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NUCLEAR ENGINEERING & SERVICES DEPARTMENT

June 8, 1992

Docket No. 50-352

License No. NPF-39

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Subject: Limerick Generating Station, Unit 1
Discontinuation of Crack Advance Verification System Monitoring on the N2H Recirculation Riser Nozzle to Safe-End Weld

Gentlemen:

In our letter dated April 3, 1992, we requested NRC approval for the application of the Mechanical Stress Improvement Process (MSIP) to the N2H recirculation riser nozzle to safe-end weld at Limerick Generating Station (LGS), Unit 1. In addition, we indicated that following application of the MSIP, we would discontinue Crack Advance Verification System (CAVS) monitoring of this weldment since the residual stress field (i.e., the stress intensity factor at the tip of the flaw indication) in the N2H nozzle to safe-end weld would no longer be represented by that of the CAVS specimen.

By letter dated April 9, 1992, the NRC approved our request to apply the MSIP to the Unit 1 N2H recirculation riser nozzle to safe-end weld. However, this approval was subject to four (4) conditions which were required to be met. Two (2) of these conditions require resolution prior to starting up from the current Unit 1 outage, which is estimated to end on June 17, 1992.

Item 1 in the April 9, 1992 NRC letter, stipulates that an ultrasonic testing (UT) examination be performed following application of the MSIP. This examination should be performed prior to startup from the current (i.e., fourth) refueling outage, and these results should be provided to the NRC prior to startup from the current outage. Attached is a plot of the post-MSIP application UT examination results in comparison to the UT examination results taken prior to application of the MSIP. The post-MSIP application examination results show no discernible change in the length or depth of the flaw indication from that measured just prior to the application of the MSIP.

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Item 4 in the April 9, 1992 NRC letter, stipulated that we should evaluate the continuation of CAVS monitoring of the N2H nozzle to safe-end weld during the fifth operating cycle, and that a final decision concerning this issue should be reached and discussed with the NRC prior to startup from the current refueling outage. Accordingly, this letter provides the basis for our decision to discontinue CAVS and/or Electro-Chemical Potential (ECP) monitoring.

We have evaluated the usefulness of continuing CAVS and/or ECP monitoring and have concluded that continued CAVS or ECP monitoring is no longer justified for the following reasons.

1) Finite element stress analysis theoretically indicates favorable residual stress patterns (i.e., from the safe-end to nozzle weld inside diameter to beyond mid-wall) with uniform stress distribution around the circumference following application of the MSIP on piping systems. The MSIP applied to the N2H nozzle to safe-end weld indication was done on a machined section of forged safe-end, and therefore, uniform stress distribution is expected since a machined section is more concentric than unmachined pipe. Argonne National Laboratories and the Electric Power Research Institute (EPRI) qualification testing have also demonstrated nearly uniform distribution of compressive stresses following application of the MSIP.

2) The CAVS specimen is no longer representative of the N2H nozzle to safe-end weld since the residual stresses in the weldment, specifically, the calculated stress intensity factor at the flaw indication no longer corresponds to that of the CAVS specimen. Therefore, the measured crack growth rate for the CAVS specimen will no longer be indicative of the flaw indication growth rate.

3) ECP measurements for plants with normal water chemistry, range from 0 to 200 mV (Standard Hydrogen Electrode (SHE)). Data from our last two (2) operating cycles confirm that ECP measurements for Unit 1 remained stable and within this range for all ECP electrodes. Actual operating transients such as a condenser tube leak, sodium excursion, or resin intrusion were accompanied by very noticeable changes in reactor water conductivity while ECP measurements and crack growth rates remained relatively stable. Furthermore, dissolved oxygen concentrations in the reactor water for plants without Hydrogen Water Chemistry (HWC) also remain constant at approximately 200 ppb. Dissolved oxygen concentrations remain stable since they are dependent on plant design and radiolysis. Without HWC, the reactor water dissolved oxygen concentrations and thus ECP measurements will continue to remain constant. Neither LGS Unit 1 or Unit 2 is a HWC

plant. Therefore, changes in other monitored reactor water chemistry parameters (i.e., conductivity, pH, chlorides) which are controlled by Technical Specifications limits are more sensitive indicators of significant reactor water chemistry changes than are ECP measurements.

Previous plant data has shown that ECP remains constant and CAVS specimen crack growth rate remains within acceptable limits as long as the reactor water chemistry is maintained within the limits specified by EPRI. The EPRI guidelines have been adopted and station procedures are in place to ensure these guidelines are followed. Continued use of the CAVS and/or ECP monitoring will not provide beneficial information that can not already be obtained from monitoring other reactor water chemistry parameters. Furthermore, the new deep bed condensate demineralizers, which will be placed into operation soon after the startup from the current Unit 1 outage, will also improve reactor water chemistry.

If you desire to discuss this issue further, please contact Mr. R. M. Krich (215) 640-6775.

Very truly yours,

G. J. Beck
Manager
Licensing Section

Attachment

cc: T. T. Martin, Administrator, Region I, USNRC (w/ attachment)
T. J. Kenny, USNRC Senior Resident Inspector, LGS (w/ attachment)

E.3.9

GE Nuclear Energy

INDICATION PLOT SHEET

SITE: LIMERICK UNIT: I

PROJECT NO: LM-192

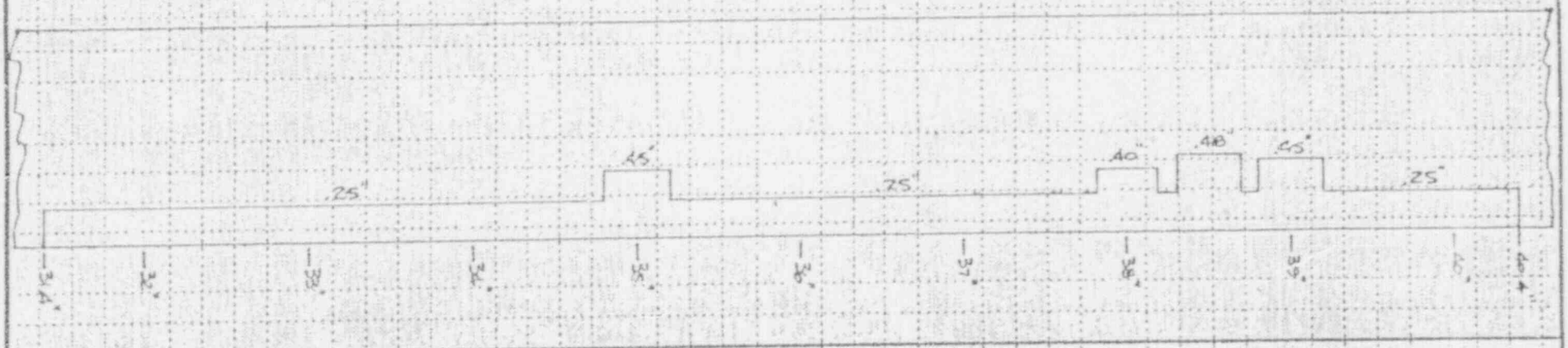
REPORT NO.

SYSTEM: REACTOR RECIRCULATION

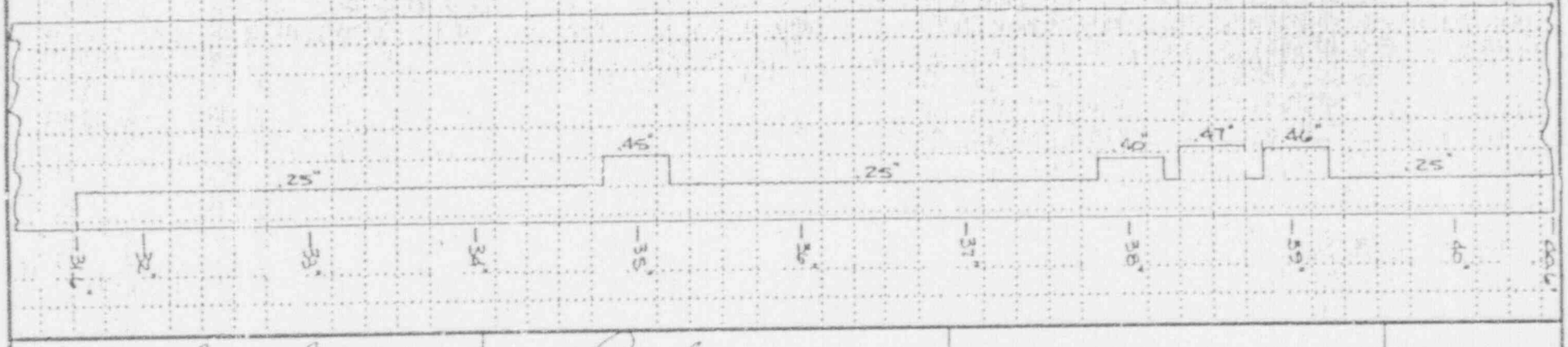
COMPONENT ID NO: VRR-IRD-1A-N2H

CONFIGURATION: SAFE END → NOZZLE

1992 PRE-MSIP DATA



1992 POST-MSIP DATA



Drawn By	Level	Date	Reviewed By	Level	Date	Reviewed By	Title	Date
Stephen W. Stanford	II	4-13-92	E. O. Reed	III	4/13/92			

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