OFFICE OF NUCLEAR REACTOR REGULATION
REQUEST FOR ADDITIONAL INFORMATION
FOR TECHNICAL SPECIFICATIONS TASK FORCE TSTF-553, REVISION 0, "ADD ACTION FOR TWO INOPERABLE [CONTROL ROOM EMERGENCY AIR TEMPERATURE CONTROL SYSTEM] CREATCS TRAINS"
CAC NUMBER MF7061

By letter dated October 31, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML15304A002), Technical Specifications Task Force (TSTF) submitted TSTF-553, Revision 0, "Add Action for Two Inoperable CREATCS [Control Room Emergency Air Temperature Control System] Trains," which requests to amend the Standard Technical Specifications (STS) in NUREG-1430 and NUREG-1431. TSTF-553 proposes to revise STS 3.7.11, "Control Room Emergency Air Temperature Control System (CREATCS)," for Babcock & Wilcox and Westinghouse plants.

TSTF-553 modifies STS 3.7.11 actions for two inoperable CREATCS trains in modes 1 through 6, and during movement of recently irradiated fuel assemblies in NUREG-1430 and NUREG-1431. The proposed change allows 24 hours to restore operability of a CREATCS train, while verifying that the control room temperature remains below the plant-specific temperature, before proceeding to shut down the reactor or suspend movement of recently irradiated fuel assemblies. This proposed change includes addition of a Note which makes the action not applicable if the condition is entered intentionally.

ARCB-RAI-1

TSTF-553 technical evaluation section states:

> …The model application contains an attachment in which the licensee must provide a plant-specific justification for the control room area temperature limit to be included in Required Action C.1. The purpose of the limit is to support control room operator habitability and the operability of equipment in the control room. The limit must be justified with evaluations that demonstrate that operator habitability will be maintained and that equipment cooled by the CREATCS will remain operable during the 24 hour completion time...

TSTF-553 Enclosure 1, "Model Application", Attachment 2, "Justification of the Control Room Area Temperature Limit," states:

> …This attachment must contain a plant-specific justification for the control room area temperature limit to be included in Required Action C.1. The purpose of the limit is to support control room operator habitability and the operability of equipment in the control room. The limit must be justified with evaluations that demonstrate that operator habitability will be maintained and that equipment cooled by the CREATCS will remain operable with the control room temperature at or below the limit...

Regulatory Guide (RG) 1.195, “Methods and Assumptions for Evaluating Radiological Consequences of Design Basis Accidents at Light-Water Nuclear Power Reactors,” and RG 1.183, “Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors,” allows credit for engineered safety features (ESF) that mitigate airborne radioactive material within the control room. NUREG-1430 control room emergency ventilation system (CREVS) and NUREG-1431 control room emergency filtration system (CREFS) are ESFs as discussed in RG 1.195 and 1.183. The efficiency of the CREVS and CREFS filters, are an input into the radiological consequence analyses of the design basis accidents. Specifically, the radiological consequence analyses of DBAs credits the removal of particulate matter (aerosols), elemental iodine and organic iodides by the CREVS / CREFS filter trains.

The efficiency of the CREVS and CREFS filters is dependent on the cooling and heating function of the control room chillers and heaters. The CREATCS not only controls the control room temperature, but also the relative humidity by condensing water on the high voltage air conditioning evaporative coils. Heaters (if included in the CREATCS) are designed to heat the incoming air stream to reduce the stream’s relative humidity upstream from the high-efficiency particulate air (HEPA) filters and iodine absorbers during system operation to minimize adsorption of water vapor from the air by the iodine absorbers and to reduce the detrimental effects of high humidity on the HEPA filters. Charcoal filtration units function most efficiently for removal of radioiodine, particularly organic iodides, at an input relative humidity of 70 percent or less. Humidity control also promotes the long term retention of radioiodine in the iodine absorber by minimizing the potential for early desorption and release of the iodine.

As stated in RG 1.52, “Design, Inspection, and Testing Criteria for Air Filtration and Adsorption Units of Post-Accident Engineered-Safety-Feature Atmosphere Cleanup Systems in Light-Water-Cooled Nuclear Power Plants,” and in accordance with Section 4.4 of American Society of Mechanical Engineers (ASME) N509-2002, the design of an ESF atmosphere cleanup system should be based on the anticipated range of operating parameters of temperature, pressure, relative humidity, radiation levels, and airborne iodine concentrations that are likely during and following the postulated DBA.

The proposed plant-specific control room area temperature in required action C.1 should not only take into account the control room operator habitability and the operability of equipment in the control room, but also should be based on the effect of temperature and relative humidity on the CREVS / CREFS filter efficiency with respect to that assumed in the radiological consequence analyses for DBAs.

Based on the above, the NRC staff is requesting the TSTF:

1. Provide an evaluation that discusses the impact of the loss of two CREATCS trains during both summer and winter. Include control room temperatures and relative humidity with regard to efficiency of the CREVS / CREFS filters.

2. Evaluate whether it is more appropriate to have a temperature band (upper and lower limit) stated in Required Action C.1, based upon the evaluation of losing both CREATCS trains during both summer and winter.

3. Revise the technical evaluation in TSTF-553 to include discussion of the impact on efficiency of the CREVS / CREFS filters due to changes in the CREATCS temperature / relative humidity.

4. Revise NUREG-1430 and NUREG-1431 technical specifications bases to include discussion of impact on efficiency of the CREVS / CREFS filters due to changes in the CREATCS temperature / relative humidity.

5. Revise TSTF-553 Enclosure 1, “Model Application”, Attachment 2, “Justification of the Control Room Area Temperature Limit,” to include discussion of impact on efficiency of the CREVS / CREFS filters due to changes in the CREATCS temperature / relative humidity.