



Virginia Electric and Power Company  
North Anna Power Station, Unit No. 1  
Docket No: 50-338  
Report No: LER/RO 79-024/43X-1

Attachment: Page 1 of 3

### Description Of Event

On February 28, 1979, during preoperational tests on Unit 2, an uncontrolled and unplanned release of radioactive waste occurred. The Unit 2 sump had become contaminated. Without knowledge of this contamination, a temporary pump was used to pump out the sump into the storm drain system.

### Probable Consequences of Event

The estimated total activity released to the Unit #2 Reactor containment was  $7.42 \text{ E4 } \mu\text{Ci}$ . Estimated total activity released to the Station Storm Drain System is  $3.11 \text{ E3 } \mu\text{Ci}$ . The estimated release to the discharge canal exceeded the maximum permissible concentration (MPC) for the mixture by a factor of 20 to 1. Based on a sump pump capacity of 400 gpm and a main circulating water flow of  $9.52 \text{ E5 gpm}$ , the estimated release rate at the site boundary was 0.00845 times MPC for the mixture.

Samples taken from the storm drain discharge and the discharge canal concur with these calculated values. That is, all samples showed no detectable contamination. Also, all radiation surveys conducted on Unit 2 containment detected no direct radiation greater than 1mRem/hour and all swipes taken were less than 1000 dpm/100Cm<sup>2</sup>.

### Cause

When a sample is taken from the Unit 1 primary coolant system, the sample line is purged to the Hydrogenated Contaminated Liquid Purge Header. This purge header empties into the Unit 1 Volume Control Tank (VCT). Off of this purge header is a pressure relief valve with a pressure relief line that dumps into the High Level Waste Drain Tank via a four inch inlet line. This tank and inlet line is shared with Unit 2 via a pressure relief line and a pressure relief valve off of the Unit 2 purge header.

During normal sampling operations on Unit 1, the relief valve on the Unit 1 purge header leaked. The Unit 2 purge header relief valve leaked also, causing contamination to get into the Unit 2 purge header. This contamination then spread to the Unit 2 Volume Control Tank (VCT).

The Unit 2 VCT was not used for some period of time until the Charging System was put on recirculation via an abnormal path for 2-PO-36.3. This path went through the VCT rather than coming in just downstream of the VCT outlet as does the normal recirculation flow. The contamination was spread in this manner throughout the Chemical and Volume Control System all the way to the inlet valve on the Boron Injection Tank and to the main flow control valve for Safety Injection. Some leakage occurred past the inlet valve to the Boron Injection Tank, through the boron injection line and into the vessel via "A" Loop Cold Leg. The major flow of the contaminated water occurred, however, through the main flow control valve for the Safety Injection System into the vessel via the "B" Loop Charging Line. This valve maintains a small flow at all times to provide for

thermal balance. This water was then pumped into the Unit 2 sump by a temporary construction pump and then into the Unit 2 storm drain system. In this manner, the unplanned and uncontrolled release of radioactive contamination occurred.

#### Immediate Corrective Action

Immediately upon discovery of the contaminated water in the Unit 2 reactor vessel and sump, the applicable Emergency Plan Implementing Procedures were put into action. These actions included the evacuation of Unit 2 containment, collection of air samples and smears, and the sampling of various tanks and systems to determine the source and extent of the contamination. Also, all known contaminated systems and all possible contaminated systems were isolated and tagged out.

Next, a system by system search was begun to determine the source and the pathway that the contamination took to go from Unit 1 to Unit 2. This search revealed that the Unit 1 sampling system was leaking reactor coolant through the relief valves on the Unit 1 Hydrogenated Contaminated Liquid Purge Header to the Unit 2 VCT via the Unit 2 Hydrogenated Contaminated Liquid Purge Header. This system was left isolated pending the installation of new relief valves.

The contaminated water that remained on the Unit 2 sump and vessel was then pumped to the High Level Liquid Waste System in the Auxiliary Building. These systems and associated piping were then flushed with water to the High Level Liquid Waste System until radioactivity levels were below MPC. Also, all the soil around a hose leak, which was contaminated, was picked up and put in 55 gallon 17 H drums. Finally, the area around the storm drain input, which had minor contamination, was decontaminated.

#### Scheduled Corrective Action

The relief valves on the Unit 1 purge header and the Unit 2 purge header have been isolated pending arrival of replacement valves. As soon as the new relief valves arrive, they will be installed.

#### Action to Prevent Recurrence

Currently, the Unit 1 Hydrogenated Contaminated Liquid Purge Header is isolated from the Unit 2 VCT. This isolation will remain in effect until the Unit 2 Sampling System and Hydrogenated Contaminated Liquid Purge Header are operational. At that time, Unit 2 containment will be a controlled area and the Unit 2 VCT, a contaminated system.

To insure that an uncontrolled and unplanned release does not recur, approval from Health Physics is required prior to operation of the Unit 2 containment temporary sump pump.

#### Supplemental Information

Initial samples obtained from Unit 2 systems indicated possible trace amounts of XE-133 in the component cooling as early as December 14, 1978 and a definite presence of XE-133 in the RCS during hot functional testing in January 1979. The presence of XE-133 in the RCS appeared to result from a single incident as the activity levels decreased corresponding to the decay half life for XE-133 and no additional nuclides were found in the RCS. This incident was suspected to be an

overpressurization of the sample purge header while obtaining a Unit 1 primary coolant sample.

The radioactivity levels detected in the Unit 2 RCS were well below the E.T.S. limit of  $4 \times 10^{-5}$   $\mu\text{Ci/ml}$  for noble gases released in liquids to unrestricted areas and had diminished to below minimum detectable limits by the completion of hot functionals on February 1, 1979. Samples taken from the Unit 2 containment sump during hot functionals did not indicate radioactive contamination present.

The Unit 2 RCS was drained to mid-loop level on February 4th via the RHR system to the Boron Recovery System. Draining of the RCS was continued to the Boron Recovery System on February 6th and completed on February 7th. The Unit 2 reactor vessel was drained to the containment sump via the transfer canal on February 12th and 13th. No additional activities involving the transfer of water within the primary systems in Unit 2 containment are recorded in the Unit 2 control room operation's log until the charging system was placed on recirculation for 2-PO-36.3 on February 27th.

The Unit 2 VCT was filled to 40% on February 8th and 47% on February 17th. The VCT level had decreased to 21% on February 17th before refilling and to 21% on February 26th. A review of the control room operators surveillance sheets for the period indicates the VCT level was dropping by approximately 2-3% per day. No entries in the control room operators' log on use of the charging pumps during this period were found. The decrease in volume may have resulted from cooling of the VCT liquid after hot functionals.

In conclusion, the date of the initial unplanned release of radioactivity reported under LER 79-024/43L-0 was February 28, 1979 as previously reported.

1131 226