OCT 6 1969

Original signed by
S. Levine

R. S. Boyd, Assistant Director for Reactor Projects, DRL
THRU: S. Levine, Assistant Director for Reactor Technology, DRL

DOCKET NO. 50-247: INDIAN POINT II QUESTIONS - 5.6.2 POST LOSS-OF-COOLANT ACCIDENT HYDROGEN EVOLUTION

Responses to the enclosed list of information requests will assist us in completing our review of the H_2 problem for Indian Point II.

Original signed by
C. W. Moon

R. C. DeYoung, Acting Chief
Safety Systems Technology Branch
Division of Reactor Licensing

57-462A
DRL:SSTB:MAT

Enclosure:
List of Proposed Questions

cc w/encl:
M. Rosen, DRL
C. W. Moon, DRL
V. R. Johnson, DRL

bcc: S. Levine, DRL
R. C. DeYoung, DRL
M. A. Taylor, DRL

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DATE ▶	9/26/69	9/ /69	9/30/69	10/ 3/69		

Form AEC-318 (Rev. 9-53) AECM 0240

U.S. GOVERNMENT PRINTING OFFICE : 1968 O—296-617

5.6.2 POST LOSS-OF-COOLANT HYDROGEN EVOLUTION

1. Your analyses of the potential hydrogen evolution over the post loss-of-coolant period neglects certain potential hydrogen sources such as the clad-water reaction and the chemical reaction of materials subject to corrosive attack in the post-accident environment. In addition, we understand that more refined calculations regarding coolant energy deposition would indicate that the predicted evolution of hydrogen by coolant radiolysis, as shown in the FSAR, may be unduly conservative. Please update your FSAR analyses to include all potential hydrogen sources and to factor in the more refined calculations for coolant radiolysis.

2. We understand that Westinghouse has conducted dynamic loop testing in order to simulate and explore the influence that certain post-accident parameters (e.g., core coolant flow, coolant temperature, radiation doses) may have on coolant radiolysis. Please provide a discussion of the results from these tests in order that we may acquire a better understanding of the degree of conservatism included in your analyses of the post-accident hydrogen evolution.

3. Please review your use of materials in safety related components and within the containment environment for assurance of long-term compatibility with spray solutions. Provide an identification of those materials subject

to corrosive attack during the post-accident period. Describe the locations of these materials and provide estimates of applicable quantities, exposed areas, thicknesses, and corrosion potentials. Discuss the matters of safety significance arising from corrosion of these components, e.g., the type and effects of corrosion products and the potential for and consequences of loss of component function.

4. We understand that installation of the Westinghouse flame recombiner system is being considered for the Indian Point II plant as an engineered safety feature in order to control hydrogen evolved within the containment during the post-loss of coolant period.

   a. Please clarify your intentions in regard to the above and provide information relating to the detail design arrangement of the recombiner system in the Indian Point II plant.

   b. Provide suitable discussion and analyses to support the adequacy of the design basis operation of the recombiner system. This should include, but not be limited to the following:

      1) Sampling procedures (liquid, gas), time to sample, location where measurements taken, sampling errors, stratification considerations, etc.

      2) Systems failure mode analyses including the built-in protective and failure mitigating devices.

      3) Fuel system supply; the handling arrangements, logistics, and availability requirements.

4) Post installation checkout and evaluation of the recombiner system, including the planned processing setpoints.

5) System testing procedures and frequency.

c. Discuss the capability of the various components of the recombiner system, e.g., motors, valves, igniters, instrumentation, etc. to withstand the post accident environment (i.e., pressure, temperature, moisture, radioactivity, and corrosive chemical conditions) and remain functional. Identify the various system components subject to such environmental conditions which must remain functional for satisfactory recombiner initiation and operation. Indicate for these components, the test data or other applicable evidence to support the expected functional capability. Discuss the expected operating lifetime requirements and the design lifetime of the recombiner system.

d. How soon following the loss-of-coolant accident might the flame recombiner system be capable of being initiated, given the unlikely occurrence of greater than predicted hydrogen levels in the containment? Discuss those features and/or operating characteristics of the recombiner system which form the limiting time-to-initiate considerations. This discussion should include considerations of time to sample and measure, time to acquire and connect fuel supplies, time and exposure restriction regarding control station manning, and the restrictions imposed by recombiner design (e.g., blower rating, processing setpoints).

5. Prior to and in conjunction with the long-term operation of the flame recombiner system, it may be necessary or desirable to continue operation of certain other engineered safety features such as the containment spray systems and/or the fan recirculation systems. This may be desirable from the viewpoint of providing good mixing of containment gases in order to minimize the potential for stratification and pocketing. Given the design basis loss-of-coolant accident, please provide a discussion of the expected long-term operating modes of such other engineered safety features. Relate the period of operation of these systems to the various time phases of the accident, i.e., fission product reduction phase, heat removal phase, mixing and circulation phase, etc., in order that the integrated functional requirements over the long-term period may be more completely understood.

6. We understand that, in selecting a proposed combustible gas control system (CGCS), alternative measures were studied for feasibility. Provide a discussion of those alternatives studied and the favorable/unfavorable features and technical considerations which led to the final selection of the flame recombiner system.

7. Controlled containment purging could be a suitable backup provision to the flame recombiner system. Please provide an evaluation of controlled purging for the Indian Point II plant.