Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

August 10, 1979

Howard Levin
SEP Branch
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
Mail Stop 542

Mr. Levin:

Per your August 10, 1979 request to Mr. R. Janecek, I am enclosing an additional copy of Attachment 2 to our July 31, 1979 letter concerning the Reactor Building-Turbine Building junction.

Yours truly,

Neil P. Smith

NPS/cb
Attachment
cc: R.F. Janecek
B.B. Palagi
J.L. White

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S/1

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SARGENT & LUNDY ENGINEERS

DESIGN CONTROL SUMMARY
DESIGN VERIFICATION

PAGE 1

PROJECT NAME Dresden
PROJECT NO. 5667-00 UNIT NO. 2
CLIENT Commonwealth Edison
CALC. NO. & DESCRIPTION
CALC. FOR Reactor Bldg - Turbine Bldg Connection Check
☒ SAFETY RELATED ☐ NON SAFETY RELATED

COMMENT NO.

QA SERIAL NUMBER

SIGNATURE & DATE FOR REV. 0		IDENTIFICATION OF PAGES PREPARED/REVISED/VOIDED & REVIEW METHOD
PREPARER	Joel Swanson 7-13-79	Att # 2
REVIEWER	Chris Kurt 7-20-79	
APPROVER	Adolf Walser 7-26-79	REVIEW METHOD DETAILED CHECK
SIGNATURE & DATE FOR REV__		
PREPARER		
REVIEWER		
APPROVER		REVIEW METHOD
SIGNATURE & DATE FOR REV__		
PREPARER		
REVIEWER		
APPROVER		REVIEW METHOD
SIGNATURE & DATE FOR REV__		
PREPARER		
REVIEWER		
APPROVER		REVIEW METHOD

FORM SAS 22.1 Rev. 0

SARGENT & LUNDY ENGINEERS CHICAGO

Calc. Reactor Bldg - Turbine Bldg Connection at 561'-6"		Calc. No.
		Rev. / Date
X Safety-Related	Non-Safety-Related	Page 1 of 5

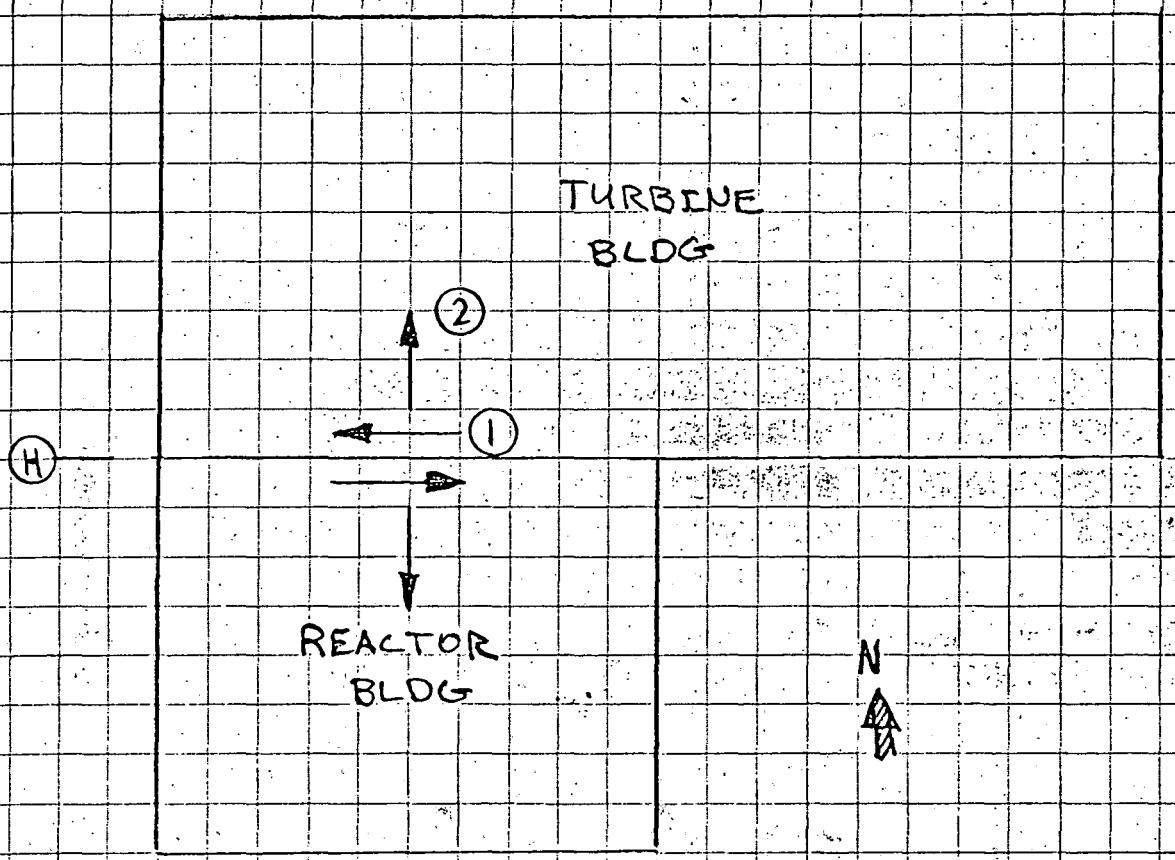
Client C.E Co.	Prepared by J. Simeon	Date 7-13-79
Project Dresden	Reviewed by C. Kunt	Date 7/20/79
Proj. No. 5667-00 Equip. No.	Approved by	Date

See Dwg B-234

$A_{S\,TOTAL} = 381.2\ in^2$

$F_y = 60ksi$ See General Notes B-201

$f'_c = 4ksi$



Earthquake Mode 1
This creates a shearing force between the buildings.

Form GQ-4.3.1 Rev. 1

SARGENT & LUNDY ENGINEERS CHICAGO

Calc. for Reactor Bldg - Turbine Bldg. Connection @ 501'-6"		Calc. No.	
		Rev.	Date
X Safety-Related	Non-Safety-Related	Page 2	of 5

Client C.E. Co.		Prepared by J. Smason	Date 7-13-79
Project Dresden		Reviewed by C. Kurt	Date 7/20/79
Proj. No.	Equip. No.	Approved by	Date

Check shear friction ACI 11.7 (318-77)

$V_n = A_v f_y \mu$ $\quad \mu = 1$

$V_n = 381.2 \times 60 = 22900^k$

$V_u = .85\,(22900^k) = \underline{19400^k}$

$A_c = 4' \times 141.5' \times 144 = 81504\ in^2$

$f'_c = 4000\ psi$

$V_n < .8^{ksi} \times 81504\ in^2 = 65200$ OK.

Use $V_u = \underline{19400^k}$

Earthquake Mode 2

Assume reinforcement takes tension

$T_u = 22900^k$ (See Above)

$T_u = .9 \times 22900^k = 20600^k$

Moment capacity of wall @ Row H

Compressive Load

See Dresden Calc. Book Volume 10 Section 6

$C = 91.6\ k/ft$ $\quad f'_c = 4\ ksi$

$f_y = 60\ ksi$

Design as per ACI Design Handbook Publication SP-17(73)

Form GQ-4.3.1 Rev. 1

Client	C.E. Co.	Prepared by J. Swanson	Date 7-13-79
Project	Dresden	Reviewed by C. Kurt	Date 7/20/79
Proj. No.	Equip. No.	Approved by	Date

Wall is 4'-0" Thick

Reinforcement is #10 @12"

Assume Slenderness is negligible

$h = 48"$

let $\gamma = \frac{48 - 2(.75 + \frac{1.27}{2})}{48} = .94$ Use $\gamma = .9$

Table R4-60.90

ρ_g for a 1'-0" Section $\frac{2 \times 1.27}{46.5 \times 12} = .0096$

$\frac{P_u}{A_g} = \frac{91.6}{48 \times 12} = .16$ ksi

For $\rho_g = .01$ $\frac{de}{h} = 1.95$ $\delta = 1$

assume a straight line interpolation

$= 1.95\left(\frac{.0096}{.01}\right) = .897$

$e = .897 \times 48" = 43"$

$M_u = 43" \times 91.6^k/ft = 3943"k/ft$

SARGENT & LUNDY ENGINEERS CHICAGO

Calculation

X Safety-Related | Non-Safety-Related

Calc. No. | Rev. | Date

Client	C.E. Co.	Prepared by J. Smason	Date 7-13-79
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Proj. No.	Equip. No.	Approved by	Date

$M_u = 328\ 'k/ft$

Assume supports @ 568'-6" and 545'-6"

load is applied @ 561'-6" - 2'-0" = 559'-6"

$$M_{max} = \frac{V \times 9'\text{-}0'' \times 14'\text{-}0''}{23'\text{-}0''} = 547'p$$

$$V'_{max} = \frac{328'k/ft}{547'} = 60^k/ft$$

Length of Wall = 141.5'

$V_T = 141.5' \times 60^k/ft = \underline{8490^k}$ This controls Case 2

SARGENT & LUNDY ENGINEERS CHICAGO

Calc. for

X Safety-Related | Non-Safety-Related

Calc. No.

Rev. | Date

Client C-E-Co

Project Dresden 2+3

Proj. No. Equip. No.

Prepared by J. Smason Date 7-18-79

Reviewed by C. Kurt Date 7/20/79

Approved by Date

Earthquake Forces

See Blume Report "Earthquake Analysis Reactor-Turbine Building" Section 8

For Earthquake Mode 1
This is caused by an E-W Earthquake
See Model Fig. 2
The buildings are linked at 561'-6". therefore the difference in shear at that pt. is the design shear. See Fig. 9

From Fig. 9 F ≅ 10,000 k for Units 2+3

Allowable force for Unit 2 = 19400 k O.K.

For Earthquake Mode 2
Model representation is Fig. 1
Buildings are linked at 561'-6" and 613'-0"
We are interested in the forces only at 561'-6"
Member 15
Fig 5 has N-S Earthquake Shears
It shows at top axial force member 15 = 955 k

Allowable tension force for Unit 2 = 8490 k OK

Form GQ-3.08.1 Rev. 2