Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

February 23, 1981

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

Subject: Dresden Station Units 2 and 3
Quad Cities Station Units 1 and 2
Implementation of NUREG-0619
NRC Docket Nos. 50-237/249
and 50-254/265

References(a): D. G. Eisenhut letter to Licensees dated November 13, 1980.

(b): R. F. Janecek letter to D. G. Eisenhut dated January 22, 1981.

Dear Mr. Eisenhut:

Per our commitment in Reference (b), enclosed for your review is additional information concerning our implementation of NUREG-0619 for Dresden Units 2 and 3 and Quad Cities Units 1 and 2.

Enclosures 1 and 2 provide our implementation plans addressing corrective action for the cracking problems associated with the feedwater nozzle and CRD return nozzle, respectively. As stated, Commonwealth Edison Co. believes that our planned corrective actions adequately address any safety concerns associated with the nozzle cracking problems.

Please address any questions concerning the matter to this office.

One (1) signed original and fifty-nine (59) copies of this transmittal are provided for your use.

Very truly yours,

Robert F. Janecek

Robert F. Janecek
Nuclear Licensing Administrator
Boiling Water Reactors

cc: RIII Inspector, Dresden
RIII Inspector, Quad Cities

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SUBSCRIBED and SWORN to
before me this 23RD day
of February, 1981

Notary Public

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Enclosure 1
Feedwater Nozzles

Clad Removal and Improved-Design Sparger Installation

CECo's schedule for nozzle clad removal and installation of improved-design feedwater spargers in Dresden Units 2 and 3 and Quad Cities Units 1 and 2 is given in Table 1. The schedule satisfies the NUREG-0619 requirement for completion of this work by June 30, 1983.

The sparger design selected by CECo is the standard GE triple-sleeve sparger which has been approved by the NRC based on review of GE report NEDE-21821-A. Calculations of cummulative nozzle usage factor have been completed for the four CECo plants using conservative triple-sleeve seal leakage assumptions. The results of these calculations, presented in GE report 22A6652 "Feedwater Nozzle Stress Report for Rapid Cycling," show the worst case usage factor to be 0.974 at the nozzle blend radius after completion of the 40 year plant design life (assuming worst case seal degradation and periodic seal refurbishment). Extrapolation of zero leakage results to the end of design life yeilds an end of life usage factor of approximately 0.09 and since our plans include the installation of on-line leakage monitoring systems we expect that the actual end of life nozzle usage factors will be closer to the zero leakage value.

On-Line Leakage Monitoring System Installation

Coincident with the scheduled clad removal and triple sleeve sparger installation, CECo is installing on-line leakage monitoring systems in the four plants. The monitoring systems will detect bypass leakage past the secondary seal by means of thermocouples mounted on the outside surface of the nozzles. Should seal leakage develope the monitoring system will detect the relatively cold feedwater thereby providing early detection, before fatigue damage can occur. This system is identical to the one installed at Monticello where it has been successfully utilized.

Low-Flow Controller

The crack growth analysis results presented in Section 4.7.3 of GE report NEDE-21821-A revealed that reduction of low-flow cycling of feedwater flow will significantly decrease crack growth. In Section 3 of this report the crack growth analysis results are transformed into specific requirements for a low-flow controller that can significantly reduce low-flow feedwater cycling.

While CECo agrees with the analytical results noted above, we do not agree that imposing all of the GE functional requirements described in Section 3.4.4.3 of NEDE-21821-A is the only available method for arriving at a satisfactory low-flow controller. CECo intends to meet the crack growth reduction intent of NEDE-21821-A while retaining the low-flow control systems currently installed. This will be confirmed with plant-specific analyses. Should the analyses indicate that modifications will be necessary to satisfy the crack growth intent they will be completed by June 30, 1983 as required by NUREG-0619.

Reactor Water Cleanup Discharge Reroute

Section 4.7.2 of NEDE-21821-A shows that rerouting the RWCU discharge to each feedwater line results in only a negligable usage factor improvement with a nonleaking sparger (0.05 to 0.06). It only becomes significant when relatively high rates of bypass leakage exist for an extended period of time since the RWCU heating is only significant at low feedwater flow rates (<5%) which occur during approximately 1% of the plants operating time, and since the cyclic amplitude is low at these low flow rates for non-leaking spargers.

The scheduled installation of online leakage monitors at our plants assures early detection of seal leakage thereby minimizing any usage factor improvement associated with this modification. In addition, there has been no field correlation shown to date between nozzle cracking and the presence or lack of RWCU flow. In view of the above, CECo. does not believe that the marginal gain achieved by this modification warrants the high cost required to implement it (approximately $70,000 per station).

In conclusion, the program to be implemented by CECo. is believed to meet the intent of NUREG-0619. Not only are the planned modifications sufficient but also the nozzle cracking problem has added no new safety concerns which have not already been addressed. In our judgement NUREG-0619 does not justify a substantial safety improvement resulting from backfitting these proposed modifications to the RWCU system.

Table 1

SCHEDULE

	Clad Removal & Sparger Replacement	Leakage Monitor Installation	Low Flow Controller Modification (If Required)	RWCU Reroute
Dresden 2	May '81	May '81	Before 6/30/83	Not Planned
Dresden 3	Spring '82	Spring '82	Before 6/30/83	Not Planned
Quad Cities 1	Fall '82	Fall '82	Before 6/30/83	Not Planned
Quad Cities 2	Completed	Completed	Before 6/30/83	Not Planned

Enclosure 2
Control Rod Drive Return Line Nozzles

CECo. shares the NRC concerns regarding the flow of cold water to the CRD return line nozzle and the subsequent cracking of the nozzle due to thermal fatigue. A review of NUREG-0619 has been performed and a program has been developed for resolving the CRD cracking problem giving careful consideration to the bases for the NRC proposed program.

The CECo. plan will be administered as follows. During the upcoming refueling outages on D-2(Winter 1983), D-3(Winter 1982), QC-2(Fall 1982) a leak rate test will be performed on the valve which has been used to isolate the return line. This will provide an indication of whether there had been leakage of cold water to the nozzle. If the test proves that the valve was leaking a dye penetrant test of the return line nozzle as specified in NUREG-0619 will be performed. If the valve proves to be leak tight no further action is deemed necessary. Subsequent to this test two valves outside containment will be closed for normal operations with a tell-tale drain line located between the two valves being open. The QC-1 nozzle will be dye penetrant tested during its next refueling outage since it has not been previously done. The double isolation will be instituted on the unit following the dye penetrant examination. An augmented inspection of the stainless steel portion of the return lines on all four units will also be performed.

The above program is justified based on reviews of the benefits gained in performing proposed modifications. It has been determined that the CECo. program does not present a safety problem in that the operation of the CRD scram subsystem is not degraded. The following issues were evaluated while developing a program which provides for an acceptable margin of safety:

1) Edison agrees that a dye penetrant examination on the CRD nozzle as required by the NRC is necessary if cold water flow existed during plant operation. However, consider that the Dresden 2, Dresden 3, and Quad Cities 2 lines were valved out of service following the fall, 1977, the fall, 1978, and the spring, 1978 refueling outages, respectively and that during those outages the thermal sleeves were removed and the in-vessel side of the nozzles were dye penetrant examined and repaired as necessary. For these units which have had dye penetrant checks at the time the lines were valved out and for which no leakage can be identified there is no justification for performing additional inspection, especially considering the high doses received in performing such an inspection.

2) In the valved out mode the CRD return line will still be available to provide make up to the reactor vessel. For the highly improbable event in which the line might be

useful access to the reactor building would be available so that an operator could open the isolating valves establishing flow to the vessel. Since the return line will be available, no specific flow test or analysis will be performed.

3) Edison agrees that the potential for IGSC cracking does exist in the 304 stainless steel portions of the isolated return lines. This is due to the susceptibility to cracking of that type of material exposed to stagnant conditions. An augmented inspection of the stainless steel portions of the lines will be performed, therefore, in accordance with the recommendations of NUREG-75/067 "Investigation and Evaluation of Cracking in Austenitic Stainless Steel Piping of BWR Plants". Performing this inspecton is more practical than rerouting the return line and cutting and capping the return nozzle considering the radiation exposure, outage time and rerouting problems (to be discussed later). An estimate of accumulated dose during the above work showed that more total dose would be accumulated in performing the cut, cap and reroute modifications than would be accumulated during augmented inspections performed over the remaining life of the plant.

   Approaching the issue in this manner does not pose any new safety concern and is in itself not a safety issue. Conformance with NUREG-75/067 will preclude any potential safety or reliability concern.

4) It is strongly felt that rerouting the return line only relocates the problem to another area which is just as inaccessible during operation as the containment. Rerouting ignores the primary problem. The problem is that a thermal fatigue prevention device which would alleviate the cracking is not available. Rerouting the CRD return line will provide no additional benefit because thermal fatigue cracking is anticipated at any proposed return nozzle or piping tee. The approach taken by CECo, valving out the return line, eliminates the thermal fatigue cracking.

5) The concerns raised as to the effects of the corrosion products are only valid to a certain degree. The corrosion products do not degrade the operability of the CRD system. This is judged to be the case since regular surveillances are performed on the drives and any irregularities would be noted in advance of normal operation failures. Any rod which does not meet the Technical Specification requirements would be declared inoperable and subsequently left inserted if required. Therefore the surveillances and normal maintenance as performed at this time are deemed sufficient to preclude any CRD failures. Normal operation experience gained on the Dresden and Quad Cities Units with the return line valved out has substantiated the above.

Not only are the surveillance procedures adequate to detect problems but the problems caused by the corrosion products are not as grave as postulated in NUREG-0619. Tests at Dresden have shown that the flow returns to the vessel through the exhaust water header and not through the cooling water lines. Even if the problem were as severe as postulated by the NRC (corrosion products on over piston and under piston sides of the drives) the scram subsystem would not be affected. This is substantiated by the General Electric reivew of corrosion product effects on drives (November 2, 1979 letter from G.G. Sherwood to R.P. Snaider).

6) Finally, the pressure equalizing valves have been determined to be unnecessary. As previously stated the Quad Cities and Dresden Units have been operating in this mode since 1977 for Dresden 2 and Quad Cities 1 and 1978 for Dresden 3 and Quad Cities 2. No problems with system pressures have been experienced in that time. Considering the very low probability of system conditions being such as specified by GE to create the high differential pressure situation plus the Dresden and Quad Cities operating experience no problem is expected. Also, as stated previously, tests have shown that flow goes to the exhaust water header and not for the most part to cooling water lines. Therefore the valves are not necessary to prevent reverse flow to the cooling water header. Lastly, as mentioned in the NUREG the equalizing valves would help prevent continuous reverse flow through the directional control valves. As stated by the NRC this is not of concern based on tests which have been performed by GE and accepted by the NRC.

In conclusion, the program to be pursued by Commonwealth Edison to mitigate the CRD nozzle cracking problems is based on an evaluation of the merits of performing changes and the effects of the CECo proposed program on the safety function of the CRD system. Radiation and economic considerations were evaluated while comparing the gains of either implementing the NRC proposed program or the CECo program. As a result it has been determined that the CECo proposed program addresses all safety issues and results in lower total radiation exposures and will therefore be implemented on the Dresden and Quad Cities Units.