



June 23, 2014

Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Subject: Requested changes to NBSR Technical Specifications

Ref: Docket 50-184, TR-5 Facility License

Sirs:

The NIST Center for Neutron Research (NCNR) Test Reactor (NBSR) is currently replacing both Uninterruptable Power Supplies (UPS) supplying emergency AC power to reactor critical loads (reactor instrumentation and safety system, radiation monitoring, emergency diesel support). The UPS (designated T-9 and T-10) are approximately 20 years old, are of an obsolete design, spare parts are no longer available, and the manufacturer will not provide any support for the equipment. One unit, T-9, failed completely in 2013 and the NBSR has operated since that time without a redundant power supply for critical power loads (not required but it increases reliability of operations).

The batteries used in commercially available UPS systems operate at 535 VDC. The NCNR is not replacing the existing flooded lead acid battery (Vented Lead Acid or VLA), designated as the Station Battery in the Safety Analysis Report, because it is required to supply the various emergency loads (e.g. exhaust fans EF-5 and EF-6 and the shutdown cooling pumps) that operate on 125 VDC. Two redundant battery chargers will be purchased and installed to replace the function previously provided by the T-9 and T-10 UPS.

The two replacement UPS are state-of-the-art systems with valve-regulated lead acid (VRLA) or sealed batteries rather than flooded or wet lead acid batteries. Each of the redundant UPS and batteries are capable of carrying the 20 kVA (design basis value for NBSR) of AC reactor critical power loads for 4 hours (assumes full 20 kVA loading) independently, satisfying TR-5 technical specification 3.6 (TS 3.6), Emergency Power System. Because the VRLA battery uses an electrolyte that is immobilized in an absorbed glass mat (AGM) wrapped around each plate it is not possible to measure the specific gravity of the battery. Thus, the annual measurement of battery specific gravity as required by the current TR-5 technical specification 4.6(4) is impossible to perform for VRLA-type batteries.

The NCNR will follow VRLA maintenance guidance found in the UPS owner's manual and industry standard IEEE 1188-2005, *IEEE Recommended Practice for Maintenance, Testing, and Replacement of Valve-Regulated Lead-Acid (VRLA) Batteries for Stationary Applications*. The

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IEEE Standard 1188-2005 recommends that a performance test interval should not be greater than 25% of the expected service life or two years, whichever is less. The NCNR will establish a 2 year interval for performance of a capacity (discharge) test for the VRLA batteries.

Current Technical Specification 4.6(4):

- (4) The voltage and specific gravity of each cell of the station battery shall be tested annually. A discharge test of the entire battery shall be performed once every 5 years.

Requested change and addition to Technical Specification 4.6:

- (4) The voltage and specific gravity of each cell of the Vented Lead Acid (VLA) battery shall be tested annually. A discharge test of the VLA battery shall be performed once every 5 years.
- (5) A discharge test of the Valve-Regulated Lead Acid (VRLA) batteries shall be performed once every 2 years.

The current TR-5 technical specification 3.6, *Emergency Power System*, does not discuss more than one battery in the emergency power system. The following additional changes are requested to avoid confusion and to make it explicitly clear that the VLRA batteries of the new UPS are added equipment that must be operable to allow operation of the reactor. Please note that "Emergency Power" is also requested to be changed to "Emergency Power System" within the specification to correct an apparent typographical error during TR-5 relicensing in 2009. This minor change has no safety basis but improves the meaning and grammar of the paragraph.

Current Technical Specification 3.6:

3.6 Emergency Power System

Applicability: Emergency electrical power supplies

Objective: To ensure emergency power for vital equipment.

Specification

The reactor shall not be operated unless at least one (1) of the diesel-powered generators and the station battery are operable, including associated distribution equipment, and the nuclear instrumentation and emergency exhaust fans can be supplied with electrical power from the diesel generator or the battery.

Exception: In order to provide time for prompt remedial action, the Emergency Power may be inoperable for a period of no longer than 15 minutes when the specification is not met or does not exist.

Requested change to Technical Specification 3.6:

3.6 Emergency Power System

Applicability: Emergency electrical power supplies

Objective: To ensure emergency power for vital equipment.

Specification

The reactor shall not be operated unless at least one (1) of the diesel-powered generators and the station batteries (consisting of at least one (1) battery supplying a critical power UPS and one (1) battery supplying 125 VDC buses) are operable, including associated distribution equipment, and the nuclear instrumentation and emergency exhaust fans can be supplied with electrical power from the diesel generator or the batteries.

Exception: In order to provide time for prompt remedial action, the Emergency Power System may be inoperable for a period of no longer than 15 minutes when the specification is not met or does not exist.

The NCNR requests the NRC staff review and approve the proposed changes in an expeditious and timely manner because the existing Technical Specifications are in conflict with equipment that will be required to be installed by the end of FY14 with annual maintenance required within 12 months of installation. Please contact Sean O'Kelly, NCNR Deputy Director, at 301-975-6260 if you require additional information.

Respectfully,



Robert Dimeo, Director  
NIST Center for Neutron Research

**I declare under penalty of perjury that the foregoing is true and correct.**

**Executed on June 23, 2014**