



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Docket No. 50-410

July 16, 1991

Mr. B. Ralph Sylvia
Executive Vice President, Nuclear
Niagara Mohawk Power Corporation
301 Plainfield Road
Syracuse, New York 13211

Dear Mr. Sylvia:

SUBJECT: FLAW EVALUATION AND POSSIBLE REPAIR OF HPCS NOZZLE AT NINE MILE
POINT NUCLEAR STATION, UNIT 2 (TAC NO. 80557)

By letter dated December 28, 1990, Niagara Mohawk Power Corporation (NMPC) submitted for NRC staff review and approval a fracture mechanics evaluation of a flaw indication that had been detected in the weld (KC-32) joining the high pressure core spray (HPCS) nozzle safe end to the safe end extension. In its safety evaluation dated January 11, 1991, the NRC staff concluded that weld KC-32 should be ultrasonically reexamined during the mid-cycle inspection and the fracture analysis required revision to include an assessment of the residual weld stresses and flaw sizing uncertainties. In a letter dated June 10, 1991, NMPC proposed a contingent repair plan and a weld overlay design for repairing the flaw. Subsequently, on June 19, 1991, NMPC met with the NRC staff to discuss the revised analysis. By letter dated June 28, 1991, NMPC submitted the revised fracture analysis and a proposed acceptance criterion for flaw repair.

The NRC staff has reviewed the revised fracture mechanics analysis and has determined that the analysis used an acceptable residual stress distribution which is for small diameter pipe (less than 12-inches). NMPC stated that the uncertainty associated with the ultrasonic test (UT) performed on weld KC-32 was 5%. The NRC staff concludes that the revised fracture mechanics analysis is acceptable because the staff's concerns identified in its January 11, 1991, safety evaluation have been answered satisfactorily.

NMPC proposed to use an increase of no greater than 10% in the length or depth of the flaw as an acceptance criterion for restart after the mid-cycle inspection. The 10% criterion is a combination of 5% on UT uncertainty and 5% on postulated crack propagation. The NRC staff has concluded that the 10% criterion is acceptable. If the mid-cycle inspection shows that the flaw has grown more than 10% of the existing length or depth, NMPC must repair the HPCS nozzle safe end weld before restart. Otherwise, the repair is not necessary and the plant may resume and continue operation to the end of the fuel cycle. However, if the weld is not repaired, NMPC must reexamine the flaw during the refueling outage at the end of Cycle 2 and perform further evaluation or repair.

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The NRC staff has also reviewed the proposed contingency repair plan and the weld overlay design basis for repairing weld KC-32. NMPC proposed to apply a full structural Inconel 82 weld overlay if growth of the existing flaw in the weld exceeds the proposed acceptance criteria (10% of the existing flaw size) during the mid-cycle examination. The designed overlay will completely cover the flawed weld (Inconel 182) and a portion of the safe end (SB-166) and safe end extension (SA 508 Class 1). The NRC staff has concluded that, with certain modifications, the proposed repair plan and the weld overlay design basis is acceptable provided the following items are incorporated into NMPC's proposed contingent repair plan:

1. NMPC is requested to document its bases for concluding that post-weld-heat treatment (PWHT) is not required for the components to be welded. This documentation is to be included in the written report requested below and should include a discussion of any required weld pre-heat and interpass temperature requirements. NMPC is also requested to provide a copy of the proposed welding procedure and procedure qualification record to the NRC Resident Inspector at least seven days prior to initiation of welding.
2. The minimum required weld overlay thickness was calculated to be 0.255 inches in Table 1 - Weld Overlay Thickness Calculation Summary of NMPC's presentation at the meeting held on June 19, 1991. However, the calculated minimum thickness does not qualify for a full structural overlay because it does not meet the maximum allowable flaw depth of 75% of through wall thickness in ASME Code, Section XI, Article IWB-3640. The maximum Code allowable flaw depth should be maintained to provide additional margin in preventing leakage and in accommodating the uncertainties regarding the propagation mechanism for deep cracks. Therefore, NMPC should ensure that the minimum thickness of the weld overlay in the flaw region is 0.3 inches.
3. Other BWR owners have reported that the cumulated shrinkages resulting from weld overlay repairs had affected the normal settings required for the piping supports and pipe whip restraints. Therefore, NMPC should assess the effect of overlay shrinkages in the piping system and its supports and pipe whip restraints. NMPC should also assess the effect of increased deadweight and stiffness due to overlay repairs in the piping system.

Within 30 days subsequent to the completion of the mid-cycle inspection, NMPC is requested to inform the NRC, in writing, of the results of the inspection of weld KC-32 as well as the resolution of the above three contingencies if repairs are required.



Mr. B. Ralph Sylvia

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This requirement for information affects one respondent; therefore, is not subject to Office of Management and Budget review under P.L. 96-511.

Sincerely,

Donald S. Brinkman

Donald S. Brinkman, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

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Niagara Mohawk Power Corporation

Nine Mile Point Nuclear Station
Unit 2

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Mr. B. Ralph Sylvia

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July 16, 1991

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Sincerely,

ORIGINAL SIGNED BY:

Donald S. Brinkman, Senior Project Manager
Project Directorate I-1
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Office of Nuclear Reactor Regulation

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