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March 14, 1995
Fort St. Vrain
P-95021

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Docket No. 50-267

SUBJECT: **QUARTERLY SUBMITTAL OF THE 10 CFR 50.59 REPORT OF CHANGES, TESTS AND EXPERIMENTS FOR FORT ST. VRAIN DECOMMISSIONING**

REFERENCE: NRC Letter dated November 23, 1992, Erickson to Crawford (G-92244)

Gentlemen:

This letter transmits the quarterly 10 CFR 50.59 Report of Changes, Tests, and Experiments affecting Decommissioning of the Fort St. Vrain (FSV) Nuclear Station. The attached report includes a description of each change, test and experiment as well as a summary of the safety evaluation. This report covers the period of November 16, 1994 through February 15, 1995.

This report is being submitted pursuant to Condition (b)(2) of the "Order Approving Decommissioning Plan and Authorizing Decommissioning of Facility", transmitted in the referenced letter, which states the following:

> "The licensee shall submit, as specified in 10 CFR 50.4, a report containing a brief description of any changes, tests and experiments, including a summary of the safety evaluation of each. The report must be submitted quarterly."

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If you have any questions concerning this report, please contact Mr. M. H. Holmes at (303) 620-1701.

Sincerely,

Mary J Fisher

M. J. Fisher
Decommissioning Program Director

MJF/JRJ

Attachment

cc: Mr. Michael F. Weber, Chief
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Issues Branch

Regional Administrator, Region IV

Mr. Robert M. Quillin, Director
Radiation Control Division
Colorado Department of Public Health and Environment

March 1995

QUARTERLY 10 CFR 50.59 REPORT OF CHANGES, TESTS AND EXPERIMENTS FOR FSV DECOMMISSIONING

Background:

The following is a brief discussion of 10 CFR 50.59 changes to the Fort St. Vrain (FSV) facility or procedures as described in the Decommissioning Plan (DP) and tests and experiments not described in the DP, in the time period from November 16, 1994 through February 15, 1995.

While this report is similar to past reports of changes, tests and experiments submitted in accordance with 10 CFR 50.59, the quarterly decommissioning reports are submitted pursuant to Paragraph (b)(2) of the FSV Decommissioning Order (issued in NRC letter dated November 23, 1992, Erickson to Crawford), which states:

> "The licensee shall submit, as specified in 10 CFR 50.4, a report containing a brief description of any changes, tests and experiments, including a summary of the safety evaluation of each. The report must be submitted quarterly."

Changes to the FSV Facility or its Procedures as Described in the Decommissioning Plan

There were no changes to FSV facility procedures as described in the DP during this reporting period. Changes to plans for decommissioning the facility are described below.

1. Core Support Floor Removal

An earlier safety evaluation was amended to assess current core support floor (CSF) removal plans that differed from those described in the DP. The earlier safety evaluation for CSF removal is summarized in the quarterly 10 CFR 50.59 report of decommissioning changes submitted to the NRC in Reference 1.

This earlier safety evaluation for CSF removal was revised to assess the following additional items:

- CSF weight will be greater than the 270 tons mentioned in DP Section 2.3.3.10.2, primarily as the result of shielding installed on top of the CSF (weighing approximately 36 tons).

- Whereas the DP discusses a strand hydraulic jacking system to lift the CSF, the hydraulic jacking system will use steel jacking rods rather than cables.

DP Section 2.3.3.5.2, "Vessel Integrity", summarizes the results of analyses of PCRV concrete and rebar stresses at different phases of decommissioning which demonstrate that the PCRV will maintain its structural integrity throughout decommissioning. These analyses considered several cases including the CSF lift, and a case in which the CSF was supported at the PCRV upper ledge, prior to CSF sectioning and removal from the PCRV. Original calculations for the CSF lift assumed that a load of 540 tons was applied to the top of the PCRV, which conservatively accounted for the combined weight of the CSF and its lifting apparatus (beams and jacking station supports). This assumed weight bounded the actual weight of the CSF and lifting apparatus, so this original calculation remained valid. However, the original calculations assumed a CSF weight of 284 tons when situated at the PCRV upper ledge during postulated Operating and Design Basis Earthquakes (OBE and DBE). This weight was judged to be non-conservative and the analysis was revised assuming a weight of 345 tons, which accounted for the steel shielding on top of the CSF, the monorail spider assembly attached to the bottom of the CSF, water absorbed in CSF kaowool insulation, and the beams installed to support the CSF on the PCRV upper ledge. The reanalysis determined that PCRV concrete and rebar stresses increased by about 1% from the original calculations, due to the additional weight assumed at the ledge elevation, and continued to be acceptable. The stresses for postulated OBE and DBE with the CSF at the PCRV ledge remained below those for the bounding case (early decommissioning phase with all graphite blocks in core region, top head concrete plug removed, select tendons detensioned and PCRV full of water) documented in DP Section 2.3.3.5.2.

In regards to the CSF lift, the plan described in the DP to use a hydraulic jacking system with a four point lift was implemented, with a group of three hydraulic jacks used at each of the four lifting stations. DP Section 3.4.5 states "If the entire CSF is raised by high capacity jacks, drop of the CSF is not considered credible since such an accident would require multiple jack failures." This statement remains valid for use of the hydraulic jacking system with steel jack rods instead of "strands" (cables) noted in the DP. Calculations performed for the jacking system, including the jackrods, determined that the lifting capability was adequate for the projected CSF weight, with an acceptable margin of safety.

The safety evaluation concluded that the changes identified above do not increase the probability or consequences of accidents/malfunctions previously evaluated in the DP. Drop of the CSF in the PCRV is not credible since such an accident would require multiple jack failures and the jacking system, including jackrods, has adequate capacity and margin of safety, considering the weight of the CSF being greater than noted in the DP. The consequences of drop of a CSF segment would be bounded by postulated drop of a PCRV top head concrete wedge, analyzed in DP Section 3.4.3, due to the lower activity inventory of the CSF.

The increased CSF weight does not create new accidents or malfunctions. Analyses determined the PCRV would maintain its integrity during static lift of the CSF, conservatively assuming a combined CSF and lifting apparatus weight of 540 tons, which bounded the actual weight. New analyses, discussed in the safety evaluation, determined acceptable PCRV concrete and rebar stress levels for postulated OBE and DBE, with the assumed 345 ton CSF and support beams situated at the PCRV top ledge. The increased CSF weight and use of jacking rods for the hydraulic jacking system are not related to the bases for any technical specifications, and no margins of safety are reduced.

Based on the above, the safety evaluation concluded that the revised planning for CSF removal does not constitute an unreviewed safety question.

2. PCRV Beltline Concrete Removal

DP Section 2.3.3.12 describes cutting and removal of the beltline PCRV concrete segments, indicating that these activities will start after removal of the primary steam generator assemblies, removal of the helium circulator diffusers/shutoff valves, removal of the CSF support columns and draining of the PCRV. Current planning calls for commencement of beltline concrete cutting operations once the CSF is removed from the PCRV top ledge, with the above items, including shield water, still in the vessel. Beltline cutting would proceed in parallel with removal of these items. In addition, the DP identifies the beltline cut sequence as a) horizontal cuts, b) vertical radial cuts, and c) vertical back cuts. This evaluation assessed, as an alternative to the sequence defined in the DP: a) partial horizontal cuts (not through the PCRV liner while shield water level is above the cut elevation), b) vertical back cuts, c) completion of the horizontal cuts after shield water level is lowered below the horizontal cut elevation, and d) vertical radial cuts. While DP Section 2.3.3.12 states that the vertical back cuts would be made between every third tendon tube, resulting in a minimum cut depth of 27 inches, it is now planned to make this cut between every tendon tube, resulting in a minimum cut depth of approximately 31 inches. The removal of additional activated beltline concrete is considered necessary to provide assurance that sufficient activation products are removed so that the remaining concrete will meet release criteria of the final radiation survey plan.

The PCRV structural analysis described in DP Section 2.3.3.5.2, and discussed above, originally analyzed PCRV concrete and rebar stresses for a case late in decommissioning in which it was assumed that 27 inches of beltline concrete had been removed, the lower

PCRV components (steam generator primary modules, helium circulator diffusers/shutoff valves, CSF columns) had been removed, with 240,000 gallons of water in the vessel. This case was reanalyzed in accordance with current planning, assuming 55 inches of beltline concrete had been removed (conservative), PCRV components below the CSF remain in place, with 240,000 gallons of water in the vessel. This analysis concluded that PCRV stresses for this case, which included loads imposed by deadweight, OBE, and DBE, increased approximately 15% from the original analysis, remaining within allowable stress limits and below those analyzed for the bounding case (early decommissioning phase with all graphite blocks in core region, top head concrete plug removed, select tendons detensioned and PCRV full of water) documented in DP Section 2.3.3.5.2.

Changing the back cut from intersecting every third tendon tube of inner vertical tendons to every tendon tube increases the volume of concrete to be removed by approximately 14%. The evaluation considered the effect of this increased volume on the weight of concrete segments to be removed and activation inventories, concluding that beltline concrete sections removed from the PCRV would have only about one-tenth of the 15.11 curies of activity assumed to be in a tophead wedge segment in the concrete segment drop accident evaluated in DP Section 3.4.3.

The safety evaluation concluded that the probability or consequences of accidents/malfunctions previously evaluated in the DP are not increased. Administrative/Work Package controls will be in place to assure the horizontal cut does not penetrate the PCRV liner while shield water level is above the elevation of the cut, and controls will also prevent raising the water level above the cut elevation once the liner has been penetrated. Controls could involve visual sighting down the inner vertical tendon tubes, and placement of idler pulleys in the tubes so the diamond wire would rotate without proceeding much closer to the liner than these inner vertical tendon tubes. In addition, a verification analysis was performed to ensure that while the horizontal and vertical back beltline concrete cuts (which do not penetrate the liner) are in progress, and the water level is above the cut elevatior there is no path for PCRV water to communicate with the kerf lines. Based on these controls and analysis, it is determined that the probability of a loss of PCRV shield water accident, evaluated in DP Section 3.4.7, is not increased. Although the beltline concrete segments to be removed from the PCRV will weigh approximately 75 tons, including rigging, which is somewhat more than originally planned, the load is well within the capacity of the Reactor Building crane and the probability of dropping a beltline segment is not increased.

The loss of PCRV shield water accident evaluated in DP Section 3.4.7 assumed 423,500 gallons of water having a tritium concentration of 62.4 μCi/cc drains to the Reactor Building Sump. Since the volume and tritium concentration of water in the PCRV are well below these values, consequences of a PCRV breach would not approach those evaluated in the DP. Each of the beltline concrete segments are conservatively predicted to contain approximately 1.5 curies of activity. Since the top head concrete segments were assumed to contain 15.11 curies of the same nuclides in the concrete drop accident analyzed in DP Section 3.4.3, the consequences of a concrete drop accident are not increased.

No new types of accidents/malfunctions, not previously evaluated in the DP, are created by this activity. The supplemental PCRV structural analysis, performed to account for the additional concrete planned to be removed from the beltline and weight of components in the lower portion of the PCRV, concluded that the PCRV will maintain its integrity. This activity does not affect the basis for any technical specification and no margins of safety are reduced.

Based on the above, it was concluded that the alternate sequence and cutting configuration for beltline concrete cutting and removal do not constitute an unreviewed safety question.

Tests or Experiments not Described in the Decommissioning Plan

No tests or experiments were conducted this reporting period that are not described in the DP.

References

1. PSC letter dated June 14, 1994, Warembourg to NRC Document Control Desk (P-94051).