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November 6, 1981

Mr. Darrell G. Eisenhut, Director
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

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U.S. NUCLEAR REGULATORY COMMISSION

Subject: Dresden Station Units 2 and 3
Quad Cities Station Units 1 and 2
Implementation of NUREG 0619
Concerning BWR Feedwater and CRD
Return Line Nozzle Cracking
NRC Docket Nos. 50-237/249 and
50-254/265

References (a): T. A. Novak letter to J. S. Abel dated July 20, 1981.

(b): L. O. DelGeorge letter to D. G. Eisenhut dated July 7, 1981.

(c): T. J. Rausch letter to D. G. Eisenhut dated October 6, 1981.

(d): R. F Janceck letter to D. G. Eisenhut dated February 23, 1981.

Dear Mr. Eisenhut:

The following is being submitted in response to the Reference (a) request for additional information or commitments concerning implementation of NUREG 0619 guidance at Dresden Units 2 and 3 and Quad Cities 1 and 2. Clarification or additional information is being provided regarding Commonwealth Edison's position on (1) the need for feedwater low-flow control modifications, (2) the on-line feedwater nozzle leakage monitor leakage system, and (3) the control rod drive (CRD) return line nozzle issues.

Low Flow Control Evaluation

Dresden Units 2 and 3 and Quad Cities Units 1 and 2 have essentially the same feedwater supply and control system configurations. Each unit has three reactor feedwater pumps which are operated independently of each other. Feedwater flow from the three pumps combines in a single 24 inch nominal diameter line, leading to two full flow feedwater regulating valves, installed in parallel in two 14 inch diameter lines. Also, a 20% capacity valve is located in a 4 inch nominal diameter bypass line for use during startup. Low flow control, in the 0% to 20% power range, is accomplished through this bypass valve.

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The bypass valve is an air operated, glove type valve which is controlled by the single element control system illustrated schematically in Figure 1. The control system opens or closes the valve gradually in response to an electric input signal which is proportional to the difference between reactor water level and the desired level set point.

This arrangement of feedwater supply and low flow control system at Dresden Units 2 and 3 and Quad Cities 1 and 2 is similar to that used in the Monticello Nuclear Generating Plant, which has been previously demonstrated through instrumentation and analysis to provide acceptable nozzle thermal cycling in accordance with NUREG 0619 and NRC Generic Letter 81-11 crack growth requirements. Therefore, assuming that the system is operated in a like manner, similarly acceptable thermal cycling is expected. The only significant difference is that at Monticello, the original plug type valve was replaced by a drag valve in order to facilitate use of the automatic level control capability. The globe type valves in place in Dresden and Quad Cities may limit the ability to utilize the automatic control feature at very low power levels (<5%).

Our initial attempts to evaluate the severity of thermal cycling produced by low flow controller operation at Dresden and Quad Cities based on normally accessible plant data have proven inconclusive. Feedwater flow is normally measured through flow elements at the outlet of each of the reactor feedwater pumps, and summed to determine total feedwater flow. This measurement is too coarse to provide meaningful thermal cycling data in the feedwater nozzle region. Therefore, Commonwealth Edison is in the process of implementing a monitoring program, similar to that conducted at Monticello, to facilitate our evaluation of low flow controller thermal cycling. This program consists of:

1. Installation of thermocouples on the horizontal length of feedwater pipe in the vicinity of one reactor vessel nozzle.

2. Connecting a recorder to the input demand signal to the feedwater low flow control system.

Data from these two sources will be recorded during initial phases of one of the next convenient startup cycles at one of the four units once the equipment can be installed. The data will be interpreted in terms of amplitude and frequency of nozzle thermal cycling produced during low flow controller operation. The resulting thermal cycling will then be used as input to a fracture mechanics fatigue crack growth analysis to demonstrate whether or not the existing controllers at Dresden and Quad Cities meet the crack growth criteria of NUREG 0619/Generic Letter 81-11. In the event that the above analysis results do not meet the crack growth criteria, modifications will be implemented. These modifications may include change of startup operation procedure and bypass valve type.

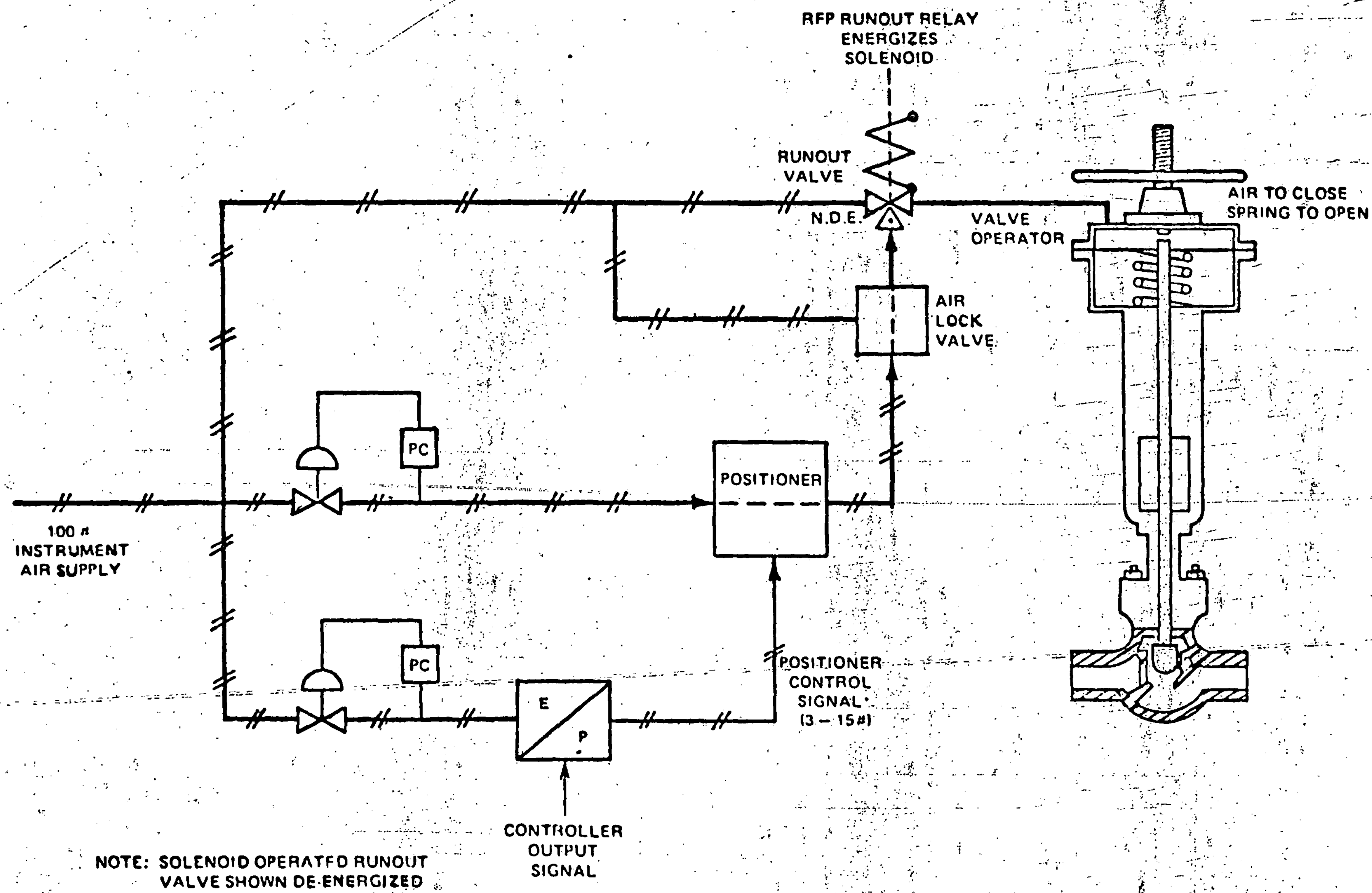

Figure 1. Feedwater Regulating Bypass Valve Control System

On-Line Leakage Monitoring System Installation

On-line leakage monitors are being installed at the Dresden and Quad Cities Stations concurrently with the feedwater nozzle modification program at each unit. Calibration details and technical basis for the systems are documented in the proprietary Licensing Topical Report entitled "NUTECH Feedwater Bypass Leakage Monitoring Systems", ADV-13-002, Rev. 0, (to be provided separately). Leakage monitoring system data from the initial installation of such systems at Dresden Unit 2 and Quad Cities Unit 2 are being collected and analyzed. Commonwealth Edison will submit performance results of the feedwater bypass leakage monitoring system at these units when sufficient field data become available and data evaluation is completed. We feel this information indicates that there is sufficient justification to rely on a temperature monitoring system to assure early seal leak detection. Therefore, Commonwealth Edion still believes that a Reactor Water Cleanup reroute is not justified.

CRD Return Line and Nozzle

Reference (a) identified four areas of concern:

1) Length of stainless steel pipe remaining in the drywell and dose needed to inspect the line,

2) Inspection of the nozzle,

3) Type of augmented inspection used, and

4) Need for pressure equalizing valves.

A survey of the sites was conducted which determined that there is approximately 25 feet of stainless steel pipe on both Dresden units and 30 to 35 feet on the Quad Cities units. Recognizing the concern for intergranular stress corrosion cracking (IGSCC), Commonwealth Edison has already embarked on an augmented inspection of these lines. It is planned that at a minimum, 100% of the welds will be inspected every 10 year interval versus the normal 25% coverage. The normal Edison ultrasonic testing procedures which have been audited by NRC personnel are being used. It is estimated that approximately 7R will be expended over the remaining life of the plant to complete this augmented inspection. In comparison. roughly 75R per unit would be expended in an effort to replace the existing line with a substitute material. Considering the benefits gained in keeping the CRD return line in place as a source of makeup to the vessel and the dose saved by inspecting the line versus total replacement, it is felt that the augmented inspection as performed by Edison is justified.

The frequency of the augmented inspection should be addressed at this time. The Edison position on the use of NUREG 0313 Rev. 1 is documented in Reference (b). Briefly it states that Edison recognizes IGSCC to be a problem and that augmented inspections are a prudent countermeasure. It is also recognized, however, that with the leak before break scenario and that with the existing leak detection methods available in the plant, IGSCC is not a safety issue. It is an availability issue and therefore any additional inspection (beyond ISI requirements) should be left to the discretion of the owner.

Reference (a) also took issue with the Edison plan for nozzle inspection. This issue was recently addressed in our Reference (c) letter concerning Quad Cities Unit 2. Similarly, at the time the Dresden thermal sleeves were removed, extensive dye penetrant examinations were performed of the nozzle inner radius and the "apron" area below the nozzle. All indications were removed. Since that time, the line has been valved out and no cold flow has occurred. As stated in Reference (d), this will be verified by a valve leak rate check.

The flaws discovered at Dresden did involve more grinding than Quad Cities but it is still felt very unlikely that cracks would have been "buttered-over". Reference (a) noted that this had happened earlier at Dresden. The incident referred to however occurred at an early time in inservice inspectio and repair technology. Since that time, the development and use of sound inspection procedures has for the most part precluded such problems. It should also be noted that such a reinspection would require work in a radiation field of approximately 27 R/hr (Reference (c)). Considering the exstensiveness of the initial inspection, the assurance that leakage has not occurred and the dose involved for inspection, it is felt that the current plan (i.e. inspection if leakage is found) is justified.

Finally Reference (a) states that the NRC does not agree with the Edison position on installing pressure equalizing valves. The corrosion products problem is stated as one reason for requiring the installation of the valves. Contrary to this, it has been determined through surveillances (run on the CRD system when the return line was initially isolated) that the exhaust water does not flow back to the cooling water header.

Reference (a) also indicated that drive performance has been affected at Dresden due to corrosion products. This is true, however, it is strongly felt that the drive wear is being perpetrated by corrosion products which are the result of fuel channel spallation and not due to the carbon steel piping. The Zirconium Oxide which comes from the fuel channels is a very hard and abrasive material, more so than corrosion products from carbon steel. Since it is felt that the corrosion products are an in-vessel problem and not one of system operation the installation of pressure equalizing valves is not felt to be necessary. (It should be noted that Commonwealth Edison is pursuing the issue of channel spalling separately.)

The remainder of the potential problems as seen by the NRC which mandate the installation of pressure equalizing valves were addressed in Reference (d), Item II.6. Briefly, it states that based on normal system operations occurring after return line isolation no future problems are anticipated. System pressures have remained normal even with the line isolated at Dresden and Quad Cities. Therefore, further action is not deemed necessary.

In conclusion, we believe that our position concerning BWR feedwater nozzle and CRD return line nozzle cracking adequately addresses all safety questions while still considering the cost/benefits of the available options.

Please direct any further questions you may have concerning this matter to this office.

One (1) signed original and fifty-nine (59) copies of this transmittal are provided for your use. The proprietary Nutech report will be transmitted under separate cover.

Very truly yours,

Thomas J. Rausch

Thomas J. Rausch
Nuclear Licensing Administrator
Boiling Water Reactors

cc: Region III Inspector - Dresden
Region III Inspector - Quad Cities

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