



Commonwealth Edison
1400 Opus Place
Downers Grove, Illinois 60515

August 23, 1991

Dr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Attn: Document Control Desk

Subject: Dresden Nuclear Power Station Unit 3
Submittal of Relief Request (CR-14) for
Inservice Inspection Program
NRC Docket No. 50-249

Reference: CECo-NRR-Region III Meeting on Reactor Vessel Head
Closure Studs on July 30, 1991 (held at CECo's
Downers Grove office).

Dr. Murley:

As discussed with your staff during the recent meeting, Commonwealth Edison Company (CECo) is pursuing an enhanced inspection program for the reactor vessel head closure studs at its Boiling Water Reactor (BWR) stations. The inspection program, which exceeds the requirements of Section XI, would include the removal of a sample of studs from the reactor vessel flange in order to perform magnetic particle examinations which would supplement the enhanced ultrasonic examinations (in-place examinations) which are currently planned. These inspections will allow CECo to make informed decisions on long-term inspection and potential replacement strategies for the studs.

As indicated in the meeting, CECo would be requesting code relief with respect to Section XI sample expansion requirements based on the results of the magnetic particle inspections performed on the removed studs. The attached relief request presents CECo's proposed alternate sample expansion and examination methodology (see attached relief request and flow chart) for the upcoming Dresden Unit 3 refueling outage (September 1991). The alternate sample expansion methodology substitutes bore probe ultrasonic examinations in place of the Section XI required magnetic particle examinations. Detected flaws will be evaluated against a maximum allowable flaw size. The flaw size is currently being determined by a conservative, bounding fracture mechanics analysis which utilizes the results from recent fracture toughness testing on stud material. The fracture mechanics analysis will be completed in the near future in order to support the inspections currently planned for the upcoming Dresden Unit 3 refueling outage (September 1991). Additionally, the completed fracture mechanics analysis will be submitted to your staff for review.

9109030010 910823
PDR ADOCK 05000249
Q PDR

AD47
11

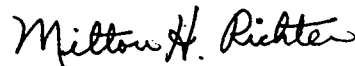
August 23, 1991

As indicated previously, the attached relief request is only applicable for the upcoming Dresden Unit 3 refueling outage (September 1991). Based on the Unit 3 inspections, the program will be re-evaluated for implementation at the other CECo BWR units, and appropriate relief requests will be submitted.

CECo requests verbal approval of this relief request to support the upcoming Unit 3 refueling outage which is scheduled to begin on September 8, 1991. CECo appreciates the prompt attention that has been given by your staff to this matter.

Please contact this office should further information be required.

Respectfully,



Milton H. Richter
Nuclear Licensing Administrator

Attachment: Relief Request Number CR-14 for Dresden Station (Unit 3)

cc: A. Bert Davis, Regional Administrator-RIII
B.L. Siegel, NRR Project Manager-Dresden
W.G. Rogers, Senior Resident Inspector-Dresden
R.A. Hermann, NRR Technical Staff
J.A. Davis, NRR Technical Staff
J.F. Schapker, Region III Inspector

ATTACHMENT
RELIEF REQUEST NUMBER CR-14
FOR
DRESDEN STATION (UNIT 3)

COMPONENT IDENTIFICATION

Code Class: 1
References: Table IWB-2500-1
IWB-2430
Examination Category: B-G-1
Item Number: B6.20 (in place)
B6.30 (when removed)
Description: Reactor Vessel Closure Stud Examination Requirements

CODE REQUIREMENT

Table IWB-2500-1 requires a volumetric examination of reactor vessel closure studs if left in place, or a surface and volumetric examination of reactor vessel closure head studs when removed from the flange. Removal is not a requirement at any time.

IWB-2430 requires additional examinations to be performed during the current outage if examinations performed in accordance with Table IWB-2500-1 reveal indications exceeding the acceptance standards of Table IWB-3410-1. If indications exceeding the acceptance standards of Table IWB-3410-1 are found as a result of the additional examinations, IWB-2430 requires examinations to be further extended in the current outage to include "all the . . . parts of similar design, size, and function."

BASIS FOR RELIEF

Commonwealth Edison Company (CECo) discovered extensive stress corrosion cracking (SCC) in two reactor vessel closure studs at Dresden Unit 2 in late 1988. CECo is currently analyzing the stud material microstructure and mechanical properties. CECo is also pursuing a proactive program of enhanced stud inspections which exceed the requirements of Section XI and the recommendations of General Electric Nuclear Energy (GE) Rapid Information Communication Services Information Letter (RICSIL) 055, "Reactor Pressure Vessel Head Stud Cracking," February 1, 1991. The CECo program is also intended to include some of the additional recommendations of Regulatory Guide 1.65.

GE RICSIL 055 recommends that enhanced end shot UT be performed on "at least five RPV head studs." However, at the next scheduled Dresden Unit 3 refueling outage (D3R12, currently scheduled to begin in September of 1991), CECo plans to perform enhanced end shot UT of all 92 RPV closure head studs. The enhanced end shot UT technique developed by CECo uses a 3/4" to 1" diameter transducer with a frequency of 3.5 or 5 MHz; the sensitivity of the examination is maximized by setting the background noise level at about 5% full screen height. This technique reliably detects a 0.3" deep saw cut notch from the top end of a reactor vessel stud. Any indications found with the enhanced end shot UT technique will be sized with bore probe UT. The bore probe UT technique developed by CECo reliably detects a 0.1" deep saw cut notch.

CECo also plans to remove, if practicable, 16 studs (approximately 1/6 of the total number of studs) from the flange of the Dresden 3 vessel for a wet fluorescent MT. Cattle chute studs will be excluded from the sample because they are normally withdrawn from the flange and kept dry until the end of the outage; for this reason they are not exposed to the aqueous environment likely to cause pitting. Cracking is believed to occur when pitted studs are tensioned while still exposed to water at the end of a refueling outage.

There are several reasons for removing a sample of studs during D3R12 and performing a surface examination:

- To provide data on incipient stud cracking.
- To allow for additional metallurgical evaluation of cracking mechanisms and potential embrittlement phenomena, if cracked studs are found and replaced.
- To provide a correlation between enhanced end shot UT, bore UT, and MT results.

This information is necessary to make informed decisions on long-term inspection and potential replacement strategies.

Code structural margins will be assured thru the enhanced end shot UT of all studs, and bore probe UT sizing of all cracked studs. Enhanced end shot UT and bore probe UT results will be evaluated in accordance with a conservative, bounding structural margin assessment. The structural margin assessment will be based on fracture mechanics methodology and actual fracture toughness testing of material from one of the low-toughness Dresden Unit 2 studs. If the end shot UT is found to be nonconservative, then an expanded sample with the more sensitive bore probe UT will be performed in accordance with the methodology described in the attached flow chart. This approach will assure that Code structural margins are maintained without expanding the MT sample.

Results of the enhanced end shot UT, bore probe UT, and MT will be compared in order to benchmark the minimum detection limit of the enhanced end shot UT technique. The minimum detection limit of the enhanced end shot UT technique will be judged against a conservative, bounding maximum allowable flaw size which would be acceptable in all 92 studs at the same time (referred to as MAXAF on the attached flow chart). If the minimum flaw detection limit of enhanced end shot UT is found to be greater than the MAXAF, additional bore probe examinations will be performed in lieu of the Section XI-required MT sample expansion.

Expanding the MT sample if unacceptable surface indications are found would greatly increase the critical path time and manrem burden during D3R12. And, as other utilities have found, it may be impossible to remove the desired sample of studs, without damage, within the time constraints of a refueling outage. It is estimated that complete removal of all 92 studs, assuming no stuck studs, would take 10 additional critical path days and expend 8 additional manrem.

The proposed program is highly proactive, in that Section XI only requires a normal sensitivity end shot UT to be performed in place, and RICSIL 055 only recommends enhanced end shot UT of at least five studs. In accordance with Section XI, structural margin would still be assured by the enhanced end shot and bore probe UT. Yet much essential information could be gained by surface examination of a limited sample of studs. For these reasons, CECO requests relief from the MT sample expansion requirements of Section XI IWB-2430 for the D3R12 refueling outage.

PROPOSED ALTERNATE EXAMINATION

During D3R12, each Unit 3 stud will be examined in place using enhanced end shot UT. Any flaws detected with enhanced end shot UT will be sized using bore probe UT.

If MT of a sample of studs reveals indications which exceed the MAXAF and were not detected by the enhanced end shot UT, then sample expansion will proceed using bore probe UT in lieu of the Section XI-required MT sample expansion (see attached flow chart).

APPLICABLE TIME PERIOD

Relief is requested for Dresden Unit 3 during refueling outage D3R12, currently scheduled to begin in September of 1991.

D3R12 RP Stud Examination & Disposit Methodology

