

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-183/93-01

License No. DR-10

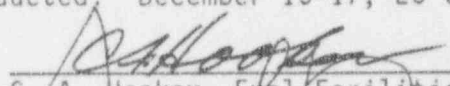
Licensee: General Electric Company
Vallecitos Nuclear Center
P. O. Box 460
Pleasanton, California 94566

Facility Name: Vallecitos Nuclear Center (VNC)
ESADA Vallecitos Experimental Superheat Reactor (EVESR)

Inspection at: Pleasanton, California

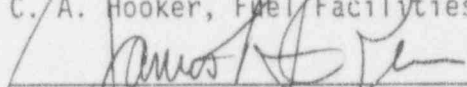
Inspection Conducted: December 15-17, 20 and 29, 1993

Inspector:


C. A. Hooker, Fuel Facilities Inspector

1/21/94
Date Signed

Approved by:


James H. Reese, Chief
Facilities Radiological Protection Branch

1/25/94
Date Signed

Summary:

Areas Inspected: This was a special unannounced inspection to review the circumstances of an event on December 15, 1993, involving the licensee's identification of an accumulation of a large volume of water in the EVESR containment building. The inspection also included several tours of the EVESR containment, outside containment associated pipe trenches and Condenser Building. Inspection procedures 30703 and 93702 were addressed.

Results: Although the licensee was unable to determine the source of the water in the EVESR containment, they committed to submitting their final investigation report to the NRC Region V Office. No violations or deviations were identified.

DETAILS

1. Persons Contacted

Licensee:

- G. L. Stimmel, Manager, Irradiation Processing Operation (IPO)
- *J. H. Cherb, Manager, Nuclear Safety
- T. Tillinghast, Sales Specialist (Acting Manager, IPO)
- J. I. Tenorio, Manager, Remote Handling Operations
- F. Arlt, Manager, Facilities Maintenance
- *A. F. Mindt, Specialist, Radiation Monitoring

*Denotes those attending the exit interview on December 29, 1993.

In addition to the individuals noted above, the inspector met and held discussions with other members of the licensee's staff.

2. Event (93702)

a. Background

The EVESR was designed as a light-water-moderated, saturated steam cooled, superheat reactor using low enriched uranium fuel. Its purpose was to provide information on the suitability of various types of experimental superheat fuel elements. The construction of the EVESR started in March 1961 and was completed in September 1963. The EVESR containment building shell was constructed as an all-welded steel pressure vessel approximately 128 ft. high and 48 ft in diameter, with about 69 ft below ground level and embedded in concrete. The containment was also supported by internal reinforced concrete structures. The containment was designed for 58 pound per square inch internal pressure. The EVESR achieved (1) initial criticality on November 25, 1963, (2) full power operations at 12.5 megawatts thermal (MWT) on May 13, 1964, and (3) after authorization, full power of 17 MWT on April 30, 1965. After serving its purpose, the EVESR was shutdown on February 1, 1967, and all of the reactor fuel was shipped offsite. All of the water was drained from the reactor vessel and associated piping systems, tanks, and the fuel storage pool.

By letter dated June 17, 1968, the EVESR license was amended to authorize possession of residual radioactive material only and not to operate the reactor. By letter dated April 15, 1970, the EVESR license was amended to exclude facilities and equipment external to the EVESR containment (dump condenser and miscellaneous equipment building, a gas fired boiler, the cooling tower, the exhaust stack, and control room) from the license. These excluded facilities were transferred to GE's State License No. 0017. Following the transfer of the above facilities and equipment to the State License, GE initiated a campaign to remove and dispose of all non-essential piping systems external to the EVESR containment. Except for the cooling tower, this campaign was completed by July 1990. The

cooling tower removal was completed by November 1993.

The EVESR containment is kept locked shut and de-energized, except for annual inspection/surveys. There are no required or activated warning systems in the containment to alert the licensee of any abnormal conditions. The licensee performs annual material condition inspections and radiological surveys inside the EVESR containment and submits a report of its findings in accordance with the reactor's NRC "Possession Only License". The 1992 annual inspection/survey was performed on November 28, 1992, and no unusual conditions were identified by the licensee (Annual Report No. 25 submitted by letter dated March 22, 1993).

b. Activities Related to the Event

At approximately 3:10 pm on December 15, 1993, while conducting the annual inspection/survey inside the EVESR Containment Building, the licensee discovered that the lower level (487 ft level) was flooded with water. At about 3:25 pm, the licensee informed a NRC Region V inspector, who was onsite conducting a routine inspection of other GE licensed activities, of the event.

At about 4:10 pm, the inspector entered the EVESR containment, occupied by a shift specialist and a radiation monitoring technician, to observe the conditions at the 487 ft level. Using a tape measurer, the licensee determined the water level to be about 7 ft 7 inches above the 487 ft level floor. The licensee initially estimated that about 20,000 gallons of water was present. The inspector did not observe any evidence that water level was increasing and from visual observations (dried residue on the containment wall and equipment) it appeared that the water level may have previously been about one inch higher. At this time the licensee speculated that the level decrease was due to evaporation to the upper surfaces of the containment, where moisture was evident. The water appeared to be slightly filmy on the surface and translucent to about two feet. The licensee's analysis of four water samples indicated a maximum cesium-137 concentration of 3.8 E-6 microcurie/milliliter (uCi/ml).

The licensee's search did not identify the source of water in the 487 ft level. The licensee noted that the water level in the ground sump near the containment was about 22 ft below grade. This was not considered as the source based on the construction of the containment.

The licensee determined that due to the status of the facility (a deactivated non fueled reactor), the accumulation of water did not have any potential safety impact on the public or facility workers, and that the event was not reportable per NRC requirements.

On December 16, 1993, the inspector accompanied the Manager, Facilities Maintenance (MFM) into the underground pipe trenches and

valve pit areas, where the principal liquid and ventilation exhaust penetrations into the EVESR containment are located. The only conspicuous remaining penetrations observed were a 3-inch radioactive waste discharge pipe, a 2-inch raw water pipe and the exhaust line. The inspector noted that some of the previously removed pipe penetrations were equipped with outside containment isolation valves, and some of the penetrations were only outfitted with taped flanges and no isolation valves. According to the MFM, prior to the removal of piping that did not have outside containment isolation valves, the licensee verified that each penetration was equipped with an isolation valve inside the containment to ensure integrity would be maintained.

During a walk-down of the two remaining liquid penetrations (liquid waste and raw water), the inspector observed that the liquid waste drain line was equipped with a pneumatic isolation control valve inside (543 ft level) and outside of the containment (valve pit No. 3). Each valve's position indicator was observed to be in the closed position. However, the condition of the internal components of the valves could not be verified at this time. According to the MFM, two de-energized liquid waste pumps located in a 900 gallon sump in the flooded 487 ft level remain connected to the drain line. The Dump Condenser Building sump, valve pit No. 2 sump, and the deactivated Vallecitos Boiling Water Reactor (VBWR) trench sump (all located in the EVESR underground pipe trench areas) collect water from ground seepage during the rainy season. The rain water is manually pumped to a portable transfer tank (holds about 1,200 gallons of water) for processing at the licensee's Waste Evaporator facility. During the higher than normal rainfall in early 1993, these sumps were pumped out several times.

Prior to 1992, the liquid waste drain line exited the pipe trench and ran underground to a transfer station near the old VBWR cooling tower where the sumps could be pumped to the transport tank. The line also ran underground to a nearby liquid waste tank farm where the line was capped. In January 1992, the licensee initiated a Change Authorization (CA), No. 92-05, to remove the underground drain line because of its age and lack of a secondary containment. The modification included excavating and removing the old drain, and installing a pump-out station with a 1-1/2 inch manual and automatic shutoff valve where the drain line exits the pipe trench. This project was completed by July 1992.

The inspector noted that the 2-inch raw water line, at the outside penetration, was equipped with a de-energized (air line removed) diaphragm valve (not shown on facility drawings of this system) and a check valve (shown on facility drawings). The inspector also observed that this system (raw water hose connections and drinking fountain) appeared to be activated inside of the containment, when the MFM opened a shut-off valve on hose connection outlet located on the 534 ft level. However, the licensee did not identify any apparent leakage above the 487 ft level (still flooded) that would

have caused the flooding in the containment. The raw water system also supplied the remaining fire sprinkler system in the EVESR Condenser Equipment Building, and there was no isolation valve between this system and the diaphragm valve at the containment penetration. On December 18, 1993, the licensee modified this system to isolate it from the containment with a locked closed valve.

The inspector also observed the licensee's inspection of the EVESR fuel storage pool which is equipped with a plywood cover. By the use of existing openings at the edges of the plywood cover and two newly drilled 2-inch holes, the licensee determined that fuel storage pool was dry, except for some observed condensation that collected in the corners at the bottom.

On December 16, 1993, the licensee's annual inspection/survey of the nearby deactivated boiling water reactor (VBWR) containment, Docket No. 50-18, License No. DPR-1 evidenced no presence of water.

On December 17, 1993, the licensee commenced pumping of the water from the EVESR containment to a nearby empty 60,000 gallon liquid waste storage tank (Tank 6). The pumping operation consisted of locating a portable submersible pump in the 487 ft level and about 300 ft of 1-1/2 inch wire-reinforced plastic hose that ran to Tank 6. On December 22, 1993, the licensee completed pumping the water from the containment. The water was pumped to about 2 ft from the top of the 487 ft level containment sump. The licensee removed approximately 50,000 gallons of water which was twice the original estimation. The licensee attributed this difference to an error in the model used for the initial estimate. Subsequent licensee inspections of the containment through December 27, 1993, found no water in-leakage that would account for the water removed from the containment. The licensee's visual inspections at the 487 ft level did not reveal any conspicuous evidence of the source of water.

Due to personnel being off during the holiday season, the licensee's investigation as to the source and cause of the water in the containment was limited. The licensee informed the inspector that since there was no evidence at this time as to the cause of the water in the EVESR containment, a formal plan to investigate and determine the source of water would be developed and initiated shortly after the beginning of the new year when they returned to normal staffing.

c. Radiological Consequences

Initial containment entry air samples and subsequent air samples taken during the removal of the water indicated only short lived natural occurring radon gas daughter products. Although no seepage from the containment was suspected, the licensee sampled a nearby outside containment ground water sump, and sample well (G-2), a nearby grade lake (Lake Lee), and water run off sumps in the area.

The licensee's analysis of the samples indicated no detectable activity.

The licensee's radiological surveys of the 487 ft level indicated that there was no change in general area radiation dose rates (less 1.0 millirem per hour) typically observed during their annual surveys. Removable surface contamination levels on the floor ranged from 4,000 to 6,000 disintegrations per minute per square ft (dpm/ft²) of beta-gamma activity. Wipe tests of the EVESR fuel transfer cask stored at this location indicated a maximum of 60,000 dpm/ft² of removable beta-gamma radioactivity above ambient levels.

Although the accumulation/flooding in the EVESR containment appeared to not represent an imminent safety problem, the event may signify the need for additional controls other than the current annual in containment inspection/surveys to preclude similar events in the future. The licensee's final investigation as to the cause and actions to prevent recurrence will be reviewed in a subsequent inspection, and is considered as an inspector followup item (IFI 50-183/93-01-01).

No violations or deviations were identified.

7. Exit Interview (30703)

The scope and results of the inspection were summarized with the licensee representatives denoted in Section 1 on December 29, 1993, at the conclusion of the onsite inspection.

The Manager, Nuclear Safety committed to submitting a report, to the NRC Region V Office, of their investigation as to the cause of the EVESR flooding. The inspector informed the licensee representatives that the report should include the source of water, the technical bases to support their determination, and the root cause of the event.

The licensee was informed that no apparent violations or deviations were identified.