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ILLINOIS POWER COMPANY

CLINTON POWER STATION, P.O. BOX 678, CLINTON, ILLINOIS 61727

August 8, 1984

Docket No. 50-461

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Clinton Power Station Unit 1
SER Outstanding Issue #9
SER Confirmatory Issues #13, #71
Suppression Pool Hydrodynamics

Dear Mr. Schwencer:

On April 18, 1984 Illinois Power met with the NRC Containment Systems Branch staff in Bethesda, Maryland to discuss the subject of suppression pool hydrodynamics. This meeting resulted in the issuance of an NRC letter to CPS dated May 22, 1984 requesting additional information. Attached is the supplemental information requested. We believe that this information will resolve your specific concerns on this issue.

Please contact us if you have any questions concerning the attached information.

Sincerely yours,

Daniel I. Herborn
Director - Nuclear Licensing
and Configuration
Nuclear Station Engineering

KAB:lam

Attachment

cc: B. L. Siegel, NRC Clinton Licensing Project Manager
NRC Resident Office
Regional Administrator, Region III, USNRC
Illinois Department of Nuclear Safety

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Attachment

The following are the NRC questions asked in the April 18, 1984 meeting with its corresponding response.

Question #1:

IPC's response to the NRC question 480.28 (Reference: Letter U-0698 dated February 17, 1984) should be modified to include the specific equipment which would be used for alternate shutdown cooling capability in the event of suction line failure.

Response:

Alternate shutdown cooling is accomplished by depressurizing the reactor and supplying cooling water from the suppression pool to the vessel by any available ECCS. The water is then returned to the suppression pool via any of the safety/relief valve discharge lines, and the decay heat will be removed by operation of the suppression pool cooling mode of the RHR system. The response to NRC question 480.28 will be revised to reflect this.

Question #2:

Evaluate the Clinton facility using the latest acceptance criteria contained in draft NUREG-0978 currently out for public comment rather than the 1982 decision.

Response:

Significant changes to the Appendix C acceptance criteria are modification of Section 1.3 to remove the methodologies for determining impact loads on short structures or structures within six feet of the suppression pool surface. With this deletion, CPS would no longer have a documented methodology for determining impact loads on these structures. Therefore, structures such as supports for the RHR and RCIC systems and structural steel supporting grating above the suppression pool would have to be reviewed by the NRC on a case-by-case basis for these impact loads.

Section 1.4 was modified to allow a reduction in froth impact loads for structures and components above the floor grating. This could provide for some load relief; however, our current design is capable of withstanding the original load and is, therefore, conservative.

Section 3.0 has been added to the draft NUREG-0978 acceptance criteria which specifies a design methodology for weir swell (reverse pool swell) phenomena. A load definition, using a methodology

similar to that used in GESSAR, has been developed for CPS. A description and justification for this methodology was provided to the NRC in February (Letter No. U-0698) and is under review.

Question #3:

State which revision of GESSAR-II Appendix 3B is being referenced for Clinton, and state how changes to the GESSAR document are incorporated into the design verification of CPS.

Response:

CPS uses GE Document #22A7000 (through Revision 2, dated June 12, 1981) as the design basis for SRV and LOCA hydrodynamic loads. As revisions are transmitted by GE for use on Clinton, appropriate evaluations are performed as to the extent and impact of the changes. The revisions are then assessed based upon relevance of the change to CPS, schedule and other information. The overall merits of the revision are then assessed to determine whether or not the revision will be implemented.

Question #4:

Provide details behind the 4.6 psid froth drag load calculation and the reason for applying the calculation from GESSAR for this phenomena.

Response:

The GESSAR definition of 11 psid across the HCU floor, as a result of wetwell froth pressurization, is to be applied to the total annulus area at the HCU floor with an appropriate dynamic load factor. Because of this, the load governed the design of structural steel at the HCU floor in many cases. A reduction was sought to minimize the design loads and eliminate potential design modifications.

The pressure differential of 4.6 psid across the HCU floor was calculated using the proprietary General Electric Containment Analytical Model. The Clinton HCU floor consists of concrete slab sections, grating and open area. The calculation was based upon the HCU elevation being 26% open. The open area for Clinton is at least 26% of the total area; therefore, the 4.6 psid specification is conservative.

Using a $\Delta P$ of 11 psid, structural steel at the HCU floor would be governed by this load. However, the reduced $\Delta P$ of 4.6 psid governs only the grating design.

Question #5:

Review FSAR Sections A3.8 and A3.9 for compatability with GESSAR-II and identify where revisions are required.

Response:

For FSAR Section A3.8, the following differences are noted:

1. Section A3.8.3.1 presents the Clinton calculated peak LOCA bubble pressure to be 20.1 psig. This value was based on FSAR analyses and is lower than the 21.8 psig specified in GESSAR-II. Subsequently, this analysis was revised for the FSAR and the pressure value was reduced to 18.9 psig. The FSAR may be revised to denote the CPS specific value of 18.9 psig, but it is intended to use the conservative 20.1 psig value as the design basis.

2. Section A3.8.3.4.5 requires revision to remove the 11 psid drag load on the HCU floor specified in GESSAR-II and insert the CPS specific drag load of 4.6 psid based on GE calculations.

3. Section A3.8.3.4.7.2 requires revision to correct the specification of the global prechug under-pressure spatial distribution by deleting the words "Mean Underpressure" from the title of FSAR Figure A3.8-37. Also, Figure 3B-34 from GESSAR-II should be added as a reference to the FSAR.

4. Figure A3.8-30 should be revised to correct the reference to A3.8-6.

For FSAR Section A3.9, the following differences are noted:

1. Section A3.9.3.1.2 states that water jet loads do not apply to submerged structures. This should be revised to state that only the quencher device is subject to water jet loads. GE has addressed this load in Section 3BO.3.2.31 of GESSAR-II.

2. Section A3.9.3.2.2 indicates that effects of interference and unsteady flow are included in the design basis where they increase the loads described in GESSAR-II. This is a conservatism included in the CPS design that is not explicitly mentioned in GESSAR-II.

3. Figure A3.9-8 should be revised to correct Note 3 by revising the reference to Figure A3.8-18 from Figure A3.8-7. Also, on the abscissa, the elevation for the transition zone shall be corrected from 22.5 ft. to 19.0 ft.

The above revisions will be implemented in a future FSAR change.

Question #6:

a) Justify why CPS has used the pool swell shape, as predicted by the GE-performed SOLA analyses, to make modifications to the present encroachments (i.e., extending the existing structure further away from the drywell wall over the suppression pool).

b) Justify the use of 115 psi as the impact load for beams used on the 737' elev. floor extension over the suppression pool.

Response:

a) Illinois Power has transmitted the justification for the encroachment extension as part of the Humphrey Issues. (Reference Letter U-0714, D. I. Herborn (IP) to A. Schwencer (NRC), dated May 25, 1984). As a member of the Containment Issues Owners Group, (CIOG), Illinois Power's involvement to resolve the validity of SOLA is still in progress.

b) The encroachment modification at 737'-0" elev. of the containment has been designed for a 115 psi impact load. The exposed surfaces of the encroachment's S-sections, C-sections, and the plates supported by the C-sections are illustrated in Figure 1.0 (attached). As shown, all the widths of these exposed sections are less than 20". Therefore, these sections were designed to the load definition of "small structures," which is 115 psi.

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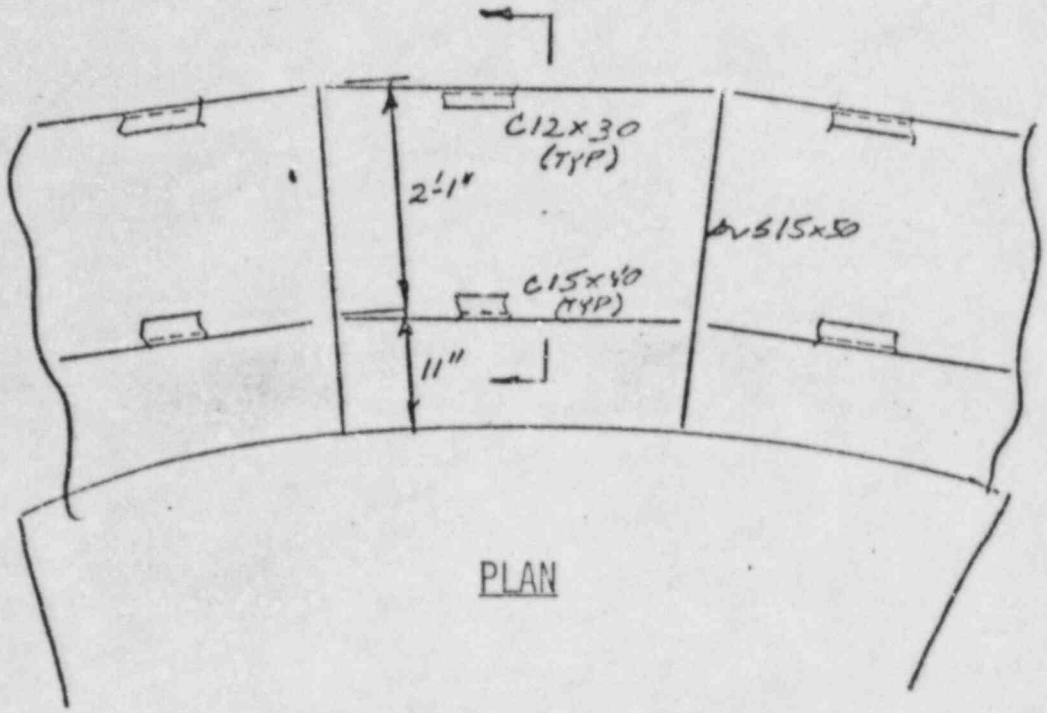


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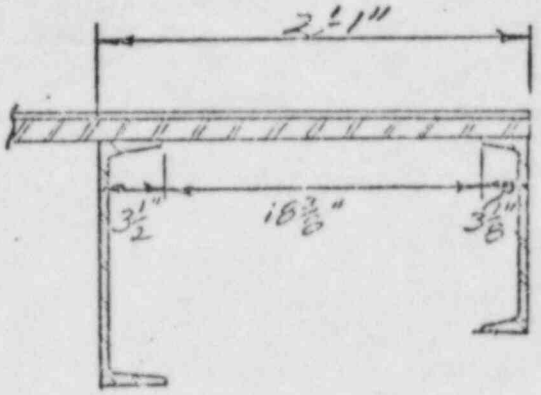


SECTION

FIGURE 1.0