ELECTRICAL POWER SYSTEMS

3/4.8.2 D.C. SOURCES

OPERATING

LIMITING CONDITION FOR OPERATION

3.8.2.1 The following D.C. channels shall be OPERABLE and energized:

a. Channel 1 consisting of 125-Volt D.C. Bus No. EVDA, 125-Volt D.C. Battery Bank No. EVCA and a full capacity charger,*

b. Channel 2 consisting of 125-Volt D.C. Bus No. EVDB, 125-Volt D.C. Battery Bank No. EVCB and a full capacity charger,*

c. Channel 3 consisting of 125-Volt D.C. Bus No. EVDC, 125-Volt D.C. Battery Bank No. EVCC and a full capacity charger,* and

d. Channel 4 consisting of 125-Volt D.C. Bus No. EVDD, 125-Volt D.C. Battery Bank No. EVCD and a full capacity charger.*

APPLICABILITY: MODES 1, 2, 3, and 4

ACTION: (Units 1 and 2)

a. With one 125-volt D.C. bus inoperable or not energized, restore the inoperable bus to OPERABLE and energized status within 8 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With one 125-volt D.C. battery and/or its normal and standby chargers inoperable or not energized, either:

1. Restore the inoperable battery and/or charger to OPERABLE and energized status within 8 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours, or

2. Energize the associated bus with an OPERABLE battery bank via OPERABLE tie breakers within 8 hours; operation may then continue for up to 7 days from time of initial loss of OPERABILITY, otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

3. With two 125 VDC batteries and/or their full-capacity chargers inoperable and 125 VDC Batteries EVCA and EVCC and/or their full-capacity chargers in service, or 125 VDC Batteries EVCB and EVCD and/or their full-capacity chargers in service during this period of time, restore at least one battery and/or its full-capacity charger to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

*A vital bus may be disconnected from its D.C. source for up to 124 hours for the purpose of performing an equalizing charge on its associated battery bank provided the vital busses associated with the other battery banks are OPERABLE and energized.

4.8.2.1.1 Each D.C. channel shall be determined OPERABLE and energized with at least one tie breaker open between redundant busses at least once per 7 days by verifying correct breaker alignment, indicated power availability from the charger and battery, and voltage on the bus of greater than or equal to 125 volts.

4.8.2.1.2 Each 125-volt battery bank and charger shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1) Verifying that the parameters in Table 4.8-3 meet the Category A limits, and

2) Verifying total battery terminal voltage is greater than or equal to 125 volts on float charge.

b. At least once per 92 days and within 7 days after a battery discharge (battery terminal voltage below 110 volts), or battery overcharge (battery terminal voltage above 150 volts), by:

1) Verifying that the parameters in Table 4.8-3 meet the Category B limits,

2) Verifying there is no visible corrosion at either terminals or connectors, or the connection resistance of these items is less than 150×10^{-6} ohms, and

3) Verifying that the average electrolyte temperature of six connected cells is above 60°F.

c. At least once per 18 months by verifying that:

1) The cells, cell plates (if visible), and battery racks show no visual indication of physical damage or abnormal deterioration;

2) The cell-to-cell and terminal connections are clean, tight, and coated with anti-corrosion material;

3) The resistance of each cell-to-cell and terminal connection is less than or equal to 150×10^{-6} ohms; and

4) The battery charger will supply at least 400 amperes at a minimum of 125 volts for at least 1 hour.

d. At least once per 18 months by verifying that the battery capacity is adequate to either:

1) Supply and maintain in OPERABLE status all of the actual emergency loads for 1 hour when the battery is subjected to a battery service test, or

2) Supply a dummy load of greater than or equal to 440 amperes for 60 minutes while maintaining the battery terminal voltage greater than or equal to 105 volts.

e. At least once per 60 months, by verifying that the battery capacity is at least 80% of the manufacturer's rating when subjected to a performance discharge test. Once per 60 month interval, this performance discharge test may be performed in lieu of the battery service test required by Specification 4.8.2.1.2d.

f. Annual performance discharge tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% of rated capacity from its average on previous performance tests, or is below 90% of the manufacturer's rating.

TABLE 4.8-3

BATTERY SURVEILLANCE REQUIREMENTS

	CATEGORY A(1)	CATEGORY B(2)	
PARAMETER	LIMITS FOR EACH DESIGNATED PILOT CELL	LIMITS FOR EACH CONNECTED CELL	ALLOWABLE(3) VALUE FOR EACH CONNECTED CELL
Electrolyte Level	>Minimum level indication mark, and $\leq$ ¼" above maximum level indication mark	>Minimum level indication mark, and $\leq$ ¼" above maximum level indication mark	Above top of plates, and not overflowing
Float Voltage	$\geq$ 2.13 volts	$\geq$2.13 volts(c)	> 2.07 volts(c)
Specific Gravity(a)	$\geq$ 1.200(b)	$\geq$ 1.195	$\geq$ 1.175
		Average of all connected cells > 1.205	Average of all connected cells $\geq$ 1.195(b)

(a) Corrected for electrolyte level and average pilot cell electrolyte temperature.
(b) Or battery charging current is less than 2 amps when on charge.
(c) Corrected for average electrolyte temperature.
(1) For any Category A parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that within 24 hours all the Category B measurements are taken and found to be within their allowable values, and provided all Category B parameter(s) are restored to within limits within the next 6 days.
(2) For any Category B parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that the Category B parameters are within their allowable values and provided the Category B parameter(s) are restored to within limits within 7 days.
(3) Any Category B parameter not within its allowable value indicates an inoperable battery. Any cell(s) not meeting Category B "Allowable Value" may be jumpered out as long as the remaining cells provide $\geq$ 105 volts following a 1 hour service discharge based on the last service discharge test.

3/4.8.3 ONSITE POWER DISTRIBUTION

OPERATING

LIMITING CONDITION FOR OPERATION

3.8.3.1 The following A.C. electrical busses and inverters shall be OPERABLE and energized with tie breakers open both between redundant busses within the unit and between the two units:

a. 4160-Volt Emergency Bus # ETA,

b. 4160-Volt Emergency Bus # ETB,

c. 600-Volt Emergency Bus # ELXA,

d. 600-Volt Emergency Bus # ELXB,

e. 600-Volt Emergency Bus # ELXC,

f. 600-Volt Emergency Bus # ELXD,

g. 120-Volt A.C. Vital Bus # EKVA energized from Inverter # EVIA connected to D.C. Channel 1,*

h. 120-Volt A.C. Vital Bus # EKVB energized from Inverter # EVIB connected to D.C. Channel 2,*

i. 120-Volt A.C. Vital Bus # EKVC energized from Inverter # EVIC connected to D.C. Channel 3,* and

j. 120-Volt A.C. Vital Bus # EKVD energized from Inverter # EVID connected to D.C. Channel 4.*

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

ACTION:

a. With less than the above complement of A.C. busses OPERABLE and energized, restore the inoperable busses to OPERABLE and energized status within 8 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With one inverter inoperable, energize the associated A.C. Vital Bus within 8 hours; restore the inoperable inverter to OPERABLE and energized status within 124 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.8.3.1 The specified A.C. busses and inverters shall be determined energized in the required manner at least once per 7 days by verifying correct breaker alignment and indicated voltage on the busses.

*An inverter may be disconnected from its D.C. source for up to 124 hours for the purpose of performing an equalizing charge on its associated battery bank provided: (1) its vital bus is OPERABLE and energized, and (2) the vital busses associated with the other battery banks are OPERABLE and energized. An inverter may be disconnected from its D.C. source for up to 7 days provided the conditions of ACTION b. of Specification 3.8.2.1 are satisfied.

Attachment II

JUSTIFICATION AND SAFETY ANALYSIS

The proposed changes to the McGuire Nuclear Station Technical Specifications seek to clarify and revise the requirements for maintaining and testing the D. C. Power sources at McGuire (Technical Specifications 3/4.8.2 and 3/4.8.3). A number of items in these technical specifications have been determined to be inconsistent or incorrect and require correction.

The first change would increase the action time to return an inoperable buss, battery or charger to operable status. Presently Technical Specification 3.8.2.1, Actions a, b1, and b2, require inoperable busses, batteries and chargers to be restored within two hours. The change would increase the time to eight hours making the allowable outage times consistent with technical specification 3.8.3.1 Action Statements. This change would make the technical specifications consistent based on the definition of operable. In order for the battery or charger to be operable (T. S. 3.8.2.1) the buss feeding it has to be operable and the buss is allowed to be inoperable for up to eight hours (T. S. 3.8.3.1). Also, all components should be allowed adequate time for corrective maintenance. Based on experience, eight hours has been determined to be an adequate time to provide corrective maintenance without degrading any safety margins.

The next proposed change would increase the time allowed for continued operation once an inoperable buss has been energized via tie breakers. The Technical Specifications (T. S. 3.8.2.1, Action b2 and T. S. 3.8.3.1, Footnote) presently allow continued operation in this scenario for 72 hours. The proposed change would increase this allowable outage time to seven days. Based on a normal situation which requires the maximum outage time (discharge testing), it has been determined that seven days would be an adequate outage time. The following is a list of major time concerns for discharge testing and a minimum estimate of performance time.

Action	Performance Time
1) Battery Tag Out & Set Up	8 Hrs.
2) Discharge Test	2 Hrs.
3) Equalizing Alignment	2 Hrs.
4) Equalizing	95 Hrs. + 1 for Stability
5) Data Readings	8 Hrs.
6) Return to Service	8 Hrs.
TOTAL	124 Hrs.

To assure that there is ample time for discharge testing, seven days is being requested to allow for unexpected delays. This will enable McGuire Nuclear Station to meet the Manufacturer and IEEE recommendations for testing and maintenance of the batteries.

The present technical specifications for McGuire's battery system were developed from the Westinghouse Standard Technical Specifications, Revision 4. The

standard technical specifications were written for a two battery system with each battery carrying two channels. McGuire's technical specifications do not take credit for the four battery system with each battery carrying a single channel as shown in Figure 1. With the four battery system at McGuire, each battery is sized to handle the loads of two channels in a blackout in conjunction with a safety injection situation. In a single failure situation with two channels tied, two channels will still be operable with the four battery system, therefore, no safety margins will be decreased by increasing the allowable outage time to seven days.

The next proposed change will add an Action Statement to Technical Specification 3.8.2.1. This additional Action Statement takes credit for the four battery system at McGuire and allows for more maintenance flexibility (similar to Catawba Nuclear Station technical specifications). With the scenario as described in the proposed Action b.3 on Attachment I, each buss will continue to maintain 125 Volts, however, present technical specifications require immediate shutdown of both units. As allowed in proposed Action b.3, the 72 hour time limit will allow time to correct the situation and return to the Limiting Condition for Operation. This change will not reduce any safety margins.

Surveillance requirement 4.8.2.1.1 is being revised to specify that a minimum of "one" tie breaker needs to be verified open between redundant busses at least once per seven days, rather than "all" tie breakers. These tie breakers are in series on the four battery system, therefore only one tie breaker needs to be open to seperate channels.

The footnote on page 3/4.8-11 is being revised to increase the time to perform an equalizing charge from 24 hours to 124 hours. 124 hours continues to be conservative and is consistent with the manufacturer's recommendation for equalizing Lead-Calcium Type batteries at the recommended voltage of 2.39 volts. 124 hours for performance time is described on Page 1 of this Justification and Safety Analysis.

Step e. of the surveillance requirements presently requires a 60 month verification of battery capacity during shutdown. The requirement to perform this during shutdown was inappropriate in the McGuire technical specifications because the batteries are shared between two units. This would result in two units being unnecessarily shutdown when neither unit needs to be shutdown to perform the surveillance requirement. This change does not decrease any safety margins.

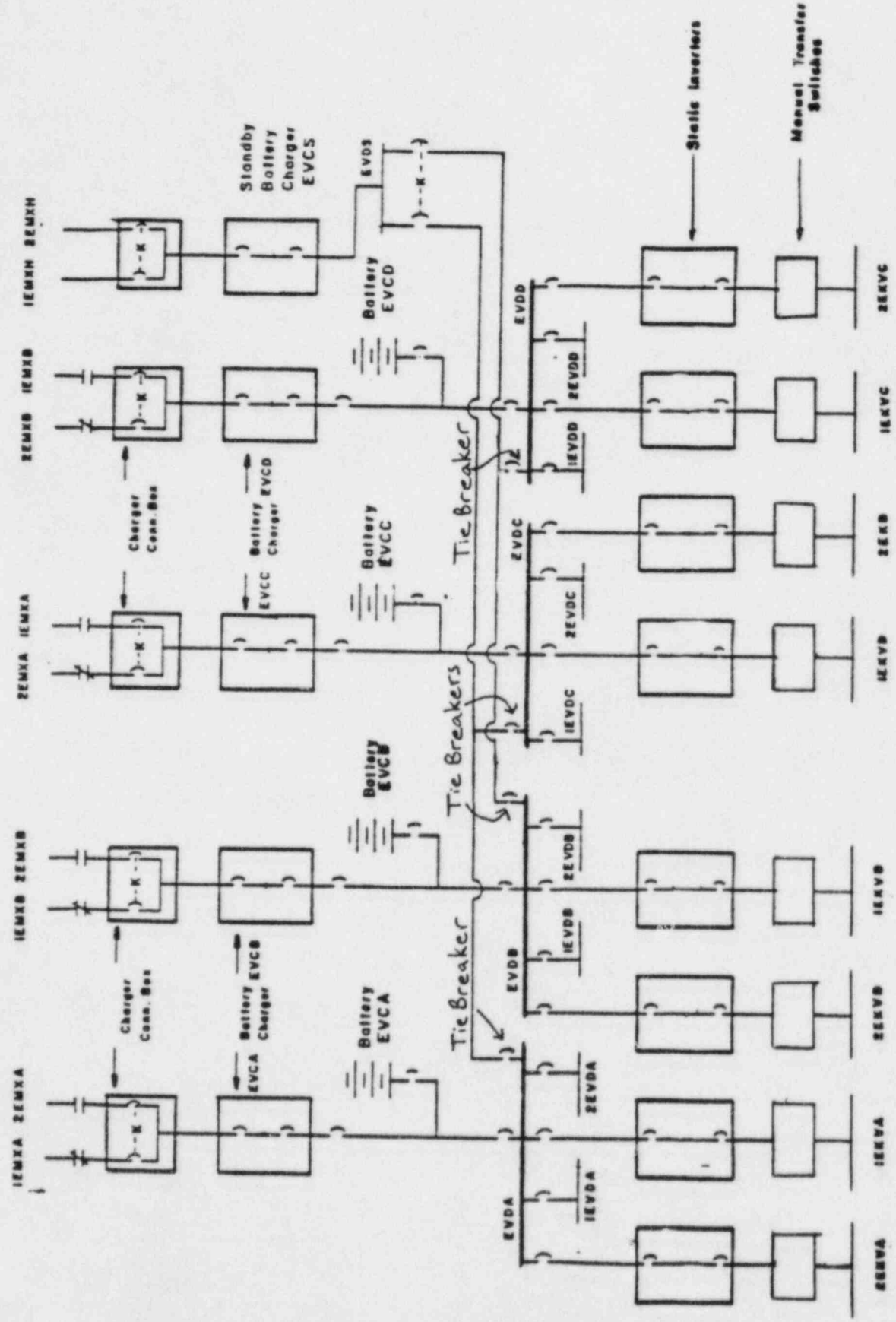
The next change would increase battery degradation from 80% of the manufacturer's rating to 90% in Surveillance Requirement 4.8.2.1.2.f. Annual performance discharge tests should be performed prior to reaching 80% capacity, because test results showing a capacity below 80% indicate that the battery is inoperable. This change is conservative and will make the technical specification conform to IEEE 450-1980 requirements.

Table 4.8-3 requires a number of clarifications. First, under "Float Voltage-Catagory B", the footnote (c) is added for consistency. Under "Specific Gravity-Catagory B-Allowable Value for Each Connected Cell", the present incorrect information is deleted and replaced with $\geq$1.175. This value was

derived from information in the bases of the technical specifications which states ". . . (3) the allowable value for an individual cell's specific gravity, ensures that an individual cell's specific gravity will not be more that 0.040 below the manufacturer's full charge specific gravity and that the overall capability of the battery will be maintained within an acceptable limit; . . .". A clarification has been made to footnote (a) to specify the type of level and temperature which the cells are to be corrected for. Footnote 3 adds a statement which clarifies the intent of Table 4.8-3 as described in IEEE 450-1980 and allows for the jumpering of cells. The changes to Table 4.8-3 improve and clarify the table and maintain all safey considerations initially allowed for by the table.

Technical Specification 3.8.3.1, Action B presently limits restoration of an inoperable inverter to 24 hours. The proposed change would increase this time limit to 124 hours. The footnote on this specification is also being revised to increase the time to perform an equalizing charge from 24 hours to 124 hours. These changes continue to be conservative and allow extended time to perform necessary maintenance on the system as shown on Page 1 of this Justification and Safety Analysis. This change does not decrease any safety margins.

Figure 1


Static Inverters
Manual Transfer Switches
Standby Battery Charger EVCS
Battery EVCD
Battery EVCC
Battery EVCB
Battery EVCA
Charger Conn. Box
Battery Charger EVCD
Battery Charger EVCC
Battery Charger EVCB
Battery Charger EVCA
Tie Breaker
Tie Breakers
Tie Breaker
1E
1EMXA 2EMXA
1EMXB 2EMXB
2EMXB 1EMXB
1EMXH 2EMXH
EVDA
EVDB
EVDC
EVDD
EVDS
1EVDA
1EVDB
1EVDC
1EVDD
2EVDA
2EVDB
2EVDC
2EVDD
1EKVA
1EKVB
1EKVC
1EKVD
2EKVA
2EKVB
2EKVC
2EKVD

Attachment III

ANALYSIS OF SIGNIFICANT HAZARDS CONSIDERATION

As required by 10 CFR 50.91 this analysis provides a determination that the proposed changes to the Technical Specifications do not involve any significant hazards consideration as defined by 10 CFR 50.92.

The proposed amendment would correct and clarify a number of items in Technical Specifications 3/4.8.2 and 3/4.8.3. The changes involving increased time limits for maintenance flexibility would not have an adverse impact on the safety margins inview of the fact that McGuire is equipped with a four battery system instead of the usual two battery system. This system has greater immunity against becoming inoperable than the two battery system. McGuires four battery system would not be disabled in the event of a worst single failure and one battery outage due to maintenance; two channels would still remain operable. Thus, increased time limits to service the battery system would not adverssely affect the ability of the system to mitigate effects of the worst single failure. other changes are simple clarifications or corrections on items that were not consistent with the electrical power system as installed at McGuire. All previous analyses for accidents involving this system continue to be valid, therefore these changes will not involve any significant hazards considerations.

The proposed amendment would not:

1. Involve a significant increase in the probability or consequences of an accidnet 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.

Based upon the preceding analysis Duke Power Company concludes that the proposed amendments do not involve a significant hazards consideration.