NRC FORM 366 (7-77)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT

Update Report, Previous Report Date 3-8-79

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

01 — LICENSEE CODE: G A E I H 2 (2) — LICENSE NUMBER: 0 0 0 0 0 0 0 0 0 0 0 (3) — LICENSE TYPE: 4 1 1 1 1 (4) — CAT (5)

CON'T 01 — REPORT SOURCE: L (6) — DOCKET NUMBER: 0 5 0 0 0 3 6 6 (7) — EVENT DATE: 0 2 2 8 7 9 (8) — REPORT DATE: 0 8 1 0 7 9 (9)

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

During conduct of the MSIV Closure test as part of the Startup Test Program, various piping supports failed resulting in a section of condensate-feedwater piping falling. Non-destructive testing was performed and revealed that the stresses incurred by the piping section were below the code allowables. Subsequent testing of the concrete fasteners associated with piping supports in safety systems revealed a generic problem with the concrete fasteners.

09 — SYSTEM CODE: Z Z (11) — CAUSE CODE: B (12) — CAUSE SUBCODE: C (13) — COMPONENT CODE: S U P O R T (14) — COMP SUBCODE: X (15) — VALVE SUBCODE: Z (16)

(17) LER/RO REPORT NUMBER — EVENT YEAR: 7 9 — — — SEQUENTIAL REPORT NO.: 0 2 6 — / — OCCURRENCE CODE: 0 1 — REPORT TYPE: X — — — REVISION NO.: 1

ACTION TAKEN: A (18) — FUTURE ACTION: Z (19) — EFFECT ON PLANT: C (20) — SHUTDOWN METHOD: Z (21) — HOURS (22): 2 4 2 4 — ATTACHMENT SUBMITTED: Y (23) — NPRD-4 FORM SUB.: N (24) — PRIME COMP. SUPPLIER: X (25) — COMPONENT MANUFACTURER: R 1 3 6 (26)

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

Following the event, an inspection of the supports associated with the piping section revealed that thecause of the failure of the supports was due to the concrete fasteners. The inspection revealed that the failure of the concrete fasteners was directly attributable to improper installation. Upon determining that the problem was generic, an inspection-repair program was performed to resolve the problem.

15 — FACILITY STATUS: G (28) — % POWER: 0 0 0 (29) — OTHER STATUS (30): N/A — METHOD OF DISCOVERY: A (31) — DISCOVERY DESCRIPTION (32): Inspection following S-U test

16 — ACTIVITY RELEASED: Z (33) — CONTENT OF RELEASE: Z (34) — AMOUNT OF ACTIVITY (35): N/A — LOCATION OF RELEASE (36): N/A

17 — PERSONNEL EXPOSURES — NUMBER: 0 0 0 (37) — TYPE: Z (38) — DESCRIPTION (39): N/A

18 — PERSONNEL INJURIES — NUMBER: 0 0 0 (40) — DESCRIPTION (41): N/A

19 — LOSS OF OR DAMAGE TO FACILITY (43) — TYPE: Z (42) — DESCRIPTION: N/A

20 — PUBLICITY — ISSUED: Y (44) — DESCRIPTION (45): Press release — NRC USE ONLY

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NARRATIVE REPORT LER #79-26

During conduct of the MSIV Closure Test from 100% power, February 14, 1979, piping support expansion anchors failed in the HNP-2 Turbine/Control Building Main Steam Pipe Chase area, which caused a section of the reactor feedwater system piping to fall through a distance of approximately twelve to fifteen inches, coming to rest intact on the elevation 147'0" (MSL) floor slab. An inspection of the piping, damaged supports and failed anchors was conducted by plant personnel, as well as by engineers for Bechtel Power Corporation; Gaithersburg, Maryland, and ITT Phillips Drill Division.

The inspection revealed that the cause of expansion anchor failure was directly attributable to improper expansion anchor installation, in that the anchors were installed in oversize holes and the degree of expansion did not result in adequate holding/load capacity. The MSIV closure test, although the test results in a hydraulic transient for the reactor feedwater system, is not viewed as a major contributing factor to the failure of the concrete expansion anchors.

As a result of the piping section falling, a stress analysis was performed to determine the stress levels experienced by the reactor feedwater piping. The analysis revealed that the most highly stressed point in the "unsupported" reactor feedwater piping resultant from the fallen piping is at the 18 x 24 inch pipe reducer fitting (see Figure 1, Isometric 2N21-100, Revision P). The stresses at this point in the piping system although higher than other stresses, were not in excess of the code allowable stresses.

Subsequent to the stress analysis, an ultrasonic examination of piping welds was performed at both ends of the 18 x 24 inch piping reducer fitting. The ultrasonic examination revealed no recordable indications. Records of this ultrasonic examination are available for review at the plant site.

Expansion anchor testing at HNP-2, as described in Item 4 of USNRC IE Bulletin No. 79-02, was initiated on or about the week of February 19, 1979.

The expansion anchor testing program was conducted in accordance with written procedures HNP-2-11004 and HNP-2-11005, Procedure HNP-2-11004, "Surveillance Procedure for Identifying Anchors Used for Hangers in Safety Systems," provided instructions for the identification, location, and number of concrete expansion anchors to be subjected to testing. Specifically, only those piping systems required to function and/or support other systems necessary to function to mitigate the consequences of the design basis accidents discussed in Chapter 15 of the HNP-2 FSAR were subjected to support anchor testing and inspection.

Procedure HNP-2-11005, "Inspection and Testing Procedure for Concrete Expansion Anchors", provides a detailed procedure for the testing and acceptance of concrete expansion anchors.

Concrete expansion anchors employed in HNP-2 were generally of two types, self-drilling expansion anchors and wedge style stud anchors. Testing of the self-drilling expansion anchors entailed the following activities:

1. Removal of the threaded fastener (either a hex head bolt, or stud and nut)

2. Visual examination of the anchor, to verify that the anchor "sleeve" is installed such that when the threaded fastener is torqued, the "sleeve" will not be in contact with the support base plate,

3. Insitu measurement of the distance from the outer surface of the base plate to the outermost (shoulder) portion of the "sleeve:, and also the outermost (top) portion of the expansion device or cone,

4 Insitu measurement of the base plate thickness, and determination of fastener diameter, length and thread engagement, and

5. Reinstallation of the threaded fastener and torque application.

Testing of the wedge style stud anchors was a simpler process, consisting of length (determined by Ultra Sonic Testing), diameter, minimum torque, and thread engagement verification).

In addition to the test performance, an engineering team was employed to review all data, compare reported data with acceptance criteria and support drawings, and ultimately accept or reject the installation tested.

Failure rates experienced were such that the testing program included the total anchor population, in lieu of a statistical sample, and ultimately, (in the interest of economics and safety) a management decision was made to simply remove and replace the self-drilling anchors with the more easily installed and tested wedge style stud anchors.

Following reactor startup, as part of the Startup Test Program, a Turbine Trip Test at 100% power and a repeat of the MSIV Closure Test at 100% power were performed. A subsequent visual inspection was performed on the piping supports associated with the condensate feedwater piping that fell previously and no problems were identified.