

NON-ROUTINE RADIOACTIVE ENVIRONMENTAL REPORT NO. 50-313/76-1

Description:

On August 14, 1976, the cumulative release of radioactive materials in liquid effluents (excluding tritium and dissolved gases) from Arkansas Nuclear One-Unit 1 (License No. DPR-51) exceeded the Environmental Technical Specification 2.4.1.2 limit of 2.5 curies for the third quarter of 1976.

Causes:

In March of 1976, Arkansas Nuclear One-Unit 1 (ANO-1) was shutdown to remove the reactor vessel surveillance specimen holder tubes (as described in Reportable Occurrence 50-313/76-4, dated April 22, 1976). During this outage, defueling and maintenance operations which ensued caused a considerable amount of radioactive waste water to be generated for processing by the liquid radioactive waste systems. Also during this period, the sodium thiosulfate tank was drained to the dirty liquid radioactive waste system as a result of being contaminated with radioactive borated water (reference Reportable Occurrence 50-313/76-11, June 19, 1976).

On July 1, 1976, while ANO-1 was escalating in power following the aforementioned outage, chart indications in the control room indicated that the D reactor coolant pump shaft seal was not staging properly. Other indications of seal performance were normal and power escalation continued, while D pump shaft seal conditions were observed closely. A few days later the C reactor coolant pump shaft seal began to exhibit abnormal chart indications in the control room also. The unit was operated with both pumps under close observation until the unit was shutdown on August 6, 1976, to make repairs to the pump seals.

Following repairs to the B, C, and D reactor coolant pump seals the unit was placed back on line on August 16, 1976. On this date the D reactor coolant pump shaft seal failed completely, resulting in a total reactor coolant pump system leak rate of approximately 25 gallons per minute (reference Reportable Occurrence No. 50-313/76-22, dated August 27, 1976). The unit was brought to cold shutdown conditions as soon as possible for repairs to the D reactor coolant pump shaft seal.

The above excessively high generations of radioactive waste water (i.e., defueling and maintenance, dumping of the sodium thiosulfate tank to the waste system, dilutions to go critical in July and August, and excessive leakage due to reactor coolant pump seal failures) resulted in the liquid radwaste tanks being filled to capacity with higher than normal activity water. As total activity in the liquid effluents approached 2.0 curies toward the end of July, the performance of the demineralizers in the liquid waste system was stepped up and resins were renewed at frequent intervals

until the available capacity of the spent resin storage tank was expired. With exhausted resins in service, activity in liquid effluents exceeded 2.5 curies on August 14 and reached 5.2 curies on August 16, 1976. Liquid releases to the environment were terminated at this point.

High chemical concentrations of sodium thiosulfate contained in the liquid waste resulted in very poor demineralizer performance. Drumming of spent resins from the spent resin storage tank was delayed as long as possible to avoid contamination of the virgin solid radioactive waste system until minor deficiencies in the system were corrected. Drumming of the spent resins, nevertheless, did begin on August 21, 1976.

Program to Reduce Release Rates:

Liquid releases to the environment were terminated on August 16, 1976, when the cumulative activity in liquid effluents for the third quarter of 1976 reached 5.2 curies. Arrangements were then made to begin to ship liquid radwaste off-site by truck and the first truck arrived on August 18.

Spent resins were transferred from the spent resin storage tank to the drumming station beginning on August 21, 1976. This drumming program is continuing and will continue until all resins are removed from the spent resin storage tank. Demineralizer resins were changed in the liquid radwaste system as space was made available in the spent resin storage tank but, due to high sodium thiosulfate concentrations in the liquid, the new resins were quickly exhausted. As the resins became exhausted, no additional releases of processed water to the lake were possible. A continuing program is underway to drum resins at a fast enough pace to keep up with the influx of spent resins to the spent resin storage tank.

Resins were changed in the spent fuel demineralizers and water was processed from the spent fuel pool (relatively low activity water) until sufficient space was created in the pool to dump two clean waste receiver tanks containing high activity water to the spent fuel pool. This operation created enough clean waste receiver tank storage capacity to enable startup and continued operation.

Trucking of water off-site will continue until the water containing sodium thiosulfate is entirely removed. Cleanup of all radioactive waste tanks will then ensure residual sodium thiosulfate and bottom crud are removed.

The monitoring program for radioactive waste discharges has been upgraded to ensure optimum performance of the radioactive waste systems thereby minimizing any further releases to the environment. Also, as a separate program, we are preparing for future submittal to you a proposed plant modification concerning the deletion of sodium thiosulfate from our safety systems because of 1) lack of credit received for performance of this system during accident conditions, 2) detrimental effects that leakage from this system has on our piping, and 3) more recently, detrimental effects that the aforementioned leakage and entry of sodium thiosulfate into our waste systems is having on performance of these waste systems.