance with NFPA 12 and 29 CFR 1910.163 (Requirement).

8.6.4 All CO₂ systems shall have a permanently connected 100 percent reserve supply (Requirement).

8.7 Foam

8.7.1 Foam extinguishing systems shall conform to the applicable requirements of NFPA 11, 11A, 16, 30, 409, and 29 CFR 1910.162, including design, installation, acceptance testing, and maintenance (Requirement).

8.7.2 The system shall be installed by a qualified contractor experienced with all types of foam protection (Requirement).

8.7.3 Application - Fixed foam extinguishing systems should be considered in the following areas:

8.7.3.1 All petroleum based rocket fuel pump rooms and valve manifolds, unless protected by an automatic sprinkler system.

8.7.3.2 Aircraft hangar service areas where a fixed foam fire-suppression system is required by NFPA 409.

8.7.3.3 Special hazard areas, where a comprehensive engineering analysis identifies foam as the most cost-effective method of protection.

8.7.4 System Activation - The foam extinguishing system shall activate the central fire alarm monitoring system and a local alarm at the protected facility (Requirement).

8.8 Water Spray

8.8.1 The design, installation, testing, and maintenance of fixed water spray systems shall be in accordance with NFPA 15 and 29 CFR 1910.163 (Requirement).

8.8.2 With the exception of pre-primed high-speed systems, water spray systems shall be of the deluge valve and open spray nozzle type (Requirement).

8.8.3 These systems are provided to protect defined hazardous equipment/areas and are not intended for complete facility protection.

8.8.4 Water spray systems shall be provided in the following hazardous areas:

8.8.4.1 Propellant - All transfer units containing hydrazine based fuels shall be provided with fixed spray systems delivering a coarse spray of not less than 0.5 gallons per minute per square foot (20.35 liters per minute per square meter) (Requirement).

8.8.4.2 Propellant - The system control shall be by manual means, immediately adjacent to the standpipe outlet (Requirement).

8.8.4.3 Propellant - Curbs, dikes, perimeter trenches, and impounding facilities shall be provided in accordance with EPA regulations (Requirement).

8.8.4.4 Nitrogen Tetroxide - All areas where transfer operations of nitrogen tetroxide propellant oxidizer are performed shall be protected by a water density of 0.25 gallons per minute per square foot (10.175 liters per minute per square meter) for areas (Requirement).

8.8.4.5 Nitrogen Tetroxide - The system control shall be by manual means, immediately adjacent to the standpipe outlet (Requirement).

8.8.4.6 Nitrogen Tetroxide - Curbs, dikes, perimeter trenches, and impounding facilities shall be provided in accordance with EPA regulations (Requirement).

8.8.4.7 Propellant testing laboratories, except solid propellant testing laboratories, shall be protected with a water spray system(s) designed to extinguish propellant fires that can occur (Requirement).

8.8.4.8 Where multiple fuels are handled or processed, the system shall be designed to provide protection from the potentially most severe hazard (Requirement).

8.8.4.9 Hazardous spacecraft systems test facilities, such as those containing cryogenic, hypergolic, and environmental systems, shall be provided with a water spray system designed to provide protection from the most severe hazard anticipated during normal test operations (Requirement).

8.8.5 Launch pad service structure and assembly building work platforms shall be provided with water spray systems designed to provide full coverage over the deck areas as follows:

8.8.5.1 Provide 0.25 gallons per minute per square foot (10.175 liters per minute per square meter) design density for normal checkout and assembly with no fuel propellant transfer (Requirement).

8.8.5.2 Provide 0.5 gallons per minute per square foot (20.35 liters per minute per square meter) design density for normal checkout with fuel propellant transfer (Requirement).

8.8.6 Launch facilities for solid rocket propellant shall be evaluated using sound engineering practices and feasibility and risk assessments to determine what fire protection is needed for these facilities (Requirement).

8.8.7 Spray nozzles shall be arranged to develop a pattern from above the hazard and shall impinge on cable trays, ground support equipment, and all similar equipment normally in use on such platforms (Requirement).

8.8.8 Platform spray systems shall be controlled manually (Requirement).

8.8.9 Where launch pad service structures are exposed to liquid propellant hazards, exit passageways shall be provided with water spray systems to aid egress by:

8.8.9.1 Providing exposure protection against radiant heat through which personnel may move easily (Requirement).

8.8.9.2 Producing an evaporative cooling effect of the air into which it is sprayed (Requirement).

8.8.9.3 Wetting the skin and clothing of the escapee to cool and dilute any liquid propellant contaminant on the skin (Requirement). The minimum spray rate is 0.2 gallons per minute per square foot (8.14 liters per minute per square meter) of egress path, over a width of 6 feet (1.83 meters) and height of 8 feet (2.44 meters) up to the first heat barrier (such as a platform bulk-head).

8.8.9.3.1 A like amount shall be sprayed along the prescribed escape route beyond the first heat barrier for a minimum distance of 20 feet (6.096 meters) or to an area of refuge (Requirement).

8.8.9.3.2 The pattern of nozzles employed shall provide the minimum required horizontal and vertical coverage in areas when subjected to wind and draft effects (Requirement).

8.8.9.3.3 The egress and spray system shall be activated with the fixed fire extinguishing system serving the hazardous area (Requirement).

8.8.10 Liquid propellant transfer control manifolds located adjacent to launch vehicles shall be provided with a water spray system(s) designed for fire control (Requirement).

8.8.11 Where a potential fire hazard exists, water spray systems shall be provided for cryogenic, gaseous oxygen, and hydrogen storage containers, grouped piping, and pumps (Requirement).

8.8.11.1 The system(s) shall be arranged to deliver a uniform spray pattern to provide exposure protection for the container surface, pumps, and adjacent piping (Requirement).

8.8.11.2 The minimum spray rate is 0.2 gallons per minute per square foot (8.14 liters per minute per square meter) of exposed surface.

8.8.11.3 Manual control stations shall be located outside the hazardous area, but within effective sight of the facility protected (Requirement).

8.8.11.4 Remote control capability shall be provided as directed by the AHJ (Requirement).

8.8.12 High speed water spray systems with a design density of 0.25 gallons per minute per square foot (10.175 liters per minute per square meter) or greater, and controlled by automatic detector(s) with manual override, shall be provided at ordinance inspection areas where solid propellant grains are exposed for visual, optical, or mechanical examination (Requirement). Facilities where solid propellant grains are x-rayed through their cases do not require these systems.

8.8.12.1 High speed water spray systems are special purpose systems and shall be designed and installed by personnel experienced in this field (Requirement).

8.8.13 A water spray system shall be provided for fuel (monomethylhydrazine, unsymmetrical dimethylhydrazine, etc.) separator systems in accordance with the following criteria (Requirement):

8.8.13.1 A density of 0.5 gallons per minute per square foot (20.35 liters per minute per square meter) over the entire containment area for each fuel separator system shall be provided (Requirement).

8.8.13.2 The water spray system shall be released by a manually activated quarter turn ball valve (release station) located an acceptable distance away (Requirement).

8.8.13.3 Actual location of the manual release station shall be field verified and approved by the AHJ (Requirement).

8.8.13.4 The quarter turn ball valve shall be enclosed in a metal or plastic housing which allows the use of supervisory seals (Requirement).

8.8.13.5 The valve shall be oriented in accordance with industry standards (handle parallel to pipe flow indicates open, handle perpendicular to pipe flow indicates closed) (Requirement).

8.8.13.6 A plastic label permanently affixed to the front cover that explicitly defines the operating procedures for the manual release station shall be provided (Requirement).

8.8.13.7 Fuel separators shall have a minimum separation distance of 20 feet (6.096 meters) from the building exterior walls and exits (Requirement). The separation distance can be reduced by the use of other exposure protection methods when acceptable to the AHJ.

8.8.13.8 A separate zone for the water flow switch on the facility fire alarm control panel capable of transmitting alarm and trouble signals to the central fire alarm control center shall be provided (Requirement).

8.8.13.8.1 Transmission of a trouble or alarm signal on this zone shall not cause evacuation of the facility unless so directed by the AHJ (Requirement).

8.8.13.9 A standard fire department connection is not required on systems where the demand exceeds the capabilities of the fire service vehicles.

8.8.13.10 Containment for the fuel separators shall be in accordance with EPA regulations (Requirement).

8.8.14 A water spray system shall be provided for oil-insulated transformers located adjacent (in accordance with FM DS 5-4) to any facility containing personnel, hazardous chemicals, and/or essential equipment (Requirement).

8.8.15 A standard fire department connection shall be provided for each water spray system (unless excepted by this standard) (Requirement).

8.8.15.1 The connection shall be located at a safe distance from the hazardous area and arranged so that hose can be readily attached (Requirement).

8.8.15.2 Connections can be piped upstream of the actuating valve.

8.8.16 Discharge of a water spray system shall activate the facility fire alarm system and indicate an alarm condition at the central fire alarm control center (Requirement).

8.8.17 Appropriate warning signs shall be posted in areas where a fixed water spray system has been installed (Requirement).

8.8.18 After installation and prior to acceptance, all water spray systems shall be activated and completely tested to simulate performance under emergency conditions (Requirement).

8.9 Portable Fire Extinguishers

8.9.1 Portable fire extinguishers shall be provided in accordance with NFPA 1 and 101 and inspected, and maintained in accordance with NFPA 10, 29 CFR 1910.157, and this standard (Requirement).

8.9.2 Fire Extinguishers. Multipurpose dry chemical extinguishers shall be provided unless deemed inappropriate for use against a known hazard as determined by the AHJ (Requirement). Notable exceptions include the following:

8.9.2.1 Wet Chemical (Class K) extinguishers shall be provided for use around deep fat fryers (Requirement). (Multipurpose dry chemical can cause boil over of hot fat and shall not be used in cooking areas).

8.9.2.2 CO₂ or other clean agent extinguishers shall be provided where delicate electrical contacts or electronic equipment is involved or other instances where the deposit of dry chemical powder will cause contamination or require expensive cleanup (Requirement).

8.9.2.3 Clean Agent extinguishers shall be provided around aircraft in accordance with NFPA 408 (Requirement). See paragraph 8.4 for the use of Halon in any new or existing facilities (Requirement).

8.9.2.4 Foam extinguishers shall be provided where a Class B (flammable liquid) hazard is confined to a dip tank or similar vessel and a foam "blanket" is needed to prevent re-ignition (Requirement).

8.9.2.5 Class D Fire Extinguishers shall be provided where the fire hazard is due to combustible metals, such as magnesium, titanium, and zirconium (Requirement).

8.9.2.5.1 The selection of extinguishers shall be made by the AHJ (Requirement).

8.9.2.6 Pressurized water can be suitable at times, subject to the approval of the AHJ. (Cleanup and corrosion characteristics shall reviewed.)

8.9.2.7 Fire extinguishers used in protecting aircraft fuel servicing areas shall meet the requirements of NFPA 407 (Requirement).

8.9.3 Where portable fire extinguishers are provided for employee use, training shall be provided in accordance with 29 CFR 1910.157 to familiarize employees with the general principles of fire extinguisher use and the hazards involved with incipient stage firefighting (Requirement).

8.9.4 Extinguishers shall not be obstructed or obscured from view at any time (Requirement).

8.9.5 Tampering with, maliciously discharging, removing, or using a fire extinguisher for any purpose other than for extinguishing fires or conducting authorized training exercises is prohibited and shall result in disciplinary action (Requirement).

8.9.6 Portable fire extinguishers and cabinets do not have to be installed in common areas, or general offices when the building is protected throughout with quick response sprinklers. In office buildings protected throughout with quick response sprinklers, fire extinguishers shall only be installed in areas such as mechanical and elevator equipment areas, computer rooms, UPS rooms, generator rooms, kitchen areas, or special hazard areas (Requirement).

8.10 Air Conditioning Systems

8.10.1 Except as specified below, all air conditioning and ventilation systems for the handling of air, not contaminated with flammable or explosive vapors or dust, shall conform to the requirements of NFPA 90A and 90B (Requirement).

8.10.2 The construction of shafts containing, or used as, vertical ducts shall be in accordance with the requirements of paragraph 7.4 (Requirement).

8.10.3 Duct linings and coverings shall be of noncombustible construction (Requirement).

8.10.3.1 The total assembly of the duct, including the adhesive and any coatings or additives involved, shall have a Flame Spread Index not exceeding 25 and a Smoke Developed Index not exceeding 50, as determined by NFPA 255 (Requirement).

8.10.3.2 The total assembly of the duct, including the adhesive and any coatings or additives involved, shall be approved for use by the AHJ (Requirement).

8.10.4 The area above suspended ceilings and below raised floors can be used as a plenum, provided that these areas do not contain combustibles, are not constructed of combustible materials, and have only materials and equipment listed for plenum use.

8.10.5 The protection of cooling towers shall be in accordance with the requirements contained in paragraph 10.5 (Requirement).

8.11 Ventilation Systems

8.11.1 All processes, operations, or other situations that present the possibility of a hazardous accumulation of combustible or explosive vapors, dusts, fumes, or other airborne or potentially airborne substances shall be provided with ventilation systems in accordance with NFPA 91, 29 CFR 1910.94, and the ACGIH Industrial Ventilation Manual of Recommended Practices (Requirement).

8.11.2 Paint Spraying - All paint spraying and finishing booths and rooms shall be provided with ventilation equipment in accordance with NFPA 33, 91, 29 CFR 1910.107, and the ACGIH Industrial Ventilation Manual of Recommended Practices (Requirement).

8.11.3 Cooking Equipment - Cooking equipment exhaust systems over processes producing smoke or grease shall be designed and protected in accordance with NFPA 96 and the ACGIH Industrial Ventilation Manual of Recommended Practices (Requirement).

8.11.3.1 Insulation shall be type Class A with a Flame Spread Index not to exceed 25 and a Smoke Development Index not to exceed 450 (Requirement).

8.11.3.2 The interior exhaust ducts shall be cleaned at a minimum frequency of semi-annually unless otherwise determined by the AHJ (Requirement).

8.12 Smoke Control/Exhaust Systems

8.12.1 The guidance provided in NFPA 92A, 92B, 101, and 204 shall be used in determining the degree of smoke control/exhaust required, installation procedures testing, operations, and maintenance requirements (Requirement).

8.12.2 Smoke control/exhaust systems should be considered for the following:

8.12.2.1 Windowless and subterranean buildings.

8.12.2.2 Warehouses containing materials having a high heat release potential, flammable liquid storage and handling facilities, and other extra hazard occupancies.

8.12.2.3 UL listed smoke and heat vents shall be provided in accordance with NFPA 204 and/or a smoke control/exhaust system (Requirement).

8.12.3 Design Principles - The design of smoke exhaust systems shall be in accordance with the requirements and guidelines contained in NFPA 90A and shall be based on the following principles (Requirement):

8.12.3.1 Achievement of negative pressures in the fire/smoke area (entire floor level or subdivisions) by shutdown of air supply fans and diversion of return air directly outside.

8.12.3.2 Development of positive pressure in adjacent areas by shutdown of return air fans. The design of smoke control systems shall be in accordance with NFPA 92A and 92B.

8.12.4 Design features shall include:

8.12.4.1 Separate fan and duct systems for each fire/smoke area (Requirement).

8.12.4.2 Provision of dampers and ducts for direct discharge of contaminated air to the outside (Requirement).

8.12.4.3 Provision of separate manual controls readily accessible for fire department use (Requirement).

8.12.5 Testing - Full-scale testing of the system shall be conducted, prior to acceptance, to verify satisfactory performance (Requirement).

8.13 Heating Equipment

8.13.1 Depending on the nature of the fuel, heating equipment shall comply with the appropriate provisions of NFPA 31, 54, 58, 59A, 86, 211, and Factory Mutual Data Sheets except as noted otherwise (Requirement).

8.13.2 Furnaces and Boilers

8.13.2.1 Furnaces and boilers for central heating systems shall be located in a room separated from the remainder of the facility by fire-resistive construction (including walls and ceiling) (Requirement).

8.13.2.2 If a sprinkler system is provided, the fire-resistance rating shall be a minimum of 1 hour (Requirement).

8.13.2.3 If no sprinkler system is provided, the fire-resistance rating shall be a minimum of 2 hours (Requirement).

8.13.2.4 Openings shall be protected by listed fire doors or dampers (Requirement).

8.13.3 Operations - Shop, storage, or other operations, not directly related to the boiler operation, involving flammable materials, shall not be located in boiler rooms (Requirement).

8.13.4 Burners - Regardless of size, burners on suspended oil-fired heaters shall be provided with flame supervision that ensures shutdown in not more than 4 seconds if flame failure occurs or trial for ignition does not establish a flame (Requirement).

8.13.5 Space Heaters - Fixed space heaters shall be approved or listed by the American Gas Association (AGA), LTL, or other nationally recognized testing authority and installed in

complete compliance with all of the requirements of the manufacturer and the laboratory involved (Requirement).

8.13.5.1 Each fuel-fired space heater shall be vented (Requirement).

8.13.5.2 The clearances specified by the manufacturer and/or the laboratory shall be maintained between the space heater and combustible materials (Requirement).

8.13.5.3 Portable space heaters for personal comfort shall not be permitted unless approved by the AHJ (Requirement).

8.13.6 Gas

8.13.6.1 Gas piping entry into the building shall be protected against the possibility of breakage due to settling or vibration (Requirement).

8.13.6.2 Where practical, piping shall be brought above grade and provided with a swing joint before entering the building (Requirement).

8.13.6.3 The physical arrangement and venting shall be such that a break in the gas line due to settling or other causes at/or near the point of entry cannot result in the free flow of gas into the building (Requirement).

8.13.6.4 Automatic gas shut off shall be required (Requirement).

8.13.6.5 To avoid placing any strain on the gas piping, any meters, regulators, or similar attachments shall be adequately supported (Requirement).

8.13.6.6 Any vents or rupture discs on the equipment shall be vented to the outside of the building (Requirement).

8.13.6.7 Earthquake sensitive shutoff valves shall be provided for each gas entry into buildings located in earthquake prone areas (Requirement).

8.13.6.8 Gas piping shall not be run in any space between or directly behind a structural member and its fireproofing (Requirement).

8.13.6.9 Gas meter rooms shall be ventilated in a manner which ensures removal of any gas leakage without moving it through the structure (Requirement).

8.13.6.10 For large capacity gas services over 3 inches (76 millimeters) diameter at 4 inches (102 millimeters) of water pressure head or any other size having equivalent or greater delivery capabilities), the piping shall be enclosed in fire-resistive shafts and vented directly to the outside at top and bottom (Requirement).

8.13.6.10.1 Any horizontal runs of the gas pipe shall be enclosed in a conduit or chase, also directly vented at each end to the exterior or to the vented vertical shaft (Requirement).

8.13.6.10.2 Gas detection and automatic shutoff shall be provided (Requirement).

8.14 Internal Combustion Engines

Stationary internal combustion engines, such as gasoline or diesel-powered generator sets or fire pumps, shall conform to the requirements of NFPA 20 and 37 (Requirement).

8.15 Elevators

The design, installation, testing, and maintenance of elevators, conveyers, dumbwaiters, and escalators shall be in accordance with the requirements contained in NFPA 101 and ANSI A17.1, and ANSI A17.3 “Safety Code for Existing Elevators and Escalators (Requirement).

8.16 Fire Pumps

8.16.1 Pumps for fire protection shall have adequate capacity with reliable power and water supply (Requirement).

8.16.2 Fire pump design, installation, testing, and maintenance shall comply with NFPA 20 and NFPA 25 (Requirement).

8.16.3 Fire pump drivers shall comply with NFPA 37 for diesel engines and NFPA 70 for electric motors (Requirement).

8.16.4 Electric centrifugal fire pumps shall also comply with the relevant requirements of NFPA 70 (Requirement).

8.16.5 Fire pumps shall be arranged to start automatically (Requirement).

8.16.6 All fire pumps shall include manual shutdown features (Requirement).

8.17 Fire Suppression System Outages

8.17.1 Whenever a fire suppression system (e.g., sprinkler, standpipe, water distribution) is removed from service for a period in excess of four hours, the AHJ and the fire department responsible for initial response shall be notified (Requirement).

8.17.2 Whenever a fire suppression system (e.g., sprinkler, standpipe, water distribution) is removed from service for a period in excess of four hours, an approved fire protection system impairment plan/procedure shall be implemented (Requirement).

9. ELECTRICAL FIRE SAFETY CRITERIA

9.1 General

9.1.1 Unless otherwise specified, all electrical installations shall conform to the applicable requirements of NFPA 70, 70E, 72, 75, 101, and local codes (Requirement).

9.1.2 Fire Safety Impact

9.1.2.1 The selection of materials, electrical equipment, and the manner in which they are installed shall minimize the negative fire safety impact they will have on the facility (Requirement). Of particular concern are fire alarm systems, power plants, generators, motors, switch gear, transformers, lightning protection, grounding, static electricity, electrical equipment in hazardous locations, heating equipment, types of cables, insulation materials, electronic test equipment, computer systems, telephone exchanges, and other special electrical installations.

9.1.2.2 Noncombustible materials shall be selected where feasible (Requirement).

9.1.2.3 Fire and smoke potentials shall be considered in the development of the overall fire protection for the facility (Requirement).

9.1.2.4 Cable and wiring shall not be abandoned in place and must be removed to reduce the fuel loading in NASA buildings (Requirement).

9.1.3 Installation - Electrical equipment shall be installed in such a manner as to maintain the integrity of fire or smoke compartment including fire stopping, fire resistance, fire separation, smoke control, and other structurally oriented fire safety features (Requirement).

9.1.4 Wiring - All electrical wiring shall be in accordance with NFPA 70 (Requirement).

9.2 Emergency Power and Lighting

Emergency lighting shall be designed, installed, tested, and maintained in accordance with NFPA 101 and NFPA 70 (Requirement).

9.3 Fire Alarm Systems

9.3.1 The fire alarm system shall be designed, installed, tested, and maintained in accordance with the provisions of NFPA 70, 72, 101, and 29 CFR 1910.165 (Requirement).

9.3.2 Requirements - A complete alarm system shall be provided in facilities meeting any of the following conditions (Requirement):

9.3.2.1 Subject to occupancy of 50 or more occupants as determined using the Life Safety Code (NFPA 101) criteria.

9.3.2.2 Floor area greater than 2,500 square feet (232.25 square meters).

9.3.2.3 A facility with one or more floors above or below the level of exit discharge.

9.3.2.4 Temporary and permanent sleeping quarters including all access corridors.

9.3.2.4.1 Smoke detection that includes audible devices shall be provided as a minimum (Requirement).

9.3.2.5 Computer rooms and essential electronic equipment areas as designated by the AHJ.

9.3.2.6 Facilities with partitions that prevent occupants from readily identifying fire effects and the subsequent need to evacuate.

9.3.2.7 Areas within the facility that require a fixed suppression system and where automatic suppression, flow switches, and tamper switches are installed.

9.3.2.8 Where air-conditioning duct detectors are required.

9.3.2.9 Other instances as determined by the AHJ.

9.3.3 Functions - The system shall perform the following:

9.3.3.1 Indicate general alarm (Requirement).

9.3.3.2 Indicate building evacuation (Requirement).

9.3.3.3 Summon trained fire and emergency service personnel (Requirement).

9.3.3.4 Initiate protective measures including shutdown of equipment (Requirement).

9.3.3.5 Maintain supervision of system circuits (Requirement).

9.3.3.6 Function during power outages for a minimum of 24 hours (Requirement).

9.3.4 System components shall be listed or approved for use by a recognized, independent testing laboratory, such as UL or FM (Requirement).

9.3.5 Facility environmental monitoring systems and security systems can share common equipment with the fire alarm components required in this chapter; however:

9.3.5.1 The performance of the fire alarm system shall not be compromised (Requirement).

9.3.5.2 The fire alarm system shall comply with the other requirements in this chapter (Requirement).

9.3.6 The design of the fire alarm system shall provide for both manual and automatic alarm initiation (Requirement).

9.3.6.1 Manual Alarm:

9.3.6.1.1 Initiation of manual alarms shall be via listed fire alarm stations (Requirement).

9.3.6.1.2 Stations shall be non-destructive, able to be reset, and feature a telltale method to signify activation or tampering (Requirement). (Hammer-through-glass or palm-plunger through-glass types are not acceptable.)

9.3.6.1.3 Each station shall have a provision for authorized personnel to gain keyed access to the switching mechanism of the station (Requirement).

9.3.6.1.4 Manual fire alarm stations shall be located in corridors adjacent to each exit stairway and at each grade exit discharge from the building (Requirement).

9.3.6.1.5 Facilities with large bays or open areas shall have stations located within 200 feet (60.96 meters) of travel distance from any normal work area (Requirement).

9.3.6.1.6 In special risk areas, additional stations may be located as deemed appropriate by the AHJ (Requirement).

9.3.6.2 Automatic Fire Detectors:

9.3.6.2.1 Initiation of an automatic alarm shall be via listed water flow switches, smoke, heat, or linear projected beam detectors, ultraviolet/infrared (UV/IR) flame detectors, and alarm initiating devices associated with the activation of fixed, automatic, fire extinguishing systems (see Chapter 8) (Requirement).

9.3.6.2.2 Automatic fire detectors shall be installed, tested, and maintained in accordance with NFPA 72 and 29 CFR 1910.164 (Requirement).

9.3.6.2.3 Units shall have field-adjustable sensitivity to compensate for varying environmental conditions (Requirement).

9.3.6.2.4 The detector shall feature an alarm indicating light or diode (Requirement).

9.3.6.3 Multiple-Zoned Detection - In areas having conditions conducive to false alarms or where automatic fire detectors are used to activate a fixed fire suppression system, multiple detectors or counting technology may be utilized in the design.

9.3.6.4 Ultraviolet/infrared flame detectors or Smoke Detection (Very Early Smoke Detection Apparatus) shall be utilized when other types of detection methods will not provide a reasonable response time (e.g., high bay areas) (Requirement).

9.3.6.5 Supervisory/trouble alarms, consisting of both an audible and visual signal, shall be transmitted to a 24 hour manned location under the following conditions (Requirement):

9.3.6.5.1 Loss of primary power to the fire alarm system, electric fire pump, or extinguishing system (Requirement).

9.3.6.5.2 Activation of tamper switches located on the control valves of the water supply to automatic sprinkler systems, fire pumps, standpipe systems, or interior building fire main systems (Requirement).

9.3.6.5.3 Low pressure in special extinguishing system actuation pressure supply cylinders (Requirement).

9.3.6.5.4 Loss of air pressure for dry pipe or pre-action sprinkler systems (Requirement).

9.3.6.5.5 Operation of a fire pump (Requirement).

9.3.6.5.6 Low water level in pressure tanks, elevated tanks, and reservoirs (Requirement).

9.3.6.5.7 Open/short circuit or ground condition in any circuit (Requirement).

9.3.6.5.8 Phase reversal on electric driven fire pumps (Requirement).

9.3.6.5.9 Fire pump controllers turned to the off position (Requirement).

9.3.7 Operation

9.3.7.1 The signals shall be sufficiently distinct so as not to be confused with other signals in the area (Requirement).

9.3.7.2 Alarms shall be audible in all areas of occupied facilities (Requirement).

9.3.7.3 Audio/visual devices shall be used in all common areas and areas specifically identified by the AHJ (Requirement). In areas where the use of bells is impractical, alternate methods such as voice messages, flashing lights, red rotating beacons, or horns can be employed, if approved by the AHJ.

9.3.7.4 The fire alarm shall operate continuously until reset (Requirement).

9.3.8 Annunciators

9.3.8.1 Interior fire alarm systems shall be equipped with annunciators, located near the building entrance to indicate to responding personnel the location of the affected alarm-initiating device when required by the AHJ (Requirement).

9.3.8.2 Annunciators shall also be provided for smoke detection systems in essential electronic equipment areas when required by the AHJ (Requirement).

9.3.9 Monitoring - All fire alarm systems shall be monitored by the NASA Center's central fire alarm monitoring system (Requirement).

9.3.10 Equipment and Wiring

9.3.10.1 All power supply equipment and wiring for the fire alarm system shall be installed in accordance with the requirements of NFPA 70 (Requirement).

9.3.10.2 The conductors of the alarm system power supply circuit shall be connected on the line side of the main service to the building via a dedicated circuit (Requirement).

9.3.10.3 Dedicated branch circuits conforming to NFPA 72 are acceptable if approved by the AHJ.

9.3.10.4 A circuit disconnecting means with a suitable over-current protective device shall be installed so that it is accessible only to authorized personnel and shall be clearly marked "Fire Alarm Disconnect" (Requirement).

9.3.10.5 Electrical circuits associated with the fire alarm system shall be arranged so that the occurrence of a single break, a ground fault, or both, will not prevent the transmission of an alarm signal in accordance with NFPA 72 (Requirement).

9.3.11 Emergency Power - Emergency power shall be provided by an approved secondary source (batteries or emergency generator) to enable the fire alarm system to operate in a normal supervisory mode for a minimum period of 24 hours, with sufficient capacity at the end of that period to operate all alarm indicating appliances (such as bells or horns), for a minimum period of 5 minutes or facility evacuation time, whichever is greater (Requirement).

9.3.12 Performance Criteria

9.3.12.1 The entire system, including all alarm initiating devices, shall be completely tested under simulated fire and power failure conditions prior to acceptance (Requirement).

9.3.12.2 Tests shall be conducted by the installation contractor and witnessed by the contracting officer or his/her representative and the AHJ or their designee (Requirement).

9.3.12.3 The following are the minimum performance criteria (Requirement):

9.3.12.3.1 Activation of any manual pull station or other alarm initiating device (water flow alarm) shall immediately activate all bells, strobes, horns, rotating beacon lights, or voice alarm speakers that form a portion of the alarm system and activate the fire alarm monitoring system and a visual and audible alarm on the main fire alarm panel and the annunciator panel (if provided) (Requirement).

EXCEPTION: A pre-alarm system, complying with NFPA 101, is permitted subject to approval by the AHJ.

9.3.12.3.2 Bells, horns, and speakers shall be audible in all areas of the facility (except high ambient noise level areas where rotating beacon lights or strobes shall be provided) (Requirement).

9.3.12.3.3 An alarm condition on the fire alarm panel shall activate auxiliary devices that are to be interfaced with it, such as motorized dampers and automatic door closers (Requirement).

9.3.12.3.4 The fire alarm system shall function satisfactorily under emergency power as indicated in paragraph 9.2 (Requirement).

9.4 Central Fire Alarm Monitoring Systems

9.4.1 Actuation

9.4.1.1 Alarms initiated by fixed fire suppression systems, local fire alarm systems, fire detection systems, or exterior fire alarm stations shall be transmitted automatically, to a constantly attended fire dispatch station (Requirement).

9.4.1.2 All equipment shall be designed, installed, tested, and maintained in accordance with appropriate sections of NFPA 70, 72, and 1221 (Requirement).

9.4.2 Supervisory Conditions - Supervisory conditions shall be transmitted as a separate and distinct signal to the central fire alarm control center (Requirement).

9.4.3 Drills and Tests - Evacuation drills and periodic tests of the central alarm monitoring systems shall be conducted in accordance with NFPA 1 and 29 CFR 1910.38 (Requirement).

9.5 Fire Alarm and Detection System Outages

Whenever a fire protection system (i.e., fire detection, reporting, notification devices) is removed from service for a period in excess of four hours, the AHJ and the fire department responsible for initial response shall be notified and an approved fire protection system impairment plan/procedure implemented (Requirement).

10. SPECIFIC OCCUPANCY REQUIREMENTS

10.1 Aircraft Hangars and Maintenance Areas

10.1.1 NASA aircraft hangars and hangars that house NASA Aircraft (including leased) shall be constructed and protected in accordance with the appropriate provisions of NFPA 409 (Requirement).

10.1.2 Draft Curtains

10.1.2.1 Draft curtains shall be provided in accordance with the guidelines contained in NFPA 204 (Requirement).

10.1.2.2 The distance between curtain boards shall not exceed 100 feet (30.48 meters) (Requirement).

10.1.3 Fire Alarms

10.1.3.1 Aircraft hangars shall be equipped with an evacuation fire alarm system designed in accordance with paragraph 9.3 (Requirement).

10.1.3.2 Maintenance areas shall be constructed and protected in accordance with the appropriate provisions of NFPA 409 and NFPA 410 (Requirement).

10.2 Vehicle Repair Garages

10.2.1 Vehicle repair garages shall comply with NFPA 88B (Requirement).

10.2.2 Vehicle repair garages shall be located in 1 story buildings of non-combustible construction (Requirement).

10.2.3 **EXCEPTION:** Existing buildings. Modifications/upgrades to existing facilities shall comply with NFPA 88B (Requirement).

10.3 Buildings Under Construction

10.3.1 Buildings under construction shall comply with NFPA 1, NFPA 241, OSHA requirements, local codes, and general conditions of the specifications (Requirement).

10.3.2 Fire Protection Removal Requirements

10.3.2.1 When the work requires the temporary removal of the protection provided by an installed fire protection system, the work shall be programmed to limit the outage to the absolute minimum, and to assure that all practical precautions are taken, in the form of substitute protection and rescheduling of hazardous "hot work" until protection is restored (Requirement).

10.3.2.2 Contractors shall not shut down, shut off, disconnect, block, or otherwise impair any fire protection sprinkler system, fire hydrant, fire alarm system, special extinguishing, or other installed fire protection system without prior authority in writing from the AHJ (Requirement).

10.3.3 Sprinkler Systems

10.3.3.1 The installation of automatic sprinkler protection required as part of a project shall closely follow the construction and be placed in service as soon as practical and before occupancy or use of the area for storage or shops is allowed (Requirement).

10.3.3.2 Placing portions of the automatic sprinkler system in service during construction shall not release the contractor from completing a final acceptance test as specified by the AHJ (Requirement).

10.3.4 Space Heating Requirements

10.3.4.1 All temporary space-heating installations (such as salamanders or plaster drying equipment) shall be approved by the AHJ (Requirement).

10.3.4.2 All temporary space-heating installations shall comply with the following requirements (Requirement):

10.3.4.2.1 No liquid fuel tanks shall be pressurized except liquefied petroleum (LPG) in approved containers (Requirement).

10.3.4.2.2 To prevent fuel box explosions, liquid and gas burning units shall be provided with appropriate safeguards properly designed for the size and fuel rate of the equipment (Requirement). For example, all gas or liquefied petroleum gas-heating units shall be equipped with safety pilots.

10.3.4.2.3 Liquid and gas-fired units shall be shut down for refueling (Requirement).

10.3.4.2.4 Solid fuel equipment shall be completely enclosed and vented to the outside (Requirement).

10.3.4.2.5 Temporary heating units shall be of a stable design to guard against overturn and spilling fire and/or fuel (Requirement).

10.3.4.2.6 Adequate clearance shall be maintained to prevent ignition of combustible materials (Requirement).

10.3.5 Asphalt and Tar Kettles

10.3.5.1 Asphalt and tar kettles or similar fired equipment for preparing hot substances shall be located in a safe place outside the building at a point where there is no danger of ignition of combustible materials (Requirement).

10.3.5.2 Continuous supervision by the user shall be maintained while such equipment is in operation (Requirement).

10.3.5.3 Each tar kettle shall be provided with a metal cover and an accurate thermometer or other gage located in full view of the operator (Requirement).

10.3.5.4 Tar kettles shall be operated at temperatures at least 25 degrees below the ignition point of the material being used (Requirement).

10.3.5.5 Two 4A:60BC rated fire extinguishers shall be provided and maintained within 25 feet of each tar kettle (Requirement).

10.3.5.6 Tar kettles shall not be located within 20 feet of a facility or shall be protected from the facility by a barrier standing 4 feet above and to both sides of the pot (Requirement).

10.3.5.7 Rope barriers shall be provided to keep unrelated personnel 20 feet from the tar kettle (Requirement).

10.3.5.8 The contractor shall verify that the lid will close tight and that the tar kettle will be constantly attended from 30 minutes prior to operations until 30 minutes beyond (Requirement).

10.3.6 Torch Down Roofing

10.3.6.1 All personnel on the roof during torch application shall be trained on the proper use of a fire extinguisher (Requirement).

10.3.6.2 At least two 2½-gallon containers of water and two 20-pound ABC (dry chemical) shall be available within 10 feet of torch operation, per torch for use during the fire watch (Requirement).

10.3.6.3 Fire watch personnel shall be provided during torch application and for two hours after completion of torch application (Requirement).

10.3.6.4 At least one calibrated infrared heat detection gun per torch shall be provided for use during the fire watch to verify cool, safe, and a non-combustible conditions exist (Requirement).

10.3.6.5 For at least 2 hours, fire watch personnel properly trained shall be provided to survey the underside of the roof deck (whenever possible), as well as the topside for possible smoldering elements (Requirement).

10.3.6.6 All fire extinguishers prior to the completion of the day's work shall be examined to make sure they are full and operable (Requirement).

10.3.7 Scaffolding Shoring and Forms

10.3.7.1 Steel or other noncombustible scaffolding, shoring, and forms are recommended, where practical.

10.3.7.2 Wood, when used, shall be subject to the following (Requirement):

10.3.7.2.1 Unnecessary accumulation of combustible forms or form lumber shall be avoided (Requirement)

10.3.7.2.2 Storage of wood material shall be kept outside of, and as far as practical from, the perimeter of the building (Requirement).

10.3.7.2.3 Forms and shoring shall be stripped from the building as soon as possible after completion of that phase of construction (Requirement).

10.3.7.2.4 Scaffolding shall be removed as soon as it is no longer needed (Requirement).

10.3.8 Gasoline-Powered Equipment - Gasoline-powered air compressors, hoists, derricks, or pumps shall be located so that the exhaust is well away from combustible material and exhaust vapors are piped outside, away from air intakes or otherwise adequately dispersed (Requirement).

10.3.9 Occupied Building Alterations

10.3.9.1 When additions or major alterations are undertaken in occupied buildings, a barrier shall be erected to separate the construction areas from the remainder of the building (Requirement).

10.3.9.2 This barrier shall be of noncombustible construction having a fire-resistance rating equivalent to that of the existing facility (Requirement).

10.3.10 Emergency Exits

10.3.10.1 Emergency exits shall be maintained during construction operations (Requirement).

10.3.10.2 In the construction of new multistory buildings, at least one usable stairway (or ramp) shall be provided at all times (Requirement).

10.3.10.3 The stairway shall be extended upwards as each floor level is erected during rehabilitation of/or modifications to existing buildings (Requirement).

10.3.10.4 If normal paths of exit travel are blocked by construction, clearly defined and illuminated alternate exits shall be provided (Requirement).

10.3.11 Inspections - The contractor shall conduct or have conducted an inspection of the entire work area at the end of each workday to discover any smoldering or incipient fires and to remove any hazardous conditions (Requirement).

10.3.12 Fire Planning - The contractor shall prepare for necessary action in case of fire (Requirement).

10.3.12.1 The degree of preparation depends upon the individual project but shall include (Requirement):

10.3.12.1.1 Fire alarm-initiating procedures (Requirement).

10.3.12.1.2 Notification of the fire department (Requirement).

10.3.12.1.3 Location of fire protection equipment (Requirement).

10.3.12.1.4 Evacuation procedures (Requirement).

10.3.12.1.5 Manual fire fighting efforts (Requirement).

10.3.12.1.6 Fire watch procedures (Requirement).

10.4 Essential Electronic Equipment Areas/Record Storage/Laboratory

10.4.1 Essential electronic equipment areas (see Chapter 3 for definition) shall be constructed and protected in accordance with the appropriate provisions of NFPA 70 and 75 (Requirement).

10.4.2 Automatic Sprinkler Protection

10.4.2.1 Automatic sprinkler protection is required for all electronic equipment and record storage areas and shall be installed in accordance with NFPA 13 and Chapter 8 of this document (Requirement).

10.4.2.2 The sprinkler system shall be valved independently from other sprinkler systems (Requirement).

10.4.2.3 The zone valve shall be equipped with electrical supervision (Requirement).

10.4.3 Under floor smoke detection shall be provided in all new raised floors (Requirement).

10.4.4 All construction under floor shall be of noncombustible material, including any ramps and/or stairs (Requirement). Use of wood or fire-retardant treated plywood is not acceptable.

10.4.5 Automatic Smoke Detection Equipment

10.4.5.1 Automatic smoke detection equipment capable of early warning shall be installed in all areas (Requirement).

10.4.5.2 Each installation shall be engineered for the specific area to be protected and meet the requirements of NFPA 72 (Requirement).

10.4.5.3 Smoke aspiration systems shall be used for new or refurbished essential electronic equipment areas (Requirement).

10.4.5.4 The smoke detection system shall be connected to a locally sounding alarm (Requirement).

10.4.5.5 The smoke detection system shall relay the alarm automatically to an approved central fire alarm control center (Requirement).

10.4.6 Areas shall be separated from the remainder of the facility by 1 hour fire-resistive construction (Requirement).

10.4.7 Record storage areas shall be separated from the remainder of the facility by 2 hour fire-resistive construction (Requirement).

10.4.8 Power cables in under floor spaces shall be either type Mineral Insulated, Metal Sheathed (MI), Metal Clad cable (MC), or Armored Cable (AC) cables or shall be installed in approved conduit or metallic tubing (Requirement).

10.4.9 Communication, data, and interconnecting cables shall be installed in approved conduit or metallic tubing or listed as approved for use in air plenums.

***EXCEPTION:** Under floor spaces not meeting the above cabling requirements shall be provided with an automatic fire suppression system. Sprinklers should only be used if the floor is raised a minimum of 4 feet (1.219 meters) and the sprinklers have at least 18 inches (458 millimeters) clearance to blockage potential.*

10.5 Cooling Towers

10.5.1 Cooling towers shall be constructed and protected in accordance with the appropriate provisions of NFPA 214 (Requirement).

10.5.2 Additionally, the following shall be considered with concurrence by the AHJ (Requirement):

10.5.2.1 Protection Requirements

10.5.2.1.1 Wood constructed cooling towers or those towers utilizing combustible construction/fill material, exceeding 2000 cubic feet in volume, shall be protected by a fixed, automatic, deluge sprinkler system, designed to provide complete coverage for the fill, fan deck, and fan motor (Requirement).

10.5.2.1.2 Sprinkler design densities/criteria shall be per NFPA 214 (Requirement).

10.5.2.1.3 Cooling towers with fiberglass or PVC type fill shall be considered combustible and shall be protected by sprinklers unless the fill is Factory Mutual approved (or equivalent) for use as noncombustible (Requirement).

10.5.2.2 New cooling towers shall be listed by an approved testing agency (Requirement).

10.5.2.3 Testing - The entire fire protection system shall be tested under simulated fire conditions prior to acceptance and on an annual basis thereafter (Requirement).

10.6 Transformer/Switchgear Locations

10.6.1 Transformers, switch-gear, and associated electrical equipment shall be installed in accordance with the appropriate provisions of NFPA 70 and 29 CFR 1910 (Requirement).

10.6.2 Transformer installations shall require a hazard assessment by a qualified risk assessment/fire protection engineer as to the location/exposure/criticality (Requirement).

10.6.3 The need for and/or type of protection of the transformer(s) shall be determined by the assessment findings and in conjunction with the AHJ (Requirement).

10.6.4 The assessment shall utilize the criteria set forth in the current Factory Mutual Loss Prevention Data Sheet 5-4. (TRANSFORMERS and ANSI IEEE Standard 979) (Requirement).

10.6.5 Applicable NFPA codes shall also be used for guidance in the assessment process (Requirement).

10.7 Food Preparation Areas

Exhaust systems over cooking equipment shall be installed and protected in accordance with the appropriate provisions of NFPA 13, 17, 96, and local codes (Requirement).

10.7.1 Extinguishing Systems:

10.7.1.1 A complete, automatic, chemical fire extinguishing system shall be provided to protect exhaust hoods, duct systems, grease removal devices, and the surface of deep fat fryers, ranges, griddles, and broilers (Requirement).

10.7.1.1.1 The system shall be in accordance with NFPA 17A (Requirement).

10.7.1.1.2 Activation of the chemical system shall interrupt power and/or the fuel supply to the affected equipment, initiate the building fire alarm system, and send a signal to a central fire alarm control center (Requirement).

10.7.1.1.3 A trip device to manually activate the extinguishing system shall be installed away from the cooking equipment near the entrance to the food preparation area or in a major travel path (Requirement).

10.7.1.2 A Class K, wet chemical type, portable fire extinguisher (potassium acetate base) shall be installed near deep fat fryers that use combustible cooking media (animal or vegetable oils and fats) (Requirement).

10.7.1.3 An appropriate number of Class A water extinguishers and Class BC dry chemical extinguishers, base on the size of the area to be protected, shall be provided for protection of the building and areas not associated with deep fat fryers.

10.7.1.4 Storage Areas - Storage rooms or areas used in conjunction with food preparation shall be protected with automatic sprinklers (Requirement). (For limited areas where no more than six sprinkler heads are required, the water can be supplied from the domestic water system).

10.8 Laboratories

10.8.1 Laboratories shall be constructed and protected in accordance with the applicable provisions of NFPA 45 and 29 CFR 1910.119, and 29 CFR 1910.1450 (Requirement).

10.8.2 Laboratories not fitting the classification outlined in the above referenced standards, yet housing unique, critically important, or high value research equipment, shall conform to the provisions of paragraph 10.4 (Requirement).

10.8.3 The AHJ shall be consulted to determine which laboratories fall within this category to assure which fire protection features shall be applicable to the laboratories (Requirement).

10.8.4 Automatic sprinkler protection is required for all areas and shall be installed in accordance with NFPA 13 and Chapter 8 of this document (Requirement).

10.8.5 The sprinkler system shall be valved independently from other sprinkler systems (Requirement).

10.8.6 The zone valve shall be equipped with electrical supervision (Requirement).

10.8.7 Under floor smoke detection shall be provided in all new raised floors (Requirement).

10.8.8 Also, all construction under floor shall be of noncombustible material, including any ramps and/or stairs (Requirement). Use of wood or fire-retardant treated plywood is not acceptable.

10.8.9 Automatic smoke detection equipment capable of early warning shall be installed in all areas (Requirement).

10.8.9.1 Each installation shall be engineered for the specific area to be protected and meet the requirements of NFPA 72 (Requirement).

10.8.9.2 Smoke aspirations system shall be used for new or refurbished areas (Requirement).

10.8.9.3 The smoke detection system shall be connected to a locally sounding alarm and shall relay the alarm automatically to an approved central fire alarm control center (Requirement).

10.8.10 These areas shall be separated from the remainder of the facility by 1 hour fire-resistive construction (Requirement).

10.8.11 Record storage areas shall be separated from the remainder of the facility by 2 hour fire-resistive construction (Requirement).

10.8.12 Power cables in under floor spaces shall be either type Mineral Insulated, Metal Sheathed (MI), Metal Clad cable (MC), or Armored Cable (AC) cables or shall be installed in approved conduit or metallic tubing (Requirement).

10.8.13 Communication, data, and interconnecting cables shall be installed in approved conduit or metallic tubing or listed as approved for use in air plenums (Requirement). **(EXCEPTION:** Under floor spaces not meeting the above cabling requirements shall be provided with an automatic fire suppression system. Sprinklers should only be used if the floor is raised a minimum of 4 feet (1.219 meters) and the sprinklers have at least 18 inches (458 millimeters) clearance to blockage potential.

10.9 Trailers and Manufactured Homes

10.9.1 Construction Requirements:

10.9.1.1 Use of trailers and manufactured home units as offices or for housing electronic equipment shall be reviewed and approved by the AHJ prior to siting (Requirement).

10.9.1.1.1 All trailers and manufactured home units so used shall meet the appropriate construction, mechanical system, and electrical system installation requirements of ANSI 119.1 and 24 CFR 3280 (Requirement).

10.9.1.1.2 Trailer/mobile home complexes that exceed 2,500 square feet (232.25 square meters) shall meet all requirements for permanent structures listed in this document, local codes, and NFPA 80A (Requirement).

10.9.1.1.3 Requirements for smaller complexes shall be determined by the AHJ (Requirement).

10.9.1.2 Trailers and mobile home units arranged for occupancy shall comply with the interior finish concealed space and exit requirements of NFPA 101 (Requirement).

10.9.1.3 Trailers and mobile home units shall be located at least 25 feet (7.62 meters) from permanent buildings and at least 25 feet (7.62 meters) apart, unless joined to form a single complex.

10.9.1.3.1 Single complex trailers must be of the same hazard classification (Requirement).

10.9.1.3.2 Single complex trailers shall be treated as permanent structures (Requirement).

10.9.2 Fire Alarm Systems shall be installed as denoted in paragraph 9.3 (Requirement).

10.10 Tunnels

10.10.1 Tunnels shall be constructed and protected in such a manner as to prevent smoke, heat, and flame from being conveyed via the tunnel into occupied areas of a building in accordance with OSHA, local codes, and NFPA 101 (Requirement). Fire-rated construction will be used as much as possible at the junction of the tunnel and the building foundation or exterior wall.

10.10.2 Fire Protection - Where passive measures alone would be insufficient to mitigate the hazard, automatic water spray systems at unprotected building openings or tunnel-wide fire suppression systems shall be installed (Requirement).

10.10.3 Entrance Requirements - A sufficient number of portals as determined by the AHJ shall be provided in tunnel networks for emergency access and firefighting efforts (Requirement).

10.10.4 Occupancy - Tunnels shall not be utilized as office or storage space (Requirement).

10.11 Anechoic Chambers

10.11.1 Anechoic chambers shall be protected by a complete fixed-based extinguishing system, designed and installed by recognized national standards, consisting of one of the following systems (Requirement) (Note- FM Global Data Sheet 1-53, *Anechoic Chambers* should be consulted when providing protection to Anechoic Chambers):

10.11.1.1 Automatic wet-pipe sprinkler protection controlled by separate U.L. listed indicating control valves.

10.11.1.2 A total-flooding automatic-acting primary system with a back-up automatic reserve system, both activated by a detection system integral to the suppression component of the system.

10.11.2 Fixed extinguishing systems shall comply with the following conditions (Requirement):

10.11.2.1 Control rooms shall be separated from the chamber by partitions having a fire-resistance rating of at least one hour (Requirement).

10.11.2.2 Vision panels shall be no more than nine square feet (0.836 square meters) (Requirement).

10.11.2.3 Vision panels shall be wired glass in steel frames (Requirement).

10.11.2.4 Air conditioning systems or other chamber ducting shall be independent of main facility systems (Requirement).

10.11.2.5 Chambers shall be equipped with an approved smoke detection system if a water-based extinguishing system is utilized to protect the chamber (Requirement).

10.12 Highbays

10.12.1 Highbays are defined to be any space with a ceiling height of thirty (30) or more feet. These spaces represent fire protection challenges due to the heat and smoke dispersion over the potentially large distances, compounded by the unique and sometimes large fuel loads associated with the aerospace industry. Based upon studies conducted by the National Institute of Standards and Technology (NIST), fire protection for highbay spaces shall conform to the following (Requirement):

10.12.1.1 Spaces with ceiling heights less than 30 feet shall follow NFPA and manufacturers guidelines (Requirement).

10.12.1.2 Spaces with ceiling heights 30 to 60 feet shall be designed by a registered Professional Engineer, with principles and practices in fire protection, using NFPA and manufacturer's

guidelines, computer fire models such as FPETOOLS, LAVENT, Fire Dynamics and Smoke View (FDS-SV) or Hazard, and sound engineering judgment (Requirement).

10.12.1.3 Spaces with ceiling heights in excess of 60 feet shall be in accordance with Section 4.5 (Requirement).

11. FIRE PREVENTION PROCEDURES

11.1 General Fire Prevention

11.1.1 Per NPR 8715.3, NASA Center Directors are responsible for implementing an effective fire safety program at their Center.

11.1.2 The following references shall be utilized in the development of a Fire Prevention Program (Requirement):

11.1.2.1 Fire Inspection and Code Enforcement Manual (IFSTA)

11.1.2.2 Local Building and Fire Codes

11.1.2.3 National Fire Prevention Code (NFPA)

11.1.2.4 Fire Protection Handbook (NFPA)

11.1.2.5 Fire and Life Safety Inspection Manual (NFPA)

11.1.2.6 Occupational Safety and Health (29 CFR 1910, 29 CFR 1960 and 29 CFR 1926)

11.1.2.7 NASA Safety Standards (NASA)

11.1.2.8 Plans Examiner for Fire and Emergency Services Manual (IFSTA)

11.2 Fire Reporting and Documentation

11.2.1 The following documents shall remain on file for the periods shown (Requirement):

Note: The AHJ can extend this time if warranted.

11.2.1.1 Fire Prevention Inspections (2 Years)

11.2.1.2 Fire/Evacuation Drills (2 Years)

11.2.1.3 Plan Reviews (5 Years)

11.2.1.4 Fire Protection System Inspections (5 Years)

11.2.1.5 Fire (Incident) Reports (Indefinite)

11.2.1.6 Fire Investigation Reports (Indefinite)

11.2.2 Fires meeting the definition of "a close call" as defined by NPR 8715.3, "NASA General Safety Program Requirements," shall be reported as specified in NPR 8621.1, "NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping" (Requirement).

11.2.3 All NASA Centers shall report to the National Fire Incident Reporting System (NFIRS) directly or via a local system (Requirement).

11.2.4 All fires shall be reported via the Incident Reporting Information System (IRIS) to the facilities emergency operations center and to NASA Headquarters, Safety and Assurance

Requirements Division, for lessons learned, and pattern development within NASA (Requirement).

11.2.5 A summary of each NASA Center's incidents and their findings shall be reported to the annual meeting of the Fire Protection Working Group for review and suggestions (Requirement).

11.3 Fire Investigation

11.3.1 The AHJ at each NASA Center shall designate person(s) responsible for the investigation of all fires at their facilities (Requirement).

11.3.2 The requirements in NPR 8621.1, "NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping," and NFPA 921 shall be used in these investigations (Requirement).

11.3.3 Contacts for outside assistance shall be established (Requirement).

11.3.4 Security shall be notified of all fires that are suspicious in nature (Requirement).

11.3.5 Persons within NASA assigned the responsibility of determining origin and cause shall be trained at the level of NFPA 1033 with annual refresher training provided by independent parties or certified origin and cause instructors (Requirement).

11.4 Smoking Locations

11.4.1 Smoking within government buildings is prohibited. Outside smoking is prohibited within the following locations:

11.4.1.1 Hot and warm zones of any hazardous material incidents.

11.4.1.2 10 feet of any non-maintained vegetation.

11.4.1.3 25 feet of any storage or transfer of flammable/combustible liquids.

11.4.1.4 50 feet of any explosives transfer or storage magazine.

11.4.1.5 200 feet of any storage or transfer of liquid oxygen.

11.4.1.6 3-5 feet of any general combustible storage.

11.4.1.7 Surplus scrap yards.

11.4.1.8 Lumber storage yards.

11.4.1.9 Active airport ramp, taxiway, or runway.

11.4.1.10 On building/structure roofs

11.5 Fire Safety Education

11.5.1 Fire/Evacuation Drills

11.5.1.1 Fire drills shall be conducted annually in all facilities occupied by ten or more persons (Requirement).

11.5.1.2 Fire drills shall be conducted and evaluated by persons knowledgeable in fire and life safety (Requirement).

11.5.1.3 Fire drills shall not be announced to the general population, however, the AHJ may wish to have key personnel involved to prevent interruption of mission essential activities (Requirement).

11.5.1.4 Emergency plans shall include contingencies for all phases of operations including mission essential operations (Requirement).

11.5.1.5 These plans shall be reviewed and approved by the AHJ (Requirement).

11.5.2 Fire Safety Education

11.5.2.1 Fire Safety Education Programs shall be available to all occupants (Requirement).

11.5.2.2 At a minimum, all new employees shall receive an introduction to emergency systems within thirty days of employment that includes how to activate the emergency services system, the operation of fixed systems, the evacuation plan for the building and the facility, awareness of emergency signals, hazard recognition and reporting, and the use of portable fire suppression equipment (if applicable) (Requirement). Other safety equipment training can be done in conjunction with this training.

11.5.2.3 Each Center/facility shall establish and maintain a comprehensive fire safety education/awareness program (Requirement).

11.5.3 Fire Extinguisher Training

11.5.3.1 Personnel that are required to use fire extinguishers shall be instructed in their use in accordance with OSHA 1910.38 (Requirement).

11.5.3.2 The training shall include all fire extinguishers which they may reasonably be expected to encounter (Requirement).

11.5.3.3 Persons who have not been trained in extinguishers shall not be instructed to use them (Requirement).

11.5.3.4 Training shall include a hands-on exercise under the same conditions which they would be expected to encounter in the work place (Requirement).

11.5.3.5 The training shall be supervised by a fire extinguisher instructor from the fire service (Requirement).

11.5.3.6 Industry Refresher Training shall be conducted in accordance with OSHA requirements (Requirement).

11.5.4 Fire Prevention Week - Centers are encouraged to take an active role in fire prevention week including jointly participating in surrounding community activities. NASA Public Affairs should be contacted in the promotion of NASA contributions to fire safety through science.

11.6 Housekeeping

Good housekeeping in all operations is essential for effective fire prevention. Accumulation of rubbish, waste, and industrial residue as well as concentrations of flammable vapors provide excellent fuel sources for fire. In order to minimize fire hazards in the workplace, the following housekeeping requirements shall be followed (Requirement):

11.6.1 Large waste cans should be avoided in favor of small cans, which shall be emptied at regular intervals into a larger can in a safe remote location (Requirement).

11.6.2 Smoking material shall not be disposed of in waste cans until 12 hours have past since it was last used (Requirement).

11.6.3 Dumpsters and recycle bins shall not be stored closer than 10 feet from a structure with a fire rated wall and 15 feet from any other nonrated structure including towers (Requirement).

11.6.4 Hazardous materials may not be disposed of in general waste dumpsters.

11.6.5 Hazardous materials shall be disposed of in accordance with environmental regulations (Requirement).

11.6.6 Metal lids or doors should be provided and, if provided, shall be kept closed when not in use (Requirement). (**EXCEPTION:** large bulk open top dumpsters).

11.6.7 Paper in excess of that necessary to perform a task shall be removed (Requirement). Papers needed, which are awaiting actions, should be stored within cabinets until needed.

11.6.8 Recycle paper storage bins shall not be stored in hallways or stairwells (Requirement).

11.6.9 Bulk storage of recycled paper waiting processing shall be stored in outside containers (Requirement). Bulk paper may be stored within a structure in an AHJ approved location.

11.6.10 Approved (UL/FM) waste cans shall be provided in areas where oily waste and/ or flammable/combustible finishes are used or found (Requirement).

11.6.10.1 These cans shall be emptied daily or anytime the self-closing lid will not close (Requirement).

11.6.10.2 Areas where these cans may be needed include, but are not limited to, printing shops, vehicle repair shops, parts cleaning areas, and machine shops.

11.6.10.3 The size of the container will be determined by the volume of material being generated and the frequency of disposal.

11.6.11 No stock item, furniture, equipment, interior decoration, vehicle, debris, or other substantial physical object shall be placed or stored temporarily or permanently in a path of emergency travel (corridor, exit door, stairway, and point of exit discharge), without the approval of the AHJ (Requirement).

11.6.12 No object shall be located in such a manner as to prevent access to, or use of, fire protection equipment (fire extinguishers, fire alarm pull stations, hydrants, fire hose outlets, fire alarm panel, sprinkler valves, and Fire Department connections) (Requirement).

11.6.12.1 Combustible dust shall not be removed by air pressure (Requirement).

11.6.12.2 Vacuum is the preferred method since airborne combustible dust may create an explosive atmosphere.

11.6.12.3 When air pressure must be used, all sources of ignition (pilot lights, on/off electric motors, hot work, etc.) shall be removed and the space must have adequate ventilation (Requirement).

11.6.12.4 Vacuum equipment shall be equipped with explosion proof motors (Requirement).

11.6.13 Scrap piles of combustible materials shall have fire lanes between piles at least 12 feet wide (Requirement).

11.6.14 Mechanical and electrical rooms, elevator rooms, space above ceilings, beneath raised floors, and under stairwells shall be kept free of combustibles and flammable materials and not be used as offices, shops, or storage rooms (Requirement).

11.6.15 Hallways, doorways, stairwells, and lobbies shall be kept free of trash and debris and not be used for storage (Requirement).

11.6.16 Contractors, including construction contractors, shall remove and safely dispose of waste material and debris resulting from their operations on a daily basis (Requirement).

11.6.17 All hoods, ducts, fans, and filters above stoves or grills shall be cleaned at frequent intervals to prevent them from becoming contaminated with grease or oily sludge (Requirement).

11.6.17.1 The minimum frequency of cleaning will be daily for stoves and hoods, weekly for filters, and semi-annual for ducts and fans.

11.6.17.2 No stove or grill shall be used without the filter in place (Requirement).

11.6.18 A minimum of a 25 foot clear area shall be maintained between facilities, including trailers and boxcars, and combustible brush land (Requirement).

11.6.19 A 50 foot clear area shall be maintained between facilities and densely wooded areas (Requirement).

11.6.20 Closets, storage rooms, file rooms, and the like require a high degree of housekeeping to maintain commodities in proper containers and neatly stacked.

11.6.21 Combustible wastes shall not be allowed to accumulate within or adjacent to facilities (Requirement).

11.6.22 Rags contaminated with flammable or combustible liquids shall be kept in tightly covered, properly identified metal or polyurethane containers when not being used (Requirement).

11.6.22.1 The containers shall be emptied at least daily and always before occupants leave the area (Requirement).

11.6.23 Mops and other cleaning materials shall only be stored in janitorial closets or storage areas (Requirement).

11.6.24 The use of free-burning foams and plastics is prohibited except when no satisfactory substitute is available and use is approved by AHJ.

11.6.25 Electrical appliances, which have been modified or that are nonstandard in any way, shall not be used (Requirement).

11.6.26 All electrical appliances shall be unplugged when not in use, except when the appliance is controlled by an internal power switch (Requirement).

11.6.27 Only UL listed or FM approved coffee makers, refrigerators, crock pots, toasters, and microwaves shall be permitted for general office food preparation provided the electrical system is capable of supporting the load needed for these items (Requirement). Toaster ovens are not approved for use.

11.6.28 Portable space heaters are prohibited unless permitted and approved by the AHJ or Center policy. Permits shall be issued for validated medical reasons or during heating system outage (Requirement).

11.7 Fire Prevention Inspections

11.7.1 Fire prevention inspections shall be conducted by persons trained to recognize fire-related problems (Requirement).

11.7.2 Fire prevention inspections are done with a written document developed for each inspection and maintained as outlined in paragraph 11.2 (Requirement).

11.7.3 The frequency and the time of inspections shall be determined by the AHJ (Requirement), however the following is a recommended guide in developing a schedule:

11.7.3.1 Quarterly Inspections:

11.7.3.1.1 Mission essential

11.7.3.1.2 High dollar value

11.7.3.1.3 High life load (greater than 300 people)

11.7.3.1.4 Moderate to high risk hazardous storage or process

11.7.3.1.5 High fire/smoke/explosion potential

11.7.3.2 Semi-Annual Inspections:

11.7.3.2.1 Routine daily business

11.7.3.2.2 Moderate dollar value

11.7.3.2.3 Moderate life load (Less than 300 people)

11.7.3.2.4 Moderate risk hazardous storage or process

11.7.3.2.5 Moderate fire/smoke development

11.7.3.3 Annual Inspections:

11.7.3.3.1 Not normally occupied

11.7.3.3.2 Low dollar value

11.7.3.3.3 No or low life load (less than 10 people)

11.7.3.3.4 Low risk hazardous storage or process

11.7.3.3.5 Low fire/smoke development

11.7.4 The facility manager shall be given a copy of the inspection report and he/she shall be responsible for correcting deficiencies including following work orders through until complete (Requirement).

11.7.5 To ensure correction of noted deficiencies, re-inspection shall be done within 30 days of initial inspection (Requirement).

11.7.6 The use of Fire Department personnel to conduct these inspections is encouraged when it will not prevent them from performing emergency duties as outlined in Chapter 12. This will present the opportunity for Fire Department personnel to update pre-fire plans at the time of inspection.

11.7.7 A fire inspection should be used as a fire safety education tool first and foremost. Only as a last resort should it be used as a compliance order.

11.8 Hot Work

11.8.1 Open fires are prohibited except when a Permit is issued by the Fire Services or Safety Official.

11.8.2 The use of matches, lighters, and candles as substitutes for flashlights is prohibited.

11.8.3 Welding and cutting and open flame operations conducted outside a designated shop requires a permit issued by the Fire Services or Safety Official. As a minimum, the permit issuing official shall ensure that a fire watch is provided by the requester on all welding, cutting, open flames, and other hot work requiring a permit (Requirement).

11.8.4 Permitting officials, fire watchers, welders, and their apprentices shall be familiar with and trained to the requirements provided in NFPA 51B, 29 CFR 1910.252 and 1910.253 (Requirement).

11.8.5 When fire systems are required to be deactivated for welding, cutting, open flames or other hot work, it is imperative that the systems be turned back on as soon as possible.

11.8.6 The permitted location of welding, cutting, open flames, or other hot work shall not be changed or altered (Requirement).

11.8.7 Whenever changes are made that either alter the permitted area, require new processes to be introduced into the area, or cause relocation to a different site, a new permit shall be issued (Requirement).

11.8.8 Use of tar pots requires a permit issued by the Fire Services or Safety Official.

11.8.9 Tar pots shall not be located within 20 feet of a facility or shall be protected from the facility by a barrier standing 4 feet above and to all sides of the pot that are exposed the building (Requirement).

11.8.10 Rope barriers shall be provided to keep unrelated personnel 20 feet from the tar pot (Requirement).

11.8.11 The user shall verify that the lid will close tight and that it will be constantly attended from 30 minutes prior to operations until 30 minutes beyond (Requirement).

11.9 Flammable and Combustible Liquids

11.9.1 All storage cabinets for flammable and combustible liquids shall comply with NFPA 30, have UL/FM seal, and be painted a highly visible yellow, with 4 inch red lettering stating, "Flammable - Keep Fire Away" (Requirement).

11.9.2 Where deemed appropriate by the AHJ, a Flammable/Combustible Liquid Storage Permit shall be obtained and prominently displayed on the outside of the cabinet (Requirement).

11.9.3 All storage buildings, sites, and designated rooms for flammable and combustible liquids shall be identified as such in accordance with NFPA 30, and placarded per NFPA 704 (Requirement).

11.9.4 Bulk storage of flammable and combustible liquids shall be in compliance with the requirements of NFPA 30, and with the approval of Fire Services or Safety Official (Requirement).

11.9.4.1 Only approved containers or portable tanks shall be used (Requirement).

11.9.4.2 Storage of containers shall be on pallets or approved shelves (Requirement).

11.9.4.3 Outside storage areas shall have a minimum of one fire hydrant within 500 feet (Requirement).

11.9.4.4 The outside storage site shall be graded to allow drainage away from any buildings (Requirement).

11.9.4.5 Outside storage shall be on pallets separated by 5 feet from all other pallets (Requirement).

11.9.5 Storage of flammable and combustible liquids with a flash point of 200 °F or less shall comply with the following (Requirement):

***EXCEPTION:** single dispensers of common cleaning materials*

11.9.5.1 Spray cans shall be stored in accordance with NFPA 30 and AHJ regulations (Requirement).

11.9.5.2 Frangible containers are prohibited for use in handling flammable and combustible liquids except when approved in writing by the Fire Services or Safety Officials. In general, a total quantity of 1 gallon of flammable/combustible liquids may be stored in flammable containers per permitted storage cabinet. This quantity can be increased per NFPA 45 for laboratory areas requiring frangible container storage based on liquid purity requirements.

11.9.5.3 Flammable or toxic materials shall be used only in areas where adequate ventilation is provided (Requirement).

11.9.5.4 Provisions shall be made to prevent vapors from accumulating in confined spaces (Requirement).

11.9.5.5 Electrical equipment shall be listed/approved for the appropriate hazard Class & Division per NFPA 70 (Requirement).

11.9.5.6 Flammable liquid storage cabinets shall be located only in "No Smoking" areas and at least 15 feet from egress routes unless otherwise approved by the AHJ (Requirement).

11.9.5.7 Flammable liquid storage cabinets shall not have combustible material stored in, on, or near them (Requirement).

11.9.5.8 All flammable liquids which require refrigeration shall be stored in refrigerators or freezers that are NFPA 45 and FM/UL approved/listed (Requirement).

11.9.5.9 Food shall not be stored in refrigerators with flammable liquids (Requirement).

11.9.5.10 Flammable and combustible liquid storage cabinet venting bungs shall remain in place, unless the cabinet is connected to a singular vented system piped to the outside (Requirement).

11.9.5.11 The flammable and combustible liquids that need to be separated because of incompatibility shall be in approved cabinets which are clearly identified; i.e., "Acids Only," "Bases Only," "Oxidizer Only," or other appropriate label (Requirement).

11.9.5.12 Only FM/UL approved safety containers that meet NFPA and OSHA requirements shall be used (Requirement).

11.9.6 Vehicles (loaded or empty) used for transporting flammable and combustible liquids shall not enter any building unless specifically approved by the AHJ (Requirement).

11.9.7 Vehicles and engines shall not be fueled or defueled inside a building, except when approved by the Fire Services or Safety Official (Requirement).

11.9.8 Any vehicle or engine being fueled or defueled inside a building shall be properly bonded and grounded (Requirement).

11.9.9 The storage, possession, or use of flammable and combustible liquids (other than safety approved solvents) is prohibited except for non-substitute essential applications approved by the Fire Services or Safety Official.

11.9.10 The user of such liquids shall develop an approved technical operating procedure for applications, precautions, and storage in accordance with OSHA 1910.1200 (Requirement).

11.9.11 A copy of the procedure shall be readily available in the work area (Requirement).

11.9.12 All construction contractors performing work shall comply with all of the requirements for storage and use of flammable and combustible liquids contained in this handbook as well as applicable OSHA regulations and NFPA codes (Requirement).

12. FIRE SERVICE OPERATIONS AND REQUIREMENTS

12.1 General

A fire protection program consists of fire protection engineering to minimize fire loss through engineering designs and systems, fire prevention to inspect for employee created fire hazards and provide fire safety education/training, and a fire suppression force to minimize losses in the event of a fire. This chapter pertains to the fire service operations element of a fire protection program including command and control, fire fighting, emergency medical service (EMS), rescue and hazardous materials response.

12.1.1 Each NASA Center Director's responsibilities for fire service operations and firefighting are provided in NPR 8715.3, Chapter 5.

12.1.2 The fire department shall be equipped with a sufficient amount of first-line and reserve firefighting vehicles to combat anticipated fires (Requirement).

12.1.3 Personnel staffing shall be authorized by the local individual who is the AHJ (Requirement). Fire service operations may be provided by:

12.1.3.1 NASA contractor

12.1.3.2 Civil Service employees

12.1.3.3 Other local fire departments

12.1.3.4 Fire brigade

12.1.3.5 Any combination of the above

12.1.4 Hazardous Materials - The wide spread use of hazardous materials increases the possibility of a spill, leak, or fire involving these materials. The fire protection role in such incidents is to provide command and control, provide rescue and EMS services, extinguish the fire, and contain the materials. Once these actions have been accomplished, the involvement of the fire department reverts to a support role. Recovery, neutralization, cleanup, and disposal of hazardous materials are accomplished by trained experts in the related field.

12.1.5 The AHJ shall be notified by the Senior Fire Officer when staffing levels or the minimum amount of firefighting vehicles needed to support the NASA mission fall below the number needed to operate adequately in time of emergency (Requirement).

12.2 Incident Management System

12.2.1 Each NASA Center/facility shall adopt, implement, train in the use of, and utilize an Incident Management System in accordance with HSPD5, NIMS, and, NFPA 1561 when managing any emergency or disaster (Requirement).

12.2.2 Specific responsibilities shall be identified in each NASA Center's Emergency Preparedness Plan required by NPR 8715.2, "NASA Emergency Preparedness Plan Procedural Requirements" (Requirement).

12.3 Local Fire Service Support

When fire suppression, rescue, EMS, and/or hazardous materials response and other fire service related emergency responses are provided by a non-NASA local fire service organization, responsibilities and agreements shall be placed in writing (Requirement). In many cases, NASA or NASA contractor personnel augment local fire service responses primarily through information coordination efforts.

12.4 NASA Contractor or Civil Service Fire Service Operations

12.4.1 Contractor(s) shall be held responsible for contract compliance (Requirement).

12.4.2 Civil Service and contracted fire departments at each NASA Center/facility shall develop and implement a written Fire Service Operations Plan that ensures compliance with applicable NFPA, OSHA, FAA, and/or NASA documents (Requirement).

12.4.3 The Fire Service Operations Plan shall include the following (Requirement):

12.4.3.1 Mission Statement

12.4.3.2 Management Plan:

12.4.3.2.1 Organizational Structure and Lines of Communication

12.4.3.2.2 Occupational Safety and Health Plan

12.4.3.2.3 Self inspection/Self audit process

12.4.3.2.4 Training and Certification Plan

12.4.3.3 Operations Plans:

12.4.3.3.1 Emergency Response Plan

12.4.3.3.2 Minimum Staffing Plan

12.4.3.3.3 Vehicle Maintenance and Refurbishment Plan

12.4.3.3.4 Physical Fitness Plan

12.5 Fire Brigades

Where Industrial Fire Brigades are established and operated at a NASA Center/facility, the brigades shall, as a minimum, comply with this standard, NFPA 600, NFPA 1081, and OSHA 29 CFR 1910.156 (Requirement).

12.6 Communications

Where consolidated communications centers are not employed, the provisions for providing and maintaining adequate facilities for the receipt of alarms and communications functions at each NASA Center/facility shall be provided and operated by qualified operators that meet the requirements of NFPA 1061 and 1221 (Requirement).

12.7 Aircraft Operations

Each NASA Center/facility that has runways, taxiways, and facilities for the arrival and departure of aircraft shall have sufficient amounts of Aircraft Rescue and Fire Fighting (ARFF) resources to respond to and suppress fires and maintain a means of egress for the flight crews during aircraft emergencies, per FAA Part 139 and NFPA 403 (Requirement).

12.8 Fire Stations

12.8.1 Each fire station located at NASA Centers/facilities shall be designed, constructed, and maintained to allow the fire department to effectively fulfill its assigned mission(s) and to provide firefighters with a safe working environment orientated to their operational needs (Requirement), including:

12.8.1.1 A training and education center to provide firefighters an environment conducive to learning manipulative and technical skills (Requirement).

12.8.1.2 A dining room with tables and chairs, stove and oven, refrigerator, sink, dishwasher, counter space, and cabinet storage (Requirement).

12.8.1.3 Furnished day room and recreational area (Requirement).

12.8.1.4 Sleeping accommodations with individual or crew cubicle, clothing racks, nightstands, lockers, drapes, individual lighting, and carpeting (Requirement).

12.8.1.5 Physical fitness room equipped with proper exercise equipment (Requirement).

12.8.1.6 Storage area(s) for extinguishing agents, equipment, and materials, including personal protective equipment (PPE) (Requirement).

12.8.1.7 Bays to house assigned fire apparatus and support vehicles (Requirement).

12.8.1.8 Administrative space (Requirement).

12.8.1.9 Heating and air conditioning (Requirement).

12.8.1.10 Fire Alarm Communications Center for those NASA Centers/facilities that assign this function to the fire department (Requirement).

12.8.1.11 Compliance with applicable portions of NFPA 1500 (Requirement).

12.8.1.12 Maintenance/repair area(s) for facility, apparatus, and/or equipment, including personal protective equipment (PPE) (e.g. sink(s), washer, and dryer) (Requirement).

12.8.1.13 Emergency Operations Center (e.g. primary or alternate site) for those NASA Centers/facilities that assign this function to the fire department (Requirement).

12.8.1.14 Compliance with applicable portions of NFPA Fire Protection Handbook (Requirement).

12.9 Response Time and Distance

12.9.1 For NASA Centers/facilities, the AHJ shall establish response times to various facility locations to ensure that the fire response arrives in a timely manner in order that appropriate action(s) are taken to mitigate the emergency situation (Requirement).

12.9.2 For a fire department emergency response, the turnout time shall be no longer than 1 minute (Requirement).

12.9.3 Unannounced station bunker drills shall be performed to ensure compliance with the standard (Requirement).

12.9.4 Annual time/distance response assessments from station(s) to major facilities shall be conducted and recorded to ensure capability to reach the scene in a timely manner (Requirement).

12.10 Pre-fire Planning

12.10.1 Each NASA/Center/facility shall implement a pre-fire plan program (Requirement).

12.10.2 Pre-fire plans shall be prepared on facilities with a current replacement value in excess of \$500,000 or more than 10,000 square feet of floor space (Requirement).

12.10.3 Pre-fire plans shall also be required for each type aircraft that is based at the Center or regularly frequents the Center (Requirement).

12.10.4 While NFPA 1620 (facilities) and NFPA 424 (aircraft) shall be referenced, the minimum required data for a pre-fire plan is as follows (Requirement):

12.10.4.1 Facility Pre-fire Plans:

12.10.4.1.1 Facility number, type, occupancy, and fire loading (Requirement).

12.10.4.1.2 Square footage and number of floors (Requirement).

12.10.4.1.3 Location of water supply, connections, and valves (Requirement).

12.10.4.1.4 Facility hazards, laboratories, flammable storage, or other potential hazards (Requirement).

12.10.4.1.5 Approach access and fenced areas (Requirement).

12.10.4.1.6 Water available, determined by fire flow (Requirement).

12.10.4.1.7 Type of fire systems, locations of water and utility shut-off valves (Requirement).

12.10.4.1.8 Single line drawing with NFPA 170 symbols (Requirement).

12.10.4.1.9 Forcible entry and air tools required to gain entry (Requirement).

12.10.4.1.10 Specialized facility features (Requirement).

12.10.4.1.11 Approximate number of occupants (day/night) (Requirement).

12.10.4.2 Aircraft Pre-fire Plans:

12.10.4.2.1 Any hazards not indicated in the applicable Technical Manual, Aircraft Emergency Rescue Information (Fire Protection) (Requirement).

12.10.4.2.2 Type of Aircraft (Requirement).

12.10.4.2.3 Optimum vehicle positions (ARFF vehicles) (Requirement).

12.10.4.2.4 Approach to entry points on aircraft (Requirement).

12.10.4.2.5 Predesignated rescue duties (Requirement).

12.10.4.2.6 Other factors pertaining to aircraft fire fighting (Requirement).

EXHIBIT F
FIRE PROTECTION CODE COMPLIANCE REPORT: OPF 3; K6-0696

Fire Protection Code Compliance Report: OPF3; K6-696

The OPF fire protection systems include: fire alarm notification and detection, wet-pipe fire suppression, deluge fire suppression, pre-action fire suppression, standpipe, classified electrical, and fire rated construction.

This code compliance report applies only to the office area of the facility, the high-bay and SSMEPF areas are not included and are not identified as being code compliant as these areas were solely designed for shuttle operations and were compliant with code for that use only.

Any modifications to the facility that may affect the fire and life safety systems (including but not limited to all "systems" identified in this report) shall be reviewed, approved, and accepted by the KSC AHJ to ensure compliance with all applicable codes and standards for the specified occupancy. Any modification performed without concurrence of the AHJ will immediately render the facility non-compliant until such time that the modification is inspected and certified by the AHJ or designated representative. Non-compliance status may result in facility closure. Therefore, it is strongly suggested to have the AHJ involved early in the design stages to avoid delays and changes.

Fire Alarm:

The facility fire alarm system consists of a primary Simplex® 4001 fire alarm panel (24 years old), Simplex® 4020 subpanel for the pre-action sprinkler system in the control room, and a networked subpanel for the SSMEPF. The system reports alarm, supervisory, and trouble signals to the Central Fire Monitoring System (CFMS) in the Launch Control Center (LCC) (Building K6-900) Room 2P10. The office areas are equipped with manual pull stations, duct detectors, smoke detectors, heat detectors, and audible/visual notification. The office area systems are currently installed and maintained in compliance with NFPA 72, NFPA 101, and NASA STD 8719.11A.

Fire Suppression:

The office area fire suppression systems consist of a wet-pipe sprinkler and a pre-action sprinkler. The systems include flow switches and tamper switches monitored by the FACP. The systems are installed and maintained in compliance with NFPA 13, NFPA 25, and NASA STD 8719.11A.

Life Safety:

The office area life safety systems, including: the means of egress (corridor/stair width, etc); the fire protection features (rated enclosures, fire barriers, etc); and interior finishes comply with NFPA 101 and NASA STD 8719.11A. No appreciable maintenance costs identified.

Additional information not used to provide Code Compliance in the office area:

Fire Pump House (Facility K6-895), the associated 250,000 gallon above ground storage tank, and related piping feeds boosted water pressure, as needed, to OPF 3 high-bay as well as several other buildings in the vicinity. The wet-pipe system in the office areas is fed from the domestic distribution system.

High Bay 3 is currently classified as a Class 1, Division 2, Hazard Area and therefore uses intrinsically safe notification and detection devices and all electrical components are listed for use in this environment.

The wet-pipe fire sprinkler systems are 24 years old. The sprinklers in the SSMEPF are 12 years old. When the systems reach 50-years old, the fusible link sprinkler heads must be replaced with new ones per NFPA 25. The systems have 20 or more years of life expectancy.

Operating costs include quarterly, semi-annual, annual, and 5-year testing as required by NFPA 25 and 72.

The high-bay deluge is an electrically activated (manual push button) system divided into six zones. These open head systems located at the high-bay ceiling will discharge only the zone activated.

Signed: _____

Jeff T. Dudley

Date: _____

7/19/11

Jeff Dudley
KSC Authority Having Jurisdiction