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

OFFICE OF THE
CHAIRMAN

COMMISSION
CORRESPONDENCE

May 14, 1980

The Honorable Morris K. Udall, Chairman
Subcommittee on Energy and the Environment
Committee on Interior and Insular Affairs
United States House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

This is in response to your letter of February 7, 1980 regarding reactor control system failures which could lead to accident sequences not previously anticipated.

It is certainly true that failures in control systems can and will occur, and that such failures can initiate transients and accidents. Also, actions of control systems could mitigate or aggravate the course of events during a transient or accident. Although the staff does not review control systems in detail, applicants are required to include control-system failures as sources of transients and accidents, for example, postulated interruption of main feedwater.

The Crystal River event of February 26, 1980, for example, was initiated by a power supply failure in the plant's non-nuclear instrumentation system. This caused spurious opening of a power operated relief valve, release of reactor coolant, and partial loss of control room instrumentation. However, the automatic emergency cooling injection system performed as designed to prevent fuel failure. The staff is currently investigating the generic implications of the Crystal River event to determine how such challenges to the safety systems can be reduced.

As an example of a potential problem involving the interaction between high energy lines and control systems, in September 1979 a licensee reported to the NRC that it was examining the possibility, raised by its reactor designer, that steam produced during some postulated pipe breaks could damage control systems. As a result, the consequences of the pipe break might be more severe than previously calculated. Specific possible scenarios involving such control system failures were identified.

Shortly thereafter, Harold Denton, Director of the Office of Nuclear Reactor Regulation, sent letters to all owners of operating light water reactors requesting that they determine if an unreviewed safety question related to control system failures existed at their plants.

All licensees responded to the request within 20 days. The NRC staff has screened the submittals and has found no identified safety problems; that is, the staff found no event sequences that lead to unacceptable consequences. Potentially unacceptable accidents were eliminated either because postulated interactions were shown to be impossible to achieve (by virtue of plant layout or equipment qualification) or because it was shown that sufficient time existed for the operator to take remedial action. On this basis, no significant corrective measures or power derating have been prescribed. A copy of the staff's review of the licensees submittals is enclosed.

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Some staff members have recommended power derating based on postulated control system failures. However, it is the staff consensus that safety systems will mitigate control system failures at any power, and that interim power derating is not required for protection of the public health and safety. The Commission concurs. Nonetheless, the Commission recognizes the need for further deliberate investigation of control system failures and their potential affects. As discussed below, the staff has initiated additional work in this area.

The Commission's Advisory Committee on Reactor Safeguards was briefed on the record by the staff regarding this matter on November 9, 1979.

These issues and related issues involving non-safety-grade equipment are being addressed by the staff through two major programs. The Systems Interaction Program is intended to systematically discover potential interactions between plant systems. The Integrated Reliability Evaluation Program has as its objective the identification of high-risk accident sequences at individual plants and development of initiatives to reduce the probability of such sequences.

The Commission feels that this letter adequately responds to the questions raised in your letter and stands ready to provide additional information should you require it.

However, Commissioners Gilinsky and Bradford feel that the above responses down play what they regard as a serious problem. They feel that a better discussion of the safety implications of control systems is provided in the attached October 22, 1979 memorandum from Harold Denton.

Sincerely,

John F. Ahearne
Chairman

Enclosures:
1. Memo dated Dec. 19, 1979 from Paul Check to Darrell Eisenhut
2. Memo dated Oct. 22, 1979 from Harold Denton to Chairman Ahearne

cc: Rep. Steven Symms