

MOSS PROCEDURE	Outage Process Instructions			Number: MSO-P-0002	
Outage Procedure	Approved by: MOSS	Initial Issue Date: 05/20/2010	Page: 1 of 25	Revision: 4 Eff Date: 05/06/2024	

SUBJECT OUTAGE PROCEDURE

PURPOSE

This procedure establishes responsibilities and instructions for requesting, preparing, and processing an outage request at Kennedy Space Center (KSC), instructions for processing outages from request through execution and closure, and guidelines for the communication process so that customers and stakeholders affected by outages are notified.

SCOPE AND APPLICABILITY

This procedure is applicable for all Fire Protection and Utility systems as defined in this document to include Electric, Elevators, Heating Ventilation and Air Conditioning (HVAC), Water, Pneumatics, KCCS, Communication, Networks, Software, and Roads and Bridge Outage Coordination.

Elevator outages are not included in the outage process if other elevators are available for use at the same location or the elevator is taken out of service for maintenance.

- a. Electrical Outages are to include high voltage, low voltage, Relay and Test, and Generator.
- b. Elevator outages are not required if the elevator is being secured for maintenance and other elevators are available in the immediate area for use. However, if all elevators in one area are to be taken out of service at once, an outage is required. The outage shall be communicated to the occupants 48 hours in advance and DAAWG shall be notified.
- c. Water outages are to include potable and non-potable water distribution systems, pumping stations (potable and fire) that feed multiple buildings and systems. Fire sprinkler systems which have been scheduled for normal maintenance with a duration of ten hours or less are covered under the Impairment process, PPS-P-0001. Fire sprinkler system outages in processing facilities which exceed 10 hours require an approved Water outage per MSO-P-0002. Fire Alarm and Fire Suppression systems except as specifically addressed in MSO-P-0002, shall be covered under the Protective System Impairment Notification Process, PPS-P-0001.

- d. Heating, Ventilation and Air Conditioning outages include chilled water, compressed air and hot water systems.
- e. Kennedy Complex Control System (KCCS) outages which impact remote control and monitoring for power and utility systems.
- f. Communication outages including voice, transmissions, operational television, phones, and timing & countdown.
- g. Information Technology outages including any interruption of service or software load for critical systems that monitor or control operationally an essential system, including Andover.
- h. Roads and Bridges to include any outage that takes a major roadway or bridge out of service.

1. REQUIREMENTS

An approved outage is required for any of the following conditions:

- a. A utility system is taken out of service (planned or unplanned) to perform maintenance, repairs or modifications resulting in a loss of service or a loss of redundancy for that service.
- b. A utility systems full service (in accordance with design requirements) is compromised causing a loss of redundancy or the original designed configuration of a utility system has been compromised by the loss of a redundant system or the back up of a system that is outside the original designed configuration.
- c. When any redundant part of a configured utility system is taken offline or out of service, thus creating a single point failure for the remaining system / equipment that is left on-line or in-service. Examples include taking down two of three water chillers at the same location or taking down one of two air compressors at a location, (even if a portable compressor is staged) resulting in the system being out of configuration as designed.

1.1. Types of Outages

Scheduled, Unplanned, Emergency, and Unscheduled

- a. Scheduled Outage: A planned interruption of a utility service required to perform work for system maintenance, repairs, construction or modification. The outage request is to be submitted at least 15 working days prior to the outage start date for timely processing. See section 3.1 for specific work instructions.

- b. **Unplanned :** Outages which are submitted less than 15 working days before the requested utility outage start date. Requester **MUST** notify Outage Coordinator's Office via phone call when an unplanned outage is submitted. Unplanned outage requests require a justification and Outage Coordination Management approval before the outage can be processed and may also require QR approval. See section 3.5 for specific work instructions. See DEFINITIONS section on page 23 for QR approval information.
- c. **Emergency Outage:** A utility system that has been determined will fail soon and could cause property damage, mission milestone impact or personnel injury. The outage request is to be processed to notify customers and coordinate impacts to determine the appropriate time to perform the work. Unless the system must be secured immediately because of fire or other extreme conditions, the outage must be approved by a branch level manager or above with knowledge of the outage processing for that equipment and area who can verify the proper securing and notifications have been accomplished. See section 3.6 for specific work instructions.
- d. **Unscheduled Outage:** A system or piece of equipment suddenly or unexpectedly fails, powers-down, malfunctions, or becomes inoperative. See section 3.7 for specific work instructions. An outage is submitted to document the failure and placed into INPROG status by the CCC.

1.2. **Outage Processing Tool**

Utility outages are to be processed using the Maximo Outage Request Module or by submitting a Request for Utility Outage, BOSS form MSO-F-0004 to the outage coordination office. When Maximo is not available, refer to FAM-P-2011 Maximo Contingency Plan for outage process.

Required Fields

- Utility System (Electric, Water, HVAC, etc.)
- Outage Work Order (WON not required to begin outage processing, TBD can be used until a WON is provided/written)
- Location (Facility Number)
- Reason for Outage

Additional Fields

• Outage Summary Description • Target Start/Finish • Actual Start/Finish • Description of Work Request • Assets/Facilities Affected • Additional Outage Work Orders	• Requestor • Phone • Area Influenced by Outage • Outage Type • Owner • Loss of Redundancy Only
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Reports

- Outage Assessor Action Required (open outages requiring assessment by a specific assessor group)
- Outage Assessor Action Required – Admin Report (open outages requiring assessment by all assessor groups)
- Outage Report by Utility System (previously by Type)
- Outage Request Report
- Outage Support by Shop (single shop) – shows all outages identifying support from specified shop
- Outage Support Shops Report (single SR) – required support shops for a specific Outage
- Outage Switching Orders Not Complete – outages which require switching order which has not been written
- Outage Task Instructions Needing Completion (single system) – shows which assessors have not identified completion of writing support tasking
- Outage Task Instructions Needing Completion – All Systems - shows which assessors have not identified completion of writing support tasking
- Outages Needing Assessment by System – shows which outages require assessments which have not been performed
- Outage Audit Report – for use by outage coordinators only

2. **RESPONSIBILITIES**

- a. Outage Coordinator: Primary Point of Contact (POC) for the outage process from request through closure. For BOSS maintained systems the BOSS outage coordinator is the primary POC for outage processing. For Communication equipment the Communication Outage Coordinator shall act as the primary POC for the outage process. The outage coordinator tracks and coordinates the outage through the various stages from submittal to completion in Maximo, works with System Engineer (SE) to generate support work orders as required and verifies tasking for shop. The outage coordinator notifies Facility Manager and assessors when an outage has been extended or cancelled. The outage coordinator participates in meetings as required to manage the outages scheduled. The outage coordinator is responsible for conducting a weekly outage meeting to review near term upcoming outages.
- b. Requestor: The person requesting a utility outage. The requestor could be the system owner, system manager, system engineer, shop supervisor, construction inspector or CCC console operator. If the requester does not have access to MAXIMO, the outage coordinator may enter the outage on the requester's behalf. It is the responsibility of the requestor to verify the impact matches outage request scope of work and to provide drawings, coordinate

walk downs and/or any other pre-outage planning that may be required to ensure a safe, effective outage is planned; and to allow sufficient time to do so. It is also the requestor's responsibility to provide a shop support request, SHOP parent WON and/or EWR for outage support as applicable. The requester is also required to attend or assign a representative to attend weekly outage meetings to discuss upcoming outages they have submitted.

- c. Impactor: The outage impactor is the responsible organization or individual who after reviewing an outage request, inserts the outage impact in Maximo with a specific description of the equipment and facilities which shall be impacted by the outage. Outage impactors include CCC console operators, system management, system engineers and system owners. The outage impactor is responsible for verifying the impact is accurate, up to date and reflects any real time system configuration which could affect the standard impact. The outage impactor shall change the status of the outage to IMPACT COMPLETE once the impact has been provided. The primary system SE shall perform field walk downs as required to verify the impacts, update impact sheets and make real time observations which could affect the impact of a system being processed for an outage.

NOTE: See section 3.1.2 for information on Impact Issues and Tracking Tool

- d. SE: Primary SE is responsible for maintaining and updating outage impacts. The SE is to provide technical support to verify outage impacts are complete and correct. Performs walk downs of impacts as required. The SE shall provide technical support regarding assessments for outages and shall provide shop tasking for all valid backup support. The SE is responsible for assisting in the implementation of outages and providing real time tasking to any shop as required. SE is responsible for performing all electrical, HVAC, Water, Protective Systems, and Elevator assessments.
- e. Assessor: The assessors is the group of individuals, designated by BOSS Management, required to review the impacts and assess the actions required to support a utility outage. i.e., lift station needs to be pumped down, UPS needs to be secured, generator backup required, etc. Assessor is responsible for checking the appropriate Shop Support Required boxes in the Outage Module as well as including the details of that shop support in his assessment. Failure to provide assessment by the requested due date will result in a NO-GO for the outage; and the failure to respond will be reported to management and/or discussed on the daily BRIDG meeting.
- f. Facility Manager: The Facility Manager performs an initial review of the outage upon submittal and verifies outages do not conflict with operations or flight hardware testing, communicates upcoming outage impacts to the facility occupants and any other interested parties/customers, etc., follows status of all planned and upcoming outages for their facilities, verifies back up equipment

and outage mitigation is scheduled to minimize impacts to facility occupants, posts signs, restricts access and provides fire watch, as applicable. The Facility Manager approves all outages once the impacts and assessments are completed and supports as required the implementation of all utility and communication outages. The Facility Manager is required to attend the weekly outage coordination meeting. FAILURE TO RESPOND TO OUTAGE REQUEST BY DUE DATE MAY RESULT IN AN AUTOMATIC APPROVAL, WITH OC USING THEIR DISCRETION TO APPROVE OR TBD THE OUTAGE.

- g. Mission Support Office/JSTC: Responsible to de-conflict outages with upcoming operations, launches, etc. and work with Facility Manager to ensure outages have been briefed to facility occupants and support as required has been coordinated with the shops. The Mission Support Office is responsible for maintaining outage information on all facility integrated schedules. The JSTC is the primary test conductor responsible for outage implementation. The JSTC shall verify the assessor's comments and any required outage support before the outage is opened. The JSTC is responsible for briefing the test team and obtaining final concurrence before outage begins. When the NTD is not on station, the JSTC shall act in the capacity of the NTD/CTC and approve or deny outages based on impacts, assessments and operational requirements as required. The JSTC is the primary POC for outages in work and shall be notified immediately by the console operator if an outage shall be extended or cancelled. The JSTC shall process emergency and unscheduled outage requests. The JSTC is responsible for verifying all scheduled outages have been opened or rescheduled each day with the outage coordinator. Outages should be opened as close as possible to the starting time in the Maximo record, but should not be opened more than two hours from the scheduled start time without the concurrence from Outage Coordination Management.
- h. Planning and Scheduling: Shop schedulers verify the shop resources are scheduled to support all planned outages as required. The shop scheduler verifies the shop has approved documentation with tasking to perform work to support approved outages. On support WON, close individual shop task lines as required.
- i. Console Operator: Console Operators are responsible for taking requests from shops to open and close outages with the exception of roads, bridges, elevators. The console operator requests permission through the JSTC to proceed before the start of every outage. The console operator changes the status of outage to "in progress" when opened and "complete" when field work is done and is responsible for making notifications to JSTC and the Outage Coordinators when an outage is extended beyond the scheduled closure time or cancelled. Console operators shall be the primary POC for Unscheduled Outage Requests and shall communicate those requests through the JSTC.

- j. Power Console Operator: Develop switching orders and work permits required to switch the power system in a safe and efficient manner. Continuously monitor the status of the power system and attend weekly outage meetings.
- k. BOSS Construction Services (Inspectors): Construction inspectors request outages for NASA funded C of F projects. Inspectors coordinate projects with NASA COTAR, power generation, Facility Managers, Operations Personnel, Power Coordinators, power supervision (for support availability/scheduling), Outage Coordinators and the Contractor for processing and approvals. Provide Parent SHOP WON/Shop Support Request as required for outage support, coordinate pre-outage walk downs, provide drawings and set up any planning/coordination that may be required to ensure a safe, effective outage is planned. If outage is requested less than 15 workdays before start date, obtain QR approval as required.
- m. BOSS Construction Management: Construction Management requests outages for BOSS projects that are performed by Outside Contractors (non-BOSS shop). Outage and project statuses are reported to BOSS Project Management. Construction Management is responsible to coordinate projects with NASA COTAR, power generation, Facility Managers, Operations Personnel, Power Coordinators, Outage Coordinators and the Contractor for processing and approvals.

3. OUTAGE PROCESS

3.1 Scheduled Outage Process

Requesting A Utility Outage

Requestor identifies the need for an outage and submits an outage request. (Appendix A Scheduled Outage Step 1)

- a. Scheduled outage request must be made 15 working days prior to outage start date. Outage request made less than 15 working days prior to outage start date shall be reviewed for processing (as an unplanned outage) on a case-by-case basis. Unplanned Outage request MUST be called in to Outage Coordinator office when request is submitted and will require Mission Support management approval and may require QR approval.
- b. Scheduled outages should not impact processing operations.
- c. Complete the outage request in the Maximo Outage Request Module or if Maximo access is not available, contact the Outage Coordinators office for Form MSO-F-0003, "Request for Utility Outage". Complete the outage request with the following information at a minimum:

1. Name and phone of requestor
2. Outage description
3. Location, Facility Number outage summary description
4. System impacted by outage
5. Request start and completion dates.
6. Reference to any associated work packages as applicable.
7. Reason for Outage

NOTE: Location (Facility Number) is a required field and ***MUST*** be filled out in order to submit an outage request.

3.2 Outage Impact

Outage impacts can be placed in the Maximo outage record by supervision, engineering or console operators. The appropriate system engineer is responsible for verifying the impacts are correct and complete. (Appendix A Scheduled Outage Step 2) Outage impacts should be complete within two working days of receipt from the outage coordinator.

The Outage Impact Issue Tracker on MSO's SharePoint site is a tool to be used by CCC and other personnel as applicable to record and track any issues getting a correct, current impact for the outage in a timely manner. This tool assists the SE in identifying outages that need to have an impact verified, corrected and/or a system walked down in order to provide the needed impact to the CCC for the outage.

Updates to outage impacts for areas and facilities that are covered by a NASA lease agreement are the responsibility of the tenant of that facility. BOSS will provide as much information as is available on areas impacted and NASA equipment that will be affected. The tenant is responsible for supplying the information for specific downstream impacts to their equipment. If that information has not been provided to BOSS, the outage processing will continue as planned with the information available. The tenant is responsible as an assessor to verify the specific impacts to their facility and provide an assessment in the Maximo record and their approval.

Outage impact requirements

- Outage impacts shall contain a summary at the start of the impact which details the equipment being secured and the equipment affected.
- The impact shall have a table when applicable showing critical loads, securing and notifications required.
- The impact shall be formatted with indents to show a logical order to the equipment being secured. For electrical that shall include substation, panels, loads so they are clearly visible.
- The impact shall be clearly formatted to show the facility number associated with the equipment.
- The impact shall be detailed enough and clearly written to allow the outage assessors to understand the equipment and facility being impacted.
- Any impact that does not have correct formatting or sufficient information will be returned to the impactor for correction.

3.3 Outage Assessments

After impacts are complete the outage coordinator sends the outage for assessment. Outage assessments are to be entered into Maximo or submitted to the outage coordinator if Maximo access is not available. Assessments should be returned three days after initial request is sent out unless the outage coordinator has designated a “no later than” date on the request. (Appendix A Scheduled Outage Step 3).

Outage Assessments shall be recorded in the appropriate block in Maximo and should not be recorded by phone or emails whenever possible. If Maximo access is not available, then email attachments can be made by the outage coordinator.

- a. Assessors are responsible for reviewing the impacts and recording the specific impacts the outage has on their system. Assessors should make the SE and outage coordinator aware of any support / notifications required during the performance of the outage and document the support required in the outage in Maximo (using the Shop Support Required Tab and/or “Tasking Instructions Written” check box on the Outage Assessments Tab)
- b. Outage assessors are determined by the BOSS Management from a list of required assessors by outage type. The system supervisor of each assessor group shall update the list of approved assessors maintained by the outage coordinators office when any change to affected personnel takes place but at a minimum shall request quarterly updates.

- c. Outage assessors include but may not be limited to LCS, Comm., ESS, Fire Protection, Protective Systems, Water and Waste, HVAC/Compressed Air, Pneumatics, Elevators, KNET, KCCS, SE, phones, and Facility Manager.
- d. Weekly Outage Meeting will be used as a GO/NO-GO point for upcoming planned outages whenever possible.

3.4 Outage Assessment Review

As assessments are collected, the Requester/SE/Facility Manager/Outage Coordinator shall work together to verify assessments have been addressed and the proper support has been coordinated. (Appendix A Scheduled Outage Step 4)

- a. The outage coordinator shall generate Maximo work orders for any identified support from the assessors and required by the SE. The appropriate SE shop supervision or designee shall provide tasking in the Maximo work orders (or outage assessment) for all valid support.
- b. The primary SE of the power or utility system the outage is impairing is responsible for evaluating the assessments and providing shop tasking for all valid support at least 5 working days before the scheduled start of the outage.
- c. The primary SE is responsible for ensuring all secondary system impacts have been properly addressed by the SE for that system and the appropriate support and safing has been documented.

3.4.1 Outage Planning and Prep

As assessments are collected, the Outage Coordinator shall verify the SE has addressed any support requirements or back up equipment to any system that has been identified in the assessment process. (Appendix A Scheduled Outage Step 5)

- a. The Primary SE shall provide tasking for all valid support.
- b. The shop scheduler shall verify the shops have approved tasking and are scheduled to support the outage.

3.4.2 Outage Approval

Final approval for the outage should be granted no later than 5 working days before the outage start date. Approval should be recorded in Maximo and should be documented in the approval log. If Maximo access is not available,

the outage coordinator may enter comments in the approval log per telecom or by email. (Appendix A Scheduled Outage Step 6)

- e. The approval log for the facility manager should contain the current date, the concurrence of the approver, the dates/times for which the outage is approved and any notes or special instructions to be addressed before outage implementation.
- f. The facility manager shall make a final review of the assessments and verify the outage does not impact scheduled operations, any required support has been scheduled, the facility occupants have been advised, and the outage can be worked as planned, then approve the outage in Maximo. This includes signage, placement of portable ODMS units (if required) and any other safety protocol required.
- g. Once all assessments and approvals are received and the coordination of the outage is complete, the outage is approved by the outage coordinator and e-mailed to the appropriate parties for implementation no later than 4 working days prior to the scheduled outage start date.
- h. All required approvals are due no later than 5 working days prior to the scheduled outage start date and the outage may be denied if approvals are not provided. If no response is received from facility manager, the outage coordinator has the option to approve the outage due to no response. Weekly Outage Meeting will be used as a GO/NO-GO point for upcoming planned outages whenever possible.

3.4.3 Final Concurrence to Proceed

Final concurrence to proceed (Appendix A Scheduled Outage Step 7)

- a. The individual responsible for outage execution (Field Engineer/Tech/Construction Inspector/Comm Control Console) shall open the outage through the appropriate CCC console operator or JSTC.
- b. The console operator shall request permission to open the outage through the JSTC from the Contractor Test Conductor (CTC) or NASA Test Director (NTD) as required and log the outage opening into Systems Engineering Tie In Log (SETI). When the NTD is not manned the JSTC shall be the sole authority to open outages and is responsible for providing the final go, delay or cancel the outage as appropriate and as operations require.
- c. The JSTC shall record the outage opening in E-LOG.

3.4.4 Outage Implementation

Opening outage to begin work (Appendix A Scheduled Outage Step 8)

- a. The CCC console operator shall verify, through the appropriate shops, that all equipment that requires securing before the outage begins, equipment staging and support required is available before requesting to open the outage to the JSTC.
- b. The JSTC shall verify that all assessments and actions identified in Maximo to support an outage have been addressed. After verifying that all support is ready the JSTC shall provide the final concurrence for the outage implementation.
- c. The console operator shall monitor the activities in the performance of an outage and shall notify the JSTC immediately of any issues that occur during this work.
- d. The JSTC shall verify that all scheduled outages have been opened or notify the outage coordinator to reschedule them each day.
- e. Outages should be opened as close to the scheduled start time but shall not be opened more than four hours from the scheduled time without Outage Coordination Management approval.

3.4.5 Extending an Outage

The requestor who opens the outage through the console operator is responsible for notification to the console and outage coordinator when the work cannot be completed in the time scheduled. (Appendix A Scheduled Outage Step 9)

- a. The console operator shall notify the JSTC immediately when an outage cannot be completed in the time scheduled in the outage request.
- b. The console operator shall immediately notify the outage coordinator and JSTC of the extension. Justification and expected duration of the requested extension is required. The Outage Coordinator shall make phone and/or email notifications of the extension to the facility manager, SE and assessors. On off shifts and weekends if the outage coordinator is not available, the console operator shall notify JSTC and shall send an email to the outage coordinators to notify them of the extension. The console operator shall also make appropriate entries into the SETI log to document why the outage could not be completed in the scheduled time stated on the outage request. JSTC will notify the test team and will also ensure notifications have been made to the appropriate personnel. Any securing, notification or back up support required because of an outage

extension should be coordinated through the JSTC, SE, Facility Manager and assessors. Outage extensions for processing facilities require the approval of the BOSS Work Integration Branch Manager. (???)

- c. If the outage affects processing area, the JSTC notifies the CTC/NTD of the outage extension and makes a log entry of the outage extension details. The JSTC shall also verify the notifications have been made of the extension to the appropriate parties and shall help coordinate any action which must be taken.

3.4.6 Completing/Closing an Outage

The requestor who opens the outage through the console operator is responsible for notification to the console when the field work is complete and the outage may be closed. (Appendix A Scheduled Outage Step 10)

- a. The console operator, when notified by the field that the outage is ready to be closed, shall change the outage request status in Maximo to "COMPLETE".
This means that the field work is complete but administrative work remains to be performed, then outage is to be reviewed for final closure by the Outage Coordinator.
- b. The console operator completes the outage when notified by the field and makes applicable notes in the Systems Engineering Tie In (SETI) log.
- c. The console operator notifies the test team of the outage completion through the JSTC console.
- d. The JSTC notifies the CTC/NTD of the outage completion and notes the date, time and completion in E-log.
- e. The outage coordinator reviews a COMPLETE outage and places the outage in CLOSED status in Maximo per the next day's Highlights Report.
- f. Before closing an outage, CCC and /or requester as required shall provide positive confirmation that all systems that were secured or placed out of normal configuration have been restored. If a failure occurs on a supporting system, then that system must have an unscheduled outage opened if applicable and a WON written to document the system anomaly.

3.4.7 Rescheduling an Outage

The outage coordinator is the POC for rescheduling an outage when requested.

- a. The requestor may request an outage be rescheduled at any time in the process before the outage is opened by contacting the outage coordinator.
- b. The JSTC or CTC/NTD may request to reschedule any outage that would impact operational requirements or for cause.
- c. The outage coordinator shall reschedule an outage or place it in TBD status for any of the following reasons. The outage coordinator shall make notes in Maximo with the reasons for the reschedule and shall notify the Facility Manager, SE and Assessors.
 - 1. Funding has not been approved for the outage support
 - 2. The requestor asks to reschedule the outage.
 - 3. The outage would impact operational requirements.
 - 4. The impacts are not complete, incorrect or have been changed after the outage has been assessed.
 - 5. The assessments are not complete, incorrect or have been changed after the outage has been approved.
 - 6. The test team members deny the outage request.
- d. When an outage is rescheduled to a new date after assessments are complete, the outage must be sent out to all assessors for review again and then be processed for scheduling and approval if required.
- e. When an outage cannot be worked as scheduled and an alternate date is not provided, the requester or console notifies the outage coordinator. The outage coordinator enters the information into the outage via Maximo and changes the status of the outage to TBD. The updated information is then e-mailed to affected parties if required.

3.5 Unplanned Outage

Unplanned outages are defined as outages that have been requested with less than 15 business days until the scheduled outage start date. Unplanned outages require the same notifications, impacts and assessments as scheduled outages and the steps in appendix A are the same as scheduled outages. Unplanned outages must provide justification on why the outage cannot be scheduled and processed normally and must be processed through the Outage Coordinator and approved by Mission Support management before processing. (Appendix A Scheduled Outage Step 1-8). Unplanned outage may also require QR approval.

- a. Outage request submitted less than 15 workdays before the outage start date shall be reviewed on a case by case basis.
- b. Notification by phone call MUST be made to Outage Coordinator's office when an unplanned outage is submitted.
- c. Outage final concurrence, implementation and closure is the same for scheduled and unplanned outages.

3.6 Emergency Outage

An emergency outage is an outage taken on a utility system that is in eminent danger of failing and that failure would cause equipment damage or would cause a risk of injury to personnel if not secured. Emergency outages should be approved by the Outage Coordination Branch Manager to verify the appropriate notifications have been made. If the risk of damage or injury does not permit the advance notification, the equipment should be secured and an immediate notification made to the Outage Coordination Branch Manager. Examples of this type outage would include equipment overheating, bearing failure, water leaks impacting energized equipment, etc. Actions which fall into the normal function of that equipment such as breaker opening or trips are not to be opened as an emergency outage and should be processed as an unplanned outage as defined in Section 3.2 (Appendix A Emergency Outage Step 1-4)

- a. The requestor, usually the primary System Engineer for that system, shall notify the appropriate console operator and inform them of the emergency condition and request an emergency outage.

- b. The console operator shall notify the Outage Coordination Branch Manager for approval. The console operator shall also notify the JSTC, CTC/NTD, Facility Manager, applicable SE. A review of previous outages on the impacted equipment will be performed and previous assessors will be notified of the outage. The console operator shall gather all the required fields in Maximo and generate an emergency outage.
- c. In addition to the notifications made by the console operator, the JSTC shall make notifications to management, using available call trees based on the severity of the condition.

3.7 **Unscheduled Outage**

A system or piece of equipment suddenly or unexpectedly fails, powers-down, malfunctions, or becomes inoperative. (Appendix A **Unscheduled** Outage Step 1-2)

- a. **Unscheduled** outages are to be opened and placed IN PROGRESS by the CCC console operator in Maximo
- b. Notification to the JSTC/test team and Outage Coordinator shall be made upon discovery of the failure by the CCC console operator.
- c. JSTC will notify the facility manager and other appropriate personnel of the **unscheduled** outage by using existing call trees.

NOTE: Once the failure has been investigated, a scheduled outage should be submitted to perform any required repair work and/or further troubleshooting.

4 **OUTAGE PROCESSING DURING MAXIMO OUTAGES**

The following guidelines should be used when there is a scheduled or unscheduled Maximo outage which results in a loss of the Maximo operating system.

- a. The outage coordinators shall keep hard copies of all Maximo outage request which are being processed.
- b. For new outage requests generated during a Maximo outage, the outage coordinator shall be the single point of contact for new scheduled and unplanned outage requests. The outage coordinator shall assign a number to the outage and shall log all the required information into an excel spreadsheet. Required fields include the following:

1. Outage type

2. Report date
 3. Support required
 4. Requester's Name, Organization and phone
 5. Outage description
 6. Location and description of Work Request
 7. Facilities affected
 8. Reason for outage
 9. Impact if outage is denied
 10. Requested start date and duration of outage
- c. Outage numbering shall consist of the following SRVMS000. The numbering shall contain SRV then MS for Mission Support and sequential numbering. The first outage number would be SRVMS001. The outages shall be recorded in a log book which shall be maintained in the outage coordinator's office.
 - d. The outage coordinators may email PDF versions of the outage if available and may accept email impacts, assessments, and approvals. The outage coordinator shall be responsible for transferring that information from the email to the hard copy outage file.
 - e. The outage coordinators shall coordinate support required with the SE, shop, facility manager and mission support office.
 - f. The outage coordinator shall obtain approvals for the outage and shall verify a printed copy of the approved outage with impacts, assessments and approvals is available for all shops supporting the outage and on the appropriate utility and JSTC console.
 - g. The outage shall be opened and worked the same as an electronic Maximo outage and any required notes shall be attached to the work copy. The work copy shall be delivered to the outage coordinators office after the outage is closed by the console.
 - h. Outages which are being processed manually should continue to be processed manually to completion after an extended Maximo outage for consistency.

- i. When Maximo is available the outage coordinators shall enter the data from the completed, collected copies into Maximo. The numbers for the hand written outages created shall be transferred to Maximo for tracking purposes.

5 OUTAGE ABATEMENT TEAM

Outages of complex nature or which shall impact flight hardware or operations should be coordinated through a meeting of the outage abatement team which shall consist of at a minimum a representative from the following; the NTD office, outage coordinator, the primary and impacted SE, the facility manager, the JSTC, Safety, Console Operator and the Mission Support Office management. Additional participants shall attend integrated meetings as required.

FIGURE 1: Required Assessors by Outage Type

Outage Type	ELEC	HVAC	WATER	PNEU	KCCS	COMM	IT/KCCS/ BAS	R&B
Required Assessors								
LCS	*	*				*		
COMM	*	*			*	*		
NICS	*	*						
ESS	*	*						
Fire Protection	*	*	*					
Protective Systems	*		*	*				
Water and Waste	*	*	*	*	*	*		
HVAC	*	*	*	*	*			
Pneumatics	*			*	*			
Elevators	*					*		
SE	*	*	*	*	*	*	*	*
Facility Manager	*	*	*	*	*	*	*	*
KCCS	*				*	*		

Outage Assessors

LCS – Launch Control Systems

Comm – Phones, e-mail, PAWS, voice, transmissions, OTV

KNET – Kennedy Admin Network / NICS

KCCS – Kennedy Complex Control System

ESS – Electronic Security, Traffic, TAWS

Fire Protection – Fire Department

Protective Systems – Fire Alarms, Fire Suppression, Sprinkler

Water & Waste – potable water

HVAC – HVAC, chilled water, HTHW, Compressed Air

Pneumatics – GN2, GHe (KPLSS)

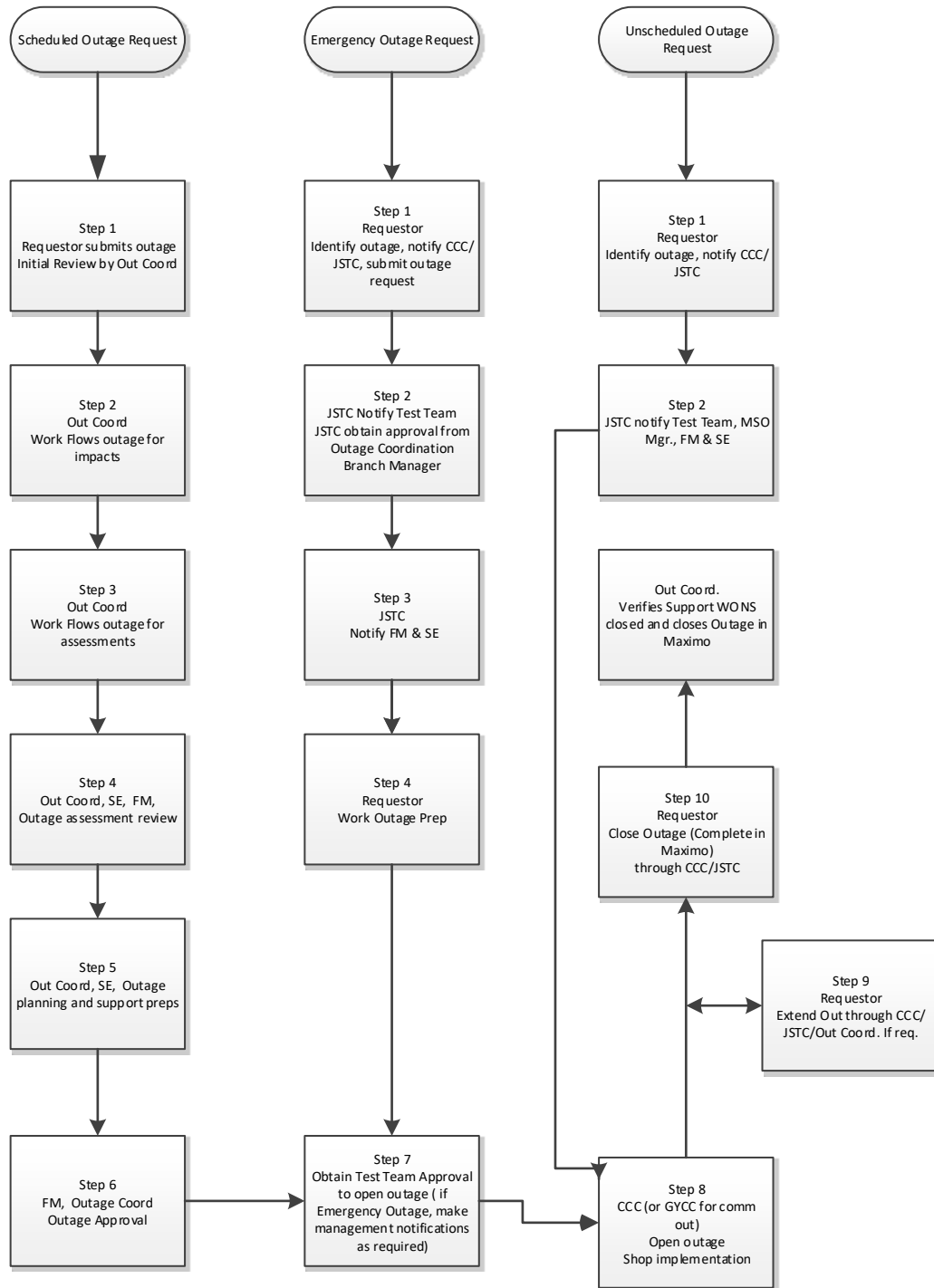
Elevators – Applicable for facilities with elevators

SE – Power System Engineer

Outage Approvals

Facility Managers

Others as required

APPENDIX A: Flowchart

RECORDS

The following records are retained by the organizations listed below:

Record	Responsible Organization
Outage Package consisting of Outage Requests, impacts, assessments, approvals, and applicable documentation	Work Integration and Outage Coordination
ELOG	Work Implementation and Tracking
SETI	Work Implementation and Tracking

AFFECTED DIVISIONS/OFFICES

Engineering Services
FSEU and OM&E

MANAGEMENT ROLES AND RESPONSIBILITIES

BOSS Program Manager: Ensures BOSS compliance to the requirements stated in this procedure. Reviews and approves or disapproves waiver requests written against this standard.

Division Manager: Ensures compliance within the Division to the requirements stated in this procedure.

Branch Manager: Ensures compliance at the branch level to the requirements stated in this procedure.

FUNCTIONAL ROLES AND RESPONSIBILITIES

See section 2 of this document

REFERENCE DOCUMENTS

The following documents are referenced in this procedure:

Document Number	Title
FAM-P-2011	Maximo Contingency Plan
MSO-F-0003	Request for Utility Outage
PPS-P-2011	Electrical Safety for Power Generation, Transmission and Distribution Systems

ACRONYMS

BOSS – Base Operations & Spaceport Services Contract
CCC- Complex Control Center
ELOG- Electronic Log
FM – Facility Manager
HVAC - Heating Ventilation and Air Conditioning
JSTC – BOSS Test Conductor
KCCS – Kennedy Complex Control System
KNET- Kennedy Admin Network
KPLSS- KSC Propellants & Life Support Services
MSO – Mission Support Office
NICS- NASA Integrated Communication Services Contract
NTD – NASA Test Director
POC- Point of Contact
QR – Quick Response
SETI – System Engineering Tie In
SE – System Engineer

DEFINITIONS

Assessment: A review of the impacts in an outage and how the impacts affect the applicable system and a statement of actions to support the successful implementation of an outage. (Including back up requirements and equipment securing required)

CCC: Complex Control Center. Located in the LCC the CCC console operator provides 24/7 monitoring of the power and utility systems for BOSS managed equipment.

Closed: Maximo status placing the outage record in a closed status when the field work is complete. Final paper closure and review by the outage coordinator remain.

Emergency Outage: An unplanned impending system or equipment failure/interruption due to a malfunction or defect.

GYCC: Call sign for the IMCS Comm Control console.

JSTC Console: 24/7 operations center that serves as a central point of contact for all BOSS contractors to include NASA and NASA facilities located on Kennedy Space Center.

Impact: The effect an outage has on a system, facility or operational requirement.

Maximo: An automated system used to provide electronic traceability for outage processing and support work documents.

Open: Maximo status placing the outage record in progress when requested of the appropriate console for the outage type.

Outage: A planned interruption of service required to perform work for system maintenance, repairs or modification.

Piggyback Outage: An outage worked in parallel and within the scope of a planned outage. Primary outage number should be referred to on the piggyback outage.

Processing Facilities: Processing Facilities are considered to be any facility designated for the processing or storage of flight hardware or GSE, including any critical support buildings. Processing Facilities include but are not limited to:

- M7-1354 (PHSF)
- M7-1104 (MPPF)
- M7-1362 (Firex Pump Station)
- M7-505A (LETf)
- M7-0505 (Payload Support Building)
- M7-0355 (Neil Armstrong Operations and Checkout Building)
- M7-0407 (Industrial Area Chiller Plant)
- M7-0360 (Space Station Processing Facility)
- M7-0411 (SSPF Science Annex)
- L6-0248 (Booster Fabrication Facility Service Building)
- L7-0251 (Booster Fabrication Facility Aft Skirt Test Building)
- K6-0494 (Rotation/Processing Building)
- K6-0848 (Vehicle Assembly Building)
- K6-0794 (Terminal Protection System Facility)
- K6-1193 (Repeater Building)
- UK-0027 (Shuttle Landing Facility)
- K7-0405 (Ordnance Storage Magazines 4/5/6)
- K6-0696 (Commercial Crew and Cargo Processing Facility)
- K6-0894 (Orbiter Processing Facility)
- K6-0895 (OPF Pumphouse)
- ML-1 (Mobile Launcher 1)
- K7-0468 (Converter/Compressor Building)
- K6-0900 (Launch Control Center)
- J8-1708 (Launch Pad 39A)
- J7-0337 (Launch Pad 39B)
- J7-1388 (Industrial Water Pumping Station)
- M7-0361A (Ammonia Vapor Containment Building).

QR APPROVAL: Quick Response is an execution option for customers to request accelerated timelines for select high priority work in exchange for paying a premium rate. To request a QR, utilize this distribution group: ksc-dl-boss-quick-response-processing@mail.nasa.gov.

Unplanned Outage: An outage that is submitted with less than the required 15 working days planning of a scheduled outage and more than 24 hours before the planned outage start time.

Requestor: The person requesting a utility outage, typically a SE, construction inspector or supervisor but could be others.

SE: BOSS system engineer.

Unscheduled Outage: An outage required when a system or piece of equipment suddenly or unexpectedly fails, powers-down, malfunctions, or becomes inoperative.

Water Outage: An outage required of a water system to include potable and non-potable water, fire sprinkler systems for durations of ten hours or more, pump-station pumps, water distribution systems and sound suppression.

REVISION RECORD

The following revisions have been applied to this document:

Revision Number	Change Description	Date
0	Initial Release	5/20/2010
1	Revised in its Entirety	10/23/2012
2	Revised to include recent Maximo changes	1/22/2014
3	Revised to include Contract Changes, ERB actions and Emergency Outage Clarifications	2/6/2017
4	Update document to support BOSS Contract change	1/31/2020
5	Revised to include change approval process from ten to fifteen days	5/6/2024

DOCUMENT APPROVALS**X**

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X

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