UPDATE REPORT - Previous Report Date 07-10-80 U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT

CONTROL BLOCK / / / / / / / (1) (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

/0/1/ /V/A/N/A/S/1/ (2) /0/0/-/0/0/0/0/0/-/0/0/ (3) /4/1/1/1/1/ (4) / / / (5)

LICENSEE CODE — LICENSE NUMBER — LICENSE TYPE — CAT

/0/1/ REPORT SOURCE /X/ (6) /0/5/0/0/0/3/3/8/ (7) /0/6/2/6/8/0/ (8) /0/3/2/4/8/2/ (9)

DOCKET NUMBER — EVENT DATE — REPORT DATE

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

/0/2/ / During a review of the FSAR safety analysis for boron dilution accidents, it was /

/0/3/ / determined that nonconservative RCS volumes were used for the cold shutdown con- /

/0/4/ / dition. This event is reportable pursuant to T.S. 6.9.1.8.h. A complete review /

/0/5/ / of inadvertent boron dilution scenarios showed that with normal administrative /

/0/6/ / controls over RCS makeup activities, this event does not involve any safety con- /

/0/7/ / sequences. The public health and safety were not affected. /

/0/8/ / /

SYSTEM CODE — CAUSE CODE — CAUSE SUBCODE — COMPONENT CODE — COMP. SUBCODE — VALVE SUBCODE

/0/9/ /Z/Z/ (11) /X/ (12) /Z/ (13) /Z/Z/Z/Z/Z/Z/ (14) /Z/ (15) /Z/ (16)

(17) LER/RO REPORT NUMBER — EVENT YEAR — SEQUENTIAL REPORT NO. — OCCURRENCE CODE — REPORT TYPE — REVISION NO.

/8/0/ /-/ /0/5/5/ / \ / /0/1/ /X/ /-/ /1/

ACTION TAKEN — FUTURE ACTION — EFFECT ON PLANT — SHUTDOWN METHOD — HOURS — ATTACHMENT SUBMITTED — NPRD-4 FORM SUB. — PRIME COMP. SUPPLIER — COMPONENT MANUFACTURER

/G/ (18) /G/ (19) /Z/ (20) /Z/ (21) /0/0/0/0/ (22) /Y/(23) /N/(24) /Z/(25) /Z/9/9/9/(26)

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

/1/0/ / Draining the RCS to the center line of the RCS hot legs during shutdown for /

/1/1/ / maintenance activities was not considered when the FSAR analysis was performed. /

/1/2/ / Procedures were changed to require a 5 percent shutdown margin during cold shut- /

/1/3/ / down. A review has shown this action is not required; therefore, it will be /

/1/4/ / removed from procedures. /

FACILITY STATUS — %POWER — OTHER STATUS — METHOD OF DISCOVERY — DISCOVERY DESCRIPTION (32)

/1/5/ /E/ (28) /1/0/0/ (29) / NA / (30) /D/ (31) / NSSS NOTIFICATION /

ACTIVITY RELEASED — CONTENT OF RELEASE — AMOUNT OF ACTIVITY (35) — LOCATION OF RELEASE (36)

/1/6/ /Z/ (33) /Z/ (34) / NA / / NA /

PERSONNEL EXPOSURES — NUMBER — TYPE — DESCRIPTION (39)

/1/7/ /0/0/0/ (37) /Z/ (38) / NA /

PERSONNEL INJURIES — NUMBER — DESCRIPTION (41)

/1/8/ /0/0/0/ (40) / NA /

LOSS OF OR DAMAGE TO FACILITY (43) — TYPE — DESCRIPTION

/1/9/ /Z/ (42) / NA /

PUBLICITY — ISSUED — DESCRIPTION (45)

/2/0/ /N/ (44) / NA /

NRC USE ONLY / / / / / / / / / / / / / /

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Virginia Electric and Power Company
North Anna Power Station, Unit 1 Attachment: Page 1 of 2
Docket No. 50-338
Report No. LER 80-055/01X-1

Description of Event

During a review of the FSAR safety analysis for boron dilution accidents, it was determined that nonconservative RCS volumes were used for the Cold Shutdown condition. FSAR section 15.2.4.3 states that in the Cold Shutdown condition with a boron concentration of 1500 ppm, all the RCC assemblies in, and a dilution flow rate of 300 gpm, the reactor could go critical in 15.5 minutes. The FSAR analysis assumes a full RCS. This assumption is incorrect since during Cold Shutdown conditions the RCS may be drained to the center line of the hot legs. The 15.5 minute dilution time to criticality would be incorrect for the Cold Shutdown condition with the RCS drained to the hot leg center line. The FSAR analysis error described above applies to both Unit 1 and 2 and is reportable pursuant to T.S. 6.9.1.8.h.

Probable Consequences of Occurrence

In modes 3, 4, 5, and 6 the primary grade water valves to the blender are key locked closed after a planned makeup activity pursuant to T.S. 3.1.3.2 to ensure RCS dilution water source isolation. The administrative controls placed on makeup activities effectively preclude the potential for inadvertant dilution during Cold Shutdown conditions. The public health and safety are not affected.

Cause of Event

Because of the nonconservative Cold Shutdown RCS volume assumption made in the FSAR Cold Shutdown boron dilution accident analysis, the 15.5 minute Cold Shutdown dilution time to criticality given in the FSAR is correct.

Immediate Corrective Action

Vepco initiated a review of all possible inadvertant boron dilutions for hot and cold shutdown conditions. In order to increase the safety margin for boron dilution accidents, the following actions were temporarily implemented:

1) During shutdown conditions and while on the residual heat removal system, a minimum of two shutdown banks will be available for trip (fully withdrawn) whenever dilution/boration capability exists.

2) Following either a source range high flux at shutdown alarm or trip of the withdrawn bank, the operator will terminate the dilution and initiate boration immediately.

3) The source range detectors and high flux at shutdown alarm will be verified as operable during shutdown.

Subsequent Corrective Action

On July 9, 1980 Westinghouse (letter # VPA-80-77) informed Vepco that boron dilution concerns were not applicable when shutdown by greater than 5 percent. The NRC Office of Inspection and Enforcement had already been informed on June 30, 1980 by Westinghouse that inadvertent boron dilution concerns did not apply when shutdown greater than 5 percent. Based on Westinghouse recommendations, procedures were changed to require a 5 percent or greater shutdown margin when shutdown while on RHR. The immediate corrective actions were discontinued.

Scheduled Corrective Actions

On June 1, 1981 Vepco concluded its review of boron dilution events. The results of the review, reported to the NRC Office of Inspection and Enforcement in a letter (Serial No. 266) dated June 1, 1981, indicated that administrative controls currently in place at North Anna Power Station which require locking out the RCS dilution water source after a makeup activity as required by T.S. 3.1.3.2 effectively preclude the potential for an inadvertent dilution accident while shutdown. Based on the review results, requirements for a 5 percent shutdown margin while shutdown on RHR will be deleted from procedures.

The T.S. shutdown margin limit of 1.77 percent or greater for operational Modes 1 thru 5 will replace the 5 percent shutdown margin in applicable procedures.

Actions to Prevent Recurrence

No actions to prevent recurrence are required.

Generic Implications

Westinghouse has informed affected plants of this potential problem.