UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

May 7, 1980

Dockets Nos. 50-321, 366
and 271

Mrs. Leo A. Drey
515 West Point Avenue
University City, Missouri 63130

Dear Mrs. Drey:

Your letter to the Nuclear Regulatory Commission dated March 25, 1980 has been referred to me for reply. My review of your letter suggests a potential misunderstanding of two technical issues for General Electric Boiling Water Reactors: (1) the methods of post accident combustible gas control and (2) the inerting with nitrogen of Mark I containments and its potential for increasing radioactive materials inventory in the reactor coolant. Please note that I have not had the benefit of reviewing the UPI story in the St. Louis Post Dispatch on March 20, 1980.

The Commission's current regulations for licensing power reactors require that the design of containment systems include provisions for combustible gas control; that is, following postulated accidents, the facility can control the concentration of hydrogen or oxygen to assure that flammable concentrations do not result. Following a postulated loss-of-coolant accident, hydrogen may accumulate within the containment as a result of metal-water reaction between the fuel and its cladding, and as a result of radiolytic decomposition of the emergency cooling water. If a sufficient amount of hydrogen is generated and oxygen is available in sufficient quantities, the subsequent ignition of the hydrogen might lead to failure of the containment.

There are two principal methods that are used to satisfy this requirement. The method used by most facilities is the inerting of the containment with nitrogen. By maintaining an inerted atmosphere and by maintaining the oxygen concentration to less than 4%, the possibility of hydrogen combustion is minimized. This normal inerting system is supplemented by safety grade containment atmospheric dilution systems for maintaining oxygen concentrations below ignition concentration.

The second method of satisfying our requirements is to provide for a combustible gas control system. Neither Vermont Yankee nor Hatch Unit No. 2 containments are inerted. For these facilities, and as permitted by our regulations, they can accommodate the effects of hydrogen that may be released during a loss-of-coolant accident without a loss of safety function. These two reactors are licensed on this basis. In the case of Hatch 2, the facility also has hydrogen recombiners which typically would not be required to operate until about a week (minimum) to several months (maximum) following an accident. Nevertheless, as a result of the TMI-2 Lessons Learned Task Force, members of the staff recommended that Vermont Yankee and Hatch 2 containments be inerted on the basis that the accident at TMI-2 may have resulted in an amount of metal-water reactor and hydrogen generation in excess of the amounts considered in current regulations. The

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Commission's decision at that time was to defer rule making (i.e., formal change to our regulations) pending a more thorough evaluation of questions related to rate and amount of hydrogen generation, the need to control it, and the means of doing so.

Recently the staff presented to the Commission a proposed interim requirement recommending rule making. I believe this to be the report you referred to in your letter. A copy is enclosed for your information. The report is a technical basis for the staff's recommendations. As of this date, the Commission has not ruled on this issue. You will note that the report proposes interim hydrogen control requirements for not only Mark I, but also Mark II containments (none of which are presently licensed). A listing of licensed reactors with Mark I containments is included as Enclosure 2.

In regard to your second expressed question, the inerting of Mark I containments has no effect of the nitrogen-14 concentration in the reactor coolant. The containment volume is physically separated from the reactor coolant system and is normally isolated. The principal contribution to carbon-14 releases from a boiling water reactor is the thermal neutron reaction with oxygen-17 in the reactor coolant. Carbon-14 can also be produced by neutron activation of nitrogen-14 in the drywell. Flux levels in this volume are substantially lower (approximately 4×10^8 neutrons/cm^2 - sec) than in the primary coolant. However, since the drywell atmosphere is isolated, the inerting of boiling water reactors has virtually no effect on the annual quantity of carbon-14 that is released from boiling water reactors.

I trust this letter is responsive to your request.

Sincerely,

Robert W. Reid

Robert W. Reid, Chief
Operating Reactors Branch #4
Division of Licensing

Enclosures:
1. SECY 80-107
2. History of Plants

Enclosure 2

LISTING OF BOILING WATER REACTORS WITH MARK I CONTAINMENTS

Oyster Creek
Nine Mile Point 1
Dresden 2 and 3
Millstone
Monticello
Quad Cities 1 and 2
Pilgrim
Brown's Ferry 1, 2 and 3
Vermont Yankee
Duane Arnold
Peach Bottom 2 and 3
Cooper
Hatch 1 and 2
Brunswick 1 and 2
Fitzpatrick
Enrico Fermi 2
Hope Creek 1 and 2