

ATTACHMENT 1

REVISED PROPOSED CATAWBA TECHNICAL SPECIFICATIONS CHANGES

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ELECTRICAL POWER SYSTEMS

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3/4.8.2 D.C. SOURCES

OPERATING

LIMITING CONDITION FOR OPERATION

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

- a. Channel 1 consisting of 125-Volt D.C. Bus No. EDA, 125-Volt D.C. Battery Bank No. EBA and a full-capacity charger,*
- b. Channel 2 consisting of 125-Volt D.C. Bus No. EDB, 125-Volt D.C. Battery Bank No. EBB and a full-capacity charger,*
- c. Channel 3 consisting of 125-Volt D.C. Bus No. EDC, 125-Volt D.C. Battery Bank No. EBC and a full-capacity charger,*
- d. Channel 4 consisting of 125-Volt D.C. Bus No. EDD, 125-Volt D.C. Battery Bank No. EBD and a full-capacity charger,*
- e. Train A consisting of 125-Volt D.C. Bus No. EDE, and
- f. Train B consisting of 125-Volt D.C. Bus No. EDF.

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

ACTION:

- a. With 125 VDC Bus EDE or EDF inoperable, restore the inoperable bus to OPERABLE status within 2 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 VDC Bus EDA, EDB, EDC or EDD inoperable, restore the inoperable bus to OPERABLE 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.
- c. With either 125 VDC Battery Bank No. EBB or EBC and/or its full-capacity charger inoperable, restore the inoperable battery and/or full-capacity charger to OPERABLE status within 10 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- d. With either 125 VDC Battery Bank No. EBA or EBD and/or its full-capacity charger inoperable and 125 VDC diesel generator Batteries DGBA and DCBB and their full-capacity chargers in service powering Busses EDE and EDF during this period of time, restore the inoperable battery and/or full-capacity charger to OPERABLE status within

*A vital bus may be disconnected from its D.C. source for up to 24 hours for the purpose of performing an equalizing charge on its associated battery bank provided that the vital busses associated with the other battery banks are OPERABLE and energized. Also when the spare charger is being used as a replacement for the normal battery charger verify that the A.C. input to the charger is from the same A.C. division as the normal charger which it is replacing.

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LIMITING CONDITION FOR OPERATION

ACTION (Continued)

10 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

- e. With two 125 VDC batteries and/or their full-capacity chargers inoperable and 125 VDC Batteries EBA and EBC and/or their full-capacity chargers in service, or 125 VDC Batteries EBB and EBD 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.

SURVEILLANCE REQUIREMENTS

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

- a. At least once per 7 days by verifying that:
 - 1) The parameters in Table 4.8-3 meet the Category A limits,
 - 2) The total battery terminal voltage is greater than or equal to 125 volts on float charge, and
 - 3) There is no visible indication of damaging electrolyte leakage.
- b. At least once per 92 days and within 7 days after a battery discharge with battery terminal voltage below 110 volts, or battery overcharge with battery terminal voltage above 150 volts, by verifying that:
 - 1) The parameters in Table 4.8-3 meet the Category B limits,
 - 2) There is no visible corrosion at either terminals or connectors, or the connection resistance of these items is less than 150×10^{-6} ohm, and
 - 3) 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 anticorrosion material,
 - 3) The resistance of each cell-to-cell and terminal connection is less than or equal to 150×10^{-6} ohm, and

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 4) The battery charger will supply at least 200 amperes at a minimum of 125 volts for at least 8 hours.
- d. At least once per 18 months during shutdown^{*}, 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 from Batteries EBA and EBD and from Batteries EBB and EBC of greater than or equal to 373 amperes for the first minute of the first hour, greater than or equal to 213 amperes for the next 59 minutes of the first hour and a dummy load only from Batteries EBA and EBD of greater than or equal to 210 amperes for the second hour while maintaining the battery terminal voltage greater than or equal to 105 volts
- e. At least once per 60 months, during shutdown, 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 4.8.2.1.1d.; and
- f. At least once per 18 months, during shutdown, by giving performance discharge tests of battery capacity 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.

4.8.2.1.2 Each D.C. channel shall be determined OPERABLE and energized with tie breakers 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.

* For battery 2EBD only, Surveillance requirement 4.8.2.1.1d may be performed during power operation on a one-time basis, provided it is performed prior to the expiration of the current grace period on August 24, 1992.

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3/4.8 ELECTRICAL POWER SYSTEMS

BASES

3/4.8.1, 3/4.8.2 and 3/4.8.3 A.C. SOURCES, D.C. SOURCES, and ONSITE POWER DISTRIBUTION

The OPERABILITY of the A.C. and D.C. power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety-related equipment required for: (1) the safe shutdown of the facility, and (2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy the requirements of General Design Criterion 17 of Appendix A to 10 CFR Part 50.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the safety analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss-of-offsite power and single failure of the other onsite A.C. source. The A.C. and D.C. source allowable out-of-service times are based on Regulatory Guide 1.93, "Availability of Electrical Power Sources," December 1974. When one diesel generator is inoperable, there is an additional ACTION requirement to verify that all required systems, subsystems, trains, components and devices, that depend on the remaining OPERABLE diesel generator as a source of emergency power, are also OPERABLE, and that the steam-driven auxiliary feedwater pump is OPERABLE. This requirement is intended to provide assurance that a loss-of-offsite power event will not result in a complete loss of safety function of critical systems during the period one of the diesel generators is inoperable. The term, verify, as used in this context means to administratively check by examining logs or other information to determine if certain components are out-of-service for maintenance or other reasons. It does not mean to perform the Surveillance Requirements needed to demonstrate the OPERABILITY of the component. The ACTION requirements for diesel generator testing in the event of the inoperability of other electric power sources also reflect the potential for degradation of the diesel generator due to excessive testing. This concern has developed concurrently with increased industry experience with diesel generators and has been acknowledged by the NRC staff in Generic Letter 84-15.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that: (1) the facility can be maintained in the shutdown or refueling condition for extended time periods, and (2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

The Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guide 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, 1.108, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," Revision 1, August 1977, Regulatory Guide 1.137, "Fuel-Oil Systems for Standby Diesel Generators," Revision 1, October 1979, the NRC Staff Evaluation Report concerning the Reliability of Diesel Generators at Catawba, August 14, 1984, and Generic

BASESA.C. SOURCES, D.C. SOURCES, and ONSITE POWER DISTRIBUTION (Continued)

Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability." If any other metallic structures (building, new or modified piping systems, conduits) are placed in the ground near the Fuel Oil Storage System or if the original system is modified, the adequacy and frequency of inspections for the Cathodic Protection System shall be reevaluated and adjusted in accordance with the manufacturer's recommendations.

The Surveillance Requirements for demonstrating the OPERABILITY of the station batteries are based on the recommendations of Regulatory Guide 1.129, "Maintenance Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants," February 1978, and IEEE Std 450-1980, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery terminal voltage on float charge, connection resistance values and the performance of battery service and discharge tests ensures the effectiveness of the charging system, the ability to handle high discharge rates and compares the battery capacity at that time with the rated capacity.

Table 4.8-3 specifies the normal limits for each designated pilot cell and each connected cell for electrolyte level, float voltage and specific gravity. The limits for the designated pilot cells float voltage and specific gravity, greater than 2.13 volts and 0.015 below the manufacturer's full charge specific gravity or a battery charger current that had stabilized at a low value, is characteristic of a charged cell with adequate capacity. The normal limits for each connected cell for float voltage and specific gravity, greater than 2.13 volts and not more than 0.020 below the manufacturer's full charge specific gravity with an average specific gravity of all the connected cells not more than 0.010 below the manufacturer's full charge specific gravity, ensures the OPERABILITY and capability of the battery.

Operation with a battery cell's parameter outside the normal limit but within the allowable value specified in Table 4.8-3 is permitted for up to 7 days. During this 7-day period: (1) the allowable values for electrolyte level ensures no physical damage to the plates with an adequate electron transfer capability; (2) the allowable value for the average specific gravity of all the cells, not more than 0.020 below the manufacturer's recommended full charge specific gravity, ensures that the decrease in rating will be less than the safety margin provided in sizing; (3) the allowable value for an individual cell's specific gravity, ensures that an individual cell's specific gravity will not be more than 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; and (4) the allowable value for an individual cell's float voltage, greater than 2.07 volts, ensures the battery's capability to perform its design function.

ATTACHMENT 2

REVISED JUSTIFICATION AND SAFETY ANALYSIS

Background/Discussion

Each unit at Catawba is provided with a separate 125-volt DC and 120-volt AC vital instrumentation and control (I&C) power system. The system provides a reliable, continuous source of power to Class 1E instrumentation and controls. The system consists of four independent and physically separated load groups that supply I&C channels A, B, C, and D. For the DC portion of the system, each load group contains its own battery, battery charger, DC distribution center, and DC panelboard.

Each of the 125 VDC batteries is sized to supply the continuous emergency load of its own load group and the loads of another load group for a period of one hour. Each battery is also capable of supplying the anticipated momentary loads during this one-hour period. The batteries on Channels A and D are rated for 1200 ampere-hours and those on Channels B and C are rated for 825 ampere-hours. The 1200 ampere-hour batteries have adequate capacity to supply these loads for two hours. The 825 ampere-hour batteries have adequate capacity to supply these loads for a minimum of one hour. During normal operation, the batteries are floated on the DC distribution centers and are available to assume the loads without interruption upon loss of a battery charger or AC power source. Each battery consists of 59 cells and is located in a separate room in the Auxiliary Building.

Each battery charger is capable of supplying the steady-state loads of its own load group while charging its associated battery. A spare battery charger is provided to serve as a backup for any one of the normal battery chargers.

Bus tie breakers are provided between distribution centers A and C and between distribution centers B and D to allow the standby charger to feed a vital bus in case its normal charger is out of service and to allow the opposite battery to float on the bus when the bus main battery is out of service. In this configuration, the affected bus and the associated cross-tied bus will be supplied by two paralleled chargers and one battery. This is a normal alignment when maintenance or testing is being performed on a battery or its associated charger. These tie breakers are manual breakers and are operated in accordance with approved procedures.

Figure 1 depicts the DC portion of the vital I&C power system.

Technical Specification Surveillance Requirement 4.8.2.1.1.d requires that a battery service test be conducted at least once every 18 months while the unit is shut down. Recently, a NRC Electrical Distribution System Functional Inspection (EDSFI) was held at Catawba. As a result of the EDSFI, a violation (50-413, -414/92-01-02) was issued because Catawba had been conducting the 18-month battery service test while the unit was operating instead of while the unit was shut down, as required by technical specifications.

Description of Proposed Technical Specification Changes

Technical Specification Surveillance Requirement 4.8.2.1.1.d is modified to indicate via footnote that for battery 2EBD only, the 18-month service test may be conducted during

power operation on a one-time basis, provided the test is conducted prior to the expiration of the current grace period for this surveillance requirement. The grace period will expire on August 24, 1992. No changes to the Bases section of the Catawba Technical Specifications as they currently exist are required to support this one-time amendment. The justification for the proposed change, as well as the NRC Safety Evaluation Report (SER) for the change, will form the basis for this one-time amendment.

Justification and Safety Analysis

Because of the design of the DC portion of the vital I&C power system at Catawba, deleting the shutdown requirement from Surveillance Requirement 4.8.2.1.1.d will have no significant effect upon nuclear safety. Due to Catawba's ability to cross-tie a vital bus to an alternate battery as indicated in the above discussion and as illustrated in Figure 1, the affected channel will remain battery-backed while its battery is taken out of service in order to perform the service test. When a service test is being performed on a particular battery, the associated battery charger is removed from service and the standby charger (ECS) is connected to the affected distribution center. Therefore, both a battery and two battery chargers remain available to supply the cross-tied channels during the test.

It should be noted that one of the findings of the Catawba EDSFI involved whether calculations support that a small battery (825 ampere-hour) could adequately supply two channels in a cross-tied configuration while a large battery (1200 ampere-hour) is out of service. During the EDSFI audit, there was not sufficient time to resolve the concern by updating the analytical model or correlating test results in detail.

The 825 ampere-hour battery calculations reviewed during the EDSFI are overly conservative because: 1) only two periods were established for the one-hour duty cycle (first minute = 1st period; last 59 minutes = 2nd period); 2) both non-continuous and momentary loads are assumed to be continuous for each respective period of the duty cycle; and 3) loads were conservatively estimated. Following the EDSFI, Duke Power Company has been in the process of revising this calculation. Although the revision has not been finalized, preliminary assessments have identified specific conservatisms and demonstrate that the loads for the two channel cross-tied configuration are below the 825 ampere-hour battery capacity. Table 1 details these specific load revisions, the respective bases for the load revision, and the revised load requirements for each period of the 825 ampere-hour battery duty cycle. Table 2 incorporates the changes listed in Table 1 and details the total loads for two channels being fed from a single 825 ampere-hour battery. Based on Table 2, the adjusted battery discharge current is approximately 316 amperes for the first minute, 200 amperes for the 1-10 minute period, 198.5 amperes for the 10-20 minute period, and 188 amperes for the 20-60 minute period. The corresponding battery terminal end voltages are 112.7 VDC, 115.1 VDC, 114.5 VDC, and 113.3 VDC, respectively.

The actual state of the 825 ampere-hour battery reflects a capacity greater than the revised calculated requirement. In order to verify that the batteries can perform their design function, a service test is performed every 18 months. During the service test, the batteries

are discharged at a rate enveloping their respective load profiles. For the 825 ampere-hour battery, the values are 373 amperes for the first minute and 213 amperes for the next full 59 minutes per Surveillance Requirement 4.8.2.1.1.d2. In addition to the service test, a performance test is also performed on each battery. During the performance test, the battery is discharged at its manufacturer-specified discharge rate to determine its actual capacity and to provide an indication of remaining life span.

Performance test data shows that the battery exceeded the technical specification required capacity of 80%, with an excess of the required capacity of 44.4%. Service test data also shows that battery 2EBB is consistently capable of exceeding the required load profile discharge.

Conclusions

Deleting the shutdown requirement of Technical Specification Surveillance Requirement 4.8.2.1.1.d and allowing the 18-month service test to be conducted during power operation for battery 2EBD on a one-time basis will have no adverse effect upon nuclear safety. The design configuration of the DC portion of Catawba's vital I&C power system supports such an amendment. Neither plant personnel nor the public will be adversely affected by the proposed amendment.

Table I
 CNC-1381.05-11 "125VDC Vital Instrumentation Control Power System Battery and Battery Charger Sizing Calculation"

LOAD	Preliminary Revisions To DC Loads						BASIS FOR REVISION
	OLD		NEW				
	0-1min	1-60min	0-1min	1-10min	10-20min	20-60min	
4 KV switchgear control power	67	6	67	3.3	13.3	3.3	Breaker operations match D/G loading.
Load center control power	20	2	20	1	1	1	Breaker operations match D/G loading.
D/G load sequencer	10.4	4	10.4	4	1.7	1.7	Sequencer is reset during first 10 minutes.
Auxiliary feedwater controls	18.3	7.7	6.7	0.5	0.5	0.5	Loads deenergize to safe position on feedwater isol
Feedwater system controls	31.5	12.1	0.1	1.3	0.1	0.1	Loads deenergize to safe position on feedwater isol
Reactor trip switchgear	8	10	12	1	1	1	Breakers are not reclosed.
Containment valve injection water system	7.7	7.7	7.7	0.1	0.1	0.1	Valves are deenergized post-LOCA.
Containment H2 sample and purge system	3.6	3.6	0.4	0.4	0.4	0.4	Evaluated for use of system post-LOCA.
Radiation monitoring	2.7	0.3	0.3	1.4	0.3	0.3	Only 1 solenoid energized at a time.
Main steam vent to atmosphere sys	2.3	2.3	0	2.3	2.3	2.3	Valves are deenergized post-LOCA.

CNC-1381.05-11 *125VDC Vital Instrumentation Control Power System Battery and Battery Charger Sizing Calculation*

LOAD	0-1 min	1-60 min	0-1 min	1-10 min	10-20 min	20-60 min	EASIS FOR REVISION
Containment spray sys	2.1	2.1	0.1	0.1	0.1	0.1	Press. transmitters not isolated
Solid state prot. sys	5	5	0.1	0.1	0.1	0.1	Actual relay load for post-LOCA analyzed.
Chemical & volume control system	2.3	2.3	0	0	0	0	Solenoids go to safe position
Containment purge vent system	1.5	1.5	0	0	0	0	Solenoids go to safe position
Residual removal system	0.7	0.7	0	0.7	0.7	0.7	Solenoid energized after 10 minutes.
Main steam system	15.2	3.7	0.9	12.4	6	5.1	Main steam isol evaluated.
TOTALS	198.3	71	125.7	28.6	27.6	16.7	

CNC-1381.05-11 "125VDC Vital Instrumentation Control Power System Battery and Battery Charger Sizing Calculation"

LOAD	Preliminary Revisions To AC Loads						BASIS FOR REVISION
	OLD		NEW				
	0-1min	1-60min	0-1min	1-10min	10-20min	20-60min	
UHI solenoids and transmitters	8	4.7	0	0	0	0	System has been deleted.
Auxiliary feedwater controls	4.5	1.5	0.1	0.1	0.1	0.1	Loads deenergize to safe position on feedwater isol.
Solid state protection system	7.5	7.5	2.7	2.7	2.7	2.7	Backup power supply not needed.
Fuel pool ventilation system	3.7	2.6	0.3	0.3	0.3	0.3	No system actuation in first hour post-LOCA.
Process instrumentation and control	7.2	7.2	3.6	3.6	3.2	3.2	Some circuitry deleted (UP?).
TOTALS	30.9	23.5	6.7	6.7	6.3	6.3	

BUS		0-1 min.	1-10 min.	10-20 min.	20-60 min.
1EPB (ADC)		0.67	0.67	0.67	0.67
1EPD (ADC)		45.60	23.93	15.23	14.33
1ERPb (AAC)		23.25	23.25	23.25	23.25
1ERPd (AAC)		75.20	70.45	70.05	70.05
1EDB (ADC)		1.27	1.27	1.27	1.27
1EDD (ADC)		1.27	1.27	1.27	1.27
1EDF (ADC)		110.04	21.44	29.14	19.14
1EIB (ADC)		44.23	44.23	44.23	44.23
1EID (ADC)		112.56	107.12	106.66	106.66
Total DC Load for Two Load Channels (ADC)		315.64	199.93	198.47	187.57
825 AH Battery Terminal Voltage Profile (VDC)	start of period	112.7	115.1	115.1	115.1
	end of period	112.7	115.1	114.5	113.3

TABLE 2: ADJUSTED BATTERY LOAD VALUES

ATTACHMENT 3

REVISED NO SIGNIFICANT HAZARDS CONSIDERATION AND
ENVIRONMENTAL IMPACT ANALYSES

No Significant Hazards Consideration Analysis

Duke Power Company has made the determination that this amendment request involves a no significant hazards consideration by applying the standards established by the Commission's regulation in 10 CFR 50.92. This ensures that 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.

The Commission has provided guidelines pertaining to the application of the three standards by listing specific examples in 48FR14870. Example vi relates to a change which either may result in some increase to the probability or consequences of a previously-analyzed accident or may reduce in some way a safety margin, but where the results of the change are clearly within all acceptable criteria with respect to the system or component specified in the Standard Review Plan.

In this case the change proposed by this request is similar to Example vi in that it results in the deletion on a one-time basis of a specific conditional requirement for conducting a test required by technical specifications.

The following evaluation measures aspects of this proposal against the Part 50.92(c) requirements to demonstrate that all three standards are satisfied.

First Standard

The amendment would not involve a significant increase in the probability or consequences of an accident previously evaluated.

Performing a service test of the vital batteries while at power will not result in the initiation of any accident scenarios, therefore there will be no effect on the probability of any accident. The design of the DC portion of Catawba's vital I&C power system allows the battery service test to be conducted at power while maintaining an operable battery and battery charger to supply the affected bus. Therefore, all vital buses will remain battery backed at all times.

Second Standard

The amendment would not create the possibility of a new or different kind of accident from any kind of accident previously evaluated.

No accident causal mechanisms are introduced by conducting the service test of the vital batteries during power operation. No equipment will be operated in a new or deleterious manner, therefore there will be no effect on accident causal mechanisms.

Third Standard

The amendment would not involve a significant reduction in a margin of safety.

As demonstrated previously, the affected bus will remain battery backed at all times while conducting the service test, thereby maintaining DC power redundancy. Therefore, there will be no significant effect on any safety margin.

Based on the above and the supporting technical justification, Duke Power Company has concluded that there is no significant hazard consideration involved in this amendment request.

Environmental Impact Analysis

The proposed technical specification amendment has been reviewed against the criteria of 10 CFR 51.22 for environmental considerations. The proposed amendment does not involve a significant hazards consideration, nor increase the types and amounts of effluents that may be released offsite, nor increase individual or cumulative occupational radiation exposures. Therefore, the proposed amendment meets the criteria given in 10 CFR 51.22(c)(9) for a categorical exclusion from the requirement for an Environmental Impact Statement.