APR 14 1977

Distribution

Docket File	V. Moore
NRC PDR	M. Ernst
Local PDR	R. Vollmer
LWR #3 File	W. Gammill
F. J. Williams	OELD
D. B. Vassallo	IE(3)
R. Heineman	ACRS(16)
R. Tedesco	R. Mattu
D. Ross	bcc: NSIC
M. Rushbrook	TIC
W. Pike	
O. Parr	
J. Knight	
H. Denton	

Docket Nos. 50-438
and 50-439

Tennessee Valley Authority
ATTN: Mr. Godwin Williams, Jr.
Manager of Power
830 Power Building
Chattanooga, Tennessee 37401

Gentlemen:

SUBJECT: BELLEFONTE NUCLEAR PLANT UNIT 1 - REACTOR VESSEL SUPPORTS

During the past year, we have been investigating the consequences of reactor coolant system breaks postulated within the reactor cavity. We became concerned with these breaks for several reasons. First, a new computer code had for the first time quantitatively determined the asymmetric loads on the reactor internals caused by sub-cooled blowdown of the primary system; these loads are transmitted to the reactor supports and are largest when a break is postulated close to a reactor vessel nozzle. Second, past design methods had not explicitly accounted for the asymmetric loading concurrent with the other loads from a pipe break within the reactor cavity.

We have reviewed the methods proposed by Babcock & Wilcox Company (B&W) for calculating the asymmetric loads on internals. In addition, we and our consultant, the Idaho National Engineering Laboratory, have developed models to predict these loads and the mechanical response of a reactor coolant system to pipe breaks.

In the near future, we plan to use our models to perform an independent check of the B&W model. Since our analysis includes the details of a reactor cavity and reactor vessel supports, a specific plant must be modelled. The plant we have chosen is the Bellefonte Nuclear Plant Unit 1. We have chosen Bellefonte Unit 1 because it is the lead plant for the B&W Mark C fuel design (205 assembly design).

OFFICE	LWR-3 PM	LWR-3 BC				
SURNAME	WPike:ab	OParr				
DATE	4/ /77	4/ /77				

NRC FORM 318 (9-76) NRCM 0240 ☆ U.S. GOVERNMENT PRINTING OFFICE: 1976 — 626-624

APR 14 1977

The information we need on the details of Bellefonte 1 are listed in the Enclosure. We request that you provide us with three copies of this information.

Our present schedule for completing our independent analysis including a review by the Advisory Committee on Reactor Safeguards, is September 1, 1977. A prompt response to this request is imperative in order for us to meet this schedule. Please contact us if you have any question with regard to this matter.

Sincerely,

/s/

Olan D. Parr, Chief
Light Water Reactors Branch No. 3
Division of Project Management

Enclosure:
Modelling Information Need
for Bellefonte 1

cc: see next page

OFFICE ➢						
SURNAME ➢						
DATE ➢						

cc: Herbert S. Sanger, Jr., Esq.
General Counsel
Tennessee Valley Authority
629 New Sprankle Building
Knoxville, Tennessee 37902

Mr. E. G. Beasley
Tennessee Valley Authority
400 Commerce Avenue, W9C 165
Knoxville, Tennessee 37902

Mr. T. Spink
Licensing Engineer
Tennessee Valley Authority
303 Power Building
Chattanooga, Tennessee 37401

APR 14 1977

ENCLOSURE

BELLEFONTE NUCLEAR PLANT UNIT 1

REACTOR VESSEL SUPPORTS

STRUCTURAL DETAILS (BLUEPRINTS) OF:

(1) Reactor Vessel

(A) Dimensions (heights, radii, thicknesses, head connectors, nozzle details).

(B) Materials

(2) Upper Core Support Structure (Support Columns, Upper Support Plate (including hole pattern), Internal Support Ledge, Hold-down Spring)

(A) Dimensions

(B) Materials

(C) Details of interfaces between U. S. plate, ledge, core barrel, reactor vessel. Include equivalent springs used in analysis.

(3) Core Barrel

(A) Dimensions

(B) Materials

(C) Nozzle Details

(D) Details of interfaces with:

(i) Thermal Shield

(ii) Upper and Lower Core Plates

(iii) Radial Supports

(iv) Bottom Support Casting

(v) Baffles (Flow Shroud)

(vi) RPV Nozzles

(4) Upper and Lower Core Plates

(A) Dimensions (including hole patterns)

(B) Materials

(C) Details of interfaces with:

(i) Support Columns

(ii) Fuel Assemblies

(iii) Baffles

(5) Thermal Shield

(A) Dimensions

(B) Materials

(6) Bottom Support (Columns and Bottom Support Casting)

(A) Dimensions

(B) Materials

(C) Details of Interfaces with:

(i) Eath Other

(ii) Lower Core Plate

(7) Piping

(A) Materials

(B) Complete Plant Layout Including Dimensions, Elevations, Angles, Supports

(8) Reactor Vessel Supports

(A) Dimensions

(B) Materials

(C) Details of Sliding Support Restraint and Equivalent Stiffness of Base Structure

(9) Steam Generator

(A) Dimensions

(B) Materials

(C) Details of interfaces with snubbers and S. G. support

(D) Steam line and feedwater line details with hangers and snubbers detailed (location and stiffness)

(10) Pump

(A) Dimensions

(B) Materials

(C) Details of interface with pump support

(11) Pressurizer

(A) Dimensions

(B) Materials

(C) Details of interface with support

(12) Steam Line

(A) Dimensions

(B) Materials

(13) Component Supports

(A) Steam Generator (including snubbers)

(i) Dimensions

(ii) Materials

(iii) Details of connectivity

(iv) Spring rates where applicable (snubbers and columns)

(B) Pump (including snubbers)

(Same as I. M. 1.a. -d.)

(C) Pressurizer

(Same as I.M.1.a.-d.)

(D) Valves if applicable

(E) Any other restraints needed (pipe whip, hangers, etc.)

(14) Biological Shield

(A) Dimensions and materials

(B) Connectivity if any

MASS PROPERTIES

(1) Masses, C.G. Locations, Moments of Inertia for:

(A) Reactor Vessel

(B) Bottom Support Casting

(C) Fuel Assembly

(D) Control Rods and Drivers

(E) Reactor and Internals Total (wet or dry)

(F) Valves

(G) Steam Generator

(H) Pump

(I) Pressurizer