

CCC Desk Instruction	CCC Switching Order and Work Permit Process			Number: CCC-I-0012	
Complex Control Center	Approved by: SIC	Initial Issue Date: 06/12/12	Page: 1 of 16	Revision: 18 Eff Date: 01/11/24	

PURPOSE:

This desk instruction is provided to define the responsibilities and expectations of console operations personnel in the Complex Control Center (CCC) at Kennedy Space Center (KSC). This desk instruction is to be used exclusively by console operations personnel in the Complex Control Center as a reference guide to work requirements that are identified in MSO-P-0004, "Complex Control Center Operations".

INSTRUCTIONS:

The following instructions shall be adhered to by all power console operations personnel when generating and/or processing electrical system Switch Orders or Work Permits in the Complex Control Center.

I. Switching Order Generation and Processing

Note 1 - No switching will be performed on an energized medium voltage system without a properly approved switching order, (KSC Form 26-67) except for an emergency situation. Operation of switches on a de-energized or isolated system is not considered switching.

Note 2 - No switching will be performed on an energized < 600 voltage system within a substation without a properly approved switching order, except for an emergency situation or when a detailed test procedure is provided. Operation of switches on a de-energized or isolated system is not considered switching.

Note 3 - In an emergency the Power Console/Management is to be contacted for approval of all switching. Switching steps will be recorded as performed and after-the-fact switching order will be issued.

Note 4 - Where de-energizing switching is performed on an energized < 600 voltage system in support of a construction contractor, switching shall not be implemented unless arrangements have been made by construction management personnel with the contractor to accept the Work Permit (KSC Form 26-400) on site after switching operations are complete.

Note 5 - Construction contractor or ISC personnel may perform switching on branch circuits without the use of switch orders or work permits. (Disconnect switches shall be considered part of the branch circuit.)

Note 6 – Overhead Bridge Crane Testing shall not require an outage; however Crane operations personnel shall contact the power console operators 48 hours prior to scheduled crane operations to request support so that switch orders can be prepared and electrical shop personnel are scheduled to support such crane operations.

- a. When an approved electrical outage or a request from the electrical power shop comes into the power console, the power console operators shall generate a Switching Order, as required, to support the work being done as part of the electrical outage.

- b. All Switching Orders shall be generated by the power console operators, using KSC Form 26-67, in accordance with PPS-P-0004, "Electrical Systems Power Switching Procedure". Reference Attachment A for an illustration of KSC Form 26-7V.
- c. At the beginning of each switch order, steps shall be written to verify the position of any "PSEUDO" indication that affects multiple power sources, such as Selector Switches, MTS's, ATS's, Ties, N.O. (normally open) or N.C (normally closed) switches, A/B Switches, etc. that are not sensed and or controlled on KCCS and which cannot have their position verified by using KCCS screens. These verification steps are to be written at the beginning of the switch order.
- d. All Switching Orders generated by the power console operators shall have a "second set of eyes" (SSOE) review performed by another JBEP/JSEP certified power console operator where the title of the Switch Order Form is compared to the "Outage Summary Description" and/or "Reason for Outage" blocks on the Outage Request Form to verify that these match. The power console operator performing the SSOE review for this shall initial or sign their name in Block #6 "Operation to be Performed" on the Switch Order Form (KSC Form 26-67) after they perform the SSOE review comparing the Switch Order and Outage Request. See examples below:

Number: SRV32551 Status: CLOSED Submit Date: 7/10/19 Outage Type: ELEC		Outage Request Report			
Outage Summary Desc: SS-809B (Loss of Redundancy) @ (K6-848) VAB (401)					
Requestor: Fessner, Michael Email: michael.j.fessner@nasa.gov Phone: 321.861.0632		Outage Coordinator: JROYAL Phone: 321.861.6067 Target Start: Jul 24, 2019, 3:00 PM Actual Start: Jul 24, 2019, 3:41 PM			
		Target Finish: Jul 24, 2019, 11:00 PM Actual Finish: Jul 24, 2019, 5:48 PM			

Switching Order					
1. Orsino S/S	2. C-5/C-5A S/S XXXX	3. Switch Order No. 373	4. Date of Outage 7/24/2019	5. Time of Outage 1500-2200	Page 1 of 2
6. Operation to be Performed DENERGIZE/ENERGIZE USS 809B @ VAB					

- e. All Switching Orders generated by the power console operators shall also have a "second set of eyes" (SSOE) review performed on all of the steps written in the switch order by another JBEP/JSEP certified power console operator. The power console operator performing the SSOE review of the switch order steps shall initial or sign their name in the "Step 1" box on the Switch Order Form (KSC Form 26-67) after they perform the SSOE review.
- f. Power console operators shall enforce the requirement that no switching shall be performed on an energized system without a properly approved Switching Order, except for an emergency situation.
- g. When switching involves transferring loads from one transformer to another at either the C5/C5A or Orsino substation, ensure steps area included in the switch order to: (1) Verify or add steps to ensure NGR's are switched "out" of the circuit; and (2) Verify or set the Transformer Differential relays and the TS relays for all transformers at the affected substation (i.e. – C5/C5A or Orsino) to the "preferred" setting before attempting to switch loads from one transformer to another.

- h. Power console operators shall also coordinate with the appropriate field personnel to ensure that energizing of cables shall not be performed on feeders that run through manholes occupied by work personnel.
- i. When generating a Switching Order, the power console operators shall assign a unique number to each Switching Order they generate by utilizing CCC-F-0012A, "Switch Order Log". Reference Attachment B for an illustration of this form. This Switch Order log shall be kept at the C3 power console in the Complex Control Center.
- j. Once a Switch Order is generated, it is to be saved by the power console operator to the CCC Share Drive at the following location: [\\bossfile\ccc\\$\shared\switch orders & work permits](#) folder.
- k. All Switch Orders that have been generated shall have both a "field" copy and an "office" copy printed out and ready to be worked. These shall be filed in the desktop filing system at the C3 power console so they are ready for the electrical shop personnel when they arrive in the Complex Control Center.
- l. Switch orders written on equipment not displayed on the status board nor requiring verification on the board can be sent to the power shop via electronic format. In this case, the "field" copy of the switch order is to be scanned into an email and sent to the following email address in the global KSC email system: [KSC-DL-BOSS-Power-Systems-Shop-Distribution](#)
- m. Switch order written on equipment displayed on the status board require verification on the board. In this case, when the electrical shop personnel performing the switching come to the Complex Control Center, the power console operator shall give them the "field" copy of the Switching Order and walk down the Power Systems Map board in the Complex Control Center. The power console operator shall then complete all required sections of the Switching Order as required by PPS-P-0004.
- n. All power console operators shall: (1) Obtain approvals for any redlines and/or changes to final versions of switch orders from a supervisor or manager (not from a shop lead or shop technician) as required by PPS-P-0004; and (2) Record the name of the supervisor or manager providing the approval on the original switch order and in the Systems Electronic Tie-In (SETI) Log.
- o. When electrical shop personnel contact the power console and work the Switching Order steps, the power console operator will record information on the Switch Order as required by PPS-P-0004.
- p. For any Switching Orders not complete at the end of the shift they were started, the power console operator shall file them in the desktop filing system on the power console.
- q. If all of the switching operations in a Switch Order are not completed during the work shift in which they were started, the power console operator that worked the shift when the switching was started shall ensure that up-to-date status of system configuration and Switching Order step completion is communicated to the next power console operator at shift turnover.

- r. A second set of eyes (SSOE) review on all Switch Orders is required to be performed to ensure the map board is “PINNED” or “UNPINNED” correctly when a switch order is either partially worked or completed. For power console operators that work on a shift that another power console operator is also working, then that second console operator can do the SSOE review. If a power console operator is the only one working on their shift, then the next shift’s power console operator is to perform the SSOE review. This SSOE review will be noted in Box 24 on the Switch Order Form. An example is shown below on how to document that a SSOE review was performed.

	24. Status Board Corrected		SSOE-OUT Date Initials
	OUT Date	IN Date	
	25. Date & Time		SSOE - IN Date Initials
	Time Initials	Time Initials	

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- s. When electrical shop personnel bring the “field” copy of the Switching Order back to the power console in the Complex Control Center, the power console operator shall match-up the completed “field” and “office” copies; shall ensure that the SSOE review was completed as required in step r. above, and shall scan them and file them electronically in the Completed Switch Orders folder located at: [\\bossfile\ccc\\$\shared\Power\Completed Files - Switch Orders](\\bossfile\ccc$\shared\Power\Completed Files - Switch Orders)
- t. Completion of de-energization steps in a Switch Order, and completion of re-energization steps in a Switch Order shall be documented/recorded by the power console operator in the Systems Engineering Tie-In (SETI) Log.

II. Work Permit Generation and Processing

- a. When a Switching Order is generated, and it results in an electrical system being completely de-energized, then the power console operator shall generate a Work Permit to go with the Switching Order.
- b. All Work Permits shall be generated by the power console operators, using KSC Form 26-400, in accordance with PPS-P-0004. Reference Attachment C for an illustration of KSC Form 26-400.
- c. Power console operators shall ensure that a Work Permit is never issued to perform work on an energized circuit or equipment and shall ensure compliance with the requirement to only issue Work Permits when a system is de-energized and safe to work on. (Examples of Switching Order operations that would not require a Work Permit would be tasks such as performing a PMI on an UPS unit; Working on a system when the relay has been placed in “maintenance”, system testing, etc. In these cases, the system is not completely de-energized; a no work permit would be generated.)

- d. If a Work Permit is required as part of a Switching Order, the power console operator is to generate a Switching Order that contains an initial step that states "Issue Work Permit #XXX" as well as a completion step of "Pick-Up Work Permit #XXX" (to ensure it is documented that the Work Permit is turned back in to the power console).
- e. When generating a Work Permit, the power console operators shall assign a unique number to each Work Permit they generate by utilizing CCC-F-0012B, "Work Permit Log". Reference Attachment D for an illustration of this form. This Work Permit log shall be kept at the C3 power console in the Complex Control Center.
- f. Once a Work Permit is generated, it is to be saved by the power console operator that generated it to the CCC Share Drive at the following location: [\\bossfile\ccc\\$\shared\switch orders & work permits](\\bossfile\ccc$\shared\switch orders & work permits) folder.
- g. All Work Permits that have been generated shall have a "field" copy and an "office" copy printed out and ready to be worked. These shall be filed in the desktop filing system at the power console.
- h. When electrical shop personnel come to the Complex Control Center to pick up the "field" copy of the Work Permit, the power console operator shall complete the sections of the Work Permit as required by PPS-P-0004.
- i. When electrical shop and/or subcontractor personnel bring the "field" copy of the Work Permit back to the power console in the Complex Control Center, the power console operator shall match-up the "field" and "office" copies; scan them and file them electronically in the Completed Work Permits folder located at: [\\bossfile\ccc\\$\shared\Power\Completed Files - Work Permits](\\bossfile\ccc$\shared\Power\Completed Files - Work Permits)

III. Neutral Grounding Resistor and Relay Configuration For Switching at Orsino and C5/C5A Substations

- a. Neutral Grounding Resistor (NGR) usage is required for manhole entry when work is to be performed by personnel in the manhole. NGR usage is not required if personnel entry into the manhole is for inspection purposes only.
- b. When entry into a manhole is required, and all of the feeders in the manhole(s) cannot be completely de-energized, then the use of the Neutral Grounding Resistors (NGRs) is required for all feeders and transformers at either the Orsino or C5 substation, whichever is applicable for the manhole(s) being entered.
**Note - All NGR's at the applicable substation must be "switched-in" before personnel can enter any manholes containing feeders fed from the applicable substation.*
- c. When use of the NGRs is required, the first step that must be taken is to set all of the relays in the appropriate substation yard, Orsino or C5, into the "maintenance" settings using an approved Switching Order written solely for the configuration of these relays. All changes made to relay settings shall be recorded in the SETI log.
- d. A separate Switching Order is required to be prepared by the power console operators for the process of placing the NGRs "into" the circuit and taking them back "out" of the circuit. Reference Attachment E for an illustration of how a NGR switch-in and switch-out Switching Order is to be written.

- e. When Switching “In” the applicable NGRs, power console operator is to work the switching steps on the appropriate switching order over the recorded radio NET and all actions shall be recorded in the SETI logs.
- f. When Switching “Out” the applicable NGR’s, power console operator is to work the switching steps on the appropriate switching order over the recorded radio NET and all actions shall be recorded in the SETI log.
- g. NGRs will be switched “in” and switched “out” of the circuit daily and before weekends when no work in manholes is scheduled. If a Phase II lightning warning is in effect at the end of a work day, electrical shop supervision/management will authorize the NGRs to stay “In” the circuit until the next work day. Substation relays are NOT required to be changed from “maintenance” to “preferred” settings daily. They can stay in “maintenance” settings for the duration of the scheduled work in the manholes.
- h. When all manhole entry activities are complete, and all applicable NGRs are switched back “out”, then all of the relays in the appropriate substation yard, Orsino or C5, shall be returned to the “preferred” settings using the same approved Switching Order referenced in section “b” above. All changes made to relay settings shall be recorded in the SETI log.
- i. Requirements for Wye/Wye connected transformers: Wye/Wye connected transformers (Currently, the only transformers of this type at KSC are USS-831, USS-234 and USS-235.) shall not be energized with their associated feeder breaker and transformer relay settings in “maintenance”. If a Wye/Wye connected transformer needs to be energized, all of the NGRs for the associated substation (Orsino or C5/C5A) must be taken “out” of the circuit and the associated feeder breaker relays, associated transformer VCB relays and associated transformer differential relays must be placed back in “preferred” setting BEFORE energizing these substations. (Example: For USS-831, VCB 616 relay, VCB TS10 relay and T10 differential relay would all be placed to “preferred” settings before energizing this substation.)
- j. Requirements for NGR and relay configuration when energizing one or more substations that have a combined transformer load of greater than 2500 KVA: In the case of any substation with a transformer greater than 2500 KVA (For Example: USS-119 and USS-829 which both have 10,000 KVA transformers), or in the case of two substations being energized at the same time with combined transformer loads greater than 2500 KVA (For example USS-150, 1500 KVA and USS-183, 1500 KVA, for a total load of 3000 KVA) all of the NGRs for the associated substation (Orsino or C5/C5A) must be taken “out” of the circuit and the associated feeder breaker relays, associated transformer VCB relays and associated transformer differential relays must be placed back in “preferred” setting BEFORE energizing these substations. (Example: For USS-119A, All three Orsino NGR’s would be taken “out” of the circuit and the VCB 213 relay, the VCB TS1 relay and the T1 differential relays would all be placed to “preferred” settings before energizing this substation).
- k. Requirements for energizing a feeder: A feeder shall not be energized with its respective feeder breaker relay setting and transformer relay settings in “maintenance”. If a feeder breaker needs to be energized, all of the NGRs for the associated substation (Orsino or C5/C5A) must be taken “out” of the circuit and the associated feeder breaker relays, associated transformer VCB relays and associated transformer differential relays must be placed back in “preferred” setting BEFORE energizing the feeder.

- l.** In the event a fault occurs when the NGR's are in the circuit, testing of the applicable NGR's (Orsino or C5) and the applicable Powell ESCO Vacuum Fault Interrupter's (VFI's) having single phase transformers shall be completed as required in CCC Desk Instruction CCC-I-0024 "NGR \ VFI Fault Response Checklist".
- m.** Restrictions on use of NGR's on Launch and Static Fire Days: The NGR's at C5/C5A Substation are NOT to be used (i.e. – not "switched in" or "in the circuit") from T-12 hours to T+2 hours on any day that a Launch or Static Fire Test is being performed at either Pad A or Pad B at Kennedy Space Center.

ATTACHMENT A
SWITCHING ORDER

Switching Order					
1. Orsino S/S	2. C-5/C-5A S/S	3. Switch Order No.	4. Date of Outage	5. Time of Outage	Page 1 of 1
6. Operation to be Performed					
7. Justification					
8. Requested By					
9. Prepared By				10. Date & Time	
11. Authorized By				12. Date & Time	
13. Operation Performed By				14. Completed, Date & Time	
15. Work Permit No.	16. Issued To / Received By	17. Company	18. Date & Time		
STEP 1 All parties involved in this Switch Order have reviewed switchboard and concur with Switch Order. Electrical switching operation will be adhered to with no approved deviation.					
19.	20.	21.	22.		
	TIME	OPER. INITIAL	P.C.G. INITIAL		
23. Remarks:				24. Status Board Corrected	
				25. Date & Time	

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ATTACHMENT B

SWITCH ORDER LOG

S/O #	DATE	OPERATION TO BE PERFORMED
001	/ /	
002	/ /	
003	/ /	
004	/ /	
005	/ /	
006	/ /	
007	/ /	
008	/ /	
009	/ /	
010	/	SAMPLE
011	/	
012	/ /	
013	/ /	
014	/ /	
015	/ /	
016	/ /	
017	/ /	
018	/ /	
019	/ /	
020	/ /	
021	/ /	
022	/ /	
023	/ /	
024	/ /	
025	/ /	

ATTACHMENT C

WORK PERMIT

1A. O&E/CSA	1B. Order	Work Permit		3. Permit Number	
4. Issue Date and Time		5. Approval Power Coordinator			6. Date and Time
7. Description and Location of Equipment Affected					
8. High Voltage Switching Required: ☐ Yes ☐ No				9. Feeder Affected	10. System
11. De-energized by S.O. Number		12. Operator		13. Date & Time	
14. Switching Performed:					
15. Work Permit Received By		16. Operator Signature			17. Date & Time
18. Signature and Title of Approving Authority					
19. Y/N?	20. Location	21. Date & Time	22. By	23. Removed Y/N?	24. Date & Time
25. GROUND PLACED					
26. GROUND PLACED					
27. GROUND PLACED					
28. GROUND PLACED					
29. GROUND PLACED					
30. LOCKOVER PLACED	31. Y/N?	32. Location	33. Date & Time	34. Removed Y/N?	35. Date & Time
36. STOP TAGS PLACED	37. Y/N?	38. Location		39. Removed Y/N?	40. Date & Time
41. STOP TAGS PLACED	37. Y/N?	38. Location		39. Removed Y/N?	40. Date & Time
42. STOP TAGS PLACED	37. Y/N?	38. Location		39. Removed Y/N?	40. Date & Time
43. STOP TAGS PLACED	37. Y/N?	38. Location		39. Removed Y/N?	40. Date & Time
44. Work Permit Transmitted to		45. Company or Department			46. Date & Time
47. Personnel Clear-Work Permit Released By					48. Date & Time
49. System Energized by S.O. Number					50. Completion Date & Time
51. System Returned to Normal Configuration:		52. Operator			
☐ Yes ☐ No					
53. Notes					

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ATTACHMENT D
WORK PERMIT LOG

W/P #	DATE	FACILITY / LOCATION	PURPOSE	RECIPIENT
001	/ /			
002	/ /			
003	/ /			
004	/ /			
005	/ /			
006	/ /			
007	/ /			
008	/ /			
009	/ /	SAMPLE		
010	/ /			
011	/ /			
012	/ /			
013	/ /			
014	/ /			
015	/ /			
016	/ /			
017	/ /			
018	/ /			
019	/ /			
020	/ /			
021	/ /			
022	/ /			
023	/ /			
024	/ /			
025	/ /			

ATTACHMENT E

SAMPLE SWITCH ORDER FOR NGR SWITCHING – Page 1

Switching Order					
1. Orsino S/S XXXX	2. C-5/C-5A S/S	3. Switch Order No. 386	4. Date of Outage 8/1/2019	5. Time of Outage 0700-1730	Page 1 of 10
6. Operation to be Performed ENGAGE / DISENGAGE NGRs FOR T1, T2, AND T3 @ ORSINO					
7. Justification MANHOLE WORK				O/R:	
8. Requested By MCGOUGH				WON:	
9. Prepared By BATTEN				10. Date & Time 8/1/2019 0705	
11. Authorized By				12. Date & Time	
13. Operation Performed By				14. Completed, Date & Time	
15. Work Permit No. N/A	16. Issued To / Received By		17. Company	18. Date & Time	
STEP 1 All parties involved in this Switch Order have reviewed switchboard and concur with Switch Order. Electrical system power switching procedure will be followed with no approved deviation.					
19. OPERATIONS			20. TIME	21. OPER. INITIAL	22. P.C.G. INITIAL
PRIOR	TO MANHOLE	ENTRY			
2) AT ORSINO	CHECK NGR ALARMS	IF IN ALARM HAVE FIELD RESET			
3) AT ORSINO	A) VCB 1 MAINTENANCE BYPASS SWITCH	A) VERIFY OPEN			
	B) VCB 1 (C)	B) OPEN			
	C) VCB 1 MANUAL OPERATING HANDLE	C) PLACE TO CLOSE BLOCKED			
4) AT ORSINO	A) VCB 2 MAINTENANCE BYPASS SWITCH	A) VERIFY OPEN			
	B) VCB 2 (C)	B) OPEN			
	C) VCB 2 MANUAL OPERATING HANDLE	C) PLACE TO CLOSE BLOCKED			
23. Remarks: ENGAGE - DISENGAGE NGRs @ ORSINO			24. Status Board Corrected		
			25. Date & Time		

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ATTACHMENT E

SAMPLE SWITCH ORDER FOR NGR SWITCHING – Page 2

Switching Order					
1. Orsino S/S	2. C-5/C-5A S/S	3. Switch Order No.	4. Date of Outage	5. Time of Outage	Page 2 of 10
XXXX		386	8/1/2019	0700-1730	
5) AT ORSINO	A) VCB 3 MAINTENANCE BYPASS SWITCH B) VCB 3 (C) C) VCB 3 MANUAL OPERATING HANDLE	A) VERIFY OPEN B) OPEN C) PLACE TO CLOSE BLOCKED			
AFTER	MANHOLE	ENTRY			
6) AT ORSINO	A) VCB 1 (C) OPERATING HANDLE	A) PLACE TO NORMAL B) CLOSE			
7) AT ORSINO	A) VCB 2 MANUAL OPERATING HANDLE	A) PLACE TO NORMAL B) CLOSE			
8) AT ORSINO	A) VCB 3 MANUAL OPERATING HANDLE	A) PLACE TO NORMAL B) CLOSE			
PRIOR	TO MANHOLE	ENTRY			
9) AT ORSINO	CHECK NGR ALARMS	IF IN ALARM HAVE FIELD RESET			
23. Remarks: ENGAGE - DISENGAGE NGRs @ ORSINO			24. Status Board Corrected		
			25. Date & Time		

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RECORDS

The following records are retained by the organizations listed below:

Record	Responsible Organization
CCC-F-0012A, Switch Order Log	Complex Control Center
CCC-F-0012B, Work Permit Log	Complex Control Center
KSC Form 26-67, Switching Order	Complex Control Center
KSC Form 26-400, Work Permit	Complex Control Center
Systems Electronic Tie-In Log	Complex Control Center

ROLES AND RESPONSIBILITIES

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

Spaceport Integration Center Manager: Ensures compliance at the Spaceport Integration Center level to the requirements stated in this procedure.

Complex Control Center Staff: Ensures performance of console operations duties in accordance with this desk instruction.

REFERENCE DOCUMENTS

The following documents are referenced in this procedure:

Document Number	Title
CCC-F-0012A	Switch Order Log
CCC-F-0012B	Work Permit Log
KSC Form 26-67	Switching Order
KSC Form 26-400	Work Permit
MSO-P-0004	Complex Control Center Operations

ACRONYMS

BOSS – Base Operations & Spaceport Services Contract

CCC – Complex Control Center

KSC – Kennedy Space Center

NGR – Neutral Grounding Resistor

SETI – Systems Electronic Tie-In Log

SSOE – Second Set of Eyes Review

SIC – Spaceport Integration Center

VFI – Vacuum Fault Interrupter

DEFINITIONS

Neutral Grounding Resistor - An electrical device that is used for resistance grounding of an industrial power system. They are connected between ground and neutral of transformers, generators and grounding transformers. Neutral Grounding Resistors are used to limit maximum fault current to a value which will not damage the equipment in the power system yet allow sufficient flow of fault current to operate protective relays to clear the fault.

Switching Order – A sequence of written instructions to perform electrical distribution system switching. At Kennedy Space Center, these are generated using KSC Form 26-67.

Work Permit – A document issued by the ISC power console operators to ensure that an electrical system has been de-energized, made safe by a switching order and protective grounds have been place as required to perform specified work on an electrical system. At Kennedy Space Center, these are generated using KSC Form 26-400.

REVISION RECORD

The following revisions have been applied to this document:

Revision Number	Change Description	Date
0	Initial Release	06/12/12
1	Added Five “Notes” to Section I “Switching Order Generation and Processing”, Added new Section I.h. regarding emailing switch orders for equipment not displayed on the status board.	11/13/13
2	Modified Section I. “Switching Orders”. Added new Section III “Neutral Grounding Resistor Switching at Orsino & C5 Substations”. Added Attachment E “Sample Switch Order For NGR Switching”. Added NGR, SO and WP Definitions.	07/14/14
3	Added Section 1.d. to add a Step #2 on the switch order form containing a requirement to: “VERIFY no personnel are in any manholes prior to initiating switching on any feeders”.	10/07/14
4	Added Section III.i. – Requiring G, H & N Lines to be fed from FP&L when NGR’s are switched “in” the circuit at C5/C5A Substation and Added Section III.j. – New requirement to test NGR’s and Powel ESCO VFI’s in the event a fault occurs when NGR’s are in the circuit at Orsino or C5 Substations.	11/05/14
5	Revised Section 1.d. to address relay setting requirements when transferring loads from one transformer to another at either C5/C5A or Orsino Substations.	03/19/15
6	Added new Section 1.c. for Second Set of Eyes Review; Added new Section 1.l. for console operators to obtain approvals for any redlines and/or changes to final versions of switch orders from a supervisor or manager; and updated acronyms.	03/25/15

7	Added new Section III. K. for Requirements for NGR and Relay configuration when re-energizing substations that have 5000 KVA or above transformers.	05/26/15
8	Modified Section III. K, L, M and N for NGR and Relay configurations when a Wye/Wye connected transformer is involved; When a greater than 2500 KVA transformer is involved or when energizing a feeder that has been de-energized.	06/15/15
9	Modified Section III.K. to include one greater than 2500 KVA transformer of a combined load of greater than 2500 KVA for two or more transformers being energized at the same time.	11/05/15
10	Revised Section III e. and f. to remove reference to operation of blade switches on poles next to transformer to place NGR in and out of the circuit. Removed due to addition of new NGR VCB's added in C5 and Orsino Substations.	03/31/16
11	Revised Section I.p. and II.i. To add scanning and electronic filing of completed "field" and "office" copies of Switch Orders and Work Permits. Updated Attachment E, Sample NGR Switch Order.	01/12/17
12	Added Section III.n. to restrict use of C5/C5A NGR's on Static Fire Test days at either Pad A or Pad B at KSC.	01/31/17
13	Deleted the requirement for C5/C5A Substation: G, H & N Lines must be fed from FP&L when NGR's are switched "in" the circuit and G, H & N Lines must stay on FP&L for the duration of the outage requiring NGR usage. As of 6/16/17, no longer required.	06/16/17
14	Added Section 1.c. "Pseudo Verification Requirements"; Added Section 1.q. "SSOE On Switch Order Step Completion Map Board Pinning"; and added Section 1.r. "Ensuring Office Copy of Switch Order has SSOE Review before scanning to the electronic files."	07/27/17
15	Added a new Section 1.d. requiring a "second set of eyes" review performed by another JBEP/JSEP power console operator where the title of a Switch Order Form is compared to the "Outage Summary Description" and/or "Reason for Outage" blocks on the corresponding Outage Request Form to verify that these match.	03/06/18
16	Converted Desk Instruction from ISC to BOSS document	08/09/19
17	Added USS-234 and USS-235 as Wye/Wye connected transformers in Section III.i.	11/14/23
18	Updated New BOSS Logo & Updated Signatures	01/11/24

DOCUMENT APPROVALS

Manager, Complex Control Center
Signed by: cards