United States Senate

WASHINGTON, D.C. 20510

July 27, 1984

Mr. Carlton C. Kammerer
Nuclear Regulatory Commission
Matomic Building
1717 H Street, NW
Suite 1159
Washington, D.C. 20555

Dear Mr. Kammerer:

Because of my desire to be responsive to all inquiries and communications directed to this office, and knowing that your objectives are similar in this regard, the attached communication is referred to you for consideration. I would very much appreciate your evaluating the information presented and taking whatever action is required to resolve the situation. At your earliest convenience, I would be grateful for your findings and views, in duplicate form. Please send your response to the attention of Marco A. Caceres.

My warmest personal regards.

Sincerely,

Pete V. Domenici
United States Senator

PVD/mc
Enclosure

2265 Avalon
Las Cruces, NM 88005
27 June 1984

Pete Domenici
U.S. Senator
Santa Fe-3004 New Postal Bldg.
Santa Fe, NM 87501

Dear Mr. Domenici:

Ever since the first Boiling Water Reactor (BWR) went on line it seems that a lot of reactors have been having trouble with their scram (Safety Control Rod Automatic Mechanism) system. "This kind of failure, the nuclear industry has long believed, has a negligible chance of occurring, on the order of once in a million reactor operating years. Yet it has happened several times already."[1] The two most mentioned cases have been Browns Ferry Unit 3 and Salem NJ reactors 1 and 2. If we intend to keep using nuclear reactors as a source of energy we must do something about the scram system.

On June 28, 1980, at the Browns Ferry Unit 3 BWR, 76 of 185 control rods failed to insert fully into the core when a scram was called for by the reactor operator. "Fortunately, this occurred during a routine shutdown from power, rather than during the kind of reactor transient in which complete and rapid scram of all the rods might have been very important."[2]

Shortly after the Browns Ferry Unit 3 event, the Nuclear Regulatory Commission's (NRC's) Office of Analysis and Evaluation of Operational Data (AEOD) initiated an indendent study of the design and operation of the Browns Ferry Unit 3 scram system and the special scram systems tests and inspection which was performed at the plant site during the daysimmediately

following the event. "The purpose of the study was to provide an independent assessment of the cause of the event to determine the lessons learned, and to recomment corrective actions."[3]

The apperent cause of this event was found to be water accumulation in the scram discharge volume (SDV) prior to the attempted scram.

After the operator saw the water accumulation it took 4 tries to get the control rods to drop manually. The elapsed time from the first scram through the forth was-14 minutes. "Normally all the rods insert within 3 seconds."[4]

"The following is the principal findings of the AEOD study of the Browns Ferry Unit 3."[5]

- The Browns Ferry 3 SIV high-level-scram function did not and cannot provide protection against the undetected accumulation of water in the east SDV header with attendant loss of the east bank scram capability even during unobstucted venting and draining conditions.

- A single blockage in the venting system or drain line of the west header SDV can result in an undetected accumulation of water in both the east and west headers, which could disable the scram capability of all control rods.

-With the current SDV-SIV design a blockage in the SDV drain or vent path can cause a partial loss of scram capability and disable the protection system that was installed to ensure detection and corrective action.

- There are numerous actual and potential mechanisms for introducing and retaining water in the SDV with no accumulation in the SIV.

The current SDV-SIV design permits the automatic high-level-scram safety function to be adversely influenced by the clean radioactive-waste drain system for the reactor building. This system is not safety related.

- The Browns Ferry 3 partial scram failure, together with recent events at other BWR's shows that float-type instruments for monitoring

water levels have a significant degree of unreliability.

- If a scram condition exists which cannot be by passed in SHUTDOWN or REFUEL mode and if the SDV vent or the SIV drain valve fails to close, an inisolatable blowndown of reactor coolant outside the primary containment can occur.

- The Browns Ferry 3 emergency operating instructions did not include a procedure or guidance for the operator to follow in the event of a partial or complete scram failure.

"The AECD also found out if a postulated that attendant to a reactor scram a break may occur in the SDV system piping downstream of the scram outlet valves and upstream of the SDV system vent or drain valves."[6]

The partial scram failure that occured at Browns Ferry 3 demonstrated that BWR scram systems as presently designed are susceptible to loss of scram capability while operating at full power. "Futhermore, the event showed that the loss of scram capability can occur in a way which goes undetected by the operator and unprotected by the reactor protection system."[7]

The second most talked about failure of scram devices happened twice in three days. The dates were February 22, 1983 and again on February 25, 1983. The place was Salem, NJ.

The Salem Unit 1 reactor control rads failed to insert upon receipt of an automatic trip signal from the reactor protection system. However, the rods did insert and shutdown the plant upon receipt of a manual initial trip signal. On February 25, 1983, approximately two hours after the Salem Unit 1 event, the cause of the failure to trip was determined by licensee instrumentation technicians to be failure of the UV trip device in both RTBs to function as designed. The same problem had occured

on February 22, 1983, but it was not recognized by the licensee. As previously discussed, the plant on both occasions was shut down by manual operator action. Possible contributors to the failure of the UV trip devices are 1) dust and dirt; 2) lack of lubrication; 3) wear; 4) more frequent operation than intended by design; and 5) nicking of latch surfaces caused from repeated operation of the breakers. Base on an independent evalution of the failed UV trip devices identified by the licensee, the NRC staff concluded that, while the Salem Unit 1 breaker failures occurred as a result of several contributors, the predominant cause use excessive wear accelerated by lack of lubrication and improper maintenance.

It appears that no preventive maintenance was conducted on the Salem Unit 1 DB-50 circuit breakers until January 1983. Additionally, the lubrication recommendations of the Westinghouse 1974 Technical Bulletin and Data Letter were not implemented during the January 1983 maintenance, since personnel performing the maintenance (including a Westinghouse service representative) were not aware of this information. "The January maintenacne was preformed because of a breaker problem which occurred at Salem Unit 2 on January 6, 1983. In this event, a reactor trip occurred due to a low-low water level condition in one steam generator and only one RTB operated. The second RTB finally opened 25 minutes later, although the reactor had already tripped from opening of the other RTB. The failure of this RTB use concluded by the licensee to be due to dirt and corrosion interfering with proper operation of the UV trip devices. As a result of this event, maintenance was conducted on all Unit 1 RTBs, at least one of which involved supervision of the RTB vender, Westinghouse. The licensee also reported that all reactor trip breakers were tested after maintenance per plant procedures."[8]

My opinion on the scram is, do not let the NRC give out anymore licenses to private corporations until the manufacture (Westinghouse) upgrades the efficiency of the scram system to where the plant operator is not worrying about the control rods not closing completely as required. When the NRC makes the private corporations and the manufacture of the scram systems work together, then and only then will the production of nuclear energy be safe.

Sincerely,

Steve L. Benavidez

ENDNOTES

[1]Eliot Marshall, " The Salem Case: A failure of Nuclear Logic," Science, 15 April 1983, p. 280

[2]David Ckrent, " Anticipated Transients Without Scram," Nuclear Reactor Safety, 2 May 1983, p. 260

[3]William R. Casto, " Partial Failure to Srcam at Browns Ferry 3," Nuclear Safety, March-April 1981, p. 226

[4]William R. Casto, " Partial Failure to Scram at Browns Ferry 3," Nuclear Safety, March-April 1981, p. 227

[5]William R. Casto, " Neutronics Analysis of Browns Ferry 3 Partial Control Rod Insertion," Nuclear Safety, September-October 1982, p. 573

[6]E.W. Hagen, " Operation and Safety Concerns of the BWR Scrams System," Nuclear Safety, March-April 1982, p. 160

[7]William R. Casto, " Operating Experiences," Nuclear Safety, March-April 1981. p. 227

[8]U.S. Nuclear Regulatory Commission, Report to Congress on Abnormal Occurrences (Washington, D.C.: U.S. Coverment Printing Office January-March 1983), p.p. 10-11

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