

Commonwealth Edison Company
1400 Opus Place
Downers Grove, IL 60515-5701

April 23, 1996



United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Subject: Response to Request for Additional Information Regarding
Relief from Inservice Inspection Program Requirements
for Pressurizer Surge Nozzle-to-Vessel Weld and Pressurizer
Surge Nozzle Inner Radius Section

Byron Nuclear Power Station, Units 1 and 2
Facility Operating Licenses NPF-37 and NPF-66
NRC Docket Nos. 50-454 and 455

Braidwood Nuclear Power Plants, Units 1 and 2
Facility Operating Licenses NPF-72 and NPF-77
NRC Docket Nos. 50-456 and 457

- Reference 1: M. Lesniak (ComEd) letter to the USNRC Document Control Desk transmitting Relief from Inservice Inspection Program Requirements for Pressurizer Surge Nozzle-to-Vessel Weld and Pressurizer Surge Nozzle Inner Radius Section dated March 23, 1996.
- Reference 2: G.F. Dick, Jr. (NRC) to D. Farrar (ComEd) Request for Additional Information regarding the Pressurizer Weld Request dated April 17, 1996.

In a March 28, 1996, letter to the Nuclear Regulatory Commission (NRC) Commonwealth Edison Company (ComEd) requested approval of a relief request for examination of the pressurizer surge nozzle to vessel weld and the pressurizer surge nozzle inner radius section (Reference 1). In the NRC letter of April 17, 1996 (Reference 2), a request for additional information (RAI) was transmitted to ComEd regarding the pressurizer weld relief request. Attached is ComEd's response to those questions.

If you have any questions concerning this correspondence, please contact this office.

Sincerely,

Marcia T. Lesniak
Nuclear Licensing Administrator

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Attachment

- cc: H.J. Miller, Regional Administrator - RIII
G.F. Dick, Byron Project Manager - NRR
H. Peterson, Senior Resident Inspector - Byron
C.J. Phillips, Senior Resident Inspector - Braidwood

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ATTACHMENT

Response to RAI concerning Byron/Braidwood Relief Requests NR-19 and NR-24

1. Question

Compared to other similar plants, the Byron/Braidwood estimates for erecting scaffolding, disconnecting and replacing heater cables and removing and replacing insulation appear high. Are these estimates and the associated dose estimate of 154 man-rem for all four units? Please explain what is involved with disconnecting the heater cable.

Response

The 154 person-Rem dose estimate to perform the pressurizer surge nozzle UT inspections is for a single unit. The estimate is based on actual dose rate data recorded at Braidwood Unit 2 on 3/16/96. The total time estimates used to achieve the overall dose estimates were assembled at Byron Station by the on-site mechanical contractor engineers.

To supplement the dose estimates, dose rates were recently recorded at the Byron Station Unit 1 during the present refuel outage. The dose rates were slightly less than those recorded at Braidwood. Based on the differences, the Byron Unit 1 dose estimate is more closely estimated at 124 person-Rem.

The total time estimates include time for disconnection/reconnection of the heater cables. 412 hours (approximately 60% of the total hours for cable activities) are applicable in the radiation area at the pressurizer. There are 78 heaters in the pressurizer, each with a cable that is supported by "Kellum" grip hangers from an auxiliary steel structure below the pressurizer. Each heater has a cable with two conductors. To disconnect each heater cable, a rubber boot seal must be removed and the conductors must be determined at bolted lug terminations. Once determined, the cable must be temporarily supported at another location. The process is reversed for reconnection.

The heater assembly is very susceptible to damage at the termination point. The lugs from the cable wires are bolted to lugs which, at the other end, are soldered to pins encased in ceramic insulators. These insulators are very fragile and highly susceptible to breakage. Should an insulator be inadvertently damaged, total heater replacement is required.

2. Question

Can complete volumetric examination of the adjacent nozzle safe-end weld be performed? Can complete volumetric examination of the other pressurizer nozzles be performed? Will the remaining Class 1 nozzle-to-vessel welds and inside radius (IR) sections receive complete volumetric examinations?

Response

A "complete" exam is considered to be an exam that meets the ASME Section XI requirements. Complete volumetric examination can be performed on the nozzle-to-safe end weld of the pressurizer surge nozzle. This inspection would be performed only from the safe end side of the weld. Limitations posed by the geometry of the nozzle preclude data acquisition from the nozzle side of the weld. This weld is scheduled for examination on all four units as shown below.

Byron Unit 1	B1R07	Present Outage
Byron Unit 2	B2R07	3/98 Outage Start
Braidwood Unit 1	A1R06	3/97 Outage Start
Braidwood Unit 2	A2R06	9/97 Outage Start

Complete volumetric examination of pressurizer nozzles other than the surge nozzle can be performed. These examinations include inner radius UT, nozzle-to-vessel weld UT, and nozzle-to-safe end weld UT. The required volumetric examinations have been completed at both Braidwood units and at Byron Unit 2. At Byron Unit 1, a portion of the exams are completed and the remaining exams are scheduled in the present refuel outage, B1R07.

Regarding other Class 1 vessel nozzles, complete volumetric examination can be completed on the reactor vessel nozzles and steam generator primary system nozzles. The applicable reactor vessel nozzle exams, for all 8 nozzles, are the inner radius UT, nozzle-to-vessel weld UT and nozzle-to-safe end weld UT. The reactor vessel nozzles will be inspected by UT methods from the inside of the nozzle during the 10 year reactor vessel examinations. The schedule is as follows.

Byron Unit 1	B1R07	Present Outage
Byron Unit 2	B2R07	3/98 Outage Start
Braidwood Unit 1	A1R06	3/97 Outage Start
Braidwood Unit 2	A2R06	9/97 Outage Start

The applicable steam generator exams, for all nozzles, are the inner radius UT and the nozzle-to-elbow UT. These welds have inspection schedules as follows.

Inner Radius

Byron Unit 1	B1R07	Present Outage
Byron Unit 2		Complete
Braidwood Unit 1		Relief Granted
Braidwood Unit 2	A2R05	Present Outage

Nozzle-to-Elbow

Byron Unit 1	B1R07	Present Outage
Byron Unit 2		Complete
Braidwood Unit 1		Complete
Braidwood Unit 2	A2R05	Present Outage

3. Question

It is important to understand the potential benefit of removing the insulation (e.g., the percentage of the examinations that could be completed). Therefore, clarification regarding potential coverage with the insulation removed is needed.

- a. In the "Basis for Relief" it is stated that scanning from the nozzle side is not possible and scanning from the shell side is limited by the heater penetrations and that coverage is limited to 60%. Does this estimate include coverage for all four directions?

Response

Yes, the estimate of examination coverage represents the average of scans in all four directions using standard 45 degree and 60 degree angles. The axial scan (for circumferential reflectors) from the nozzle side is the most limited due to nozzle geometry. The axial scan from the shell side is limited by geometry and also by interference with the heater penetrations. Scanning circumferentially (for axial reflectors) is partially limited in both directions by geometry.

- 3b For the IR section, it is stated that the geometry is not conducive to typical ultrasonic techniques. It is understood that conventional techniques will not be effective for examining most IR sections and that special techniques employing compound angles must be used to interrogate this region. Has the use of compound angles been considered? What percentage of the Code-required volume can be examined if the insulation were removed?

Response

- 3b Yes, the use of compound angles for the inner radius section examination has been considered. It is estimated that 100% of the Code-required inner radius examination volume can be covered with a manual examination technique utilizing six separate compound angles. However, performing the examination with compound angles will require a significant amount of time in a high dose field. Additionally, the development of sizing techniques which can account for the inherent geometric and access limitations will be required. Equipment procurement to support sizing will also be necessary.

4. Question

The regulations [10 CFR 50.55a(g)(3)(i)] require that for facilities with construction permits issued on or after July 1, 1974, access to enable the performance of inservice examinations be provided for Class 1 components. It appears that this requirement is not met for the pressurizer surge nozzle. Please explain. What would be required to modify or replace the insulation so that access for examination would be provided?

Response

Byron and Braidwood stations are in compliance with the regulations [10 CFR 50.55a(g)(3)(i)] on the basis that all of the nozzles on the pressurizer are accessible for inservice inspection if the insulation and heater cables are removed.

With insulation and heater cables removed, volumetric examination coverage for the nozzle-to-vessel weld of the pressurizer surge nozzle could be performed with approximately 60% coverage. The geometry of the vessel nozzle and adjacent heater penetrations dictates the level of volumetric examination that can be achieved on the nozzle-to-vessel weld. Complete volumetric examination could be completed for the pressurizer surge nozzle inner radius, nozzle-to-safe end weld and safe end-to-pipe weld.

Modification of the insulation details to improve accessibility to the nozzle would require the following activities as a minimum:

- New insulation designs which are safe, constructable, and economically feasible,
- Review and/or performance of seismic analyses to account for differences and consequences,
- Acquisition of acceptable insulating materials, and
- Budgeting of funds for design and installation of the new insulation.

With regards to replacement of the insulation, the original designer/supplier of the pressurizer insulation is the Diamond Power Corporation. Ownership of this company has since been transferred to others. Replacement of the insulation would require the acquisition of like-for-like insulation materials, fabrication to the same design specifications by the original supplier (or alternate supplier), disconnection/reconnection of the heater cables and the removal/installation of insulation materials under the same radiation conditions discussed in the original relief request.

It should be noted that modification or replacement of the insulation, the geometry of the pressurizer is unchanged and the coverage of the nozzle-to-vessel weld via UT examination remains unchanged.