Docket: 50-293
AITS: F01004888
EA:

T. [illegible]

JUL 24 1981

NOTE TO: Richard Wessman, Chief, Enforcement Branch, IE

FROM: Robert T. Carlson, Director, Enforcement and Investigation Staff, RI

SUBJECT: BOSTON EDISON COMPANY - PILGRIM
RECOMMENDED ESCALATED ENFORCEMENT ACTION

The enclosed documents are forwarded per your request for background information on the Pilgrim violation of 10 CFR 50.44.

Robert T. Carlson

Robert T. Carlson, Director
Enforcement and Investigation Staff

Enclosures:
1. SER, 8/25/71
2. BECo ltr to DOL, 6/13/74
3. Ippolito ltr to Andognini, 3/14/79
4. Andognini ltr to Ippolito, 6/6/79
5. Andognini ltr to Ippolito, 10/19/79
6. Ippolito ltr to Andognini, 10/30/79
7. LER 81-021/01X-0, 6/16/81
8. Novak memo to Morisi, 6/26/81
10. RI Daily Rpt, 7/31/80
11. RI Daily Rpt, 9/9/80

C/9

August 25, 1971

SAFETY EVALUATION

BY THE

DIVISION OF REACTOR LICENSING

U.S. ATOMIC ENERGY COMMISSION

IN THE MATTER OF

BOSTON EDISON COMPANY

PILGRIM NUCLEAR POWER STATION

DOCKET NO. 50-293

4.1.2 Containment Atmosphere Control

Following a loss-of-coolant accident (LOCA), (a) hydrogen gas could be generated inside the primary containment from a chemical reaction between the fuel rod cladding and steam (metal-water reaction), and (b) both hydrogen and oxygen would be generated as a result of radiolytic decomposition of recirculating coolant solutions. If a sufficient amount of the hydrogen is generated and oxygen is available in stoichiometric quantities, the subsequent reaction of hydrogen with oxygen at rates rapid enough to lead to significant over-pressure could lead to failure of the containment to maintain low leakage integrity.

The applicant proposes venting of the containment as the corrective measure if the monitored hydrogen concentration inside the containment shows signs of approaching the lower flammability limits. The proposed venting involves purging containment atmosphere with air and venting in a controlled manner through the standby gas treatment system to the stack.

We have concluded that a hydrogen control system should be provided, in addition to the purging system proposed by the applicant, to keep the hydrogen content within safe limits: i.e., less than 4 volume percent. In its report on the Dresden 3 facility, the ACRS recommended that a reasonable time period be allowed for the design of such a system and appropriate review by the regulatory staff. Special Report No. 14 submitted for Dresden Unit 3 in response to our letter to Commonwealth Edison Company dated December 22, 1970 provided additional information on post-accident combustible gas control for Dresden Unit 3. This Special Report provides a conceptual design of a flammability control system and a containment atmosphere monitoring system. As was the case for the Dresden Unit 3 facility, installation of a combustible gas control system would require a change in the design of the Pilgrim facility after the construction permit had been issued.

Since we had not considered the problem of combustible gas control during our construction permit review of the Pilgrim application, we evaluated this matter in the light of 10 CFR 50.109 which states that the Commission may require the backfitting of a facility if it finds that such action will provide substantial additional protection which is required for the public health and safety. Our calculations in accordance with AEC Safety Guide No. 7 on other similar plants has indicated that the production of hydrogen is such that purging would be required within about 10 hours following a loss-of-coolant accident. The radiological consequences from such releases using the existing standby gas treatment system calculated by us for another similar plant indicate that the incremental doses could be significant. Thus the capability to control the hydrogen concentration by measures not requiring release to the environment with the present system would provide a substantial reduction in the total offsite doses that might result from the accident.

We have concluded that the backfitting of the Pilgrim facility in this regard will provide substantial additional protection required for the public health and safety, but that the design and installation of the system need not be completed prior to issuance of an operating license. We believe this action to be consistent with the advice of the ACRS as given on the Dresden 3 facility, i.e., that action should be achieved on a reasonable time basis. We will require the applicant to submit the detailed design and schedule for the installation and testing of a co inment atmosphere monitoring system and control system to meet the design basis given in Safety Guide 7.

The primary containment will be provided with an inert atmosphere of nitrogen during reactor power operation, keeping the containment atmosphere oxygen concentration less than 5% by weight, in order to minimize the possibility of the combustion of hydrogen evolved from a zirconium-water reaction during the first few minutes following a loss-of-coolant accident. The inert atmosphere will also extend the time available to cope with the hydrogen evolved from radiolysis of the primary coolant.

We recognize that inerting makes inspection and repair of the primary system more difficult and believe that it is prudent to permit short term personnel access to the drywell for leak inspections during startup/hot standby periods when the primary system is at or near rated operating temperature and pressure. Accordingly, a 24-hour transition period is permitted to inert subsequent to inspections and the placement of the reactor in the Run Mode, and to deinert during operation prior to a shutdown without significantly affecting plant safety.

Containment inerting has been required for all previous boiling water reactor pressure suppression containments. We conclude that the inerting system for the Pilgrim Station provides additional plant safety which outweighs the operational restrictions that may result.

4.1.3 Isolation Valves

The basic function of all primary containment isolation valves is to provide containment integrity between the primary coolant system pressure boundary or the containment atmosphere and the environs in the event of accidents or similar equipment failures. Where necessary the valves are provided with valve operators, and these valves are automatically closed when the sensors detect certain accident or faulted conditions. The consequences of postulated pipe failures both inside and outside the containment have been evaluated. For example, the operational aspects of the main steam line isolation valves for a