UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

NOV 14 1972

Docket Nos. 50-237,
50-249, 50-254
and 50-265

Commonwealth Edison Company
ATTN: Mr. L. D. Butterfield, Jr.
Nuclear Licensing Administrator
Post Office Box 767
Chicago, Illinois 60690

Gentlemen:

We have reviewed your submittal dated February 22, 1972, regarding a conceptual design of a combustible gas control system to meet Safety Guide No. 7. Based on our preliminary review, it appears that containment atmospheric dilution (CAD) may be an acceptable concept for Dresden Units 2 and 3 and Quad-Cities Units 1 and 2. However, to fully assess the acceptability of the conceptual design of the CAD system, additional information is needed.

Since the CAD system also has been proposed by other BWR applicants, our review is being performed on a generic basis. Our initial review of the CAD system was based on the proposal submitted for the Browns Ferry Nuclear Power Station. The enclosed questions are based on that proposal. A guide for reply to these questions can be found in Amendment 41 of the Browns Ferry application dated September 27, 1972 (Docket Nos. 50-259, 50-260 and 50-296).

Since your proposal may differ in certain respects from the design for Browns Ferry, we request that you identify any questions that are not applicable to your proposal. Your responses may refer, where applicable, to information already filed with us in connection with the referenced dockets. We request that your reply be submitted within

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60 days with one signed original and fifty-nine additional copies. For those questions that can only be answered upon completion of final design, provide a schedule for submittal of those answers.

Sincerely,

Original Signed by
D. J. Skovholt

Donald J. Skovholt
Assistant Director for
Operating Reactors
Directorate of Licensing

Enclosure:
Request for Additional
Information

cc w/enclosure:
Mr. Charles Whitmore
President and Chairman
Iowa-Illinois Gas and
Electric Company
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Form AEC-318 (Rev. 9-53) AECM 0240

REQUEST FOR ADDITIONAL INFORMATION

DRESDEN UNITS 2 AND 3

DOCKET NOS. 50-237 AND 50-249

AND

QUAD-CITIES UNITS 1 AND 2

DOCKET NOS. 50-254 AND 50-265

1. Discuss experience at Dresden and Quad-Cities Stations with respect to the concentration of oxygen you have been able to maintain in containment. In addition, discuss your capability to further reduce oxygen concentration.

2. Present an analysis of the time at which nitrogen addition must begin following a LOCA as a function of initial oxygen concentration.

3. Identify all potential post-LOCA oxygen sources within containment, excluding that oxygen attributable to radiolytic decomposition. Discuss the nature of these sources (e.g., oxygen entrained in coolant, leakage from air supply systems, etc.) and the potential for contributing to the total oxygen concentrations in containment.

4. Provide a curve of the steam concentration versus time and a discussion of the long term containment pressure transient selected assuming the containment and core cooling systems are functional. Justify that the selected long term pressure transient is conservative from the viewpoint of (a) steam concentrations, and (b) nitrogen makeup requirements.

5. Provide the analyses and diffusion calculations to support the contention that no special mixing provisions (or systems) are required. Describe and evaluate the containment atmosphere circulation patterns and paths between the drywell and suppression chamber that will develop which allows for homogeneity of the combustible gases. Reference experimental work to support this contention of mixing.

6. Using Safety Guide No. 7 parameters, provide curves of the oxygen and hydrogen gas generation versus time for the suppression chamber and for the drywell. Provide the steam concentration for each location versus time and indicate the point in time when homogeneity of the gases occur. Distinguish between core and containment solution radiolysis.

7. Provide an evaluation of the adequacy of the purge system and/or the standby gas treatment system to acceptably function as a backup system for the proposed nitrogen dilution system. Identify the system flow rates*, initiation time, initiation actions required, instrument information that is required to be available to alert operator of the need to initiate purge, the purge gas composition (including fission products, moisture levels, gas concentrations, etc.) and any system constraints (e.g., pressure, sampling time, moisture, combustible gas levels, fission products inventory, air infiltration, nitrogen makeup requirements, etc.) against earlier initiation. Provide an evaluation of the sizing bases for the system's components (e.g., filters, ducting, fans, etc.) and make a conclusion regarding the acceptability of these components to sustain the post-LOCA purge gas conditions and composition. If the CAD system is inoperable and purge is used at the proposed purge rate, provide a curve of containment atmosphere composition and pressure as a function of time.

8. Provide detailed P&I diagrams showing all essential system elements and the detailed design arrangements for the proposed nitrogen dilution and purge backup systems. Include the appropriate sampling, mixing, and makeup system elements.

9. Provide discussion and analyses in detail to support the adequacy of the design bases for the nitrogen dilution system and discuss how the system will be operated. The discussion should include, but not be limited to the following:

   a. The sampling equipment, principles, design, operating procedures, equipment qualification for LOCA service, time to sample or monitor, location of sampling points in containment, location of measurement readout, sampling errors and stratification considerations.

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* To perform necessary radiological dose calculations, the information provided should include purge rates in terms of equivalent containment leakage as a function of time following a LOCA.

b. The pre-operational checkout and evaluation of the sampling and nitrogen dilution systems.

c. The system testing procedures and frequency.

d. The design pressure limitations of components and piping.

e. The delivery capability of the nitrogen supply against the pressure head of containment under accident conditions.

f. The existing constraints which would prevent earlier than anticipated usage of the nitrogen dilution system, e.g.,

(1) makeup limitations due to inadequacy of onsite nitrogen inventory or time to obtain offsite makeup (specify),

(2) time required to sample and judge action requirements,

(3) time and actions required to override the isolation requirements, including all applicable valving required to be defeated to effect dilution operations.

10. Identify the codes, standards, and classifications applied to the final design of the nitrogen dilution systems and components, including the supporting systems and equipment, i.e., makeup, sampling, purge system.

11. It is our understanding that the nitrogen dilution, purge, and sampling systems originally were provided for normal operating functions and were not specifically considered as being required for post-accident safety functions. Describe in detail the design bases for and any design changes made or planned to these systems to upgrade them to the standards of an engineered safety system. Provide a failure mode analysis for these systems.

12. Describe all features, components, and functions in the containment atmosphere control system that will be shared between plant units and evaluate the acceptability of the proposed sharing.

13. Describe the surveillance of the CAD system equipment and monitors and limiting condition of operation you would propose for incorporation into the Dresden Units 2 and 3 and Quad-Cities Units 1 and 2 Technical Specifications.

14. Section 3.2, page 6 of the Supplement to Special Report No. 14, states that "the operator will have sufficient time available to establish some small leakage rate if the containment leakage rate proves to be too small." Clarification of this statement should be provided and should include discussion of:

    a. The information readily available to the operator to facilitate his judgment on whether the leak rate is less than or greater than the allowable leak rate,

    b. The system used and actions that can be taken to control the leak rate,

    c. A discussion on what constraints and system provisions will exist for the operator to limit the allowable leak rate within prescribed values, and

    d. What disposition and processing provisions are provided for the discharged gases.

15. Discuss the potential for stratification of hydrogen leakage from the drywell into the reactor building or compartments. Discuss the need for positive mixing of the atmosphere in the reactor building or compartments to prevent the formation of localized combustible gas mixtures.

16. For the long-term period following the DBA, discuss the potential degradation of valve structure and penetrations within the primary containment in connection with the capability of the containment and containment systems to maintain (a) structural integrity and (b) required leak-tightness requirements needed during the long term following a loss-of-coolant accident.