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Directorate of Regulatory Operations, Region I

RO INQUIRY REPORT NO. 50-219/73-02Q
FISH KILL FROM DECREASE IN COOLING WATER TEMPERATURES - OYSTER CREEK
RESPONSE TO MEMO FROM C. A. PELLETIER, DATED MARCH 5, 1973

The following comments are presented as a clarification to the forwarding memo for the subject report sent by me to J. Keppler, dated January 30, 1973 and in response to a memo sent to you by C. Pelletier, dated March 5, 1973. I have attempted to answer Dr. Pelletier's questions in the order presented in this memo.

1. "Unplanned" shutdowns include occurrences which would cause a reactor scram such as turbine trips, high pressure, variable low pressure, high flux or overpower, low reactor coolant flow, etc. Many of the "unplanned" shutdowns or scrams do not constitute an abnormal occurrence and therefore, do not require notification of RO:I. These "unplanned" shutdowns, therefore, go unnoticed for a period of time (until next inspection) or until some other, more obvious event occurs, such as a fish kill. Nowhere in the original memo was "advanced" notification of "unplanned" shutdowns recommended as this is, of course, impossible.

2. Many factors have been found to affect the extent and magnitude of a cold-shock fish kill. These factors are variable depending on the location of the plant and include such items as; a.) past history of water and air temperatures, b.) non-fatal temperature changes to which the fish had been exposed prior to a fatal temperature change, c.) the temperature to which fish have acclimated before rapid temperature change, d.) salinity during the rapid temperature change, e.) turbidity and other naturally occurring water conditions such as foaming, pH, DO, etc. In addition, biologists from Sandy Hook Marine Laboratory and the New Jersey Division of Fish, Game and Shellfish (Nacote Creek) stated that in some cases, there is little that can be done in identifying the cause of a fish kill unless the fish can be caught and analyzed in process of dying. Once the fish are dead, one can only hope to rule out possible causes of death (for example, radiological or heavy metals) by after-the-fact analyses. If Oyster Creek were to notify RO:I of an "unplanned" shutdown as might occur from a turbine trip, RO:I would notify the New Jersey Department of Environmental Protection, who in turn would notify the New Jersey Division of Fish, Game and Shellfish.

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RO:I would also notify the Sandy Hook Marine Laboratories who have agreed (informally) to send biologists to the site (including skin divers). In addition, RO:I will soon have the capability of analyzing for a variety of water quality parameters in the field. In essence, therefore, by notifying RO:I, the AEC would be able to determine why the fish were dying and not only the fact that the fish were dead. In the instance of the last Oyster Creek fish kill (beginning on February 16, 1973), if Oyster Creek had notified RO:I when the kill began, in my opinion, Sandy Hook Marine Laboratory would have in all probability discovered that the initial kill was caused by infectious agents and not by cold shock per se. The cold shock merely accelerated the kill.

3. The information required as an input for such an evaluation would come from three sources:

   a. Oyster Creek would provide data such as temperature records (ambient air, intake and discharge), pump operation, flows, and discharges (radiological and non-radiological).

   b. State and Federal officials and biologists would provide professional expertise and laboratories in an effort to determine the actual cause of the kill.

   c. RO:I would provide water quality data (Oyster Creek is not capable of providing this data at this time). More importantly, RO:I would provide the coordinating function for the entire evaluative effort.

4. Even if the evaluation showed that a significant number of fish would be killed, the exact cause and mechanism would be more clearly understood. If the kill were bacterial in nature, for example, or bacterial complicated by thermal stresses, then this discovery might lead to the conclusion that the fish kill was not generic to a nuclear plant but rather a phenomenon common to other power plants (eg., LILCO'S Northport Fossil Plant). Information such as this could potentially lead to a long range solution. The evaluation could indicate possible ways of limiting the extent of the kill even if not being able to prevent it.

5. As mentioned in Dr. Pelletier's memo, normal operating characteristics of a nuclear plant, for all practical purposes, limit the action which the licensee can take to prevent, or even limit in some cases, a cold-shock fish kill. As the original recommendation stated, all RO:I would require was that the utility notify us of the unplanned shutdown once it occurred and provide us with certain operational data which be utilized in the evaluation by AEC and other Federal and State authorities in order to arrive at possible alternative courses of action within the operational capabilities of the plants involved. In my opinion, there are means which could be utilized to limit if not prevent wide spread

kills, and through a careful evaluation of what is occurring at the time it is occurring, the most effective recommendations can be made with respect to solving the problem. Again, as mentioned in Dr. Pelletier's memo, continued occurrences at a site or plant should be sufficient cause for a licensing review for the purpose of discussing modification of systems or other corrective actions with the licensee. The first step to be taken, however, should be a careful evaluation of what actually is occurring during the fish kill.

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