September 10, 2015

Dr. Robert Dimeo, Director
NIST Center for Neutron Research
National Institute of Standards and Technology
U.S. Department of Commerce
100 Bureau Drive, Mail Stop 8561
Gaithersburg, MD 20899-8561

SUBJECT: NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY, ISSUANCE OF AMENDMENT NO. 10 TO THE RENEWED FACILITY LICENSE NO. TR-5 FOR THE NATIONAL BUREAU OF STANDARDS TEST REACTOR (TAC NO. MF4420)

Dear Dr. Dimeo:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 10 to Renewed Facility Operating License No. TR-5 for the National Institute of Standards and Technology (NIST), National Bureau of Standards Test Reactor (NBSR). The amendment consists of a change to the facility operating license in response to the request as stated in your letter dated June 23, 2014, as supplemented by letters dated August 20, 2014, February 26, 2015, and June 12, 2015. The amendment also makes changes to Technical Specification 3.6 and Surveillance Requirement 4.6 related to the NIST NBSR emergency power system.

A copy of the safety evaluation supporting Amendment No. 10 is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

**/RA/**

Xiaosong Yin, Project Manager
Research and Test Reactors Licensing Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No. 50-184
License No. TR-5

Enclosures:
1. Amendment No. 10
2. Safety Evaluation

cc w/encls: See next page

cc:

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Radiological Health Program
Air & Radiation Management Adm.
Maryland Dept. of the Environment
1800 Washington Blvd, Suite 750
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Dr. Thomas H. Newton, Deputy Director
Chief Reactor Operations and Engineering
NIST Center for Neutron Research
National Institute of Standards and Technology
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Gaithersburg, MD 20899-8561

Test, Research, and Training
Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

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Docket No. 50-184
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cc w/encls: See next page

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**ADAMS Accession Nos: ML15237A078 (Pkg.); ML15237A146** **NRR-058**

| OFFICE | PRLB/PM | PRLB/LA | OGC | PRLB/BC | PRLB/PM |
|---|---|---|---|---|---|
| NAME | XYin | ABaxter | BMizuno | AAdams | XYin |
| DATE | 8/ 28/2015 | 8/26/2015 | 9/8/2015 | 9/2/2015 | 9/10/2015 |

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UNITED STATES NUCLEAR REGULATORY COMMISSION

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

DOCKET NO. 50-184

NATIONAL BUREAU OF STANDARDS TEST REACTOR

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 10
License No. TR-5

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for an amendment to Renewed Facility Operating License No. TR-5, filed by the National Institute of Standards and Technology (the licensee) on June 23, 2014, as supplemented by letters dated August 20, 2014, February 26, 2015, and June 12, 2015, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in Chapter I of Title 10 of the *Code of Federal Regulations* (10 CFR);

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this license amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this license amendment is in accordance with 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the enclosure to this license amendment, and paragraph 2.C.2. of License No. TR-5 is hereby amended to read as follows:

> Technical Specifications
>
> The technical specifications contained in Appendix A, as revised by Amendment Nos. 9 and 10, are hereby incorporated in the license. The licensee shall operate the reactor in accordance with the technical specifications.

3. This license amendment is effective on the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

**/RA/**

Alexander Adams, Jr., Chief
Research and Test Reactors Licensing Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Attachments:
Facility Operating License
and Technical Specifications changes

Date of Issuance: September 10, 2015

ATTACHMENT TO LICENSE AMENDMENT NO. 10

RENEWED FACILITY OPERATING LICENSE NO. TR-5

DOCKET NO. 50-184

Replace the following page of the Renewed Facility Operating License No. TR-5. The revised page is identified by amendment number and contains a vertical line indicating the area of change.

Facility Operating License

| Remove | Insert |
| --- | --- |
| Page 3 | Page 3 |

a. up to 45.0 kilograms of contained uranium-235 of any enrichment, provided that less than 5.0 kilograms of this amount be unirradiated;

b. to possess and use, but not to separate such special nuclear material as may be produced by operation of the reactor.

3. Pursuant to the Act and 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material," to possess and use a two-curie americium-beryllium neutron source for reactor startup.

4. Pursuant to the Act and 10 CFR Part 30 to possess, use, and transfer but not to separate, except for byproduct material produced in non-fueled experiments, such byproduct material as may be produced by operation of the reactor.

C. This license shall be deemed to contain and is subject to the conditions specified in Parts 20, 30, 50, 51, 55, 70, 73, and 100 of the Commission's regulations; is subject to all applicable provisions of the Act and rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified below:

1. The licensee is authorized to operate the reactor at steady-state power levels up to a maximum of 20 megawatts (thermal).

2. The technical specifications contained in Appendix A, as revised by Amendment Nos. 9 and 10, are hereby incorporated in the license. The licensee shall operate the reactor in accordance with the technical specifications.

3. The licensee shall maintain and fully implement all of the provisions of the Commission-approved physical security plan, including changes made pursuant to the authority of 10 CFR 50.54(p). The approved physical security plan consists of a National Institute of Standards and Technology document, withheld from public disclosure pursuant to 10 CFR 73.21, entitled, "NBSR Safeguards Plan," dated May 1983, transmitted by letter dated May 5, 1983.

ATTACHMENT TO LICENSE AMENDMENT NO. 10

RENEWED FACILITY OPERATING LICENSE NO. TR-5

DOCKET NO. 50-184

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages to the Renewed Facility Operating License No. TR-5. The revised pages are identified by amendment number and contain vertical lines indicating the areas of changes.

Technical Specifications

| Remove | Insert |
|---|---|
| Page 23 | Page 23 |
| Page 39 | Page 39 |

## 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 the 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.

Basis

One diesel-powered generator is capable of supplying emergency power to all necessary emergency equipment. The second diesel-powered generator is provided to permit outages for maintenance and repairs.

The station batteries provide an additional source of emergency power for the nuclear instruments and the emergency exhaust fans. These fans may be powered from AC or DC power supplies. The batteries are capable of supplying this emergency load for a minimum of 4 hours. By allowing this amount of time and by requiring operability of at least one diesel and the station batteries, adequate emergency power sources shall always be available.

## 3.7 Radiation Monitoring Systems and Effluents

### 3.7.1 Monitoring Systems and Effluent Limits

Applicability: Radiation monitoring systems

Objective: To detect abnormal levels or locations of radioactivity.

Specifications

The reactor shall not be operated unless:

(1) Two of three gaseous effluent monitors are operable for normal air, irradiated air, and stack air.

(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 entire 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 two years.

Basis

(1) The NBSR is equipped with two diesel power generators, each capable of supplying full emergency load; therefore, only one of the generators shall be required. The diesel generators have proven to be very reliable over decades of service. The quarterly test frequencies are consistent with industry practice and are considered adequate to ensure continued reliable emergency power for emergency equipment.

(2) This testing frequency of the operable generator will ensure that at least one of the required emergency generators will be operable.

(3) An annual test of the emergency power equipment under a simulated complete loss of outside power will ensure the source will be available when needed.

(4) and (5), Specific gravity and voltage checks of individual cells are the accepted method of ensuring that all cells of a VLA battery are in satisfactory condition. The annual frequency for these detailed checks is considered adequate to detect any significant changes in the ability of the battery to retain its charge. During initial installation, the station batteries were discharge tested to measure their capacity. Experience has shown that repeating these tests at the specified intervals is adequate to detect deterioration of the cells and loss of battery capacity.

4.7 Radiation Monitoring System and Effluents

4.7.1 Monitoring System

Applicability: Radiation monitoring equipment

Objective: To operability of radiation monitors.

Specifications

(1) The gaseous effluent monitors for normal air, irradiated air and stack air shall be channel tested before startup, after a shutdown of longer than twenty-four (24) hours, or quarterly. Each of the above air monitors shall be channel calibrated annually.

(2) The fission products monitor shall be channel tested monthly and channel calibrated annually.

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 10 TO

RENEWED FACILITY OPERATING LICENSE NO. TR-5

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

DOCKET NO. 50-184

## 1.0 INTRODUCTION

By letters dated June 23, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14196A043), and August 20, 2014 (ADAMS Accession No. ML14241A384), the National Institute of Standards and Technology Center for Neutron Research (NIST, the licensee) requested a revision to the Operating License for the National Bureau of Standards Test Reactor (NBSR). The proposed amendment would revise the NBSR Technical Specification (TS) 3.6, "Emergency Power System," and Surveillance Requirement (SR) 4.6, "Emergency Power System," due to the replacement of the existing uninterrupted power supplies (UPS) with new UPS. Specifically, the proposed changes would add specification and testing requirements for the new valve-regulated lead acid (VRLA) batteries of the new UPS. In response to the U.S. Nuclear Regulatory Commission (NRC) staff's request for additional information (RAI) issued on January 30, 2015 (ADAMS Accession No. ML15022A101), the licensee provided supplemental information in letters dated February 26, 2015 (ADAMS Accession No. ML15058A714), and June 12, 2015 (ADAMS Accession No. ML15167A064). The supplemental letters dated February 26, 2015, and June 12, 2015, provided additional information that clarified the application, did not expand the scope of the requested amendment, and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register* (FR) on July 7, 2015 (80 FR 38760).

## 2.0 EVALUATION

The following regulation and industry guidance document is applicable to the staff's review of the license amendment request (LAR):

- 10 CFR 50.36(c)(3), "Surveillance requirements," which are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.

- Institute of Electrical and Electronics Engineers Standard (IEEE Std.) 1188-2005, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Valve-Regulated

> Lead-Acid (VRLA) Batteries for Stationary Applications," recommends maintenance, test schedules, and testing procedures that can be used to optimize the life and performance of VRLA batteries for stationary applications. It also provides guidance to determine when batteries should be replaced.

## 2.1 Background

According to NBSR Safety Analysis Report (SAR), Section 8.2, and TS 3.6, the emergency electrical power system is designed to provide power to the nuclear instruments and the emergency exhaust fans, should a complete loss of off-site power occur. The fans may be powered from alternating current (AC) or direct current (DC) power supplies. In the existing configuration of the emergency power system, one of two diesel-powered generators (DG) is capable of supplying power to all necessary emergency equipment. A station battery provides an additional source of emergency power for the nuclear instruments and the emergency exhaust fans. The station battery is a 125 Volts DC (VDC) vented lead-acid (VLA) type battery that is capable of supplying the vital loads for a minimum of 4 hours. The station battery consists of sixty 2-volt cells with a capacity of 880 ampere-hours (Ah). In addition, as stated in the LAR, there are currently two redundant UPS, designated as T9 and T10, used to supply emergency AC power to reactor critical loads (reactor instrumentation and safety system, radiation monitoring, emergency diesel support) and charge the 125 VDC station battery.

## 2.2 Proposed Changes

In the LAR, the licensee stated that UPS T9 failed completely in 2013. UPS T9 and T10 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. Hence, the NBSR is replacing both UPS T9 and T10 with two new UPS of a different design to supply the AC reactor critical loads, and two new redundant battery chargers to charge the 125 VDC station battery. The new UPS are provided with VRLA batteries. The licensee stated that each of the new UPS and VRLA batteries are capable of carrying the 20 kilo Volts Amperes (kVA) (design basis value for NBSR) of AC reactor critical power loads for 4 hours (assumes full 20 kVA loading) independently. As a result of these changes, the licensee proposed to revise the NBSR TS 3.6 and SR 4.6 related to emergency power systems to add specification and testing requirements for the VRLA batteries.

The current specification in TS 3.6, "Emergency Power System," states:

> 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.

The revised specification in TS 3.6 would state:

> 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 the 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 current specification (4) in SR 4.6, "Emergency Power System," states:

> (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.

The revised specification (4) in SR 4.6 would state:

> (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.

A new specification (5) would be added to SR 4.6 and would state:

> (5) A discharge test of the Valve-Regulated Lead Acid (VRLA) batteries shall be performed once every two years.

2.3 Staff's Evaluation

The staff reviewed the LAR and requested the licensee to provide additional information regarding the proposed changes. In response to the staff's RAI, the licensee provided supplemental information on the new UPS, the new battery chargers, and the VRLA batteries, in letters dated February 26, 2015, and June 12, 2015.

<u>New replacement UPS and VRLA batteries</u>

The staff noted that the two replacement 20 kVA UPS have the same output capacity as the T9 and T10 UPS, and are designated as main UPS and standby UPS. Since the VRLA batteries are part of the replacement UPS, they are only charged by the UPS chargers and have a manufacturer lifetime of 24.8 Ah for 4 hours, assuming a linear discharge rate. The licensee verified the capability of the VRLA batteries with discharge tests. After 4 hours of placing the main UPS AC loads (critical power panels 1, 2, 3, and rod drive power and controller) on its associated VRLA battery, a battery voltage of 446 Volts (V) and current of 14.7 amps was recorded. The licensee determined that the main UPS VRLA battery would provide an

estimated 8 hours of power to all of the AC loads described as critical; and thus, it is capable of providing 4 hours of power to the nuclear instrumentation, the only TS required AC loads, which draw 3 amps at 115 VAC. Similar results were obtained for the standby UPS VRLA battery. The staff reviewed the manufacturer's specifications for the UPS, including the replacement UPS AC loading information provided in the LAR and the RAI responses, and finds that the replacement UPS including the VRLA batteries have adequate capacities to supply the TS required AC loads. The staff concludes that the replacement UPS including the VRLA batteries will continue to perform the AC power supply function of the T9 and T10 UPS because the capacity and capability of the new replacement UPS and VRLA batteries are adequate to carry all required AC loads, and therefore, the change is acceptable.

New Battery Chargers

In the LAR, the licensee stated that the two new stand-alone battery chargers have replaced the T9 and T10 UPS charging capabilities for the 60-cell VLA station battery. In addition, the charging configuration for the 60-cell VLA battery has changed. In the previous configuration with the T9 and T10 UPS in service, either T9 UPS or T10 UPS charged the 60-cell VLA battery. In the new configuration, the two new battery chargers operate in parallel to charge the 60-cell VLA battery, with one charger nominally the primary charger. In addition, each stand-alone battery charger was specified for the same input and output capabilities as the T9 and T10 UPS. The staff noted that the adequacy of the battery charger design was confirmed after the installation of the battery chargers. After the chargers were connected to the 125 VDC distribution panel, the output voltage of the chargers was approximately 128 VDC, and the 60-cell VLA battery terminal voltage was 128 VDC. In addition, the licensee provided the manufacturer's ratings and specifications for the battery chargers. The staff reviewed the information provided in the LAR, the RAI responses, and the licensee's evaluation and finds that the battery chargers have adequate capacity to charge the 60-cell VLA battery, which has sufficient output voltage to supply the required DC loads. Since the battery chargers have adequate capacity, the staff concludes that the new battery chargers will continue to perform the same design function of the T9 and T10 UPS, and therefore, the change is acceptable.

In response to the staff's RAI, the licensee provided one-line diagrams that show the current and the proposed configuration for the 125 VDC system. The staff reviewed the one-line diagrams and verified that the system matches the design description provided by the licensee.

TS 3.6, "Emergency Power System"

The current specification in TS 3.6 requires, in part, that the VLA station battery, including associated distribution equipment, be operable. The proposed revised TS 3.6 would require that at least one VRLA battery that supplies a critical power UPS and one VLA battery that supplies the 125 VDC buses be operable. In its letter dated February 26, 2015, the licensee stated that the VRLA battery for the main UPS provides power only to the AC loads and only when the normal AC input to the main UPS is lost. After the main UPS VRLA battery is depleted, the standby UPS will provide AC power to the output of the main UPS. If AC power is lost to the standby UPS, then the VRLA battery for the standby UPS will provide AC power to the output of the main UPS. The staff reviewed the proposed change to TS 3.6 and finds that one VRLA battery will provide emergency power to the TS-required AC loads (nuclear

instrumentation). Therefore, the staff finds that the TS operability requirement for at least one VRLA battery is acceptable.

In addition, the term “Emergency Power” within the current specification in TS 3.6 is changed to “Emergency Power System” in the revised specification. The staff noted that this minor change corrects an apparent typographical error. The staff finds that this editorial change is administrative in nature and does not change the intent of the TS, and is therefore acceptable.

SR 4.6, “Emergency Power System”

The current specification in SR 4.6 (4) requires annual testing of the voltage and specific gravity of each cell of the station battery in addition to the battery discharge test that is performed once every 5 years. The proposed change to SR 4.6 (4) would replace the words “station” with “Vented Lead Acid (VLA)” and “entire” with “VLA.” In the LAR, the licensee stated that the 60-cell station battery is a VLA battery and is not replaced. The staff finds the proposed change to SR 4.6 (4) is acceptable because the change is editorial in nature and does not change the surveillance requirements.

The proposed SR 4.6 (5) would be added and would require performance of a discharge test for the VLRA batteries once every 2 years. The licensee stated that the VRLA maintenance guidance found in the UPS owner’s manual and the industry IEEE Std. 1188-2005 will be used for the VLRA batteries. IEEE Std. 1188-2005 recommends that a performance discharge test (battery capacity test) interval should not be greater than 25 percent of the expected life of the VRLA battery or 2 years, whichever is less. The licensee proposed a 2-year interval for the discharge test. In its letter dated June 12, 2015, Attachment 2, the licensee stated that the VRLA batteries have a 10-year design life. The staff finds that since a 2-year testing interval is less than 2.5 years (25 percent of 10 years), the proposed discharge testing interval is consistent with the recommendations of IEEE Std. 1188-2005, and is therefore acceptable.

The new proposed SR 4.6 (5) does not include testing of the voltage and specific gravity (SG) of the battery cell and performance of a service test for the VRLA batteries. The licensee clarified that the SG of the VRLA batteries cannot be measured because the electrolyte of the VRLA batteries is immobilized in an absorbed glass matte wrapped around each plate. Based on this information, the staff finds it acceptable to exclude measuring of the SG of the VRLA battery from the proposed specification.

In its supplemental letters dated February 26, 2015, and June 12, 2015, the licensee provided additional information regarding testing of the battery cell voltage and performance of the service test for the VRLA batteries.

IEEE Std. 1188-2005 recommends inspecting the voltage of each battery cell/unit. In its letter dated June 12, 2015, the licensee stated that a semi-annual or annual preventative maintenance inspection that records selected parameters for each battery during a partial loading of the battery will be performed as recommended in the UPS owner’s manual. The condition of each battery will then be assessed based on determining pass or fail criteria specified in the vendor manual, and taking corrective actions of battery replacement or additional monitoring. The licensee provided a copy of the report for an annual preventative maintenance inspection performed by the UPS manufacturer on April 8, 2014. The report

includes the open/float voltages recorded for the VRLA battery jars. In addition, in its letter dated February 26, 2015, the licensee provided the manufacturer's specifications for a 12-V VRLA battery unit, which consists of 6 cells. The staff reviewed the information provided by the licensee and finds that the preventative maintenance inspection satisfies the IEEE Std. 1188-2005's recommendations and vendor instructions for testing of battery unit voltage.

IEEE Std. 1188-2005 recommends performance of a service test for VRLA batteries. The intent of the service test is to determine the battery's ability, as found, to satisfy the design requirements (battery duty cycle) of the DC system. In its letter dated June 12, 2015, the licensee clarified that each UPS VRLA battery is a battery bank consisting of 72 multi-cell VRLA batteries, 36 of which are in series, with two 36 battery groups in parallel to generate the proper voltage with the required current for the minimum required time. The licensee stated that the VRLA battery banks are monitored by the UPS integrated monitoring systems, designated as ABM Technology (ABM). In Attachment 3 of the letter, the licensee provided the manufacturer technical paper describing the ABM. The ABM controls the charging scheme of the UPS VRLA battery banks. The ABM uses a constant voltage charge to recharge the battery to a predetermined float level after a power outage, or whenever the UPS is turned on. The ABM monitors the bulk charging period to detect conditions that could lead to thermal runaway. If the float voltage is not reached in a predetermined time, an alarm is triggered and the UPS is shut down. During 48 - 96 hours of float charging, the ABM performs a battery test automatically at two different loads to verify battery performance. After the float charging period, the UPS is completely turned off for 28 days. During this period, the battery open circuit voltage (OCV) is constantly monitored. If the OCV is measured below a specified threshold at 25 percent of the battery expected discharge time, dependent on the load, an alarm is signaled indicating the battery is nearing the end of its service life and should be replaced. If the OCV drops below a predetermined threshold voltage after 10 days, the battery charging is initiated. After 28 days or whenever battery charging is requested, the UPS is turned on and the ABM process is restarted. The staff noted that the ABM system helps to protect the battery from unnecessary failures like electrolyte dry out and thermal runaway, and its charging scheme (the battery is charged for periods of time and the charger is disabled for periods of time) reduces the time that the battery is subject to grid corrosion and, thus, extends battery service life for UPS applications. In addition, the ABM estimates each VRLA battery bank service life based on the battery bank's actual load (required per TS 3.6), which is significantly less than the normal load that is supplied by the UPS. The staff reviewed the information provided by the licensee and finds that the VRLA batteries have adequate capacity to supply the TS required AC loads, and the ABM system adequately monitors battery parameters to detect problems that can affect battery performance and signal when the battery needs to be replaced. The staff also finds that, in addition to the testing performed by the ABM system, the annual or semi-annual preventive maintenance inspection of the individual VRLA battery and the performance discharge test (capacity test) of the VRLA batteries (2 years) provide reasonable assurance that the VRLA batteries will be effectively maintained to ensure that their duty cycles will be met. Therefore, the staff finds that the VRLA batteries monitoring and maintenance, satisfy the intent of the IEEE Std. 1188-2005 recommended battery service test.

In summary, the NRC staff reviewed the licensee's proposed changes to the TS 3.6 and SR 4.6 related to the emergency power system. The changes would revise the specifications in TS 3.6 and SR 4.6 (4) and add a new specification SR 4.6 (5). After its review, the NRC staff finds that the proposed changes would upgrade the current outdated UPS T9 and T10 with modern new

technologies and update the licensee's TSs to reflect the upgrade. The proposed changes to the TSs do not change how the licensee operates the facility. Because of this, there is no significant increase in the amounts of any effluents that may be released offsite, and there is no significant increase in individual or cumulative occupational radiation exposure. Based on the above staff's evaluation, the staff finds that the proposed changes, to replace both UPS T9 and T10 with two new UPS, continue to meet 10 CFR 50.36 requirements. Therefore, the staff finds the proposed changes in the LAR acceptable

## 3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Maryland State official was notified of the proposed issuance of the amendment. The State official did not provide any comments.

## 4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20, and changes a surveillance requirement. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The NRC has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding published in the FR on July 7, 2015 (80 FR 38760). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

## 5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: Sergiu S. Basturescu
Adakou Foli
Xiaosong Yin

Date: September 10, 2015