ATTACHMENT 1

MARKED-UP TECHNICAL SPECIFICATIONS PAGES FOR CATAWBA

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 DC channel in MODE 1, 2, 3, or 4. DG batteries ------------------ 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

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 ≥ 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 ≥ 373 amps for the first minute, then ≥ 213 amps for the next 59 minutes. DC channel batteries EBA and EBD must also supply a current of ≥ 210 amps for an additional hour. The DG batteries are tested to supply a current ≥ 171.6 amps for the first minute, then ≥ 42.5 amps for the remaining 119 minutes. Terminal voltage is required to remain ≥ 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.

ATTACHMENT 2

REPRINTED TECHNICAL SPECIFICATIONS PAGES FOR CATAWBA

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 <u>AND</u> 18 months when battery shows degradation or has reached 85% of expected life with capacity < 100% of manufacturer's rating <u>AND</u> -----NOTE----- Not applicable to DG batteries ---------- 24 months when battery has reached 85% of the expected life with capacity ≥ 100% of manufacturer's rating

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 ≥ 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 ≥ 373 amps for the first minute, then ≥ 213 amps for the next 59 minutes. DC channel batteries EBA and EBD must also supply a current of ≥ 210 amps for an additional hour. The DG batteries are tested to supply a current ≥ 171.6 amps for the first minute, then ≥ 42.5 amps for the remaining 119 minutes. Terminal voltage is required to remain ≥ 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.

ATTACHMENT 3

DESCRIPTION OF PROPOSED CHANGES AND TECHNICAL JUSTIFICATION

Description of Proposed Changes

TS 3.8.4 governs DC source requirements for Modes 1, 2, 3, and 4. In particular, SR 3.8.4.8 delineates requirements for the performance of the battery service test. This test is performed on an 18-month frequency. SR 3.8.4.9 delineates requirements for the performance of the performance discharge test or modified performance discharge test. This test is normally performed on a 60-month frequency, although the surveillance interval is reduced in the event that battery degradation exists or the battery has reached 85% of its expected life. SR 3.8.4.8 and SR 3.8.4.9 each require its respective test to be performed during unit shutdown conditions for the DC channel batteries. This is achieved via notes to the SRs which state that the surveillance shall not be performed in Mode 1, 2, 3, or 4.

In this proposed amendment, SR 3.8.4.8 is modified to substitute the phrase "DG batteries" for "DC channel" in Note 2. Catawba does not presently conduct a service test of the DG batteries while the units are in Mode 1, 2, 3, or 4, and has no plans to do so. Therefore, the TS are being made more conservative by prohibiting service testing of the DG batteries while the units are on line. This change will allow the service test of the DC channel batteries to be performed while in Mode 1, 2, 3, or 4. SR 3.8.4.9 is modified to add the phrase "for the DG batteries" to the note, which effectively eliminates this note from applying to the DC channel batteries. The result of these changes is that both SR 3.8.4.8 and SR 3.8.4.9 may be performed during Mode 1, 2, 3, or 4 for the DC channel batteries and neither SR 3.8.4.8 nor SR 3.8.4.9 may be performed during Mode 1, 2, 3, or 4 for the DG batteries. Changes are also made to the TS Bases consistent with these changes. Refer to the attached marked-up TS and TS Bases pages for these changes.

Technical Justification

Summary Statement: Implementation of this amendment will result in increased outage scheduling flexibility and will result in a cost savings by allowing testing of the DC channel batteries with the units on line. As will be demonstrated in detail in the paragraphs that follow, the design of the Catawba 125 Volt DC Vital Instrumentation and Control Power System has exceptional capacity and capability. Each DC channel battery is sized of sufficient capacity so that one battery can supply all required loads to two load channels (its own load channel plus another load channel) for a specified duration. The system is designed to allow two load channels of the same safety train to be *tied to a single battery via installed tie breakers. This design exceeds that found at most plants; therefore, there is no safety concern with testing the DC channel batteries while the Catawba units are on line. Regulatory bases which recommended DC channel battery testing while the units are shutdown were developed based on systems with far less redundancy and diversity than that employed at Catawba. Therefore, Catawba has concluded that the design of the 125 Volt DC Vital Instrumentation and Control Power System supports the proposed change.*

The 125 Volt DC Vital Instrumentation and Control Power System supplies power to nuclear safety related instrumentation and control loads requiring an uninterrupted power source to maintain safe reactor status during the following plant conditions:

1. Normal plant operation
2. Blackout or loss of offsite power
3. Design basis events
4. Blackout or loss of offsite power concurrent with design basis events

The 125 Volt DC Vital Instrumentation and Control Power System is comprised of four independent and physically separate channels. The four channels are designated A, B, C, and D. Each channel consists of a battery (EBA, EBB, EBC, EBD), a battery charger (ECA, ECB, ECC, ECD, ECS), a 125 volt DC distribution center (EDA, EDB, EDC, EDD, (and EDE/EDF as indicated below)), and a 125 volt DC power panelboard (EPA, EPB, EPC, EPD). The four independent channels are separated into two redundant safety trains, such that the loss of any one channel does not interfere with the performance of the required safety function of the system. Channels A and C comprise safety train A, while channels B and D comprise safety train B. In addition to the normal battery charger associated with its respective channel, a spare battery charger (ECS) serves as a backup should one of the normal battery chargers fail or be otherwise unavailable.

To assure high availability of power and to protect against a loss of DC power, the loads on distribution centers EDE and EDF which are required for plant shutdown are supplied power from two independent sources through auctioneering diode assemblies. The two 125 volt DC sources are the 125 Volt DC Vital Instrumentation and Control Power System and the 125 Volt DC Essential Diesel Auxiliary Power System. Thus, if either of these sources is lost, the distribution centers will continue to receive power from the remaining source. Refer to attached Figure 1 for a schematic representation of the normal system alignment for channel A, which is representative of all four channels, with the exception that channels B and C do not have the auctioneering diode assemblies' loads.

The 125 Volt DC Vital Instrumentation and Control Power System batteries are lead calcium batteries. Each battery assembly consists of 60 cells and has a capacity of 1495 ampere-hours. Each battery is sized to supply the continuous emergency loads and momentary loads fed from its associated distribution center plus supply the loads associated with another train-related distribution center for two hours.

In the event that a battery must be removed from service, its associated 125 volt DC distribution center can be connected to the spare charger and the other 125 volt DC distribution center of the same train, utilizing tie breakers and the appropriate breaker on the spare charger distribution center. This way, backup battery power will be available to all distribution centers, should AC power to the battery chargers fail. Note that the tie breakers are Kirk Key interlocked in such a way that any two channels associated with opposite trains cannot be connected together.

Due to the redundancy of the system design, Catawba's TS allow for a DC channel to be inoperable for a period of up to 10 days. When a DC channel is inoperable, TS 3.8.4 Required Action A.1 requires closing the tie breakers so that the inoperable channel can be powered from the other train-related DC channel. The closing of the tie breakers must be accomplished within 8 hours. The unit can then operate in this configuration for the remainder of the 10-day period.

The battery service test simulates the combined load of two load channels during worst case design basis accident conditions. This test verifies each battery's ability, as found, to satisfy the design requirements (i.e., battery duty cycle) of the 125 Volt DC Vital Instrumentation and Control Power System. The battery design requirements were established with the conservative assumption that a design basis accident would occur while a battery is removed from service for maintenance or testing. Consequently, each battery is sized to simultaneously supply the design basis accident loads associated with its respective load channel, the loads fed by the train-related auctioneering diode assembly, and the loads associated with the other train-related load channel for two hours. For example, battery EBA is sized to simultaneously supply the design basis accident loads fed from distribution center EDA, auctioneering diode assembly EADA, and distribution center EDC. Refer to attached Figure 2.

The 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. This test is intended to determine overall battery degradation due to age and usage.

Catawba proposes to conduct the battery service test and performance discharge test/modified performance discharge test with the unit on line by first declaring the battery and DC channel to be tested inoperable. The inoperable DC channel will then be tied to the other train-related DC channel using the above mentioned tie breakers. The required test will then be performed on the inoperable battery. Performance of the battery service test or the performance discharge test/modified performance discharge test can be accomplished in a short time period relative to the 10-day allowed outage time for an inoperable DC channel. It requires approximately 50 to 60 hours to conduct the battery service test or the performance discharge test/modified performance discharge test. This time includes recharging the battery and functional verification to ensure that the battery meets all TS requirements before it is returned to service. These test completion times are well within the 10-day allowed outage time for an inoperable DC channel. During the performance of the required tests, both safety trains will continue to remain operable.

As an example, if a test is being conducted on battery EBA, channel A would first be declared inoperable. Channel A would then be tied to battery-backed channel C. Channels B and D would be unaffected during the conduct of the test. Therefore, both safety trains would still be capable of performing their required functions during an accident, since each battery has the ability to supply two load channels for a two-hour period during a design basis accident. Figure 2 illustrates the alignment of channels A and C during battery EBA testing.

Catawba's 125 Volt DC Vital Instrumentation and Control Power System batteries were upgraded to a much larger capacity in 1996. Since then, the Unit 1 and Unit 2 battery service tests have been performed on each battery three times, all with the worst case load profiles (two load channels plus the loads of EDE or EDF). All batteries have easily passed each battery service test with plenty of capacity margin left on them.

It should also be noted that Catawba maintains some spare battery cells, which are tested and kept on float charge. In the event that any cells fail to recover following testing, the non-recoverable cells can be replaced with the spare cells quickly, well within the 10-day allowed outage time for an inoperable DC channel.

The risk of a fire event would not be increased by conducting testing of the DC channel batteries with the unit on line. The load unit used during the conduct of the tests is composed of largely non-combustible materials (e.g., ceramic wire-wound resistors, metal busbar, etc.). In addition, breakers/fused disconnects are used with the load unit in order to protect against the occurrence of a potential fault condition. The unit is constantly attended when in use. The potential hydrogen generation is equivalent to about 1% by volume. This is well below the lower explosive limit of 4% and below the limit of 2% set forth in Regulatory Guide 1.128, "Installation Design and Installation of Large Lead Storage Batteries for Nuclear Power Plants." Current operating practice ensures that battery room ventilation is operable during the conduct of testing to further reduce the possibility of collecting an explosive gas concentration. Except for during battery charging, no significant amount of hydrogen gas is generated during the actual conduct of testing activities. Any fire that may occur during testing typically would originate due to a loose terminal connection. The potential for fire ignition would not be increased by testing during innage periods. Since the test equipment and the area are attended during testing, experience demonstrates that a fire would be identified in the incipient stages by the test personnel. In the early stages (or after a fire in battery terminations is fully developed), the fire would self-extinguish by removing power from the test unit. The potential fire severity due to testing is no greater during innage periods than outage periods. Based on these mitigating factors, Catawba concludes that conducting DC channel battery testing with the unit on line does not contribute to an increased risk of a fire event while the units are operating.

Catawba has also examined the results of performing TS required battery testing with the unit on line from a risk standpoint. A probabilistic risk analysis focussed on the impacts in the following areas and determined the results indicated below:

1. The potential for a plant transient originating from the 125 Volt DC Vital Instrumentation and Control Power System (initiator frequency): The frequency of a unit trip resulting from a loss of two vital DC buses, assuming a vital battery was unavailable for 10 days, was determined to be approximately 6E-4. This increase is negligible in comparison with a nominal trip frequency of about two trips per year. Therefore, the risk impact on initiator frequency associated with the unavailability of one battery is seen to be acceptable.
2. The potential for any reduction in the reliability of safety systems relied upon to mitigate various design basis events (safety system performance): The resulting system failure probabilities were found to be the same as those of the base case of the Catawba Probabilistic Risk Analysis. Moreover, no new failure combinations arose involving maintenance/testing unavailability of the battery being tested. Having one vital battery unavailable was found to have virtually no impact on safety system reliability. Although the redundancy of the 125 Volt DC Vital Instrumentation and Control Power System would be reduced slightly, the system's reliability remains sufficiently high for supporting safety systems.
3. The potential for a reduction in the reliability of any important actions required for mitigating accidents and the potential for inadvertently rendering important equipment unavailable (plant configuration and control): Connecting a DC bus via the tie breakers to the other train-related bus does not introduce an unavailability for either bus, since a live bus transfer is utilized to perform the alignment. In addition, unavailability of a battery would not hinder any important actions required during accident mitigation.
4. Any impact on the estimated core damage probability (core damage frequency): Analysis determined that the resulting core damage frequency was unchanged from the Catawba Probabilistic Risk Analysis base case value. No new failure combinations arose involving maintenance/testing unavailability of the battery being tested.

In conclusion, the proposed amendment to allow battery testing with the unit on line was determined to have a negligible impact on risk with respect to initiator frequency, safety system performance, plant configuration and control, and core damage frequency.

Figure 1: Alignment of Channel A During **Normal Operation**

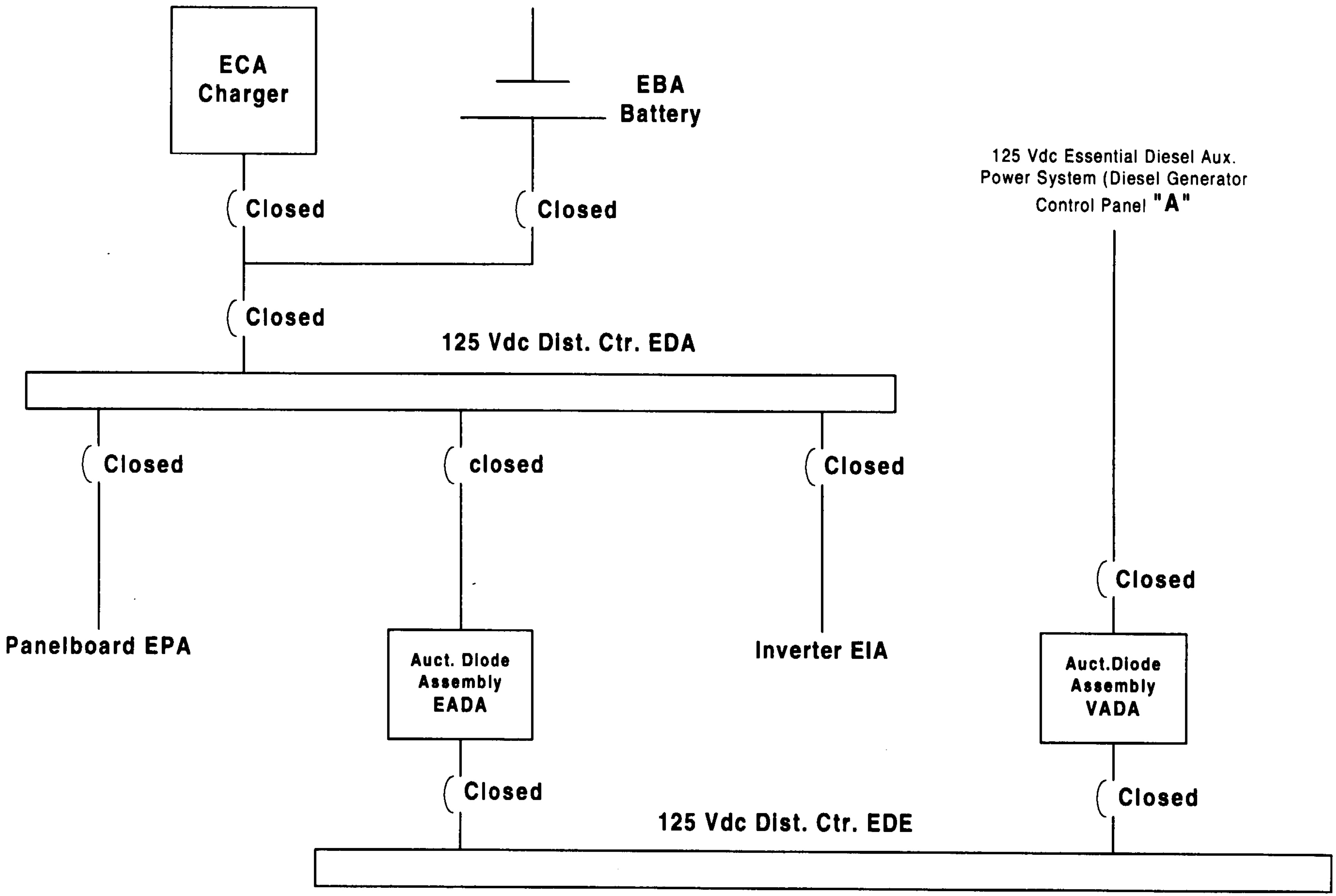
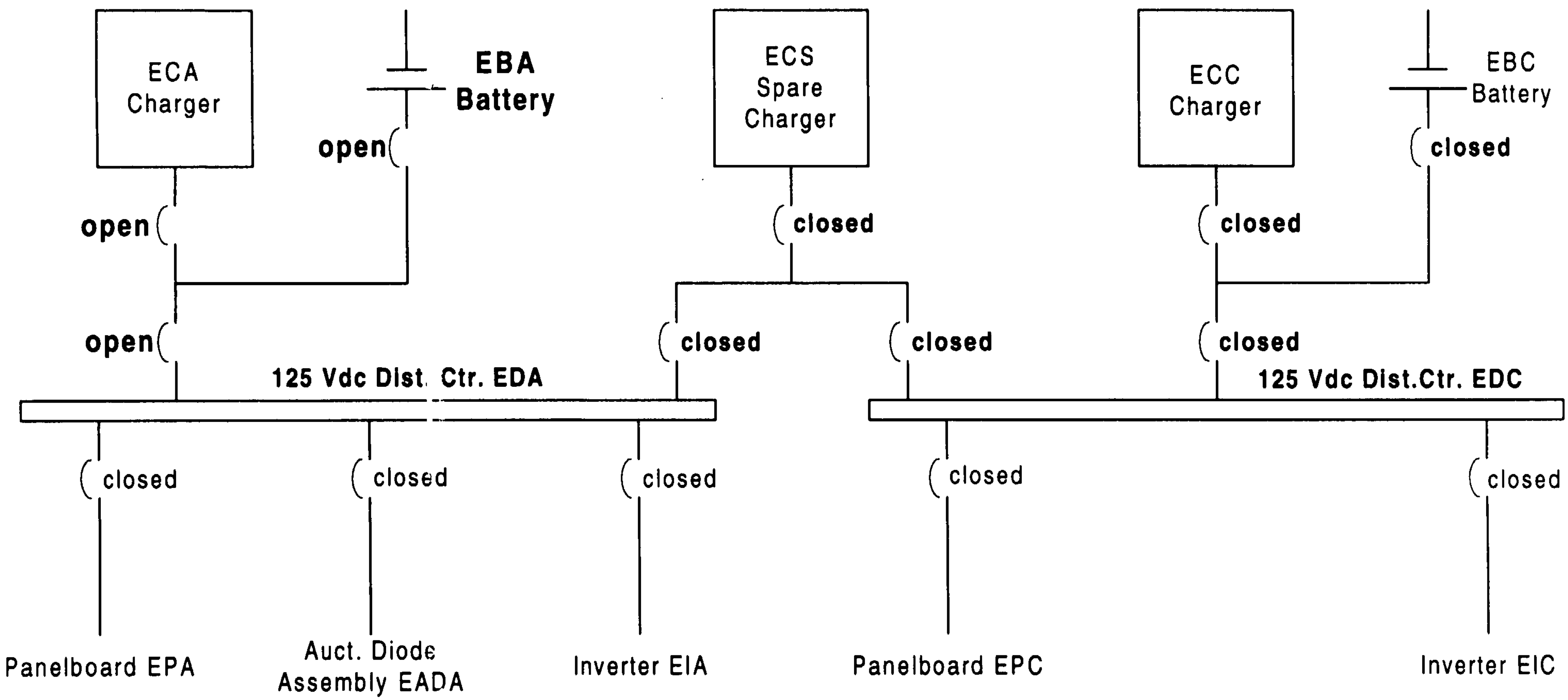


Figure 2: Alignment of
Channels A & C During
<u>EBA</u> Out of Service



ATTACHMENT 4

NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

No Significant Hazards Consideration Determination

The following discussion is a summary of the evaluation of the changes contained in this proposed amendment against the 10 CFR 50.92(c) requirements to demonstrate that all three standards are satisfied. A no significant hazards consideration is indicated if operation of the facility in accordance with the proposed amendment would not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated, or

2. Create the possibility of a new or different kind of accident from any accident previously evaluated, or

3. Involve a significant reduction in a margin of safety.

First Standard

Implementation of this amendment would not involve a significant increase in the probability or consequences of an accident previously evaluated. Approval of this amendment will have no significant effect on accident probabilities or consequences. The 125 Volt DC Vital Instrumentation and Control Power System is not an accident initiating system; therefore, there will be no impact on any accident probabilities by the approval of this amendment. The design of the system is not being modified by this proposed amendment. It has been shown that the required battery testing can be performed safely with the unit on line well within the allowed outage time for an inoperable DC channel. Both safety trains would continue to be capable of performing their required design functions in the event of an accident. Therefore, there will be no impact on any accident consequences.

Second Standard

Implementation of this amendment would not create the possibility of a new or different kind of accident from any accident previously evaluated. No new accident causal mechanisms are created as a result of NRC approval of this amendment request. No changes are being made to the plant which will introduce any new accident causal mechanisms. This amendment request does not impact any plant systems that are accident initiators.

Third Standard

Implementation of this amendment would not involve a significant reduction in a margin of safety. Margin of safety is related to the confidence in the ability of the fission product barriers to perform their design functions during and following an accident situation. These barriers include the fuel cladding, the reactor coolant system, and the containment system. The performance of these fission product barriers will not be impacted by implementation of this proposed amendment. It has already been shown that both safety trains of the 125 Volt DC Vital Instrumentation and Control Power System will continue to be able to perform their accident mitigation functions should they be required. In addition, the probabilistic risk analysis conducted for this proposed amendment demonstrated that there is no appreciable increase in overall plant risk incurred by its implementation. No safety margins will be impacted.

Based upon the preceding discussion, Duke Energy has concluded that the proposed amendment does not involve a significant hazards consideration.

ATTACHMENT 5

ENVIRONMENTAL ANALYSIS

Environmental Analysis

Pursuant to 10 CFR 51.22(b), an evaluation of this license amendment request has been performed to determine whether or not it meets the criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) of the regulations.

Implementation of this amendment will have no adverse impact upon the Catawba units; neither will it contribute to any additional quantity or type of effluent being available for adverse environmental impact or personnel exposure.

It has been determined there is:

1. No significant hazards consideration,

2. No significant change in the types, or significant increase in the amounts, of any effluents that may be released offsite, and

3. No significant increase in individual or cumulative occupational radiation exposures involved.

Therefore, this amendment to the Catawba TS meets the criteria of 10 CFR 51.22(c)(9) for categorical exclusion from an environmental impact statement.