CONNECTICUT YANKEE ATOMIC POWER COMPANY

HADDAM NECK PLANT
362 INJUN HOLLOW ROAD EAST HAMPTON, CT 06424-3099

August 12, 1998

Docket No. 50-213
CY-98-136

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Haddam Neck Plant
Reactor Coolant System Decontamination

The purpose of this letter is to update the NRC on the results of the investigation Connecticut Yankee Atomic Power Company (CYAPCO) conducted into the July 27, 1998, event at the Haddam Neck Plant, and communicate CYAPCO's basis for continuing with the reactor coolant system (RCS) decontamination (decon). This new information supplements the information provided at the management meeting held with the NRC on August 3, 1998.

Background

During the past year CYAPCO, has been diligently performing work activities necessary to support a safe and successful RCS decon. The goal of the RCS decon project is to remove a film of radioactive material which has accumulated on the inside of the RCS piping over the past 30 years. The removal of this material is accomplished over several decontamination cycles and is beneficial to CYAPCO because it will significantly reduce the radiation levels encountered by plant workers during the subsequent decommissioning activities. The first cycle resulted in an approximate 60% reduction in decontaminated system radiation levels.

On July 27, 1998, during the first cycle of a multi-cycle evolution, CYAPCO was in the process of aligning the ion exchangers to the primary system. The ion exchangers are used to remove the radioactivity from the system during the RCS decon. During this time, a flow blockage occurred and caused pressure in the system to increase, resulting in a relief valve lifting and pipe vibration, which caused leaks to develop in two separate small diameter lines in the system. CYAPCO was able to quickly respond to the event, using contingency procedures provided for this type of situation. The total water volume that leaked to the aerated drain tank was estimated to be 1200-1500 gallons. All leakage was contained, no personnel injury or internal or skin exposure occurred, and there was no release of radioactive water to the environment.

Discussion

Immediately after the event occurred, and the plant had been placed in a stable condition, CYAPCO formed a dedicated event review team (ERT). The ERT was comprised of individuals who were not involved in the RCS decon and represented the Oversight, Operations, Engineering and Corrective Action Departments. This team conducted interviews, reviewed operations logs, reviewed test results and developed hypotheses, in an attempt to determine the root cause. The ERT has concluded that there are two root causes. First, personnel managing the RCS decon demonstrated poor judgment in making three attempts to valve in a demineralizer without changing system configuration. Second, reliance on operator action to control pressure within design basis parameters was inadequate.

CYAPCO has made a significant effort to locate the blockage, including a review of plant log sheets, computer modeling of the effected components, inspection of suspect components and flow testing of the various flow paths in the system. Review of this data supports the cause of the blockage as the letdown post-filter inlet valve LD-V-238 being in the fully closed or near to fully closed position. The extensive investigation and the related corrective actions ensure that there is no other blockage in the system and that CYAPCO will not be in a position where personnel inappropriately feel the need to act quickly to place a demineralizer in service.

On August 3, 1998, CYAPCO and the NRC held a meeting at the Haddam Neck Plant during which time CYAPCO presented information on the RCS decon process, the probable cause and contributing causes of the event, along with corrective actions that were taken or were planned. Since that time, the ERT has completed its investigation, has recommended certain additional corrective actions, and CYAPCO has completed a comprehensive evaluation and actions over and above what were discussed on August 3, 1998. The additional corrective actions are discussed below.

Additional Corrective Actions Taken

CYAPCO has conducted structural integrity and material condition inspections of the RCS decon piping. The two leaks in the letdown purification line have been repaired. The inspections revealed the following:

- No damaged or failed pipe supports;
- No indications of excessive pipe movements;
- No deformation of piping;
- No signs of structural or material degradation to cantilevered vents or drains; and
- Validation of the overall material condition of piping and supports.

The ERT also identified that Operations personnel were required to perform many valve manipulations using reach-rods. The use of reach-rods does not let the operators visually verify valve position or definitively know what type of valve they are manipulating. Therefore, CYAPCO has developed a list of reach-rod operated valves used in the RCS decon. The list identifies the valve type and number of turns needed to fully open or close each valve. This list provides guidance to Operations personnel to ensure that when they manipulate a valve it is placed in the correct position. In addition, on-shift field observations by independent engineering personnel are being conducted on key valve operations. To further assist the operators, new guidance has been supplied regarding expected parameters when aligning to the demineralizers.

CYAPCO has also reviewed the assumed failures contained in the RCS decon safety evaluation to determine if any additional failures need to be considered. As noted in the August 3, 1998, meeting, CYAPCO concluded that a booster pump trip circuit should be installed so that in the event the system were to pressurize to an unacceptable level, the pump would automatically trip and prevent the lifting of the relief valve. This would provide a faster response to any pressure transient and would provide added assurance that the system would not be subjected to an over-pressure transient. CYAPCO's review concluded that any leakage within the associated buildings was bounded by the safety evaluation assumption of a 1600 gallon leak occurring outside.

CYAPCO has performed additional flow testing at flows and pressures consistent with those expected during the RCS decon. This testing did not identify any flow blockage or unexpected pressure increases in the RCS decon lines. No leakage was identified. Flow testing did find that the letdown flow indicator, FI-113 was out of calibration caused by the vibration during the July 27, 1998 event. The indicator was recalibrated.

In addition, the system was flow modeled on a computer to reproduce the pressure transient. The only possible way to reproduce the transient was to introduce a total flow blockage of the letdown line. Flow modeling was also used to accurately predict the pressures and pressure drops seen during flow testing and verified that there are no blockages in the system as configured.

CYAPCO has also improved the communication protocol between personnel in the field and in the control room. During the event, information was not effectively communicated between the personnel directing the event who were in contact with personnel in the plant via head sets and the personnel in the control room maintaining the remaining plant in a safe condition and communicating with personnel in the plant by telephone. Information that was relayed by telephone was not effectively communicated to the personnel directing the event. Communication that comes in by telephone will be relayed in an immediate fashion to the Shift

Manager or his designee, as appropriate. Control Room personnel involved in the RCS decon will be notified by the Shift Manager of pertinent communication.

CYAPCO has installed additional cameras to monitor critical areas in the pipe trenches. Also, additional pressure and flow instrumentation has been added to monitor for pressure transients.

Conclusion

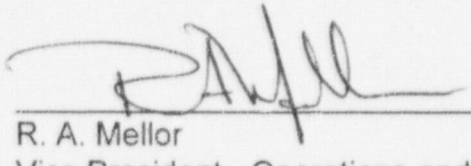
The cause of the flow blockage that occurred on July 27, 1998, was the closed or nearly closed post-filter inlet valve. CYAPCO has instituted numerous corrective actions that will prevent or mitigate the effects of pressure transients, along with other actions that will provide assurance of valve positions. Also, additional on-shift personnel have been stationed to verify valve positioning.

Based on the extensive corrective action implemented, CYAPCO is confident that the RCS decon can proceed in a safe manner. With the corrective actions discussed at the August 3, 1998 meeting, and in further discussions with the NRC Staff on August 6 and 9, 1998 on the corrective actions discussed above, CYAPCO has commenced with Cycle 2 of the RCS decon.

Should you have any questions on the above, or desire additional information, please contact Mr. G. P van Noordennen at (860) 267-3938.

Very truly yours,

CONNECTICUT YANKEE ATOMIC POWER COMPANY



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