Omaha Public Power District
444 South 16th Street Mall
Omaha, Nebraska 68102-2247
402/636-2000

October 13, 1995
LIC-95-0180

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station: P1-137
Washington, D.C. 20555

References:
1. Docket No. 50-285
2. Letter from OPPD (W. G. Gates) to NRC (Document Control Desk) dated December 7, 1992 (LIC-92-340A)
3. Letter from OPPD (W. G. Gates) to NRC (Document Control Desk) dated May 14, 1993 (LIC-93-0146)
4. Letter from NRC (S. D. Bloom) to OPPD (T. L. Patterson) dated August 12, 1993
5. Letter from OPPD (T. L. Patterson) to NRC (Document Control Desk) dated March 20, 1995 (LIC-95-0065)
6. Letter from NRC (T. Y. Liu) to OPPD (T. L. Patterson) dated July 26, 1995

SUBJECT: Response to Request for Additional Information (RAI) on Proposed Revision to the Safety Evaluation for the Spent Fuel Storage Rerack at Fort Calhoun Station (FCS) Unit No. 1 (TAC No. M91954)

Attached please find the Omaha Public Power District's (OPPD) responses to the NRC's questions provided in Reference 6 related to the proposed revision to the Safety Evaluation Report (SER) for the spent fuel pool rerack at FCS.

In Reference 5, OPPD notified the NRC of the difference between the design and as-built rack-to-wall clearances for the spent fuel pool rerack effort and of OPPD's intent to update the FCS Updated Safety Analysis Report (USAR) based on this as-built information. OPPD suggested that the NRC may want to consider revising the SER, as documented in Reference 4, to reflect the as-built condition. In Reference 6, the NRC requested additional information on the proposed revision to the SER in the form of eight questions. To address these NRC questions, OPPD retained the services of Holtec International, the rack designer.

A001 1/1

Rec'd w/o disks

On September 18, 1995, a telephone conference call was conducted with Messrs. S. D. Bloom, R. L. Rothman and Y. Kim of the NRC and members of the OPPD staff, specifically to discuss Question No. 8 of the RAI. OPPD's response to Question No. 8 reflects the agreements reached in that conference call. As part of the agreement with the NRC, OPPD is providing eight computer diskettes which contain the complete inputs and outputs of the pool structure analysis. These eight proprietary diskettes are enclosed with the NRC Project Manager's copy only. Attachment 2 contains the Proprietary Affidavit from Holtec International, pursuant to 10 CFR 2.790, related to the information being provided in the enclosed diskettes. Attachment 3 provides the manual calculation for local concrete bearing, identified as "Appendix B, Fuel Rack Reconciliation."

If you should have any questions, please contact me.

Sincerely,

T. L. Patterson
Division Manager
Nuclear Operations

TLP/dll

Attachments w/enclosures

c: Winston & Strawn (w/o Attachments)
L. J. Callan, NRC Regional Administrator, Region IV (w/o Attachments)
S. D. Bloom, NRC Project Manager
W. C. Walker, NRC Senior Resident Inspector (w/o Attachments)

LIC-95-0180
Attachment 2

OMAHA PUBLIC POWER DISTRICT

FORT CALHOUN STATION UNIT NO. 1

Proprietary Affidavit Pursuant to 10 CFR 2.790

From

Holtec International

AFFIDAVIT PURSUANT TO 10CFR2.790

I, K.P. Singh, being duly sworn, depose and state as follows:

(1) I am President, Holtec International, and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in eight (8) computer diskettes entitled "Fort Calhoun Station Spent Fuel Pool Structural ANSYS 4.4A Files". The proprietary computer files in the diskettes are identified as "PREPME.DAT", "PREPTH.DAT", "POSTME.DAT", "POSTSE.DAT", "POSTTH.DAT", "POSTPS.DAT", "POSTSH.DAT", AND "MODEL.16".

(3) In making this application for withholding of proprietary information of which it is the owner, Holtec International relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4) and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10CFR Part 9.17(a)(4), 2.790(a)(4), and 2.790(b)(1) for "trade secrets and commercial or financial information obtained from a person and privileged or confidential" (Exemption 4). The material for which exemption from disclosure is here sought is all "confidential commercial information", and some portions also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by Holtec's competitors without license from Holtec International constitutes a competitive economic advantage over other companies;

b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product.

c. Information which reveals cost or price information, production, capacities, budget levels, or commercial strategies of Holtec International, its customers, or its suppliers;

d. Information which reveals aspects of past, present, or future Holtec International customer-funded development plans and programs of potential commercial value to Holtec International;

e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs 4.a, 4.b, 4.d, and 4.e, above.

(5) The information sought to be withheld is being submitted to the NRC in confidence. The information (including that compiled from many sources) is of a sort customarily held in confidence by Holtec International, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by Holtec International. No public disclosure has been made, and it is not available in public sources. All disclosures to third parties, including any required transmittals to the NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within Holtec International is limited on a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his designee), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside Holtec International are limited to regulatory bodies, customers, and potential customers, and

their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information classified as proprietary was developed and compiled by Holtec International at a significant cost to Holtec International. This information is classified as proprietary because it contains detailed historical data and analytical results not available elsewhere. This information would provide other parties, including competitors, with information from Holtec International's technical database and the results of evaluations performed using codes developed by Holtec International. Release of this information would improve a competitor's position without the competitor having to expend similar resources for the development of the database. A substantial effort has been expended by Holtec International to develop this information.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to Holtec International's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of Holtec International's comprehensive spent fuel storage technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology, and includes development of the expertise to determine and apply the appropriate evaluation process.

The research, development, engineering, and analytical costs comprise a substantial investment of time and money by Holtec International.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

Holtec International's competitive advantage will be lost if its competitors are able to use the results of the Holtec International experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

AFFIDAVIT PURSUANT TO 10CFR2.790

The value of this information to Holtec International would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive Holtec International of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.

STATE OF NEW JERSEY)
) ss:
COUNTY OF CAMDEN)

Dr. K.P. Singh, being duly sworn, deposes and says:

That he has read the foregoing affidavit and the matters stated therein are true and correct to the best of his knowledge, information, and belief.

Executed at Cherry Hill, New Jersey, this 26th day of September, 1995.

K P Singh

Dr. K.P. Singh
Holtec International

Subscribed and sworn before me this 26 day of September 1995.

Maria C. Pepe

MARIA C. PEPE
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires April 25, 2000

LIC-95-0180
Attachment 1

OMAHA PUBLIC POWER DISTRICT

FORT CALHOUN STATION UNIT NO. 1

"Responses to Request for Additional Information on the Proposed Revision to the Safety Evaluation Report for the Spent Fuel Storage Reracks"

NRC Question #1: From the results of the re-analysis, provide:

a) the total vertical pedestal load,
b) the maximum vertical load at any single pedestal,
c) the maximum shear load at any single pedestal,
d) the maximum fuel assembly-to-cell wall impact load,
e) the maximum rack-to-rack impact load at baseplate level,
f) the maximum rack-to-rack impact load at top of rack,
g) the maximum rack-to-wall impact load at baseplate level,
h) the maximum rack-to-wall impact load at the top of rack,
i) the maximum top corner displacement in x-direction,
j) the maximum top corner displacement in y-direction,
k) the maximum baseplate corner displacement in x-direction,
l) the maximum baseplate corner displacement in y-direction,
m) the maximum stress factor above baseplate, and
n) the maximum stress factor at support pedestals.

OPPD's Response #1:

The following table summarizes the key results of the whole pool multi-rack re-analysis. Limiting values are presented from the analysis runs using the design basis regular fuel with all spent fuel racks loaded.

Item	Regular Fuel Under MHE
Total Vertical Pedestal Load, lbf.	1,958,316.0
Max. Vertical Load at Single Pedestal, lbf.	189,800.0
Max. Shear Load at Single Pedestal, lbf.	73,877.0
Max. Fuel Assembly-to-CellWall Impact Load, lbf.	638.6
Max. Rack-to-Rack Impact Load at Baseplate Level, lbf.	3,316.0
Max. Rack-to-Rack Impact Load at Rack Top, lbf.	2,322.0
Max. Rack-to-Wall Impact Load at Baseplate Level, lbf.	0.0
Max. Rack-to-Wall Impact Load at Rack Top, lbf.	1,225.0
Max. Top Corner Displacement in X-Dir., in.	0.7369
Max. Top Corner Displacement in Y-Dir., in.	0.5858
Max. Baseplate Corner Displacement in X-Dir., in.	0.3142
Max. Baseplate Corner Displacement in Y-Dir., in.	0.3644
Max. Stress Factor Above Baseplate	0.508
Max. Stress Factor at Support Pedestal	0.308

Note: The values shown for maximum stress factor above baseplate are based upon the largest ratio of stress factors (above baseplate/supportpedestal) from 3-D Single Rack analysis multiplied by the value for the support pedestal stress factor obtained from the reconciliation.

NRC Question #2:

Provide the largest magnitude of the fluid pressure distribution along the height of the rack and spent fuel pool wall during the fluid and structure interactions for the original analysis and the re-analysis in a tabular form.

OPPD's Response #2:

The current version of DYNARACK used for the licensing basis and reconciliation analyses saves only the average pressure between the spent fuel racks and the adjacent pool walls as a function of time. The fluid pressure distribution along the rack height is not available from the computer output. The table below provides the instantaneous peak dynamic pressures which develop at each wall for both the original and the revised analyses.

Instantaneous Peak Dynamic Pressure (psi) (Regular Fuel Under MHE)		
	Original	**Revised**
North Wall	4.89	4.54
East Wall	-8.61	-4.05
South Wall	7.84	4.71
West Wall	-8.61	-8.09

NRC Question #3:

Indicate whether the artificial time histories used for the re-analysis are identical to the time histories used for the original analysis in Reference 1. Also, indicate whether all analysis methodologies and material properties used in the re-analysis are identical to those used in the original analysis except for the clearances between the racks and between the racks and the spent fuel pool walls.

OPPD's Response #3:

The seismic input data is identical to the original analysis. With the exception of the rack-to-rack and rack-to-wall clearances, all other design inputs remain unchanged.

NRC Question #4:

Provide the clearances between the racks and between the racks and the spent fuel pool walls used in the original and re-analysis in a tabular form.

OPPD's Response #4:

The attached sketch of the FCS Unit 1 pool layout (Figure 1) shows the "as built" rack-to-rack and rack-to-wall gaps as well as the design basis gaps. The "as built" gap measurements are circled in the sketch and were measured from the most protruding points of the bumper bars. The design and as-installed average clearance between racks and between racks and walls (excluding bumper bars) are shown in Table 1.

NRC Question #5:

Explain the reason(s) why the clearances were inaccurately assumed in the original analysis. Provide an estimate on how good the latest clearances are.

OPPD's Response #5:

Nominal design gaps of rack-to-rack and rack-to-wall were used in the original analyses. The nominal gaps were determined based on the best available information in the design phase. Due to rack fabrication tolerance and pool structural construction tolerance, the as-installed gaps were expected to deviate from the nominal gaps. It was recognized from the original pool analysis that structural margin was available which could accommodate as-built uncertainties. The reconciliation analyses for the as-installed condition confirm that the structural margin is sufficient. The as-installed gaps were measured in the field. The measurement accuracy is within 1/16th of an inch.

NRC Question #6:

Was there any physical rack design change necessitated by the results of the re-analysis? If yes, describe the change(s).

OPPD's Response #6:

Based on the results of the reconciliation analysis for the as-installed condition, all rack stresses are below the code allowables; therefore, no physical rack modification was necessary.

NRC Question #7:

Indicate whether OPPD is planning to attach space bars to the racks as a mechanism to reduce the magnitude of the impact loads.

OPPD's Response #7:

The original rack design presumed that rack-to-rack impacts would occur and had 3/16-inch bumper bars added to each rack top corner to serve as hardened impact regions as well as spacers between racks. Since the deviation of the gaps does not change the conclusions of the original safety evaluation, OPPD has no plans to install additional space bars to the racks.

NRC Question #8:

With respect to the fuel pool structure analysis, the original analysis shows the limiting safety margin of 1.03 for a wall (Table 8.5.3 of Reference 1). What is the limiting safety margin of the wall after considering the rack-to-wall impact loads in the re-analysis? Provide the inputs and outputs of the original and re-analysis including any technical assumptions made during the analysis for further staff review.

OPPD's Response #8:

The key conservative assumptions made in the pool structural analysis performed in the original rack design are re-summarized as follows:

a) Use of a heavier fuel mass per canister = 2480 lbs. The Spent Fuel Pool (SFP) is currently only licensed for intact fuel storage. This assumption essentially doubles the fuel load to the racks, thus, higher loading is postulated for the pool structure.

b) The transfer canal is assumed to be dry to maximize the mechanical and thermal loads to the intermediate wall (by increasing the pressure differential and thermal gradient).

c) The abnormal thermal load T_A is conservatively used for the normal operating thermal load T_o to maximize the thermal stress in the load combination.

d) The design value of concrete strength was used even though the actual core test data indicating high strength was available.

e) Lower bound value of re-bar yield strength is used which is estimated to build in approximately 10% margin of safety.

f) Local shear stress and bending moments were reported instead of the gross values. That is, the stress redistribution effect due to any localized overstress was not considered.

The American Concrete Institute (ACI) Code requires only evaluation of nonlocal stresses. Assumption f) above has the effect of producing a localized peak stress resultant. The lower bound margin of 1.03 for local shear stress is indeed applicable only over a small region located at the top corner of the intermediate wall between the main pool and the transfer canal. Allowing for stress redistribution results in increasing this margin to 1.26.

The maximum rack-to-wall impact force calculated from the multi-rack re-analysis for intact (regular) fuel is 1,225 pounds. This occurs at the top corner hardened region (bumper bar) of Rack E on the west wall. This location is not near the location of the 1.03 minimum margin reported in the original pool structure analysis (south wall) and therefore, does not affect the original calculation. The original computer design analysis for the pool structure was not revisited for the as-built reconciliation. There is a local wall bump in the impact region, which reduces the as-installed local rack-to-wall gap to 3/16th of an inch. Significant margins were obtained for the west wall in the original pool structural analysis. The minimum west wall bending and shear margins are 1.57 and 2.01, respectively. The impact force to the pool structure, obtained from the multi-rack re-analysis, is low in magnitude and impactive in nature. Therefore, the concrete was conservatively reviewed by a manual calculation only for local bearing and the global structural margin of the wall was determined as not being reduced by the impact.

The limiting safety margin of the wall(s) remain unchanged after considering rack-to-wall impact loads. For the intermediate (south) wall, the minimum margin is 1.03 in shear (local) and for the impacted west wall is 1.57 in bending and 2.01 in shear.

A copy of the proprietary computer input and output for the original pool structure analysis has been included with this response. This information is contained on eight (8) computer diskettes entitled "Fort Calhoun Station Spent Fuel Pool Structural ANSYS 4.4A Files" (Attachment 1, Enclosure A).

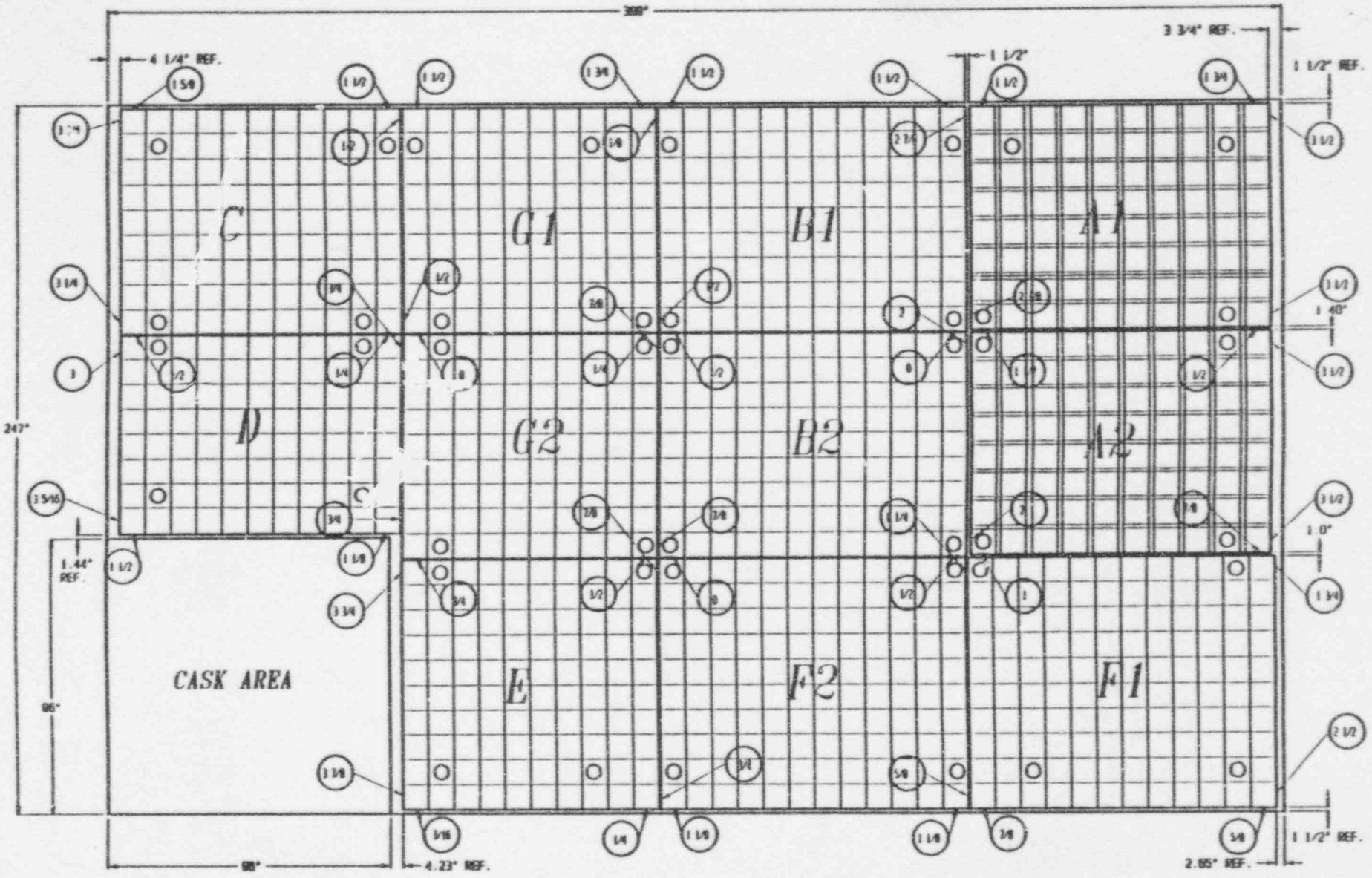
Attachment 2 contains the proprietary affidavit executed by Holtec International pursuant to 10 CFR 2.790.

Attachment 3 provides the manual calculation for local concrete bearing, identified as "Appendix B, Fuel Rack Reconciliation," pages B-1 to B-7.

TABLE 1
As-Installed Rack-to-Rack and Rack-to-Wall Gaps

Rack I.D.	Gap Size (in.)*			
	North	South	East	West
A1	3.000 (1.500)	3.688 (3.750)	1.813 (1.500)	1.875 (1.400)
A2	2.375 (1.500)	3.688 (3.750)	1.675 (1.400)	1.313 (1.000)
B1	0.688 (0.500)	3.000 (1.500)	1.688 (1.500)	0.625 (0.500)
B2	1.250 (0.500)	2.375 (1.500)	0.625 (0.500)	0.625 (0.500)
C	3.438 (4.250)	0.875 (0.500)	1.750 (1.500)	0.750 (0.500)
D	3.344 (4.250)	1.125 (0.500)	0.750 (0.500)	97.500 (97.440)
E	100.000 (100.230)	1.188 (0.500)	1.000 (0.500)	0.406 (1.500)
F1	1.313 (0.500)	2.313 (2.650)	1.313 (1.000)	0.938 (1.500)
F2	1.188 (0.500)	1.313 (0.500)	0.625 (0.500)	1.313 (1.500)
G1	0.875 (0.500)	0.688 (0.500)	1.813 (1.500)	0.500 (0.500)
G2	1.125 (0.500)	1.250 (0.500)	0.500 (0.500)	1.000 (0.500)

* The as-installed gap size is taken as the average of two measurements at rack top excluding 3/16-inch bumper bars (see Figure 1). The values in parentheses are the nominal design basis gaps.



NOTE: - RACK TO RACK GAPS: 1/2" EXCEPT AS NOTED.

Figure 1

APPENDIX B

FUEL RACK RECONCILIATION

B.1 INTRODUCTION

The purpose of this appendix is to reconcile the high density fuel racks and the spent fuel pool for the layout dimensions which exist after rack installation. The 'as-built' rack-to-rack and rack-to-wall gaps often differ from the design basis gap specifications. Therefore, it becomes necessary to show that the variations in gap length do not compromise the structural integrity of the fuel racks or the spent fuel pool.

In order to prove that the changes in gap width do not affect the original design conclusions, a Whole Pool Multi-Rack (WPMR) analysis was performed using the 'as-built' pool layout dimensions. The results of this analysis were compared with those from earlier WPMR analyses of the design basis pool layout. Further stress calculations were carried out where necessary.

B.2 WPMR ANALYSES (As-Built Dimensions)

Two seperate WPMR analyses were performed using the 'as-built' dimensions. The conditions of the two runs are as follows:

(1) All racks are filled to capacity with regular fuel (1380 lbf. per assembly).

(2) All racks are filled to capacity with consolidated fuel (2480 lbf. per assembly).

In each case, the controlling set of time-histories (MHE Set-4) was used for the analysis (See Section 3.4). By doing so, the worst case results were obtained.

Several input files from previous WPMR analyses required modification because of the differences in the pool layout. 'As-built' gap dimensions were taken from Holtec As-Built Pool Layout Drawing No. 1000. All adjacent rack baseplates are in contact. The modified input files are included in Section B.7. Further explanation of the WPMR model and theory are contained in Section 1.0 of this report.

The results of the WPMR analysis for the 'as-built' conditions are presented in Section B.8.

B.3 COMPARISON OF RESULTS

The limiting output values obtained from the original and the 'as-built' pool layouts are shown in Table B.3.1.

Table B.3.1

Comparison of WPMR Results

	Design Basis Pool Layout		'As-Built' Pool Layout	
	Regular Fuel	Consolidated Fuel	Regular Fuel	Consolidated Fuel
Max. Rack Top Disp. (N-S)	0.9939 in.	1.575 in.	0.7369 in.	1.069 in.
Max. Rack Top Disp. (E-W)	0.7921 in.	1.205 in.	0.5858 in.	1.173 in.
Max. Rack Bot. Disp. (N-S)	0.2669 in.	0.7840 in.	0.3142 in.	0.2997 in.
Max. Rack Bot. Disp. (E-W)	0.2691 in.	0.6565 in.	0.3644 in.	0.3094 in.
Max. Pedestal Load	171,100 lbf.	309,800 lbf.	189,800 lbf.	336,800 lbf.
Max. Stress Factor (R6)	0.329	0.564	0.308	0.500
Max. Rack-to-Rack Impact (Top)	4,231 lbf.	7,568 lbf.	2,322 lbf.	4,490 lbf.
Max. Rack-to-Rack Impact (Bot.)	2,993 lbf.	5,185 lbf.	3,316 lbf.	6,934 lbf.
Max. Rack-to-Wall Impact (Top)	-	-	1,225 lbf.	6,813 lbf.
Max. Rack-to-Wall Impact (Bot.)	-	-	-	1,088 lbf.

B.4 ADDITIONAL CALCULATIONS

The following page includes bearing stress calculations for a spent fuel pool wall under maximum impact conditions. The design bearing strength exceeds the calculated maximum rack-to-wall impact.

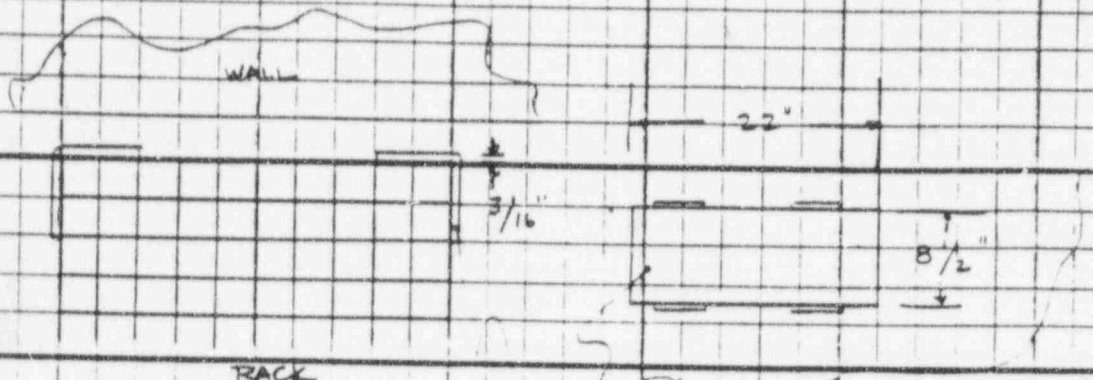
HOLTEC INTERNATIONAL
CALCULATION SHEET

Page B-5 Rev. ____

Project No. 20330 Report No. ____ Other ____

CHARLES W. BULLARD JR. 11/4/98 Date ____ Date
Prepared By Reviewed By

STRESS CALCULATIONS



EFFECTIVE AREA

ASSUME IMPACT OCCURS OVER 1/2" BAND OF BUMPER BAR.

$A_1 = .5(8.5) = 4.25\ in^2$

BEARING STRENGTH

THE DESIGN BEARING STRENGTH SHALL NOT EXCEED

$2\phi(0.85 f_c' A_1) = 17{,}701$ lbf

WHERE $\phi = 0.70$ FOR BEARING ON CONCRETE

$f_c' = 3500$ psi

HOLTEC INTERNATIONAL
CALCULATION SHEET

Project No. 20330 Report No. _____ Other _____

CHARLES W. BULLARD 2 11/4/98 _____ _____
Prepared By Date Reviewed By Date

THE MAXIMUM BACK-TO-WALL IMPACT AT BUMPER BAR LOCATIONS IS 6,813 lbf.

6,813 lbf. < 17,701 lbf

B.5 DISCUSSION OF RESULTS

Under the 'as-built' conditions, the maximum rack-to-rack impact load at bumper bar locations is 4,490 lbf.. The maximum impact load between a fuel rack and an adjacent pool wall is 6,813 lbf. (See Table B.3.1). These values are less than the maximum rack-to-rack impact obtained for the design basis pool layout. Thus, prior calculations regarding rack impacts are binding.

Dimensionless stress factors are reduced under 'as-built' layout conditions. Therefore, all stress levels remain below their allowable limits.

Stress calculations provided in Section B.4 show that the pool walls can sustain impacts greater than those predicted by WPMR analysis.

B.6 CONCLUSIONS

The results of the WPMR analyses indicate that the 'as-built' spent fuel pool layout at Fort Calhoun Generating Station is kinematically stable and dynamically safe. The increased rack-to-rack impact loads at the baseplate level and the resulting rack-to-wall impacts remain within acceptable limits.