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May 25, 1982

Office of Inspection and Enforcement
United States Nuclear Regulatory Commission
Attn: R. C. Haynes, Regional Administrator
Region I
631 Park Avenue
King of Prussia, Pennsylvania 19406

Reference: Beaver Valley Power Station, Unit No. 1
Docket No. 50-334, License No. DPR-66
Confirmatory Action Letter 82-06 (NUREG-0737)

Gentlemen:

References: A. Confirmatory Action Letter 82-06, dated March 4, 1982
B. IE Inspection Report 82-05, dated March 23, 1982
C. DLC Response to Inspection Report 82-05, dated April 19, 1982

During a routine safety inspection conducted at Beaver Valley Power Station, Unit No. 1, (Reference B) it was alleged that one of our activities was not being conducted in full compliance with NRC requirements. As a result, a Notice of Violation was issued and we subsequently responded (Reference C). During the course of the inspection, the NRC Inspector expressed his concern over the details leading to the resulting violation and expressed his opinion that the Duquesne Light Company had inadequate management controls in the design modification area, in particular in the area of NUREG-0737 requirements. It was requested that the Duquesne Light Company commit to the following prior to start-up from the second refueling outage:

1. A detailed review of all NUREG 0737 related modifications
2. Differences between the requirements and the modifications are to be identified and resolved with the Office of Nuclear Reactor Regulation.
3. An audit by the Quality Assurance Department to independently verify that this review was performed and appropriate actions initiated for any identified differences.

These requests were formalized in a Confirmatory Action Letter (Reference A) and clarified through a subsequent telephone conversation, on or about March 9, 1982, between myself and Mr. S. D. Ebnetter. This clarification was necessary to conform the statements contained in Reference A to accurately reflect the commitments made during the exit interview for Inspection 82-05. Those commitments are listed above and were found acceptable with Mr. Ebnetter.

Immediately following the exit interview for the referenced inspection, we retained the services of EDS Nuclear Inc. for the purpose of performing an independent review of those Design Change Packages (DCPs) which required station modifications resulting from NUREG-0737 and to determine the degree of compliance with the regulatory requirements. Additionally, this audit was to include a review of the engineering procedures governing DCP development and to determine if any deficiencies existed in the implementation of this procedure for those DCPs resulting from NUREG-0737. The details of these objectives, as listed below, were to determine:

- a. specific compliance of each DCP with applicable portions of NUREG-0737 or 0578, as appropriate;
- b. adequacy of design inputs as contained and specified in each DCP file;
- c. whether the specified design inputs were correctly translated into detailed design documents;
- d. overall adequacy of the design documents to meet the intent of NUREG-0737 or 0578, as applicable;
- e. whether any deficiencies between the DCPs and the regulatory requirements exist and, if such deficiencies exist, to document any Duquesne Light Company (DLC) notification of such deficiencies to the NRC, and
- f. the degree of compliance of each DCP with DLC Engineering Management Procedure 2.8, "Handling of Design Change Packages", or Station Engineering Procedure 2.13, "Generating Non-Safety Related Design Change Package", as appropriate

Included as Table 1 is a listing of those NUREG-0737 items and the associated DCPs which were reviewed by EDS Nuclear Inc.

The results of the EDS Nuclear Inc. review are contained in eleven separate documents addressing the objectives listed above. For the purpose of this submittal, compliance of the design outputs for each DCP with the regulatory requirements, as documented in the EDS reports, have been reviewed to determine if differences to Staff positions exist. In general, this review determined that the final design of each DCP modification meets the intent of the appropriate regulatory requirement. In only two cases did the design modification appear to have a difference of potential safety significance.

A. NUREG item II.B.1; Reactor Coolant System Vents

The auxiliary circuits for the system solenoid operated valves appeared to be powered from the same battery which did not satisfy the power supply redundancy requirements. This auxiliary circuit was to prevent simultaneous opening of both vent paths. An engineering change was issued to modify the electrical system electrical interlock. As a result of this change to the design, administrative controls will be developed to prevent the simultaneous opening of both vent paths. With this resolution, the design of the system meets the intent of the regulatory requirements.

B. NUREG item II.E.1.1; Auxiliary Feedwater System

The "fail-safe" position of the auxiliary feedwater pump minimum recirculation line valves could not be established for all modes of system operation. It was believed that total isolation of the Auxiliary Feedwater Pumps (AFP) minimum recirculation line valve, resulting from a loss of instrument air, may not be acceptable under all modes of AFP operation since the AFP endurance test included the pump recirculation mode. This requirement does not appear directly in NUREG-0737, but exists in the Harold R. Denton letter of October 30, 1979 which is referenced in NUREG-0737 as a clarification document. This document states, "For those designs where instrument air is needed for operation, the electric power supply requirement should be capable of being manually connected to emergency power sources".

The existing recirculation lines and valves were installed under a previous modification (Design Change Package 130). As a part of this modification, the existing AFP oil cooler discharge flow path was rerouted from the AFP suction to the existing recirculation line, returning flow to the Primary Plant Demineralized Water Storage Tank thus providing a second recirculation flow path. The safety reviews conducted at that time recognized the fact that upon loss of AC Power, the instrument air system would not be available and the new recirculation line flow control valves would fail closed as designed. However, emergency recirculation for short-term operation is still available through the oil cooler discharge to the Primary Plant Demineralized Water Storage Tank, as provided in the original design. We have concluded that, while it is desirable to have the recirculation line flow path available, it is not needed for operation to permit the station to execute a controlled cool-down since recirculation is not required while feeding the steam generators. The inability to attain minimum flow for the AFW pumps is annunciated and valve position indication is available in the control room. Therefore, the Operator can readily take appropriate action to protect the pumps if the valve fails closed.

In addition to these two items, the EDS reports identified 177 unresolved items which represent potential differences to the NRC Staff Positions. Many of these unresolved items were a result of the limited time available for the EDS review. This resulted in items being recorded as having incomplete documentation. None of these unresolved items were judged by EDS to represent a condition where the design change would not accomplish the purpose intended by NRC requirements. Since these reports have been issued, corrective actions have been initiated to resolve each of these unresolved items and a majority of the items has been resolved satisfactorily. We are continuing efforts to resolve those items remaining, however, some of these do represent a difference from Staff requirements. Collectively, they have been included as two categories and are identified below with their resolutions:

C. Human-Factors Analysis

A detailed human-factors analysis was not performed as part of the design to install the displays and controls added to the control room. A review will be performed by the operating department of the newly installed control room equipment. The results of this review will be factored into the control room

design review performed to satisfy NUREG-0737, item I.D.1. This review will be conducted as the operations personnel perform surveillance activities related to the new equipment as this will be an appropriate time to evaluate the man-machine interface under actual operating conditions. This human-factors analysis applies to NUREG-0737 items II.B.1, II.E.1.2 and II.F.1.

D. Environmental Qualification

An additional independent review is presently being conducted to determine that safety-related electrical equipment is qualified to the current equipment qualification criteria. It has been determined that some of the equipment installed for these modifications do not have sufficient documentation available to permit a conclusive statement that each component is qualified to the latest standard. As such, we are reporting that equipment of this nature will be documented in the Environmental Qualification File and efforts to resolve the qualification issue will continue. It has been our practice to purchase equipment qualified to the latest standards or to install the best available equipment. Because qualification to the latest industry standards cannot be demonstrated at this time for some items, it is being reported as a difference to the Staff Position. All efforts to resolve this qualification issue will be followed in accordance with our Equipment Qualification Program and in accordance with the NRC Staff requirements. The equipment qualification issue applies to NUREG-0737 items II.B.1, II.F.1.3, II.F.1.4, II.F.1.5 and II.F.1.6.

The remaining unresolved items have been further classified to those pertaining to the Reactor Vessel Level Instrumentation System and to those which were part of DCPs completed prior to the issuance of NUREG-0737.

E. NUREG Item II.F.2; Instrumentation for Detection of Inadequate Core Cooling

In our submittal of April 15, 1981, we provided a complete evaluation of the ICC instrument system conformance to NUREG-0737 criteria. Differences to Staff requirements were noted at that time. Additionally, we submitted a letter on April 28, 1982 indicating that installation of this system would not be completed during our current refueling outage and that we are scheduling the remaining work for the third refueling outage. The EDS evaluation of this DCP was consistent with our previous submittal. This evaluation also identified areas where supporting engineering and operational activities have not progressed to the point where clear differences to Staff requirements can be identified. This has resulted in items being identified as potential differences and they will be followed and resolved as work on this DCP continues.

F. Pre-0737 Unresolved Items

The scope of the EDS review included DCPs which had been completed prior to the issuance of NUREG-0737. These DCPs were included to provide a comprehensive review of those modifications initiated for the TMI Action Plan items. The NUREG-0737 items represented in this category are II.D.3 (Valve Position Indication) and II.F.2.1 (Subcooling Meter) which together represent 4 potential differences to NUREG-0737. Because they were completed prior to NUREG-0737, they were not considered in the modification design for these TMI Action Plan

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items. We therefore do not consider them as differences to NUREG-0737. We will however, attempt to resolve any items identified by this review.

The above differences, those considered as pre-0737 and item H below, represent 40 items identified in the EDS report. There remains 37 items which have been classified as unresolved items for which additional documentation is required. The areas represented by these 37 items include regulatory guides pertaining to quality assurance as outlined in Appendix B of NUREG-0737, the completion of additional procedures required to test, maintain and operate the new equipment, and documentation needed in support of design reviews performed by our Architect Engineer who did the design work for the modifications. Much of the documentation needed to satisfy the EDS review team was not located in our corporate office files but should be available at the offices of the Architect Engineer or Vendor. If it is determined that a difference does exist after all supporting documentation has been reviewed, we will notify the NRC of the difference. With regard to the regulatory guides pertaining to quality assurance, we wish to note that those designs which have been determined to be QA Category I, have been designed and installed and will be maintained in accordance with our Quality Assurance Program. In addition, all procedures required to test and operate the equipment will be issued prior to use of the equipment. A detailed list of the 37 unresolved items is attached on Table 2.

We would also like to document at this time two additional differences which have recently been identified through the normal course of implementing modifications.

G. NUREG-Item II.B.3 Post Accident Sampling System (PASS)

In our submittal of June 26, 1980 we identified two safety related radiation monitors being installed on the PASS filter exhaust ventilation system to monitor airborne activity leakage. A high range radiation signal from these monitors will automatically reclose the containment sample line isolation valves. This system was designed in accordance with IEEE-279-1971, paragraph 4.12. While performing post-accident sampling, the containment isolation signal is bypassed to open the necessary containment sample line isolation valves. Our PASS design includes a microprocessor which controls the automatic functions to reclose these isolation valves. Due to equipment delivery problems, this microprocessor will not be installed prior to start-up from this second refueling outage.

As an interim solution, we have purchased a Canberra Model 2071 Dual Counter Timer, power supply and printer. Both radiation monitors have an input to the Dual Counter Timer which will provide a local read-out of counts per unit time. We are making changes to the control circuitry which will not permit the bypass of a containment isolation signal and therefore will not be able to sample until this signal has been reset. This interim method of operating is conservative and will not violate containment integrity. We believe this is consistent with the latest NRC statement which classifies the sampling system as non-essential. The present schedule for installing the microprocessor is August 1, 1982.

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H. NUREG Item II.F.1.5; Accident Monitoring; Containment Water Level

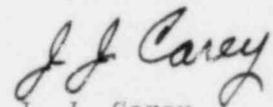
The level transmitters installed were qualified to IEEE standard 344-1971 rather than the 1975 edition and as such do not meet the Staffs' requirements related to qualification as stated in NUREG-0737. The level instruments installed were the best available at the time of purchase. Our handling of this equipment will be in accordance with our Environmental Qualification Program and in accordance with the NRC Staff requirements.

This review effort has identified some areas where improvement in the control of design modifications may be made. The design modification procedures will be reviewed against the recommendations of EDS Nuclear and revisions will be implemented to improve our management controls in the design modification area. This will result in a more consistent identification of regulatory requirements and better translation of the resulting design inputs to design outputs.

In accordance with our commitments to the NRC resulting from the routine safety inspection 82-05, we have completed our initial review of NUREG-0737 related modifications and are providing this submittal to document identified differences to the NRC Staff requirements. We do not feel the differences represent a compromise of safety and that each system will function as required to provide the operator the tools necessary to identify and mitigate the consequences of an accident. The Quality Assurance Department has conducted an audit of the EDS Nuclear review effort and has scheduled another audit for the week of May 24, 1982, to verify that corrective actions have been initiated for resolution of those unresolved items EDS Nuclear has identified. It can be demonstrated at this time that corrective actions have been initiated to resolve each concern of EDS through the reduction of the unresolved items from 179 to 37 items.

We are continuing to close out all unresolved items.

Very truly yours,



J. J. Carey
Vice President, Nuclear

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TABLE NO. 1

<u>Design Change Package</u>	<u>Applicable NUREG-0737/0578 Section</u>	<u>Subject Matter</u>
DCP-292 ₃	II.D.3 (0737)	Safety Relief Valve Position Indicator
DCP-293 ₃	NUREG-0578	Subcooled Margin Meter
DCP-294 ₁	II.F.1.6 (0737)	H ₂ Concentration
DCP-295 ₁	II.B.1 (0737)	RCS Vents
DCP-297 ₁	II.F.1.4 (0737)	Containment Pressure
DCP-298 ₁	II.F.1.5 (0737)	Water Level Inside Containment
DCP-299 ₃	II.E.1.1 & II.E.1.2 (0737)	AFW System/AFWS Controls
DCP-303 ₁	II.F.1.1-3 (0737)	Miscellaneous Post- Accident Monitoring
DCP-320 ₁	II.B.3 (0737)	Sampling System
DCP-333 ₂	II.F.3 (0737)	Reactor Vessel Water Level
DCP-362 ₁	II.B.2 (0737)	Recombiner Shielding

NOTES:

1. Complete prior to start-up from second refueling outage
(letter; Carey to Varga; December 30, 1981)
2. Complete during third refueling outage
(letter; Carey to Eisenhut; April 28, 1982)
3. Completed prior to second refueling outage

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TABLE NO. 2

<u>Design Change Title</u>	<u>Unresolved Item</u>
1. Containment Hydrogen Monitoring (DCP-294)	a. Accessibility of isolation devices under accident conditions not documented. b. Fire hazards analysis (single failure) not documented. c. HELB Analysis for separation of redundant sample lines not documented. d. Adherence to Reg. Guide 1.75 not documented. e. Adherence to QA Reg. Guides not documented. f. Adherence to Reg. Guide 1.118 not documented.
2. Reactor Coolant Gas Vent System (DCP-295)	a. Procedures not developed to ensure power is disconnected and valves locked closed. b. Vent system operation relative to limits imposed by 10 CFR 50.44 & .46 not specifically addressed. c. Adherence to Reg. Guides 1.92 & 1.100 not documented. d. Procedures not developed for testing portions of the system during outages.
3. Containment Pressure Monitoring (DCP-297)	a. Seismic qualification not documented. b. Accessibility of isolation devices under accident conditions not documented. c. Fire hazards analysis (single failure) not documented. d. Failure of one channel <u>not</u> resulting in ambiguity not documented.

- e. Adherence to Reg. Guide 1.75 not documented.
 - f. Adherence to Reg. Guide 1.118 not documented.
4. Containment Sump Level (DCP-298)
- a. Fire hazards analysis (single failure) not documented.
 - b. HELB analysis for separation of redundant channels not documented.
 - c. Failure of one channel not resulting in ambiguity not documented.
 - d. Adherence to Reg. Guide 1.75 not documented.
 - e. Provisions for checking operational status of each channel during operation not documented.
 - f. Adherence to Reg. Guide 1.118 not documented.
5. Radiation Monitoring Instrumentation (DCP-303)
- a. Acceptability of 2 series breakers providing isolation of an associated circuit from a vital bus not documented. (R. G. 1.75)
 - b. Instrument accuracy in the accident environment not documented.
 - c. Method for transmitting final data not documented in the final design system description.
 - d. Maintenance procedures not developed.
 - e. In situ calibration methods are not developed.
 - f. Type-testing of monitors to 10^6 R/hr not documented.
 - g. Calibration certification of detectors not documented.
 - h. Isolation of electrical interface with TSC not documented.

- i. Redundancy of instrument signal transmission to Control Room not documented.
 - j. Consequential failure effects analysis on the channels following a LOCA not documented.
 - k. Adherence to QA Reg. Guides not documented.
 - l. Isolation of electrical interface with TSC not documented.
 - m. Administrative controls to control access for removal of channels not documented.
 - n. Adherence to Reg. Guide 1.118 not documented.
6. Hydrogen Recombiner Shielding (DCP-362)
- a. Containment volume considered as a direct radioactive source in determining dose rates at the recombiner panel not documented.