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NJK-83-351

October 3, 1983

Mr. Edson G. Case, Deputy Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Case:

Enclosed please find a listing of those changes, tests, and experiments completed during the month of September, 1983, for Quad-Cities Station Units 1 and 2, DPR-29 and DPR-30. A summary of the safety evaluation is being reported in compliance with 10 CFR 50.59.

Thirty-nine copies are provided for your use.

Very truly yours,

COMMONWEALTH EDISON COMPANY
QUAD-CITIES NUCLEAR POWER STATION

N. J. Kalivianakis
Station Superintendent

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Enclosure

cc: T. J. Rausch

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10CFR50.59 SAFETY EVALUATION FOR PERFORMING AN ON-LINE CHEMICAL DECONTAMINATION OF THE RECIRCULATION LOOPS OF UNIT 2 USING TEMPORARY EQUIPMENT AND SERVICES SUPPLIED BY LONDON NUCLEAR SERVICES, INC.

1. The probability of an occurrence or the consequence of an accident, or malfunction of equipment important to safety as previously evaluated in the Final Safety Analysis Report is not increased as a result of this job. The effect of the decontamination solvent on existing plant systems was extensively reviewed and showed the following:

   a. Metallurgy

      The original materials specifications for the recirculation system and annulus allowed for general corrosion. Results of corrosion testing and analysis by London Nuclear and reviewed by Systems Materials Analysis (SMAD) indicated that the solvent corrosion rates are less than the original allowance by a factor of approximately 30.

      Additional corrosion data is being generated by London Nuclear from constant extension rate tests and tests on welded pre-cracked specimens. Although the results of these tests will be useful for expanding the data base, the existing corrosion test data is sufficient to determine that the solvent is acceptable for use. (Reference SMAD letter dated July 28, 1983).

   b. Core Spray

      The solvent will be contained within the recirculation loops and annulus and will not come in contact with any other systems/equipment necessary to maintain reactor safety. In the unlikely event that the decontamination solution is transported into the reactor vessel core, the dilution factor (originally .1 weight percent) is increased at least ten-fold. In their review of corrosion data, SMAD included the possibility of this occurring and, as stated, accepted the solvent for use. In any event, subsequent heating of reactor coolant to 450° F. will decompose the solvent to oxygen, hydrogen, and carbon dioxide.

   c. Gaskets/Seals

      Materials analysis of gaskets, seals, and valve packing materials was included in the SMAD review. Past experience with decontaminations by London Nuclear at other utilities indicates no adverse effects of the decontamination on these materials. Gasket and seal failures are addressed in the FSAR. Their status will not change as a result of this project.

d. Corrosion Verification

304 Stainless Steel coupons will be placed in the decontamination flow path and analyzed upon completion of the project for assurance of the actual corrosion rates.

e. Water Purity

The reactor coolant will be returned to technical specification limitations leaving the recirculation system in essentially its original condition.

2. The possibility for an accident or malfunction of a different type than any previously evaluated in the Final Safety Analysis Report is not created. Potential accidents or malfunctions of equipment were reviewed and addressed as follows.

a. Hydro/Pre-Op

Prior to performing the decontamination, a hydrostatic pressure test is performed on the decontamination skid and hoses to the recirculation system taps. Pre-operational tests are performed on the skid to verify instrumentation, controls, and equipment operability and to determine the adequacy of shutdown safeguards. Process hoses are rated at 400 psi; operating pressure is 35-40 psi and hydrostatic test pressure is 100 psi.

b. Residual Chemicals

The effects of residual solvent in the system was determined negligible. Reactor coolant is cleaned and returned to technical specification limits. Residual solvent will be highly diluted and at high temperatures will decompose.

At the conclusion of the decontamination, the recirculation pump seals and instrument lines will be backflushed.

c. Leaks/Spills

Potential leak points outside the drywell will be under visual surveillance during the process. Leaks within the drywell will be contained by isolating the drywell sump pumps until the decontamination is complete. Secondary containment will be maintained throughout the process. Gaseous releases from the evaporation of spills will be monitored via the standby gas system.

Liquid spills will be processed through normal radwaste lines. The diluted solvent is compatible with the station radwaste system.

d. Radiation Protection

Station radiation protection procedures will be followed throughout the decontamination. During resin transfer to the solidification truck, the affected areas of the reactor building will be evacuated. Access into the drywell during the process will be strictly controlled by station health physicists.

e. Level Monitoring

The level of the solvent in the recirculation system risers will be continuously monitored. Since SMAD has reviewed the material/solvent interface for materials within the core and has accepted the solvent for use, the consequences of a failure in the level controls causing a spill into the core are negligible. At the conclusion of the decontamination, the reactor coolant in the core will be analyzed for assurance that significant solvent did not enter this area.

f. Equipment Failure

Major components of the decontamination skid are isolable for repair or replacement. The length of time required for equipment repairs is not constrained by the expected corrosion rates of the solvent left stagnant in the system. These rates are temperature and flow dependent and will decrease rapidly when process circulation is interrupted.

3. The margin of safety as defined in the basis for any Technical Specification is not reduced. The decontamination project will be performed in accordance with the existing technical specification. The reactor will be maintained in the shutdown mode with all interlocks in the shutdown position.

a. Chemistry

Coolant chemistry will be monitored continuously as part of the project, and upon completion of the decontamination, coolant will be returned to the technical specification limits.

b. Release Monitoring

Liquid and/or gaseous releases will be monitored as normal and will adhere to technical specification limitations.

c. Temperature/Pressure Limitations

The decontamination will be performed at 250° F. and 25-30 psig; both ranges fall within technical specification limits for maintaining primary system integrity.

d. Head Replacement

To obtain the 250° F. operating temperature, the reactor vessel head will be replaced and tensioned to O-Ring Seating pass requirements. The temperature limitation of 100° F. flange temperature specified in the technical specifications does not apply to an O-Ring seating pass tension. General Electric determined that the studs could be tensioned to 10% of the designed flange loading without temperature dependency. The O-Ring seating pass will induce approximately a 7% flange load.

10 CFR 50.59 SAFETY EVALUATION TO DOCUMENT THE REVIEW PERFORMED ON SEPTEMBER 21, 1983, TO CERTIFY/QUALIFY MATERIAL RECEIVED FROM BRAND INDUSTRIAL SERVICES CORPORATION FOR USE AS A PIPE PENETRATION BARRIER ON THE "D" STEAM LINE

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1. Is the probability of an occurrence or the consequence of an accident, or malfunction of equipment important to safety as previously evaluated in the Final Safety Analysis Report increased?

   No. The use of SGR600 Silicone Rubber Fabric in lieu of Keene Corporation PE2141 Flame Retardant Fabric will not degrade the integrity of Secondary Containment. Visual inspection and tests indicate the material will perform the function of a pipe penetration barrier sufficiently adequate to mitigate the consequences of the dropped fuel bundle, failed fuel or the postulated rod drop accident.

2. Is the possibility of an accident or malfunction of a different type than any previously evaluated in the Final Safety Analysis Report created?

   No. This pipe penetration barrier is a passive component which will not cause the failure of any other safety equipment to perform its function to mitigate the consequences of an accident. Based on the Certificate of Compliance issued by Brand Industrial Services Corporation, this material is viewed as an acceptable replacement for the original Purchase Order material Keene Corporation PE2141. Therefore, upon installation of this material the Reactor Building is considered intact and Secondary Containment integrity is maintained. Post-maintenance inspections verified the integrity of the penetration barrier.

3. Is the margin of safety, as defined in the basis for any Technical Specification, reduced?

   No. The ability to maintain sufficient negative pressure on the Reactor Building will be enhanced by the installation of this material as a pipe penetration barrier. The Secondary Containment Capability Test recently successfully performed indicates the failure of the penetration will not degrade the safety margin.

   Flame tests performed on material and the supplier Certificate of Compliance adequately assures this penetration is sealed as a fire barrier.