

John D. O'Toole
Vice President

ENCLOSURES TRANSMITTED HERewith
CONTAIN 10 CFR 2.790 INFORMATION

Consolidated Edison Company of New York, Inc.
4 Irving Place, New York, NY 10003
Telephone (212) 460-2533

July 1, 1982

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

Mr. Ronald C. Haynes, Regional Administrator
Region I
U. S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, Pa. 19406

Dear Mr. Haynes:

This letter is submitted in accordance with the requirements of Title 10, Code of Federal Regulations, Part 20. It supplements the report submitted pursuant to 10 CFR 20.403(b) on June 2 and additional information concerning the cause of the event and corrective action which was transmitted to you on June 9. These reports describe an event on June 1, 1982 in which the limit for whole body exposure in 10 CFR 20.101(b)(1) was exceeded for one employee of a contractor performing activities at Indian Point 2.

Attachment A to this letter is the report required by 10 CFR 20.405(a). The report describes the incident, our review of the incident, the cause of the exposure and the corrective actions taken to prevent recurrence. Con Edison believes that the corrective actions which have already been implemented provide adequate assurance that no individual participating in the project will be subjected to exposure in excess of the limits set forth in 10 CFR Part 20.

Attachment B to this letter contains the name, social security number, date of birth and the exposure of the worker who received the exposure described above, as required by 10 CFR 20.405(b). In accordance with 10 CFR 2.790(a), correspondence to the NRC which identifies the name of an individual, the disclosure of which would constitute a clearly unwarranted invasion of personal privacy, are exempt from disclosure. We understand, therefore, that Attachment B to this letter will not be placed in the Public Document Room and will receive limited distribution.

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If you or your staff have any questions concerning this incident, we would be pleased to meet with you to further review the incident and Con Edison's response to it.

Very truly yours,

John D. Fivole

cc: Mr. Richard DeYoung, Director
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mr. T. Rebelowski, Senior Resident Inspector
U. S. Nuclear Regulatory Commission
P. O. Box 38
Buchanan, New York 10511

ATTACHMENT A

Report on Exposure In Excess Of 10 CFR 20.101(b)(1)
On June 1, 1982 At Indian Point 2

During the past several months Con Edison has been engaged in the installation of replacement spent fuel racks in the spent fuel storage facility. This project, which is being conducted primarily by contractor personnel, requires the movement of spent fuel within the spent fuel pool by station personnel, removal of existing fuel storage racks and the installation of new fuel storage racks. Prior to June 1, 1982 some of the old storage racks had been removed and four new storage racks had been installed.

On May 27-28, 1982 plans were developed by station personnel to relocate spent fuel assemblies within the spent fuel pool. This fuel relocation was required to permit installation of another new fuel rack (No. 7) by the diving contractor. The procedure for the fuel relocation was set forth in station procedure SOP 17.24 Revision 3, entitled "Fuel Storage Building-Fuel Assembly and Component Relocation." The procedure contained the step-by-step instructions for the relocation of the spent fuel assemblies and a diagram which indicated that certain storage locations in some of the new fuel racks would be empty after the fuel movement had been completed. During the fuel relocation on May 31, fuel assembly D-55 was moved to location G-29 instead of B-29. No fuel assembly was supposed to be stored in location G-29 which was closer to the area in which the divers would be installing the new fuel rack than B-29. Location B-29, which should have contained a fuel assembly was empty.

During the morning of June 1, 1982, a health physics technician performed a radiation survey of the entire spent fuel pool. The survey was conducted with an ionization chamber, a Technical Associates-CPMU. The survey results, which are recorded on a map representing the layout of the spent fuel pool with the old fuel racks in place, indicated a "hot spot" of 1000 mr next to a fuel rack which was in the area where the divers would be working. This reading was the highest reading recorded on the survey in the area in which the divers would be working. The results of the survey were reported to Con Edison's health physics supervisors and the contractors' supervisors. During our investigation of this incident, the health physics technician who conducted the survey said that he saw a spent fuel assembly in the vicinity of G-29. He also alleged that he reported this to three supervisors associated with the project. Based upon our investigation and interviews of personnel involved in the project, we have concluded that he did not disclose the information concerning the fuel assembly to those supervisors. The highest reading which was recorded on the survey in the vicinity of the misplaced fuel assembly was the 1000mr "hot spot".

The divers were instructed to probe the area of the "hot spot" to verify its location prior to beginning work in the area. We have determined that between the completion of the fuel shuffle on May 31 and the health physics survey on the morning of June 1, fuel assembly D-55 could not have been moved from B-29 to G-29.

Two divers were assigned to the installation of new fuel rack No. 7 on June 1. With respect to radiation dosimetry, Con Edison provided the divers with the Technical Associates-CPMU detector for surveying the area of their immediate work location, self-reading dosimeters, a film badge and thermoluminescent devices (TLDs). Each diver was also equipped with an alarming dosimeter which was provided by the diving contractor. Prior to commencing work in the area, the divers used the CPMU to survey the work area and locate the 1000mr "hot spot".

The divers remained in the pool for a few hours in connection with the installation of the new fuel rack. During the course of their work in the pool, no unusual indications were observed by the health physics technician whose duties included monitoring the CPMU read-out outside the pool. The divers reported that the alarming dosimeters did not activate. Upon leaving the pool, some of the self-reading dosimeters were found to be reading off-scale. The TLDs were immediately processed and it was determined that one of the divers had received an exposure in excess of the limits specified in 10 CFR Part 20, Con Edison promptly informed NRC Region I inspectors, who were at Indian Point 2, of the recorded exposure. Based on reading from the TLDs, the diver received a whole body exposure of 8.67 Rem on June 1, 1982. The divers whole body quarterly exposure for the second quarter of 1982 is 9.45 Rem. All diving operations were suspended pending the determination of the cause of the exposure and the implementation of corrective action.

The investigation included a review of the location of fuel assemblies and other highly radioactive objects stored in the spent fuel pool, of the June 1 health physics survey, and of instrumentation used during that health physics survey and by the divers. The location of all fuel assemblies and other highly radioactive objects stored in the pool was verified. A visual check, with the use of an underwater television camera as necessary, was made of the fuel racks to assure that a fuel assembly was installed in each location where an assembly was supposed to be located and that a fuel assembly was not in any other location. In addition all highly radioactive objects were surveyed and their locations verified. These verifications were independently reviewed by Quality Assurance personnel. One fuel assembly, D-55, was found to have been misplaced and it was in location G-29.

A radiation survey of the spent fuel pool was conducted. It should be noted that the 1000 mr "hot spot" previously detected in the vicinity of the misplaced apparent fuel assembly was in the field emanating from the misplaced fuel assembly and was actually many times higher than detected due to a defective instrument. With the exception of the field associated with the misplaced fuel assembly, no unusual radiation fields were detected. Based on interviews with the divers, we have estimated how long the divers remained in various locations while installing the new fuel rack and the orientation of their bodies while working in these areas. From those interviews and the radiation surveys, we believe that the over-exposed diver was working in fields which could cause the exposure received for the time period of thirty minutes.

The review of the instruments used in the radiation surveys of the pool conducted immediately prior to the exposure and the instruments used by the divers indicated that some of the instruments did not operate properly. The two alarming dosimeters used by the divers were checked. One alarming dosimeter was found to be inoperable and would not alarm when placed in a field in excess of the set point. Therefore, that dosimeter would not have properly alerted the diver to the radiation field. In addition, the ionization chamber (Technical Associates - CPMU), which was used for underwater radiation surveys prior to the diving operations and by the divers during the dive, indicated intermittent erratic behavior. Immediately prior to the survey on the morning of June 1, the instrument had been checked with a 500 R source which is stored in the pool and the instrument indicated properly. During the survey, the instrument indicated a range of readings from 800 R to less than 100mr, as had been anticipated. Therefore, prior to the dive on June 1, there was no reason to believe that this instrument would operate erratically. When the instrument was being checked following the incident, its intermittent erratic behavior was first observed.

Based upon these reviews, Con Edison has determined that the exposure was caused by several factors. These factors, which were reported to you in the Company's letter dated June 9, 1982, included:

1. Incorrect location of a fuel assembly during fuel movement.
2. Failure of the health physics survey, which was conducted between time of fuel movement and the time of the diving activities, to properly detect the high radiation field caused by the misplaced fuel assembly. This failure to properly detect the radiation field was attributable to an instrument malfunction.
3. Failure of the divers' active monitoring equipment to detect the radiation field. The divers were equipped with two types of active radiation monitoring instrumentation: an alarming dosimeter and the ionization chamber designated for use underwater (CPMU). The CPMU was the same instrument used to conduct the radiation survey prior to the exposure. The failure to detect the radiation field was due to instrument failure.

Prior to resuming diving operations, Con Edison instituted several changes to the management control system associated with the installation of the new fuel racks in the spent fuel pool. Con Edison believes that these corrective actions provide adequate assurance that no individual participating in the project will be subjected to exposures in excess of the limits set forth in 10 CFR Part 20. These corrective actions include:

1. To assure that the management control system is properly implemented, a senior Nuclear Power Generation manager has been assigned full-time to the project and has been relieved of all other duties. The manager is responsible for proper coordination among the Con Edison and contractor organizations involved in the project and will review adherence to the procedural requirements of each participating organization.
2. During the course of this project, Quality Assurance personnel will be present during fuel relocations and will conduct an independent verification that each fuel assembly is moved to the proper location in accordance with approved procedures. This verification will be conducted independent of the verifications by plant operators and will not be based on the fuel movement instructions provided to the operators but rather on the spent fuel pool storage map.
3. Movement of any other potentially highly radioactive objects (i.e. greater than 1R/hr on contact) stored in the spent fuel pool is controlled by written procedure and will be independently verified by Quality Assurance personnel.
4. A more extensive radiation survey of the spent pool will be conducted prior to each diving operation following the movement of any spent fuel assembly. In addition, our procedures have been revised to require such surveys following the movement of any other potentially highly radioactive objects which are stored in the spent fuel pool.
5. Prior to daily diving operations, health physics supervision and a representative of the diving contractor will conduct an inspection of the fuel storage locations in the vicinity of the diving area to verify that the appropriate adjacent storage locations are empty.
6. Prior to daily diving operations, health physics personnel will also conduct a radiation survey of the diving area using two independent types of radiation exposure monitoring equipment. In addition, the survey form will be designed to accurately reflect the layout of the racks in the fuel pool as they are being changed during the installation of the new racks.

7. Each diver will be equipped with an alarming dosimeter, or chirper, calibrated under the supervision of station personnel and checked daily prior to the diving operations. These instruments will be maintained under the control of the Radiation Protection Section.
8. Constraints have been imposed on the period of time in which the diver may remain in the water before his radiation monitoring instruments are checked. Within approximately ten minutes of entering the water, the diver must return to the surface for an instrument check. In addition, the divers now exit the pool after approximately two hours to permit reading of their dosimeters.
9. In order to provide additional assurance of procedure adherence on the part of all personnel associated with the diving operations, a meeting was held with the divers, their tenders, health physics technicians and supervisors from Con Edison and the contractors to conduct an in-depth review of the important procedures.
10. To limit the possibility of loose "crud" causing high exposures, the divers are now required to frisk approximately every 30 minutes while at their work location. This is performed under the direct observation of a Health Physics Technician.

In addition to the investigations and corrective actions implemented by the line organizations responsible for overall facility activities, the Nuclear Facilities Safety Committee (NFSC), which is responsible for the independent review and audit of radiological safety at Indian Point 2, is conducting an independent investigation of the incident under the auspices of its Radiation Safety Sub-Committee (RSSC). To assist the RSSC in performing the review, the RSSC has engaged a consultant to perform an in-depth review of the incident, to identify any program deficiencies and to recommend preventive measures. We believe that the review conducted by the NFSC will provide additional assurance that the Company programs will adequately protect the health and safety of all workers at Indian Point 2.