VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

February 21, 1980

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
Attn: Mr. Albert Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Serial No. 134
PO/FHT:scj
Docket Nos. 50-280
50-281
License Nos. DPR-32
DPR-37

Dear Mr. Denton:

Asymmetric LOCA Loads on Reactor Pressure Vessels
Surry Power Station Units 1 and 2

In response to Mr. Victor Stello's letter of January 25, 1978, Virginia Electric and Power Company became a participant in a Westinghouse Owners Group to resolve the subject issue. The purpose of this letter is to review the status of the evaluation and to provide the results of the analyses completed to date.

The evaluation program was divided into three phases, A, B, and C. Phase A included data acquisition from the Utilities, and a review of structural and hydraulic parameters for potential grouping of generically similar plants.

Phases B and C separated the evaluations for breaks postulated outside the reactor cavity and inside the reactor cavity. Phase B involved the actual structural assessments of plant groups and development of specific plant qualification programs as required for breaks outside the reactor cavity. Phase C included evaluation of breaks inside the reactor cavity annulus and verification of the structural integrity of the reactor vessel and supports, reactor internal structures, fuel, and ECCS piping attached to the reactor coolant system. The integrity of the CRDM's and primary equipment supports which may be controlled by these vessel nozzle breaks is also considered in Phase C.

Concurrent with the Phase B and C work, mechanistic pipe break analyses were also undertaken to determine if large through-wall cracks in reactor coolant system piping would propagate to a large LOCA. Results of this work have previously been submitted by Westinghouse letter NS-TMA-2200, dated February 6, 1980, as WCAP 9558, "Mechanistic Fracture Evaluation of Reactor Coolant Pipe Containing a Postulated Circumferential Through-Wall Crack."

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This report and the NSAC/EPRI Technical Memorandum submitted to the NRC on October 19, 1979, in a letter from John E. Ward (Chairman, AIF Committee on Reactor Licensing and Safety) to Harold R. Denton, have determined, by diverse and independent analyses and experimental results, that the probability of high energy line breaks in reactor piping systems, both austenitic and ferritic, is extremely small. In addition the consequence of unanticipated, slow crack growth due to fatigue, corrosion fatigue, or stress corrosion cracking is likely to be relatively slow leakage. The analyses specifically determined that very large cracks are required to initiate ductile fracture in nuclear piping under normal loadings; if ductile fracture does initiate due to a severe overload, unstable crack extension is unlikely to occur; and the openings of through wall cracks are small.

These results support the conclusion that a double-ended guillotine break in a reactor system pipe without any prior indication of substantial leakage is unrealistic and need not be considered as a basis for plant design or modification.

Nevertheless, Phase B and Phase C asymmetric loads analyses have been continued. Results have been and will be submitted as described below.

Westinghouse Owners Group report "Phase B5: Subcompartment Asymmetric Pressure Loads", authored by D. S. Nixdorf was presented to your staff in February, 1979. The remainder of the Phase B work, covering steam generator and reactor coolant pump integrity and supports evaluation, is reported in WCAP 9628, "Westinghouse Owners Group Phase B Asymmetric LOCA Loads Evaluation", which was submitted by Westinghouse letter NS-TMA-2200 dated February 6, 1980.

Phase C results for verification of the structural integrity of the reactor vessel supports and ECCS piping attached to the reactor coolant system are being submitted by Westinghouse letter NS-TMA-2206, dated February 14, 1980. In accordance with the agreement reached with the NRC staff in November, 1979, results of evaluations of reactor internal structures, fuel and control rod drive mechanisms will be provided by July, 1980.

In addition, the Westinghouse Owners Group has analyzed two representative plants and presented the results to the NRC in a meeting on February 21, 1979. The representative plants analyzed used nominal existing plant configurations including break limiting devices in the reactor cavity shield wall.

The above analysis results have been compiled because of the staff's express desire to gain a better understanding of the asymmetric loads issue. We continue to believe the additional Mechanistic Fracture Evaluation work which the Owners Group undertook provides sufficient justification to eliminate the double-ended guilotine break as a basis for plant design. We urge that review of WCAP 9558 continue and that its conclusions be adopted as resolution of this issue.

We do not feel that backfitting the Surry plant will provide substantial additional protection of the public health and safety. To the contrary, modification will impose additional radiation exposure to those installing the modifications.

The NRC has stated that asymmetric LOCA loads should be combined with seismic loads. This position is not justified as demonstrated by the Mechanistic Fracture Evaluation.

We agree with the NRC Staff assessment "that the probability of a pipe break resulting in substantial transient loads on the vessel support system or other structures is acceptably small because: (1) the break of primary concern must be very large, (2) it must occur at a specific location, (3) the break must occur essentially instantaneously, and (4) the welds are currently subject to inservice inspection by volumetric and surface techniques in accordance with ASME Code Section XI". Therefore operation of Surry Units 1 and 2 is justified while this matter is being resolved.

Very truly yours,

C. M. Stallings
Vice President-Power Supply
and Production Operations

cc: Mr. James P. O'Reilly