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August 14, 1985

Mr. John A. Zwolinski, Chief
Operating Reactors Branch No. 5
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

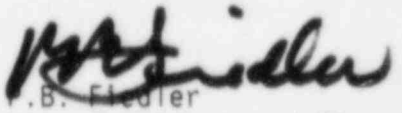
Dear Mr. Zwolinski:

Subject: Oyster Creek Nuclear Generating Station
Docket No. 50-219
NRC Request for Additional Information
Regarding Licensee Response to Generic Letter 84-09

By letter dated April 29, 1985 the NRC staff requested additional information regarding the Response to Generic Letter 84-09 which had been provided for Oyster Creek by letter dated July 13, 1984. The purpose of this correspondence is to provide the necessary additional information for the NRC staff to complete their review of Oyster Creek relative to the Recombiner Capability Requirements of 10CFR50.44(c)(3)(ii).

The attachment to this letter provides the requested additional information. If you have any questions, please contact M. W. Laggart, Manager, BWR Licensing at (201) 299-2341.

Very truly yours,



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RESPONSE TO NRC GENERIC LETTER 84-09

ADDITIONAL INFORMATION

QUESTION 1

You stated in your response to criterion 2 of the GL that nitrogen is used for the drywell instrument air/nitrogen system; however, atmospheric air exists as the backup to the nitrogen system and is actuated automatically if the nitrogen system fails. Section 6.2.5.3.5, Post-LOCA Oxygen Sources in containment, in the Oyster Creek Updated Final Safety Analysis Report (FSAR), however, states the instrument air supply inside the drywell, during power operation when the containment is inerted, is from a nitrogen supply and is not a source of oxygen during a LOCA. It is explained in your response that the use of the backup to the nitrogen system could result in air in-leakage and increase the drywell oxygen concentration but, if the concentration exceeds the high limit, an annunciator will then alert the operator to take proper action.

Supplement your response to criterion 2 of GL-84-09 with a discussion of the indication to the operator that the backup air system has been actuated, the proper actions taken by the operator, the high limit for annunciator action, the restrictions on the time the nitrogen system may be out of service, the sources and amounts of this air in-leakage and increased drywell oxygen concentration prior to and during an accident and the operational reliability of the nitrogen system (e.g. can the system suffer a single active failure and still perform its intended function).

For the drywell instrument air/nitrogen system to be acceptable to the staff in meeting criterion 2 in the GL, the backup air system must be automatically isolated when primary containment isolation occurs for the design basis Loss-of-Coolant Accident (LOCA). If the nitrogen system does not meet the single active failure criteria above, the staff also required that (1) the control room operators must have appropriate instrumentation in the control room to indicate whether or not the air backup system is operating, (2) the total volume of the drywell instrument air/nitrogen system (e.g. accumulators, piping) that can be filled with air after using the air backup system is actuated, must be shown to be negligible compared to the drywell volume and (3) the use of the air backup system must be limited to a maximum of 15 days through appropriate limiting conditions for operations and surveillance requirements in the Technical Specifications.

RESPONSE 1

The Oyster Creek Plant Procedure #312, Revision 30 "Reactor Containment Integrity and Atmospheric Control" instructs that the drywell and torus oxygen concentration should be inerted to less than 3% (volume) initially. During power operation, if any of the following occurs, the nitrogen system will be automatically transferred to the 100 psig air system:

a. Loss of power to the nitrogen compressor;

b. Loss of power to the compressor control circuit;

c. Nitrogen receiver pressure decreasing below 65 psig;

d. Air/nitrogen header pressure decreasing below 65 psig.

This will be indicated by the air/N_2 indicator when the "AIR" illuminates and the "N_2 COMPRESSOR FAIL" alarm (C-3-g) annunciates on Panel 1F/2F.

An oxygen concentration of greater than 3.5% by volume will annunciate the "TORUS/DW O_2 HI" alarm at C-7-f on Panel 1F/2F. Therefore, there are sufficient indications and/or alarms for the operator to realize that the nitrogen system is switched to air supply and/or the oxygen concentration is approaching the 4% Technical Specification limit. Once the limit is exceeded, the Technical Specification requires the plant to be shut down within 24 hours.

Reliability of the Nitrogen System is provided by two separate compressors with staggered setpoints on pressure. The backup air supply will be automatically isolated when primary containment isolation occurs for the design basis Loss-of-Coolant Accident (LOCA) by the indication of low-low reactor water level. An estimate of the volume that can be filled by air after using the air backup system is provided below:

The instrument air/nitrogen system is comprised of 1, 1-1/2 and 2" schedule 40 piping, valves, air cylinder operators and accumulators. The total volume of the system containing instrument air would be approximately 40 ft^3 at nominal 100 psig system pressure. Correcting this for an equivalent volume of free air (at atmospheric pressure) there is about 290 ft^3 of free air. For

the drywell volume of 180,000 ft^3, this represents 0.16% free air by volume. If the estimation is incorrect by a factor of two, there would be less than 0.4% free air by volume.

Further considering that oxygen makes up 20.9% of dry air, the oxygen concentration relative to the drywell would be less than 0.08% by volume. This order of magnitude should prove to be negligible in comparison to the drywell volume.

GPUN is planning to impose a maximum of 15 days for use of the air backup system in Operating Procedure #312 and will propose a Technical Specification Change Request accordingly.

QUESTION 2

In your letter dated July 13, 1984, you did not provide justification that the following specific potential sources of oxygen in containment listed in GL-84-09 may be neglected: instrument air system, service air system, breathing air system, MSIV leakage control system, pressurized penetrations and inflatable door seals. Supplement your response to criterion 3 of the GL with a discussion on your justification to neglect the above potential sources of oxygen.

RESPONSE 2

The Instrument Air System has been discussed in detail in response to Question 1. The Service Air and Breathing Air Systems use separate hoses and are not connected into the drywell during power operation. The plant does not have an MSIV leakage control system. All penetrations are sealed by separate pure nitrogen bottles independent of the Instrument Air/Nitrogen System. All doors use gaskets and have no inflatable seals using air. There is a TIP purge system that may use compressed nitrogen or air. During power operation,

pure nitrogen is used. There are no other potential sources for oxygen in-leakage other than the above discussed.

QUESTION 3

Provide the safety classification of the combustible gas control system for Oyster Creek. Section 6.2.5.3.6.c, pages 6.2-50/51 of the Oyster Creek Updated FSAR states that (1) purging the primary containment to limit the hydrogen concentration following a LOCA may be required within 22 hours (Case 3, maximum hypothetical radiolytic gas generation) to 23 days (Case 1, maximum expected radiolytic gas generation) and (2) conservative calculations of radiolytic gas generation indicate that adequate time is available to take corrective action by either purging the primary containment or dilution by pressurization. It is the position of the staff that the updated FSAR means you are relying on purging/repressurization as the primary means for combustible gas control and these systems must be designed to conform to GDC 41, 42 and 43 of Appendix A to 10CFR Part 50 and must be "safety-grade". Provide the safety classification of the purging/repressurization system for the primary containment and a discussion of its conformance to GDC 41, 42 and 43.

RESPONSE 3

The combustible gas control system for Oyster Creek is the Containment Inerting System (System 212) which is classified as "Nuclear Safety Related" inside the containment up to and including the isolation valves, and is not specifically classified for the rest of the system outside the containment.

Since more recent state-of-the-art understanding and detailed analysis (References 1&2) have shown that (1) the oxygen generation rate in boiling water is less than 0.1 molecules per 100 eV (G = 0.1), and (2) starting at a 4% oxygen concentration and a most severe hydrogen generation accident, the oxygen concentration will not increase to exceed 5%, (the Reg. Guide 1.7 combustible limit) in 1000 days, therefore, GPUN plans to change the Oyster Creek Updated FSAR to reflect this fact, specifically: Section 6.2.5.3.6.c, page 6.2-48/51.

1. Case 1 for the maximum expected radiolytic gas accumulation rate G = 0.1 and original oxygen concentration of 4% will be replaced by the base case of Reference 1.

2. Delete Case 2, "Maximum Credible Radiolytic Gas Accumulations", since a G value equal to 0.3 was used. Overly conservative assumptions are not required.

3. Delete Case 3, "Maximum Hypothetical Radiolytic Gas Assumption", where G = 0.45 for the same reason.

QUESTION 4

In Section 6.2.5 of the Updated FSAR, it is stated that your containment Combustible Gas Control System (CGCS) is based on controlling the hydrogen content in primary containment following a LOCA instead of controlling the oxygen content. Based on the analyses in Section 6.2.5 of the Updated FSAR, it appears that purging will be required earlier for hydrogen control than for oxygen control. In fact, beginning at 4% oxygen in primary containment, which is a proposed technical specification you have submitted to NRC, purging following a LOCA may not be required within the first 30 days if the CGCS is controlling on oxygen. Therefore, provide your justification for the CGCS controlling on hydrogen rather than on oxygen.

RESPONSE 4

Using the more recent technological understanding, GPUN plans to change the Oyster Creek FSAR to reflect that, during normal operating conditions, controlling the combustible gases following a LOCA is based on controlling the oxygen content, rather than the hydrogen content. At those times when the containment is de-inerted, as allowed by the Technical Specifications, combustible gas control would be based on hydrogen content. Since the Technical Specification limit on oxygen content has already been changed to 4% (Reference 3), thus purging following a LOCA is no longer required within the first 30 days. This is planned to be reflected both in the FSAR and the Emergency Operating Procedures.

REFERENCES

1. GE Report NEDO-22155, "Generation and Mitigation of Combustible Gas Mixtures in Inerted BWR Mark I Containments". June 1982.

2. Northeast Utilities Docket 50-245, "Millstone No. 1 Combustible Gas Control Evaluation". August 1982.

3. Amendment No. 86. Operating License DPR-16. Docket 50-219. LS05-85-06-013. Dated June 7, 1985.