LICENSEE POST-EXAM COMMENTS

CATAWBA EXAM
50-413, 414/2001-301

APRIL 2 - 6 & 16 - 20, 2001

LICENSEE POST-EXAM COMMENTS

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DUKE POWER

April 27, 2001

Mr. Michael Ernstes
Operations Branch Division of Reactor Safety
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SUBJECT: Catawba Nuclear Station Senior Reactor and Reactor Operator Exams Post Examination Comments

The following comments are offered concerning the NRC initial license examinations administered at Catawba Nuclear Station between April 4, 2001 and April 24, 2001.

Please find attached the following:

- Form ES-403-1 for the written examination administered on April 24, 2001.
- Written exam item analysis of questions missed by 50% or more of the candidates.
- Facility comments for the operating examination for 2 administrative JPMs and 1 system JPM with supporting facility references.
- Complete RO and SRO question analysis spreadsheets.
- Examination cover sheets and graded answer sheets for 9 SRO candidates and 6 RO candidates.
- Clean xerox copies of answer sheets for 9 SRO candidates and 6 RO candidates.
- Master copy of RO and SRO examinations with changes noted and reference packages.
- Answer keys for the RO and SRO written examinations.
- Examination administration log/ seating chart.

Please note that the grading performed does not take into account the question that we are requesting be reviewed for accepting 2 answers per phone conversation between Mr. John Suptela and Mr. Charles Payne on 4/25/01.

Sincerely,

Gary R. Peterson By RL Swigart

Gary R. Peterson
Site Vice President
Catawba Nuclear Station

cc: Mr. Charles Payne
Mr. Robert A. Lindsay
Mr. John W. Pitesa

Catawba NRC Initial Operator Licensing Examination
Post Exam Comments

The NRC Initial Operator Licensing Written Examination was conducted as scheduled on April 24, 2001. Based on a post exam review of the questions, one question was determined to have two correct answers. The following justification is provided for consideration as directed by NRC NUREG 1021 (Operator Licensing Examination Standards for Power Reactors) ES-402.

There are no other post examination comments on the written exam.

1. Question: SRO Test Question # 770

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1 Pt(s) Unit 1 is starting-up in mode 1. Given the following conditions and events:

- Battery charger 1ECB is out of service.
- Battery charger 1ECS is supplying bus 1EDB.
- Annunciator 1AD-11, H/3 (*125VDC ESS PWR CHANNEL C TROUBLE*) alarms due to the loss of power from battery charger 1ECC.
- The battery charger 1ECC output breaker is faulted.

Which of the following describes operator action needed in response to these conditions?

REFERENCES PROVIDED:

A. Switch inverter 1EIC to the regulated power supply, and be in mode 3 within 6 hours.

B. Crosstie bus 1EDC to bus 1EDA, and fix one of the chargers within 10 days.

C. Switch inverter 1EIC to the regulated power supply, and fix one of the chargers within 24 hours.

D. Crosstie bus 1EDC to bus 1EDA, and fix one of the chargers or be in mode 3 within 6 hours.

Distracter Analysis:

A. Incorrect: they would have 14 hours if the buses were not cross-tied.

Plausible: This is a possible action if the buses could not be cross-tied.

B. **Correct**:

C. **Incorrect**: They still have to crosstie or shutdown within 14 hours.
Plausible: If the candidate focuses on inverter vs. DC source TS.

D. **Incorrect**: the busses can be cross-tied for 10 days.
Plausible: If the candidate thinks more than one train is affected.

Level: SRO Only

KA: APE 058AA1.01(3.4/3.5)

Lesson Plan Objective: EPL LPRO 9, 19

Source: New

Level of knowledge: comprehension

References:
1. OP-CN-EL-EPL page 19
2.Tech Spec's 3.8.4, 3.8.7, 3.8.9

2. Correct Answer Expected: "B" was the correct answer in the answer key.

3. Comment:

This question asked the SRO candidates to determine the correct course of action if two battery chargers were inoperable at the same time. The initial conditions postulated that vital DC bus 1EDB was being supplied by the standby battery charger 1ECS because battery charger 1ECB was out of service. With 1ECS supplying DC bus loads on vital DC bus 1EDB, all 4 channels and both trains of vital DC remain fully operable.

When battery charger 1ECC fails, Tech Spec 3.8.4 condition A applies and action statement A.1 should be entered. This statement reads (in part):

"Verify associated bus tie breakers are closed between DC channels".

The exam team thought that it would be possible to close DC bus tiebreakers between 1EDA and 1EDC to allow bus 1EDA to supply the DC loads on 1EDC. The batteries and chargers are rated to be able to supply two DC channels (busses) concurrently.

However, it was determined during the post exam review that there is no existing approved station procedure to allow vital DC bus crosstie operation under these conditions.

OP/1/A/6350/008 (125 VDC/120 VAC Vital Instrument and Control Power System) is the operating procedure that controls the allowable configurations of the vital DC system. If charger 1ECC is removed from service, OP/1/A/6350/008 enclosure 4.7 directs powering bus 1EDC from the standby charger 1ECS. This course of action is not possible because 1ECS is already supplying DC loads on 1EDB (charger 1ECB was removed from service as an initial condition). OP/1/A/6350/008 enclosure 4.15 allows DC bus crosstie operations between 1EDA and 1EDC if an equalizing battery charge is in progress on 1EBC. Enclosure 4.19 allows crosstie operations between 1EDA and 1EDC if battery 1EBC is removed from service.

However, in both cases the standby battery charger 1ECS is aligned to the vital DC tie bus along with charger 1ECA. There is no case in OP/1/A/6350/008 where a single battery charger is aligned to carry both 1EDA and 1ECA concurrently.

Without clear procedural direction to crosstie DC busses from a single battery charger, an SRO would not direct this action without significant outside direction and assistance. As a minimum, a temporary procedure would have to be prepared and approved. In addition, a safety analysis (10CFR50.59) may have to be conducted.

The NRC does not require operators to memorize the operating procedures in order to pass the written exam. However, if a candidate already knows these procedures well enough to recognize that there is no procedural direction to accomplish the action, he or she may make use of this information to answer the question. The NRC should not penalize a candidate for knowledge that is above and beyond the minimum required for a license.

A key consideration is that the stem of the question did not impose any conditional requirements or operational contingencies to continue the startup. Although the plant was in mode 1, there was no power level provided in the stem of the question and some candidates could have presumed that the power level was as low as 5%. There was no stated or implied operational necessity that required the startup to continue with one channel of DC power out of service or degraded.

Three candidates selected "A" as the correct answer because they likely determined it would not be prudent to crosstie the bus without an existing plant operational procedure and they could comply with Tech Spec 3.8.4 by following action statement B.1. This choice demonstrates conservative decision-making and should not be penalized. Following this course of action would maintain compliance with their tech specs and place the plant in a stable configuration where repairs could be readily completed without concurrently continuing a plant startup.

Accepting 2 answers does not compromise the discriminatory value of this question. The pass rate of this test item will be raised from 33% to 67% by accepting "A" and "B". The Examiner Standards recommend that written exam questions be prepared to score between 70% and 90%. The discriminatory value of this question would be maintained.

4. Recommendation:

Catawba Nuclear Station recommends that the NRC accept two answers to this question, "A" and "B". The original premise of the question did not impose a restriction or condition that made "A" incorrect.

"B" is also correct because this course of action is clearly allowable by Tech Specs. If the candidate presumed that a temporary procedure could be prepared in short order (8 hours is allowable) to crosstie these breakers, "B" remains a correct course of action, although less conservative than "A".

If the NRC determines that only a single answer is correct, then "A" is the conservative and therefore most correct (or best) answer to this question. However, if "A" were determined to be the only correct answer, then the candidates would be required to have knowledge of OP/1/A/6350/008 (from memory) that is beyond what is normally expected of a qualified operator.

5. References provided:

1. OP/1/A/6350.008 (125 VDC / 120 VAC Vital Instrument and Control Power System)
2. Tech Spec 3.8.4 (Electrical Power Systems, DC Sources - Operating)
3. OP-CN-EL-EPL (125 VDC/120 VAC VITAL INSTRUMENTATION AND CONTROL POWER SYSTEM)

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources—Operating

LCO 3.8.4 Four channels of DC electrical power subsystems and the Train A and Train B Diesel Generator (DG) DC electrical power subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One channel of DC electrical power subsystem inoperable.	A.1 Verify associated bus tie breakers are closed between DC channels. AND A.2 Restore channel of DC electrical power subsystem to OPERABLE status.	8 hours 10 days
B. Required Action and Associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours
C. One or more DG DC electrical power subsystem(s) inoperable.	C.1 Enter applicable Condition(s) and Required Action(s) of LCO 3.8.1, "AC Sources - Operating", for the associated DG made inoperable.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. A and/or D channel of DC electrical power subsystem inoperable. AND Associated train of DG DC electrical power subsystem inoperable.	D.1 Enter applicable Condition(s) and Required Action(s) of LCO 3.8.9, "Distribution Systems-Operating", for the associated train of DC electrical power distribution subsystem made inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.4.1	Verify DC channel and DG battery terminal voltage is $\geq$ 125 V on float charge.	7 days
SR 3.8.4.2	Verify DG battery cell voltage $\geq$ 1.36 V on float charge.	7 days
SR 3.8.4.3	Verify no visible corrosion at the DC channel and DG battery terminals and connectors. OR (For the DC channel only) Verify battery connection resistance of these items is $\leq$ 1.5 E-4 ohm.	92 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.8.4.4	Verify DC channel and DG battery cells, cell plates, and racks show no visual indication of physical damage or abnormal deterioration that could degrade battery performance.	18 months
SR 3.8.4.5	Remove visible terminal corrosion, verify DC channel and DG battery cell to cell and terminal connections are clean and tight, and are coated with anti-corrosion material.	18 months
SR 3.8.4.6	Verify DC channel battery connection resistance is $\leq$ 1.5 E-4 ohm.	18 months
SR 3.8.4.7	Verify each DC channel battery charger supplies $\geq$ 200 amps and the DG battery charger supplies $\geq$ 75 amps with each charger at $\geq$ 125 V for $\geq$ 8 hours.	18 months
SR 3.8.4.8	----------NOTES---------- 1. The modified performance discharge test in SR 3.8.4.9 may be performed in lieu of the service test in SR 3.8.4.8 once per 60 months. 2. This Surveillance shall not be performed for the DG batteries in MODE 1, 2, 3, or 4. ---------- Verify DC channel and DG battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
SR 3.8.4.9 ----------NOTE---------- This Surveillance shall not be performed for the DG batteries in MODE 1, 2, 3, or 4. ---------- Verify DC channel and DG battery capacity is ≥ 80% of the manufacturer's rating when subjected to a performance discharge test or a modified performance discharge test.	60 months AND 18 months when battery shows degradation or has reached 85% of expected life with capacity < 100% of manufacturer's rating AND --------NOTE-------- Not applicable to DG batteries ---------- 24 months when battery has reached 85% of the expected life with capacity ≥ 100% of manufacturer's rating

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.4 DC Sources—Operating

BASES

BACKGROUND

The station DC electrical power system provides the AC emergency power system with control power. It also provides both motive and control power to selected safety related equipment and preferred AC vital bus power (via inverters). As required by 10 CFR 50, Appendix A, GDC 17 (Ref. 1), the DC electrical power system is designed to have sufficient independence, redundancy, and testability to perform its safety functions, assuming a single failure. The DC electrical power system also conforms to the recommendations of Regulatory Guide 1.6 (Ref. 2) and IEEE-308 (Ref. 3).

The 125 VDC electrical power system consists of four independent and redundant safety related Class 1E DC electrical power subsystems (Channels A, B, C, and D). Each channel consists of one 125 VDC battery (each battery is capable of supplying 2 channels of DC loads for a train), the associated battery charger(s) for each battery, and all the associated control equipment and interconnecting cabling.

There is one spare battery charger which provides backup service in the event that the preferred battery charger is out of service. If the spare battery charger is substituted for one of the preferred battery chargers, then the requirements of independence and redundancy between trains are maintained.

During normal operation, the 125 VDC load is powered from the battery chargers with the batteries floating on the system. In case of loss of normal power to the battery charger, the DC load is automatically powered from the station batteries.

The Channels A and D of DC electrical power subsystems or the Diesel Generator (DG) DC electrical power subsystems provide through auctioneering diode assemblies, the buses EDE for the A train and EDF for the B train to supply the control power for its associated Class 1E AC power load group, 4.16 kV switchgear, and 600 V load centers. The DC electrical power subsystems also provide DC electrical power to the inverters, which in turn power the AC vital buses.

BASES

BACKGROUND (continued)

The DC power distribution system is described in more detail in Bases for LCO 3.8.9, "Distribution System—Operating," and LCO 3.8.10, "Distribution Systems—Shutdown."

Each 125 V vital DC battery (EBA, EBB, EBC, EBD) has adequate storage capacity to carry the required duty cycle of its own load group and the loads of another load group for a period of two hours. Each 125 V vital DC battery is also capable of supplying the anticipated momentary loads during this two hour period. The 125 V DC DG batteries have adequate storage capacity to carry the required duty cycle for 2 hours.

Each 125 V vital DC battery is separately housed in a ventilated room apart from its charger and distribution centers. Each subsystem or channel is located in an area separated physically and electrically from the other subsystem to ensure that a single failure in one subsystem does not cause a failure in a redundant subsystem. There is no sharing between redundant Class 1E subsystems, such as batteries, battery chargers, or distribution panels, except for the spare battery charger which may be aligned to either train.

The batteries for each channel DC electrical power subsystems are sized to produce required capacity at 80% of nameplate rating, corresponding to warranted capacity at end of life cycles and the 100% design demand. Battery size is based on 125% of required capacity. The voltage limit is 2.13 V per cell, which corresponds to a total minimum voltage output of 125 V per battery discussed in the UFSAR, Chapter 8 (Ref. 4). The criteria for sizing large lead storage batteries are defined in IEEE-485 (Ref. 5).

Each channel of DC electrical power subsystem has ample power output capacity for the steady state operation of connected loads required during normal operation, while at the same time maintaining its battery bank fully charged. Each battery charger also has sufficient capacity to restore the battery from the design minimum charge to its fully charged state within 8 hours while supplying normal steady state loads discussed in the UFSAR, Chapter 8 (Ref. 4).

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 6 (Ref. 6), and in the UFSAR, Chapter 15 (Ref. 7), assume that Engineered Safety Feature (ESF) systems are OPERABLE. The DC electrical power system provides

APPLICABLE SAFETY ANALYSES (continued)

normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC sources is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining the DC sources OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite AC power or all onsite AC power; and

b. A worst case single failure.

The DC sources satisfy Criterion 3 of 10 CFR 50.36 (Ref. 8).

LCO

The DC electrical power subsystems, each subsystem consisting of one battery, battery charger and the corresponding control equipment and interconnecting cabling supplying power to the associated bus within the train are required to be OPERABLE to ensure the availability of the required power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. Loss of any train DC electrical power subsystem does not prevent the minimum safety function from being performed (Ref. 4).

An OPERABLE DC electrical power subsystem requires a battery and respective charger to be operating and connected to the associated DC bus.

APPLICABILITY

The DC electrical power sources are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure safe unit operation and to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of AOOs or abnormal transients; and

b. Adequate core cooling is provided, and containment integrity and other vital functions are maintained in the event of a postulated DBA.

The DC electrical power requirements for MODES 5 and 6 are addressed in the Bases for LCO 3.8.5, "DC Sources—Shutdown."

ACTIONS

A.1 and A.2

Condition A represents the loss of one channel for a DC source. The inoperable channel must be energized from an OPERABLE source within 8 hours. The inoperable channel may be powered from that train's other DC channel battery by closing the bus tie breakers. Each channel battery is sized and tested to supply two channels of DC for a period of two hours, in the event of a postulated DBA. Being powered from an OPERABLE source, the inoperable channel must be returned to OPERABLE status within 10 days or the plant must be prepared for a safe and orderly shutdown. The spare battery charger (ECS), which must be powered from the same train which it is supplying, may be substituted for the channel's battery charger to maintain a fully OPERABLE channel. In this case, Condition A is not applicable.

B.1 and B.2

If the inoperable channel of DC electrical power subsystem cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

C.1

Condition C represents one train's loss of the ability to adequately supply the DG with the required DC power and the DG is inoperable. The DG is no longer capable of supplying the required 4.16 kV AC power and applicable Condition(s) and Required Action(s) for the AC sources must be entered immediately.

D.1

Being powered from auctioneering diode circuits from either the A channel of DC or the A Train of DG DC, distribution center EDE supplies breaker control power to the 4.16 kV AC and the 600 VAC switchgear, auxiliary feedwater pump controls, and other important DC loads. The EDF center is powered from the B Train of DG DC or the D channel of DC and provides DC power to Train B loads, similar to EDE center. With

ACTIONS (continued)

the loss of the channel DC power and the associated DG DC power, the load center power for the train is inoperable and the Condition(s) and Required Action(s) for the Distribution Systems must be entered immediately.

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1

Verifying battery terminal voltage while on float charge for the batteries helps to ensure the effectiveness of the charging system and the ability of the batteries to perform their intended function. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery (or battery cell) and maintain the battery (or a battery cell) in a fully charged state. The voltage requirements are based on the nominal design voltage of the battery and are consistent with the initial voltages assumed in the battery sizing calculations. The 7 day Frequency is consistent with manufacturer recommendations and IEEE-450 (Ref. 9).

SR 3.8.4.2

Verifying battery individual cell voltage while on float charge for the DG batteries ensures each cell is capable of supporting their intended function. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery (or battery cell) and maintain the battery (or a battery cell) in a fully charged state. The voltage requirements are based on the nominal design voltage of the battery and are consistent with the initial voltages assumed in the battery sizing calculations. For this surveillance two different cells shall be tested each month. The 7 day Frequency is consistent with manufacturer recommendations.

SR 3.8.4.3

Visual inspection to detect corrosion of the battery cells and connections, or measurement of the resistance of each intercell, interrack, intertier, and terminal connection, provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance.

SURVEILLANCE REQUIREMENTS (continued)

The Surveillance Frequency for these inspections, which can detect conditions that can cause power losses due to resistance heating, is 92 days. This Frequency is considered acceptable based on operating experience related to detecting corrosion trends.

SR 3.8.4.4

Visual inspection of the battery cells, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance. The presence of physical damage or deterioration does not necessarily represent a failure of this SR, provided an evaluation determines that the physical damage or deterioration does not affect the OPERABILITY of the battery (its ability to perform its design function). Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.8.4.5 and SR 3.8.4.6

Visual inspection and resistance measurements of intercell, interrack, intertier, and terminal connections provide an indication of physical damage or abnormal deterioration that could indicate degraded battery condition. The anticorrosion material, as recommended by the manufacturer for the DG batteries, is used to help ensure good electrical connections and to reduce terminal deterioration. The visual inspection for corrosion is not intended to require removal of and inspection under each terminal connection. The removal of visible corrosion is a preventive maintenance SR. The presence of visible corrosion does not necessarily represent a failure of this SR provided visible corrosion is removed during performance of SR 3.8.4.5.

For the DG batteries, the cell-to-cell terminal pole screws should be set from 14 to 15 foot-pounds of torque. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.7

This SR requires that each battery charger for the DC channel be capable of supplying at least 200 amps and at least 75 amps for the DG chargers. All chargers shall be tested at a voltage of at least 125 V for $\geq$ 8 hours. These requirements are based on the design capacity of the chargers (Ref. 4). According to Regulatory Guide 1.32 (Ref. 10), the battery charger supply is required to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and duration ensures that these requirements can be satisfied.

The Surveillance Frequency is acceptable, given the unit conditions required to perform the test and the other administrative controls existing to ensure adequate charger performance during these 18 month intervals. In addition, this Frequency is intended to be consistent with expected fuel cycle lengths.

SR 3.8.4.8

A battery service test is a special test of battery capability, as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The discharge rate and test length should correspond to the design duty cycle requirements as specified in Reference 4. The DC channel batteries are tested to supply a current $\geq$ 373 amps for the first minute, then $\geq$ 213 amps for the next 59 minutes. DC channel batteries EBA and EBD must also supply a current of $\geq$ 210 amps for an additional hour. The DG batteries are tested to supply a current $\geq$ 171.6 amps for the first minute, then $\geq$ 42.5 amps for the remaining 119 minutes. Terminal voltage is required to remain $\geq$ 105 volts during these tests.

Except for performing SR 3.8.4.8 for the DC channel batteries with the unit on line, the Surveillance Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.32 (Ref. 10), which states that the battery service test should be performed during refueling operations or at some other outage, with intervals between tests, not to exceed 18 months.

This SR is modified by two Notes. Note 1 allows the performance of a modified performance discharge test in lieu of a service test once per 60 months.

SURVEILLANCE REQUIREMENTS (continued)

The modified performance discharge test is a simulated duty cycle consisting of just two rates; the one minute rate published for the battery or the largest current load of the duty cycle, followed by the test rate employed for the performance test, both of which envelope the duty cycle of the service test. Since the ampere-hours removed by a rated one minute discharge represents a very small portion of the battery capacity, the test rate can be changed to that for the performance test without compromising the results of the performance discharge test. The battery terminal voltage for the modified performance discharge test should remain above the minimum battery terminal voltage specified in the battery service test for the duration of time equal to that of the service test.

A modified discharge test is a test of the battery capacity and its ability to provide a high rate, short duration load (usually the highest rate of the duty cycle). This will often confirm the battery's ability to meet the critical period of the load duty cycle, in addition to determining its percentage of rated capacity. Initial conditions for the modified performance discharge test should be identical to those specified for a service test. The reason for Note 2 is that performing the Surveillance would perturb the electrical distribution system and challenge safety systems.

SR 3.8.4.9

A battery performance discharge test is a test of constant current capacity of a battery, normally done in the as found condition, after having been in service, to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage.

A battery modified performance discharge test is described in the Bases for SR 3.8.4.8. Either the battery performance discharge test or the modified performance discharge test is acceptable for satisfying SR 3.8.4.9; however, only the modified performance discharge test may be used to satisfy SR 3.8.4.9 while satisfying the requirements of SR 3.8.4.8 at the same time.

The acceptance criteria for this Surveillance are consistent with IEEE-450 (Ref. 9). This reference recommends that the battery be replaced if its capacity is below 80% of the manufacturer's rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements.

SURVEILLANCE REQUIREMENTS (continued)

The Surveillance Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life and capacity is < 100% of the manufacturer's rating, the Surveillance Frequency is reduced to 18 months. However (for DC vital batteries only), if the battery shows no degradation but has reached 85% of its expected life, the Surveillance Frequency is only reduced to 24 months for batteries that retain capacity ≥ 100% of the manufacturer's rating. Degradation is indicated, according to IEEE-450 (Ref. 9), when the battery capacity drops by more than 10% relative to its average capacity on the previous performance tests or when it is ≥ 10% below the manufacturer's rating. These Frequencies are consistent with the recommendations in IEEE-450 (Ref. 9). This SR is modified by a Note which is applicable to the DG batteries only. The reason for the Note is that performing the Surveillance would perturb the associated electrical distribution system and challenge safety systems.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.
2. Regulatory Guide 1.6, March 10, 1971.
3. IEEE-308-1971 and 1974.
4. UFSAR, Chapter 8.
5. IEEE-485-1983, June 1983.
6. UFSAR, Chapter 6.
7. UFSAR, Chapter 15.
8. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).
9. IEEE-450-1975 and/or 1980.
10. Regulatory Guide 1.32, February 1977.

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(806-07)

Duke Power Company
PROCEDURE PROCESS RECORD

(1)ID No. OP/1/A/6350/008
Revision No. 41

PREPARATION

(2) Station CATAWBA NUCLEAR STATION

(3) Procedure Title 125VDC/120VAC VITAL INSTRUMENT AND CONTROL POWER SYSTEM

(4) Prepared By _____ Date 5-18-2000

(5) Requires 10CFR50.59 evaluation?
- ☑ Yes (New procedure or revision with major changes)
- ☐ No (Revision with minor changes)
- ☐ No (To incorporate previously approved changes)

(6) Reviewed By _____ (QR) Date 6-8-2000

Cross-Disciplinary Review By Thai Nguyen (QR) NA _____ Date 6-8-2000

Reactivity Mgmt. Review By _____ (QR) NA ALL Date _____

(7) Additional Reviews

Reviewed By _____ Date _____

Reviewed By _____ Date _____

(8) Temporary Approval *(if necessary)*

By _____ (SRO/QR) Date _____

By _____ (QR) Date _____

(9) Approved By R. Michael Glover Date 6/8/2000

PERFORMANCE (Compare with control copy every 14 calendar days while work is being performed.)

(10) Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

(11) Date(s) Performed _____

Work Order Number (WO#) _____

COMPLETION

(12) Procedure Completion Verification

- ☐ Yes ☐ N/A Check lists and/or blanks properly initialed, signed, dated, or filled in N/A, as appropriate?
- ☐ Yes ☐ N/A Listed enclosures attached?
- ☐ Yes ☐ N/A Data sheets attached, completed, dated, and signed?
- ☐ Yes ☐ N/A Charts, graphs, etc. attached, dated, identified, and marked?
- ☐ Yes ☐ N/A Procedure requirements met?

Verified By _____ Date _____

(13) Procedure Completion Approved _____ Date _____

(14) Remarks *(attach additional pages, if necessary)*

41A - 6/30/00 - Encl 4.24
41B - 10/5/00 - Encl 4.27

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INFORMATION ONLY

Duke Power Company Catawba Nuclear Station	Procedure No. OP/1/A/6350/008
125VDC/120VAC Vital Instrument and Control Power System	Revision No. 041
Continuous Use	Electronic Reference No. CN005FM4

125VDC/120VAC Vital Instrument and Control Power System

1. Purpose

To describe the steps necessary for placing the inverters, batteries and battery chargers in and out of service.

2. Limits and Precautions

2.1 Do **NOT** restart an inverter within 60 seconds after taking it out of service.

2.2 The battery charger "FLOAT-EQUALIZE" switch shall remain in the "FLOAT" position, except when equalizing charges are in progress.

2.3 When placing or removing an equalizing charge on batteries, refer to Tech Spec 3.8.4 and 3.8.5 for limiting conditions for operation.

2.4 When placing 1ECS in service, ensure train separation is maintained unless in No Mode.

2.5 Keep AC input to 1ECS energized to ensure its operability.

2.6 Battery room ventilation shall be in operation whenever a battery is on charge.

2.7 When removing an inverter from service, refer to Tech Spec 3.8.7 and 3.8.8 for limiting condition for operation.

2.8 If voltages are **NOT** within the ranges given, IAE should be notified so corrective action can be taken.

2.9 Do **NOT** align a battery charger to supply any bus unless a battery is connected. The chargers lack sufficient voltage stability to serve as the sole power source to a DC System. {PIP 92-0563}

3. Procedures

Refer to Section 4 (Enclosures).

4. Enclosures

4.1 Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)

4.2 Inverter Startup (1EIA, 1EIB, 1EIC, 1EID)

4.3 Placing 1ECS in Standby Alignment from 1EMXA (Train A)

4.4 Placing 1ECS in Standby Alignment from 1EMXJ (Train B)

4.5 1ECA Shutdown and Return to Service

4.6 1ECB Shutdown and Return to Service

4.7 1ECC Shutdown and Return to Service

4.8 1ECD Shutdown and Return to Service

4.9 1EIA Shutdown and Return to Service

4.10 1EIB Shutdown and Return to Service

4.11 1EIC Shutdown and Return to Service

4.12 1EID Shutdown and Return to Service

4.13 Placing and Removing Equalize Charge on 1EBA

4.14 Placing and Removing Equalize Charge on 1EBB

4.15 Placing and Removing Equalize Charge on 1EBC

4.16 Placing and Removing Equalize Charge on 1EBD

4.17 Removing 1EBA from Service

4.18 Removing 1EBB from Service

4.19 Removing 1EBC from Service

4.20 Removing 1EBD from Service

4.21 One Line Diagrams of Vital I&C

4.22 1ECS Shutdown and Return to Service

4.23 Battery 1EBA Discharge Test Alignment

4.24 Battery 1EBB Discharge Test Alignment

4.25 Battery 1EBC Discharge Test Alignment

4.26 Battery 1EBD Discharge Test Alignment

4.27 1EDC Isolation and Return to Service

Battery Charger Startup
(1ECA, 1ECB, 1ECC, 1ECD)

1. Initial Conditions

_____ 1.1 Review the Limits and Precautions.

_____ 1.2 Verify the battery charger "FLOAT-EQUALIZE" switches are set in the "FLOAT" position on the following:

- ☐ 1ECA
- ☐ 1ECB
- ☐ 1ECC
- ☐ 1ECD
- ☐ 1ECS

2. Procedure

2.1 Notify IAE to support placing the desired battery charger in service:

_____ • Model W/O #91003518 for 1ECA
_____ • Model W/O #91003519 for 1ECB
_____ • Model W/O #91003520 for 1ECC
_____ • Model W/O #91003521 for 1ECD
_____ • Other W/O or W/R_____

NOTE: Do **NOT** continue until IAE support has arrived.

2.2 Placing 1ECA in service

_____ _____ 2.2.1 Ensure 1EMXA-F04B (125 VDC Vital Inst & Control Battery Charger 1ECA) is closed.

_____ _____ 2.2.2 Close 1EDA-F02A (Battery 1EBA).

_____ _____ 2.2.3 Close 1EDA-F02B (Main Breaker).

_____ _____ 2.2.4 Close the "AC INPUT" breaker on 1ECA.

_____ IAE 2.2.5 IAE adjust the output voltage on 1ECA to a value of 0.75 volts to 1.25 volts below the terminal voltage of 1EBA.

_____ _____ 2.2.6 Close the "DC OUTPUT" breaker on 1ECA.

_____ _____ 2.2.7 Close 1EDA-F03A (Battery Charger 1ECA).

_____ IAE 2.2.8 IAE adjust the output voltage on 1ECA to 2.21 times the number of connected cells (+2 VDC, -0 VDC).

_____ SRO 2.2.9 Perform Tech Spec assessment for required actions due to 1ECA and 1EBA return to service.

NOTE: Do **NOT** continue until IAE support has arrived.

2.3 Placing 1ECB in service

_____ _____ 2.3.1 Ensure 1EMXJ-F04B (125 VDC Vital Inst & Control Battery Charger 1ECB) is closed.

_____ _____ 2.3.2 Close 1EDB-F02A (Battery 1EBB).

_____ _____ 2.3.3 Close 1EDB-F02B (Main Breaker).

_____ _____ 2.3.4 Close the "AC INPUT" breaker on 1ECB.

_____ IAE 2.3.5 IAE adjust the output voltage on 1ECB to a value of 0.75 volts to 1.25 volts below the terminal voltage of 1EBB.

_____ _____ 2.3.6 Close the "DC OUTPUT" breaker on 1ECB.

_____ _____ 2.3.7 Close 1EDB-F03A (Battery Charger 1ECB).

_____ IAE 2.3.8 IAE adjust the output voltage on 1ECB to 2.21 times the number of connected cells (+2 VDC, -0 VDC).

_____ SRO 2.3.9 Perform Tech Spec assessment for required actions due to 1ECB and 1EBB return to service.

NOTE: Do **NOT** continue until IAE support has arrived.

2.4 Placing 1ECC in service

_____ _____ 2.4.1 Ensure 1EMXI-F05B (125 VDC Vital Instr & Control Battery Charger 1ECC) is closed.

_____ _____ 2.4.2 Close 1EDC-F02A (Battery 1EBC).

_____ _____ 2.4.3 Close 1EDC-F02B (Main Breaker).

_____ _____ 2.4.4 Close the "AC INPUT" breaker on 1ECC.

IAE 2.4.5 IAE adjust the output voltage on 1ECC to a value of 0.75 volts to 1.25 volts below the terminal voltage of 1EBC.

—— —— 2.4.6 Close the "DC OUTPUT" breaker on 1ECC.

—— —— 2.4.7 Close 1EDC-F03A (Battery Charger 1ECC).

IAE 2.4.8 IAE adjust the output voltage on 1ECC to 2.21 times the number of connected cells (+2 VDC, -0 VDC).

SRO 2.4.9 Perform Tech Spec assessment for required actions due to 1ECC and 1EBC return to service.

NOTE: Do **NOT** continue until IAE support has arrived.

2.5 Placing 1ECD in service

—— —— 2.5.1 Ensure 1EMXB-F05B (125 VDC Vital Inst & Control Battery Charger 1ECD) is closed.

—— —— 2.5.2 Close 1EDD-F02A (Battery 1EBD).

—— —— 2.5.3 Close 1EDD-F02B (Main Breaker).

—— —— 2.5.4 Close the "AC INPUT" breaker on 1ECD.

IAE 2.5.5 IAE adjust the output voltage on 1ECD to a value of 0.75 volts to 1.25 volts below the terminal voltage of 1EBD.

—— —— 2.5.6 Close the "DC OUTPUT" breaker on 1ECD.

—— —— 2.5.7 Close 1EDD-F03A (Battery Charger 1ECD).

IAE 2.5.8 IAE adjust the output voltage on 1ECD to 2.21 times the number of connected cells (+ 2 VDC, -0 VDC).

SRO 2.5.9 Perform Tech Spec assessment for required actions due to 1ECD and 1EBD return to service.

2.6 File this enclosure in the Control Copy folder of this procedure.

1. Initial Conditions

——— 1.1 Review the Limits and Precautions.

——— 1.2 Verify the applicable 125VDC Vital Instrumentation and Control Distribution Center is energized (voltage present on bus voltage meter):

- ☐ 1EDA
- ☐ 1EDB
- ☐ 1EDC
- ☐ 1EDD

2. Procedure

2.1 Placing 1EIA in service

——— ——— 2.1.1 Close 1EDA-F03C (Inverter 1EIA).

——— 2.1.2 Verify the "LOW DC VOLTAGE" light on 1EIA is **NOT** illuminated.

> **NOTE:** Step 2.1.4 must be performed immediately after Step 2.1.3 is completed. Failure to close the "BATTERY INPUT" breaker immediately after the "PRE-CHARGE" pushbutton is released may result in blown inverter input fuses.

——— 2.1.3 Depress the "PRE-CHARGE" pushbutton on 1EIA until the "PRE-CHARGE" indicator lamp has been illuminated for a minimum of 5 seconds.

——— ——— 2.1.4 Close the "BATTERY INPUT" breaker on 1EIA.

——— 2.1.5 Verify the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMA is in the "ON" position.

——— 2.1.6 Verify the following on 1EIA:

- ☐ "INVERTER OUTPUT" amps 0.
- ☐ "INVERTER OUTPUT" voltage 118 - 125V.
- ☐ "INVERTER OUTPUT" frequency 59.4 - 60.3 Hz.

——— ——— 2.1.7 Close the "INVERTER OUTPUT" breaker on 1EIA.

NOTE: Both lamps come from the same source. If one lamp is out, a work request should be written to repair it, but the procedure may be continued.

—— 2.1.8 Verify the "IN SYNC" light is illuminated on either MANUAL BYPASS SWITCH 1EMA or 1EIA.

—— —— 2.1.9 Place the "MANUAL BYPASS SWITCH" on MANUAL BYPASS SWITCH 1EMA to the "NORMAL OPERATION" position.

—— 2.1.10 Ensure the "INVERTER OUTPUT" volts and amps on 1EIA read the same as system output volts and amps on MANUAL BYPASS SWITCH 1EMA.

—— —— 2.1.11 Ensure the "ALTERNATE SOURCE AC INPUT" breaker on MANUAL BYPASS SWITCH 1EMA is open.

—— —— 2.1.12 Ensure 1VRD-F01B (Inverter 1EIA Alternate Supply) is open.

—— 2.1.13 Perform Tech Spec assessment for required actions due to 1EIA return to service.
SRO

2.2 Placing 1EIB in service

—— —— 2.2.1 Close 1EDB-F03C (Inverter 1EIB).

—— 2.2.2 Verify the "LOW DC VOLTAGE" light on 1EIB is **NOT** illuminated.

NOTE: Step 2.2.4 must be performed immediately after Step 2.2.3 is completed. Failure to close the "BATTERY INPUT" breaker immediately after the "PRE-CHARGE" pushbutton is released may result in blown inverter input fuses.

—— 2.2.3 Depress the "PRE-CHARGE" pushbutton on 1EIB until the "PRE-CHARGE" indicator lamp has been illuminated for a minimum of 5 seconds.

—— —— 2.2.4 Close the "BATTERY INPUT" breaker on 1EIB.

—— 2.2.5 Verify the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMB is in the "ON" position.

—— 2.2.6 Verify the following on 1EIB:

- ☐ "INVERTER OUTPUT" amps 0.
- ☐ "INVERTER OUTPUT" voltage 118 - 125V.
- ☐ "INVERTER OUTPUT" frequency 59.4 - 60.3 Hz.

—— 2.2.7 Close the "INVERTER OUTPUT" breaker on 1EIB.

NOTE: Both lamps come from the same source. If one lamp is out, a work request should be written to repair it, but the procedure may be continued.

—— 2.2.8 Verify the "IN SYNC" light is illuminated on either MANUAL BYPASS SWITCH 1EMB or 1EIB.

—— —— 2.2.9 Place the "MANUAL BYPASS SWITCH" on MANUAL BYPASS SWITCH 1EMB to the "NORMAL OPERATION" position.

—— 2.2.10 Ensure the "INVERTER OUTPUT" volts and amps on 1EIB read the same as system output volts and amps on MANUAL BYPASS SWITCH 1EMB.

—— —— 2.2.11 Ensure the "ALTERNATE SOURCE AC INPUT" breaker on MANUAL BYPASS SWITCH 1EMB is open.

—— —— 2.2.12 Ensure 1VRD-F01D (Inverter 1EIB Alternate Supply) is open.

—— 2.2.13 Perform Tech Spec assessment for required actions due to 1EIB return to service.
SRO

2.3 Placing 1EIC in service

—— —— 2.3.1 Close 1EDC-F03C (Inverter 1EIC).

—— 2.3.2 Verify the "LOW DC VOLTAGE" light on 1EIC is **NOT** illuminated.

NOTE: Step 2.3.4 must be performed immediately after Step 2.3.3 is completed. Failure to close the "BATTERY INPUT" breaker immediately after the "PRE-CHARGE" pushbutton is released may result in blown inverter input fuses.

—— 2.3.3 Depress the "PRE-CHARGE" pushbutton on 1EIC until the "PRE-CHARGE" indicator lamp has been illuminated for a minimum of 5 seconds.

—— —— 2.3.4 Close the "BATTERY INPUT" breaker on 1EIC.

—— 2.3.5 Verify the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMC is in the "ON" position.

—— 2.3.6 Verify the following on 1EIC:

- ☐ "INVERTER OUTPUT" amps 0.
- ☐ "INVERTER OUTPUT" voltage 118 - 125V.
- ☐ "INVERTER OUTPUT" frequency 59.4 - 60.3 Hz.

—— —— 2.3.7 Close the "INVERTER OUTPUT" breaker on 1EIC.

NOTE: Both lamps come from the same source. If one lamp is out, a work request should be written to repair it, but the procedure may be continued.

—— 2.3.8 Verify the "IN SYNC" light is illuminated on either MANUAL BYPASS SWITCH 1EMC or 1EIC.

—— —— 2.3.9 Place the "MANUAL BYPASS SWITCH" on MANUAL BYPASS SWITCH 1EMC to the "NORMAL OPERATION" position.

—— 2.3.10 Ensure the "INVERTER OUTPUT" volts and amps on 1EIC read the same as system output volts and amps on MANUAL BYPASS SWITCH 1EMC.

—— —— 2.3.11 Ensure the "ALTERNATE SOURCE AC INPUT" breaker on MANUAL BYPASS SWITCH 1EMC is open.

—— —— 2.3.12 Ensure 1VRD-F01C (Inverter 1EIC Alternate Supply) is open.

—— 2.3.13 Perform Tech Spec assessment for required actions due to 1EIC return to service.
SRO

2.4 Placing 1EID in Service

—— —— 2.4.1 Close 1EDD-F03C (Inverter 1EID).

—— 2.4.2 Verify the "LOW DC VOLTAGE" light on 1EID is **NOT** illuminated.

NOTE: Step 2.4.4 must be performed immediately after Step 2.4.3 is completed. Failure to close the "BATTERY INPUT" breaker immediately after the "PRE-CHARGE" pushbutton is released may result in blown inverter input fuses.

—— 2.4.3 Depress the "PRE-CHARGE" pushbutton on 1EID until the "PRE-CHARGE" indicator lamp has been illuminated for a minimum of 5 seconds.

—— —— 2.4.4 Close the "BATTERY INPUT" breaker on 1EID.

—— 2.4.5 Verify the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMD is in the "ON" position.

—— 2.4.6 Verify the following on 1EID:

- ☐ "INVERTER OUTPUT" amps 0.
- ☐ "INVERTER OUTPUT" voltage 118 - 125V.
- ☐ "INVERTER OUTPUT" frequency 59.4 - 60.3 Hz.

—— —— 2.4.7 Close the "INVERTER OUTPUT" breaker on 1EID.

NOTE: Both lamps come from the same source. If one lamp is out, a work request should be written to repair it, but the procedure may be continued.

—— 2.4.8 Verify the "IN SYNC" light is illuminated on either MANUAL BYPASS SWITCH 1EMD or 1EID.

—— —— 2.4.9 Place the "MANUAL BYPASS SWITCH" on MANUAL BYPASS SWITCH 1EMD to the "NORMAL OPERATION" position.

—— 2.4.10 Ensure the "INVERTER OUTPUT" volts and amps on 1EID read the same as system output volts and amps on MANUAL BYPASS SWITCH 1EMD.

—— —— 2.4.11 Ensure the "ALTERNATE SOURCE AC INPUT" breaker on MANUAL BYPASS SWITCH 1EMD is open.

—— —— 2.4.12 Ensure 1VRD-F01E (Inverter 1EID Alternate Supply) is open.

—— 2.4.13 Perform Tech Spec assessment for required actions due to 1EID return to service.
SRO

2.5 File this enclosure in the Control Copy folder of this procedure.

Enclosure 4.3

Placing 1ECS in Standby Alignment from 1EMXA (Train A)

1. Initial Conditions

—— 1.1 Review the Limits and Precautions.

—— 1.2 IF required, obtain kirk key(s) #681 and #697 from the WCC.

—— 1.3 Verify 1ECS "FLOAT-EQUALIZE" switch is set to the "FLOAT" position.

2. Procedure

2.1 IF 1ECS is being powered from 1EMXJ, perform the following:

—— —— 2.1.1 Open the "DC OUTPUT" breaker on 1ECS.

—— —— 2.1.2 Open the "AC INPUT" breaker on 1ECS.

—— —— 2.1.3 Open 1EMS-F01C (Incoming Breaker From MCC 1EMXJ-F04A (Feeder B)).

> **NOTE:** 1EMXA and 1EMXJ are kirk keyed so only one breaker can be closed at a time.

—— —— 2.1.4 Open 1EMXJ-F04A (Fdr B-Vital Inst & Cont Spare Chgr AC Power Pnl 1EMS).

—— —— 2.2 Close 1EMXA-F04A (Fdr A-Vital Inst & Cont Spare Chgr AC Power Pnl 1EMS).

> **NOTE:** Incoming breakers from 1EMXA and 1EMXJ on 1EMS to 1ECS are kirk keyed so only one breaker can be closed at a time.

—— —— 2.3 Close 1EMS-F01B (Incoming Bkr From MCC 1EMXA-F04A (Feeder A)).

—— —— 2.4 Close the "AC INPUT" breaker on 1ECS.

—— 2.5 Verify the DC output voltage on 1ECS is within ± 5 volts of "BUS 1EDA VOLTAGE".

—— —— 2.6 Close the "DC OUTPUT" breaker on 1ECS.

2.7 File this enclosure in the Control Copy folder of this procedure.

Enclosure 4.4

Placing 1ECS in Standby Alignment from 1EMXJ (Train B)

1. Initial Conditions

—— 1.1 Review the Limits and Precautions.

—— 1.2 IF required, obtain kirk key(s) #681 and #697 from the WCC.

—— 1.3 Verify 1ECS "FLOAT-EQUALIZE" switch is set to the "FLOAT" position.

2. Procedure

2.1 IF 1ECS is being powered from 1EMXA, perform the following:

—— —— 2.1.1 Open the "DC OUTPUT" breaker on 1ECS.

—— —— 2.1.2 Open the "AC INPUT" breaker on 1ECS.

—— —— 2.1.3 Open 1EMS-F01B (Incoming Breaker From MCC 1EMXA-F04A (Feeder A)).

NOTE:	1EMXA and 1EMXJ are kirk keyed so only one breaker can be closed at a time.

—— —— 2.1.4 Open 1EMXA-F04A (Fdr A-Vital Inst & Cont Spare Chgr AC Power Pnl 1EMS).

—— —— 2.2 Close 1EMXJ-F04A (Fdr B-Vital Inst & Cont Spare Chgr AC Power Pnl 1EMS).

NOTE:	Incoming breakers from 1EMXA and 1EMXJ on 1EMS to 1ECS are kirk keyed so only one breaker can be closed at a time.

—— —— 2.3 Close 1EMS-F01C (Incoming Bkr From MCC 1EMXJ-F04A (Feeder B)).

—— —— 2.4 Close the "AC INPUT" breaker on 1ECS.

—— 2.5 Verify the DC output voltage on 1ECS is within ± 5 volts of "BUS 1EDB VOLTAGE".

—— —— 2.6 Close the "DC OUTPUT" breaker on 1ECS.

2.7 File this enclosure in the Control Copy folder of this procedure.

1. Initial Conditions

——— 1.1 Review the Limits and Precautions.

NOTE:	The only time 1ECS may be aligned per Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) is during No Mode. Aligning 1ECS per Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) will result in Train A equipment being powered from Train B.

_____ 1.2 Verify 1ECS is aligned per one of the following:

- ☐ Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A))
  OR
- ☐ Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) of this procedure.

——— 1.3 Verify 1ECA is aligned per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)) of this procedure.

——— 1.4 Obtain kirk key #695 from WCC.

2. Procedure

NOTE:	If 1ECS is aligned to 1EMXA, the TSAIL entry for 1ECA will be for tracking.

_____ SRO 2.1 Perform a Tech Spec assessment for required actions due to 1ECA being removed from service.

_____ SRO 2.2 **IF** 1ECS is aligned to 1EMXJ (trains cross-connected), perform the following: {PIP 96-1849}

- ☐ Ensure a TSAIL entry is made requiring the completion of this enclosure before entering Mode 6 from No Mode.
- ☐ Declare 1RNLT7400 **AND** 0RNLT7390 inoperable. Refer to Tech Spec 3.3.2 for appropriate action.

_____ 2.3 Notify IAE to support 1ECA shutdown.

- ☐ Model W/O #91003522
- ☐ Other W/O **OR** W/R_____.

2.4 Verify the appropriate incoming breaker to 1ECS is closed:

——— • Enclosure 4.3
1EMS-F01B (Incoming Bkr From MCC 1EMXA-F04A) (Feeder A)

——— • Enclosure 4.4
1EMS-F01C (Incoming Bkr From MCC 1EMXJ-F04A) (Feeder B)

NOTE: Do **NOT** continue until IAE support has arrived.

——— ——— 2.5 IAE adjust the output voltage on 1ECS to a value of 0.75 volts to 1.25 volts below the terminal voltage of 1EBA.
IAE

NOTE:
1. The breaker in Step 2.6 is kirk keyed with the output breaker to 1EDB and 1EDD so only one breaker can be closed at a time.
2. If 1ECS is aligned to 1EMXJ, an alarm will be received on 1AD-11, I/6 "STBY CHARGER 1ECS INPUT/OUTPUT TRAINS X-CONNECTED" when the following step is performed.

——— ——— 2.6 Ensure 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC) is closed.

——— ——— 2.7 Close 1EDA-F03B (125 VDC Bus 1EDA Tie Bkr To 125 VDC Bus 1EDC).

——— ——— 2.8 Open the "DC OUTPUT" breaker on 1ECA.

——— 2.9 IAE adjust output voltage on 1ECS to 2.21 times the lowest number of connected cells on:
IAE

☐ 1EBA (+2 VDC, -0 VDC)
OR
☐ 1EBC (if aligned) (+2 VDC, -0 VDC)

——— 2.10 Verify 1ECS is supplying power to DIST. CTR. DC # 1EDA:

☐ "DC OUTPUT" > 0 amps. (1ECS)
☐ "BUS 1EDA VOLTAGE" 130 - 135 volts. (1EDA)

——— ——— 2.11 Open 1EDA-F03A (Battery Charger 1ECA).

——— ——— 2.12 Open the "AC INPUT" breaker on 1ECA.

NOTE: 1. At this point, the system is aligned as follows:

- 1ECS is now in service on 1EDA.
- 1ECA is shutdown.

2. Subsequent steps are to return the system to the following alignment:

- 1ECA in service on 1EDA.
- 1ECS in standby.

2.13 Notify IAE to support returning 1ECA to service.

☐ Model W/O #91003518
☐ Other W/O **OR** W/R_____

NOTE: Do **NOT** continue until IAE support has arrived.

2.14 Close the "AC INPUT" breaker on 1ECA.

IAE 2.15 IAE adjust the output voltage on 1ECA to a level of 0.75 volts to 1.25 volts below the terminal voltage of 1EBA.

2.16 Close the "DC OUTPUT" breaker on 1ECA.

2.17 Close 1EDA-F03A (Battery Charger 1ECA).

NOTE: The following step should be N/A'd if 1ECS is aligned to Battery 1EBC.

2.18 Open 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC).

IAE 2.19 IAE adjust the output voltage on 1ECA to 2.21 times the number of connected cells on 1EBA (+2 VDC, -0 VDC).

2.20 Verify 1ECA is supplying power to DIST. CTR. DC # 1EDA.

☐ "DC OUTPUT" > 0 amps. (1ECA)
☐ "BUS 1EDA VOLTAGE" 130 - 135 volts. (1EDA)

2.21 Verify 1EDC is being supplied from one of the following:

☐ 1ECC and 1EBC.
OR
☐ 1ECS and 1EBC.

—— —— 2.22 Open 1EDA-F03B (125 VDC Bus 1EDA Tie Bkr To 125 VDC Bus 1EDC).

NOTE: The following two steps should be N/A'd if 1ECS is aligned to Battery 1EBC.

—— 2.23 Remove the key from 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC).

—— 2.24 Return the key to the WCC.

—— 2.25 Perform a Tech Spec assessment for required actions due to 1ECA being returned to service.
SRO

—— 2.26 **IF** 1ECS was aligned to 1EMXJ (trains cross-connected), perform the following:
SRO {PIP 96-1849}

- ☐ Ensure the TSAIL entry made per this enclosure is cleared.
- ☐ Perform a Tech Spec assessment for 1RNLT7400 **AND** 0RNLT7390 being returned to service.

NOTE: 1ECS should be left energized and in standby per this procedure at all times unless maintenance is to be performed on it.

2.27 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

1. Initial Conditions

——— 1.1 Review the Limits and Precautions.

> **NOTE:** The only time 1ECS may be aligned per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) is during No Mode. Aligning 1ECS per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) will result in Train B equipment being powered from Train A.

_____ 1.2 Verify 1ECS is aligned per one of the following:

☐ Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A))
OR
☐ Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) of this procedure.

——— 1.3 Verify 1ECB is aligned per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)) of this procedure.

——— 1.4 Obtain kirk key #695 from WCC.

2. Procedure

> **NOTE:** If ECS is aligned to 1EMXJ, the TSAIL entry for 1ECB will be for tracking.

_____ SRO 2.1 Perform a Tech Spec assessment for required actions due to 1ECB being removed from service.

_____ SRO 2.2 **IF** 1ECS is aligned to 1EMXA (trains cross-connected), ensure a TSAIL entry is made requiring the completion of this enclosure before entering Mode 6 from No Mode.

_____ 2.3 Notify IAE to support 1ECB shutdown.

☐ Model W/O #91003522
☐ Other W/O **OR** W/R_____.

2.4 Verify the appropriate incoming breaker to 1ECS is closed:

——— • Enclosure 4.3
1EMS-F01B (Incoming Bkr From MCC 1EMXA-F04A) (Feeder A)

——— • Enclosure 4.4
1EMS-F01C (Incoming Bkr From MCC 1EMXJ-F04A) (Feeder B)

NOTE: Do **NOT** continue until IAE support has arrived.

IAE 2.5 IAE adjust the output voltage on 1ECS to a value of 0.75 volts to 1.25 volts below the terminal voltage of 1EBB.

NOTE:
1. The breaker in Step 2.6 is kirk keyed with output breaker to 1EDA and 1EDC so only one breaker can be closed at a time.
2. If 1ECS is aligned to 1EMXA, an alarm will be received on 1AD-11, I/6 "STBY CHARGER 1ECS INPUT/OUTPUT TRAINS X-CONNECTED" when the following step is performed.

2.6 Ensure 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD) is closed.

2.7 Close 1EDB-F03B (125 VDC Bus 1EDB Tie Bkr To 125 VDC Bus 1EDD).

2.8 Open the "DC OUTPUT" breaker on 1ECB.

IAE 2.9 IAE adjust output voltage on 1ECS to 2.21 times the lowest number of connected cells on:

☐ 1EBB (+2 VDC, -0 VDC)
OR
☐ 1EBD (if aligned) (+2 VDC, -0 VDC)

2.10 Verify 1ECS is supplying power to DIST. CTR. DC # 1EDB:

☐ "DC OUTPUT" > 0 amps. (1ECS)
☐ "BUS 1EDB VOLTAGE" 130 - 135 volts. (1EDB)

2.11 Open 1EDB-F03A (Battery Charger 1ECB).

2.12 Open the "AC INPUT" breaker on 1ECB.

NOTE: 1. At this point, the system is aligned as follows:

- 1ECS is now in service on 1EDB.
- 1ECB is shutdown.

2. Subsequent steps are to return the system to the following alignment:

- 1ECB in service on 1EDB.
- 1ECS in standby.

2.13 Notify IAE to support returning 1ECB to service.

☐ Model W/O #91003519
☐ Other W/O **OR** W/R_____.

NOTE: Do **NOT** continue until IAE support has arrived.

_____ 2.14 Close the "AC INPUT" breaker on 1ECB.

_____ IAE 2.15 IAE adjust the output voltage on 1ECB to a value of 0.75 volts to 1.25 volts below the terminal voltage of 1EBB.

_____ 2.16 Close the "DC OUTPUT" breaker on 1ECB.

_____ 2.17 Close 1EDB-F03A (Battery Charger 1ECB).

NOTE: The following step should be N/A'd if 1ECS is aligned to Battery 1EBD.

_____ 2.18 Open 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

_____ IAE 2.19 IAE adjust the output voltage on 1ECB to 2.21 times the number of connected cells on 1EBB (+2 VDC, -0 VDC).

_____ 2.20 Verify 1ECB is supplying power to DIST. CTR. DC # 1EDB.

☐ "DC OUTPUT" > 0 amps. (1ECB)
☐ "BUS 1EDB VOLTAGE" 130 - 135 volts. (1EDB)

_____ 2.21 Verify 1EDD is being supplied from one of the following:

☐ 1ECD and 1EBD.
OR
☐ 1ECS and 1EBD.

—— —— 2.22 Open 1EDB-F03B (125 VDC Bus 1EDB Tie Bkr To 125 VDC Bus 1EDD).

> **NOTE:** The following two steps should be N/A'd if 1ECS is aligned to Battery 1EBD.

—— 2.23 Remove the key from 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

—— 2.24 Return the key to the WCC.

—— SRO 2.25 Perform a Tech Spec assessment for required actions due to 1ECB being returned to service.

—— SRO 2.26 **IF** 1ECS was aligned to 1EMXA (trains cross-connected), ensure the TSAIL entry made per this enclosure is cleared.

> **NOTE:** 1ECS should be left energized and in standby per this procedure at all times unless maintenance is to be performed on it.

2.27 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

1. Initial Conditions

——— 1.1 Review the Limits and Precautions.

NOTE:	The only time 1ECS may be aligned per Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) is during No Mode. Aligning 1ECS per Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) will result in Train A equipment being powered from Train B.

_____ 1.2 Verify 1ECS is aligned per one of the following:

☐ Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A))
OR
☐ Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) of this procedure.

——— 1.3 Verify 1ECC is aligned per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)) of this procedure.

——— 1.4 Obtain kirk key #695 from WCC.

2. Procedure

NOTE:	If 1ECS is aligned to 1EMXA, the TSAIL entry for 1ECC will be for tracking.

_____ SRO 2.1 Perform a Tech Spec assessment for required actions due to 1ECC being removed from service.

_____ SRO 2.2 **IF** 1ECS is aligned to 1EMXJ (trains cross-connected), ensure a TSAIL entry is made requiring the completion of this enclosure before entering Mode 6 from No Mode.

_____ 2.3 Notify IAE to support 1ECC shutdown.

☐ Model W/O #91003522
☐ Other W/O **OR** W/R_____.

2.4 Verify the appropriate incoming breaker to 1ECS is closed:

——— • Enclosure 4.3
1EMS-F01B (Incoming Bkr From MCC 1EMXA-F04A) (Feeder A)
——— • Enclosure 4.4
1EMS-F01C (Incoming Bkr From MCC 1EMXJ-F04A) (Feeder B)

NOTE: Do NOT continue until IAE support has arrived.

IAE 2.5 IAE adjust the output voltage on 1ECS to a value of 0.75 volts to 1.25 volts below the terminal voltage of 1EBC.

NOTE:
1. The breaker in Step 2.6 is kirk keyed with output breaker to 1EDB and 1EDD so only one breaker can be closed at a time.
2. If 1ECS is aligned to 1EMXJ, an alarm will be received on 1AD-11, I/6 "STBY CHARGER 1ECS INPUT/OUTPUT TRAINS X-CONNECTED" when the following step is performed.

2.6 Ensure 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC) is closed.

2.7 Close 1EDC-F03B (125 VDC Bus 1EDC Tie Bkr To 125 VDC Bus 1EDA).

2.8 Open the "DC OUTPUT" breaker on 1ECC.

IAE 2.9 IAE adjust output voltage on 1ECS to 2.21 times the lowest number of connected cells on:

☐ 1EBC (+2 VDC, -0 VDC)
OR
☐ 1EBA (if aligned) (+2 VDC, -0 VDC)

2.10 Verify 1ECS is supplying power to DIST. CTR. DC # 1EDC.

☐ "DC OUTPUT" > 0 amps. (1ECS)
☐ "BUS 1EDC VOLTAGE" 130 - 135 volts. (1EDC)

2.11 Open 1EDC-F03A (Battery Charger 1ECC).

2.12 Open the "AC INPUT" breaker on 1ECC.

NOTE: 1. At this point, the system is aligned as follows:

- 1ECS is now in service on 1EDC.
- 1ECC is shutdown.

2. Subsequent steps are to return the system to the following alignment:

- 1ECC in service on 1EDC.
- 1ECS in standby.

2.13 Notify IAE to support returning 1ECC to service.

☐ Model W/O #91003520
☐ Other W/O **OR** W/R_____..

NOTE: Do **NOT** continue until IAE support has arrived.

_____ 2.14 Close the "AC INPUT" breaker on 1ECC.

_____ IAE 2.15 IAE adjust the output voltage on 1ECC to a value of 0.75 volts to 1.25 volts below the terminal voltage of 1EBC.

_____ 2.16 Close the "DC OUTPUT" breaker on 1ECC.

_____ 2.17 Close 1EDC-F03A (Battery Charger 1ECC).

NOTE: The following step should be N/A'd if 1ECS is aligned to Battery 1EBA.

_____ 2.18 Open 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC).

_____ IAE 2.19 IAE adjust the output voltage on 1ECC to 2.21 times the number of connected cells on 1EBC (+2 VDC, -0 VDC).

_____ 2.20 Verify 1ECC is supplying power to DIST. CTR. DC # 1EDC.

☐ "DC OUTPUT" > 0 amps. (1ECC)
☐ "BUS 1EDC VOLTAGE" 130 -135 volts. (1EDC)

_____ 2.21 Verify 1EDA is being supplied from one of the following:

☐ 1ECA and 1EBA.
OR
☐ 1ECS and 1EBA.

—— —— 2.22 Open 1EDC-F03B (125 VDC Bus 1EDC Tie Bkr To 125 VDC Bus 1EDA).

NOTE: The following two steps should be N/A'd if 1ECS is aligned to Battery 1EBA.

—— 2.23 Remove the key from 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC).

—— 2.24 Return the key to the WCC.

—— SRO 2.25 Perform a Tech Spec assessment for required actions due to 1ECC being returned to service.

—— SRO 2.26 **IF** 1ECS was aligned to 1EMXJ (trains cross-connected), ensure the TSAIL entry made per this enclosure is cleared.

NOTE: 1ECS should be left energized and in standby per this procedure at all times unless maintenance is to be performed on it.

2.27 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

1. Initial Conditions

_____ 1.1 Review the Limits and Precautions.

> **NOTE:** The only time 1ECS may be aligned per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) is during No Mode. Aligning 1ECS per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) will result in Train B equipment being powered from Train A.

_____ 1.2 Verify 1ECS is aligned per one of the following:

- ☐ Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A))
  OR
- ☐ Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) of this procedure.

_____ 1.3 Verify 1ECD is aligned per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)) of this procedure.

_____ 1.4 Obtain kirk key #695 from WCC.

2. Procedure

> **NOTE:** If 1ECS is aligned to 1EMXJ, the TSAIL entry for 1ECD will be for tracking.

_____ SRO 2.1 Perform a Tech Spec assessment for required actions due to 1ECD being removed from service.

_____ SRO 2.2 **IF** 1ECS is aligned to 1EMXA (trains cross-connected), perform the following: {PIP 96-1849}

- ☐ Ensure a TSAIL entry is made requiring the completion of this enclosure before entering Mode 6 from No Mode.
- ☐ Declare 1RNLT7370 **AND** 0RNLT7360 inoperable. Refer to Tech Spec 3.3.2 for appropriate action.

_____ 2.3 Notify IAE to support 1ECD shutdown.

- ☐ Model W/O #91003522
- ☐ Other W/O **OR** W/R_____.

2.4 Verify the appropriate incoming breaker to 1ECS is closed:

——— • Enclosure 4.3
1EMS-F01B (Incoming Bkr From MCC 1EMXA-F04A) (Feeder A)

——— • Enclosure 4.4
1EMS-F01C (Incoming Bkr From MCC 1EMXJ-F04A) (Feeder B)

NOTE: Do **NOT** continue until IAE support has arrived.

——— 2.5 IAE adjust the output voltage on 1ECS to a value of 0.75 volts to 1.25 volts below 1EBD terminal voltage.
IAE

NOTE:
1. The breaker in Step 2.6 is kirk keyed with output breaker to 1EDA and 1EDC so only one breaker can be closed at a time.
2. If 1ECS is aligned to 1EMXA, an alarm will be received on 1AD-11, I/6 "STBY CHARGER 1ECS INPUT/OUTPUT TRAINS X-CONNECTED" when the following step is performed.

——— ——— 2.6 Ensure 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD) is closed.

——— ——— 2.7 Close 1EDD-F03B (125 VDC Bus 1EDD Tie Bkr To 125 VDC Bus 1EDB).

——— ——— 2.8 Open the "DC OUTPUT" breaker on 1ECD.

——— 2.9 IAE adjust output voltage on 1ECS to 2.21 times the lowest number of connected cells on:
IAE

☐ 1EBD (+2 VDC, -0 VDC)
OR
☐ 1EBB (if aligned) (+2 VDC, -0 VDC)

——— 2.10 Verify 1ECS is supplying power to DIST. CTR. DC # 1EDD.

☐ "DC OUTPUT" > 0 amps. (1ECS)
☐ "BUS 1EDD VOLTAGE" 130 - 135 volts. (1EDD)

——— ——— 2.11 Open 1EDD-F03A (Battery Charger 1ECD).

——— ——— 2.12 Open the "AC INPUT" breaker on 1ECD.

NOTE: 1. At this point, the system is aligned as follows:

- 1ECS is now in service on 1EDD.
- 1ECD is shutdown.

2. Subsequent steps are to return the system to the following alignment:

- 1ECD in service on 1EDD.
- 1ECS in standby.

2.13 Notify IAE to support returning 1ECD to service.

☐ Model W/O #91003521
☐ Other W/O **OR** W/R_____.

NOTE: Do **NOT** continue until IAE support has arrived.

2.14 Close the "AC INPUT" breaker on 1ECD.

IAE 2.15 IAE adjust the output voltage on 1ECD to a value of 0.75 volts to 1.25 volts below the terminal voltage of 1EBD.

2.16 Close the "DC OUTPUT" breaker on 1ECD.

2.17 Close 1EDD-F03A (Battery Charger 1ECD).

NOTE: The following step should be N/A'd if 1ECS is aligned to Battery 1EBB.

2.18 Open 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

IAE 2.19 IAE adjust the output voltage on 1ECD to 2.21 times the number of connected cells on 1EBD (+2 VDC, -0 VDC).

2.20 Verify 1ECD is supplying power to DIST. CTR. DC # 1EDD.

☐ "DC OUTPUT" > 0 amps. (1ECD)
☐ "BUS 1EDD VOLTAGE" 130 - 135 volts. (1EDD)

2.21 Verify 1EDB is being supplied from one of the following:

☐ 1ECB and 1EBB.
OR
☐ 1ECS and 1EBB.

—— —— 2.22 Open 1EDD-F03B (125 VDC Bus 1EDD Tie Bkr To 125 VDC Bus 1EDB).

NOTE: The following two steps should be N/A'd if 1ECS is aligned to Battery 1EBB.

—— 2.23 Remove the key from 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

—— 2.24 Return the key to the WCC.

—— SRO 2.25 Perform a Tech Spec assessment for required actions due to 1ECD being returned to service.

—— SRO 2.26 **IF** 1ECS was aligned to 1EMXA (trains cross-connected), perform the following: {PIP 96-1849}

- ☐ Ensure the TSAIL entry made per this enclosure is cleared.
- ☐ Perform a Tech Spec assessment for 1RNLT7370 **AND** 0RNLT7360 being returned to service.

NOTE: 1ECS should be left energized and in standby per this procedure at all times unless maintenance is to be performed on it.

2.27 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

1. Initial Conditions

—— 1.1 Review the Limits and Precautions.

—— 1.2 Verify 1EIA is in service per Enclosure 4.2 (Inverter Startup (1EIA, 1EIB, 1EIC, 1EID)) of this procedure.

—— 1.3 Verify 1VRD is energized and **NOT** supplying an inverter's load.

—— 1.4 Obtain kirk key #684 for 1VRD from the WCC.

2. Procedure

> **NOTE:** Tech Specs 3.8.7 and 3.8.8 should be referred to for operability requirements.

SRO 2.1 Perform Tech Spec assessment for required actions due to 1EIA shutdown.

SRO 2.2 Declare channels 1RNLT7400 **AND** 0RNLT7390 inoperable. Refer to Tech Spec 3.3.2 for appropriate action. {PIP 95-1809}

> **NOTE:** Kirk key interlock prohibits closing of more than one inverter supply breaker from 1VRD.

—— —— 2.3 Close 1VRD-F01B (Inverter 1EIA Alternate Supply).

—— —— 2.4 Close the "ALTERNATE SOURCE AC INPUT" breaker on MANUAL BYPASS SWITCH 1EMA.

—— 2.5 Verify the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMA is in the "ON" position.

> **NOTE:** Both lamps come from the same source. If one lamp is out, a work request should be written to repair it, but the procedure may be continued.

—— 2.6 Verify the "IN SYNC" indicator lamp is illuminated on either MANUAL BYPASS SWITCH 1EMA or 1EIA.

—— 2.7 Verify the "ALTERNATE SOURCE LOW VOLTAGE" lamp on MANUAL BYPASS SWITCH 1EMA is **NOT** illuminated.

—— 2.8 Verify the "ALT SOURCE OFF FREQUENCY" lamp on 1EIA is **NOT** illuminated.

—— 2.9 Verify the "ALTERNATE SOURCE AC INPUT" meter on MANUAL BYPASS SWITCH 1EMA is reading 59.4 - 60.3 Hz.

_____ _____ 2.10 Turn the "MANUAL BYPASS SWITCH" on MANUAL BYPASS SWITCH 1EMA to the "ALTERNATE SOURCE TO LOAD" position.

_____ 2.11 Verify the "ALTERNATE SOURCE SUPPLYING LOAD" light illuminates on 1EIA.

_____ 2.12 Verify the load was transferred from 1EIA to 1VRD as follows:

- ☐ "INVERTER OUTPUT" amps 0. (1EIA)
- ☐ "SYSTEM OUTPUT" amps > 0. (1EMA)
- ☐ "SYSTEM OUTPUT" voltage 118 - 125V. (1EMA)

2.13 **IF** IAE requests a frequency adjustment on 1EIA, perform the following:

_____ 2.13.1 Place the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMA in the "OFF" position.

_____ 2.13.2 Notify IAE that 1EIA is ready for frequency adjustment.

_____ 2.13.3 **WHEN** the frequency corrections on 1EIA are complete, place the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMA in the "ON" position.

_____ _____ 2.14 Open the "INVERTER OUTPUT" breaker on 1EIA.

_____ _____ 2.15 Open the "BATTERY INPUT" breaker on 1EIA.

_____ _____ 2.16 Open 1EDA-F03C (Inverter 1EIA).

NOTE: 1. At this point, 1ERPA is being supplied by 1VRD, 1EIA is shutdown.

2. Subsequent steps are to return 1EIA to service.

_____ _____ 2.17 Close 1EDA-F03C (Inverter 1EIA).

_____ 2.18 Verify the "LOW DC VOLTAGE" light is **NOT** illuminated on Inverter 1EIA.

NOTE: Step 2.20 must be performed immediately after Step 2.19 is completed. Failure to close the "BATTERY INPUT" breaker immediately after the "PRE-CHARGE" pushbutton is released may result in blown inverter input fuses.

_____ 2.19 Depress the "PRE-CHARGE" pushbutton on 1EIA until the "PRE-CHARGE" indicator lamp has been illuminated for a minimum of 5 seconds.

_____ _____ 2.20 Close the "BATTERY INPUT" breaker on 1EIA.

—— 2.21 Verify the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMA is in the "ON" position.

—— 2.22 Verify the following on 1EIA:

- ☐ "INVERTER OUTPUT" amps 0.
- ☐ "INVERTER OUTPUT" voltage 118 - 125V.
- ☐ "INVERTER OUTPUT" frequency 59.4 - 60.3 Hz.

—— —— 2.23 Close the "INVERTER OUTPUT" breaker on 1EIA.

> **NOTE:** Both lamps come from the same source. If one lamp is out, a work request should be written to repair it, but the procedure may be continued.

—— 2.24 Verify the "IN SYNC" light is illuminated on either MANUAL BYPASS SWITCH 1EMA or 1EIA.

—— —— 2.25 Place the "MANUAL BYPASS SWITCH" on MANUAL BYPASS SWITCH 1EMA to the "NORMAL OPERATION" position.

—— 2.26 Verify the output volts and amps on 1EIA read the same as system output volts amps on MANUAL BYPASS SWITCH 1EMA.

—— —— 2.27 Open the "ALTERNATE SOURCE AC INPUT" breaker on MANUAL BYPASS SWITCH 1EMA.

—— —— 2.28 Open 1VRD-F01B (Inverter 1EIA Alternate Supply).

—— 2.29 Perform a Tech Spec assessment for required actions due to 1EIA being returned to service.
SRO

—— 2.30 Perform a Tech Spec assessment for 1RNLT7400 **AND** 0RNLT7390 being returned to service. {PIP 95-1809}
SRO

—— 2.31 Return kirk key for 1VRD to the WCC.

> **NOTE:** 1EIA is now returned to service per Enclosure 4.2 (Inverter Startup (1EIA, 1EIB, 1EIC, 1EID)).

2.32 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

1. Initial Conditions

—— 1.1 Review the Limits and Precautions.

—— 1.2 Verify 1EIB is in service per Enclosure 4.2 (Inverter Startup (1EIA, 1EIB, 1EIC, 1EID)) of this procedure.

—— 1.3 Verify 1VRD is energized and **NOT** supplying an inverter's load.

—— 1.4 Obtain kirk key #684 for 1VRD from the WCC.

2. Procedure

NOTE: Tech Specs 3.8.7 and 3.8.8 should be referred to for operability requirements.

—— SRO 2.1 Perform Tech Spec assessment for required actions due to 1EIB shutdown.

NOTE: Kirk key interlock prohibits closing of more than one inverter supply breaker from 1VRD.

—— —— 2.2 Close 1VRD-F01D (Inverter 1EIB Alternate Supply).

—— —— 2.3 Close the "ALTERNATE SOURCE AC INPUT" breaker on MANUAL BYPASS SWITCH 1EMB.

—— 2.4 Verify the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMB is in the "ON" position.

NOTE: Both lamps come from the same source. If one lamp is out, a work request should be written to repair it, but the procedure may be continued.

—— 2.5 Verify the "IN SYNC" indicator lamp is illuminated on either MANUAL BYPASS SWITCH 1EMB or 1EIB.

—— 2.6 Verify the "ALTERNATE SOURCE LOW VOLTAGE" lamp on MANUAL BYPASS SWITCH 1EMB is **NOT** illuminated.

—— 2.7 Verify the "ALT SOURCE OFF FREQUENCY" lamp on 1EIB is **NOT** illuminated.

—— 2.8 Verify the "ALTERNATE SOURCE AC INPUT" meter on MANUAL BYPASS SWITCH 1EMB is reading 59.4 - 60.3 Hz.

—— —— 2.9 Turn the "MANUAL BYPASS SWITCH" on MANUAL BYPASS SWITCH 1EMB to the "ALTERNATE SOURCE TO LOAD" position.

—— 2.10 Verify the "ALTERNATE SOURCE SUPPLYING LOAD" light illuminates on 1EIB.

—— 2.11 Verify the load was transferred from 1EIB to 1VRD as follows:

- ☐ "INVERTER OUTPUT" amps 0. (1EIB)
- ☐ "SYSTEM OUTPUT" amps > 0. (1EMB)
- ☐ "SYSTEM OUTPUT" voltage 118 - 125V. (1EMB)

2.12 **IF** IAE requests a frequency adjustment on 1EIB, perform the following:

—— 2.12.1 Place the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMB in the "OFF" position.

—— 2.12.2 Notify IAE that 1EIB is ready for frequency adjustment.

—— 2.12.3 **WHEN** the frequency corrections on 1EIB are complete, place the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMB in the "ON" position.

—— —— 2.13 Open the "INVERTER OUTPUT" breaker on 1EIB.

—— —— 2.14 Open the "BATTERY INPUT" breaker on 1EIB.

—— —— 2.15 Open 1EDB-F03C (Inverter 1EIB).

NOTE: 1. At this point, 1ERPB is being supplied by 1VRD, 1EIB is shutdown.

2. Subsequent steps are to return 1EIB to service.

—— —— 2.16 Close 1EDB-F03C (Inverter 1EIB).

—— 2.17 Verify the "LOW DC VOLTAGE" light is **NOT** illuminated on 1EIB.

NOTE: Step 2.19 must be performed immediately after Step 2.18 is completed. Failure to close the "BATTERY INPUT" breaker immediately after the "PRE-CHARGE" pushbutton is released may result in blown inverter input fuses.

—— 2.18 Depress the "PRE-CHARGE" pushbutton on 1EIB until the "PRE-CHARGE" indicator lamp has been illuminated for a minimum of 5 seconds.

—— —— 2.19 Close the "BATTERY INPUT" breaker on 1EIB.

—— 2.20 Verify the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMB is in the "ON" position.

—— 2.21 Verify the following on 1EIB:

- ☐ "INVERTER OUTPUT" amps 0.
- ☐ "INVERTER OUTPUT" voltage 118 - 125V.
- ☐ "INVERTER OUTPUT" frequency 59.4 - 60.3 Hz.

—— —— 2.22 Close the "INVERTER OUTPUT" breaker on 1EIB.

> **NOTE:** Both lamps come from the same source. If one lamp is out, a work request should be written to repair it, but the procedure may be continued.

—— 2.23 Verify the "IN SYNC" light is illuminated on either MANUAL BYPASS SWITCH 1EMB or 1EIB.

—— —— 2.24 Place the "MANUAL BYPASS SWITCH" on MANUAL BYPASS SWITCH 1EMB to the "NORMAL OPERATION" position.

—— 2.25 Verify the output volts and amps on 1EIB read the same as system output volts amps on MANUAL BYPASS SWITCH 1EMB.

—— —— 2.26 Open the "ALTERNATE SOURCE AC INPUT" breaker on MANUAL BYPASS SWITCH 1EMB.

—— —— 2.27 Open 1VRD-F01D (Inverter 1EIB Alternate Supply).

—— 2.28 Perform a Tech Spec assessment for required actions due to 1EIB being returned to service.
SRO

—— 2.29 Return kirk key for 1VRD to the WCC.

> **NOTE:** 1EIB is now returned to service per Enclosure 4.2 (Inverter Startup (1EIA, 1EIB, 1EIC, 1EID)).

2.30 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

1. Initial Conditions

—— 1.1 Review the Limits and Precautions.

—— 1.2 Verify 1EIC is in service per Enclosure 4.2 (Inverter Startup (1EIA, 1EIB, 1EIC, 1EID)) of this procedure.

—— 1.3 Verify 1VRD is energized and **NOT** supplying an inverter's load.

—— 1.4 Obtain kirk key #684 for 1VRD from the WCC.

2. Procedure

NOTE:	Tech Specs 3.8.7 and 3.8.8 should be referred to for operability requirements.

—— 2.1 Perform Tech Spec assessment for required actions due to 1EIC shutdown.
SRO

NOTE:	Kirk key interlock prohibits closing of more than one inverter supply breaker from 1VRD.

—— —— 2.2 Close 1VRD-F01C (Inverter 1EIC Alternate Supply).

—— —— 2.3 Close the "ALTERNATE SOURCE AC INPUT" breaker on MANUAL BYPASS SWITCH 1EMC.

—— 2.4 Verify the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMC is in the "ON" position.

NOTE:	Both lamps come from the same source. If one lamp is out, a work request should be written to repair it, but the procedure may be continued.

—— 2.5 Verify the "IN SYNC" indicator lamp is illuminated on either MANUAL BYPASS SWITCH 1EMC or 1EIC.

—— 2.6 Verify the "ALTERNATE SOURCE LOW VOLTAGE" lamp on MANUAL BYPASS SWITCH 1EMC is **NOT** illuminated.

—— 2.7 Verify the "ALT SOURCE OFF FREQUENCY" lamp on 1EIC is **NOT** illuminated.

—— 2.8 Verify the "ALTERNATE SOURCE AC INPUT" meter on MANUAL BYPASS SWITCH 1EMC is reading 59.4 - 60.3 Hz.

—— —— 2.9 Turn the "MANUAL BYPASS SWITCH" on MANUAL BYPASS SWITCH 1EMC to the "ALTERNATE SOURCE TO LOAD" position.

—— 2.10 Verify the "ALTERNATE SOURCE SUPPLYING LOAD" light illuminates on 1EIC.

—— 2.11 Verify the load was transferred from 1EIC to 1VRD as follows:

- ☐ "INVERTER OUTPUT" amps 0. (1EIC)
- ☐ "SYSTEM OUTPUT" amps > 0. (1EMC)
- ☐ "SYSTEM OUTPUT" voltage 118 - 125V. (1EMC)

2.12 **IF** IAE requests a frequency adjustment on 1EIC, perform the following:

—— 2.12.1 Place the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMC in the "OFF" position.

—— 2.12.2 Notify IAE that 1EIC is ready for frequency adjustment.

—— 2.12.3 **WHEN** the frequency corrections on 1EIC are complete, place the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMC in the "ON" position.

—— —— 2.13 Open the "INVERTER OUTPUT" breaker on 1EIC.

—— —— 2.14 Open the "BATTERY INPUT" breaker on 1EIC.

—— —— 2.15 Open 1EDC-F03C (Inverter 1EIC).

> **NOTE:** 1. At this point, 1ERPC is being supplied by 1VRD, 1EIC is shutdown.
>
> 2. Subsequent steps are to return 1EIC to service.

—— —— 2.16 Close 1EDC-F03C (Inverter 1EIC).

—— 2.17 Verify the "LOW DC VOLTAGE" light is **NOT** illuminated on Inverter 1EIC.

> **NOTE:** Step 2.19 must be performed immediately after Step 2.18 is completed. Failure to close the "BATTERY INPUT" breaker immediately after the "PRE-CHARGE" pushbutton is released may result in blown inverter input fuses.

—— 2.18 Depress the "PRE-CHARGE" pushbutton on 1EIC until the "PRE-CHARGE" indicator lamp has been illuminated for a minimum of 5 seconds.

—— —— 2.19 Close the "BATTERY INPUT" breaker on 1EIC.

—— 2.20 Verify the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMC is in the "ON" position.

_____ 2.21 Verify the following on 1EIC:

- ☐ "INVERTER OUTPUT" amps 0.
- ☐ "INVERTER OUTPUT" voltage 118 - 125V.
- ☐ "INVERTER OUTPUT" frequency 59.4 - 60.3 Hz.

_____ _____ 2.22 Close the "INVERTER OUTPUT" breaker on 1EIC.

NOTE: Both lamps come from the same source. If one lamp is out, a work request should be written to repair it, but the procedure may be continued.

_____ 2.23 Verify the "IN SYNC" light is illuminated on either MANUAL BYPASS SWITCH 1EMC or 1EIC.

_____ _____ 2.24 Place the "MANUAL BYPASS SWITCH" on MANUAL BYPASS SWITCH 1EMC to the "NORMAL OPERATION" position.

_____ 2.25 Verify the output volts and amps on 1EIC read the same as system output volts and amps on MANUAL BYPASS SWITCH 1EMC.

_____ _____ 2.26 Open the "ALTERNATE SOURCE AC INPUT" breaker on MANUAL BYPASS SWITCH 1EMC.

_____ _____ 2.27 Open 1VRD-F01C (Inverter 1EIC Alternate Supply).

_____ 2.28 Perform a Tech Spec assessment for required actions due to 1EIC being returned to service.
SRO

_____ 2.29 Return kirk key for 1VRD to the WCC.

NOTE: 1EIC is now returned to service per Enclosure 4.2 (Inverter Startup (1EIA, 1EIB, 1EIC, 1EID)).

2.30 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

1. Initial Conditions

—— 1.1 Review the Limits and Precautions.

—— 1.2 Verify 1EID is in service per Enclosure 4.2 (Inverter Startup (1EIA, 1EIB, 1EIC, 1EID)) of this procedure.

—— 1.3 Verify 1VRD is energized and **NOT** supplying an inverter's load.

—— 1.4 Obtain kirk key #684 for 1VRD from the WCC.

2. Procedure

NOTE: Tech Specs 3.8.7 and 3.8.8 should be referred to for operability requirements.

—— SRO 2.1 Perform Tech Spec assessment for required actions due to 1EID shutdown.

—— SRO 2.2 Declare channels 1RNLT7370 **AND** 0RNLT7360 inoperable. Refer to Tech Spec 3.3.2 for appropriate action. {PIP 95-1809}

NOTE: Kirk key interlock prohibits closing of more than one inverter supply breaker from 1VRD.

—— —— 2.3 Close 1VRD-F01E (Inverter 1EID Alternate Supply).

—— —— 2.4 Close the "ALTERNATE SOURCE AC INPUT" breaker on MANUAL BYPASS SWITCH 1EMD.

—— 2.5 Verify the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMD is in the "ON" position.

NOTE: Both lamps come from the same source. If one lamp is out, a work request should be written to repair it, but the procedure may be continued.

—— 2.6 Verify the "IN SYNC" indicator lamp is illuminated on either MANUAL BYPASS SWITCH 1EMD or 1EID.

—— 2.7 Verify the "ALTERNATE SOURCE LOW VOLTAGE" lamp on MANUAL BYPASS SWITCH 1EMD is **NOT** illuminated.

—— 2.8 Verify the "ALT SOURCE OFF FREQUENCY" lamp on 1EID is **NOT** illuminated.

—— 2.9 Verify the "ALTERNATE SOURCE AC INPUT" meter on MANUAL BYPASS SWITCH 1EMD is reading 59.4 - 60.3 Hz.

— ——— 2.10 Turn the "MANUAL BYPASS SWITCH" on MANUAL BYPASS SWITCH 1EMD to the "ALTERNATE SOURCE TO LOAD" position.

——— 2.11 Verify the "ALTERNATE SOURCE SUPPLYING LOAD" light illuminates on 1EID.

——— 2.12 Verify the load was transferred from 1EID to 1VRD as follows:

- ☐ "INVERTER OUTPUT" amps 0. (1EID)
- ☐ "SYSTEM OUTPUT" amps > 0. (1EMD)
- ☐ "SYSTEM OUTPUT" voltage 118 - 125V. (1EMD)

2.13 **IF** IAE requests a frequency adjustment on 1EID, perform the following:

——— 2.13.1 Place the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMD in the "OFF" position.

——— 2.13.2 Notify IAE that 1EID is ready for frequency adjustment.

——— 2.13.3 **WHEN** the frequency corrections on 1EID are complete, place the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMD in the "ON" position.

— ——— 2.14 Open the "INVERTER OUTPUT" breaker on 1EID.

——— ——— 2.15 Open the "BATTERY INPUT" breaker 1EID .

——— ——— 2.16 Open 1EDD-F03C (Inverter 1EID).

NOTE: 1. At this point, 1ERPD is being supplied by 1VRD, 1EID is shutdown.

2. Subsequent steps are to return 1EID to service.

——— ——— 2.17 Close 1EDD-F03C (Inverter 1EID).

——— 2.18 Verify the "LOW DC VOLTAGE" light is **NOT** illuminated on Inverter 1EID.

NOTE: Step 2.20 must be performed immediately after Step 2.19 is completed. Failure to close the "BATTERY INPUT" breaker immediately after the "PRE-CHARGE" pushbutton is released may result in blown inverter input fuses.

——— 2.19 Depress the "PRE-CHARGE" pushbutton on 1EID until the "PRE-CHARGE" indicator lamp has been illuminated for a minimum of 5 seconds.

— ——— 2.20 Close the "BATTERY INPUT" breaker on 1EID.

—— 2.21 Verify the "SYNC SELECTOR" switch on MANUAL BYPASS SWITCH 1EMD is in the "ON" position.

—— 2.22 Verify the following on 1EID:

- ☐ "INVERTER OUTPUT" amps 0.
- ☐ "INVERTER OUTPUT" voltage 118 - 125V.
- ☐ "INVERTER OUTPUT" frequency 59.4 - 60.3 Hz.

—— —— 2.23 Close the "INVERTER OUTPUT" breaker on 1EID.

NOTE: Both lamps come from the same source. If one lamp is out, a work request should be written to repair it, but the procedure may be continued.

—— 2.24 Verify the "IN SYNC" light is illuminated on either MANUAL BYPASS SWITCH 1EMD or 1EID.

—— —— 2.25 Place the "MANUAL BYPASS SWITCH" on MANUAL BYPASS SWITCH 1EMD to the "NORMAL OPERATION" position.

—— 2.26 Verify the output volts and amps on 1EID read the same as system output volts and amps on MANUAL BYPASS SWITCH 1EMD.

—— —— 2.27 Open the "ALTERNATE SOURCE AC INPUT" breaker on MANUAL BYPASS SWITCH 1EMD.

—— —— 2.28 Open 1VRD-F01E (Inverter 1EID).

—— 2.29 Perform a Tech Spec assessment for required actions due to 1EID being returned to service.

—— 2.30 SRO Perform a Tech Spec assessment for 1RNLT7370 **AND** 0RNLT7360 being returned to service. {PIP 95-1809}

—— 2.31 Return kirk key for 1VRD to the WCC.

NOTE: 1EID is now returned to service per Enclosure 4.2 (Inverter Startup (1EIA, 1EIB, 1EIC, 1EID)).

2.32 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

Enclosure 4.13

Placing and Removing Equalize Charge on 1EBA

1. Initial Conditions

——— 1.1 Review the Limits and Precautions.

——— 1.2 Verify 1ECA is aligned per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)) of this procedure.

NOTE:	The only time 1ECS may be aligned per Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) is during No Mode. Aligning 1ECS per Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) will result in Train A equipment being powered from Train B.

_____ 1.3 Verify 1ECS is aligned per one of the following:

☐ Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A))

OR

☐ Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) of this procedure.

——— 1.4 Verify IAE has determined an equalizing charge is required on 1EBA.

——— 1.5 Obtain kirk key #695 from the WCC.

2. Procedure

NOTE:	Tech Specs 3.8.4 and 3.8.5 should be referred to for operability requirements.

_____ SRO 2.1 Perform Tech Spec assessment for required actions due to 1EBA equalize charge.

_____ SRO 2.2 **IF** 1ECS is aligned to 1EMXJ (trains cross-connected), perform the following: {PIP 96-1849}

☐ Ensure a TSAIL entry is made requiring the completion of this enclosure before entering Mode 6 from No Mode.

☐ Declare 1RNLT7400 **AND** 0RNLT7390 inoperable. Refer to Tech Spec 3.3.2 for appropriate action.

2.3 Verify the appropriate incoming breaker to 1ECS is closed:

——— • Enclosure 4.3
1EMS-F01B (Incoming Bkr From MCC 1EMXA-F04A) (Feeder A)

——— • Enclosure 4.4
1EMS-F01C (Incoming Bkr From MCC 1EMXJ-F04A) (Feeder B)

NOTE:	IAE will make all adjustments to chargers and record all readings.

—— 2.4 Verify the DC output voltage on 1ECS is within ± 5 volts of the voltage on DIST CTR. DC # 1EDA.

NOTE:	1. The breaker in the following step is kirk keyed with the output breaker to 1EDB and 1EDD so only one breaker can be closed at a time. 2. If 1ECS is aligned to 1EMXJ, an alarm will be received on 1AD-11, I/6 "STBY CHARGER 1ECS INPUT/OUTPUT TRAINS X-CONNECTED" when the following step is performed.

—— —— 2.5 Close 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC).

—— —— 2.6 Close 1EDA-F03B (125 VDC Bus 1EDA Tie Bkr To 125 VDC Bus 1EDC).

—— 2.7 Verify 1EDA and 1EDC voltages are within ± 5 volts of each other.

—— —— 2.8 Close 1EDC-F03B (125 VDC Bus 1EDC Tie Bkr To 125 VDC Bus 1EDA).

—— —— 2.9 Open 1EDA-F02B (Main Breaker).

_____ 2.10 IAE make necessary adjustments to 1ECA in preparation for placing 1EBA on "EQUALIZE".
IAE

_____ 2.11 Place the "FLOAT-EQUALIZE" switch for 1ECA (located inside the charger door) to "EQUALIZE".

NOTE:	If the voltage is **NOT** in the range given, the IAE Supervisor should be notified so corrective action can be taken.

—— 2.12 Verify the DC output voltage on 1ECA to be 142.05 - 147.05 volts.

NOTE:
- At this point, 1EBA is on equalize charge from 1ECA. 1EDA and 1EDC are tied together and 1ECS is supplying 1EDA/1EDC.
- IAE will determine the length of time for equalize charge.
- Subsequent steps align 1EBA for constant current charge (if requested by IAE) and return to normal alignment.

——— 2.13 Place the "FLOAT-EQUALIZE" switch for 1ECA (located inside the charger door) to "FLOAT".

2.14 **IF** requested by IAE, charge 1EBA using the constant current charger as follows:

——— ——— 2.14.1 Open 1EDA-F02A (Battery 1EBA).

——— 2.14.2 Have IAE connect the constant current charger to 1EBA.

NOTE: IAE will determine the length of time for constant current charge.

——— 2.14.3 Have IAE disconnect the constant current charger from 1EBA.

——— ——— 2.14.4 Close 1EDA-F02A (Battery 1EBA).

——— 2.15 Verify the output voltage on 1ECA to be within ± 5 volts of the DC voltage on DIST. CTR. DC # 1EDA.

——— ——— 2.16 Close 1EDA-F02B (Main Breaker).

——— ——— 2.17 Open 1EDA-F03B (125 VDC Bus 1EDA Tie Bkr To 125 VDC Bus 1EDC).

——— 2.18 Verify 1ECA is supplying power to DIST. CTR. DC # 1EDA:

☐ "DC OUTPUT" > 0 amps. (1ECA)
☐ "BUS 1EDA VOLTAGE" 130 - 135 volts. (1EDA)

——— ——— 2.19 Open 1EDC-F03B (125 VDC Bus 1EDC Tie Bkr To 125 VDC Bus 1EDA).

——— ——— 2.20 Open 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC).

——— 2.21 Remove the key from 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC).

——— 2.22 Return the key to the WCC.

_____ 2.23 Perform Tech Spec assessment for required actions due to 1EBA return to service
SRO

_____ SRO 2.24 **IF** 1ECS was aligned to 1EMXJ (trains cross-connected), perform the following: {PIP 96-1849}

- ☐ Ensure the TSAIL entry made per this enclosure is cleared.
- ☐ Perform a Tech Spec assessment for 1RNLT7400 **AND** 0RNLT7390 being returned to service.

NOTE:
1. Equalize charge on 1EBA is complete and 1ECA and 1EBA are returned to service on 1EDA per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)).
2. 1ECS is returned to standby alignment per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) or Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)).

2.25 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

Placing and Removing Equalize Charge on 1EBB

1. Initial Conditions

_____ 1.1 Review the Limits and Precautions.

_____ 1.2 Verify 1ECB is aligned per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)) of this procedure.

NOTE: The only time 1ECS may be aligned per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) is during No Mode. Aligning 1ECS per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) will result in Train B equipment being powered from Train A.

_____ 1.3 Verify 1ECS is aligned per one of the following:

☐ Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A))

OR

☐ Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) of this procedure.

_____ 1.4 Verify IAE has determined an equalize charge is required on 1EBB.

_____ 1.5 Obtain kirk key #695 from the WCC.

2. Procedure

NOTE: Tech Specs 3.8.4 and 3.8.5 should be referred to for operability requirements.

_____ SRO 2.1 Perform Tech Spec assessment for required actions due to 1EBB equalize charge.

_____ SRO 2.2 **IF** 1ECS is aligned to 1EMXA (trains cross-connected), ensure a TSAIL entry is made requiring the completion of this enclosure before entering Mode 6 from No Mode.

2.3 Verify the appropriate incoming breaker to 1ECS is closed:

_____ • Enclosure 4.3
1EMS-F01B (Incoming Bkr From MCC 1EMXA-F04A) (Feeder A)

_____ • Enclosure 4.4
1EMS-F01C (Incoming Bkr From MCC 1EMXJ-F04A) (Feeder B).

NOTE: IAE will make all adjustments to chargers and record all readings.

—— 2.4 Verify the DC output voltage on 1ECS is within ± 5 volts of the voltage on DIST. CTR DC # 1EDB.

NOTE:
1. The breaker in the following step is kirk keyed with the output breaker to 1EDA and 1EDC so only one breaker can be closed at a time.
2. If 1ECS is aligned to 1EMXA, an alarm will be received on 1AD-11, I/6 "STBY CHARGER 1ECS INPUT/OUTPUT TRAINS X-CONNECTED" when the following step is performed.

—— —— 2.5 Close 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

—— —— 2.6 Close 1EDB-F03B (125 VDC Bus 1EDB Tie Bkr To 125 VDC Bus 1EDD).

—— 2.7 Verify 1EDB and 1EDD voltages are within ± 5 volts of each other.

—— —— 2.8 Close 1EDD-F03B (125 VDC Bus 1EDD Tie Bkr To 125 VDC Bus 1EDB).

—— —— 2.9 Open 1EDB-F02B (Main Breaker).

_____ 2.10 IAE make necessary adjustments to 1ECB in preparation for placing 1EBB on "EQUALIZE".
IAE

—— 2.11 Place the "FLOAT-EQUALIZE" switch for 1ECB (located inside the charger door) to "EQUALIZE".

NOTE: If the voltage is **NOT** in the range given, the IAE Supervisor should be notified so corrective action can be taken.

—— 2.12 Verify the DC output voltage on 1ECB to be 142.05 - 147.05 volts.

NOTE:
- At this point, 1EBB is on equalize charge from 1ECB. 1EDB and 1EDD are tied together and 1ECS is supplying 1EDB/1EDD.
- IAE will determine the length of time for equalize charge.
- Subsequent steps align 1EBB for constant current charge (if requested by IAE) and return to normal alignment.

——— 2.13 Place the "FLOAT-EQUALIZE" switch for 1ECB (located inside the charger door) to "FLOAT".

2.14 IF requested by IAE, charge 1EBB using the constant current charger as follows:

——— ——— 2.14.1 Open 1EDB-F02A (Battery 1EBB).

——— 2.14.2 Have IAE connect the constant current charger to 1EBB.

NOTE: IAE will determine the length of time for constant current charge.

——— 2.14.3 Have IAE disconnect the constant current charger from 1EBB.

——— ——— 2.14.4 Close 1EDB-F02A (Battery 1EBB).

——— 2.15 Verify the output voltage on 1ECB to be within ± 5 volts of the DC voltage on DIST. CTR. DC # 1EDB.

——— ——— 2.16 Close 1EDB-F02B (Main Breaker).

——— ——— 2.17 Open 1EDB-F03B (125 VDC Bus 1EDB Tie Bkr To 125 VDC Bus 1EDD).

——— 2.18 Verify 1ECB is supplying power to DIST. CTR. DC # 1EDB.

☐ "DC OUTPUT" > 0 amps. (1ECB)
☐ "BUS 1EDB VOLTAGE" 130 - 135 volts. (1EDB)

——— ——— 2.19 Open 1EDD-F03B (125 VDC Bus 1EDD Tie Bkr To 125 VDC Bus 1EDB).

——— ——— 2.20 Open 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

——— 2.21 Remove the key from 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

——— 2.22 Return the key to the WCC.

_____ 2.23 Perform Tech Spec assessment for required actions due to 1EBB return to service.
SRO

SRO 2.24 **IF** 1ECS was aligned to 1EMXA (trains cross-connected), ensure the TSAIL entry made per this enclosure is cleared.

NOTE:
1. Equalize charge on 1EBB is complete and 1ECB and 1EBB are returned to service on 1EDB per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)).
2. 1ECS is returned to standby alignment per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) or Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)).

2.25 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

Placing and Removing Equalize Charge on 1EBC

1. Initial Conditions

_____ 1.1 Review the Limits and Precautions.

_____ 1.2 Verify 1ECC is aligned per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)) of this procedure.

> **NOTE:** The only time 1ECS may be aligned per Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) is during No Mode. Aligning 1ECS per Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) will result in Train A equipment being powered from Train B.

_____ 1.3 Verify 1ECS is aligned per one of the following:

☐ Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A))

OR

☐ Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) of this procedure.

_____ 1.4 Verify IAE has determined an equalize charge is required on 1EBC.

_____ 1.5 Obtain kirk key #695 from the WCC.

2. Procedure

> **NOTE:** Tech Specs 3.8.4 and 3.8.5 should be referred to for operability requirements.

_____ SRO 2.1 Perform Tech Spec assessment for required actions due to 1EBC equalize charge.

_____ SRO 2.2 **IF** 1ECS is aligned to 1EMXJ (trains cross-connected), ensure a TSAIL entry is made requiring the completion of this enclosure before entering Mode 6 from No Mode.

2.3 Verify the appropriate incoming breaker to 1ECS is closed:

_____ • Enclosure 4.3
1EMS-F01B (Incoming Bkr From MCC 1EMXA-F04A) (Feeder A)

_____ • Enclosure 4.4
1EMS-F01C (Incoming Bkr From MCC 1EMXJ-F04A) (Feeder B)

Placing and Removing Equalize Charge on 1EBC

> **NOTE:** IAE will make all adjustments to chargers and record all readings.

—— 2.4 Verify the DC output voltage on 1ECS is within ± 5 volts of the voltage on DIST. CTR. DC # 1EDC.

> **NOTE:**
> 1. The breaker in the following step is kirk keyed with the output breaker to 1EDB and 1EDD so only one breaker can be closed at a time.
> 2. If 1ECS is aligned to 1EMXJ, an alarm will be received on 1AD-11, I/6 "STBY CHARGER 1ECS INPUT/OUTPUT TRAINS X-CONNECTED" when the following step is performed.

—— —— 2.5 Close 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC).

—— —— 2.6 Close 1EDC-F03B (125 VDC Bus 1EDC Tie Bkr To 125 VDC Bus 1EDA).

—— 2.7 Verify 1EDC and 1EDA voltages are within ± 5 volts of each other.

—— —— 2.8 Close 1EDA-F03B (125 VDC Bus 1EDA Tie Bkr To 125 VDC Bus 1EDC).

—— —— 2.9 Open 1EDC-F02B (Main Breaker).

____ 2.10 IAE make necessary adjustments to 1ECC in preparation for placing 1EBC on "EQUALIZE".
IAE

—— 2.11 Place the "FLOAT-EQUALIZE" switch for 1ECC (located inside the charger door) to "EQUALIZE".

> **NOTE:** If the voltage is **NOT** in the range given, the IAE Supervisor should be notified so corrective action can be taken.

—— 2.12 Verify the DC output voltage on 1ECC to be 142.05 - 147.05 volts.

Placing and Removing Equalize Charge on 1EBC

NOTE:
- At this point, 1EBC is on equalize charge from 1ECC. 1EDA and 1EDC are tied together and 1ECS is supplying 1EDA/1EDC.
- IAE will determine the length of time for equalize charge.
- Subsequent steps align 1EBC for constant current charge (if requested by IAE) and return to normal alignment.

——— 2.13 Place the "FLOAT-EQUALIZE" switch for 1ECC (located inside the charger door) to "FLOAT".

2.14 **IF** requested by IAE, charge 1EBC using the constant current charger as follows:

——— ——— 2.14.1 Open 1EDC-F02A (Battery 1EBC).

——— 2.14.2 Have IAE connect the constant current charger to 1EBC.

NOTE: IAE will determine the length of time for constant current charge.

——— 2.14.3 Have IAE disconnect the constant current charger from 1EBC.

——— ——— 2.14.4 Close 1EDC-F02A (Battery 1EBC).

——— 2.15 Verify the output voltage on 1ECC to be within ± 5 volts of the DC voltage on DIST. CTR. DC # 1EDC.

——— ——— 2.16 Close 1EDC-F02B (Main Breaker).

——— ——— 2.17 Open 1EDC-F03B (125 VDC Bus 1EDC Tie Bkr To 125 VDC Bus 1EDA).

——— 2.18 Verify 1ECC is supplying power to DIST. CTR. DC # 1EDC.

☐ "DC OUTPUT" > 0 amps. (1ECC)
☐ "BUS 1EDC VOLTAGE" 130 - 135 volts. (1EDC)

——— ——— 2.19 Open 1EDA-F03B (125 VDC Bus 1EDA Tie Bkr To 125 VDC Bus 1EDC).

——— ——— 2.20 Open 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC).

——— 2.21 Remove the key from 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC).

——— 2.22 Return the key to the WCC.

_____ 2.23 Perform Tech Spec assessment for required actions due to 1EBC return to service.
SRO

_____ 2.24 **IF** 1ECS was aligned to 1EMXJ (trains cross-connected), ensure the TSAIL entry made per this enclosure is cleared.
SRO

NOTE:
1. Equalize charge on 1EBC is complete and 1ECC and 1EBC are returned to service on 1EDC per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)).
2. ECS is returned to standby alignment per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) or Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)).

2.25 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

Placing and Removing Equalize Charge on 1EBD

1. Initial Conditions

_____ 1.1 Review the Limits and Precautions.

_____ 1.2 Verify 1ECD is aligned per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)) of this procedure.

> **NOTE:** The only time 1ECS may be aligned per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) is during No Mode. Aligning 1ECS per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) will result in Train B equipment being powered from Train A.

_____ 1.3 Verify 1ECS is aligned per one of the following:

☐ Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A))

OR

☐ Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) of this procedure.

_____ 1.4 Verify IAE has determined an equalize charge is required on 1EBD.

_____ 1.5 Obtain kirk key #695 from the WCC.

2. Procedure

> **NOTE:** Tech Specs 3.8.4 and 3.8.5 should be referred to for operability requirements.

_____ SRO 2.1 Perform Tech Spec assessment for required actions due to 1EBD equalize charge.

_____ SRO 2.2 **IF** 1ECS is aligned to 1EMXA (trains cross-connected), perform the following: {PIP 96-1849}

☐ Ensure a TSAIL entry is made requiring the completion of this enclosure before entering Mode 6 from No Mode.

☐ Declare 1RNLT7370 **AND** 0RNLT7360 inoperable. Refer to Tech Spec 3.3.2 for appropriate action.

2.3 Verify the appropriate incoming breaker to 1ECS is closed:

_____ • Enclosure 4.3
1EMS-F01B (Incoming Bkr From MCC 1EMXA-F04A) (Feeder A)

_____ • Enclosure 4.4
1EMS-F01C (Incoming Bkr From MCC 1EMXJ-F04A) (Feeder B)

NOTE: IAE will make all adjustments to chargers and record all readings.

—— 2.4 Verify the DC output voltage on 1ECS is within ± 5 volts of the voltage on DIST. CTR. DC # 1EDD.

NOTE:
1. The breaker in the following step is kirk keyed with the output breaker to 1EDA and 1EDC so only one breaker can be closed at a time.
2. If 1ECS is aligned to 1EMXA, an alarm will be received on 1AD-11, I/6 "STBY CHARGER 1ECS INPUT/OUTPUT TRAINS X-CONNECTED" when the following step is performed.

—— —— 2.5 Close 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

—— —— 2.6 Close 1EDD-F03B (125 VDC Bus 1EDD Tie Bkr To 125 VDC Bus 1EDB).

—— 2.7 Verify 1EDD and 1EDB voltages are within ± 5 volts of each other.

—— —— 2.8 Close 1EDB-F03B (125 VDC Bus 1EDB Tie Bkr To 125 VDC Bus 1EDD).

—— —— 2.9 Open 1EDD-F02B (Main Breaker).

IAE 2.10 IAE make necessary adjustments to 1ECD in preparation for placing 1EBD on "EQUALIZE".

—— 2.11 Place the "FLOAT-EQUALIZE" switch for 1ECD (located inside the charger door) to "EQUALIZE".

NOTE: If the voltage is **NOT** in the range given, the IAE Supervisor should be notified so corrective action can be taken.

—— 2.12 Verify the output voltage on 1ECD to be 142.05 - 147.05 volts.

Placing and Removing Equalize Charge on 1EBD

NOTE:
- At this point, 1EBD is on equalize charge from 1ECD. 1EDB and 1EDD are tied together and 1ECS is supplying 1EDB/1EDD.
- IAE will determine the length of time for equalize charge.
- Subsequent steps align 1EBD for constant current charge (if requested by IAE) and return to normal alignment.

_____ 2.13 Place the "FLOAT-EQUALIZE" switch for 1ECD (located inside the charger door) to "FLOAT".

2.14 **IF** requested by IAE, charge 1EBD using the constant current charge as follows:

_____ _____ 2.14.1 Open 1EDD-F02A (Battery 1EBD).

_____ 2.14.2 Have IAE connect the constant current charger to 1EBD.

NOTE: IAE will determine the length of time for constant current charge.

_____ 2.14.3 Have IAE disconnect the constant current charger from 1EBD.

_____ _____ 2.14.4 Close 1EDD-F02A (Battery 1EBD).

_____ 2.15 Verify the output voltage on 1ECD to be within ± 5 volts of the DC voltage on DIST. CTR. DC # 1EDD.

_____ _____ 2.16 Close 1EDD-F02B (Main Breaker).

_____ _____ 2.17 Open 1EDD-F03B (125 VDC Bus 1EDD Tie Bkr To 125 VDC Bus 1EDB).

_____ 2.18 Verify 1ECD is supplying power to DIST. CTR. DC # 1EDD.

☐ "DC OUTPUT" > 0 amps. (1ECD)
☐ "BUS 1EDC VOLTAGE" 130 - 135 volts. (1EDD)

_____ _____ 2.19 Open 1EDB-F03B (125 VDC Bus 1EDB Tie Bkr To 125 VDC Bus 1EDD).

_____ _____ 2.20 Open 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

_____ 2.21 Remove the key from 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

_____ 2.22 Return the key to the WCC.

_____ 2.23 Perform Tech Spec assessment for required actions due to 1EBD return to service.
SRO

SRO 2.24 **IF** 1ECS was aligned to 1EMXA (trains cross-connected), perform the following: {PIP 96-1849}

- ☐ Ensure the TSAIL entry made per this enclosure is cleared.
- ☐ Perform a Tech Spec assessment for 1RNLT7370 **AND** 0RNLT7360 being returned to service.

NOTE:
1. Equalize charge on 1EBD is complete and 1ECD and 1EBD are returned to service on 1EDD per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)).
2. 1ECS is returned to standby alignment per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) or Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)).

2.25 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

1. Initial Conditions

_____ 1.1 Review the Limits and Precautions.

_____ 1.2 Verify the following are in service per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)) of this procedure:

- ☐ 1EBA
- ☐ 1EBC
- ☐ 1ECC

NOTE: The only time 1ECS may be aligned per Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) is during No Mode. Aligning 1ECS per Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) will result in Train A equipment being powered from Train B.

_____ 1.3 Verify 1ECS is aligned per one of the following:

- ☐ Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A))
  OR
- ☐ Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) of this procedure.

_____ 1.4 Obtain kirk key #695 from the WCC.

2. Procedure

_____ 2.1 Notify IAE to support 1ECA shutdown.

- ☐ Model W/O #91003522
- ☐ Other W/O **OR** W/R_____.

_____ SRO 2.2 **IF** 1ECS is aligned to 1EMXJ (trains cross-connected), perform the following: {PIP 96-1849}

- ☐ Ensure a TSAIL entry is made requiring the completion of this enclosure before entering Mode 6 from No Mode.
- ☐ Declare 1RNLT7400 **AND** 0RNLT7390 inoperable. Refer to Tech Spec 3.3.2 for appropriate action.

2.3 Verify the appropriate incoming breaker to 1ECS is closed:

——— • Enclosure 4.3
1EMS-F01B (Incoming Bkr From MCC 1EMXA-F04A) (Feeder A)

——— • Enclosure 4.4
1EMS-F01C (Incoming Bkr From MCC 1EMXJ-F04A) (Feeder B)

NOTE: Tech Specs 3.8.4 and 3.8.5 should be referred to for operability requirements.

——— 2.4 Perform Tech Spec assessment for required actions due to 1EBA shutdown.
SRO

NOTE: Do **NOT** continue until IAE has arrived.

——— 2.5 IAE adjust the output voltage on 1ECS to 2.21 times the lowest number of connected cells on either 1EBA or 1EBC (+2 VDC, -0 VDC).
IAE

——— 2.6 Verify the DC output voltage on 1ECS is within ± 5 volts of the voltage on 1EDA.

NOTE:
1. The breaker in the following step is kirk keyed with the output breaker to 1EDB and 1EDD so only one breaker can be closed at a time.
2. If 1ECS is aligned to 1EMXJ, an alarm will be received on 1AD-11, I/6 "STBY CHARGER 1ECS INPUT/OUTPUT TRAINS X-CONNECTED" when the following step is performed.

——— ——— 2.7 Close 1EDS-F01B (Feeder To Dist Center 1EDA And 1EDC).

——— ——— 2.8 Close 1EDA-F03B (125 VDC Bus 1EDA Tie Bkr To 125 VDC Bus 1EDC).

——— 2.9 Verify the voltages on 1EDA and 1EDC are within ± 5 volts of each other.

——— ——— 2.10 Close 1EDC-F03B (125 VDC Bus 1EDC Tie Bkr To 125 VDC Bus 1EDA).

——— ——— 2.11 Open 1EDA-F02B (Main Breaker).

——— ——— 2.12 Open 1EDA-F02A (Battery 1EBA).

NOTE: Step 2.13 should be N/A'd if the number of connected cells on 1EBC is equal to or less than that of 1EBA.

——— 2.13 IAE adjust the output voltage on 1ECS to 2.21 times the number of connected cells on 1EBC (+2 VDC, -0 VDC).
IAE

NOTE: 1. At this point, the system is aligned as follows:

- 1EBA is isolated
- 1ECA is energized and isolated
- 1EDA and 1EDC are tied together
- 1ECS is supplying Train A.

2. Subsequent steps are to restore 1EBA to service.

3. IAE will determine the course of action to restore 1EBA to operable status.

4. IAE will determine if an equalize charge is required and for how long.

2.14 Notify IAE to support returning 1ECA to service.

☐ Model W/O #91003518
☐ Other W/O **OR** W/R_____.

NOTE: Do **NOT** continue until IAE support has arrived.

IAE 2.15 IAE adjust the output voltage on 1ECA to a value of 0.75 to 1.25 volts below the terminal voltage of 1EBA.

2.16 Close 1EDA-F02A (Battery 1EBA).

IAE 2.17 IAE adjust the output voltage on 1ECA to 2.21 times the number of connected cells on 1EBA (+2 VDC, -0 VDC).

NOTE: IAE will determine if an equalize charge is required. Generally, an equalize charge will be required if a battery has been disconnected from its charger for more than 12 hours or has been discharge tested. {PIP 99-4565}

2.18 **IF** an equalize charge is required, perform the following:

2.18.1 Place the "FLOAT-EQUALIZE" switch for 1ECA (located inside the charger door) to "EQUALIZE".

NOTE: If the voltage is **NOT** in the range given, the IAE Supervisor should be notified so corrective action can be taken.

IAE 2.18.2 Verify the output voltage on 1ECA to be 142.05 - 147.05 volts.

NOTE: 1. 1EBA is now on equalize charge.

2. Subsequent steps align 1EBA for constant current charge (if requested by IAE) and return to normal alignment.

_____ 2.18.3 Place the "FLOAT-EQUALIZE" switch for 1ECA (located inside the charger door) to "FLOAT".

NOTE: Do **NOT** continue until requested by IAE. {PIP 96-1897}

2.19 **IF** requested by IAE, charge 1EBA using the constant current charge as follows:

_____ _____ 2.19.1 Open 1EDA-F02A (Battery 1EBA).

_____ 2.19.2 Have IAE connect the constant current charger to 1EBA.

NOTE: IAE will determine length of time for constant current charge.

_____ 2.19.3 Have IAE disconnect the constant current charger from 1EBA.

_____ _____ 2.19.4 Close 1EDA-F02A (Battery 1EBA).

_____ 2.20 **WHEN** 1EBA is ready to be restored, notify IAE to support.

☐ Model W/O #91003518
☐ Other W/O **OR** W/R_____.

NOTE: Do **NOT** continue until IAE has arrived.

_____ 2.21 IAE adjust the output voltage on 1ECA to 2.21 times the number of connected cells on 1EBA (+2 VDC, -0 VDC).
IAE

_____ 2.22 IAE perform quarterly battery inspection.
IAE

_____ _____ 2.23 Close 1EDA-F02B (Main Breaker).

_____ _____ 2.24 Open 1EDA-F03B (125 VDC Bus 1EDA Tie Bkr To 125 VDC Bus 1EDC).

_____ 2.25 Verify 1ECC is supplying power to DIST. CTR. DC # 1EDC.

☐ "DC OUTPUT" > 0 amps. (1ECC)
☐ "BUS 1EDC VOLTAGE" 130 - 135 volts. (1EDC)

— —— 2.26 Open 1EDC-F03B (125 VDC Bus 1EDC Tie Bkr To 125 VDC Bus 1EDA).

—— —— 2.27 Open 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC).

—— 2.28 Remove the key from 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC).

—— 2.29 Return the key to the WCC.

_____ 2.30 Perform Tech Spec assessment for required actions due to 1EBA return to service.
SRO

_____ 2.31 **IF** 1ECS was aligned to 1EMXJ (trains cross-connected),perform the following:
SRO {PIP 96-1849}

- ☐ Ensure the TSAIL entry made per this enclosure is cleared.
- ☐ Perform a Tech Spec assessment for 1RNLT7400 **AND** 0RNLT7390 being returned to service.

NOTE:
1. 1EBA and 1EDC are returned to service per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)).
2. 1ECS is returned to standby alignment per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) or Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)).

2.32 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

1. Initial Conditions

_____ 1.1 Review the Limits and Precautions.

_____ 1.2 Verify the following are in service per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)) of this procedure:

- ☐ 1EBB
- ☐ 1EBD
- ☐ 1ECD

NOTE: The only time 1ECS may be aligned per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) is during No Mode. Aligning 1ECS per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) will result in Train B equipment being powered from Train A.

_____ 1.3 Verify 1ECS is aligned per one of the following:

- ☐ Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A))

  OR
- ☐ Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) of this procedure.

_____ 1.4 Obtain kirk key #695 from the WCC.

2. Procedure

_____ 2.1 Notify IAE to support 1ECB shutdown.

- ☐ Model W/O #91003522
- ☐ Other W/O **OR** W/R_____.

_____ SRO 2.2 **IF** 1ECS is aligned to 1EMXA (trains cross-connected), ensure a TSAIL entry is made requiring the completion of this enclosure before entering Mode 6 from No Mode.

2.3 Verify the appropriate incoming breaker to 1ECS is closed:

_____ • Enclosure 4.3
1EMS-F01B (Incoming Bkr From MCC 1EMXA-F04A) (Feeder A)

_____ • Enclosure 4.4
1EMS-F01C (Incoming Bkr From MCC 1EMXJ-F04A) (Feeder B)

NOTE: Tech Specs 3.8.4 and 3.8.5 should be referred to for operability requirements.

_____ 2.4 Perform Tech Spec assessment for required actions due to 1EBB shutdown.
SRO

NOTE: Do **NOT** continue until IAE has arrived.

_____ 2.5 IAE adjust the output voltage on 1ECS to 2.21 times the lowest number of connected cells on either 1EBB or 1EBD (+2 VDC, -0 VDC).
IAE

_____ 2.6 Verify the DC output voltage on 1ECS is within ± 5 volts of 1EDB voltage.

NOTE:
1. The breaker in the following step is kirk keyed with the output breaker to 1EDA and 1EDC so only one breaker can be closed at a time.
2. If 1ECS is aligned to 1EMXA, an alarm will be received on 1AD-11, I/6 "STBY CHARGER 1ECS INPUT/OUTPUT TRAINS X-CONNECTED" when the following step is performed.

_____ _____ 2.7 Close 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

_____ _____ 2.8 Close 1EDB-F03B (125 VDC Bus 1EDB Tie Bkr To 125 VDC Bus 1EDD).

_____ 2.9 Verify the voltages on 1EDB and 1EDD are within ± 5 volts of each other.

_____ _____ 2.10 Close 1EDD-F03B (125 VDC Bus 1EDD Tie Bkr To 125 VDC Bus 1EDB).

_____ _____ 2.11 Open 1EDB-F02B (Main Breaker).

_____ _____ 2.12 Open 1EDB-F02A (Battery 1EBB).

NOTE: Step 2.13 should be N/A'd if the number of connected cells on 1EBD is equal to or less than that of 1EBB.

_____ 2.13 IAE adjust the output voltage on 1ECS to 2.21 times the number of connected cells on 1EBD (+2 VDC, -0 VDC).
IAE

NOTE: 1. At this point, the system is aligned as follows:

- 1EBB is isolated
- 1ECB is energized and isolated
- 1EDB and 1EDD are tied together
- 1ECS is supplying Train B.

2. Subsequent steps are to restore 1EBB to service.

3. IAE will determine the course of action to restore 1EBB to operable status.

4. IAE will determine if an equalize charge is required and for how long.

2.14 Notify IAE to support returning 1ECB to service.

☐ Model W/O #91003519
☐ Other W/O **OR** W/R_____.

NOTE: Do **NOT** continue until IAE support has arrived.

IAE 2.15 IAE adjust the output voltage on 1ECB to a value of 0.75 to 1.25 volts below the terminal voltage of 1EBB.

2.16 Close 1EDB-F02A (Battery 1EBB).

IAE 2.17 IAE adjust the output voltage on 1ECB to 2.21 times the number of connected cells on 1EBB (+2 VDC, -0 VDC).

NOTE: IAE will determine if an equalize charge is required. Generally, an equalize charge will be required if a battery has been disconnected from its charger for more than 12 hours or has been discharge tested. {PIP 99-4565}

2.18 **IF** an equalize charge is required, perform the following:

2.18.1 Place the "FLOAT-EQUALIZE" switch for 1ECB (located inside the charger door) to "EQUALIZE".

NOTE: If the voltage is **NOT** in the range given, the IAE Supervisor should be notified so corrective action can be taken.

IAE 2.18.2 Verify the output voltage on 1ECB to be 142.05 - 147.05 volts.

NOTE: 1. 1EBB is now on equalize charge.

2. Subsequent steps align 1EBB for constant current charge (if requested by IAE) and return to normal alignment.

_____ 2.18.3 Place the "FLOAT-EQUALIZE" switch for 1ECB (located inside the charger door) to "FLOAT".

NOTE: Do **NOT** continue until requested by IAE. {PIP 96-1897}

2.19 **IF** requested by IAE, charge 1EBB using the constant current charge as follows:

_____ _____ 2.19.1 Open 1EDB-F02A (Battery 1EBB).

_____ 2.19.2 Have IAE connect the constant current charger to 1EBB.

NOTE: IAE will determine length of time for constant current charge.

_____ 2.19.3 Have IAE disconnect the constant current charger from 1EBB.

_____ _____ 2.19.4 Close 1EDB-F02A (Battery 1EBB).

_____ 2.20 **WHEN** 1EBB is ready to be restored, notify IAE to support.

☐ Model W/O #91003519
☐ Other W/O **OR** W/R_____.

NOTE: Do **NOT** continue until IAE has arrived.

_____ 2.21 IAE adjust the output voltage on 1ECB to 2.21 times the number of connected cells on 1EBB (+2 VDC, -0 VDC).
IAE

_____ 2.22 IAE perform quarterly battery inspection.
IAE

_____ _____ 2.23 Close 1EDB-F02B (Main Breaker).

_____ _____ 2.24 Open 1EDB-F03B (125 VDC Bus 1EDB Tie Bkr To 125 VDC Bus 1EDD).

_____ 2.25 Verify 1ECD is supplying power to DIST. CTR. DC # 1EDD.

☐ "DC OUTPUT" > 0 amps. (1ECD)
☐ "BUS 1EDC VOLTAGE" 130 - 135 volts. (1EDD)

—— —— 2.26 Open 1EDD-F03B (125 VDC Bus 1EDD Tie Bkr To 125 VDC Bus 1EDB).

—— —— 2.27 Open 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

—— 2.28 Remove the key from 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

—— 2.29 Return the key to the WCC.

—— SRO 2.30 Perform Tech Spec assessment for required actions due to 1EBB return to service.

—— SRO 2.31 **IF** 1ECS was aligned to 1EMXA (trains cross-connected), ensure the TSAIL entry made per this enclosure is cleared.

NOTE: 1. 1EBB and 1EDD are returned to service per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)).

2. 1ECS is returned to standby alignment per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) or Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)).

2.32 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

1. Initial Conditions

——— 1.1 Review the Limits and Precautions.

——— 1.2 Verify the following are in service per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)) of this procedure:

- ☐ 1EBC
- ☐ 1EBA
- ☐ 1ECA

NOTE: The only time 1ECS may be aligned per Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) is during No Mode. Aligning 1ECS per Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) will result in Train A equipment being powered from Train B.

_____ 1.3 Verify 1ECS is aligned per one of the following:

- ☐ Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A))
  OR
- ☐ Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) of this procedure.

——— 1.4 Obtain kirk key #695 from the WCC.

2. Procedure

_____ 2.1 Notify IAE to support 1ECC shutdown.

- ☐ Model W/O #91003522
- ☐ Other W/O **OR** W/R_____.

_____ SRO 2.2 **IF** 1ECS is aligned to 1EMXJ (trains cross-connected), ensure a TSAIL entry is made requiring the completion of this enclosure before entering Mode 6 from No Mode.

2.3 Verify the appropriate incoming breaker to 1ECS is closed:

——— • Enclosure 4.3
1EMS-F01B (Incoming Bkr From MCC 1EMXA-F04A) (Feeder A)

——— • Enclosure 4.4
1EMS-F01C (Incoming Bkr From MCC 1EMXJ-F04A) (Feeder B)

NOTE: Tech Specs 3.8.4 and 3.8.5 should be referred to for operability requirements.

____ SRO 2.4 Perform Tech Spec assessment for required actions due to 1EBC shutdown.

NOTE: Do **NOT** continue until IAE has arrived.

____ IAE 2.5 IAE adjust the output voltage on 1ECS to 2.21 times the lowest number of connected cells on either 1EBA or 1EBC (+2 VDC, -0 VDC).

____ 2.6 Verify the DC output voltage on 1ECS is within ± 5 volts of the voltage on 1EDC.

NOTE:
1. The breaker in the following step is kirk keyed with the output breaker to 1EDB and 1EDD so only one breaker can be closed at a time.
2. If 1ECS is aligned to 1EMXJ, an alarm will be received on 1AD-11, I/6 "STBY CHARGER 1ECS INPUT/OUTPUT TRAINS X-CONNECTED" when the following step is performed.

____ ____ 2.7 Close 1EDS-F01B (Feeder To Dist Center 1EDA And 1EDC).

____ ____ 2.8 Close 1EDC-F03B (125 VDC Bus 1EDC Tie Bkr To 125 VDC Bus 1EDA).

____ 2.9 Verify the voltages on 1EDA and 1EDC are within ± 5 volts of each other.

____ ____ 2.10 Close 1EDA-F03B (125 VDC Bus 1EDA Tie Bkr To 125 VDC Bus 1EDC).

____ ____ 2.11 Open 1EDC-F02B (Main Breaker).

____ ____ 2.12 Open 1EDC-F02A (Battery 1EBC).

NOTE: Step 2.13 should be N/A'd if the number of connected cells on 1EBA is equal to or less than that of 1EBC.

____ IAE 2.13 IAE adjust the output voltage on 1ECS to 2.21 times the number of connected cells on 1EBA (+2 VDC, -0 VDC).

NOTE: 1. At this point, the system is aligned as follows:

- 1EBC is isolated
- 1ECC is energized and isolated
- 1EDA and 1EDC are tied together
- 1ECS is supplying Train A.

2. Subsequent steps are to restore 1EBC to service.

3. IAE will determine the course of action to restore 1EBC to operable status.

4. IAE will determine if an equalize charge is required and for how long.

2.14 Notify IAE to support returning 1ECC to service.

☐ Model W/O #91003520
☐ Other W/O **OR** W/R_____.

NOTE: Do **NOT** continue until IAE support has arrived.

IAE 2.15 IAE adjust the output voltage on 1ECC to a value of 0.75 to 1.25 volts below the terminal voltage of 1EBC.

2.16 Close 1EDC-F02A (Battery 1EBC).

IAE 2.17 IAE adjust the output voltage on 1ECC to 2.21 times the number of connected cells on 1EBC (+2 VDC, -0 VDC).

NOTE: IAE will determine if an equalize charge is required. Generally, an equalize charge will be required if a battery has been disconnected from its charger for more than 12 hours or has been discharge tested. {PIP 99-4565}

2.18 **IF** an equalize charge is required, perform the following:

2.18.1 Place the "FLOAT-EQUALIZE" switch for 1ECC (located inside the charger door) to "EQUALIZE".

NOTE: If the voltage is **NOT** in the range given, the IAE Supervisor should be notified so corrective action can be taken.

IAE 2.18.2 Verify the output voltage on 1ECC to be 142.05 - 147.05 volts.

NOTE: 1. 1EBC is now on equalize charge.

2. Subsequent steps align 1EBC for constant current charge (if requested by IAE) and return to normal alignment.

_____ 2.18.3 Place the "FLOAT-EQUALIZE" switch for 1ECC (located inside the charger door) to "FLOAT".

NOTE: Do **NOT** continue until requested by IAE. {PIP 96-1897}

2.19 **IF** requested by IAE, charge 1EBC using the constant current charge as follows:

_____ _____ 2.19.1 Open 1EDC-F02A (Battery 1EBC).

_____ 2.19.2 Have IAE connect the constant current charger to 1EBC.

NOTE: IAE will determine length of time for constant current charge.

_____ 2.19.3 Have IAE disconnect the constant current charger from 1EBC.

_____ _____ 2.19.4 Close 1EDC-F02A (Battery 1EBC).

2.20 **WHEN** 1EBC is ready to restore, notify IAE to support.

_____

☐ Model W/O #91003520
☐ Other W/O **OR** W/R_____.

NOTE: Do **NOT** continue until IAE has arrived.

_____ 2.21 IAE adjust the output voltage on 1ECC to 2.21 times the number of connected cells on 1EBC (+2 VDC, -0 VDC).
IAE

_____ 2.22 IAE perform quarterly battery inspection.
IAE

_____ _____ 2.23 Close 1EDC-F02B (Main Breaker).

_____ _____ 2.24 Open 1EDC-F03B (125 VDC Bus 1EDC Tie Bkr To 125 VDC Bus 1EDA).

_____ 2.25 Verify 1ECA is supplying power to DIST. CTR. DC # 1EDA.

☐ "DC OUTPUT" > 0 amps. (1ECA)
☐ "BUS 1EDA VOLTAGE" 130 - 135 volts. (1EDA)

___ ___ 2.26 Open 1EDA-F03B (125 VDC Bus 1EDA Tie Bkr To 125 VDC Bus 1EDC).

___ ___ 2.27 Open 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC).

___ 2.28 Remove the key from 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC).

___ 2.29 Return the key to the WCC.

___ 2.30 Perform a Tech Spec assessment for the required actions due to 1EBC return to service.
SRO

___ 2.31 **IF** 1ECS was aligned to 1EMXJ (trains cross-connected), ensure the TSAIL entry made per this enclosure is cleared.
SRO

NOTE:
1. 1EBC and 1EDA are returned to service per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)).
2. 1ECS is returned to standby alignment per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) or Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B))

2.32 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

1. Initial Conditions

——— 1.1 Review the Limits and Precautions.

——— 1.2 Verify the following are in service per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)) of this procedure:

- 1EBD
- 1EBB
- 1ECB

> **NOTE:** The only time 1ECS may be aligned per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) is during No Mode. Aligning 1ECS per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) will result in Train B equipment being powered from Train A.

_____ 1.3 Verify 1ECS is aligned per one of the following:

☐ Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A))
OR
☐ Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) of this procedure.

——— 1.4 Obtain kirk key #695 from the WCC.

2. Procedure

_____ 2.1 Notify IAE to support 1ECD shutdown.

☐ Model W/O #91003522
☐ Other W/O **OR** W/R_____.

_____ SRO 2.2 **IF** 1ECS is aligned to 1EMXA (trains cross-connected), perform the following: {PIP 96-1849}

☐ Ensure a TSAIL entry is made requiring the completion of this enclosure before entering Mode 6 from No Mode.
☐ Declare 1RNLT7370 **AND** 0RNLT7360 inoperable. Refer to Tech Spec 3.3.2 for appropriate action.

2.3 Verify the appropriate incoming breaker to 1ECS is closed:

——— • Enclosure 4.3
1EMS-F01B (Incoming Bkr From MCC 1EMXA-F04A) (Feeder A)

——— • Enclosure 4.4
1EMS-F01C (Incoming Bkr From MCC 1EMXJ-F04A) (Feeder B)

NOTE: Tech Specs 3.8.4 and 3.8.5 should be referred to for operability requirements.

——— SRO 2.4 Perform Tech Spec assessment for required actions due to 1EBD shutdown.

NOTE: Do **NOT** continue until IAE has arrived.

——— IAE 2.5 IAE adjust the output voltage on 1ECS to 2.21 times the lowest number of connected cells on either 1EBB or 1EBD (+2 VDC, -0 VDC). (Sign-off by IAE when completed).

——— 2.6 Verify the DC output voltage on 1ECS is within ± 5 volts of the voltage on 1EDD.

NOTE:
1. The breaker in the following step is kirk keyed with the output breaker to 1EDA and 1EDC so only one breaker can be closed at a time.
2. If 1ECS is aligned to 1EMXA, an alarm will be received on 1AD-11, I/6 "STBY CHARGER 1ECS INPUT/OUTPUT TRAINS X-CONNECTED" when the following step is performed.

——— ——— 2.7 Close 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

——— ——— 2.8 Close 1EDD-F03B (125 VDC Bus 1EDD Tie Bkr To 125 VDC Bus 1EDB).

——— 2.9 Verify the voltages on 1EDD and 1EDB are within ± 5 volts of each other.

——— ——— 2.10 Close 1EDB-F03B (125 VDC Bus 1EDB Tie Bkr To 125 VDC Bus 1EDD).

——— ——— 2.11 Open 1EDD-F02B (Main Breaker).

——— ——— 2.12 Open 1EDD-F02A (Battery 1EBD).

NOTE: Step 2.13 should be N/A'd if the number of connected cells on 1EBB is equal to or less than that of 1EBD.

——— IAE 2.13 IAE adjust the output voltage on 1ECS to 2.21 times the number of connected cells on 1EBB (+2 VDC, -0 VDC).

NOTE: 1. At this point, the system is aligned as follows:

- 1EBD is isolated
- 1ECD is energized and isolated
- 1EDB and 1EDD are tied together
- 1ECS is supplying Train B.

2. Subsequent steps are to restore 1EBD to service.

3. IAE will determine the course of action to restore 1EBD to operable status.

4. IAE will determine if an equalize charge is required and for how long.

_____ 2.14 Notify IAE to support returning 1ECD to service.

☐ Model W/O #91003521
☐ Other W/O **OR** W/R_____.

NOTE: Do **NOT** continue until IAE support has arrived.

_____ 2.15 IAE adjust the output voltage on 1ECD to a value of 0.75 to 1.25 volts below the terminal voltage of 1EBD.
IAE

_____ _____ 2.16 Close 1EDD-F02A (Battery 1EBD).

_____ 2.17 IAE adjust the output voltage on 1ECD to 2.21 times the number of connected cells on 1EBD (+2 VDC, -0 VDC).
IAE

NOTE: IAE will determine if an equalize charge is required. Generally, an equalize charge will be required if a battery has been disconnected from its charger for more than 12 hours or has been discharge tested. {PIP 99-4565}

_____ 2.18 **IF** an equalize charge is required, perform the following:

_____ 2.18.1 Place the "FLOAT-EQUALIZE" switch for 1ECD (located inside the charger door) to "EQUALIZE".

NOTE: If the voltage is **NOT** in the range given, the IAE Supervisor should be notified so corrective action can be taken.

_____ 2.18.2 Verify the output voltage on 1ECD to be 142.05 - 147.05 volts.
IAE

NOTE: 1. 1EBD is now on equalize charge.

2. Subsequent steps align 1EBD for constant current charge (if requested by IAE) and return to normal alignment.

_____ 2.18.3 Place the "FLOAT-EQUALIZE" switch for 1ECD (located inside the charger door) to "FLOAT".

NOTE: Do **NOT** continue until requested by IAE. {PIP 96-1897}

2.19 **IF** requested by IAE, charge 1EBD using the constant current charge as follows:

_____ _____ 2.19.1 Open 1EDD-F02A (Battery 1EBD).

_____ 2.19.2 Have IAE connect the constant current charger to 1EBD.

NOTE: IAE will determine length of time for constant current charge.

_____ 2.19.3 Have IAE disconnect the constant current charger from 1EBD.

_____ _____ 2.19.4 Close 1EDD-F02A (Battery 1EBD).

2.20 **WHEN** 1EBD is ready to restore, notify IAE to support.

_____

☐ Model W/O #91003521
☐ Other W/O **OR** W/R_____.

NOTE: Do **NOT** continue until IAE has arrived.

_____ 2.21 IAE adjust the output voltage on 1ECD to 2.21 times the number of connected cells on 1EBD (+2 VDC, -0 VDC).
IAE

_____ 2.22 IAE perform quarterly battery inspection.
IAE

_____ _____ 2.23 Close 1EDD-F02B (Main Breaker).

_____ _____ 2.24 Open 1EDD-F03B (125 VDC Bus 1EDD Tie Bkr To 125 VDC Bus 1EDB).

_____ 2.25 Verify 1ECB is supplying power to DIST. CTR. DC # 1EDB.

☐ "DC OUTPUT" > 0 amps. (1ECB)
☐ "BUS 1EDB VOLTAGE" 130 - 135 volts. (1EDB)

—— —— 2.26 Open 1EDB-F03B (125 VDC Bus 1EDB Tie Bkr To 125 VDC Bus 1EDD).

—— —— 2.27 Open 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

—— 2.28 Remove the key from 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

—— 2.29 Return the key to the WCC.

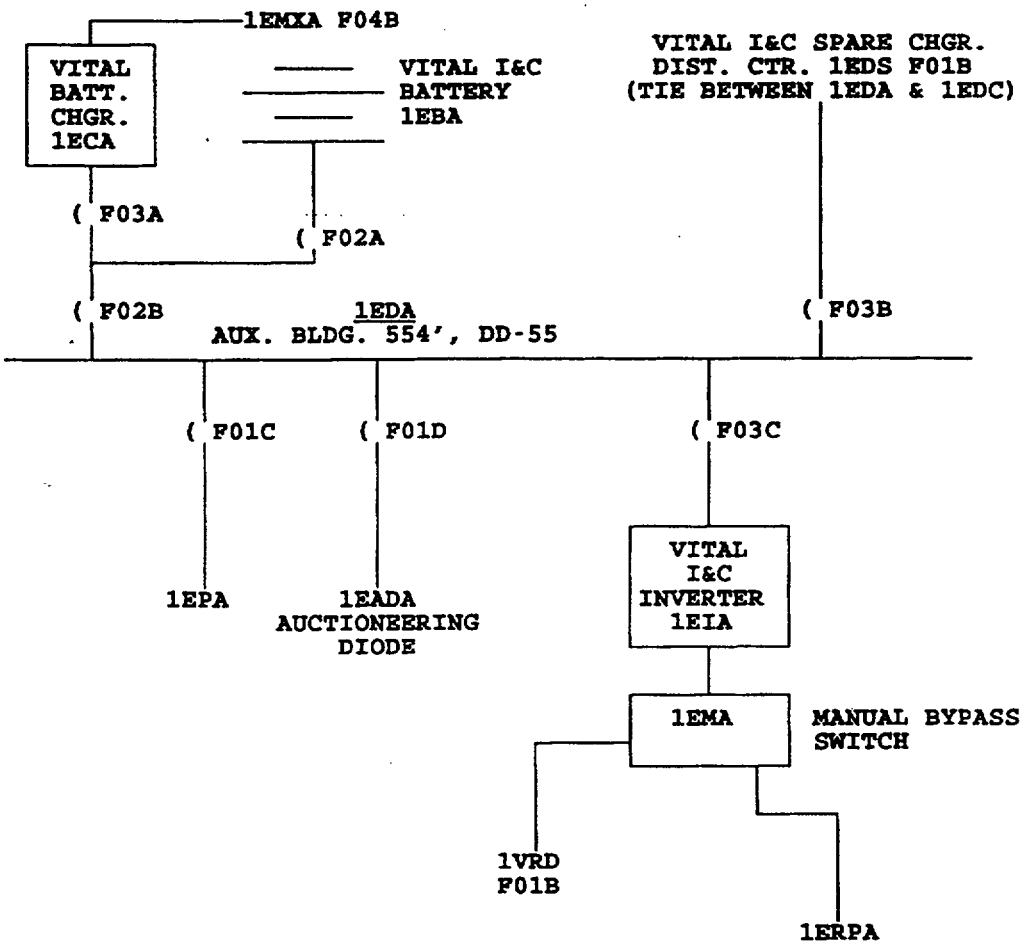
—— 2.30 Perform Tech Spec assessment for required actions due to 1EBD return to service.
SRO

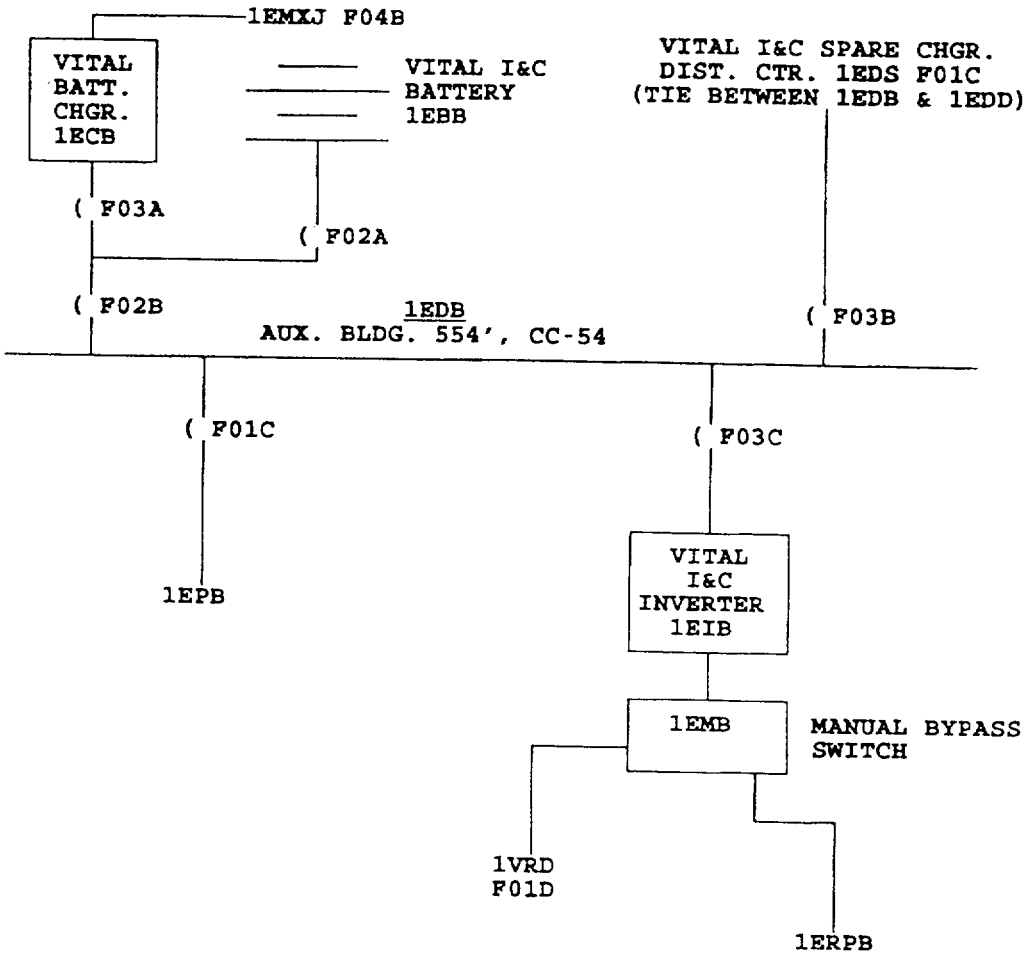
—— 2.31 **IF** 1ECS was aligned to 1EMXA (trains cross-connected),perform the following:
SRO {PIP 96-1849}

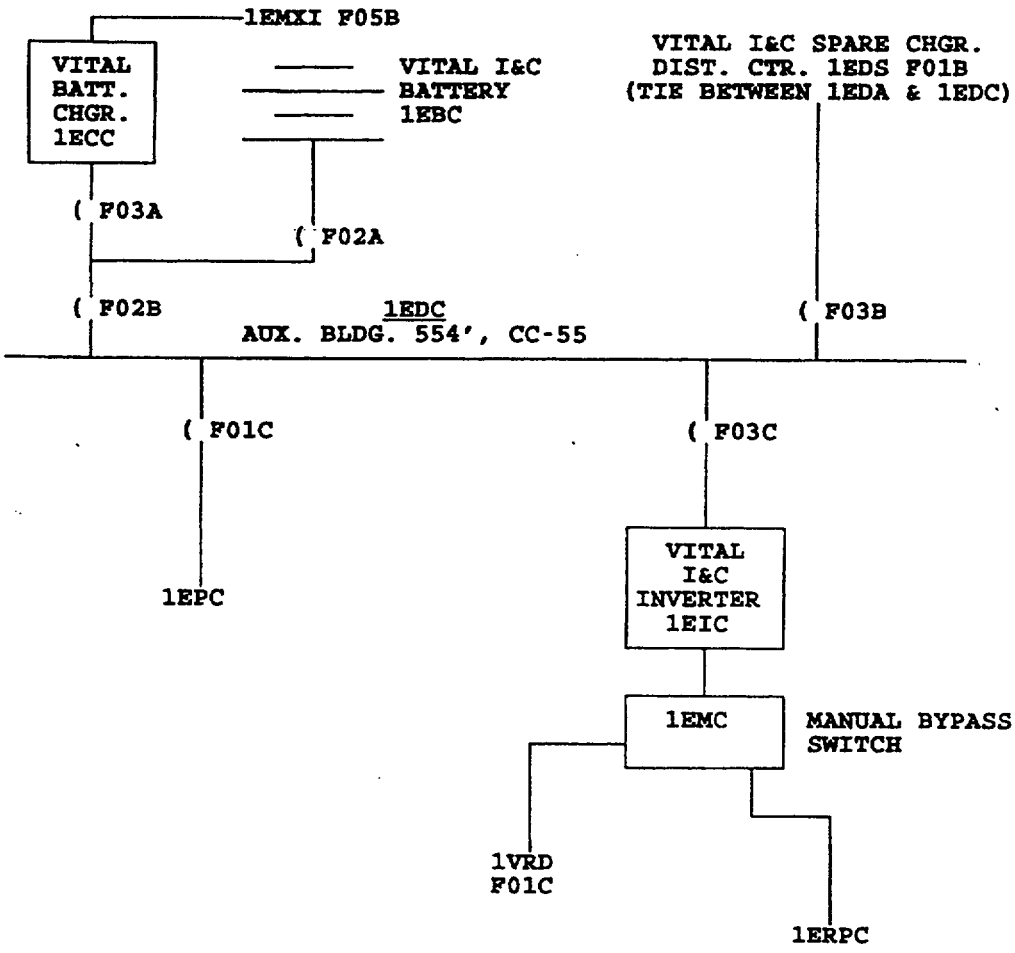
- ☐ Ensure the TSAIL entry made per this enclosure is cleared.
- ☐ Perform a Tech Spec assessment for 1RNLT7370 **AND** 0RNLT7360 being returned to service.

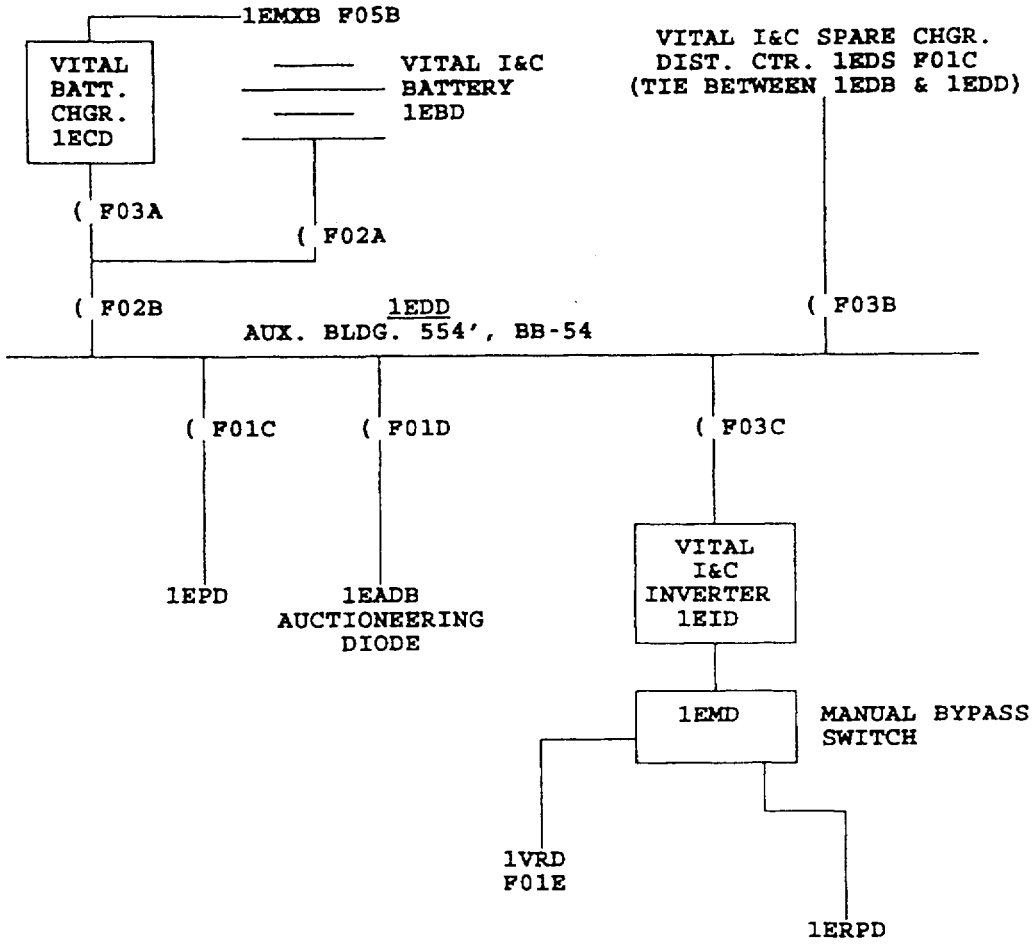
NOTE:
1. 1EBD and 1EDB are returned to service per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)).
2. 1ECS is returned to standby alignment per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) or Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)).

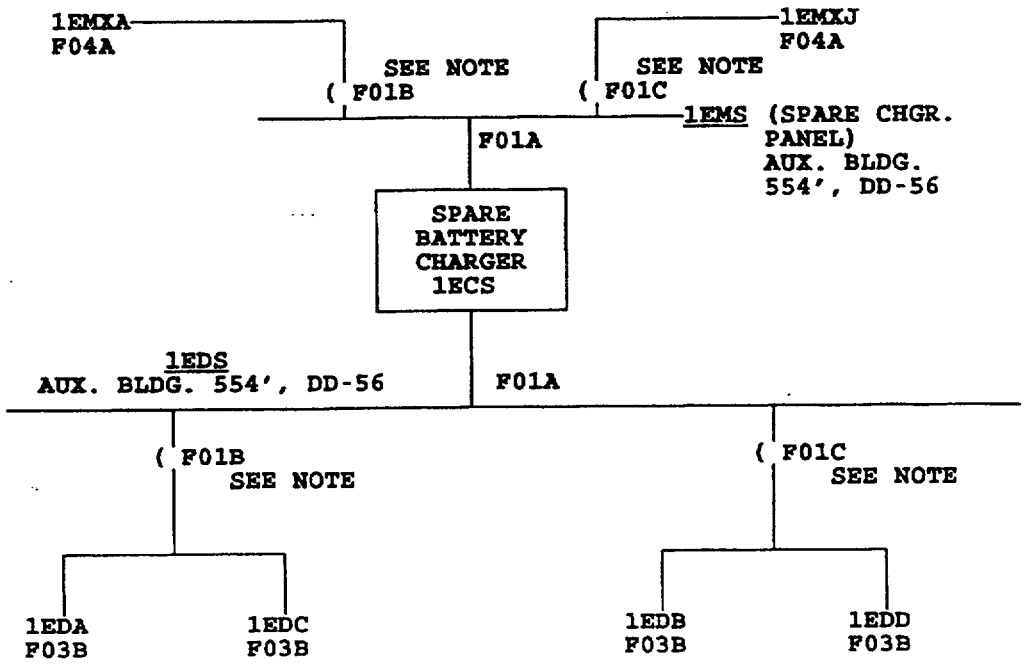
2.32 Do **NOT** file this enclosure in the Control Copy folder of this procedure.


1EMXA F04B
VITAL BATT. CHGR. 1ECA
VITAL I&C BATTERY 1EBA
VITAL I&C SPARE CHGR. DIST. CTR. 1EDS F01B (TIE BETWEEN 1EDA & 1EDC)
F03A
F02A
F02B
1EDA
AUX. BLDG. 554', DD-55
F03B
F01C
F01D
F03C
1EPA
1EADA AUCTIONEERING DIODE
VITAL I&C INVERTER 1EIA
1EMA
MANUAL BYPASS SWITCH
1VRD F01B
1ERPA

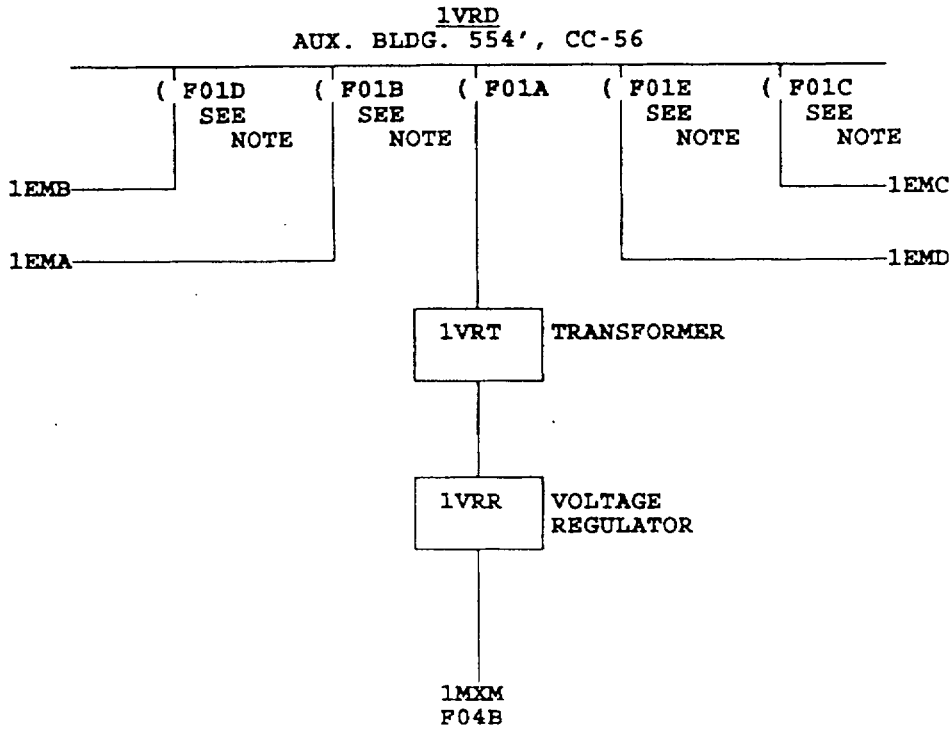

1EMXJ F04B
VITAL BATT. CHGR. 1ECB
VITAL I&C BATTERY 1EBB
VITAL I&C SPARE CHGR. DIST. CTR. 1EDS F01C (TIE BETWEEN 1EDB & 1EDD)
F03A
F02A
F02B
1EDB
AUX. BLDG. 554', CC-54
F03B
F01C
F03C
1EPB
VITAL I&C INVERTER 1EIB
1EMB
MANUAL BYPASS SWITCH
1VRD F01D
1ERPB


1EMXI F05B
VITAL BATT. CHGR. 1ECC
VITAL I&C BATTERY 1EBC
VITAL I&C SPARE CHGR. DIST. CTR. 1EDS F01B (TIE BETWEEN 1EDA & 1EDC)
F03A
F02A
F02B
1EDC
AUX. BLDG. 554', CC-55
F03B
F01C
F03C
1EPC
VITAL I&C INVERTER 1EIC
1EMC
MANUAL BYPASS SWITCH
1VRD F01C
1ERPC


1EMXB F05B
VITAL BATT. CHGR. 1ECD
VITAL I&C BATTERY 1EBD
VITAL I&C SPARE CHGR. DIST. CTR. 1EDS F01C (TIE BETWEEN 1EDB & 1EDD)
F03A
F02A
F02B
1EDD
AUX. BLDG. 554', BB-54
F03B
F01C
F01D
F03C
1EPD
1EADB AUCTIONEERING DIODE
VITAL I&C INVERTER 1EID
1EMD
MANUAL BYPASS SWITCH
1VRD F01E
1ERPD



NOTE: Breakers are kirk key interlocked such that only one breaker can be closed at one time:
(1EMS F01B kirk keyed with 1EMS F01C)
(1EDS F01B kirk keyed with 1EDS F01C)



NOTE: Breakers are kirk key interlocked such that only one breaker can be closed at one time: (1VRD F01D, 1VRD F01B, 1VRD F01E and 1VRD F01C)

1. Initial Conditions

—— 1.1 Review the Limits and Precautions.

—— 1.2 Verify 1ECS is **NOT** aligned to 1EDA, 1EDB, 1EDC or 1EDD.

2. Procedure

> **NOTE:** 1EDS-F01B and 1EDS-F01C are kirk key interlocked to prevent closing both breakers at the same time.

2.1 Verify the following breakers are open:

—— —— • 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC)
—— —— • 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD)

—— 2.2 Document which breaker is closed on 1EMS: _____

> **NOTE:** 1EMS-F01B and 1EMS-F01C are kirk key interlocked to prevent closing both breakers at the same time.

2.3 Ensure the following breakers are open:

—— —— • 1EMS-F01B (Incoming Bkr From MCC 1EMXA F04A (Feeder A))
—— —— • 1EMS-F01C (Incoming Bkr From MCC 1EMXJ F04A (Feeder B))

—— 2.4 Remove the kirk key from breaker opened in the previous step.

—— 2.5 Return kirk key removed from 1EMS to WCC.

> **NOTE:** 1ECS is now shutdown, subsequent steps are to return the system to standby alignment.

—— 2.6 Obtain kirk key #697 from the WCC.

—— —— 2.7 Ensure the "AC INPUT" breaker on 1ECS is ON.

—— —— 2.8 Ensure the "DC OUTPUT" breaker on 1ECS is ON.

NOTE: 1EDS-F01B and 1EDS-F01C are kirk key interlocked to prevent closing both breakers at the same time.

2.9 Ensure the following breakers are open:

- 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC)
- 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD)

2.10 Close breaker on 1EMS that was documented in Step 2.2.

NOTE: 1ECS should be left energized and in STANDBY per this procedure at all times unless maintenance is to be performed on it.

2.11 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

1. Initial Conditions

——— 1.1 Review the Limits and Precautions.

——— 1.2 Verify the following are in service per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)) of this procedure:

- ☐ 1EBA
- ☐ 1EBC
- ☐ 1ECC

NOTE: The only time 1ECS may be aligned per Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) is during No Mode. Aligning 1ECS per Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) will result in Train A equipment being powered from Train B.

_____ 1.3 Verify 1ECS is aligned per one of the following:

- ☐ Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A))

  OR
- ☐ Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) of this procedure.

——— 1.4 Obtain kirk key #695 from the WCC.

2. Procedure

_____ 2.1 Notify IAE to support 1ECA shutdown.

- ☐ Model W/O #91003522
- ☐ Other W/O **OR** W/R_____.

——— 2.2 **IF** 1ECS is aligned to 1EMXJ (trains cross-connected), perform the following: {PIP 96-1849}
SRO

- ☐ Ensure a TSAIL entry is made requiring the completion of this enclosure before entering Mode 6 from No Mode.
- ☐ Declare 1RNLT7400 **AND** 0RNLT7390 inoperable. Refer to Tech Spec 3.3.2 for appropriate action.

2.3 Verify the appropriate incoming breaker to 1ECS is closed:

——— • Enclosure 4.3
1EMS-F01B (Incoming Bkr From MCC 1EMXA-F04A) (Feeder A)

——— • Enclosure 4.4
1EMS-F01C (Incoming Bkr From MCC 1EMXJ-F04A) (Feeder B)

NOTE: Tech Specs 3.8.4 and 3.8.5 should be referred to for operability requirements.

——— 2.4 Perform Tech Spec assessment for required actions due to 1EBA shutdown.
SRO

NOTE: Do **NOT** continue until IAE has arrived.

——— 2.5 IAE adjust the output voltage on 1ECS to 2.21 times the lowest number of connected cells
IAE on either 1EBA or 1EBC (+2 VDC, -0 VDC).

——— 2.6 Verify the DC output voltage on 1ECS is within ± 5 volts of the voltage on 1EDA.

NOTE:
1. The breaker in the following step is kirk keyed with the output breaker to 1EDB and 1EDD so only one breaker can be closed at a time.
2. If 1ECS is aligned to 1EMXJ, an alarm will be received on 1AD-11, I/6 "STBY CHARGER 1ECS INPUT/OUTPUT TRAINS X-CONNECTED" when the following step is performed.

——— ——— 2.7 Close 1EDS-F01B (Feeder To Dist Center 1EDA And 1EDC).

——— ——— 2.8 Close 1EDA-F03B (125 VDC Bus 1EDA Tie Bkr To 125 VDC Bus 1EDC).

——— 2.9 Verify the voltages on 1EDA and 1EDC are within ± 5 volts of each other.

——— ——— 2.10 Close 1EDC-F03B (125 VDC Bus 1EDC Tie Bkr To 125 VDC Bus 1EDA).

——— ——— 2.11 Open 1EDA-F02B (Main Breaker).

NOTE: The following step should be N/A'd if the number of connected cells on 1EBC is equal to or less than that of 1EBA.

——— 2.12 IAE adjust the output voltage on 1ECS to 2.21 times the number of connected cells on 1EBC
IAE (+2 VDC, -0 VDC).

——— 2.13 IAE obtain pretest readings from Battery 1EBA.
IAE

___ ___ 2.14 **WHEN** requested by IAE, open 1EDA-F02A (Battery 1EBA).

___ IAE 2.15 IAE complete required service test and 18 month PM for Battery 1EBA.

___ IAE 2.16 IAE adjust the output voltage on 1ECA to a value of 0.75 to 1.25 volts below the terminal voltage of 1EBA.

___ ___ 2.17 Close 1EDA-F02A (Battery 1EBA).

___ IAE 2.18 IAE make necessary adjustments to 1ECA in preparation for placing 1EBA on "EQUALIZE".

___ 2.19 Place the "FLOAT-EQUALIZE" switch for 1ECA (located inside the charger door) to "EQUALIZE".

NOTE: If the voltage is **NOT** in the range given, the IAE Supervisor should be notified so corrective action can be taken.

___ IAE 2.20 Verify the output voltage on 1ECA to be 142.05 - 147.05 volts.

NOTE: 1. 1EBA is now on equalize charge.

2. IAE will determine when to return 1EBA to "FLOAT".

___ 2.21 Place the "FLOAT-EQUALIZE" switch for 1ECA (located inside the charger door) to "FLOAT".

___ IAE 2.22 IAE adjust the output voltage on 1ECA to 2.21 times the number of connected cells on 1EBA (+2 VDC, -0 VDC).

___ 2.23 **IF** the IAE 5-Year Battery Performance Test will be performed, complete the following:

___ IAE 2.23.1 IAE obtain pretest readings from Battery 1EBA.

___ ___ 2.23.2 **WHEN** requested by IAE, open 1EDA-F02A (Battery 1EBA).

___ IAE 2.23.3 IAE complete required performance test for Battery 1EBA.

___ IAE 2.23.4 IAE adjust the output voltage on 1ECA to a value of 0.75 to 1.25 volts below the terminal voltage of 1EBA.

___ ___ 2.23.5 Close 1EDA-F02A (Battery 1EBA).

___ IAE 2.23.6 IAE make necessary adjustments to 1ECA in preparation for placing 1EBA on "EQUALIZE".

_____ 2.23.7 Place the "FLOAT-EQUALIZE" switch for 1ECA (located inside the charger door) to "EQUALIZE".

NOTE: If the voltage is **NOT** in the range given, the IAE Supervisor should be notified so corrective action can be taken.

_____ IAE 2.23.8 Verify the output voltage on 1ECA to be 142.05 - 147.05 volts.

NOTE: 1. 1EBA is now on equalize charge.

2. IAE will determine when to return 1EBA to "FLOAT".

_____ 2.23.9 Place the "FLOAT-EQUALIZE" switch for 1ECA (located inside the charger door) to "FLOAT".

_____ IAE 2.23.10 IAE adjust the output voltage on 1ECA to 2.21 times the number of connected cells on 1EBA (+2 VDC, -0 VDC).

_____ IAE 2.24 IAE perform quarterly battery inspection.

_____ _____ 2.25 Close 1EDA-F02B (Main Breaker).

_____ _____ 2.26 Open 1EDA-F03B (125 VDC Bus 1EDA Tie Bkr To 125 VDC Bus 1EDC).

_____ 2.27 Verify 1ECC is supplying power to DIST. CTR. DC # 1EDC.

☐ "DC OUTPUT" > 0 amps. (1ECC)
☐ "BUS 1EDC VOLTAGE" 130 - 135 volts. (1EDC)

_____ _____ 2.28 Open 1EDC-F03B (125 VDC Bus 1EDC Tie Bkr To 125 VDC Bus 1EDA).

_____ _____ 2.29 Open 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC).

_____ 2.30 Remove the key from 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC).

_____ 2.31 Return the key to the WCC.

_____ SRO 2.32 Perform Tech Spec assessment for required actions due to 1EBA return to service.

_____ SRO 2.33 **IF** 1ECS was aligned to 1EMXJ (trains cross-connected),perform the following: {PIP 96-1849}

☐ Ensure the TSAIL entry made per this enclosure is cleared.
☐ Perform a Tech Spec assessment for 1RNLT7400 **AND** 0RNLT7390 being returned to service.

NOTE:
1. 1EBA and 1EDC are returned to service per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)).
2. 1ECS is returned to standby alignment per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) or Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)).

2.34 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

1. Initial Conditions

_____ 1.1 Review the Limits and Precautions.

_____ 1.2 Verify the following are in service per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)) of this procedure:

- ☐ 1EBB
- ☐ 1EBD
- ☐ 1ECD

> **NOTE:** The only time 1ECS may be aligned per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) is during No Mode. Aligning 1ECS per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) will result in Train B equipment being powered from Train A.

_____ 1.3 Verify 1ECS is aligned per one of the following:

- ☐ Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A))
  OR
- ☐ Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) of this procedure.

_____ 1.4 Obtain kirk key #695 from the WCC.

2. Procedure

_____ 2.1 Notify IAE to support 1ECB shutdown.

- ☐ Model W/O #91003522
- ☐ Other W/O **OR** W/R_____.

_____ SRO 2.2 **IF** 1ECS is aligned to 1EMXA (trains cross-connected), ensure a TSAIL entry is made requiring the completion of this enclosure before entering Mode 6 from No Mode.

2.3 Verify the appropriate incoming breaker to 1ECS is closed:

_____ • Enclosure 4.3
1EMS-F01B (Incoming Bkr From MCC 1EMXA-F04A) (Feeder A)

_____ • Enclosure 4.4
1EMS-F01C (Incoming Bkr From MCC 1EMXJ-F04A) (Feeder B)

NOTE: Tech Specs 3.8.4 and 3.8.5 should be referred to for operability requirements.

_____ 2.4 (SRO) Perform Tech Spec assessment for required actions due to 1EBB shutdown.

NOTE: Do **NOT** continue until IAE has arrived.

_____ 2.5 (IAE) IAE adjust the output voltage on 1ECS to 2.21 times the lowest number of connected cells on either 1EBB or 1EBD (+2 VDC, -0 VDC).

_____ 2.6 Verify the DC output voltage on 1ECS is within ± 5 volts of 1EDB voltage.

NOTE:
1. The breaker in the following step is kirk keyed with the output breaker to 1EDA and 1EDC so only one breaker can be closed at a time.
2. If 1ECS is aligned to 1EMXA, an alarm will be received on 1AD-11, I/6 "STBY CHARGER 1ECS INPUT/OUTPUT TRAINS X-CONNECTED" when the following step is performed.

_____ _____ 2.7 Close 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

_____ _____ 2.8 Close 1EDB-F03B (125 VDC Bus 1EDB Tie Bkr To 125 VDC Bus 1EDD).

_____ 2.9 Verify the voltages on 1EDB and 1EDD are within ± 5 volts of each other.

_____ _____ 2.10 Close 1EDD-F03B (125 VDC Bus 1EDD Tie Bkr To 125 VDC Bus 1EDB).

_____ _____ 2.11 Open 1EDB-F02B (Main Breaker).

NOTE: The following step should be N/A'd if the number of connected cells on 1EBD is equal to or less than that of 1EBB.

_____ 2.12 (IAE) IAE adjust the output voltage on 1ECS to 2.21 times the number of connected cells on 1EBD (+2 VDC, -0 VDC).

_____ 2.13 (IAE) IAE obtain pretest readings from Battery 1EBB.

_____ _____ 2.14 **WHEN** requested by IAE, open 1EDB-F02A (Battery 1EBB).

_____ 2.15 (IAE) IAE complete required service test and 18 month PM for Battery 1EBB.

_____ 2.16 (IAE) IAE adjust the output voltage on 1ECB to a value of 0.75 to 1.25 volts below the terminal voltage of 1EBB.

_____ _____ 2.17 Close 1EDB-F02A (Battery 1EBB).

_____ IAE 2.18 IAE make necessary adjustments to 1ECB in preparation for placing 1EBB on "EQUALIZE".

_____ 2.19 Place the "FLOAT-EQUALIZE" switch for 1ECB (located inside the charger door) to "EQUALIZE".

NOTE: If the voltage is **NOT** in the range given, the IAE Supervisor should be notified so corrective action can be taken.

_____ IAE 2.20 Verify the output voltage on 1ECB to be 142.05 - 147.05 volts.

NOTE: 1. 1EBB is now on equalize charge.

2. IAE will determine when to return 1EBB to "FLOAT".

_____ 2.21 Place the "FLOAT-EQUALIZE" switch for 1ECB (located inside the charger door) to "FLOAT".

_____ IAE 2.22 IAE adjust the output voltage on 1ECB to 2.21 times the number of connected cells on 1EBB (+2 VDC, -0 VDC).

_____ 2.23 **IF** the IAE 5-Year Battery Performance Test will be performed, complete the following:

_____ IAE 2.23.1 IAE obtain pretest readings from Battery 1EBB.

_____ _____ 2.23.2 **WHEN** requested by IAE, open 1EDB-F02A (Battery 1EBB).

_____ IAE 2.23.3 IAE complete required performance test for Battery 1EBB.

_____ IAE 2.23.4 IAE adjust the output voltage on 1ECB to a value of 0.75 to 1.25 volts below the terminal voltage of 1EBB.

_____ _____ 2.23.5 Close 1EDB-F02A (Battery 1EBB).

_____ IAE 2.23.6 IAE make necessary adjustments to 1ECB in preparation for placing 1EBB on "EQUALIZE".

_____ 2.23.7 Place the "FLOAT-EQUALIZE" switch for 1ECB (located inside the charger door) to "EQUALIZE".

NOTE: If the voltage is **NOT** in the range given, the IAE Supervisor should be notified so corrective action can be taken.

_____ 2.23.8 Verify the output voltage on 1ECB to be 142.05 - 147.05 volts.
IAE

NOTE: 1. 1EBB is now on equalize charge.

2. IAE will determine when to return 1EBB to "FLOAT".

_____ 2.23.9 Place the "FLOAT-EQUALIZE" switch for 1ECB (located inside the charger door) to "FLOAT".

_____ 2.23.10 IAE adjust the output voltage on 1ECB to 2.21 times the number of connected cells on 1EBB (+2 VDC, -0 VDC).
IAE

_____ 2.24 IAE perform quarterly battery inspection.
IAE

_____ _____ 2.25 Close 1EDB-F02B (Main Breaker).

_____ _____ 2.26 Open 1EDB-F03B (125 VDC Bus 1EDB Tie Bkr To 125 VDC Bus 1EDD).

_____ 2.27 Verify 1ECD is supplying power to DIST. CTR. DC # 1EDD.

☐ "DC OUTPUT" > 0 amps. (1ECD)
☐ "BUS 1EDD VOLTAGE" 130 - 135 volts. (1EDD)

_____ _____ 2.28 Open 1EDD-F03B (125 VDC Bus 1EDD Tie Bkr To 125 VDC Bus 1EDB).

_____ _____ 2.29 Open 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

_____ 2.30 Remove the key from 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

_____ 2.31 Return the key to the WCC.

_____ 2.32 Perform Tech Spec assessment for required actions due to 1EBB return to service.
SRO

_____ 2.33 **IF** 1ECS was aligned to 1EMXA (trains cross-connected), ensure the TSAIL entry made per this enclosure is cleared.
SRO

NOTE:
1. 1EBB and 1EDD are returned to service per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)).
2. 1ECS is returned to standby alignment per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) or Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)).

2.34 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

1. Initial Conditions

_____ 1.1 Review the Limits and Precautions.

_____ 1.2 Verify the following are in service per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)) of this procedure:

- ☐ 1EBC
- ☐ 1EBA
- ☐ 1ECA

> **NOTE:** The only time 1ECS may be aligned per Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) is during No Mode. Aligning 1ECS per Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) will result in Train A equipment being powered from Train B.

_____ 1.3 Verify 1ECS is aligned per one of the following:

- ☐ Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A))
  OR
- ☐ Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) of this procedure.

_____ 1.4 Obtain kirk key #695 from the WCC.

2. Procedure

_____ 2.1 Notify IAE to support 1ECC shutdown.

- ☐ Model W/O #91003522
- ☐ Other W/O **OR** W/R_____.

_____ SRO 2.2 **IF** 1ECS is aligned to 1EMXJ (trains cross-connected), ensure a TSAIL entry is made requiring the completion of this enclosure before entering Mode 6 from No Mode.

2.3 Verify the appropriate incoming breaker to 1ECS is closed:

_____ • Enclosure 4.3
1EMS-F01B (Incoming Bkr From MCC 1EMXA-F04A) (Feeder A)

_____ • Enclosure 4.4
1EMS-F01C (Incoming Bkr From MCC 1EMXJ-F04A) (Feeder B)

NOTE: Tech Specs 3.8.4 and 3.8.5 should be referred to for operability requirements.

_____ SRO 2.4 Perform Tech Spec assessment for required actions due to 1EBC shutdown.

NOTE: Do **NOT** continue until IAE has arrived.

_____ IAE 2.5 IAE adjust the output voltage on 1ECS to 2.21 times the lowest number of connected cells on either 1EBA or 1EBC (+2 VDC, -0 VDC).

_____ 2.6 Verify the DC output voltage on 1ECS is within ± 5 volts of the voltage on 1EDC.

NOTE:
1. The breaker in the following step is kirk keyed with the output breaker to 1EDB and 1EDD so only one breaker can be closed at a time.
2. If 1ECS is aligned to 1EMXJ, an alarm will be received on 1AD-11, I/6 "STBY CHARGER 1ECS INPUT/OUTPUT TRAINS X-CONNECTED" when the following step is performed.

_____ _____ 2.7 Close 1EDS-F01B (Feeder To Dist Center 1EDA And 1EDC).

_____ _____ 2.8 Close 1EDC-F03B (125 VDC Bus 1EDC Tie Bkr To 125 VDC Bus 1EDA).

_____ 2.9 Verify the voltages on 1EDA and 1EDC are within ± 5 volts of each other.

_____ _____ 2.10 Close 1EDA-F03B (125 VDC Bus 1EDA Tie Bkr To 125 VDC Bus 1EDC).

_____ _____ 2.11 Open 1EDC-F02B (Main Breaker).

NOTE: The following step should be N/A'd if the number of connected cells on 1EBA is equal to or less than that of 1EBC.

_____ IAE 2.12 IAE adjust the output voltage on 1ECS to 2.21 times the number of connected cells on 1EBA (+2 VDC, -0 VDC).

_____ IAE 2.13 IAE obtain pretest readings from Battery 1EBC.

_____ _____ 2.14 **WHEN** requested by IAE, open 1EDC-F02A (Battery 1EBC).

_____ IAE 2.15 IAE complete required service test and 18 month PM for Battery 1EBC.

_____ IAE 2.16 IAE adjust the output voltage on 1ECC to a value of 0.75 to 1.25 volts below the terminal voltage of 1EBC.

___ ___ 2.17 Close 1EDC-F02A (Battery 1EBC).

___ IAE 2.18 IAE make necessary adjustments to 1ECC in preparation for placing 1EBC on "EQUALIZE".

___ 2.19 Place the "FLOAT-EQUALIZE" switch for 1ECC (located inside the charger door) to "EQUALIZE".

NOTE: If the voltage is **NOT** in the range given, the IAE Supervisor should be notified so corrective action can be taken.

___ IAE 2.20 Verify the output voltage on 1ECC to be 142.05 - 147.05 volts.

NOTE: 1. 1EBC is now on equalize charge.

2. IAE will determine when to return 1EBC to "FLOAT".

___ 2.21 Place the "FLOAT-EQUALIZE" switch for 1ECC (located inside the charger door) to "FLOAT".

___ IAE 2.22 IAE adjust the output voltage on 1ECC to 2.21 times the number of connected cells on 1EBC (+2 VDC, -0 VDC).

___ 2.23 **IF** the IAE 5-Year Battery Performance Test will be performed, complete the following:

___ IAE 2.23.1 IAE obtain pretest readings from Battery 1EBC.

___ ___ 2.23.2 **WHEN** requested by IAE, open 1EDC-F02A (Battery 1EBC).

___ IAE 2.23.3 IAE complete required performance test for Battery 1EBC.

___ IAE 2.23.4 IAE adjust the output voltage on 1ECC to a value of 0.75 to 1.25 volts below the terminal voltage of 1EBC.

___ ___ 2.23.5 Close 1EDC-F02A (Battery 1EBC).

___ IAE 2.23.6 IAE make necessary adjustments to 1ECC in preparation for placing 1EBC on "EQUALIZE".

___ 2.23.7 Place the "FLOAT-EQUALIZE" switch for 1ECC (located inside the charger door) to "EQUALIZE".

NOTE: If the voltage is NOT in the range given, the IAE Supervisor should be notified so corrective action can be taken.

_____ IAE 2.23.8 Verify the output voltage on 1ECC to be 142.05 - 147.05 volts.

NOTE: 1. 1EBC is now on equalize charge.

2. IAE will determine when to return 1EBC to "FLOAT".

_____ 2.23.9 Place the "FLOAT-EQUALIZE" switch for 1ECC (located inside the charger door) to "FLOAT".

_____ IAE 2.23.10 IAE adjust the output voltage on 1ECC to 2.21 times the number of connected cells on 1EBC (+2 VDC, -0 VDC).

_____ IAE 2.24 IAE perform quarterly battery inspection.

_____ _____ 2.25 Close 1EDC-F02B (Main Breaker).

_____ _____ 2.26 Open 1EDC-F03B (125 VDC Bus 1EDC Tie Bkr To 125 VDC Bus 1EDA).

_____ 2.27 Verify 1ECA is supplying power to DIST. CTR. DC # 1EDA.

☐ "DC OUTPUT" > 0 amps. (1ECA)
☐ "BUS 1EDA VOLTAGE" 130 - 135 volts. (1EDA)

_____ _____ 2.28 Open 1EDA-F03B (125 VDC Bus 1EDA Tie Bkr To 125 VDC Bus 1EDC).

_____ _____ 2.29 Open 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC).

_____ 2.30 Remove the key from 1EDS-F01B (Feeder To Dist Centers 1EDA And 1EDC).

_____ 2.31 Return the key to the WCC.

_____ SRO 2.32 Perform Tech Spec assessment for required actions due to 1EBC return to service.

_____ SRO 2.33 IF 1ECS was aligned to 1EMXJ (trains cross-connected), ensure the TSAIL entry made per this enclosure is cleared.

NOTE:
1. 1EBC and 1EDA are returned to service per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)).
2. 1ECS is returned to standby alignment per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) or Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B))

2.34 Do <u>NOT</u> file this enclosure in the Control Copy folder of this procedure.

1. Initial Conditions

——— 1.1 Review the Limits and Precautions.

——— 1.2 Verify the following are in service per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)) of this procedure:

- 1EBD
- 1EBB
- 1ECB

NOTE: The only time 1ECS may be aligned per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) is during No Mode. Aligning 1ECS per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) will result in Train B equipment being powered from Train A.

_____ 1.3 Verify 1ECS is aligned per one of the following:

☐ Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A))
OR
☐ Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)) of this procedure.

——— 1.4 Obtain kirk key #695 from the WCC.

2. Procedure

_____ 2.1 Notify IAE to support 1ECD shutdown.

☐ Model W/O #91003522
☐ Other W/O **OR** W/R_____.

_____ SRO 2.2 **IF** 1ECS is aligned to 1EMXA (trains cross-connected), perform the following: {PIP 96-1849}

☐ Ensure a TSAIL entry is made requiring the completion of this enclosure before entering Mode 6 from No Mode.
☐ Declare 1RNLT7370 **AND** 0RNLT7360 inoperable. Refer to Tech Spec 3.3.2 for appropriate action.

2.3 Verify the appropriate incoming breaker to 1ECS is closed:

——— • Enclosure 4.3
1EMS-F01B (Incoming Bkr From MCC 1EMXA-F04A) (Feeder A)

——— • Enclosure 4.4
1EMS-F01C (Incoming Bkr From MCC 1EMXJ-F04A) (Feeder B)

NOTE: Tech Specs 3.8.4 and 3.8.5 should be referred to for operability requirements.

——— 2.4 Perform Tech Spec assessment for required actions due to 1EBD shutdown.
SRO

NOTE: Do **NOT** continue until IAE has arrived.

——— 2.5 IAE adjust the output voltage on 1ECS to 2.21 times the lowest number of connected cells on either 1EBB or 1EBD (+2 VDC, -0 VDC). (Sign-off by IAE when completed).
IAE

——— 2.6 Verify the DC output voltage on 1ECS is within ± 5 volts of the voltage on 1EDD.

NOTE:
1. The breaker in the following step is kirk keyed with the output breaker to 1EDA and 1EDC so only one breaker can be closed at a time.
2. If 1ECS is aligned to 1EMXA, an alarm will be received on 1AD-11, I/6 "STBY CHARGER 1ECS INPUT/OUTPUT TRAINS X-CONNECTED" when the following step is performed.

——— ——— 2.7 Close 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

——— ——— 2.8 Close 1EDD-F03B (125 VDC Bus 1EDD Tie Bkr To 125 VDC Bus 1EDB).

——— 2.9 Verify the voltages on 1EDD and 1EDB are within ± 5 volts of each other.

——— ——— 2.10 Close 1EDB-F03B (125 VDC Bus 1EDB Tie Bkr To 125 VDC Bus 1EDD).

——— ——— 2.11 Open 1EDD-F02B (Main Breaker).

NOTE: The following step should be N/A'd if the number of connected cells on 1EBB is equal to or less than that of 1EBD.

——— 2.12 IAE adjust the output voltage on 1ECS to 2.21 times the number of connected cells on 1EBB (+2 VDC, -0 VDC).
IAE

——— 2.13 IAE obtain pretest readings from Battery 1EBD.
IAE

_____ _____ 2.14 **WHEN** requested by IAE, open 1EDD-F02A (Battery 1EBD).

_____ IAE 2.15 IAE complete required service test and 18 month PM for Battery 1EBD.

_____ IAE 2.16 IAE adjust the output voltage on 1ECD to a value of 0.75 to 1.25 volts below the terminal voltage of 1EBD.

_____ _____ 2.17 Close 1EDD-F02A (Battery 1EBD).

_____ IAE 2.18 IAE make necessary adjustments to 1ECD in preparation for placing 1EBD on "EQUALIZE".

_____ 2.19 Place the "FLOAT-EQUALIZE" switch for 1ECD (located inside the charger door) to "EQUALIZE".

NOTE: If the voltage is **NOT** in the range given, the IAE Supervisor should be notified so corrective action can be taken.

_____ IAE 2.20 Verify the output voltage on 1ECD to be 142.05 - 147.05 volts.

NOTE: 1. 1EBD is now on equalize charge.

2. IAE will determine when to return 1EBD to "FLOAT".

_____ 2.21 Place the "FLOAT-EQUALIZE" switch for 1ECD (located inside the charger door) to "FLOAT".

_____ IAE 2.22 IAE adjust the output voltage on 1ECD to 2.21 times the number of connected cells on 1EBD (+2 VDC, -0 VDC).

_____ 2.23 **IF** the IAE 5-Year Battery Performance Test will be performed, complete the following:

_____ IAE 2.23.1 IAE obtain pretest readings from Battery 1EBD.

_____ _____ 2.23.2 **WHEN** requested by IAE, open 1EDD-F02A (Battery 1EBD).

_____ IAE 2.23.3 IAE complete required performance test for Battery 1EBD.

_____ IAE 2.23.4 IAE adjust the output voltage on 1ECD to a value of 0.75 to 1.25 volts below the terminal voltage of 1EBD.

_____ _____ 2.23.5 Close 1EDD-F02A (Battery 1EBD).

_____ IAE 2.23.6 IAE make necessary adjustments to 1ECD in preparation for placing 1EBD on "EQUALIZE".

_____ 2.23.7 Place the "FLOAT-EQUALIZE" switch for 1ECD (located inside the charger door) to "EQUALIZE".

> **NOTE:** If the voltage is **NOT** in the range given, the IAE Supervisor should be notified so corrective action can be taken.

_____ 2.23.8 Verify the output voltage on 1ECD to be 142.05 - 147.05 volts.
IAE

> **NOTE:** 1. 1EBD is now on equalize charge.
>
> 2. IAE will determine when to return 1EBD to "FLOAT".

_____ 2.23.9 Place the "FLOAT-EQUALIZE" switch for 1ECD (located inside the charger door) to "FLOAT".

_____ 2.23.10 IAE adjust the output voltage on 1ECD to 2.21 times the number of connected cells on 1EBD (+2 VDC, -0 VDC).
IAE

_____ 2.24 IAE perform quarterly battery inspection.
IAE

—— —— 2.25 Close 1EDD-F02B (Main Breaker).

—— —— 2.26 Open 1EDD-F03B (125 VDC Bus 1EDD Tie Bkr To 125 VDC Bus 1EDB).

—— 2.27 Verify 1ECB is supplying power to DIST. CTR. DC # 1EDB.

☐ "DC OUTPUT" > 0 amps. (1ECB)
☐ "BUS 1EDB VOLTAGE" 130 - 135 volts. (1EDB)

—— —— 2.28 Open 1EDB-F03B (125 VDC Bus 1EDB Tie Bkr To 125 VDC Bus 1EDD).

—— —— 2.29 Open 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

—— 2.30 Remove the key from 1EDS-F01C (Feeder To Dist Centers 1EDB And 1EDD).

—— 2.31 Return the key to the WCC.

_____ 2.32 Perform Tech Spec assessment for required actions due to 1EBD return to service.
SRO

_____ 2.33 **IF** 1ECS was aligned to 1EMXA (trains cross-connected), ensure the TSAIL entry made per this enclosure is cleared.
SRO

NOTE:
1. 1EBB and 1EDD are returned to service per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)).
2. 1ECS is returned to standby alignment per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) or Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B)).

2.34 Do NOT file this enclosure in the Control Copy folder of this procedure.

1. Initial Conditions

——— 1.1 Review the Limits and Precautions.

——— 1.2 Verify 1EIC is in service per Enclosure 4.2 (Inverter Startup (1EIA, 1EIB, 1EIC, 1EID)) of this procedure.

——— 1.3 Verify 1VRD is energized and **NOT** supplying an inverter's load.

——— 1.4 Verify the following are in service per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)) of this procedure:

- ☐ 1EBC
- ☐ 1EBA
- ☐ 1ECA

2. Procedure

NOTE: Tech Specs 3.8.4, 3.8.5, 3.8.7, 3.8.8, 3.8.9, and 3.8.10 should be referred to for operability requirements.

——— 2.1 SRO Perform Tech Spec assessment for required actions due to 1EIC and 1EDC shutdown.

——— 2.2 Remove 1EIC from service per Enclosure 4.11 (1EIC Shutdown and Return to Service).

——— 2.3 Remove 1ECC and 1EBC from service per Enclosure 4.19 (Removing 1EBC from Service).

NOTE: 1. At this point, the system is aligned as follows:

- 1EBC is isolated
- 1ERPC is being supplied by 1VRD.
- 1EIC is shutdown.
- 1ECC is energized and isolated
- 1EDA and 1EDC are tied together
- 1ECS and 1ECA are supplying Train A.

——— 2.4 Review the load lists for 125 VDC Panelboard 1EPC in preparation for removing it from service.

——— 2.5 Verify the "BATTERY INPUT" breaker on 1EIC is open. (1EIC CB1)

NOTE: The following step will de-energize 1EDC and 1EPC.

____ ____ 2.6 Open 1EDC-F03B (125 VDC Bus 1EDC Tie Bkr To 125 VDC Bus 1EDA).

____ ____ 2.7 Open 1EDS-F01B (Feeder To Dist Center 1EDA And 1EDC).

____ ____ 2.8 Verify 1EDC-F02A (Battery 1EBC) is open.

____ ____ 2.9 Open 1EDC-F03A (Battery Charger 1ECC).

____ ____ 2.10 Open the "DC OUTPUT" breaker on 1ECC (1EDC-CB302).

____ ____ 2.11 Verify 1EDC-F03C (Inverter 1EIC) is open.

____ ____ 2.12 Verify 1EDC-F02B (Main Breaker) is open.

NOTE: 1. At this point, 1EDC and 1EPC are isolated. 1ERPC is being supplied from 1VRD.

2. Subsequent steps will return Vital Channel C to normal alignment.

____ ____ 2.13 Verify 1EDA-F03B (125 VDC Bus 1EDA Tie Bkr To 125 VDC Bus 1EDC) is closed.

NOTE: The following step will energize 1EDC and 1EPC

____ ____ 2.14 Close 1EDC-F03B (125 VDC Bus 1EDC Tie Bkr To 125 VDC Bus 1EDA).

____ ____ 2.15 Close 1EDS-F01B (Feeder To Dist Center 1EDA And 1EDC).

____ ____ 2.16 Verify the "BATTERY INPUT" breaker on 1EIC is open. (1EIC CB1)

____ ____ 2.17 Verify 1EDC-F02A (Battery 1EBC)is open.

____ ____ 2.18 Close 1EDC-F03A (Battery Charger 1ECC).

____ ____ 2.19 Close the "DC OUTPUT" breaker on 1ECC. (1EDC-CB302)

____ ____ 2.20 Verify 1EDC-F03C (Inverter 1EIC) is open.

____ ____ 2.21 Verify 1EDC-F02B (Main Breaker) is open.

____ 2.22 Return 1ECC and 1EBC to service per Enclosure 4.19 (Removing 1EBC from Service).

____ 2.23 Return 1EIC to service per Enclosure 4.11 (1EIC Shutdown and Return to Service).

NOTE:
1. 1EBC and 1EDA are returned to service per Enclosure 4.1 (Battery Charger Startup (1ECA, 1ECB, 1ECC, 1ECD)).
2. 1ECS is returned to standby alignment per Enclosure 4.3 (Placing 1ECS in Standby Alignment From 1EMXA (Train A)) or Enclosure 4.4 (Placing 1ECS in Standby Alignment From 1EMXJ (Train B))
3. 1EIC is now returned to service per Enclosure 4.2 (Inverter Startup (1EIA, 1EIB, 1EIC, 1EID)).

2.24 Do **NOT** file this enclosure in the Control Copy folder of this procedure.

125 VDC/120 VAC VITAL INSTRUMENTATION AND CONTROL POWER SYSTEM

LESSON PLAN

Prepared BY:	Russell L. Edmond	Date:	8/10/00
Reviewed BY:	E. B. Kulesa	Date:	8/14/00
OPS Review:	N/A	Date	
Approved By:	John K. Suptela	Date:	8/14/00

1. OVERVIEW:

The 125 VDC and 120 VAC Vital Instrumentation and Control Power Systems provide a source of reliable continuous power for safety related control and instrumentation required for startup, normal operations, and orderly shutdown of each unit.

2. REFERENCES:

2.1 Catawba Nuclear Station Updated Final Safety Analysis Report Chapter 8.3

2.2 120VAC Vital Instrumentation and Control Power System (EPG) Design Basis Specification Spec. CNS-106.01-EPG-0001

2.3 125 VDC Vital I & C Power System (EPL) Design Basis Specification Spec. CNS-106.01-EPL-0001

2.4 One Line Diagram CN-1705-01.01

2.5 Catawba Nuclear Station Technical Specifications 3.8.4, 3.8.5, 3.8.6, 3.8.7, 3.8.8, 3.8.9 and 3.8.10

2.6 OP/1/A/6350/008 (125 VDC/120 VAC Vital Instrument and Control Power)

2.7 PT/1/A/4350/013 (120 VAC Vital Instrument and Control Power System Test)

2.8 OP/1/B/6100/010L (Annunciator Response for 1AD-11)

2.9 SER 3-99 (Reactor Scram and Partial Loss of Class 1E AC and DC Power During Recovery)

3. AIDS:

3.1 Handout(s) as prepared by the instructor

3.2 Transparencies selected by the instructor

3.3 Slides, videos and/or other motivational tools at the instructors discretion

	Objective	ISS	NLO	LPRO	LPSO	PTRQ
1	State the purpose of the Vital Instrumentation and Control System	X	X	X	X	
2	Describe the operation of Kirk-Key Interlocks	X	X	X	X	
3	Describe the operation of Battery Chargers	X	X	X	X	
4	Describe the operation of Batteries	X	X	X	X	
5	Describe the operation of Static Inverters	X	X	X	X	
6	Describe the operation of Manual Bypass Switches	X	X	X	X	
7	Describe the operation of Auctioneering Diode Assemblies	X	X	X	X	
8	Describe operation of the Vital I & C system when configured for normal alignment	X	X	X	X	X
9	Describe operation of the Vital I & C system when configured for a battery charger being removed from service	X	X	X	X	X
10	Describe operation of the Vital I & C system when configured for a battery being removed from service	X	X	X	X	X
11	Describe operation of the Vital I & C system when configured for an equalizing charge on a battery	X	X	X	X	X
12	Describe operation of the Vital I & C system when configured for an Inverter being removed from service	X	X	X	X	X
13	Sketch channel A of the Vital I & C system per training drawing CN-SYS-EL-EPL-11	X	X	X	X	
14	Evaluate the impact a failure of any Vital I & C component will have on unit operation	X	X	X	X	X
15	Describe the Ground Detection controls and indications used at Catawba Nuclear Station	X	X	X	X	X
16	Describe how a ground is indicated on the ground detection devices used at Catawba Nuclear Station	X	X	X	X	X
17	Given appropriate plant conditions, apply the Limits and Precautions associated with OP/1/A/6350/008 (125 VDC/125 VAC Vital Instrument and Control Power System	X	X	X	X	X
18	Using the Annunciator Alarm Response Procedure for 1AD-11, correctly describe the annunciator alarms associated with the Vital I & C system			X	X	X

	Objective	ISS	NLO	LPRO	LPSO	PTRQ
19	Given a set of specific plant conditions and access to reference material, determine the actions necessary to comply with Tech Specs/SLC's.			X	X	X
20	Summarize DC battery operation under loaded conditions • State where to obtain accurate indication of a battery's condition • State actions to be taken to minimize the drain on a battery • Describe the operational characteristics when subjected to heavy loads for long periods of time	X	X	X	X	X

LESSON OUTLINE

1. INTRODUCTION
   - 1.1 Purpose
2. PRESENTATION
   - 2.1 Component Description
   - 2.2 Annunciators
   - 2.3 Operation
   - 2.4 Technical Specifications
   - 2.5 Operating Experience
3. SUMMARY

1. INTRODUCTION

1.1 Purpose (Obj. #1)

The 125 VDC and 120 VAC Vital Instrumentation and Control Power Systems provide a source of reliable continuous power for safety related control and instrumentation required for startup, normal operation, and shutdown of each unit.

2. PRESENTATION

2.1 Component Description

A. Battery Chargers (Obj. #3)

1. Five per unit, designated as follows:
   a) ECA - Channel A
   b) ECB - Channel B
   c) ECC - Channel C
   d) ECD - Channel D
   e) ECS - Spare Charger
2. Each charger is designed to;
   a) Carry its own individual load plus the DC & AC Panelboards of a train related channel.
   b) Charge its associated battery within eight hours after discharge while supplying its normal loads.
3. A charger should not be connected to a bus unless a battery is connected. The chargers lack sufficient voltage stability to serve as the sole power source to a DC System.
4. Power supplies
   a) ECA-EMXA
   b) ECB-EMXJ
   c) ECC-EMXI
   d) ECD-EMXB
   e) ECS-EMXA/EMXJ
5. Plant Response due to a Charger Failure (Obj. #14)
   a) No effect on plant since the battery is providing backup power to the chargers busses.
   b) Receive Annunciator 1(2) AD-11; H(1-4) for the applicable Battery Charger (A,B,C or D).
   c) Refer to Annunciator Response for appropriate corrective action.

6. Battery Charger Protective Relaying
   a) Overvoltage sensor provides a signal to the output circuit breaker
   b) Should a charger overvoltage condition occur with the "FLOAT/EQUALIZE" switch in "FLOAT", the DC output breaker will open to protect the battery and equipment from damage.

B. 125 VDC Batteries (Obj. #4)
   1. Four per unit, designated as follows:
      a) EBA - Channel A
      b) EBB - Channel B
      c) EBC - Channel C
      d) EBD - Channel D
   2. Each battery is sized to carry the following continuous emergency loads for a two hour period: (An emergency would be a complete loss of AC power or a battery charger failure).
      a) its own vital buss
      b) and the loads of another battery.

      The two-hour period is the conservative estimate of the time required to restore power to the battery chargers under the most adverse conditions.
   3. Each battery is also capable of supplying the anticipated momentary loads during this two-hour period.
   4. DC battery operation under loaded conditions (Obj. # 20) (SER 3-99, PIP C-00-1223)
      a) When batteries consisting of more than one cell are discharged for an extended period of time, the potential exists for individual cells to drop below the voltage of the battery bank. Under loaded conditions the most accurate indication of a battery's condition (voltage) is taken at each individual cell and not at the distribution center or any meter which measures voltage across the entire bank of batteries.
      b) When a battery is under a heavily loaded condition for a long period of time a phenomena known as cell reversal may occur. Cell reversal is a condition where an individual battery cell reverses polarity. The positive lead becomes the negative lead and the negative lead becomes the positive lead. When this happens, the cell becomes a load on the battery and causes the battery's voltage to decrease rapidly. This phenomena occurs at approximately 80-85% of normal battery voltage. Once a cell has undergone cell reversal, it cannot be recovered.

c) Low battery voltage can cause damage to the remaining cells in a battery bank and damage the equipment being supplied from the battery.

d) To prevent cell reversal and damage to equipment being supplied by a battery we have to minimize the drain on the battery. Actions taken to minimize the drain on a battery include removing non-vital loads from the DC bus, placing AC portions of these systems on alternate power sources, and consulting station management for recommended loads to remove from a DC bus.

e) Anytime battery voltage drops below 105 VDC, the battery is removed from the bus.

5. Plant Response due to 125VDC Battery Failure (Obj. #14)

a) During normal operation there should be no effect on the Plant since the Battery Charger will be supplying the 125VDC Distribution Center.

b) Receive Annunciator 1(2) AD-11; H(1-4) 125 VDC ESS PWR Channel (A-D) trouble for the applicable Battery.

c) If the Vital Battery is the only source of power then the channel will become completely de-energized which will be indicated by some of the following:

1) Multiple Control Room Alarms/Annunciators

2) One row of lights on the Status Indicator Panels will be lit.

3) All instruments which receive power will fail to the bottom of their indicated scale.

4) Loads affected:

(a) Channel B & Channel C will have little effect on plant operations since virtually no loads come off of these.

(b) See Section F2 for Loads affected by a Channel A Battery Failure.

(c) See Section F3 for Loads affected by a Channel D Battery Failure.

C. Kirk-Key Interlocks (Obj. #2)

1. Inputs to AC Power Panel EMS are interlocked such that only one breaker can be closed at a time. This prevents tying two trains of Vital Power together thereby, preventing a single failure from rendering two or more channels of Vital Instrumentation and Control Power inoperable.

2. EDS output breakers are interlocked to prevent closing more than one breaker at a time.

3. Any combination of breaker alignment which results in one train supplying the other train through the standby charger results in a control room annunciator which serves to warn the operator of this condition.
4. The feeder breakers to AC Power Panel EMS on 1EMXA and 1EMXJ are interlocked such that only one breaker may be closed at a time.

D. 125 VDC Distribution Centers

1. Four per unit, designates as follows:
   a) EDA - Channel A
   b) EDB - Channel B
   c) EDC - Channel C
   d) EDD - Channel D
2. Each Distribution Center receives power from the associated channel battery charger (normal) or battery (emergency).
3. Each Distribution Center supplies the associated channel static inverter and one 125 VDC panel boards.
   a) EDA supplies auctioneering diode assembly EADA, which feeds 125 VDC Panelboard EDE.
   b) EDD supplies auctioneering diode assembly EADB, which feeds 125 VDC Panelboard EDF.
4. A 125VDC Distribution Center Failure will cause the Plant to respond like a Battery Failure when the Battery is the only source of power to the Distribution Center.

E. Auctioneering Diodes (Obj. #7).

1. Two auctioneering Diodes feed EDE and EDF
2. For EDE Diodes, EADA and VADA:
   a) EADA receives power from 1EDA
   b) VADA receives power from 1DGBA
      (1A Diesel Generator Panel)
3. For EDF Diodes EADB and VADB:
   a) EADB receives power from 1EDD
   b) VADB receives power from 1DGBB
      (1B Diesel Generator Panel)

4. These Diode assemblies will supply their respective distribution center with power from the source with the highest voltage. These loads are essential for plant shutdown. This ensures that 1EDE and 1EDF will have power at all times and protects against a loss of DC power due to a fire in the control complex.
5. A failure of a single Diode will have virtually no effect on the plant except for the corresponding Control Room Annunciator.
6. If both Diodes fail which feed either EDE or EDF the following Plant Control functions would be lost. For a list of those functions see Section F.4. a-g.

F. 125 VDC Panelboards

1. EPB and EPC carry no loads
2. EPA carries the following loads
   a) RN System Solenoid Valves Train A
   b) KC Solenoid Valves
   c) Reactor Trip Switchgear Control (Shunt Coil also)
   d) Turbine Trip 1A
   e) Misc. Control Power Ess. Area Term. Cabinet
   f) H_2 Analyzer Solenoid Valves
   g) FDW Control & Control Bypass Relay Control
   h) Main FDW Containment Isolation Valves
   i) MD AFWP 1A Control
   j) Air Handling Unit Glycol Train A Supply Valves
   k) Aux. Safeguards Cabinet Train A
   l) Misc. NV System Solenoid Valves Train A
   m) Main Steam Isolation Valves Train A
   n) NC System Solenoid Valves
   o) EPL-EPG Isolation Dev.
   p) EPE Monitoring Isolation Dev.
   q) Containment Purge A Train Solenoid Valves
   r) Power Operated Relief Valves Solenoids
   s) CA Nozzle Tempering Flow Isolation Valves
3. EPD carries the following loads
   a) KC Solenoid Valves

b) Reactor Trip Switchgear Control (Shunt Coil also)

c) Turbine Trip 1B

d) Misc. Control Power Ess. Area

e) H_2 Analyzer Solenoid Valves

f) FDW Control & Control Bypass Relay Control

g) Main FW Containment Isolation Valve Solenoid Valves

h) Aux. Safeguard Cabinet Train B

i) Misc. NV System Solenoid Valves

j) Main Steam Isolation Valves Train B

k) EPE Monitoring Isolation Dev.

l) EPL-EPG Isolation Dev.

m) Solid State Protection System

n) RN System Solenoid Valves Train B

o) Power Operated Relief Valves Solenoids

p) CA Nozzle Tempering Flow Isolation Valves

4. EDE (EDF) carry the following loads:

   a) ETA (ETB) Swgr. Control Power

   b) ELXA & ELXC (ELXB & ELXD) Control Power

   c) D/G Sequencer 1A (1B) Control Power

   d) Aux. S/D Panel A (B) Control Power

   e) CA Turbine A (B) Train Control Power

   f) PZR Heater Gr. 1A (1B) Aux. S/D Pnl. Control

   g) NV System A (B) Solenoid Vlvs. (Aux. S/D Panel)

5. A loss of EDA or EDD concurrent with a loss of EDE or EDF, respectively would be the worst case failure for the Vital I & C System and plant response. The following action would occur in this case: (Obj #14)

   a) In the particular case of losing either EDA or EDD, control circuits are de-energized which result in a loss of main feedwater and closure of the main stream isolation valves, resulting in a turbine trip and reactor trip.

   b) As stated, the worst case occurs upon a loss of channel A or channel D. Assuming a concurrent loss of 125 VDC Panelboard EDE or EDF, the following actions take place.

      1) Lose control of 4160 V loads.

2) Lose control of 600 V essential loads.
3) Lose control of D/G sequencer loads.
4) CF control and bypass valves close.
5) KC to NDHX opens.
6) No MD CA pump indication.
7) AB containment isolation valves close.
8) Tempering isolation valves close.
9) VP isolation valves close.
10) Main steam isolation valves close.
11) Letdown isolates, divert to VCT, BA valve fails open, RMUW valve fails closed.
12) PORV's fail closed.
13) AHU Glycol supply valves close.
14) Receive reactor trip alert Annunciators.
15) Lose permissives for NS valves and VX damper.
16) Lose RN swap to SNSWP.
17) Lose Post Accident Recorders.
18) CAPT Electronic overspeed not available.
19) CA suction auto transfer to RN not available.
20) CA reset not available.
21) TD CA pump auto start.

G. Static Inverters (Obj. #5)
1. Four per unit, designated as follows:
a) EIA - Channel A
b) EIB - Channel B
c) EIC - Channel C
d) EID - Channel D
2. Static inverters convert 125 VDC power to 120 VAC power.
3. Each inverter supplies a 120 VAC Panelboard (ERPA, ERPB, ERPC and ERPD) through a Manual Bypass Switch.

4. Static inverters have a synchronizing circuit which compares the frequency and phase of the alternate 120 VAC 60 Hz supply from VRD to the inverter output. It compares the two signals only if the sync. disconnect switch is closed and the alternate AC source breaker is closed at VRD. This synchronizing circuit causes the inverter to turn in sync. with the alternate source which allows the 120 VAC panelboard power supply to be swapped without power interruption.
5. To prevent damage on inverter restart after shutdown, a 60 second wait is required to allow the capacitors and rectifiers to cool down.
6. Static inverters must be "Pre-charged" prior to closing the DC input breaker. Once the "Pre-charge" button is released, the "Battery Input" breaker must be closed immediately to prevent blowing the inverter input fuses.
7. On a Vital Inverter Failure the following Plant responses will be observed: (Obj. #14)
   a) Annunciators 1(2) AD-11; G(1-4) will be illuminated for the Respected Channel
   b) The associated 120 VAC Panelboard will be de-energized thereby rendering the following equipment inoperable.
      1) NCP Monitor
      2) Process protection
      3) Solid State Protection System
      4) Auxiliary Relay Rack
      5) Auxiliary Safeguards Cabinet
      6) Safeguard Test System
      7) Monitor Lights
      8) NS valves alarms and permissives
      9) PAM recorders
      10) Nuclear instruments I&C power
      11) VX damper
      12) Lake to pond transfer control
      13) D/G control panel
      14) VP valve indications
      15) Pzr PORV's
   c) A complete list of affected components can be found in the electrical load lists.

H. Manual Bypass Switch (Obj. #6)

1. Provides a transfer from the inverter to the alternate power source without power interruption (make-before-break contacts) to the 120 VAC panelboards (ERPA, ERPB, ERPC and ERPD).
2. The normal and alternate sources should be synchronized (in sync light lit) prior to transfer. There is no interlock to prevent transfer if the two sources are not synchronized.
3. Manual Bypass Switch panel includes a breaker from the 120 VAC Regulated Power supply which is used as an alternate source of power to the 120 VAC Panelboard.
4. The manual bypass switch has an "In Sync" indication to let the operator know that the normal and alternate power supplies to the 120 VAC panelboards are synchronized.

I. 120 VAC Vital I&C Power Panelboards

1. Four per unit, designated as follows:
   a) ERPA - Channel A
   b) ERPB - Channel B
   c) ERPC - Channel C
   d) ERPD - Channel D
2. Each channel carries similar loads, as follows:
   a) NCP Monitor
   b) Process protection
   c) Solid State Protection System
   d) Auxiliary Relay Rack
   e) Auxiliary Safeguards Cabinet
   f) Safeguard Test System
   g) Monitor Lights
   h) NS valves alarms and permissives
   i) PAM recorders
   j) Nuclear instruments I & C power
   k) VX damper
   l) Lake to pond transfer control and airlock valve
   m) D/G control panel
   n) VP valve indications
   o) Pzr PORV's

J. 120 VAC Regulated Power

1. Is NOT safety related
2. Components
   a) One voltage regulator per unit (VRR) – Maintains 600 volts to transformer VRT.
   b) One transformer per unit (VRT) – 600 VAC to feed VRD.
   c) One distribution center per unit (VRD)
   d) Four feeder breakers on the distribution center; one to each 120 VAC Vital I & C Power Channel Manual Bypass Switch.
   e) The four feeder breakers on VRD are kirk-keyed to prevent the following: (Obj. #2
      1) Feeding more than one 120 VAC Vital Load Channel by a non-essential power source at one time.
      2) Tying both safety trains of 120 VAC Vital Power together.
      3) Overloading VRD and its associated voltage regulator and transformer.
3. Power Supply
   a) Unit 1 - 1MXM
   b) Unit 2 - 2MXM

K. Control Room Status lights

1. Status Indication
   a) Standby Battery Charger ECS Train A Bkrs. Closed
   b) Standby Battery Charger ECS Train B Bkrs. Closed
   c) ESS Inverter EIA SW EMA to Alt. Source
   d) ESS Inverter EIB SW EMB to Alt. Source
   e) ESS Inverter EIC SW EMC to Alt. Source
   f) ESS Inverter EID SW EMD to Alt. Source

2.2 Annunciators (Obj. # 18)

A. Setpoints

1. 120 VAC ESS PWR Channel A (B,C,D) Trouble
   a) Annunciator Windows: G/1, G/2, G/3, G/4
   b) Setpoint: local alarm actuated on RFMP2
   c) Immediate Action: Send operator to panel RFMP2 to determine exact cause of alarm.

d) Supp. Action:

1) Attempt to restore power

2) Refer to Tech Specs.

2. 125 VDC ESS PWR Channel A (B,C,D) Trouble

a) Annunciator Windows: H/1, H/2, H/3, H/4

b) Setpoint: local alarm actuated on RFMP2

c) Immediate Action: Send operator to panel RFMP2 to determine exact cause of alarm.

d) Supp. Action: (1) If due to tie bkr. closed ensure condition desirable. If not, return to normal condition (2) If due to undervoltage or ground notify I&E (3) Refer to Tech. Specs.

3. STBY Charger ECS Input/Output trains x-connected

a) Annunciator Window: I/6

b) Setpoint: N/A

c) Immediate Action: (1) Verify the desirability of this alignment. If alignment is not desired, dispatch operator to ECS to align system properly (2) Refer to Tech. Specs.

d) Supp. Action: None

4. 125 VDC ESS PWR Stby Charger ECS Trouble

a) Annunciator Window: J/6

b) Setpoint: N/A

c) Immediate Action: Dispatch an operator to ECS to determine cause of alarm

d) Supp. Action: (1) If due to loss of power, attempt to restore (2) Refer to Tech. Specs.

2.3 Ground Detection (Obj. # 15 & 16)

A. A ground detection device and two auxiliary relays are provided on each distribution center (EDA, EDB, EDC, and EDD to detect and alarm for grounds on either the bus leg (positive or negative) of the DC distribution system.

B. Upon ground detection, the auxiliary relays provide alarm outputs to both a control room annunciator via a relash module and the Operator Aid Computer.

C. Indications and Controls

1. Volt Meter

a) Used to measure voltage to ground if a ground exists and the Battery Voltage to Ground Volt Meter Mode Selector Switch is taken to the "POS" or "NEG" position.

b) Normally indicates zero DC volts.

2. Battery Ground Positive Leg and Battery Ground Negative Leg Lamps

a) White lamps located under the Volt Meter.

b) These lamps burn dimly under normal conditions and brightly under a battery ground condition.

3. Battery Voltage to Ground Volt Meter Mode Selector Switch

a) Three position switch

1) OFF

2) NEG

3) POS

b) Used by the operator to determine the magnitude of a ground.

c) If a ground exists, the Volt Meter will indicate the amount of volts to ground when this switch is taken to the NEG (measures volts to ground on the negative leg) or the POS (measures volts to ground on the positive leg).

4. Battery Undervoltage Relay

a) During a bus undervoltage condition, this relay provides an alarm to both a control room annunciator via a reflash module and the Operator Aid Computer.

b) No control functions are associated with this relay.

5. No. 27B Battery Undervoltage Relay Test Switch

a) Two Position Switch

1) NORM

2) TEST

b) In the TEST position, this switch inserts a resistor in the undervoltage relay circuit to drop voltage to the relay.

c) When manipulated alarms will be generated in the control room via a reflash module.

d) This switch is manipulated by I & E during periodic testing and should not be manipulated by Operations personnel.

6. Battery Ground Detector Test Switch

a) Three position switch

1) NORM

2) NEG

3) POS

b) Depending on switch position (NEG or POS), a resistor is inserted between the ground detector input and either the positive or negative leg of the distribution center, thereby, simulating a battery ground condition.

c) When manipulated, alarms will be generated in the control room via a reflash module.

d) This switch is manipulated by I & E during periodic testing and should not be manipulated by Operations personnel.

2.4 Operation

A. Review the Limits and Precautions with latest copy of OP/1(2)/A/6350/008. (Obj. #17)

B. System Configuration

1. Normal Operation (Obj. #8)

a) Each battery charger receives power from its 600 volt essential power source and supplies its 125 VDC Distribution Center. The batteries are floating on their respective buses.

b) The 120 VAC Panelboards are being supplied by their inverters through the manual bypass switches.

c) The standby charger is aligned for standby operation and the 120 VAC Regulated Power Supply is energized.

d) 125 VDC Panelboards EDE and EDF are supplied from 1EDA/EDD and D/G 125 VDC Auxiliary Power Train A/B through auctioneering diode assemblies. The source of higher voltage will supply the Panelboard.

2. Abnormal Operation

a) Battery charger removed from service (Obj. #9)

1) Standby charger aligned to tie bkr buss for applicable trains charger with the individual channels tie breaker closed.

2) ECA breaker to EDA is opened.

3) The applicable train charger DC output and AC input bkrs are open.

b) Battery removed from service (Obj. # 10)

1) The standby charger is aligned to the tie bkr buss for the applicable train battery with the tie bkrs closed.

2) The main breaker on the 125 VDC distribution center and the battery breaker are open.

c) Equalizing charge (Obj. # 11)

1) Standby charger aligned as described in 'Battery removed from service'.

2) The associated main breaker on the 125 VDC distribution center is open.

3) The battery and battery charger remain connected to each other although divorced from the distribution center with the battery on 'EQUALIZE'.

d) Inverter removed from service (Obj. # 12)

1) The alternate AC source VRD is closed into the manual bypass switch for the applicable inverter.

2) The input breaker on the manual bypass switch is closed with the manual bypass switch selected to 'Alternate Source to Load Position'.

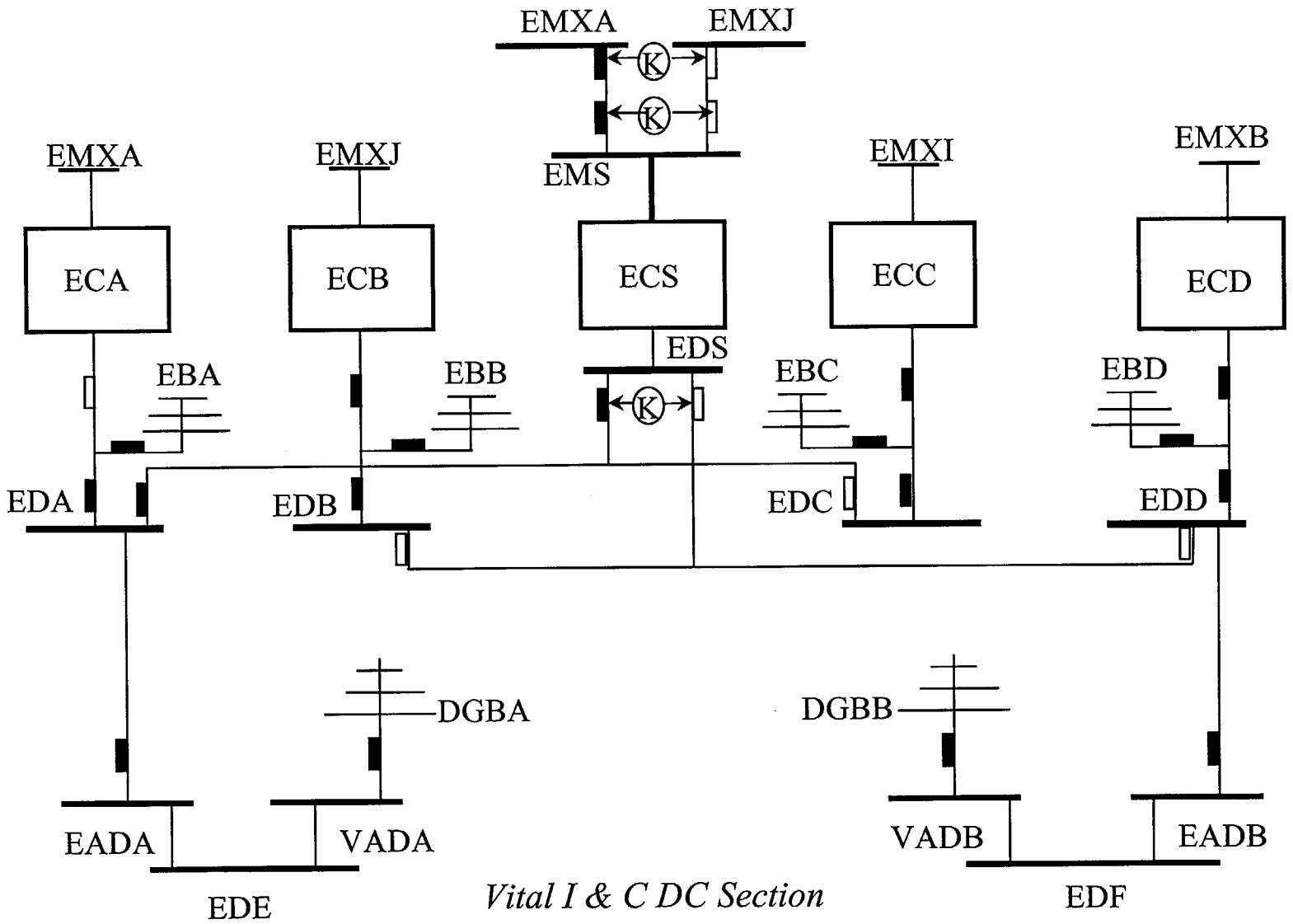
2.5 Technical Specifications (Obj. # 19)

A. Use the latest copy of Catawba Nuclear Station Technical Specifications 3.8.4, 3.8.5, 3.8.6, 3.8.7, 3.8.8, 3.8.9 and 3.8.10.

2.6 Operating Experience

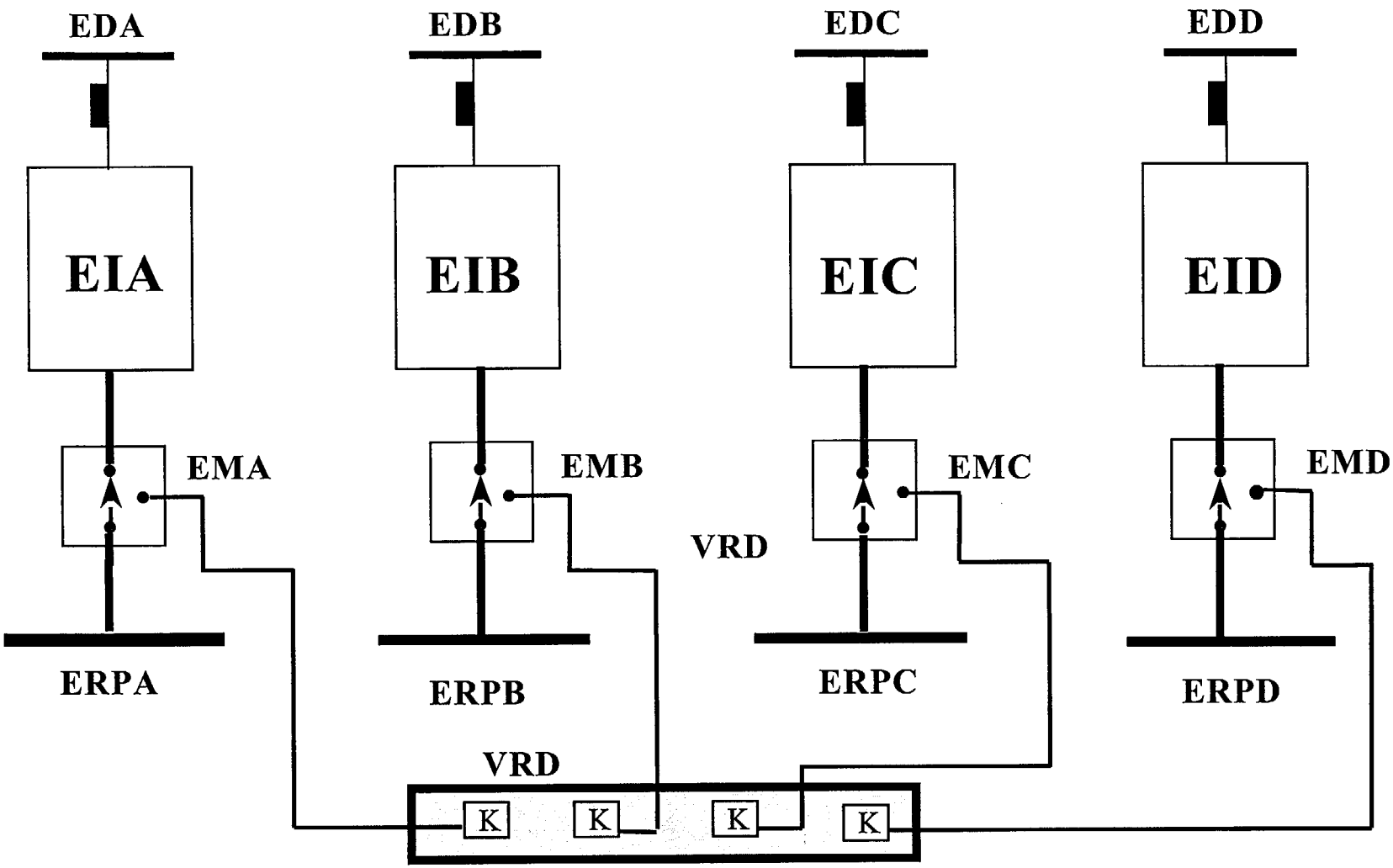
A. Cover any pertinent operator experience item.

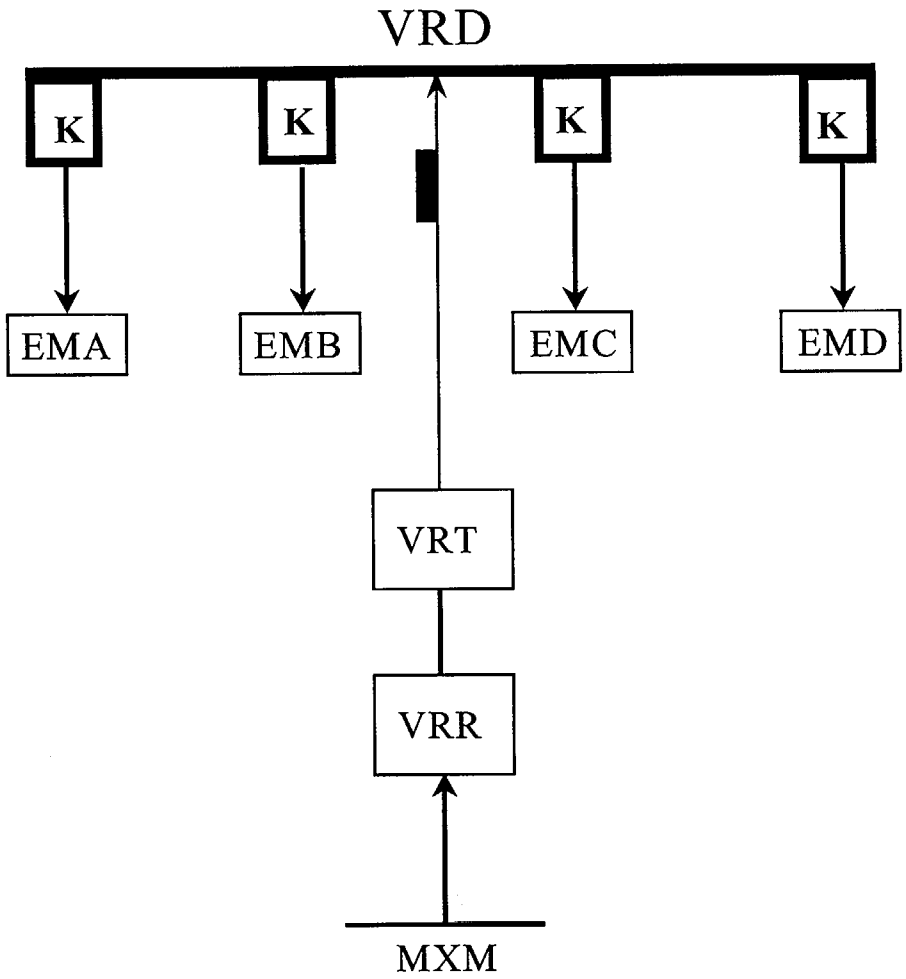
3. SUMMARY



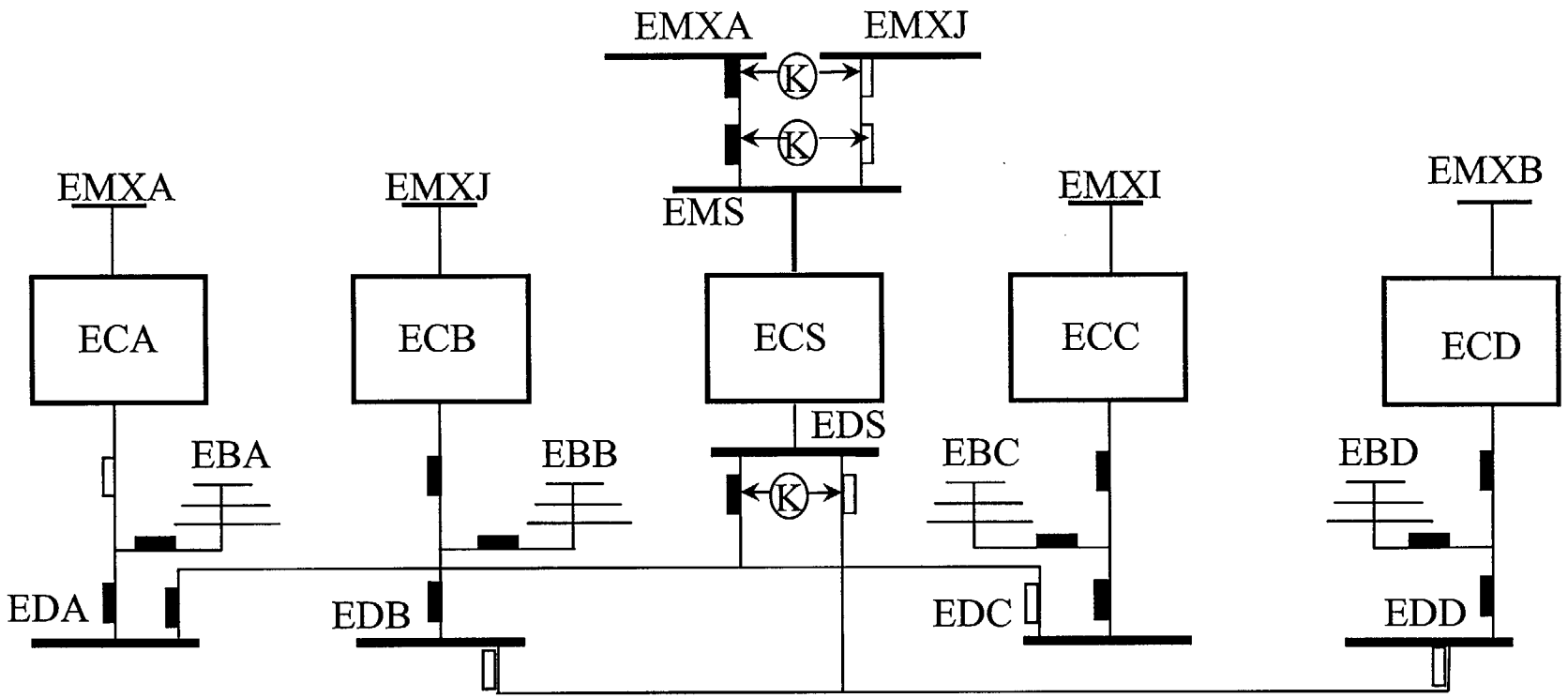
Vital I & C DC Section

AC Portion of Vital I & C



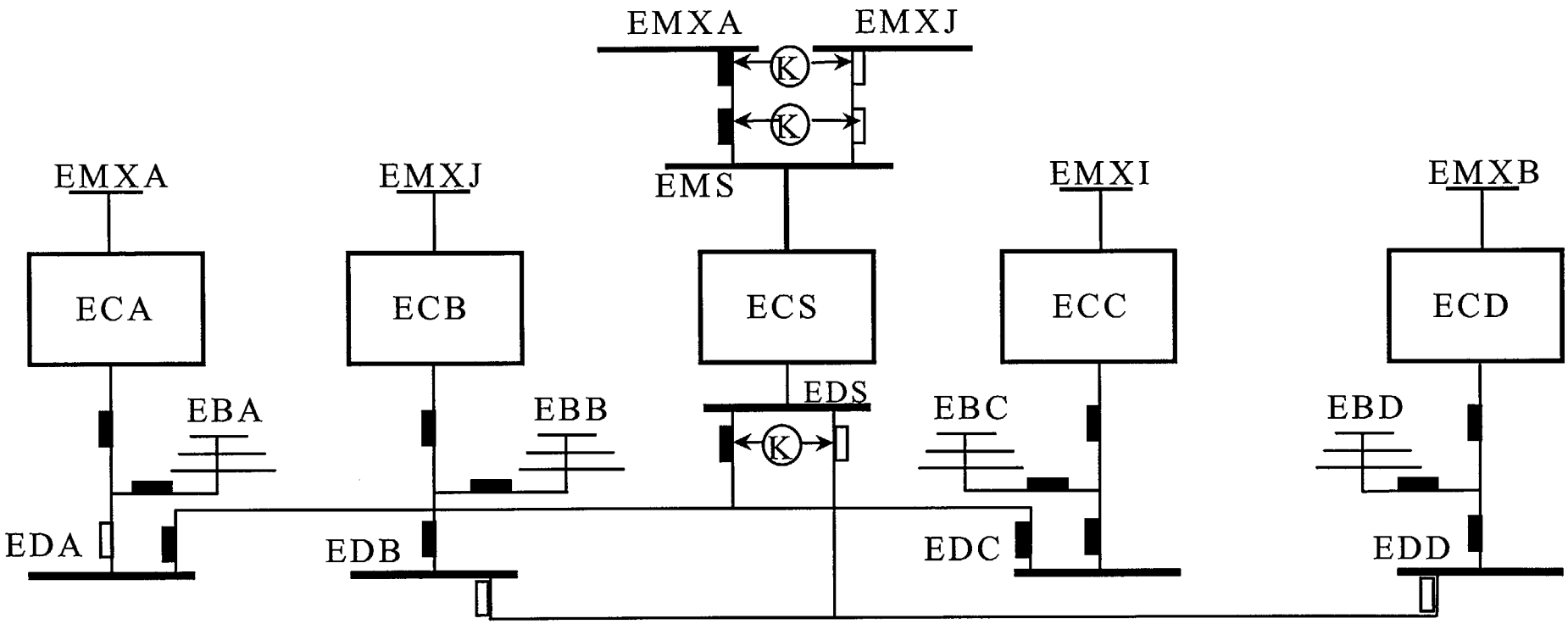


Vital I & C Regulated Power Supply



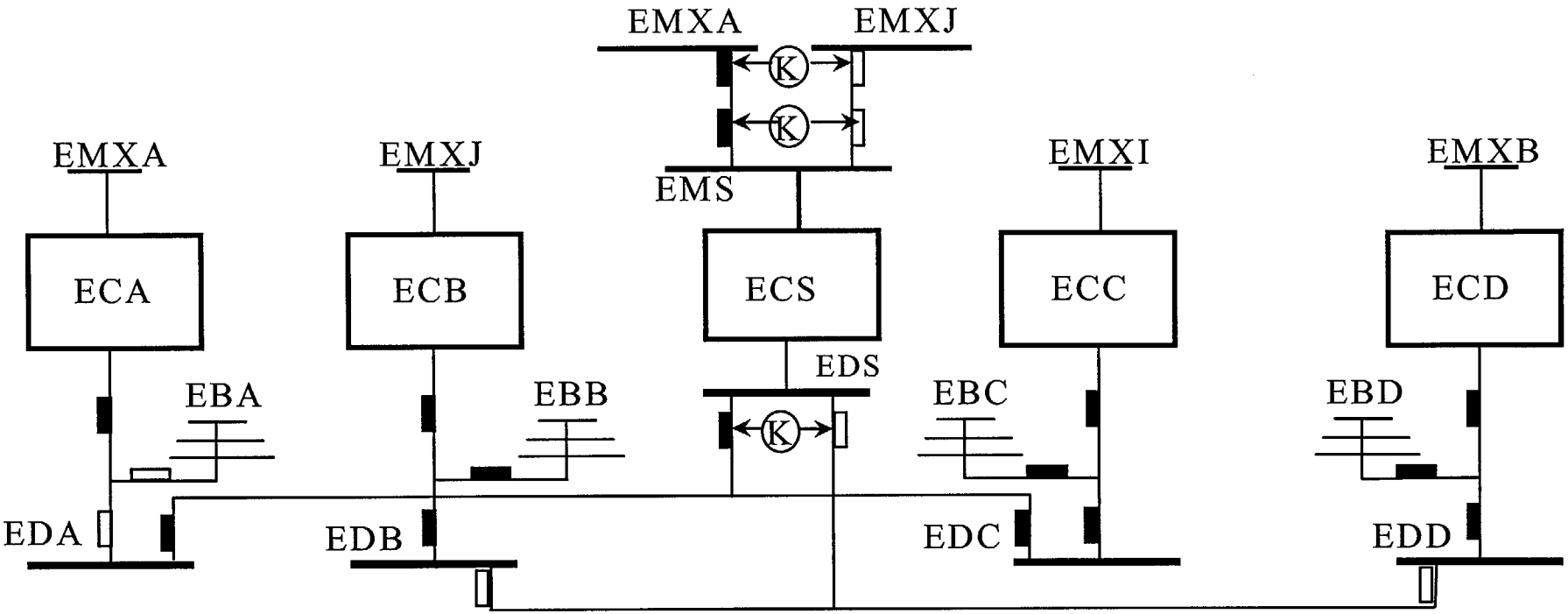
CHARGER ECA REMOVED FROM SERVICE

ECS CLOSED IN ON TIE BKR bus FOR TRAIN A
TIE BKR ON EDA CLOSED TO ECS
ECA BREAKER TO EDA OPEN
AC INPUT AND DC OUTPUT BKRS ON ECA OPEN



BATTERY EBA ON EQUALIZE

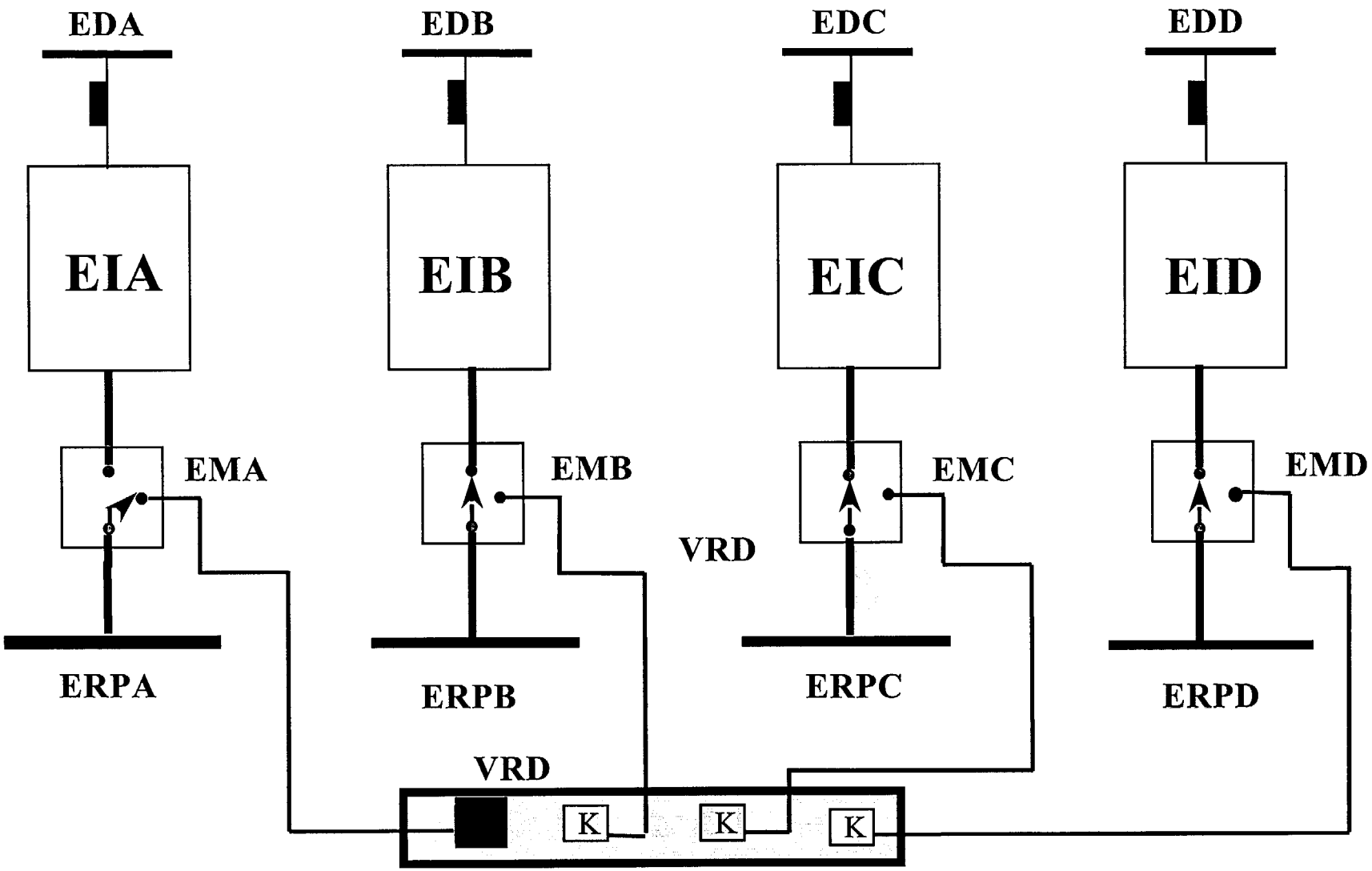
ECS CLOSED IN ON TIE BKR bus FOR TRAIN A
TIE BKRS BETWEEN EDA AND EDC CLOSED
ECA CLOSED IN TO EBA
EDA MAIN BREAKER OPEN



BATTERY EBA REMOVED FROM SERVICE

ECS CLOSED IN ON TIE BKR bus FOR TRAIN A
TIE BKRS BETWEEN EDA and EDC CLOSED
EDA MAIN BKR OPEN
BATTERY BREAKER IS OPEN

Inverter EIA Removed from service



Facility Comments for Admin JPM R1/S1 (Perform the Required Actions for a Procedure Discrepancy)

Per discussions with the Shift Operating Manager, the Superintendent of Operations, and the Operations Support Group Manager, the focus of this JPM is threefold:

1) Identification of the out of tolerance item.
2) Entry of this item into the Tech Spec Action Item Logbook (TSAIL) and thus the initiation of the required Tech Spec action.
3) Discrepancy sheet completion showing the out of tolerance item for the periodic test (PT).

These should be considered the critical items for the JPM.

Another issue with this JPM has been identified. The issue concerned:

- Whether the acceptance criteria is met with the item in TSAIL with the required actions taken.
- How the procedure should be completed.

The daily surveillance PT's are unique in that they are one of the few PT's which perform surveillance on inoperable equipment. This is due to the number of items reviewed for meeting the appropriate Mode requirements. Normally, if an item does not meet the acceptance criteria given in the PT, the PT is left open until the item in question is declared operable. To leave the Daily Surveillance PT open for every item which is inoperable is not desired by Operations Management due to the number of these PT's performed (one per 12 hour shift).

For this reason OMP 1-4 rev 64 (approved 7/22/99) section 8.4 B 3d made it permissible (but not required) to sign off the acceptance criteria for a PT as long as the out of tolerance item was declared inoperable (placed in TSAIL) and the Tech Spec action statement was complied with. However, section 8.4 B 3b states that if a discrepancy affects the acceptance criteria the PT *shall* remain incomplete (the assumption being – the acceptance criteria are not met). This caused an unanticipated grey area in the completion of the daily surveillance PT in that it was acceptable to either sign off the acceptance criteria per section 8.4 B 3d and not sign off the acceptance criteria per section 8.4 B 3b.

With regard to PT/1/A/4600/02A (Mode 1 Periodic Surveillance Items), once an out of tolerance item was found, it was permissible per OMP 1-4 rev 64 to take one of the following actions:

- N/A step 12.2.1 due to the acceptance criteria not being met.
- Perform and sign off step 12.2.2.
- N/A step 12.2.3 due to the acceptance criteria not being met.

OR

- N/A step 12.2.1 due to the acceptance criteria not being met.
- Perform and sign off step 12.2.2.
- Perform and sign off step 12.2.3 due to the acceptance criteria now being met per OMP 1-4 rev 64.

OR

- After the item has been entered into TSAIL, sign off step 12.2.1 due to the acceptance criteria now being met per OMP 1-4 rev 64.
- N/A 12.2.2 due to the acceptance criteria now being met per OMP 1-4 rev 64.
- Perform and sign off step 12.2.3 due to the acceptance criteria now being met per OMP 1-4 rev 64.

This issue was previously identified by the facility and PIP C-00-06434 was issued on 12/22/2000. The corrective action for the PIP was to change the wording of OMP 1-4 to clarify when the acceptance criteria are met and what actions are required. This change was made to rev 65 of OMP 1-4 and approved on 3/22/01 (after the freeze date for exam reference materials).

Relevant pages of OMP 1-4 (Use of Procedures) rev 64 and rev 65 are attached as well as PT/1/A/4600/002A (Mode 1 Periodic Surveillance Items) and PIP C-0006434.

Operations Management Procedure 1-4 (OSG)

Approval R.M. Glover (OPS)

(CHEM)

Rev 64 Date 7/22/99

DUKE POWER COMPANY

CATAWBA NUCLEAR STATION

USE OF PROCEDURES

1. Purpose

To provide guidance to the Operations and Chemistry Groups to further amplify Nuclear System Directive 703, "Administrative Instructions For Station Procedures" and NSD 704, "Technical Procedure Use and Adherence".

2. References

2.1. Nuclear System Directive 703, "Administrative Instructions For Station Procedures"

2.2. Nuclear System Directive 704, "Technical Procedure Use and Adherence"

3. Description

This procedure provides instruction in the following areas:

- Control of approved procedures
- Use of approved procedures
- Completion of a procedure
- Procedure changes and revisions
- Procedure changes and revisions with Procedure Discrepancy Forms.

4. Only the most recent completed procedure section needs to be maintained in the Control Copy Folder. Completed procedure section(s) that are no longer needed to identify system status should be filed.

5. Chemistry will maintain completed procedure files in the appropriate work areas.

8.4. Signoff Steps Are Required (PTs):

A. If the acceptance criteria for the test has been met and all sign-off steps have been initialed where appropriate, the Procedure Process Record should be filled out as follows:

1. The person performing the procedure shall review the procedure and complete the following on the Procedure Process Record:

a. "Date(s) Performed"

b. "Procedure Completion Verification"

2. An Operations supervisor (usually the Shift Supervisor) or an operator qualified on the procedure shall perform a review of the procedure and completes the "Verified By" section of the Procedure Process Record.

3. An Operations supervisor (usually the Control Room SRO) or Chemistry QR completes the "Procedure Completion Approved" section of the Procedure Process Record.

B. If the acceptance criteria for a test has <u>not</u> been met or the <u>procedure can not be completed for any reason</u>, proceed as follows:

1. A Procedure Discrepancy Form shall be filled out per Nuclear System Directive 704 (Technical Procedure Use and Adherence).

2. In the margin of the procedure next to an unsigned step, write the word "ITEM #" and a number which corresponds to the item number of the discrepancy entry on the Procedure Discrepancy Form.

3. Discrepancies shall be evaluated to determine if the acceptance criteria can be met as follows:

   a. If a discrepancy does not affect the acceptance criteria, the PT should be completed with corrective action (procedure change, work request, etc.) initiated.

   b. If a discrepancy affects the acceptance criteria, the PT shall remain incomplete until corrective action allows the PT to be completed.

   c. If the discrepancy prevents the completion of the PT, the procedure shall be placed in the Incomplete PT Box for the applicable unit.

   d. If a discrepancy resulted in declaring a component inoperable per Tech Specs, complying with the action statement can be used to meet the acceptance criteria and complete the PT. This would normally be used when PT completion is required for other items in the PT to meet their surveillance frequency.

   e. If a procedure step can not be completed and there are no provisions provided in the procedure for not performing the step, such as "If" statements, unused options or specified instructions, then a procedure change should be submitted.

NOTE:	If you can take data from another gauge or computer point in the same instrument loop (same transmitter), it would not be considered alternate means and you could complete the procedure. Explain on a discrepancy form, without a procedure change, the action taken unless the procedure being performed provides this option.

f. If the acceptance criteria can be met by alternate means, then a procedure change shall be processed before the procedure is completed. A Procedure Discrepancy Form can not be used in lieu of a procedure change.

Example: PT requires taking data and recording values and the gauge is broken. You have performance install a temporary gauge or you use an alternate instrument loop such as inlet versus outlet flow. In this case, a restricted change is required.

4. The Unit Operations Manager or designee tracks corrective action items and reschedules incomplete PTs to ensure their completion. The Control Room SRO will ensure PTs affecting operability of components required by Technical Specifications or SLCs, that are not completed when scheduled, will be placed in TSAIL.

5. Completed PT procedures shall be routed to the Unit Operations Manager or his designee (Chemistry Administrative Specialist) for transmittal to Master File, by placing the completed test procedure in the Completed PT Box.

6. The Unit Operations Manager or designee maintains a database file which contains a history of completed PTs and a schedule for:

- Test Identification Number
- Title
- Equipment Number (if applicable)
- Work Request Number (if applicable)
- Test Frequency
- Unit Number
- Last date test was performed
- * Next date test is due
- ** Latest test date
- Previous four test dates

* The next test date is a calculated date based on the previous test date plus one surveillance interval.

** The latest test date is that date after which the test interval is exceeded plus 25% grace time allowed under Tech Spec 4.0.2.

8.5. A Procedure Discrepancy Form should <u>not</u> normally be filled out for OPs, the procedure should remain open until properly changed or completed.

8.6. Whenever an EP or AP is used, a Procedure Evaluation Form (Attachment 3, OMP 4-10) shall be completed and forwarded along with the completed procedure to the Ops Support Manager. This form is used to ensure EPs and APs are kept current and useable. Even if no discrepancies are encountered during use of the procedure, the form shall be completed and "NONE" written in under the "DISCREPANCY" heading.

Operations Management Procedure 1-4 (OSG)

Approval R. Michael Glover (OPS)

S. K. Smith /dcj (CHEM)

Rev 65 Date 3/22/01

DUKE POWER COMPANY

CATAWBA NUCLEAR STATION

USE OF PROCEDURES

1. Purpose

To provide additional guidance to the Operations and Chemistry Groups to further amplify Nuclear System Directive 703, "Administrative Instructions For Station Procedures" and NSD 704, "Technical Procedure Use and Adherence".

2. References

2.1. Nuclear System Directive 703, "Administrative Instructions For Technical Procedures"

2.2. Nuclear System Directive 704, "Technical Procedure Use and Adherence"

3. Description

This procedure provides instruction in the following areas:

- Control of approved procedures
- Use of approved procedures
- Completion of a procedure
- Procedure changes and revisions
- Procedure changes and revisions with Procedure Discrepancy Forms.

8.4. Signoff Steps Are Required (PTs):

A. If the acceptance criteria for the test has been met and all sign-off steps have been initialed where appropriate, the Procedure Process Record should be filled out as follows:

1. The person performing the procedure shall review the procedure and complete the following on the Procedure Process Record:

a. "Date(s) Performed"

b. "Procedure Completion Verification"

2. An Operations supervisor or an operator qualified on the procedure shall perform a review of the procedure and completes the "Verified By" section of the Procedure Process Record.

3. An Operations supervisor or Chemistry supervisor completes the "Procedure Completion Approved" section of the Procedure Process Record.

B. For PTs with discrepancies, the person completing or ensuring completion of the procedure should perform the following:

1. A Procedure Discrepancy Form shall be filled out per Nuclear System Directive 704 (Technical Procedure Use and Adherence).

2. In the margin of the procedure next to an unsigned step, write the word "ITEM #" and a number which corresponds to the item number of the discrepancy entry on the Procedure Discrepancy Form.

3. Discrepancies shall be evaluated as follows:

   a. An Operations supervisor shall review the Procedure Discrepancies Process Record to determine if any discrepancy is a deficiency, and that appropriate corrective action has been initiated.

   b. If the discrepancy does not affect the PT Acceptance Criteria, note "NO" for deficiency and ensure the generation of any needed Work Request.

   c. If the procedure was completed but the discrepancy prevents meeting the Acceptance Criteria for an item:

      1. Check "YES" for deficiency.

      2. Evaluate Tech Specs and make appropriate entries.

NOTE:	Do not status WMS for any surveillance that does not meet its Acceptance Criteria.

      3. If a Tech Spec entry is made, ensure the work order for the PT is logged with the component in TSAIL.

      4. An Operations Supervisor shall review the completed procedure to ensure that the remaining surveillance item met their specified Acceptance Criteria, sign the Procedure Completion Approved on the Procedure Process Record cover sheet.

d. If the deficiency prevents completion of the procedure:

1. Check "YES" for deficiency.

2. Take appropriate action to correct the deficiency.

3. Retain the procedure in the Incomplete PT Box for the applicable unit until deficiency is corrected.

NOTE: If the acceptance criteria can be met by performing the following, it would not be considered alternate means and you could complete the procedure. Explain on a discrepancy form, without a procedure change, the action taken unless the procedure being performed provides this option.

- Data can be taken from another gauge or computer point in the same instrument loop (same transmitter).

  And

- For Analog gauges -Full scale of the gauge is less than 3 times the reference value.

  Or

- For Digital gauges - expected value will not exceed 70% of the digital gauge range.

e. If the acceptance criteria can be met by alternate means, then a procedure change shall be processed before the procedure is completed. A Procedure Discrepancy Form can not be used in lieu of a procedure change.

Example: PT requires taking data and recording values and the gauge is broken. You have performance install a temporary gauge or you use an alternate instrument loop such as inlet versus outlet flow. In this case, a restricted change is required.

4. The Operations Work Process Manager or designee tracks corrective action items and reschedules incomplete PTs to ensure their completion. The Control Room SRO will ensure PTs affecting operability of components required by Technical Specifications or SLCs, that are not completed when scheduled, will be placed in TSAIL.

5. Completed PT procedures shall be placed in the completed PT Drawer (Chemistry procedures routed to Chemistry Administrative Specialist) for transmittal to Master File.

8.5. A Procedure Discrepancy Form should not normally be filled out for OPs, the procedure should remain open until properly changed or completed.

8.6. Whenever an EP or AP is used, a Procedure Evaluation Form (Attachment 3, OMP 4-10) shall be completed and forwarded along with the completed procedure to the Ops Support Manager. This form is used to ensure EPs and APs are kept current and useable. Even if no discrepancies are encountered during use of the procedure, the form shall be completed and "NONE" written in under the "DISCREPANCY" heading.

9. Procedure Changes And Revisions

9.1. Any procedure change which requires some involvement of another group or section shall have a cross disciplinary review.

9.2. Prior to approval, procedure revisions shall be evaluated for immediate Training requirements as follows:

1. All minor procedure revisions would be exempt from the procedure review.

2. The procedure revision shall be evaluated by a job incumbent (qualified operator) to determine if any training is required prior to use by the operators. This will normally occur during the validation process, but it may occur at any point along the procedure preparation and review process. For efficient implementation when responding to emergent procedure revisions, this evaluation shall be conducted by the OSM, Chemistry General Supervisor or designee.

#11 MJ

(R06-97)

Duke Power Company
PROCEDURE PROCESS RECORD

(1)ID No. PT/1/A/4600/002A
Revision No. 173

PREPARATION

(2) Station CATAWBA NUCLEAR STATION

(3) Procedure Title MODE 1 PERIODIC SURVEILLANCE ITEMS

(4) Prepared By Dan N Peel Date 10-6-00

(5) Requires 10CFR50.59 evaluation?
☒ Yes (New procedure or revision with major changes)
☐ No (Revision with minor changes)
☐ No (To incorporate previously approved changes)

(6) Reviewed By L Baumgardner (QR) Date 10-10-00

Cross-Disciplinary Review By _____ (QR) NA (N/A) Date _____

Reactivity Mgmt. Review By _____ (QR) NA (N/A) Date _____

(7) Additional Reviews

Reviewed By _____ Date _____

Reviewed By _____ Date _____

(8) Temporary Approval *(if necessary)*

By _____ (SRO/QR) Date _____

By _____ (QR) Date _____

(9) Approved By J J Brim Date 10-18-2000

PERFORMANCE (Compare with control copy every 14 calendar days while work is being performed.)

(10) Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

(11) Date(s) Performed _____

Work Order Number (WO#) _____

COMPLETION

(12) Procedure Completion Verification

☐ Yes ☐ N/A Check lists and/or blanks properly initialed, signed, dated, or filled in N/A, as appropriate?

☐ Yes ☐ N/A Listed enclosures attached?

☐ Yes ☐ N/A Data sheets attached, completed, dated, and signed?

☐ Yes ☐ N/A Charts, graphs, etc. attached, dated, identified, and marked?

☐ Yes ☐ N/A Procedure requirements met?

Verified By _____ Date _____

(13) Procedure Completion Approved _____ Date _____

(14) Remarks *(attach additional pages, if necessary)*

Chg 173A - 1-18-01 - replace Pg 35 Encl 13.1

INFORMATION ONLY

Duke Power Company Catawba Nuclear Station **Mode 1 Periodic Surveillance Items** **Continuous Use**	Procedure No. PT/1/A/4600/002A Revision No. 173 Electronic Reference No. CN005G9I

Mode 1 Periodic Surveillance Items

1. Purpose

1.1 To verify compliance with technical specification surveillance items which have a frequency of verification from once per twelve hours (semi-daily) to once per seven days (weekly).

1.2 To give guidance for the proper operation of various instruments and/or systems.

2. References

2.1 Technical Specifications

2.2 FSAR Chapter 16 Selected Licensee Commitments

3. Time Required

3.1 Manpower - One NCO

3.2 Frequency - Time

3.2.1	Semi-daily, daily	-	One hour thirty minutes [Day shift (0700-1000)] [Night shift (1900-2200)]
3.2.2	Weekly	-	Two hours[Day shift, Sunday (0700-1000)]

4. Prerequisite Tests

None

5. Test Equipment

None

6. Limits and Precautions

None

7. Required Unit Status

____ Mode 1

8. Prerequisite System Condition

None

9. Test Method

9.1 A visual inspection shall be made to verify various systems' instrumentation is operating properly and/or indicating acceptable values or system status.

9.2 The OAC shall be used for various required calculations, when operable. When inoperable, manual calculations will be performed per PT/1/A/4600/009 (Loss of Operator Aid Computer).

9.3 Performance of this PT will include all the applicable surveillance items based on the frequency of the surveillance.

10. Data Required

10.1 Enclosure 13.1 (Periodic Surveillance Items Data)

10.2 Enclosure 13.2 (Loose Parts Monitor Data) as required

11. Acceptance Criteria

11.1 Enclosures 13.1 (Periodic Surveillance Items Data) and 13.2 (Loose Parts Monitor Data) contain acceptance criteria for individual surveillance items.

11.2 Channel checks meet the acceptance criteria when the redundant channels are within the tolerances listed in Enclosure 13.1 (Periodic Surveillance Items Data). Redundant channels may be checked on either the OAC, control room or local gauges. The acceptance criteria shall **NOT** be met by checking the same channel on two redundant indications such as a control room gauge and the OAC.

11.3 Discrepancies on instrument channel checks due to transient conditions may be evaluated to determine instrument operability. Where other independent means can be used to verify instrument operability, the intent of the channel check is met.

12. Procedure

NOTE: 1. If the Operator Aid Computer (OAC) becomes inoperable, perform the applicable steps requiring the Operator Aid Computer per PT/1/A/4600/009 (Loss of Operator Aid Computer).

2. If an Operator Aid Computer Point is inoperable, perform the applicable surveillance item using the available control room or local indication.

12.1 Complete Enclosure 13.1 (Periodic Surveillance Items Data) for the applicable surveillance items as described in the following steps:

12.1.1 Perform the surveillance items in Enclosure 13.1 (Periodic Surveillance Items Data) based on frequency (semi-daily, daily and weekly).

12.1.2 Frequency Requirements:

12.1.2.1 Day shift and night shift will perform the semi-daily surveillance items.

12.1.2.2 The daily surveillance items will be performed along with the semi-daily items of the shift specified.

12.1.2.3 Day shift will perform weekly surveillance items along with the performance of the semi-daily items on Sunday or the day specified. These items are identified by a (W) or **(day of week)** in the SHIFT INITIALS column.

12.1.2.4 The non-shaded blocks under the SHIFT INITIALS column are for the operators to sign off in for the performed surveillance items that meet their acceptance criteria.

12.1.3 Numbers in parenthesis refer to notes and qualifying conditions specific to the surveillance requirement. These conditions are explained at the bottom of that page.

12.1.4 N/A all sign offs NOT required based on the frequency of the surveillance.

12.1.5 **IF** a surveillance item exists with a qualifying condition, **AND** plant conditions are such that the qualifying condition is **NOT** met, the item may be N/A'd and initialed.

12.2 Evaluate the acceptance criteria by performing one of the following:

_____ 12.2.1 Verify the acceptance criteria specified in Section 11 is met.

OR

_____ 12.2.2 **IF** the acceptance criteria is **NOT** met, perform the following:

☐ Notify the Unit/WCC SRO that the acceptance criteria is **NOT** met.

_____ _____/_____
Unit/WCC SRO Contacted Date Time

☐ Initiate a PIP to document the test failure.

☐ Document all issues on a procedure discrepancy sheet.

_____ 12.3 **IF** any discrepancy is noted during the performance of this test that does **NOT** keep the test from meeting the acceptance criteria, it shall be given to the Unit/WCC SRO for evaluation via a discrepancy sheet.

_____ 12.4 This test was completed to satisfy the following requirement(s):

☐ Semi-daily
☐ Daily
☐ Weekly

_____ 12.5 Submit PT/1/A/4600/002A (Mode 1 Periodic Surveillance Items) to the Unit/WCC SRO.

13. Enclosures

13.1 Periodic Surveillance Items Data

13.2 Loose Parts Monitor Data

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
1	Turbine Impulse Pressure Channel Check	Each indication is within 32 psig of the other channel.		C1A0737 C1A0851		
2	Shutdown and Control Rod Position Indication System (SR 3.1.4.1)	A. OAC demand for all shutdown and control rod banks agree within ± 1 step of its control board indication.	(1)	Shutdown Banks A-E Demand C1P1546 - C1P1550 Control Rod Banks A-D Demand C1P1390 - C1P1393		
		B. Each shutdown and control rod OAC DRPI indication agrees within ± 1 step of each shutdown and control rod indication on DRPI.	(1)(2)			
		C. Rod position indication system and demand position indication system shall agree on rod position within ± 12 steps.	(1)(2)(3)	C1P1551 - C1P1559		

(1) If the acceptance criteria of Surveillance Item 2A or 2B NOT met, contact the Shift Work Manager to notify Rod Control System Engineer for guidance on operability determination.

(2) Digital Rod Position Indication for individual rods may be obtained from the OAC Control Rod Position Information, RODS.

(3) Required every 4 hours when the rod position deviation monitor (OAC Points C1P1551 through C1P1559) is inoperable, as indicated by points C1L4406 or C1L4407 in alarm, or points with NCAL quality code and/or magenta quality color. Record data on PT/1/A/4600/009 (Loss of Operator Aid Computer).

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
3	Shutdown and Control Rod Position (SR 3.1.4.1)	Each rod's indicated position shall be within ± 12 steps of its group step demand position.	(4)(5)	C1P1546 - C1P1550 C1P1390 - C1P1393		
4	Shutdown Rod Position (SR 3.1.5.1)	All shutdown banks shall be within the limits specified in the COLR as indicated by DRPI indication (± 4 steps)	(4)(6)			
5	Power Range Monitor Channel Check (SR 3.3.1.1, Table 3.3.1-1 Item 2a & 2b)	Each indication is within 2% of the average of all power range channels.		C1P0738		

(4) Digital Rod Position Indication for individual rods may be obtained from the OAC Control Rod Position Information, RODS.

(5) Required every 4 hours when the rod position deviation monitor (OAC Points C1P1551 through C1P1559) is inoperable, as indicated by points C1L4406 or C1L4407 in alarm, the acceptance criteria of Surveillance Item 2A or 2B **NOT** met, or points with NCAL quality code and/or magenta quality color. Record data on PT/1/A/4600/009 (Loss of Operator Aid Computer).

(6) DRPI system accuracy of ± 4 steps is applicable for this surveillance.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
6	Power Range/ Calorimetric Comparison (SR 3.3.1.2, Table 3.3.1-1 Item 2a)	Each Power Range Channel agrees within ± 2% of C1P1385 (Reactor Thermal Power, Best) Calculate below: BETP _____% Channel I _____% Difference _____% BETP _____% Channel II _____% Difference _____% BETP _____% Channel III _____% Difference _____% BETP _____% Channel IV _____% Difference _____%	(7)(8)(9)	C1P1385	[redacted]	

(7) Steady state conditions should be established for 30 minutes prior to performing the surveillance. If the difference exceeds ± 2 %, contact IAE to calibrate NIs and refer to the TS 3.3.1 Bases.

(8) NOT required to be performed until 12 hours after Thermal Power ≥ 15% RTP.

(9) If OAC point C1P1385 is unavailable, contact RXG Duty Engineer to complete PT/0/A/4220/001 (Manual Calculation of Thermal Power and NC Flow) to determine the Best Estimate Thermal Power (BETP) and compare the channels.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
7	Axial Flux Difference (SR 3.2.3.1)	Verify AFD within limits for each OPERABLE excore channel as specified in the COLR. Record actual AFD below. N-41 _____ N-42 _____ N-43 _____ N-44 _____	(10)	C1P1522 C1P1523 C1P1524 C1P1525	(W)	
8	Intermediate Range Monitor Channel Check (SR 3.3.1.1, Table 3.3.1-1 Item 4)	Each indication is within ½ decade of the other channel.	(11)	C1A0766 C1A0767		

(10) In Mode 1 ≥ 50% rated thermal power.

(11) Below P-10 Setpoint.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
9	Control Rod Insertion Limit (SR 3.1.6.2)	All control rods shall be above their insertion limits.	(12)	1AD-2 A/9 Alarm Dark 1AD-2 B/9 Alarm Dark C1L4409 **NOT** in alarm		
10	Control Bank Sequence and Overlap (SR 3.1.6.3)	Sequence and overlap limits specified in the COLR are met for control banks **NOT** fully withdrawn from the core.				
11	Quadrant Power Tilt Ratio (SR 3.2.4.1)	Ratio $\leq$ 1.02. **IF** OAC is out of service, record QPTR value, obtained from PT/0/A/4600/08B QPTR value _____	(13)	Excore Power Distribution Monitor, AFD	(W)	

(12) Required every 4 hours when rod insertion limit monitor is inoperable. Reference 1AD-2 A/9 or 1AD2 B/9 or C1L4464, C1L4406 or C1L4407, or C1L4409. Record data on PT/1/A/4600/009 (Loss of Operator Aid Computer).

(13) **NOT** required to be performed until 12 hours after exceeding 50% RTP.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
12	NC System Leakage (Sump Inventory) (TS LCO 3.4.15)	1. C1L4554 in service 2. Quality - GOOD 3. Cont Floor & Equip Sump A and B levels > 4 inches. (A- 1WLP5740, B- 1WLP5750)	(14) (15) (16)	C1L4554		
13	Primary Containment Upper Compartment Average Air Temp. (SR 3.6.5.1)	Temp: 75 - 100°F Record temperature: _____°F	(17)	C1P1500	[redacted]	
14	Primary Containment Lower Compartment Average Air Temp. (SR 3.6.5.2)	Temp: 100 - 120°F Record temperature: _____°F	(17)	C1P1501		

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(14) Refer to TS 3.4.15, Condition A and perform applicable actions.

(15) If OAC point C1L4554, or its inputs (WLLT6880, WLLT6870) are inoperable, perform the applicable section in PT/1/A/4600/009 (Loss of Operator Aid Computer). (Reg. Guide 1.45)

(16) If Cont Floor & Equip Sump A or B level < 4 ½ inches, then add water to the affected sump to increase sump level to a range of 10 – 14 inches.

(17) If OAC is out of service, notify IAE to perform IP/1/B/3172/006 (Procedure For VV System Temperature Measurements Upon Loss of OAC) to determine computer point readings.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
15	Containment Pressure Monitor Channel Check (SR 3.3.2.1, Table 3.3.2-1 Items 1c, 2c, 3b3, & 4c)	Press. Differential between highest and lowest channels ≤ 0.3 psig. Calculate below: High Channel _____ psig Low Channel _____ psig Differential _____ psig		1NSP5040, 1NSP5050, 1NSP5060, 1NSP5070 (located on 1MC11)		
16	CPCS Monitor Channel Check (SR 3.3.2.1, Table 3.3.2-1 Items 9a & 9b)	Pressure differential between highest and lowest Train Related Channels ≤ 0.3 psig. Calculate below: TRAIN A High Channel _____ psig Low Channel _____ psig Differential _____ psig TRAIN B High Channel _____ psig Low Channel _____ psig Differential _____ psig		C1A1492 C1A1498 C1A1504 C1A1510 C1A1516 C1A1522 C1A1528 C1A1534		
17	Primary Containment Internal Pressure. (SR 3.6.4.1)	Pressure: -0.1 psig to +0.3 psig		C1A1492 C1A1498 C1A1504 C1A1510 C1A1516 C1A1522 C1A1528 C1A1534 and Control Room Indication (1MC11) 1NSP5040 1NSP5050 1NSP5060 1NSP5070		

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
18	S/G Water Level Monitor Channel Check (SR 3.3.1.1, Table 3.3.1-1 Item 13) & (SR 3.3.2.1, Table 3.3.2-1 Item 5b & 6b)	Level differential between highest and lowest channels ≤ 4%. Calculate below:				
		S/G A				
		High Channel _____ %		C1A0731		
		Low Channel _____ %		C1A0845		
		Differential _____ %		C1A0911		
				C1A0531		
		S/G B				
		High Channel _____ %		C1A0626		
		Low Channel _____ %		C1A0632		
		Differential _____ %		C1A0537		
				C1A0638		
		S/G C				
		High Channel _____ %		C1A0644		
		Low Channel _____ %		C1A0627		
		Differential _____ %		C1A0633		
				C1A0543		
		S/G D				
		High Channel _____ %		C1A0639		
		Low Channel _____ %		C1A0645		
		Differential _____ %		C1A0628		
				C1A0549		

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
19	S/G Steam Line Pressure Monitor Channel Check (SR 3.3.2.1, Table 3.3.2-1 Item 4d(1) & 4d(2))	Pressure differential between highest and lowest channels ≤ 52 psig. Calculate below: S/G A High Channel _____ psig Low Channel _____ psig Differential _____ psig S/G B High Channel _____ psig Low Channel _____ psig Differential _____ psig S/G C High Channel _____ psig Low Channel _____ psig Differential _____ psig S/G D High Channel _____ psig Low Channel _____ psig Differential _____ psig		C1A0723 C1A1274 C1A1280 C1A0729 C1A1286 C1A1292 C1A0735 C1A1298 C1A1304 C1A0741 C1A1310 C1A1316		

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
20	Steam Generator PORV Nitrogen Supply (SR 3.7.4.1) & (SLC 16.10-1)	Absence of Alarm 1AD-3 C/1 S/G A PORV N_2 Press **NOT** Lo-C1D3584 or 1MIPG 6630 _____ psig 1MIPG 6631 _____ psig S/G B PORV N_2 Press **NOT** Lo-C1D3585 or 1MIPG 6620 _____ psig 1MIPG 6621 _____ psig S/G C PORV N_2 Press **NOT** Lo-C1D3586 or 1MIPG 6610 _____ psig 1MIPG 6611 _____ psig S/G D PORV N_2 Press **NOT** Lo-C1D3587 or 1MIPG 6600 _____ psig 1MIPG 6601 _____ psig	(18)	C1D3584 C1D3585 C1D3586 C1D3587	[redacted]	

(18) If annunciator is in alarm, verify both of the nitrogen bottles associated with each PORV has a pressure ≥ 2100 psig. If any nitrogen bottle has a pressure < 2100 psig, refer to SLC 16.10-1.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
21	PZR Water Level Monitor Channel Check (SR 3.3.1.1, Table 3.3.1-1 Item 9)	Level differential between highest and lowest channels ≤ 3.5%. Calculate below: High Channel _____ % Low Channel _____ % Differential _____ %		C1A0707 C1A0867 C1A0873		
22	PZR Total Water Volume (SR 3.4.9.1)	PZR Level: ≤ 92%		C1A0707 C1A0867 C1A0873		
23	PZR Pressure Monitor Channel Check (SR 3.3.1.1, Table 3.3.1-1 Item 8a & 8b) & (SR 3.3.2.1, Table 3.3.2-1 Item 1d))	Press. differential between highest and lowest channels ≤ 28 psig. Calculate below: High Channel _____ psig Low Channel _____ psig Differential _____ psig		C1A0713 C1A0868 C1A0874 C1A0880		

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
24	PZR Pressure (SR 3.4.1.1)	COMPUTER AVERAGE With 4 channels operable ≥ 2215.8 psig With 3 channels operable ≥ 2217.5 psig OR METER AVERAGE With 4 channels operable ≥ 2219.8 psig With 3 channels operable ≥ 2222.1 psig circle one COMPUTER or METER _____ psig Channel I _____ psig Channel II _____ psig Channel III _____ psig Channel IV (Total Press) _____ psig (# Oper Channels) + _____ (Average) =_____ psig		C1A0713 C1A0868 C1A0874 C1A0880		

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
25	Boron Injection Flow Path (BAT to NCS) (SLC 16.9-8, TR a)	The temperature of the heated portion of the flow path is ≥ 65°F. (Heat trace temperature monitor points 103-106, 108.)	(19)		(W)	

(19) Temperature may be obtained locally by one of the following methods:

Issue Model W/O 98228087 for SPOC to obtain the following temperature points at panel 1SNV (AB-560, KK-56, Rm 300):

SMU Points 103, 104, 105, 106 and 108.

OR

Locally at the Junction Boxes:

SMU Point 103	Junction Box 1(P) NV1-03	(AB-556, HH-JJ, 54, Rm 234)
SMU Point 104	Junction Box 1(P) NV1-04	(AB-550, HH-JJ, 53-54, Rm 234)
SMU Point 105	Junction Box 1(P) NV1-05	(AB-566, LL-MM, 52-53, Rm 315)
SMU Point 106	Junction Box 1(P) NV1-06	(AB-567, MM, 52-53, Rm 310)
SMU Point 108	Junction Box 1(P) NV1-08	(AB-569, NN-58, Rm 300)

Refer to CNM-1354.05-0118 and CNM-1354.05-0119 for point location if required.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
26	NC System Flow Monitor Channel Check (SR 3.3.1.1, Table 3.3.1-1 Item 10a & 10b)	Flow differential between the highest and lowest channels ≤ 5%. Calculate below: <u>Loop A</u> High Channel _____ % Low Channel _____ % Differential _____ % <u>Loop B</u> High Channel _____ % Low Channel _____ % Differential _____ % <u>Loop C</u> High Channel _____ % Low Channel _____ % Differential _____ % <u>Loop D</u> High Channel _____ % Low Channel _____ % Differential _____ %		 1NCP5000 1NCP5010 1NCP5020 1NCP5030 1NCP5040 1NCP5050 1NCP5060 1NCP5070 1NCP5080 1NCP5090 1NCP5100 1NCP5110		
27	NC System Total Flow (SR 3.4.1.3) & (SR 3.4.4.1)	Flow ≥ 100%.	(20)	C1P0859		

(20) If OAC point C1P0859 is unavailable, Contact RXG Duty Engineer to complete PT/0/A/4220/001 (Manual Calculation of Thermal Power and NC Flow) to determine NC Flow and compare the channels.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
28	Overtemperature ΔT Setpoint Channel Check (SR 3.3.1.1, Table 3.3.1-1 Item 6)	OAC Points **NOT** in alarm	(21)(22)(23)	C1P0943 C1P0944 C1P0945 C1P0946		
29	Overpower ΔT Setpoint Channel Check (SR 3.3.1.1, Table 3.3.1-1 Item 7)	Difference between the highest and lowest indication ≤ 4%. Calculate below: High Channel _____ % Low Channel _____ % Differential _____ %	(24)	C1A0656 C1A0657 C1A0658 C1A0659		

(21) At lower power levels (< ~ 85%), the instrumentation will be overranged (> 150%). If overranged, the value of the OAC points for the indicated vs. calculated difference will display in blue and have a SUS quality code. The calculation's input should be checked for validity (e.g. GOOD quality, no inserted values) using the command SHOW_ININSOPOT.

(22) If OAC Point(s) in alarm, contact the Reactor Group Duty Engineer to evaluate.

(23) If OAC Point(s) fail, refer to PT/1/A/4600/009 (Loss of Operator Aid Computer) to complete this Surveillance.

(24) If difference is greater than allowable, notify Reactor Group Duty Engineer to perform a qualitative assessment of channels to determine operability. {PIP 96-2701}

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
30	NC System ΔT Monitor Channel Check (SR 3.3.1.1, Table 3.3.1-1)	Difference between the highest and lowest indication ≤ 4%. Calculate below: High Channel _____ % Low Channel _____ % Differential _____ %	(25)	C1A0675 C1A0681 C1A0687 C1A0693		
31	Boric Acid Storage Tank Solution Temp. (SLC 16.9-12)	Temp: ≥ 65°F (1NVP5720)			(W)	
32	Boric Acid Storage Tank Level (SLC 16.9-12)	Contained volume ≥ minimum value as specified in the COLR		C1A1406	(W)	
33	Cold Leg Accumulators Operable (SR 3.5.1.2) & (SR 3.5.1.3)	Absence of all alarms: 1AD9 D/1-4 1AD9 E/1-4				
34	Cold Leg Recirc FWST To Cont Sump Swap Enable Trn A/B Lamp Test	Each Trns ENABLED light illuminates when depressing LAMP TEST pushbutton.				

(25) If difference is greater than allowable, notify Reactor Group Duty Engineer to perform a qualitative assessment of channels to determine operability. {PIP 96-2701}

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
35	NC System Tave (SR 3.4.1.2)	COMPUTER AVERAGE With 4 channels operable ≤ 587.7 °F With 3 channels operable ≤ 587.5 °F OR METER AVERAGE With 4 channels operable ≤ 587.2 °F With 3 channels operable ≤ 586.9 °F circle one COMPUTER OR METER _____ °F A Loop _____ °F B Loop _____ °F C Loop _____ °F D Loop (Total Temp) _____ °F # Oper Channels ÷ _____ (Average) = _____ °F		C1A0860 C1A0861 C1A0862 C1A0863		

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
36	Tave Low (P-4) Interlock Channel Check (SR 3.3.2.1, Table 3.3.2-1 Item 5d)	Channel A shall be within ± 2.5°F of the average of all operable channels. Channel B shall be within ± 3.5°F of the average of all operable channels. Channel C shall be within ± 2.0°F of the average of all operable channels. Channel D shall be within ± 3.0°F of the average of all operable channels.		C1A0860 C1A0861 C1A0862 C1A0863		
37	Cold Leg Accumulator Discharge Isolation Valves (SR 3.5.1.1)	Following valves shall be open as determined by the monitor light **NOT** lit: Valve # 1MD-1 1NI-54A A-10 1NI-65B A-2 1NI-76A B-11 1NI-88B B-3				

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
38	ECCS Valve Status (SR 3.5.2.1) 1FW-27A	Valve position/power disconnect switch position as indicated below: Open				
	1FW-55B	Open				
	1NI-162A	Open / DISCON				
	1NI-121A	Closed / DISCON				
	1NI-152B	Closed / DISCON				
	1NI-173A	Open / DISCON				
	1NI-183B	Closed / DISCON				
	1NI-178B	Open / DISCON				
	1NI-100B	Open / DISCON				
	1NI-147B	Open / DISCON				
39	Standby Nuclear Service Water Pond Temp. (SR 3.7.9.2)	Temp: ≤ 90.4°F ≤ 90.4°F (0RNP8130)	(26)(27)	C1A1346		
40	Standby Nuclear Service Water Pond Level (SR 3.7.9.1)	Level: ≥ 571.5 ft. ≥ 571.5 ft. (0RNP7350) ≥ 571 ft. (local)		C1A1013		

(26) Only required from 0000 hrs. June 30 to 2400 hrs. September 30, N/A all other times.

(27) If OAC point C1A1346 and Gauge 0RNP8130 are inoperable or OAC point C1A1346 in alarm, the temperature reading may be obtained per PT/0/A/4400/024 (SNSWP Temperature Monitoring).

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
41	Lake Wylie Water Temperature (SLC 16.9-14)	Water temperature of Lake Wylie ≤ 92°F when aligned to the Nuclear Service Water System, as measured in the discharge of an operating RN pump Record below and in Control Room Logbook_____°F	(28)	1(2) RNP 5000 1(2) RNP 5010		
42	FWST Level Monitor Channel Check (SR 3.3.2.1, Table 3.3.2-1 Item 7b)	Level differential between highest and lowest channels ≤ 3%. Calculate below: High Channel _____% Low Channel _____% Differential _____%		C1A1262 C1A1268 C1A1250 C1A1256		
43	FWST Borated Water Volume (SR 3.5.4.2) & (SLC 16.9-12)	A minimum contained water volume as presented in the COLR or SR 3.5.4.2, whichever is larger.		C1A1262 C1A1268 C1A1250 C1A1256	(W)	

(28) Only required from 0000 hrs. June 30 to 2400 hrs. September 30, when RN suction is aligned to Lake Wylie. N/A all other times.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
44	FWST Solution Temp (SR 3.5.4.1) & (SLC 16.9-12)	Min. 70°F Max. 100°F		C1A1154 C1A1160 C1A0545		
45	Groundwater Level (WZ) (SLC 16.7-8)	Monitor Well Levels ≤ the top of the adjacent floor slab as verified by: 1. Absence of Alarm Annunciator 1AD13 D/1, D/2 and D/3 AND 2. Locally on 0ELMC0001 as follows: Monitor Well #2 Level ≤ 550 ft.-0" Monitor Well #4 Level ≤ 558 ft.-6" Monitor Well #5 Level ≤ 558 ft. 6" Monitor Well #7 Level ≤ 550 ft. 0" Monitor Well #10 Level ≤ 560 ft. 0" Monitor Well #11 Level ≤ 560 ft. 0"	(29)		(W)	
46	Ice Condenser Inlet Door Position Monitoring System (SLC 16.6-3, TR a) (SR 3.6.13.1)	Successful annunciator panel test for annunciator window 1AD13 A/7 Absence of Alarm Annunciator 1AD13 A/7				

(29) Local levels from 0ELMC0001 are obtained by the Aux Bldg Rounds person. Each small division on 0ELMC0001 equals 3 inches.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
47	Ice Bed Temp. Monitor Channel Check (SLC 16.6-2)	At least 2 channels in the ice bed at each of the three basic elevations (< 11', 30' 9", and 55' above the floor of the ice condenser) for each one-third of the ice condensers are indicating within 5°F of each other. (1NFCR6510)	(30)			
48	Ice Bed Temperature (SR 3.6.12.1)	All operable channel temps. ≤ 27°F (1NFCR6510)				
49	Spent Fuel Pool Water Level (SR 3.7.14.1) & (SLC 16.9-21)	Level: ≥ 37.6 ft. (≥ 23 ft. above fuel assemblies) (1KFP5120)			(W)	[redacted]
50	Control Room Air Temp. (SR 3.7.11.1)	All Thermometers are ≤ 85°F	(31)			
51	Chlorine Detector Channel Check (SLC 16.6-4)	Absence of alarm Annunciator 1AD18 B/8 & E/8 (Unit 1 Intake Hi Chlorine) (Unit 2 Intake Hi Chlorine)				

(30) If NF Chart Recorder is **NOT** inking, ensure a priority E work request has been submitted.

(31) Thermometers located on columns CC-55, CC-57 and CC-59.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
52	Wind Speed Monitor Channel Check (SLC 16.7-3)	Lower wind speed has power and is indicating on scale.	(32)(33)		[redacted]	
		Upper wind speed has power and is indicating on scale.	(32)(33)			
53	Wind Direction Monitor Channel Check (SLC 16.7-3)	Lower wind direction has power and is indicating on scale.	(32)(33)			
		Upper wind direction has power and is indicating on scale.	(32)(33)			
54	Outside Air Temp ΔT Channel Check (SLC 16.7-3)	Instrument has power and is indicating on scale.	(32)(33)			
55	Outside Air Ambient Temp Channel Check (SLC 16.7-3)	Instrument has power and is indicating on scale.	(32)(33)			
56	Precipitation Sensor Channel Check (SLC 16.7-3)	Instrument has power and is indicating on scale.	(32)(33)			
57	Loose Parts Monitor Channel Check (SLC 16.7-4)	System operable per Enclosure 13.2.				

(32) Initiate work request (R005) for IAE to inspect the Meteorological Instrument System for any failures or abnormalities.

(33) Traces should be variable for wind speeds, wind directions, delta temperature and ambient temperature. If any channel is drawing a straight line, it should be evaluated for operability. The precipitation trace will be a straight line unless it is currently raining/snowing.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
58	1EMF15 Channel Check (SLC 16.7-10)	1. Power light on 2. Meter is reading ≥ ½ of background from setpoint logbook	(34)			
59	1EMF31 Channel Check (SLC 16.11-2)	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading ≥ ½ of background from setpoint logbook	(34)			
60	1EMF33 Channel Check (SLC 16.11-7)	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading ≥ ½ of background from setpoint logbook	(34)			
61	1EMF35 Channel Check (SLC 16.11-7) 351.	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading ≥ ½ of background from setpoint logbook	(34)		(W)	

(34) If meter reading is NOT ≥ ½ of background from setpoint logbook, contact Radiation Protection for operability determination.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
62	1EMF36 Channel Check (SLC 16.11-7) 36L	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading ≥ ½ of background from setpoint logbook	(35)			
63	1EMF37 Channel Check (SLC 16.11-7)	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading ≥ ½ of background from setpoint logbook	(35)		(W)	
64	1EMF 38, 39, 40 Cont Isolation Valve Position	1MI-5230 Open				
		1MI-5231 Open				
		1MI-5232 Open				
		1MI-5233 Open				
65	1EMF38 Channel Check (SR 3.4.15.1) 38L	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading ≥ ½ of background from setpoint logbook	(35)	C1E0147		

(35) If meter reading is NOT ≥ ½ of background from setpoint logbook, contact Radiation Protection for operability determination.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
66	1EMF39 Channel Check (SR 3.4.15.1) & (SLCs 16.7-10, 16.11-7) 39L	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading ≥ ½ of background from setpoint logbook	(36)	C1E0155		
67	1EMF39 Channel Check (SLC 16.11-7) 39L	Verify EMF39 Trip 2 setpoint is set at ≤ 3 times containment activity.	(37)(38)		[redacted]	
68	EMF41 Channel Check (SLC 16.7-10)	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading ≥ ½ of background from setpoint logbook 4. The scanner scan/stop switch positioned to "SCAN".	(36)			

(36) If meter reading is NOT ≥ ½ of background from setpoint logbook, contact Radiation Protection for operability determination.

(37) N/A if VQ release in progress.

(38) EMF Setpoint Log should be used to determine current Trip 2 setpoint value as necessary.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
69	1EMF42 Channel Check (SLC 16.7-10)	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading ≥ ½ of background from setpoint logbook	(39)	C1E0214		
70	EMF43 Channel Check (SLC 16.7-10) 43A	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading ≥ ½ of background from setpoint logbook	(39)	C1E0218		
71	EMF43 Channel Check (SLC 16.7-10) 43B	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading ≥ ½ of background from setpoint logbook	(39)	C1E0222		

(39) If meter reading is NOT ≥ ½ of background from setpoint logbook, contact Radiation Protection for operability determination.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
72	1EMF46 Channel Check (SLC 16.7-10) 46A	1. Power light on 2. **IF** a train related KC pump is on, verify no "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading ≥ ½ of background from setpoint logbook	(40)			
73	1EMF46 Channel Check (SLC 16.7-10) 46B	1. Power light on 2. **IF** a train related KC pump is on, verify no "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading ≥ ½ of background from setpoint logbook	(40)			
74	EMF49 Channel Check (SLC 16.11-2) 49L	1. Power light on 2. No "LOSS OF SAMPLE FLOW" alarm 3. Meter is reading ≥ ½ of background from setpoint logbook	(40)	C1E0263	[redacted]	

(40) If meter reading is **NOT** ≥ ½ of background from setpoint logbook, contact Radiation Protection for operability determination.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
75	1EMF71 Channel Check (SLC 16.7-10)	1. Power light on 2. Meter is reading ≥ ½ of background from setpoint logbook	(41)(42)			
76	1EMF72 Channel Check (SLC 16.7-10)	1. Power light on 2. Meter is reading ≥ ½ of background from setpoint logbook	(41)(42)			
77	1EMF73 Channel Check (SLC 16.7-10)	1. Power light on 2. Meter is reading ≥ ½ of background from setpoint logbook	(41)(42)			
78	1EMF74 Channel Check (SLC 16.7-10)	1. Power light on 2. Meter is reading ≥ ½ of background from setpoint logbook	(41)(42)			

(41) If meter reading is NOT ≥ ½ of background from setpoint logbook, contact Radiation Protection for operability determination.

(42) Only required between 40%-100% Reactor Power.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
79	Fuel Building Ventilation (SR 3.7.13.1)	VF operable with flow being discharged through HEPA filter 1A1/1A2 or 1B1/1B2 and Charcoal filters. (1A1- 1VFP5040 1A2- 1VFP5050) (1B1- 1VFP5060) 1B2- 1VFP5070)	(43)			
80	Doghouse Water Level Channel Check	Verify annunciators operable and no alarms on: 1AD8; D/7, D/8, E/7, E/8				
81	RL Minimum Flow Interlock Channel (SLC 16.11-2)	**IF** RL Disch Flow is above the RL Disch Lo Flow setpoint on 0RLP5080, verify (MC9) Annunciator 1AD12 F/3 dark, **OR IF** RL Disch Flow is equal to or below the RL Disch Lo Flow setpoint on 0RLP5080, verify (MC9) Annunciator 1AD12 F/3 lit	(44)		[redacted]	
82	RL Discharge Flow Channel Check	OAC points C1P0903 **OR** C2P0903 **AND** C1P0904 **OR** C2P0904 are in service **AND NOT** overranged.	(44)	C1P0903/C1P0904 Unit 2 C2P0903/C2P0904		
83	RL Intake Temp Channel Check	C1P1521 or C2P1521 in service and on scale	(44)	C1P1521 Unit 2 C2P1521		
84	RL Discharge Temp Channel Check	C1P1376 or C2P1376 in service and on scale	(44)	C1P1376 Unit 2 C2P1376		
		C1P1377 or C2P1377 in service and on scale	(44)	C1P1377 Unit 2 C2P1377		

(43) During movement of irradiated fuel assemblies in the fuel building.

(44) If RL instruments inoperable, refer to PT/0/A/4250/011 (RL Temperature and Discharge Flow Determinations).

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
85	Unit Vent Stack Flow Rate Meter Channel Check (SLC 16.11-7)	Instrument in service with > 0 SCFM indicated with any systems exhausting to the unit vent. Circle method used to determine flow rate Local/Computer (%) x 195,000 cfm = _____ cfm	(45)(46)	C1A1104		

(45) If Unit Vent Flow Monitor is inoperable, refer to PT/1/A/4450/017 (Unit Vent flow Manual Calculation). When flowrates are below 15,000 scfm, the Unit Vent Stack Flow Rate Meter may be inoperable as indicated by a zero or a negative flow indication.

(46) If C1A1104 is NOT in service, determine unit vent flow rate by multiplying 195,000 cfm by reading on local meter 1VAP8300 (AB-594, III-52) and record in space provided above.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
86	RN Pit Level Channel Check (SR 3.3.2.1, Table 3.3.2-1 Item 10)	Level Differential between the highest and lowest level is ≤ 1.5 ft. Calculate below: RN Pit A 1RNP7400 (1MC9) _____ 2RNP7400 (2MC9) _____ OAC point C1A1453 _____ Difference _____ Manual Measurement _____ _____ RN Pit B 1RNP7370 (1MC9) _____ 2RNP7370 (2MC9) _____ OAC point C1A1459 _____ Difference _____ Manual Measurement _____	(47)(48)	C1A1453 C1A1459		

(47) If the A TRN and/or B TRN RN Pit Level Instrumentation are out by > 1.5 ft., a manual measurement of water level in the pit can be made. Each instrument in the pit shall be within 1.5 ft. of the measured value. The top of the grating on the platform in the pit below the RN pump motor is at 580' - 0".

(48) OAC points C1A1453 (C2A1453) and C1A1459 (C2A1459) may be obtained from the Unit 1 (Unit 2) OAC. If OAC point is unavailable to determine pit level, issue Model Work Orders #94085162 (0RNLT7390, RN Pit A) and #94085173 (0RNLT7360, RN Pit B) as necessary for level determination.

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
87	Transfer Canal Weir Gate	Weir Gate Seal Pressure 30 psig ± 5 and no visible leakage past seal.	(49)			
88	SSF Stby Makeup Pump Suction Source (SLC 16.7-9)	Spent Fuel Pool Level ≥ 37.6 Feet with weir gate removed. (1KFP5120)			(W)	[redacted]
89	D/G 1A Prelube Oil Filter ΔP	≤ 20 psid	(50)(51)		(W)	
90	D/G 1B Prelube Oil Filter ΔP	≤ 20 psid	(50)(51)		(W)	
91	1EMF-38 Leakage Detection System (SR 3.4.15.1)	1. C1P0590 in service 2. Quality – GOOD	(52)	C1P0590		
92	1EMF-39 Leakage Detection System (SR 3.4.15.1)	1. C1P0591 in service 2. Quality – GOOD	(52)	C1P0591		

(49) N/A if weir gate removed.

(50) Obtained by Aux Bldg Rounds person, when engine aligned for Stby Readiness.

(51) If differential pressure > 20 psid, the acceptance criteria is met if a high priority work request is written to investigate the cause of the excessive pressure.

(52) If OAC point is unavailable, perform applicable section of PT/1/A/4600/009 (Loss of Operator Aid Computer). (Reg Guide 1.45)

#	SURVEILLANCE ITEM (Tech Spec Reference)	ACCEPTANCE CRITERIA	QUALIFYING CONDITIONS	COMPUTER POINT ID	DAY SHIFT INITIALS	NIGHT SHIFT INITIALS
94	CA Pumps Flow Control Accumulator Tanks Air Pressure	Air pressure in all 8 Accumulator air tanks ≥ 80 psig	(54)(55)		(W)	[redacted]
95	Alternate Cooling To Charging Pumps (SLC 16.9-24)	YD pressure ≥ 60 psig (0YDPG5270) (0YDPG5250)	(56)(57)		(W)	

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(54) If the pressure in any of the Accumulator Air Tanks is less than 80 psig, generate a PIP to have Engineering to re-evaluate the DEI limits. When the PIP is generated, acceptance criteria shall be considered to be satisfied.

(55) Obtained by the Aux Bldg Rounds person.

(56) Pressures are obtained from 0YDPG5270 and 0YDPG5250 located at SB-594, T-16/17.

(57) Obtained by the Service Bldg Rounds person.

NOTE: If any alarm monitor unit or control unit alarm indication LED fails, the acceptance criteria is met if a work request is written to investigate and repair LED.

1. Procedure

_____ 1.1 Perform the following for the Alarm Rack Verifications:

1.1.1 On the "Alarm Monitor Unit", verify the following:

- ☐ The LEDs numbered 1 through 22 are dark.
- ☐ The "Select" keyswitch is in the "PRIMARY" position.
- ☐ The "Primary" LED is illuminated.

1.1.2 On the "Control Unit", verify the following:

- ☐ The "Outputs" keyswitch is in the "ENABLE" position.
- ☐ The "Event Alarm" LED is dark.
- ☐ The "System Failure" LED is dark.
- ☐ The Normal/Inhibit keyswitch is in the "NORMAL" position.

☐ 1.1.3 Press the "Power" button on the "Tape Recorder Console".

☐ 1.1.4 Verify the "Off" light illuminates on the "Power" button.

NOTE: When performing the next step, Annunciator 1AD-4, A/8 "LOOSE PARTS PANEL TROUBLE" should alarm.

☐ 1.1.5 Press the Event Alarm "Test" button.

1.1.6 Verify the following:

- ☐ The "Event Alarm" LED on the "Control Unit" is illuminated.
- ☐ Annunciator 1AD-4, A/8 "LOOSE PARTS PANEL TROUBLE" is illuminated.

☐ 1.1.7 Press the Event Alarm "Reset" button.

1.1.8 Verify the following:

☐ The "Event Alarm" LED on the "Control Unit" is dark.

☐ Annunciator 1AD-4, A/8 "LOOSE PARTS PANEL TROUBLE" is dark.

NOTE: When performing the next step, Annunciator 1AD-4, A/8 "LOOSE PARTS PANEL TROUBLE" should alarm.

☐ 1.1.9 Press the System Failure "Test" button.

1.1.10 Verify the following:

☐ The "System Failure" LED on the "Control Unit" is illuminated.

☐ Annunciator 1AD-4, A/8 "LOOSE PARTS PANEL TROUBLE" is illuminated.

☐ 1.1.11 Press the System Failure "Reset" button.

1.1.12 Verify the following:

☐ The "System Failure" LED on the "Control Unit" is dark.

☐ Annunciator 1AD-4, A/8 "LOOSE PARTS PANEL TROUBLE" is dark.

☐ 1.1.13 Press the "Power" button on the "Tape Recorder Console".

☐ 1.1.14 Verify the "On" light illuminates on the "Power" button.

_____ 1.2 Perform the following for the Audio Monitor Verifications:

NOTE: 1. The left or right filter may be used to perform the Audio Monitor Verifications.

2. The cutoff frequencies in the following step may be varied if desired to improve clarity of the sound.

1.2.1 Adjust the cutoff frequencies on the audio monitor as follows:

☐ "Low" cutoff = 01.0 kHz

☐ "High" cutoff = 15.0 kHz

NOTE: In the following step, channels 7, 8, 11, 12, 15, 16, 19 and 20 are not required for Loose Parts System operability.

☐ 1.2.2 Using the "LINE" and "CHANNEL" selector switches, listen to each channel long enough to gain a familiarity with current background noise. {PIP 96-0025}

_____ 1	_____ 9	_____ 17
_____ 2	_____ 10	_____ 18
_____ 3	_____ 11	_____ 19
_____ 4	_____ 12	_____ 20
_____ 5	_____ 13	_____ 21
_____ 6	_____ 14	_____ 22
_____ 7	_____ 15	
_____ 8	_____ 16	

_____ 1.2.3 **IF** abnormal noise is present (abnormal noises can be knocks, pings, bangs, etc.), record as a discrepancy and notify the Reactor Engineering Duty Engineer. {PIP 96-0025}

_____ 1.3 Perform the following for the Analog Tape Recorder Verifications.

☐ 1.3.1 Power "On" LED is illuminated.

☐ 1.3.2 Tape cassette is in place.

☐ 1.3.3 Tape cassette is rewound.

_____ 1.4 Verify no voltage alarm LEDs are illuminated on channels 1-22 on the signal modules of the Signal Processor unit. {PIP 96-0025}

_____ 1.5 IF Steps 1.1 through 1.4 of this enclosure are signed off as complete, sign off Surveillance Item 57, Loose Parts Monitor System operable, and attach to Enclosure 13.1 (Periodic Surveillance Items Data).

_____ 1.6 IF there are discrepancies associated with the completion of this enclosure AND they have NOT been previously identified AND a work request initiated to correct, then notify the Reactor Engineering Duty Engineer. {PIP 96-0025}

Facility Comments for Admin JPM S4 (Review and Authorize a Gaseous Waste Release Document)

Admin JPM S4 for reviewing and completing a Gaseous Waste Release (GWR) was designed with 2 "intentional errors" in it:

1. The GWR package was for Unit 2 but the initial conditions specified that a release was to be made on Unit 1.

2. The EMF trip setpoints were not correct (the Trip 2 setpoint was lower than the Trip 1 setpoint).

Although these were both designated as "critical steps" in the JPM, the actual critical piece was to prevent the GWR release from occurring.

The cues in the initial section of the JPM were inaccurate. Since the first "error" (based on location on the GWR form reading top to bottom) was the unit designator, there was a cue associated with the step stating that if the student handed the paperwork back without looking for additional errors then the candidate should be told to identify any additional errors. However, the second "error" did not have this cue since it was assumed that the cue would already have been given. It was not considered during development of the JPM that the student might identify the errors in opposite order. Consequently, all candidates may not have received proper cueing due to the omission of the cue in the JPM.

It should also be noted that in the plant, GWR packages are delivered to the control room in color-coded folders which provide a visual cue to the SRO as to the appropriate unit (green for Unit 1 and orange for Unit 2). If it had been delivered in an orange folder (based on the GWR being for Unit 2), the candidates would have had an additional opportunity to determine that the GWR package was for Unit 2 and did not match their initial condition statement (Unit 1 release).

Facility comments for JPM I-2 (Loss of ND (Leak) at Mid-loop)

To successfully complete this JPM, the candidate had to dispatch an operator to rack in the "B" NI pump, start the pump and align flow to the NC system cold legs.

Feedback was received from the candidates that there was an error in the initial setup for this JPM. The candidates stated there should have been a red collar with a white tag sticker on the pushbutton for the "B" NI pump to indicate that the pump was racked out and white tagged per OP/1/A/6200/006 (Safety Injection System). The presence of a red collar with a white tag sticker on the "B" NI pump indicates that the pump is available to be placed in service if needed. The white tag sticker is used to indicate that the pump is racked out for configuration control. The absence of a collar and sticker with no indicating lights could mean the pump is racked out for reasons other than configuration control. It could also mean that DC control power had been lost to the control circuit or that an indicating light is burned out. This caused some candidates to not recognize that the pump was racked out and because of this, they attempted to start the pump without dispatching an operator to rack the pump in. When the pump would not start, some candidates assumed it had failed and would not start. Others dispatched an operator to rack the pump in at this point and completed the JPM as written. Those candidates that determined the "B" NI pump was failed continued in the procedure, assuming the JPM was an alternate path JPM and aligned makeup to the core from an alternate source. The critical part of the JPM is to provide a source of makeup to the core.

When this JPM was originally developed, the initial setup called for the "B" NI pump to be racked in. This was to simulate preemptive action by the SRO to have the "B" NI pump racked in and ready to start when directed by procedure. During prep week, we revised the JPM to have the "B" NI pump racked out initially, and rewrote the simulator snapshot to reflect the change. When the change was red marked in the body of the JPM, we did not go back to the set up sheet in the front of the JPM and red mark the same changes there. When the JPM was retyped, the changes were made in the body of the JPM, but not in the setup sheet. This led to the improper setup with no red collar on the "B" NI pump. Subsequent reviews of the JPM did not identify the error.

Enclosure 4.2 of OP/1/A/6200/006 (Removing the Safety Injection from Standby Readiness) is attached.

Removing the Safety Injection System from Standby Readiness

1. Initial Conditions

_____ 1.1 Review the Limits and Precautions.

_____ 1.2 Verify the NC System is in a controlled depressurization and cooldown condition per OP/1/A/6100/002 (Controlling Procedure for Unit Shutdown).

2. Procedure

2.1 **WHEN** T-AVG is < 350°F **AND** prior to any cold leg temperature reaching 285°F, complete the following steps:

_____ 2.1.1 Rack out both of the following NI pump motor breakers per OP/0/A/6350/010 (Operation of Station Breakers and Disconnects):

☐ 1ETA #11 (Safety Injection Pump Motor 1A)

AND

☐ 1ETB #11 (Safety Injection Pump Motor 1B)

_____ _____ 2.1.2 White tag the NI pump motor breakers.

2.2 **WHEN** T-AVG is <200°F, complete the following steps:

2.2.1 Place the power disconnect switches for the following valves in the "ENABLE" position:

_____ _____ • 1NI-121A (NI Pump 1A To H-Legs B & C)
_____ _____ • 1NI-152B (NI Pump 1B To H-Legs A & D)
_____ _____ • 1NI-162A (NI To C-Legs Inj Hdr Isol)

2.2.2 Ensure the following valves are closed:

_____ _____ • 1NI-121A (NI Pump 1A To H-Legs B & C)
_____ _____ • 1NI-152B (NI Pump 1B To H-Legs A & D)
_____ _____ • 1NI-162A (NI To C-Legs Inj Hdr Isol)

2.3 File this enclosure in the Control Copy folder of this procedure.

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DUKE POWER

April 30, 2001

Mr. Michael Ernstes
Operations Branch Division of Reactor Safety
U. S. Nuclear Regulatory Commission
61 Forsythe Street, S. W.
Suite 23T85
Atlanta, GA 30323

SUBJECT: Catawba Nuclear Station Senior Reactor and Reactor Operator Exams Post Examination Comments Followup

The following information concerning Administrative JPMs R3 and S3 is being provided based on a phone conversation between Mr. John Suptela and Mr. Charles Payne on 4/27/01.

Please find attached the facility comments regarding critical tasks for administrative JPMs R3 and S3.

If any additional information is required for clarification on this or previously submitted comments, please feel free to contact Bill Pitesa at (803) 831-3781 or John Suptela at (803) 831-5123.

Sincerely,

Gary R. Peterson
Site Vice President
Catawba Nuclear Station

cc: Mr. Charles Payne
Mr. Robert A. Lindsay
Mr. John W. Pitesa

Facility Comments for Admin JPM R3 (Develop an R&R to Isolate 1A KF Pump for Maintenance) and Admin JPM S3 (Perform a Review of an R&R Procedure)

These Admin JPMs indicated that the sequence of closure for the suction and discharge valves for the Spent Fuel Cooling (KF) Pump being tagged was a critical task. This is not the case.

It is considered good practice to close the discharge valve on a pump prior to the suction valve. Where there is a difference between the design pressure rating for the suction and discharge piping along with a leak of the pump's check valve, over-pressurization of the suction piping may occur.

In general, station pumps that have this concern have either an interlock or administrative controls in place to ensure the suction piping is protected. The KF Pumps suction and discharge valves have no interlock or administrative controls on them.

As shown on flow diagram CN-1570-1.0 (KF System), the suction and discharge piping for the KF pump are both Class C, stainless steel with a design pressure of 190 psia. Therefore, in this case, there is no potential for over-pressurization of the suction piping. There is no safety significance in the order of closure of the suction and discharge valves.