

UNITED STATES IC PILE

waitit novie

----

FEB 1 1979

Docket No. 50-358

Mr. Earl A. Borgmann Vice President - Engineering Cincinnati Gas & Electric Company P. O. Box 960 Cincinnati, Ohio 45201

Dear Mr. Borgmann:

SUBJECT: LEAD PLANT MARK II ACCEPTANCE CRITERIA (Wm. H. Zimmer Nuclear Power Station, Unit 1)

In our letter to you dated September 14, 1978, we identified certain generic criteria for the lead plants that we find acceptable. The bases for these criteria are discussed in NUREG 0487, dated October 1978.

To complete our safety evaluation of your application for the Zimmer Nuclear Power Project, we need to know the extent of your commitment to adopt these criteria. Your FSAR for Zimmer should be amended to identify those criteria that you are committing to adopt.

The applicants for the lead Mark II plants have identified a number of areas where they propose to take exception to our criteria. Alternative criteria were to be proposed by the Mark II owners in each of these areas. In this regard, several meetings were conducted in November and December 1978 between the NRC and the applicants for the lead plants to discuss the alternative criteria and their supporting bases. At these meetings, the staff identified certain additional information that would be required to support the alternative criteria proposed by the lead plant applicants. The status of our review for each of these items, including a summary description of the additional information required by the staff is provided in Enclosure 1. We need your schedule for pro iding this information.

Two additional enclosures are provided that relate to pool dynamic concerns that should also be resolved by the lead plant applicants. The first of these, Enclosure 2, consists of questions raised by the staff dealing with the lead plant applicants at the August 15, 1978 meeting. We have not received a response to these questions. Enclosure 3 is provided to clarify the staff's position with regard to Load Case 10.

7903150022

### Mr. Earl A. Borgmann

- 2 -

We will need your response to this letter including identification of the . criteria that you will commit to, your program to provide information to support alternative criteria and your schedule for responding to our questions. This information should be submitted no later than February 9, 1979, to meet our current review schedule.

Please contact us if you have any questions regarding this matter.

2.3

Sincerely,

John F. Stolz, Chief Light Water Reactors Branch No. 1 Division of Project Management

Enclosures: As stated

cc: See page 3

#### Mr. Earl A. Borgmann

#### FEB 1 1979

cc: Troy B. Conner, Jr., Esq. Conner, Moore & Corber 1747 Pennsylvania Avenue, N. W. Washington, D. C. 20006

> Mr. William J. Moran General Counsel The Cincinnati Gas and Electric Company P. 0. Box 960 Cinnati, Ohio 45201

- 2 -

\* 2

Mr. William G. Porter, Jr. Porter, Stanley, Arthur and Platt 37 West Broad Street Columbus, Ohio 43215

Mr. Peter H. Forster, Vice President Energy Resources The Dayton Power and Light Company P. O. Box 1247 Dayton, Ohio 45401

J. Robert Newlin, Counsel
The Dayton Power and Light Company
P. O. Box 1247
Dayton, Ohio 45401

Mr. James D. Flynn Manager, Licensing Environmental Affairs The Cincinnati Gas and Electric Company P. O. Box 960 Cincinnati, Ohio 45201

Mr. J. P. Fenstermaker Senior Vice President-Operations Columbus and Southern Ohio Electric Company 215 North Front Street Columbus, Ohio 43215

2.4

David B. Fankhauser, PhD 3569 Nine Mile Road Cincinnati, Ohio 45230

Thomas A. Luebbers, Esq. Cincinnati City Solicitor Room 215, City Hall Cincinnati, Ohio 45202

Mr. Stephen Schumacher Miami Valley Power Project P. C. Box 252 Dayton Ohio 45401

Ms. Augusta Prince, Chairperson 601 Stanley Avenue Cincinnati, Ohio 45226

Charles Bechhoefer, Esq., Chairman Atomic Safety & Licensing Board Panel U. S. Nuclear Regulatory Commission Washington, D. C. 20555 Enclosure 1

2 ...

#### Information Request Lead Plant Load Acceptance Criteria

## 1. Pool Swell Elevation and Wetwell

# Air Compression (I.B.1.b, I.B.1.e and I.B.4.a)\*

A meeting was held with the Mark II Owners Group on November 14, 1978 to discuss an alternative approach to our criteria. We concluded that this approach was acceptable. We request documentation from the Mark II owners, to include a description and justification for this new methodology.

# 2. Small Structure Impact Loads (I.B.3.a)

The Mark II owners stated that they would take exception to this criterion at our meeting with them on October 19, 1978. A summary description of their revised methodology was presented at this meeting. Insufficient information was provided for us to conclude on the acceptability of the revised methodology. We request documentation from the Mark II Owners, to include a description and justification for this new methodology.

\*Load designation based on Load Summary Table and Acceptance Criteria in letter dated September 14, 1978 from R. S. Boyd to lead Mark II plants.

· · · ·

## Asymmetric Pool Swell Loads (I.B.5)

. .....

At the October 19, 1978 meeting, the Mark II owners stated their intentions of sending the staff a letter report to include a description and a justification of a more realistic asymmetric pool swell load. We have not received any additional information since that meeting.

# 4. Submerged Boundary Load During Vent Clearing (I.A)

At the October 19, 1978 meeting, the Mark II owners stated their intentions of sending the staff a letter report to include justification for either neglecting or reducing this load for the containment walls. We have not received any additional information since that meeting.

#### 5. LOCA/SRV Submerged Drag Loads (III)

Several discussions have been conducted with the Mark II owners to investigate potential alternatives to the staff's criteria. These meetings were held on October 19 and November 15, 1978. The staff stated that in several areas deviations from our criteria appeared acceptable. However, additional information was required. This additional information includes the following:

 Justification for neglecting the acceleration drag loads associated with the LOCA water jet;

-2-

- A description of the ring vortex model;

. .....

- Unpublished data of Sarpkaya for acceleration drag coefficients in a non-oscillating flow field;
- The results of sensitivity studies to justify selection of an equivalent velocity and acceleration for drag calculations in a uniform flow field.
- Generic guidelines for establishing interference effects in drag calculations for closely spaced structures.
- A description of the zone of influence to be utilized for "T" quencher jet loads and a description of the experimental program to confirm this zone of influence.

#### 6. SRV Bubble Phasing (II.B.G)

We find that the method proposed by the Mark II owners at the December 13, 1978 meeting meets the intent of our criteria. However, some questions exist regarding the detailed methodology for calculating bubble phasing and load combination from each SRV line. We have had discussions with Sargent and Lundy. They have agreed to provide information through the Mark II program to resolve our questions.

#### 7. SRV Bubble Frequency (II.B.C)

The method proposed by the Mark II owner at the December 13, 1978 meeting does not meet our criteria. This method utilizes a broadening of the response spectrum to account for uncertainties in the frequency of the SRV load specification. Bubble frequency is a critical component of the SRV load specification. It is important that the lead plants provide either an acceptable SRV frequency specification with justification or commit to our criteria as soon as possible.

-4-

#### 8. Chugging FSI Effects

The staff concluded in the Mark II Load Evaluation Report that the Mark II owners chugging load specification was acceptable but that additional analyses of the 4T results should be performed to resolve several staff questions related to FSI effects. These questions were discussed with the Mark II owners at a meeting on August 15, 1978 (See Enclosure 2). We have not received any information from the Mark II owners, since that meeting to resolve our questions.

#### 9. Load Combinations - Load Case No. 10

The Mark II owners stated that this load case would be applied to only the containment. Our position is that the load case also be applied to piping and equipment. A clarification of our position is provided in Enclosure 3.

20

Enclosure 2 .

# Questions and Comments on Chug Impulse

#### Letter Report

(June 1978)

- Integration of the wall pressures yields "impulses" on the order of 0.05-0.10 psi-sec (Table 3-1). The values of "impulse" to be applied at the vent are on the order of 0.3 psi-sec. Provide a detailed description of the procedure used to derive the latter from the former.
- 2) The results presented in Table 3-1 indicate negative and/or no correlation between chug over/under/pressure and the corresponding values of chug "impulse" (i.e.: maximum "impulse" is associated with minimum overpressure etc.). Comment on this apparent anomaly.
- 3) The chug pressure-time histories used for most of the calculations which use presented (-56 psi . 10 msec) imply negative absolute pressure (local hydrostatic in Run 55 is approximately 3 atm. + 11 foot submergence = 50 psi). Comment on this physical inconsistency.
- 4) The proposed impulse duration of 10 msec is approximately 30% of the matural period of the 4T water-tank system. This is too high by about a factor of three to justify the notion that the loading is "impulsive" (shape of pulse not important). Provide additional justification for the use of the proposed pulse shape.
- 5) The various plots of pressure history generated by the Anamet model (e.g.: Figure 3-13) suggest that the calculations were performed with an UMpressurized wetwell. Comment on what effect omission of this additional pressure has on the final results.
- 6) As indicated in Figure 1-1, a vital link in the argument for the correctmess of the "Improved Chugging Load Definition" is the comparison of response, i.e.: comparison of the total pressure at the 4T tank/water interface from the model with actual 4T test data. Such a comparison has not been included in this report. Provide a comparison between theory and experiment for the bottom center pressure.
- 7) The 4T bottom center pressure histories from the Anamet calculation and the 4T experiments should also be compared to the corresponding pressure history computed using the "Bedrosian" methodology (Anamet rigid incident wall pressure as input) to demonstrate that the Anamet and Bedrosian computation schemes are equivalent.
- 8) Provide the basis for the particular choice of damping used for the Lead Plant 4T Chugging Load Time History shown in Figure 4-4.
- 9) The justification for considering the 4T observed boundary loads as conservative for Mark II application rests primarily on a qualitative geometric argument (bigger pool-to-vent area ratio will reduce boundary loads for same intensity chug). Demonstrate the validity of this argument quantitatively by performing additional calculations with the Anamet methodology for a "4T-like" configuration but with a larger tank diameter. Again, emphasis shall be on presentation of bottom center pressure.

Enclosure 3



# UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D. C. 20555 There verin

JAN 5 1979

MEMORANDUM FOR: W. R. Butler, Chief, Containment Systems Branch, DSS G. C. Lainas, Chief, Plant Systems Branch, DOR

FROM:

C. J. Anderson, Containment Systems Branch, DSS C. I. Grimes, Plant Systems Branch, DOR

SUBJECT:

POOL DYNAMIC LOAD COMBINATIONS FOR CONTAINMENT AND PIPING SYSTEMS - LOAD CASE 10

A meeting was held on December 11, 1978 to discuss the staff's position related to Load Case No. 10 for the Mark II Acceptance Critoria. This load case specifies that DBA pool swell loads be considered concurrent with SRV and SSE loads. The purpose of the meeting was to discuss our position in light of the staff's position related to this load case for the Mark I and III containment designs. Representatives of CSB, MEB, SEB of DSS and PSB of DOR were present.

As a result of this meeting we developed the following information to clarify our position with regard to the Mark II generic and lead plant programs and the corresponding positions for the Mark I and III containment designs.

#### Generic Position on Load Case No. 10 for Mark II Plants: DBA+ SRV + SSE

The staff requires that an evaluation be made of the Mark II containment system for this load case. This evaluation shall include the critical piping and equipment in the containment (wetwell and drywell) and the reactor building unless it can be shown that no significant dynamic loads are transmitted to these areas.

It is our judgement that a case can be made to limit the SRV actuation to one valve based on "spurious" actuation. However, although we do not believe that any SRVs can mechanistically actuate following a DBA, we require that the Mark II owners provide confirmatory analyses in this regard. These analyses for the DBA should include consideration of the uncertainties associated with the calculated reactor pressure response and the uncertainty associated with the pressure required for SRV actuation (e.g., set point drift).

Contact:

C. Anderson, 27711 C. Grimes, 28077

W. R. Butler G. C. Lainas - 2 -

As a minimum, we will require consideration of a single, spuriouslyactuated SRV concurrent with the pool swell loads associated with a DBA. Should the confirmatory reactor system response analyses indicate that there is a potential for mechanistic actuation of the SRVs following a DBA, we will reassess our position.

#### Load Case No. 10 for the Lead Mark II Plants

We require that the applicants for the lead plants evaluate their containment. critical piping and equipment based on Load Case No. 10 considering actuation of one SRV and the DBA. This evaluation should be completed prior to operation of the plant. It is our judgement that the reactor pressure transient associated with a DBA would not result in the actuation of more than one SRV. However, we believe that confirmatory analyses should be provided, as described in our generic position above, to confirm that a DBA would not result in either single or multiple SRV actuations.

#### Load Case No. 10 for Mark I and Mark III Plants

DOR has taken a position which requires the consideration of a single SRV concurrent with the DBA and SSE loads for the Mark I Long Term Program (LTP). The structural acceptance criteria for the load combination vary based on the extent of reactor system response analyses provided to support the non-mechanistic nature of the event. The scope of the LTP is limited to the torus and attached piping. DOG does not consider it necessary to extend this load combination to other structures or components due to the inherent decoupling of the torus and drywell, unique to the Mark I design.

Our position for the Mark III design is the same as our generic position for the Mark II containment.

Clifford J. Anderson Containment Systems Branch Division of Operating Reactors

Christopher Grund

Christopher I. Grime's Plant Systems Branch Division of Operating Reactors

cc: see page 3

.

W. R. Butler G. C. Lainas

- 3 -

.

cc: R. Tedesco

J. Knight F. Schauer R. Bosnak

J. Kudrick A. Hafiz

C. Grimes

T. Su

S. Hou

C. Anderson R. Satterfield

Enclosure 3

. . . . .

#### LOAD CASE NO. 10

#### POSITION - MARK II PLANTS

# Generic Position on Load Case No. 10 for Mark II Plants: DBA+ SRV + SSE

The Carf requires that an evaluation be made of the Mark II containment system for this load case. This evaluation shall include the critical piping and equipment in the containment (wetwell and drywell) and the reactor building unless it can be shown that no significant dynamic loads are transmitted to these areas.

It is our judgement that a case can be made to limit the SRV actuation to one valve based on "spurious" actuation. However, although we do not believe that any SRVs can mechanistically actuate following a DBA, we require that the Mark II owners provide confirmatory analyses in this regard. These analyses for the DBA should include consideration of the uncertainties associated with the calculated reactor pressure response and the uncertainty associated with the pressure required for SRV actuation (e.g., set point drift).

As a minimum, we will require consideration of a single, spuriouslyactuated SRV concurrent with the pool swell loads associated with a DBA. Should the confirmatory reactor system response analyses indicate that there is a potential for mechanistic actuation of the SRVs following a DBA, we will reassess our position.

#### Load Case No. 10 for the Lead Mark II Plants

We require that the applicants for the lead plants evaluate their containment, critical piping and equipment based on Load Case No. 10 considering actuation of one SRV and the DBA. This evaluation should be completed prior to operation of the plant. It is our judgement that the reactor pressure transient associated with a DBA would not result in the actuation of more than one SRV. However, we believe that confirmatory analyses should be provided, as described in our generic position above, to confirm that a DBA would not result in either single or multiple SRV actuations.

20 No 1