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February 3, 1989

Re: Indian Point Unit No. 2
Docket No. 50-247

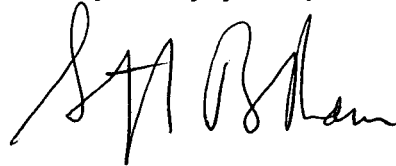
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U.S. Nuclear Regulatory Commission
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Washington, DC 20555

SUBJECT: Generic Letter 88-17, Loss of Decay Heat Removal, Programmed
Enhancement Recommendations

This letter transmits Consolidated Edison Company of New York's (Con Edison) response to the second part of the subject Generic Letter which was received on November 5, 1988. After evaluating the Generic Letter's recommended programmed enhancements, it is our intent to implement the applicable and effective hardware changes, in stages, starting with the 1989 refueling outage and finishing by the end of the projected 1991 refueling outage. Applicable and effective programmed enhancements that do not involve hardware will be implemented over the eighteen month period as prescribed by the subject Generic Letter. The programmed enhancements which are incorporated will reflect the efforts of the Westinghouse Owners Group (WOG). Our current plans for each of the six programmed enhancement recommendations are set forth in the attachment to this letter.

If you have any questions concerning this submittal, please contact Mr. J. Del Percio, Manager, Regulatory Affairs.

Very truly yours,



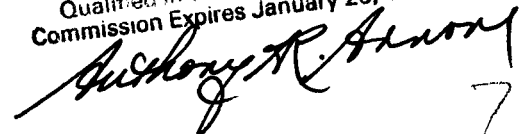
cc: Mr. William Russell
Regional Administrator - Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406-1498

Subscribed and sworn to
before me this 3rd day
of February, 1989.

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Qualified in Westchester County
Commission Expires January 26, 1991



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Attachment

Programmed Enhancement Recommendation

(1) Instrumentation

Provide reliable indication of parameters that describe the state of the RCS and the performance of systems normally used to cool the RCS for both normal and accident conditions. At a minimum, provide the following in the CR:

- (a) two independent RCS level indications
- (b) at least two independent temperature measurements representative of the core exit whenever the RV head is located on top of the RV (We suggest that temperature indications be provided at all times.)
- (c) the capability of continuously monitoring DHR system performance whenever a DHR system is being used for cooling the RCS
- (d) visible and audible indications of abnormal conditions in temperature, level, and DHR system performance

Response

(1)

- (a) As indicated in our response to the first part of Generic Letter 88-17, two separate and diverse RCS level indicating instrument systems are intended to be operational by the end of the 1989 IP-2 refueling outage (scheduled for June 1989). One scheme employs a differential pressure transducer system which is currently in use at IP-2. The second system is a diverse ultrasonic level indication system for narrow range monitoring of water level in the reactor coolant hot leg. This latter system is impervious to pressure changes in either the reactor coolant system or the Containment building atmosphere. The response of the ultrasonic system is not subject to the delays due to fluid equalization of the system.

To insure acceptable accuracy both instrument loops will be subject to error analysis. The ultrasonic instrument circuit is being installed with commensurate quality control measures.

- (b) As presently configured, IP-2 has the capability to monitor RCS temperature whenever the Reactor Vessel head is in place together with the "bedspring" assembly (instrumentation interface). This capability will be temporarily disrupted during the 1989 refueling outage when the core exit thermocouple instrument circuits are upgraded to meet Regulatory Guide 1.97 standards. As part of this effort, a special connector cable will be provided so that selected core exit thermocouples will be connected and available in the Control Room even when the "bedspring" is raised. We have already committed to removal of irradiated fuel from the reactor vessel during the 1989 outage when RCS temperature indication would be disconnected.

An investigation of the development of Reactor Coolant temperature indication without the Reactor Vessel head in place and without RHR flow will be dependent upon industry response to this issue and potential impact upon IP-2.

- (c) During the 1987 refueling outage, we undertook extensive testing of RHR pump performance as a function of reduced reactor coolant system level and flow. The data obtained from this testing have been reported to NRC via the WOG. Testing revealed that pump suction pressure is very sensitive to air ingestion and pressure will drop rapidly upon ingestion of significant air. Suction pressure is far more sensitive than pump current, vibration or pump noise. This data provides a baseline for RHR pump performance under adverse conditions that can be compared with future pump performance measurements. Thus the acceptability of RHR pump operation under adverse conditions is readily determinable.

By the completion of the 1989 outage a flow indicator designed to monitor low RHR flow conditions should be available in the Control Room. The span of the monitor will cover normal RHR flow. Shortly after the 1989 outage, RHR pump suction and discharge pressure indications should be available in the Control Room. Comparison of these parameters, together with RCS level indication, with the aforementioned RHR pump data will provide adequate indication of pump performance under various operating conditions.

It should be noted that the ultrasonic level detector will be mounted on the hot leg (No. 21) most indicative of Reactor Vessel level. In addition the RHR pump data obtained in 1987 has been correlated with Reactor Vessel level. Thus, flow gradients induced within the RCS system should have no affect upon correlating RCS (Reactor Vessel level) level with RHR performance.

We have elected not to utilize motor current and noise as these parameters provide insufficient advance warning of incipient pump problems.

- (d) The PROTEUS plant computer monitors all draindown instruments except wide range draindown level. Each analog point can have up to seven alarm levels. In addition, the PROTEUS screen which displays allowable RHR flow-narrow range level flashes when the flow level point approaches the unacceptable zone. The wide range differential pressure instrument has a Control Room annunciator alarm. The narrow range ultrasonic instrument will have an operator adjustable alarm set point in the indicator that can trigger an annunciator. This provides both an audible and visual indication.

Programmed Enhancement Recommendation

(2) Procedures

Develop and implement procedures that cover reduced inventory operation and that provide an adequate basis for entry into a reduced inventory condition. These include:

- (a) procedures that cover normal operation of NSSS, the containment, and supporting systems under conditions for which cooling would normally be provided by DHR systems.
- (b) procedures that cover emergency, abnormal, off-normal, or the equivalent operation of the NSSS, the containment, and supporting systems if an off-normal condition occurs while operating under conditions for which cooling would normally be provided by DHR systems.
- (c) administrative controls that support and supplement the procedures in items (a), (b), and all other actions identified in this communication, as appropriate.

Response

Our response to Generic Letter 87-12, as well as our response to the first part of Generic Letter 88-17 describes procedure revisions currently in effect and those planned to accommodate operation at reduced inventory conditions with irradiated fuel in the reactor vessel. For IP-2 this corresponds to an RCS level of 66' and below. These cover our normal Standard Operating Procedures (SOPs) and Abnormal Operating Procedures (AOPs).

The IP-2 Emergency Procedures will be reviewed and revised as necessary to ensure appropriate entry conditions are identified and response actions described. The conditions addressed will include accidental loss of systems which are operating to cool the RCS, uncontrolled loss of RCS inventory, symptoms of abnormal RCS operation at reduced inventory conditions and the potential for core damage. It is expected that this work will be accomplished in conjunction with the WOG. Revised Emergency Procedures will be effective within eighteen (18) months of receipt of Generic Letter 88-17.

Programmed Enhancement Recommendation

(3) Equipment

- (a) Assure that adequate operating, operable, and/or available equipment of high reliability is provided for cooling the RCS and for avoiding a loss of RCS cooling.
- (b) Maintain sufficient existing equipment in an operable or available status so as to mitigate loss of DHR or loss of RCS inventory should they occur. This should include at least one high pressure injection pump and one other system. The water addition rate capable of being provided by each equipment item should be at least sufficient to keep the core covered.

- (c) Provide adequate equipment for personnel communications that involve activities related to the RCS or systems necessary to maintain the RCS in a stable and controlled condition.

Response

Our response to the first part of Generic Letter 88-17 described the equipment available for adding inventory to the RCS. As a result of Generic Letter 87-12, our procedures were revised to require that one safety injection pump be operable when operation at midloop is contemplated. As a diverse backup, gravity flow from the RWST would suffice to accommodate boil off and core cooling. The minimal operable equipment necessary when at midloop, together with alternate sources of core cooling (i.e., utilization of Steam Generator) will be evaluated over the specified 18 month period. Our plans with respect to utilization of equipment may change accordingly. Included in this evaluation will be the reliability of support equipment.

The RHR/RCS interface at IP-2 has only a permissive circuit to open RHR suction valves MOV 730 and MOV 731 when RCS pressure is below 450 psig. RCS pressure above 450 psig does not automatically result in closure of these valves. Since single failure has already been incorporated in the design, there would appear to be no need to disable the permissive interlock. Nevertheless, for added assurance, procedures will be revised to de-energize MOV-730 and MOV-731 when they are in the open position and RHR is in service.

Communication between the Containment, Primary Auxiliary Building and the Control Room is via the telephone/page system. In addition, a separate portable radio system is utilized during outages to enhance communications between the Control Room and Containment. An antenna has been installed within the Containment for the portable radio system. Prior experience with this communication system has proven it to be acceptable.

It should be noted that there are no restrictions on maintaining RHR pump flow at high levels. Minimum RHR pump flow is based on boron stratification and RHR pump vortexing considerations.

Programmed Enhancement Recommendation

(4) Analyses

Conduct analyses to supplement existing information and develop a basis for procedures, instrumentation installation and response, and equipment/NSSS interactions and response. The analyses should encompass thermodynamic and physical (configuration) states to which the hardware can be subjected and should provided sufficient depth that the basis is developed. Emphasis should be placed upon obtaining a complete understanding of NSSS behavior under nonpower operation.

Response

With the accomplishment of RHR vortexing tests and subsequent data evaluation, Con Edison took the initiative in establishing a technical basis for RHR pump operation when in the region of vortexing. We intend to continue this thrust in establishing an analytical basis to support all facets of operation in the reduced inventory mode with irradiated fuel in the reactor vessel. We have been, and will continue to be, a major participant in the WOG effort in this area. Modifications planned for the 1989 refueling outage are predicated on our technical requirements in terms of instrumentation. Additional longer term effort is planned in defining the technical basis for the possible development of a temporary equipment hatch cover for use at mid loop operation with irradiated fuel in the reactor vessel. The supporting analysis will take into account alternate core cooling as well as other accident mitigating measures, in establishing Containment environment. We have already established an analytical basis to ensure adequate RCS venting. Our current plans call for removal of the pressurizer manway. However, due to the substantial ALARA concern represented by this option alternative measures will be evaluated (i.e., steam generator manway).

Separate from these issues identified in Generic Letter 88-17 we have evaluated the recommendations contained in INPO significant Operating Experience Reports (SOERs 85-4 and 88-3) and modified our operations accordingly.

The technical effort, both analytical and otherwise, required to form a basis to support our actions in midloop operation is intended to be accomplished no later than eighteen (18) months from the date of receipt of Generic Letter 88-17.

Programmed Enhancement Recommendation

(5) Technical Specifications

Technical Specifications (TSs) that restrict or limit the safety benefit of the actions identified in this letter should be identified and appropriate changes should be submitted.

Response

We will review the content of the Technical Specifications to determine whether any revisions are necessary. Technical Specification amendments will be sought in those instances which would restrict safe operation at midloop with irradiated fuel in the reactor vessel. An example is excessive minimum RHR flow, a restriction which does not exist for IP-2. We would opt for procedurally ensuring appropriate conditions exist for midloop operation and control of containment closure.

Programmed Enhancement Recommendation

(6) RCS Perturbations

Item (5) of the expeditious actions should be reexamined and operations refined as necessary to reasonably minimize the likelihood of loss of DHR.

Response

We will revisit our procedural and administrative controls with the objective of minimizing the loss of decay heat removal capability. As previously discussed, RCS level and low flow monitoring is intended to be installed during the 1989 outage. Subsequently, instrumentation for monitoring of RHR pump suction and discharge pressure will be incorporated. Procedures will be reviewed to provide that maximum advantage is taken of this enhanced monitoring capability. Procedural revisions limiting operational steps to reflect decay heat levels have already been taken. An example is limiting any draindown activity until the decay heat does not exceed the capability of one RHR pump and heat exchanger. Other revisions reflecting the optimum conditions of pumps and heat exchangers have been incorporated.

Additional procedural and hardware modifications will be dependent upon the outcome of the long term activities described elsewhere. INPO experience reviews have been, and will continue to be, factored into our operational controls. The implementation of modifications and testing is already subject to an operations pre-planning process whose objective is to ensure that adequate controls and equipment is available to cope with contingencies.