



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 209 TO FACILITY OPERATING LICENSE NO. NPF-3

TOLEDO EDISON COMPANY

CENTERIOR SERVICE COMPANY

AND

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1

DOCKET NO. 50-346

1.0 INTRODUCTION

By letter dated March 29, 1996, the Toledo Edison Company, Centerior Service Company, and The Cleveland Electric Illuminating Company (the licensees), submitted a request for changes to the Davis-Besse Nuclear Power Station (DBNPS) Technical Specifications (TS). The requested amendment would revise TS 4.6.4.4, Hydrogen Purge System (HPS); Section 4.6.5.1, Emergency Ventilation System (EVS); and Section 4.7.6.1, Control Room Emergency Ventilation System (CREVS) to modify the surveillance requirements (SRs) for charcoal testing.

2.0 EVALUATION

The current DBNPS TS requirements for surveillance testing of charcoal adsorber associated with the HPS, EVS and CREVS do not accurately reflect the actual testing being performed in the industry to determine methyl iodide penetration. Rather than performing the surveillance to meet older industry standards and regulatory guidance, the licensees propose to modify the TS to reflect the current testing being performed.

The hydrogen purge system (HPS) filter package consists of two HEPA filters and one charcoal adsorber with filter removal efficiency of 95% for all forms of iodine. The shield building emergency ventilation system (EVS) consists of two redundant fan-filter trains with each filter bank consisting of a prefilter, HEPA filter and two charcoal adsorber units with a total filter efficiency of not less than 95%. The control room emergency ventilation system (CREVS) consists of two 100 % capacity trains which consists of a prefilter, a HEPA filter, and a charcoal adsorber which have a total efficiency of the filters not less than 95%. The following are the current TS requirements for testing the charcoal adsorbers for each system:

HPS TS 4.6.4.4.b.2 requires verifying, within 31 days after removal, that a laboratory analysis of a representative carbon sample meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 2, March 1978, for a methyl iodide penetration of less than 1%.

HPS TS 4.6.4.4.c requires verifying after every 720 hours of charcoal adsorber operation, within 31 days after removal, that a laboratory analysis of a representative carbon sample meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 2, March 1978, for a methyl iodide penetration of less than 1%.

EVS TS 4.6.5.1.b.2 requires verifying, within 31 days after removal, that a laboratory analysis of a representative carbon sample meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 2, March 1978, for a methyl iodide penetration of less than 1%.

EVS TS 4.6.5.1.c requires verifying after every 720 hours of charcoal adsorber operation, within 31 days after removal, that a laboratory analysis of a representative carbon sample meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 2, March 1978, for a methyl iodide penetration of less than 1%.

CREVS TS 4.7.6.1.c.2 requires verifying, within 31 days after removal, that a laboratory analysis of a representative carbon sample meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 2, March 1978, for a methyl iodide penetration of less than 1%.

CREVS TS 4.7.6.1.d requires verifying after every 720 hours of charcoal adsorber operation, within 31 days after removal, that a laboratory analysis of a representative carbon sample meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 2, March 1978, for a methyl iodide penetration of less than 1%.

Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 2 requires testing in accordance with ANSI N509, 1976. Testing to this standard is not routinely performed at the available testing laboratories. Instead the licensees propose to clarify the testing requirements by adding a note, designated by an asterisk following the Regulatory Position C.6.a. The note, which reflects the actual testing that is performed, states, "The test is performed in accordance with ASTM D 3803-1979 with the following conditions: 1) equilibrate for 16 hours at 30°C/70% relative humidity (RH), 2) challenge for 2 hours at 30°C/70% RH, 3) elution for 2 hours at 30°C/70% RH."

The proposed amendment changes the testing requirements in the TS used to determine the operability of the charcoal in the ESF air handling units. The charcoal is provided to remove iodine from the air as it passes through the air handling units. There are no changes to the physical design or operation of the facility. TS Bases and Updated Safety Analysis Report (USAR) design basis are not affected.

The guidance in Regulatory Guide (RG) 1.52, "Design, Testing, and Maintenance Criteria for Post Accident Engineered-Safety-Feature Atmosphere Cleanup System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants, Revision 2" and American National Standards Institute (ANSI) N509-1976, "Nuclear Power Plant Air Cleaning Units and Components," presently forms the licensing basis test requirements. The essential elements of this test are:

- 95% RH
- A pre-test carbon sample equilibration temperature at 25 degrees Celsius
- A test medium temperature of 80 degrees Celsius
- A post-test sweep at 25 degrees Celsius
- Methyl iodide penetration of less than 1 percent

The essential elements of the proposed TS change are those outlined by RG 1.52, Revision 2 and ANSI N509-1980 which refers to ASTM D 3803-1979, "Standard Test Methods for Radiation Testing of Nuclear-Grade Gas-Phase Adsorbents." ASTM D 3803-1979 is updated guidance based on RDT M16-1T, "Gas Phase Adsorbents for Trapping Radioactive Iodine and Iodine Components."

The differences between the current TS and the proposed TS change requirements for carbon testing are:

- A pre-load and post-load sweep test temperature of 25°C and challenge at 80°C whereas the proposed temperature is 30°C for all phases of the test.
- Pre-test humidity equilibration at 95% versus a pre-test humidity equilibration at 70% RH
- Temperature equilibration of the test carbon to the test air temperature

These differences will be addressed individually and will be shown to be more conservative than the present TS requirement.

The quantity of water retained by charcoal (carbon) is dependent on temperature. Generally, the higher the temperature the less water retained. The water retained by the carbon decreases the efficiency of the carbon to adsorb other contaminants. At 25°C and 95% RH, carbon will retain about 40 weight percent water. At 80°C and 95% RH, carbon retains only about 2 to 3 weight percent water. Therefore, the lower temperature test medium of the proposed TS will yield more conservative results than present TS.

ASTM D 3803-1979 specifies a test temperature of 30°C instead of 25°C for the pre-load and post-load sweep temperatures. There is little difference in the adsorption behavior of carbon between these two temperatures. The 25°C parameter is more conservative.

Twenty-five degrees Celsius has been used but the licensees have proposed standardizing the charcoal tests to 30°C. The increase from 25°C to 30°C does not represent a significant decrease in test results for the CREVS for the duration of the TS reference to N509-1980/ASTM D 3803-1979. This is because the Control Room area is maintained at less than 110°F or 43°C). Thirty degrees Celsius testing medium will be used for testing of the HPS and EVS since the expected temperature would be above the 30°C and therefore, using 30°C is more conservative.

Pre-test humidity equilibration is achieved by sweeping air of the appropriate humidity through the test carbon. This condition is for testing new carbon and until 1977 it also was applied for testing used carbon. In 1977, RDT M16-1T-1977 was released stating that for testing used carbon, "the material shall not be pre-equilibrated before testing." NUREG/CR-0771, "Effects of Weathering on Impregnated Charcoal Performance," May 10, 1979, provides a basis by stating that, "it is thought that the elimination of the pre-humidification is a better simulation of accident conditions since a carbon filter must be ready at all times...." It also states that, "several investigators do not recommend any pre-treatment (of the carbon) in order to prevent a partial regeneration of the carbon which would increase the measured trapping efficiency." Therefore, by the release of the ASTM D 3803-1979 standard, it was established that the better test method was not to pre-equilibrate the humidity of the carbon.

The present TS reference to N509-1976 (RDT M16-1T) requires the carbon to be equilibrated to 25°C and 70% RH. The methyl iodide test medium would then be instantaneously introduced at 80°C. Carbon testing is not performed this way because this would cause condensation to form on the carbon (the dew point temperature of the test medium at these conditions is approximately 71°C.) Condensation on the carbon sample itself ("wetting the bed") results in the test being invalid. This is supported by paragraph 12.41. of ASTM D 3803-1979 which states with respect to relative humidity of the test medium that, "tests at saturation or above give very erratic results." Because of this, the testing standards after 1976 (i.e., RDT M16-1T-1977, ASTM D 3803-1979, N509-1980), have been changed to include pre-test thermal equilibration at the test temperature.

The post-test sweep of the carbon is performed to evaluate the ability of the carbon to hold the adsorbate once it is captured. The current TS test specifies a two hour test at 25°C.

The requested changes revise TS 4.6.4.4, Hydrogen Purge System (HPS); TS 4.6.5.1, Emergency Ventilation System (EVS); and TS 4.7.6.1, relating to Surveillance Requirements for charcoal filter laboratory testing, such that existing flawed test methodology in the TS will reflect the currently utilized acceptable test methodology in accordance with industry standards. The staff has evaluated this change and concludes that the testing methodology proposed by the licensees adequately demonstrates the operability of the air handling units, and is therefore acceptable.

3.0 EMERGENCY CIRCUMSTANCES

In its March 29, 1996, application, the licensees requested that this amendment be treated as an emergency amendment. In accordance with 10 CFR 50.91(a)(5), the licensees provided the following information regarding why this emergency situation occurred and how it could not have been avoided.

As a result of a discussion between Centerior Energy senior management and NRC Region III management, a recent industry instance of literal noncompliance with TS requirements for charcoal adsorber testing was discussed. As

requested by licensee management, a review of the documentation associated with the specific industry event and the review of laboratory testing requirements resulted in the determination on March 28, 1996, that DBNPS was also in literal noncompliance with TS surveillance testing requirements. The TS refers to Regulatory Guide (RG) 1.52, Revision 2, which references ANSI Standard N509-1976. The licensees have been using ANSI N509-1980 in conjunction with RG 1.52 to meet the TS requirements. The licensees and vendor have determined that this method of testing better demonstrates the ability of these ESF systems to perform their functions than the test specified in the TS. The licensees promptly reported this condition to the NRC, and requested the emergency amendment to correct this discrepancy in order to avoid an unnecessary plant shutdown.

The licensees recognize that NRC Information Notice (IN) 87-32, "Deficiencies in the Testing of Nuclear-Grade Activated Charcoal," dated July 10, 1987, identified that serious problems existed with the testing capabilities of many of the testing companies and the testing standards. All areas were vendor specific. Guidance to licensees was to seek direct contact with the individual testing companies to improve test accuracy. INEL report EGG-CS-7653, referenced in IN 87-32, recognizes Nuclear Containment Systems, Inc. (NCS), the vendor used by DBNPS as one of the few vendors whose laboratory performance meets NRC criteria. They were also determined to fully satisfy the licensees' Vendor Quality Assurance Program. IN 87-32 further identified serious shortcomings with the Standard (RG 1.52, Revision 2) which has not been revised since 1978. Based on the information provided in IN 87-32, the licensees took action to verify the test methodology and accuracy. The IN did not cause the licensees to review the TS for any needed changes.

The licensees identified the inconsistency between their existing practice and the TS requirements, promptly notified the NRC and proposed this emergency amendment to resolve the inconsistency. As a result of prior information about problems with the testing of charcoal, the licensees took action to ensure that the testing done to support operation of DBNPS was conservative. The licensees entered TS 4.0.3 which allows 24 hours to perform surveillance testing and obtained charcoal samples for testing in addition to initiating the emergency amendment request. Currently, one charcoal adsorber in each affected system has not exceeded the 18 month + 25% time requirement to perform the SR. Testing of the remaining charcoal adsorbers will be completed within the next few days. The licensees submitted the amendment request in a timely manner, and requested emergency processing. Absent relief from the NRC, a plant shutdown would be required due to the inconsistency between the testing procedures used and the TS requirements. Throughout this process, the licensees acted promptly and kept the staff informed regarding the status of activities.

The staff has concluded that an emergency situation exists in that failure to act in a timely manner will result in an unnecessary plant shutdown and that the licensees could not avoid the emergency situation once the condition was identified. Therefore, pursuant to 10 CFR 50.90(a)(5), this request is being handled on an emergency basis.

4.0 BASIS FOR FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

As required by 10 CFR 50.91(a), the licensees have provided their analysis of the issue of no significant hazards consideration. The NRC staff has reviewed the licensees' analysis against the standards of 10 CFR 50.92(c), which allow a final no significant hazards consideration determination to be made 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 previously evaluated; or,
- (3) Involve a significant reduction in a margin of safety.

The staff's review has determined that the proposed changes do not involve a significant hazards consideration, because operation of DBNPS in accordance with the proposed change would not:

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

The charcoal testing protocol changes will not affect system operation or performance, nor do they affect the probability of any event initiators. These changes do not affect any ESF actuation setpoints or accident mitigation capabilities. Therefore, the proposed changes will not significantly increase the consequences of an accident or malfunction of equipment important to safety previously evaluated in the Updated Safety Analysis Report (USAR).

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

The changes to the charcoal sample testing protocol will not affect the method of operation of the system. The proposed changes only affect the testing criteria for the charcoal samples. No new or different accident scenarios, transient precursors, failure mechanisms, or limiting single failures will be introduced as a result of these changes. Therefore, the possibility of a new or different kind of accident other than those already evaluated will not be created by this change.

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

The new charcoal adsorber sample laboratory testing protocol more accurately demonstrates the required performance of the adsorbers in the Control Room Emergency Ventilation System (CREVS) following a design basis Loss of Coolant Accident (LOCA) or in the Fuel Handling Building Exhaust following a fuel handling accident outside containment. The change in charcoal sample testing protocol will not affect system performance or operation. The decontamination efficiencies used in the offsite and control room dose analyses are not affected by this change.

Therefore, all offsite and control room dose analyses are not affected by this change, and all offsite and control room doses will remain within the limits of 10 CFR Part 100 and 10 CFR Part 50 Appendix A, GDC 19. Thus, these changes will not result in a significant reduction in any margin of safety.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or changes a surveillance requirement. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant changes in the types, of any effluent that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). The Commission has made a final no significant hazards finding with respect to this amendment. 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.

6.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Ohio State official was notified of the proposed issuance of the amendment. The State official had no comments.

7.0 CONCLUSION

The staff 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) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

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