

REPORT NUMBER: 001
 EVENT DATE: 042181
 REPORT DATE: 050581

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)
 On April 21, 1981, at 0226 hours, reactor manual scram and blowdown/cool-down subsequent to main turbine and condenser failure resulted in reactor coolant temperature decrease of 210°F in a hour period. (T.S. 3.6.A.1).

RETURN TO:
 LA-1210
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 etc

SYSTEM CODE: CA (11)
 CAUSE CODE: X (12)
 CAUSE SUBCODE: Z (13)
 COMPONENT CODE: Z Z Z Z Z Z (14)
 COMP. SUBCODE: Z (15)
 VALVE SUBCODE: Z (16)
 LER, RD REPORT NUMBER: 81 (17)
 EVENT YEAR: 81 (21, 22)
 SEQUENTIAL REPORT NO.: 004 (24, 26)
 OCCURRENCE CODE: 01 (28, 29)
 REPORT TYPE: T (30)
 REVISION NO.: 10 (32)
 ACTION TAKEN: X (33)
 FUTURE ACTION: Z (34)
 EFFECT ON PLANT: Z (35)
 SHUTDOWN METHOD: Z (36)
 HOURS: 0000 (37, 40)
 ATTACHMENT SUBMITTED: Y (41)
 NFRD-4 FORM SUB.: N (42)
 PRIME COMP. SUPPLIER: Z (43)
 COMPONENT MANUFACTURER: Z99 (44)

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)
 The cooldown rate was exceeded due to the necessity for manual reactor blowdown/cool-down. Vessel fatigue and brittle fracture analyses have been satisfactorily completed. ~~attachment~~ Required margin against brittle fractured not compromised.

FACILITY STATUS: X (28)
 % POWER: 000 (29)
 OTHER STATUS (30): Emergency Shutdown (44)
 METHOD OF DISCOVERY (31): A (45)
 DISCOVERY DESCRIPTION (32): Operator Observation (46)
 ACTIVITY RELEASED OF RELEASE: Z (33)
 CONTENT: Z (34)
 AMOUNT OF ACTIVITY (35): NA (44)
 LOCATION OF RELEASE (36): NA (45)
 PERSONNEL EXPOSURES NUMBER: 000 (37)
 TYPE: Z (38)
 DESCRIPTION (39): NA (40)
 PERSONNEL INJURIES NUMBER: 000 (40)
 DESCRIPTION (41): NA (42)
 LOSS OF OR DAMAGE TO FACILITY TYPE: Z (42)
 DESCRIPTION (43): NA (44)
 PUBLICITY DESCRIPTION (44): NA (45)
 ISSUED DESCRIPTION (45): NA (46)

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ATTACHMENT TO LER 81-04/1T
NORTHEAST NUCLEAR ENERGY COMPANY
HILLSTONE NUCLEAR POWER STATION - UNIT 1
PROVISIONAL LICENSE NUMBER DPR-21
DOCKET NUMBER 50-245

IDENTIFICATION OF OCCURRENCE

A parameter subject to a limiting condition for operation was less conservative than the least conservative aspect of the limiting condition for operation established in the technical specifications.

CONDITIONS PRIOR TO OCCURRENCE

Prior to the occurrence the plant was manually scrammed from 31 percent of rated power due to high main condenser conductivity subsequent to main turbine failure.

DESCRIPTION OF OCCURRENCE

On April 21, 1981, at 0226 hours, the main turbine was manually tripped due to high shaft bearing temperature and excessive turbine vibration. Subsequently, high main condenser conductivity was experienced, and the reactor was manually scrammed and isolated in accordance with emergency procedures. The Isolation Condenser System was inoperable due to post-surveillance system draining, thereby necessitating reactor blowdown/cooldown through manual operation of a main steam safety/relief valve, using the torus as a heat sink. The Core Spray and Low Pressure Coolant Injection systems were initiated as a precautionary measure, but were not injected since the feedwater system remained available for the duration of the transient.

In the first hour following opening of the safety/relief valve, reactor coolant temperature decreased by 210°F. Technical Specification 3.6.A.1 limits the average rate of reactor coolant temperature change to 100°F in any one hour period.

DESIGNATION OF APPARENT CAUSE OF OCCURRENCE

The initiating event of the transient was mechanical failure of the fourteenth and fifteenth stages of the main turbine, which resulted in main condenser tube fracture from turbine debris. Failure to remain within reactor coolant temperature change requirements is attributable to the means in which the reactor was depressurized and cooled. When the main steam safety/relief valves must be used for this purpose, cooldown rate cannot be easily maintained within prescribed limits.

ANALYSIS OF OCCURRENCE

Operating limits for the reactor vessel pressure and temperature during normal heatup and cooldown were established using Appendix G of the Summer 1972 Addenda to Section III of the ASME Boiler and Pressure Vessel Code. For the transient in question, a fatigue evaluation consisting of a comparison with the design blowdown case was performed. The evaluation indicates that the original design analysis bounds the subject blowdown/cooldown transient and that the impact upon the usage factor in the limiting locations, namely, the recirculation inlet nozzles and the bottom head support skirt region, is minimal. In addition, a brittle fracture evaluation was performed. The required margin against brittle fracture was not compromised, primarily because the minimum vessel temperature was above the upper shelf fracture toughness of the vessel material.

CORRECTIVE ACTION

The experienced blowdown/cooldown transient analysis will be input into the formal fatigue usage tracking program for future reference. The unit will be returned to service following completion of main turbine and condenser repairs.