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August 22, 1994  
5000-94-0035  
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U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D.C. 20555

Gentlemen:

Subject: Oyster Creek Nuclear Generating Station (OCNGS)  
Operating License No. DPR-16  
Docket No. 50-219  
Response To Additional Information  
Concerning In-Structure Response Spectra

By letter dated December 23, 1993, GPU Nuclear Corporation provided a report prepared by EQE Engineering Consultants entitled "Design Criteria for Soil Structure Interaction Analysis of the Reactor/Containment Building at GPU Nuclear/Oyster Creek Nuclear Generating Station" for your review. The NRC staff determined that additional information is required in order for the staff to complete its review. Your letter dated March 17, 1994 requested this additional information.

The attached information provides GPUN's response to your request. We believe that this response provides you the information necessary to complete your review. As stated in our letter dated December 23, 1993, GPUN intends to use the resulting spectra to resolve Supplement 1 to Generic Letter 87-02, and in conjunction with damping values specified in Regulatory Guide 1.61 and ASME Code Case N411 for all future designs, analyses and evaluations.

If you have any questions concerning this submittal, please contact Mr. Michael Laggart, Manager, Corporate Nuclear Licensing.

Sincerely,

R. W. Keaten  
Vice President & Director  
Technical Functions

9408290128 940822  
PDR ADOCK 05000219  
P PDR

c: Administrator Region I  
NRC Oyster Creek Project Manager  
Senior Resident Inspector

GPU Nuclear Corporation is a subsidiary of General Public Utilities Corporation

*Disk located in Central Files*

*A025*

GPU NUCLEAR RESPONSES TO ADDITIONAL INFORMATION

REQUESTED BY NRC LETTER DATED

MARCH 17, 1994

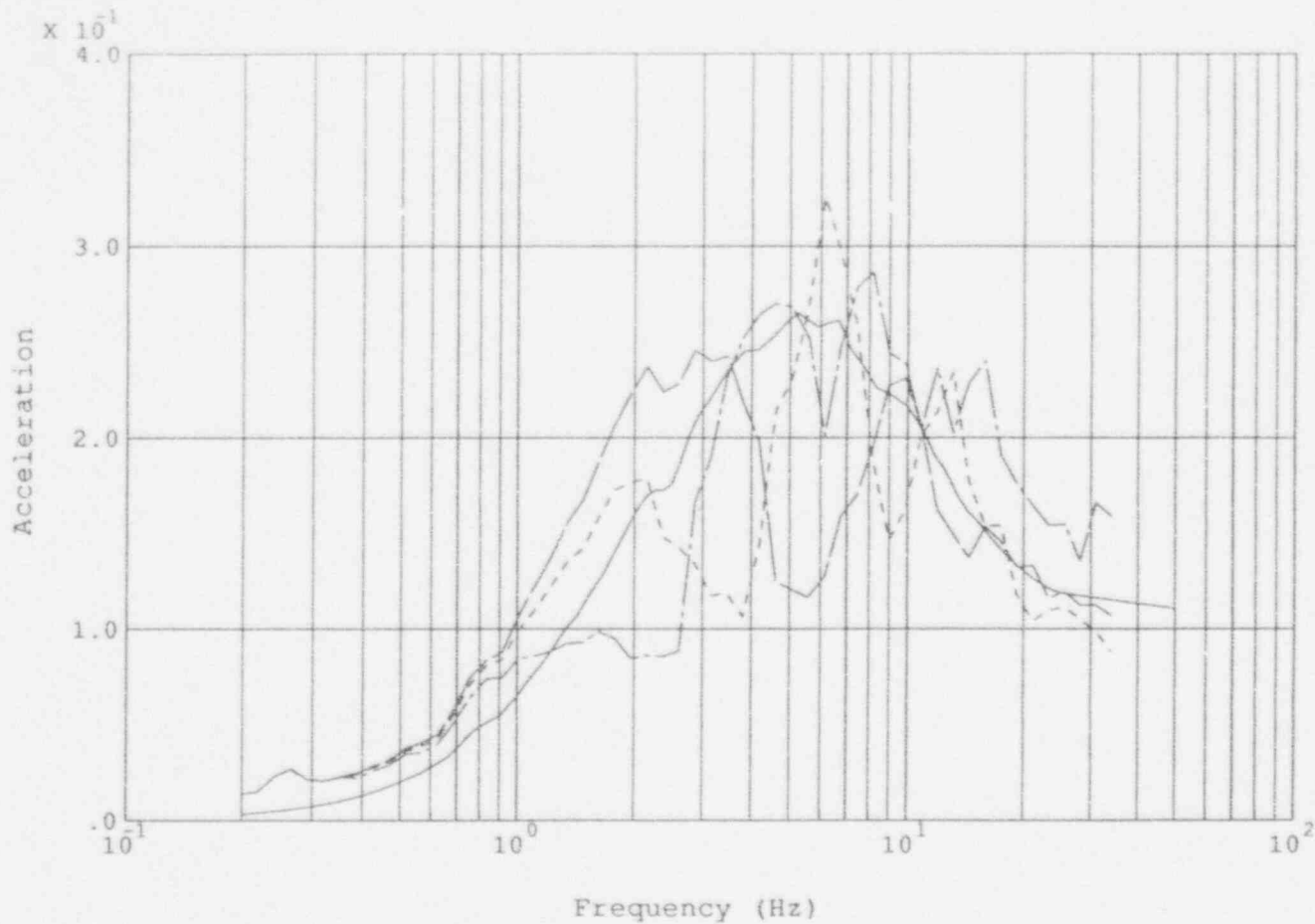
REGARDING IN-STRUCTURE RESPONSE SPECTRA

**NRC QUESTION #1**

Provide the three sets of spectra (corresponding to the three high-strain soil profiles) developed at the foundation level together with the enveloping spectra and 60% of the site specific response spectra (SSRS). Also, provide modified synthetic time-histories (if any) developed to ensure that the 60% criterion is satisfied.

**GPU NUCLEAR RESPONSE**

1. The deconvolved spectra for the two horizontal time histories developed at the foundation level for the three high strain soil profiles and the time histories to be used in the final analyses are shown in Figures 1s1-1 and 1s1-2. The envelope of the three spectra for each of the horizontal directions are shown in Figures 1-1 and 1-2. These figures show the comparison of both horizontal components to 60% of the surface spectrum. The spectra from these time histories meet the 60% requirement at all frequencies. These time histories are included in the diskette as part of the response to Question 4.



Legend:

60% Target  
Best Estimate  
Upper Bound  
Lower Bound

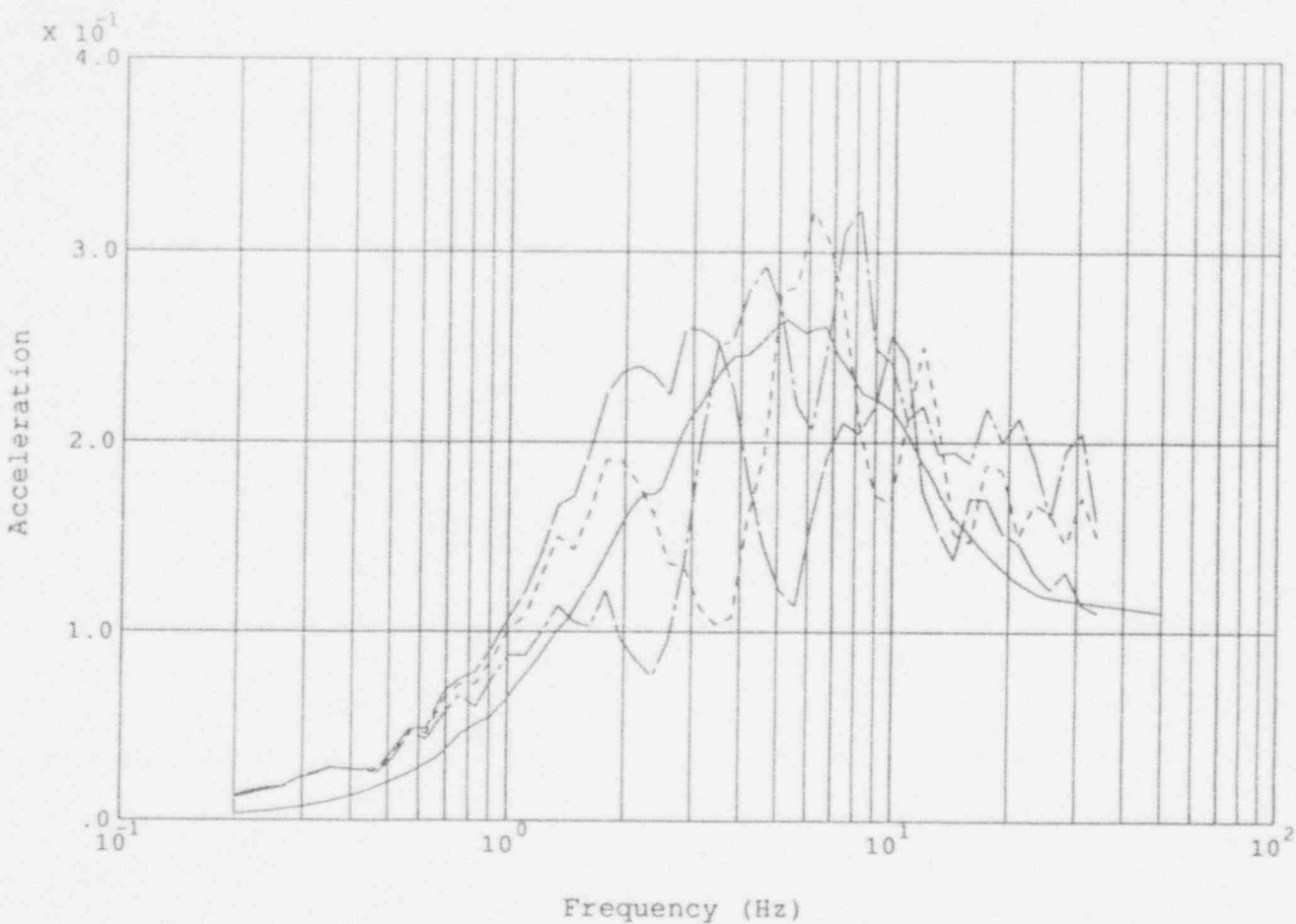
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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Notes:

COMPONENT 1  
5% Spectral Damping  
Accelerations in g's

Figure 1s1-1: Deconvolved Motion, 3 Soil Conditions vs. 60% of Ground Surface Target, OCNCS Reactor Building





Legend:

60% Target

Best Estimate

Upper Bound

Lower Bound

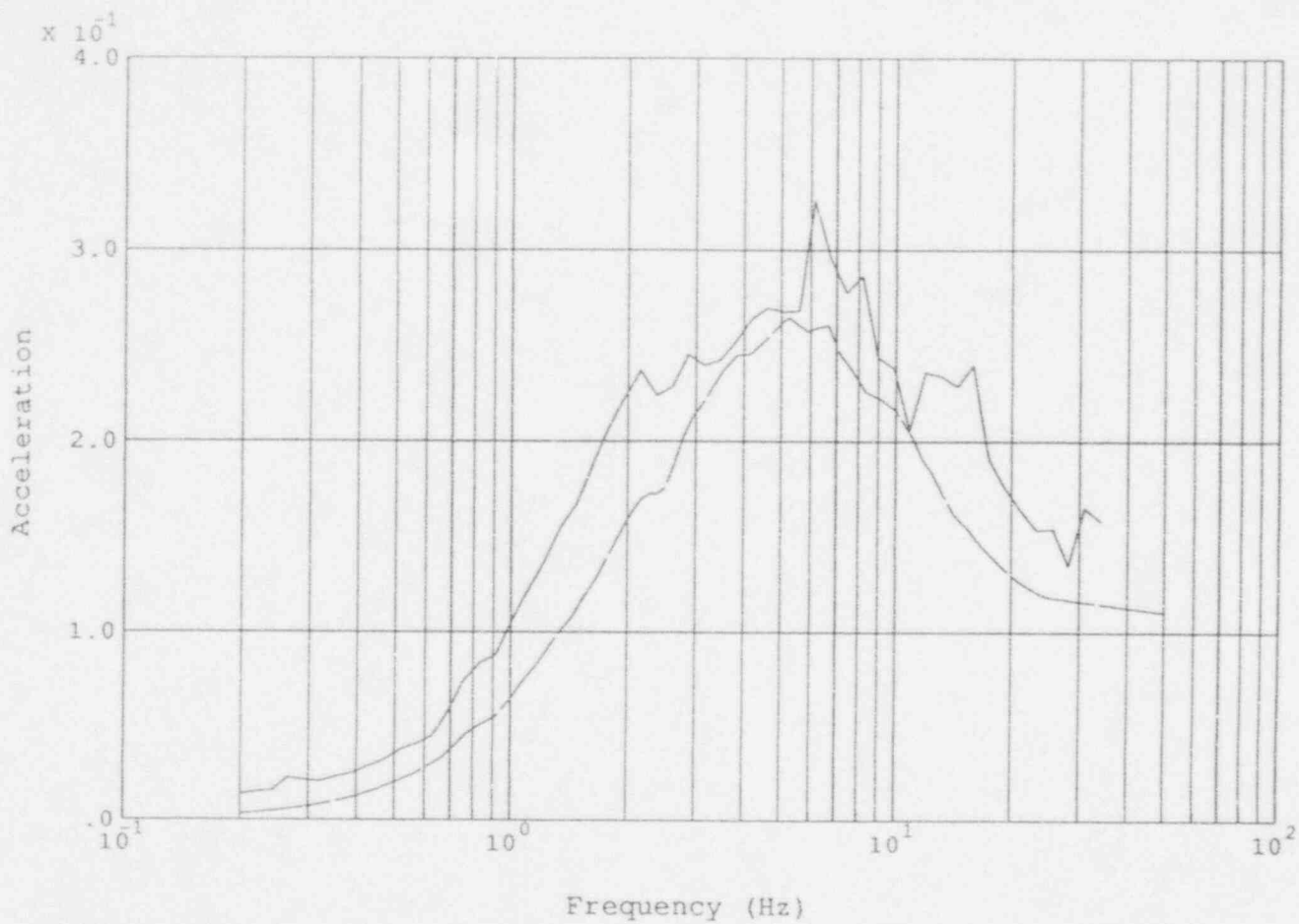
Notes:

COMPONENT 2

5% Spectral Damping

Accelerations in g's

Figure 1s1-2: Deconvolved Motion, 3 Soil Conditions vs. 60% of Ground Surface Target, OCNCS Reactor Building



Legend:

Horiz. Component 1 \_\_\_\_\_  
 60% of Freefield \_\_\_\_\_

Notes:

Accelerations in g's  
 5% Spectral Damping

Figure 1-1' Envelope of Deconvolved Motions, OCNGS Reactor Building

**NRC QUESTION #2****Structural Modelling:**

- 2.a At OCNGS, the spent fuel pool (SFP) load is distributed between the reactor building, the shield wall and the columns. Provide information related to the distribution of SFP mass and its eccentricity in the model shown in Fig. 4-1.

**GPU NUCEAR RESPONSE**

- 2.a A three-dimensional, lumped-mass dynamic stick model of the OCNGS Reactor building was used in the SSI Analysis. The model includes separate sticks for the reactor building, drywell vessel, biological shield wall and reactor pressure vessel. The mass and stiffness of the walls of the SFP and the mass of water, fuel, and equipment in the SFP were included in the model of the reactor building.

The center of mass was calculated using the center of gravity of the individual masses for all floors in the reactor building. This includes the walls, water, fuel, and equipment associated with the SFP. In all cases, differences between center of mass and center of rigidity at a particular floor were explicitly included in the model. The model shown in Figure 4-1 explicitly accounts for the appropriate distribution and eccentricity of the SFP mass.

**NRC QUESTION #2.b**

- 2.b Provide a sample calculation which demonstrates the resonsibility of the spring constants shown in Table 6 of Appendix A.

**GPU NUCLEAR RESPONSE**

- 2.b A three-dimensional lumped-mass model of the OCNGS Reactor Building was developed by URS Blume in 1987. This model included spring constants for the springs listed in Table 6 of Appendix A of the EQE report. GPUN reviewed this model to determine its appropriateness for use in the present EQE Soil Structure Interaction Analysis and noticed some anomalies. Therefore, GPUN obtained the services of Harstead Engineering Associates to perform a detailed review of the URS Blume model. The results of this review were subsequently independently verified by GPUN.

Attached are pages 121 through 130 of the calculation prepared by G. Harstead to review the model developed by URS Blume. Also attached are pages 5 through 14 of the verification of the G. Harstead calculation prepared by GPUN. These attachments describe how the values for the spring constants shown in Table 6 of Appendix A were developed.

|  |                                   |                      |                                |
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| Originator<br><b>G.A. HARSTEAD</b>         | Date<br><b>1/15/91</b>            | Reviewed by          | Date                           |

## INTERFACE STIFFNESS

1. STAR TRUSS - DRYWELL VESSEL & BIOLOGICAL SHIELD EL 82'-2"

### CONCERN:

1. ERROR IN AREA OF LEGS
2. QUESTION ON LOCAL RADIAL STIFFNESS OF DRYWELL VESSEL

2. LUGS - CONCRETE DRYWELL SHIELD & DRYWELL VESSEL EL 82'-2"

### CONCERN:

1. LOCAL ROTATION OF DRYWELL MAY NOT BE RESTRAINED BY BENDING STIFFNESS OF LEGS OF STAR TRUSS

3. UPPER TIER - BIOLOGICAL SHIELD & DRYWELL VESSEL, EL 44'25"

### CONCERN:

1. DETAILS OF DRYWELL VESSEL SUPPORT INDICATES RADIAL RESTRAINT IS ELIMINATED DUE TO HINGED HANGER

4. LOWER TIER - BIOLOGICAL & DRYWELL VESSEL, EL 22'-6"

### CONCERN:

1. DETAILS OF DRYWELL VESSEL SUPPORT INDICATES RADIAL RESTRAINT IS ELIMINATED DUE TO LUBRITE R'S AND SLOTTED HOLES. TANGENTIAL RESTRAINT MINIMIZED BY LUBRITE R'S AND OVER SIZE HOLES AND MINIMAL BRACING

5. RPV STABILIZER - NO CALCS. AVAILABLE

|   |                                  |                      |                                |
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# INTERFACE STIFFNESS

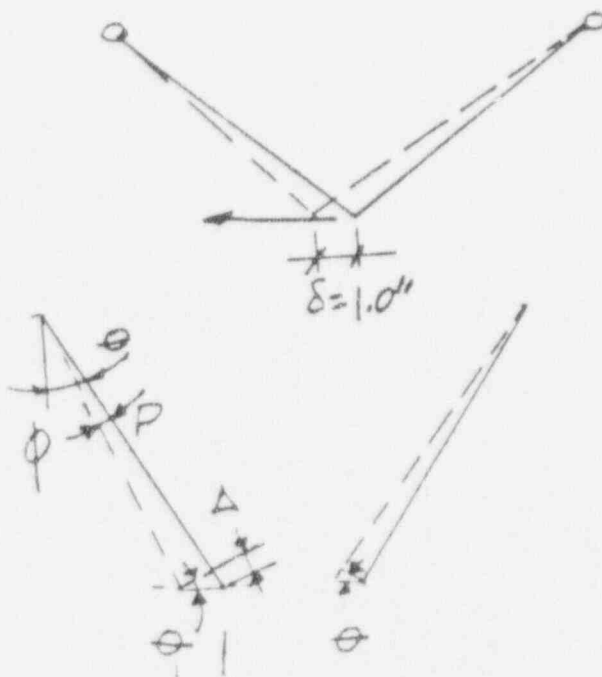
## STAR TRUSS

REF. 66136-CA-01

SHT. 8.13 - 8.18

BETWEEN DRYWELL &amp; CONCRETE BIOLOGICAL SHIELD

## STAR TRUSS LEGS



10" DBL EXTRA

STRONG

 $A = 16.1 \text{ IN}^2$ 
 $L = 5.598$ 

REF. 66136-CA-01

SHT 8.16

HOWEVER

DOUBLE

EXTRA

STRONG

 $A = 30.63 \text{ IN}^2$ 
 $I = 367.8 \text{ IN}^4$ 

$$\Delta = \frac{PL}{AE}$$

$$\sin \theta = \frac{\Delta}{\delta}$$

$$\frac{F}{2} = P \sin \theta$$

$$\delta = \frac{\Delta}{\sin \theta} = \frac{PL}{AE \sin \theta} ; F = 2 \sin \theta P$$

$$\frac{F}{\delta} = \frac{2 \sin^2 \theta AEP}{PL} = \frac{2 \sin^2 \theta AE}{L}$$



N 0016 (10-88)

|            |                         |         |                |             |   |          |            |
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## INTERFACE STIFFNESS

STAIR TRUSS

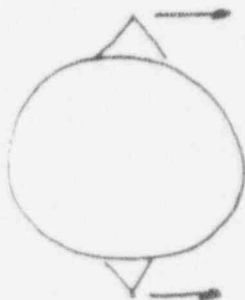
$$\theta = 36.291^\circ$$

$$K = \frac{2(30.63)(29)(10^3)}{5.598(12)} \sin^2 \theta$$

$$= 26446 \sin^2(36.291)$$

$$= 9265 \text{ K/IN}$$

IF WE ONLY ASSUME 2 SETS 180° APART:



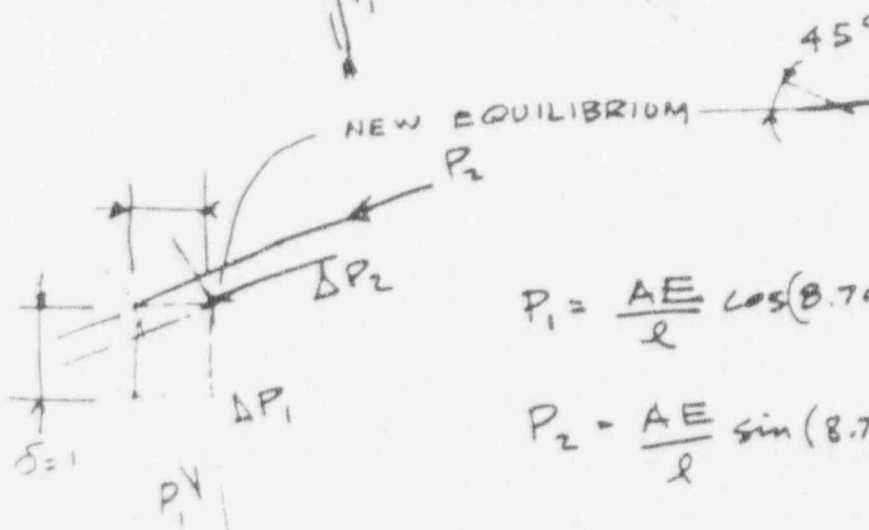
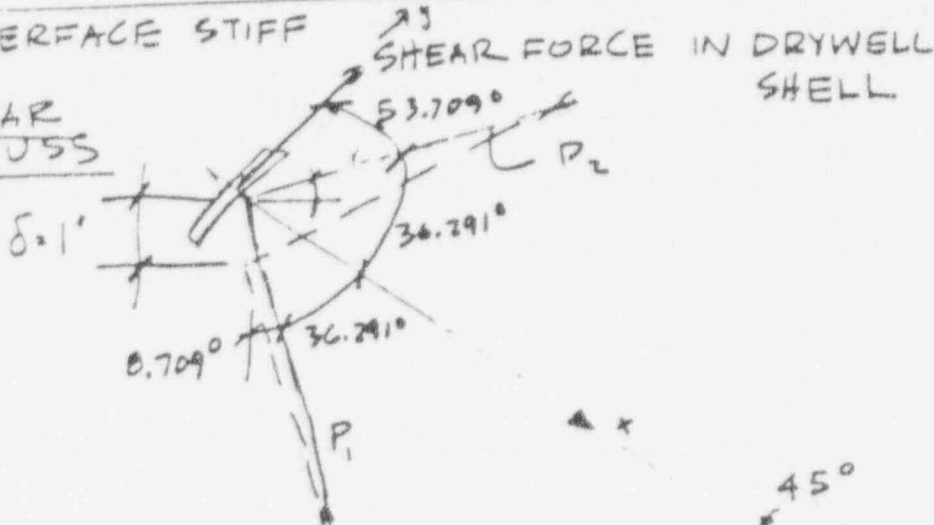
$$K = 2(9265) = 18530 \text{ K/IN}$$

BUT LEGS AT 45° WILL PROVIDE RESTRAINT ?

|   |                                   |                      |                                |
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INTERFACE STIFF

STAR  
TRUSS



$$P_1 = \frac{AE}{L} \cos(8.709) = 130706 \text{ K}$$

$$P_2 = \frac{AE}{L} \sin(8.709) = 2002.2 \text{ K}$$

$$\sum F_x = 0 = (P_1 - P_2) \cos 36.291 + (\Delta P_1 - \Delta P_2) \cos 36.29 = 0$$

$$\therefore P_1 - P_2 = -(\Delta P_1 - \Delta P_2)$$

$$\Delta P_1 = \frac{AE}{L} \sin(8.709) \quad \Delta P_2 = \frac{AE}{L} \cos 8.709$$

$$\frac{\Delta P_1}{\Delta P_2} = \frac{\sin 8.709}{\cos 8.709} = .15319$$





|                                    |                               |             |                        |
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## INTERFACE STIFFNESS

## STAR TRUSS

$$P_1 - P_2 = - (.15318 \Delta P_2 - \Delta P_2)$$

$$\Delta P_2 = \frac{P_1 - P_2}{.8468} = \frac{13070.6 - 2002.2}{.8468} = 13,070.6 \text{ K}$$

$$\Delta P_1 = .15318 (13070.6) = 2002.2$$

THIS INDICATES THAT WITHOUT RADIAL RESTRAINT PROVIDED BY DRYWELL, THE INTERFACE STIFFNESS CANNOT BE DEVELOPED BY TRUSS MEMBERS NOT ORIENTED SO THAT COMPONENTS OF FORCES IN LEGS WILL CANCEL OUT NORMAL TO SHELL

## STIFFNESS OF STAR TRUSS

$$K = 18530 \text{ K/IN} = 222360 \text{ K/FT}$$

THIS IS ABOUT  $\frac{1}{3}$  THAT CALCULATED

BY URS/BLUME REF 66136-A-01  
SHT B.17

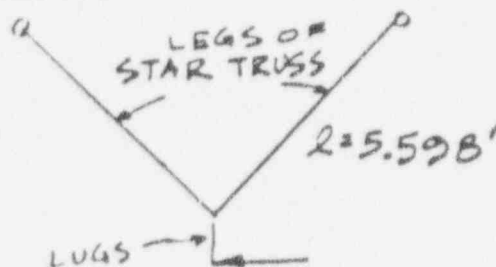


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## INTERFACE STIFFNESS

LUGS

LUGS - REF. 66136-CA-01 SHT 8.2-8.12



$$M = Pa$$

NOTE:

IN ORDER FOR LUG STIFFNESS  
TO BE BASED UPON CANTILEVER,  
RESTRAINT IS NEEDED.  
NEGLECTING DRYWELL  
SHELL EVALUATE STAR  
TRUSS LEGS.



$$\theta = \frac{2}{3} \left( \frac{1}{2} \right) \frac{M}{EI} L$$

2 legs

$$\frac{M}{\theta} = \frac{3EI}{L} = \frac{3(29)(10^4)(367.8)(2)}{5.598(12)} = (476339) 2 \text{ IN-K/rad}$$

$$P = \frac{M}{a}$$

$$\delta = \theta a$$

$$a = 4"$$

$$\frac{P}{\delta} = \frac{M/a}{\theta a} = \frac{M}{\theta a^2} = \frac{2(476339)}{(4)^2} = 59,422 \text{ K/IN}$$

DUE TO BENDING OF LEGS OF STAR TRUSS THE  
STIFFNESS OF LUGS IS REDUCED

$$K_{LUGS} = 122,900 \text{ K/IN} \quad 66136-CA-01 \text{ SHT 8.7}$$

$$K_{EQUV} = \frac{1}{\frac{1}{59,422} + \frac{1}{122,900}} = 40053.3 \text{ K/IN}$$

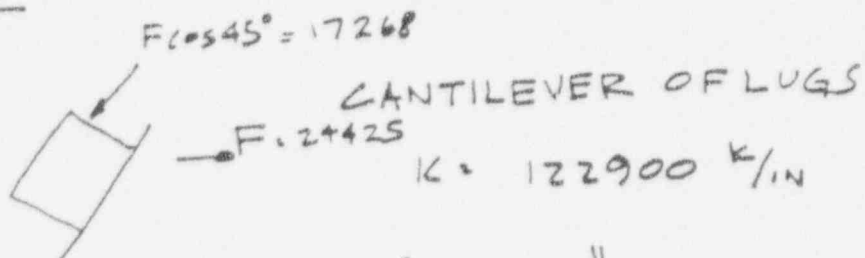
$$1.683 \times 10^{-5} \quad 8.137 \times 10^{-6}$$

$$K_{2LUGS} = 80106.6 \text{ K/IN}$$



|                                   |                               |               |                         |
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## INTERFACE STIFFNESS

LUGS

$$\delta = \frac{17268}{K} = .14''$$

$$\delta \cos 45^\circ = .1''$$

$$K = \frac{24425}{1.0 + .1} = 22204.5 \text{ K/IN}$$

## CORRECT FOR MOMENT

$$K_{\text{EQUIV}} = \frac{1}{\frac{1}{22204.5} + \frac{1}{59422}} = 16164$$

4 LUGS @ 45°

$$K = 4(16164) = 64656 \text{ K/IN}$$

|                                     |                            |               |                         |
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## INTERFACE STIFFNESS

LUGS

| $\delta$     | K      | F     |
|--------------|--------|-------|
| 0 - .01"     | 0      |       |
| .01 - .01414 | 80106  | 331.6 |
| .01414 →     | 144763 |       |

URS/BLUME COMPOSITE  $F = 967.6 \text{ K}$ 

REF: 66136-CA-01

SAT 8.7

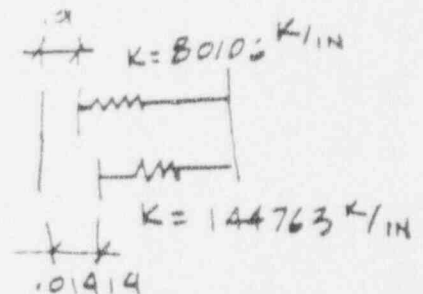
$$\delta_{(\text{ABOVE } .01414)} = \frac{967.6 - 331.6}{144763} = .00439$$

$$\delta_{\text{TOTAL}} = .01414 + .00439 = .01853$$

$$K_{\text{COMPOSITE}} = \frac{967.6}{.01853} = 52208.5 \text{ K/IN}$$

$$= 626502 \text{ K/FT}$$

BETTER TO USE GAP ELEMENTS

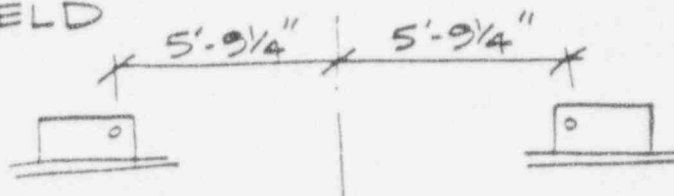


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## INTERFACE STIFFNESS

RPV STABILIZER - NO URS/BLUME CALC.

PES WELDED TO TOP OF BIOLOGICAL SHIELD

REF: B&R  
DWG 4204-1 $3/4"$   $\phi$  ROD -

GE DWG 112C2523

ASSUME AREA IS CONSTANT

ROOT DIAM = 2.925

AISC Steel Construction  
6th Ed. p. 4-91

$$A = \frac{\pi d^2}{4} = \frac{\pi (2.925)^2}{4} = 6.7 \text{ in}^2$$

$$K = \frac{AE}{L} = \frac{6.7(29)(10^3)}{11.54(12)} = \frac{16837}{12} \text{ K} = 1403 \text{ K/in}$$

$$= 16837 \text{ K/FT}$$

$$K_{2\text{STAB}} = 33674 < 48000 \text{ K/FT} \quad \swarrow \text{say OK}$$

WHILE THE ABOVE ROUGH CHECK IS  $\sim 1/4$  OF URS/BLUME VALUE, THE BLUME VALUE IS REASONABLE IF A MORE PRECISE ANALYSIS WERE PERFORMED CONSIDERING GLEEVES, SPRINGS, 10"  $\phi$  PIPE IN THE WHOLE ASSEMBLY

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(B) NODAL COORDINATION

1) ONLY MINOR CHANGES ARE SUGGESTED BY G.H. TO THE RX BLDG STICK AT THE X & Z COORDINATES. THESE DIFFERENCES SHOULD NOT HAVE SIGNIFICANT EFFECT TO THE DYNAMIC PROPERTIES OF THE COMBINED STICK MODEL. THEREFORE, THE USE OF GH'S NODAL COORDINATION IS ACCEPTABLE.

(C) SPRING CONSTANTS

THERE ARE FIVE PLACES WHERE THE COMBINED MODEL HAS SPRINGS IN THE X AND Z DIRECTIONS. THEY ARE: UPPER & LOWER TIES (PLATFORMS), RX VESSEL STABILIZER, DRYWELL STAR TRUSS AND DRYWELL LUGS. G.H. REVISES THE SPRING CONSTANTS FROM BLUME'S VALUES AT ALL LOCATIONS EXCEPT RX. VESSEL STABILIZER. THE DISCUSSION AND EVALUATION OF GH'S REVISION TO THESE VALUES ARE AS FOLLOWS.

1) THE UPPER TIER PLATFORM @ EL. 46'

THE UPPER TIER PLATFORM IS SUPPORTED BY HANGERS AT THE EXTERIOR END AND BY POSTS AT THE INTERIOR END. BECAUSE THE SUPPORTS ARE HANGERS AND ACTING AS A HINGE AND THE



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CONNECTIONS WERE DESIGNED TO PREVENT RADIAL RESTRAINT BY MEANS OF SLOTTED HOLES. GH DETERMINED THAT THE HORIZONTAL RESTRAINT PROVIDED FROM THIS PLATFORM IS MINIMAL. NO CREDIT WAS GIVEN BY GH. TO THE TANGENTIAL RESTRAINT BECAUSE THE PLATFORM IS MORE FLEXIBLE THAN ASSUMED BY BLUME. THE FLEXIBILITY AT THE END OF HANGERS WERE ASSUMED TO BE FIXED BY BLUME. HOWEVER, THIS IN REALITY IS NOT THE CASE. THE END SUPPORT IS VERY FLEXIBLE BY CONSIDERING THAT THE SHELL OF THE DRYWELL COULD BE BENT OR EVEN BUCKLED. THE JOINTS BETWEEN THE RADIAL BEAMS AND SMALL WIDE FLANGE & CHANNEL SECTION OF TANGENTIAL BEAMS MAY BE LOOSE DUE TO THERMAL CYCLES. THIS CAN ALSO GREATLY REDUCE THE SPRING CONSTANT OF THE PLATFORM. ALTHOUGH BLUME CALCULATED AND DETERMINED A SPRING CONSTANT OF 441 KIPS PER FOOT FOR THIS PLATFORM, THE EFFECTIVE VALUE IS NEGLIGIBLE WHEN THE ABOVE FACTS ARE CONSIDERED IN THE ANALYSIS.

THEREFORE, GH'S DETERMINATION OF NO RIGIDITY PROVIDED BY THE UPPER TIE PLATFORM IS A REASONABLE ASSUMPTION.

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2) THE LOWER TIER PLATFORM @ EL. 23'

THE LOWER TIER IS SUPPORTED ON THE DRYWELL SHELL BY BRACKET. THE CONNECTIONS ARE NOT ONLY SCOTED BUT ALSO INSTALLED WITH LUBRITE BEARING PADS TO ALLOW RADIAL MOVEMENT. WITH REGARD TO TANGENTIAL RESTRAINT, THIS PLATFORM IS STRENGTHENED BY MEANS OF CROSS BRACINGS. THIS PLATFORM UNLIKE THE UPPER TIER SHOULD PROVIDE SOME DEGREE OF RIGIDITY IN TERMS OF SPRING CONSTANT. HOWEVER, THE LOWER TIER IS ONLY 13 FEET ABOVE THE COMMON FOUNDATION OF THE DRYWELL AND RX VESSEL PEDESTAL (EL 10'-3"). INCLUSION OF TANGENTIAL STIFFNESS WILL HAVE A NEGLIGIBLE EFFECT UPON SEISMIC RESPONSE IN ANY EVENT.

THEREFORE, GH'S DECISION TO IGNORE THE RIGIDITY OF THE LOWER TIER PLATFORM IS JUSTIFIABLE.



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### 3) STAR TRUSS @ EL. B2'-9"

URS/BLUME CALCULATED THE SPRING CONSTANT FOR THE STAR TRUSS BETWEEN DRYWELL AND BIO-SHIELD WALL BASED ON THE RIGID PLANE CONFIGURATION OF THE STRUCTURES, (i.e. THE BIO-SHIELD WALL & DRYWELL REMAIN CIRCLE AT ALL TIME DURING SEISMIC EVENT, THIS ASSUMPTION MAY BE TRUE FOR THE BIO-SHIELD WALL BUT NOT FOR THE DRYWELL BECAUSE THE BIO-SHIELD WALL IS MORE RIGID IN THE X-Z PLANE THAN THE DRYWELL. GH DETERMINED THAT THE LOCAL RADIAL DISPLACEMENTS OF THE DRYWELL AT EL. B2'-9" WOULD GREATLY REDUCE THE RADIAL STIFFNESS OF THE STAR TRUSS. SINCE COMPUTATION OF THIS AFFECT WOULD REQUIRE AN EXTREMELY SOPHISTICATED ANALYSIS, TO CONSERVATIVELY DETERMINE THE SPRING CONSTANT OF THE STAR TRUSS GH ONLY CONSIDERED THE TANGENTIAL RIGIDITY OF THE STAR TRUSS. THIS IS APPROPRIATE BECAUSE THE TANGENTIAL RIGIDITY OF THE DRYWELL IS SIGNIFICANTLY GREATER THAN THE RADIAL RIGIDITY.

IN REALITY, THE SPRING CONSTANT OF THE STAR TRUSS IS IN BETWEEN BLUME'S VALUE (690,081 KIPS/FT) AND GH'S VALUE (222,360 KIPS/FT). CONSIDERING THAT THE USE OF A LOWER SPRING CONSTANT WILL TEND TO LOWER THE CALCULATED NATURAL FREQUENCY OF

|  |      |             |               |                      |
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DRYWELL, GH'S APPROACH IS CONSERVATIVE.

THEREFORE, GH'S APPROACH TO EVALUATE THE RIGIDITY OF THE STAR TRUSS IS CONSERVATIVE.

4) THE LUGS CONNECTING THE DRYWELL & CONCRETE STRUCTURE @ EL 82'9"

THE 8 LUGS STICKING INTO THE CONCRETE POCKET HAVE A 0.01 INCH GAP TO THE RX BLDG CONCRETE. BLUME USED A BI-LINEAR APPROACH TO EVALUATE THE CANTILEVER RIGIDITY OF THE LUGS. GH. ADOPTED BLUME'S APPROACH IN ADDITION TO CONSIDERING THE BENDING EFFECT OF THE STAR TRUSS MEMBERS DUE TO BENDING MOMENT FROM THE LUGS. IN REALITY, BOTH THE BLUME & GH VALUES ARE CONSERVATIVE IN THIS CASE. THE 0.01 INCH GAP BY NOW MUST BE CLOSED UP DUE TO THE INTRUSION OF WATER AND FOREIGN PARTICLES AND THE BUILD-UP OF RUST. ONCE AGAIN, UNDER-ESTIMATING THE SPRING CONSTANT IS CONSERVATIVE FOR CALCULATING THE DRYWELL RESPONSE. THEREFORE, THE USE OF GH'S VALUE (626,000 KIP/FT) FOR LUG SPRING IS CONSERVATIVE AND ACCEPTABLE.

|  |      |             |               |                       |
|--|------|-------------|---------------|-----------------------|
| Subject<br>VERIFICATION OF REVIEW OF 3D SESSOX MODEL |      | Calc. No.   | Rev. No.<br>0 | Sheet No.<br>10 of 17 |
| Originator   | Date | Reviewed by |               | Date                  |

5) R<sub>x</sub> VESSEL STABILIZERS @ 6L 82'-9"

URS/BLUME PROVIDE NO SUPPORT FOR USING THE 48,000 KIPS/FT SPRING VALUE IN THE CALCULATION.

GH. ASSUMED THE STABILIZER AS A SIMPLE ROD AND CALCULATED 33,674 KIPS/FT OF SPRING CONSTANT FOR 2 STABILIZERS. GH DETERMINED THAT THIS RESULT CONFIRMED BLUME'S VALUE OF 48,000 KIPS/FT.

THE FOLLOWING CALCULATION IS TO VERIFY THE ACCURACY OF THE SPRING CONSTANT BY COMPUTING THE COMBINED EFFECT OF STABILIZER FROM THE RODS & DISC SPRINGS.

|  |           |               |                       |
|--|-----------|---------------|-----------------------|
| Subject<br>VERIFICATION OF REVIEW OF 3D MODEL <sup>SEISMIC</sup> | Calc. No. | Rev. No.<br>0 | Sheet No.<br>11 of 17 |
| Originator   | Date      | Reviewed by   | Date                  |

S-1) DISCRPTIONS

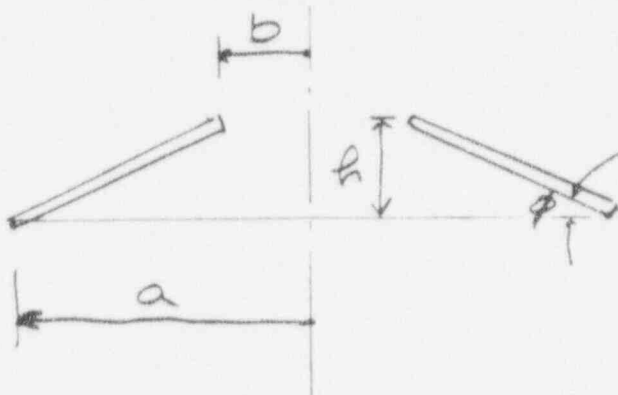
REF. DRAWINGS: 1) GE. 112C-2523  
2) GE. 153F-765  
3) GE. 129B-2146

THE REACTOR STABILIZER CONSISTS OF 8 ROD & DISC. SPRING ASSEMBLIES. EACH ASSEMBLY WAS PRE-TENSIONED TO 106 KIPS. DURING THE SEISMIC EVENT, AT LEAST 4 OUT OF 8 ASSEMBLIES ARE WORKING TO SUPPORT THE REACTOR VESSEL.

THIS SECTION OF THIS VERIFICATION IS TO DETERMINE IF THE USE OF 48,000 KIPS/FT BY BLUME AND ACCEPTED BY G14. IS REASONABLE.

|  |           |                      |                              |
|--|-----------|----------------------|------------------------------|
| Subject<br><b>VERIFICATION OF REVIEW OF 3D MODEL</b> | Calc. No. | Rev. No.<br><b>0</b> | Sheet No.<br><b>12 of 17</b> |
| Originator   | Date      | Reviewed by          | Date                         |

### 5-2) SPRING CONSTANT FOR DISC SPRINGS



8 DISC. SPRINGS  
PER SET OF STABILIZER  
ASSEMBLY.  
(REF. DWG. GE 112C-2523)

SINCE THERE IS NO INFORMATION AVAILABLE FOR 'h',  
WE ASSUME THE  $\phi$  ANGLE IS  $20^\circ$  BY MEASURING  
A SMALL SAMPLE DISC SPRING.

$$h = 1.937 \tan 20^\circ = 0.705''$$

$$t = 0.551'' \quad a = 3.937 \text{ IN}, \quad b = 2 \text{ IN}, \quad a-b = 1.937$$

REF = 'FORMULAS FOR STRESS AND STRAIN' by ROARK

$$\frac{a}{b} = 1.969 \sim 2, \quad M = 0.7$$

$$P = \frac{ES}{(1-\nu^2)Ma^2} \left[ (h-\delta) \left( h - \frac{b}{2} \right) t + t^3 \right]$$

$$E = 29 \times 10^6 \text{ PSI} \quad \nu = 0.3$$

|  |                              |                      |                                     |
|--|------------------------------|----------------------|-------------------------------------|
| Subject<br><u>VERIFICATION OF REVIEW OF 3D MODEL</u> | Calculator<br><u>SEISMAL</u> | Rev. No.<br><u>0</u> | Sheet No.<br><u>14</u> of <u>17</u> |
| Originator   | Date                         | Reviewed by          | Date                                |

### 5.3) SPRING CONSTANT FOR RODS & OTHER ELEMENTS

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CONSIDERS THE OTHER ELEMENTS OF THE STABILIZER

AS A UNIFORM  $3\frac{1}{2}$ "  $\phi$  ROD. THIS IS CONSIDERED APPROPRIATE.

$$K_{2 \text{ RODS}} = 33674 \text{ KIPS/FT}$$

### 5.4) TOTAL SPRING CONSTANT OF STABILIZER

4 RODS & 4 DISC. SPRINGS

$$\frac{1}{K} = \frac{1}{2 \times 33,674} + \frac{1}{4 \times 61632}$$

$$= .0000148 + .0000041$$

$$= .0000189$$

$$\therefore K = 53,000 \text{ KIPS/FT} \sim 48,000 \text{ KIPS/FT}$$

### 5.5) CONCLUSION

53,000 KIPS/FT IS VERY CLOSE TO 48,000 KIPS/FT THAT URS/BLUMING USED.

THEREFORE, USE OF 48,000 KIPS/FT FOR  
Rx STABILIZER SPRING CONSTANT IS REASONABLE.

|                                    |         |             |          |           |
|------------------------------------|---------|-------------|----------|-----------|
| Subject                            | SEISMIC | Gate No.    | Rev. No. | Sheet No. |
| VERIFICATION OF REVIEW OF 3D MODEL |         |             | 0        | 13 of 17  |
| Originator                         | Date    | Reviewed by | Date     |           |

$$\delta = 0.1''$$

$$D = \frac{29 \times 10^6}{.91 \times 0.7 \times (3.937)^2} \times 0.1 \left[ 0.605 \times 0.655 \times 0.551 + 0.1673 \right]$$

$$= 2,937,161 \times .0386 = 113,271 \#$$

$$\delta = 0.2''$$

$$P = 2,937,161 \#$$

$$.06713 = 197,168 \#$$

$$\delta = 0.3''$$

$$P = 2,937,161 \#$$

$$.08735 = 256,547 \#$$

$$\delta = 0.4''$$

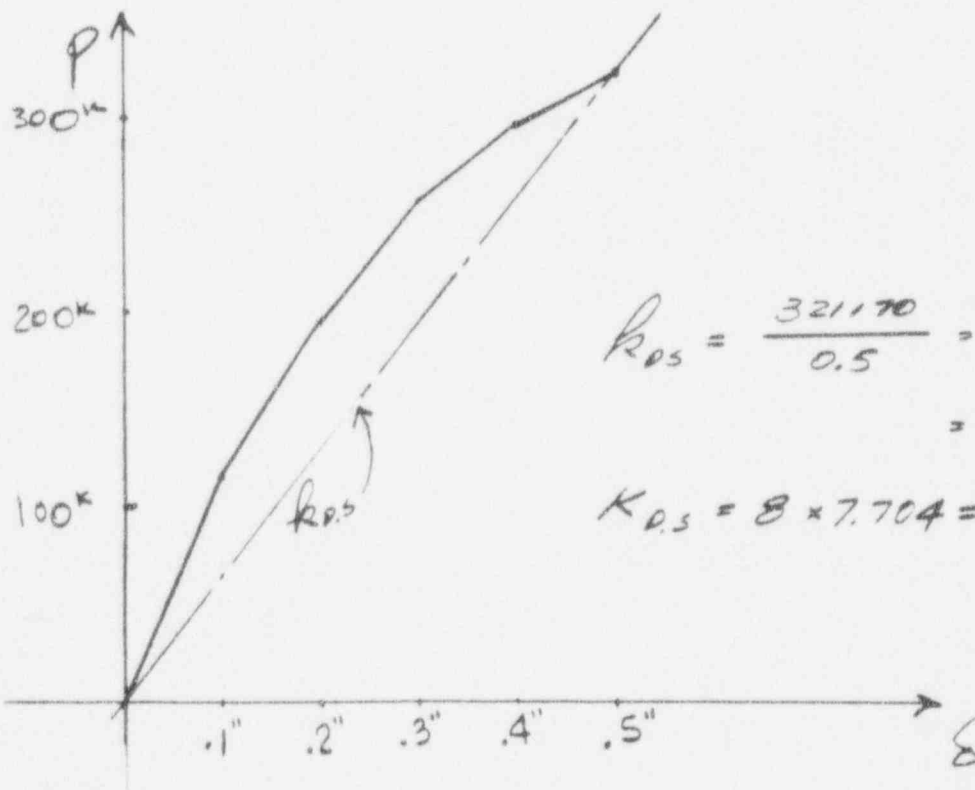
$$P = 2,937,161 \#$$

$$.1009 = 296,263 \#$$

$$\delta = 0.5''$$

$$P = 2,937,161 \#$$

$$.1093 = 321,170 \#$$

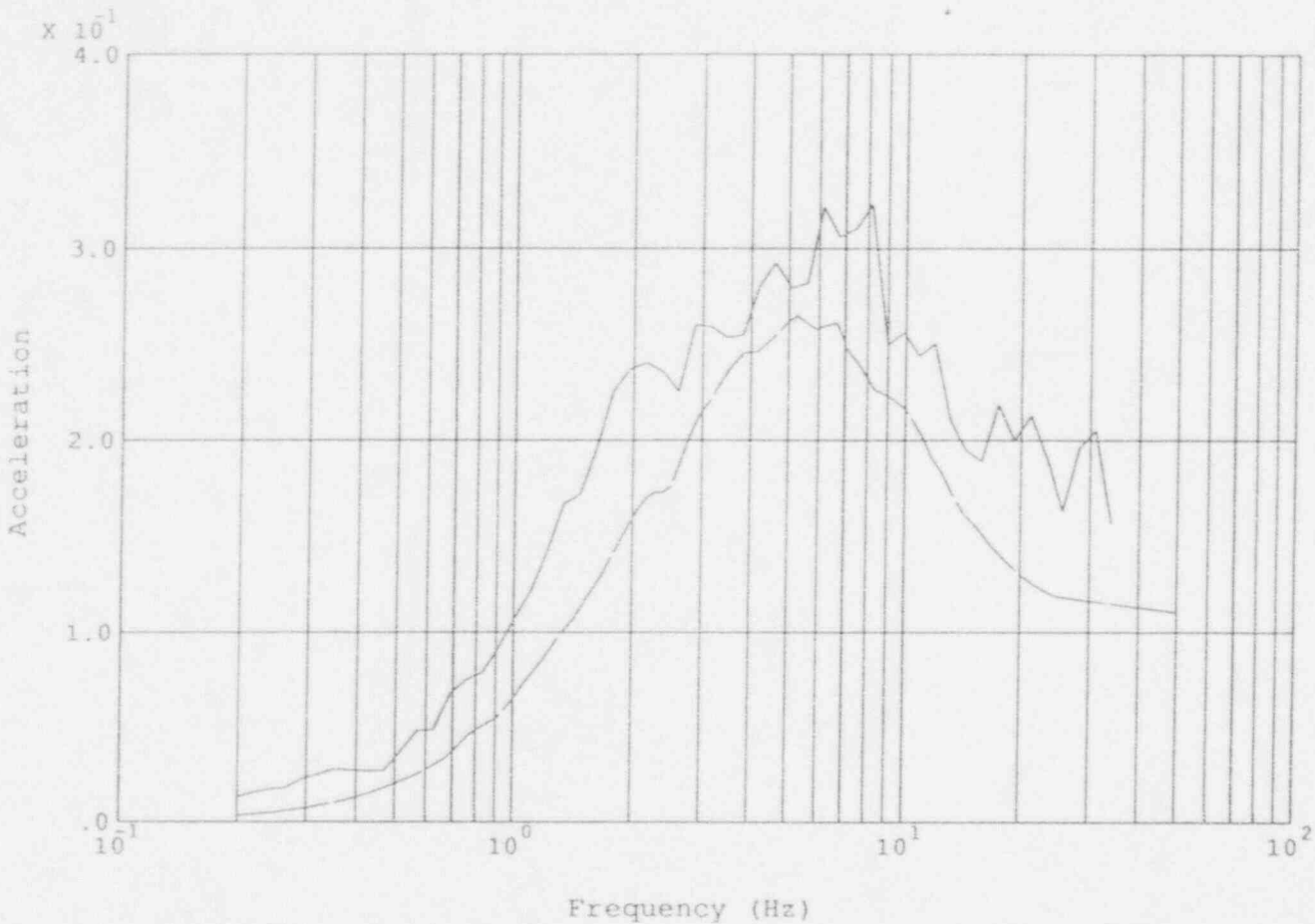


$$R_{0.5} = \frac{321,170}{0.5} = 642 \text{ k/in}$$

$$= 7.704 \text{ k/ft}$$

$$K_{0.5} = 8 \times 7.704 = 61,632 \text{ k/ft}$$





Legend:

Horiz. Component 2 \_\_\_\_\_

60% of Freefield \_\_\_\_\_

Notes:

Accelerations in g's

5% Spectral Damping

Figure 1-2: Envelope of Deconvolved Motions, OCNGS Reactor Building



**NRC QUESTION #2.c**

- 2.c A number of floor slabs and walls at OCNGS have been identified as vertically flexible. Provide information related to the plans for developing vertical floor response spectra for these floors.

**GPU NUCLEAR RESPONSE**

- 2.c The Oyster Creek Reactor Building is a rectangular structure with relatively uniformly spaced column lines in each direction. The column lines divide each floor into floor slabs which are nearly square. All floor slabs are supported by beams or walls on all four sides and there is a column or a wall at every corner. The smallest slab is 20.75' x 22.0' and the largest is 21.5' x 23.25'. All slabs are at least 12 inches thick. Analyses of the floor slabs of the OCNGS Reactor Building were performed in order to determine the potential for amplification of the vertical in-structure spectra due to vertical vibrations of the slabs. All the floor slabs were reviewed, and four were selected for analysis. The first three are considered typical and the fourth is bounding, that is, it has the lowest frequency of any slab in the reactor building.

Finite element models of these four slabs were generated. Boundary beams were explicitly modeled. Columns were modeled as fixed vertical supports and external walls as fixed boundaries. The surrounding slabs were not modeled since they do not significantly affect the fundamental frequency of the slab. Also, the actual width of the floor beams was conservatively neglected. The beam widths effectively reduce slab lengths by approximately 20%, therefore neglecting these widths results in an underestimation of actual frequency. Modal analyses were performed to determine the fundamental frequencies of the slabs. Figures 2s1-1 through 2s1-4 show finite element models of the selected slabs. The slabs and the results of the analyses are described below.

The first slab selected is at elevation 95'-3" between column lines RA, RB, R4, and R5. Its plan dimensions are 23.25' by 20.75' and its thickness is 26". At line RA, the slab is connected to a wall and is supported by beams at the other lines and by columns at the corners. The modal analysis of this slab predicts a fundamental vertical frequency of 43.5 Hz.

The second slab selected is at elevation 51'-3" between column lines RD, RE, R6, and R7. Its plan dimensions are 22.0' by 21.5' and its thickness is 12". At line R7, the slab is connected to a wall and is supported by beams at the other lines and by columns at the corners. The modal analysis of this slab predicts a fundamental vertical frequency of 25.5 Hz.

**GPUN RESPONSE #2.c (CONT'D)**

The third slab selected is at elevation 95'-3" between column lines RB, RC, R2, and R3. Its plan dimensions are 23.25' by 21.5' and its thickness is 16". This slab is supported by beams at all boundary lines and by columns at the corners. The modal analysis of this slab predicts a fundamental vertical frequency of 24.4 Hz.

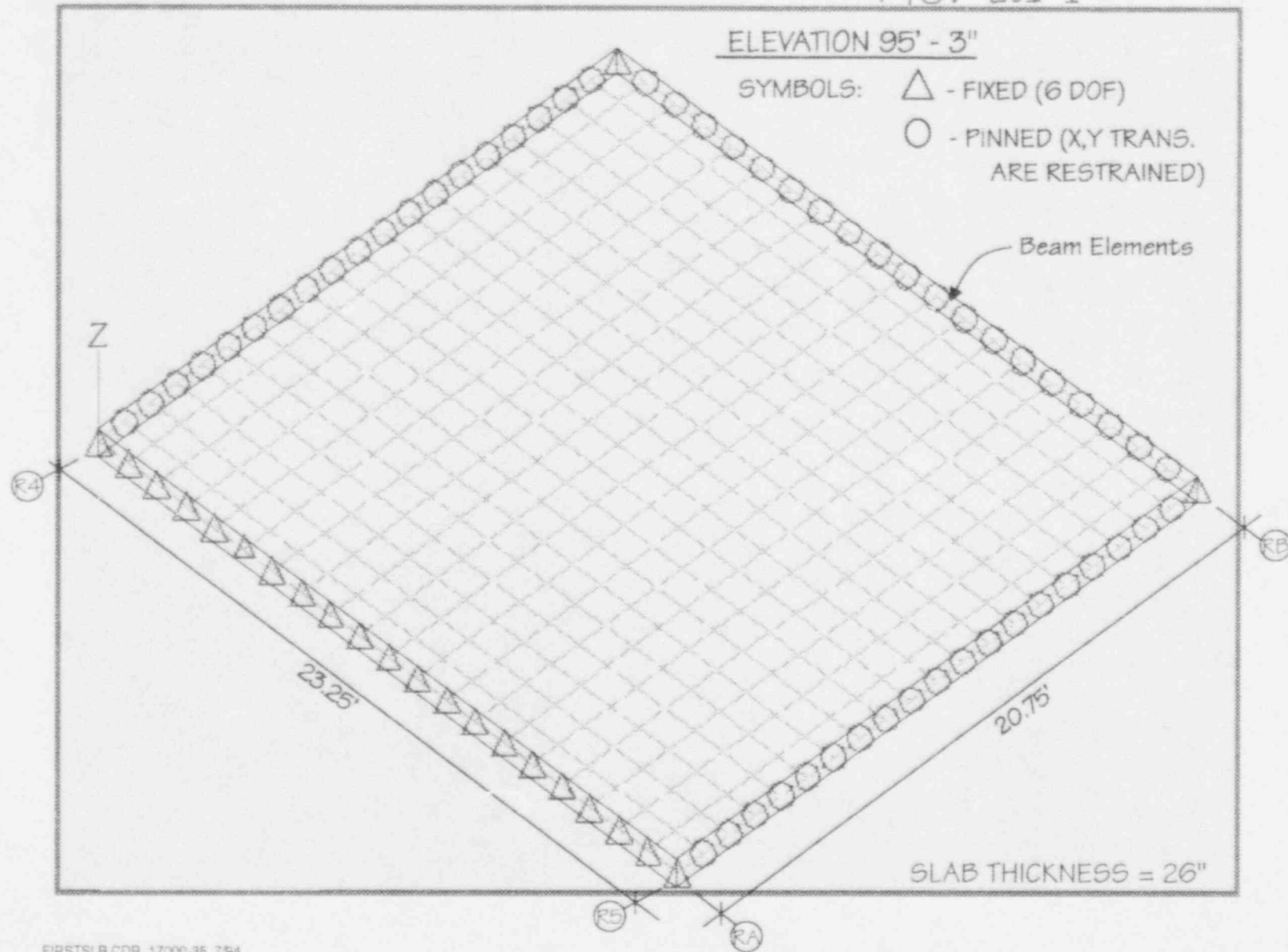
The fourth slab selected is at elevation 75'-3" between column lines RB, RC, R3 and R4. Its plan dimensions are 23.25' by 21.5' and its thickness is 12". This slab is supported by beams at all boundary lines and by columns at the corners. The modal analysis of this slab predicts a fundamental frequency of 22.4 Hz.

The lowest fundamental vertical frequency of any slab in the reactor building is 22.4 Hz. The dominant vertical frequencies of the soil-structure system range from 5 Hz to 10 Hz depending on the floor elevation. The lower frequency (5 Hz) is more dominant in the lower elevations and the higher frequency (10 Hz) is more dominant in the upper elevations. The ratios of slab fundamental frequency to structure vertical frequency range from 2.2 to more than four, thus no vertical floor amplification will occur.

Also, the mode shapes for the fundamental modes of the floors are in a "Checkerboard" pattern, ie, adjacent slab modal displacements have opposing signs. Therefore, given the relatively uniform mass distribution of the floor, the mass participation factors for these modes are low. Thus, the in-structure response spectra will be generated without including this effect.

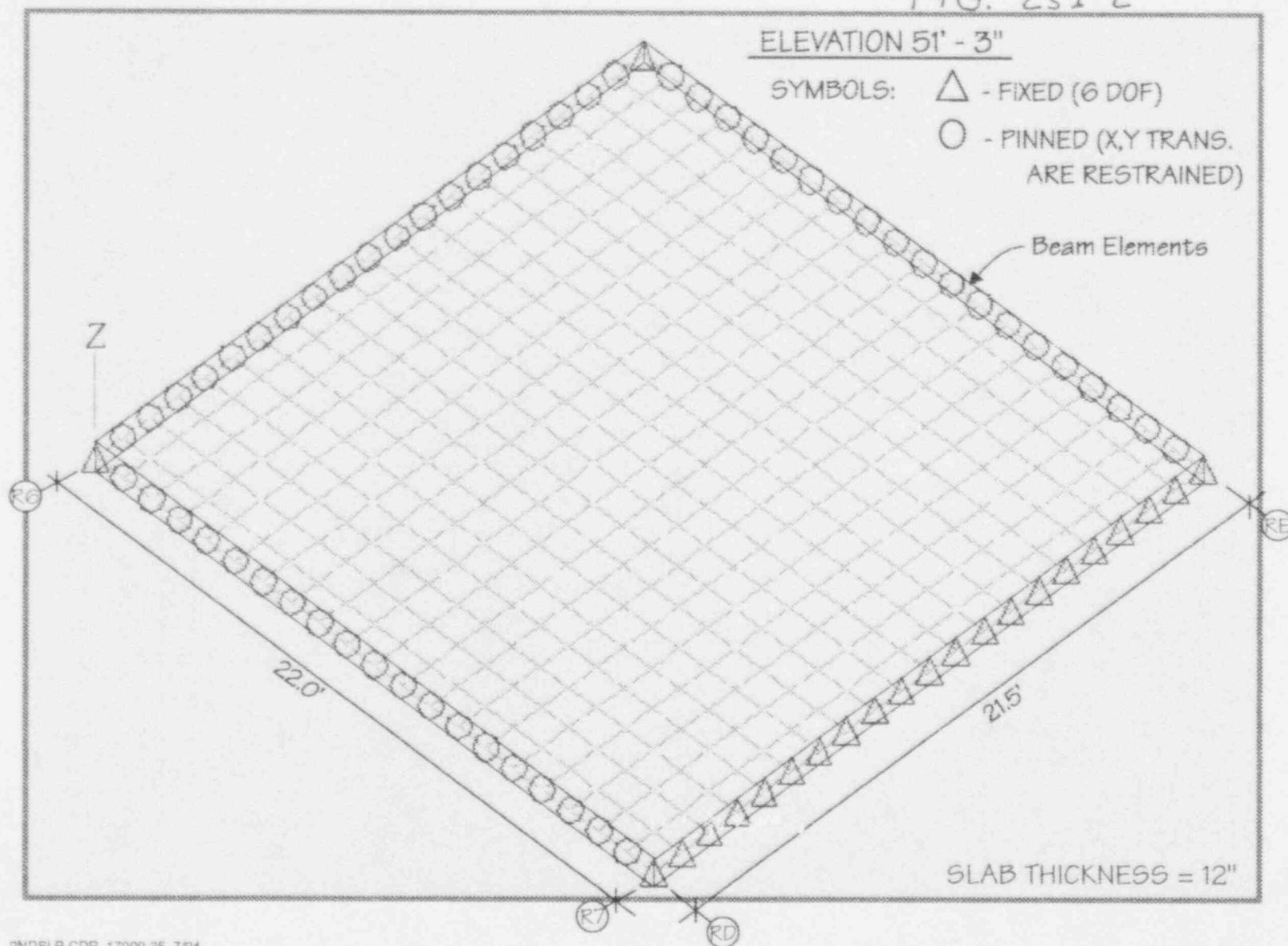
# "FIRST" SLAB

FIG. 2s1-1



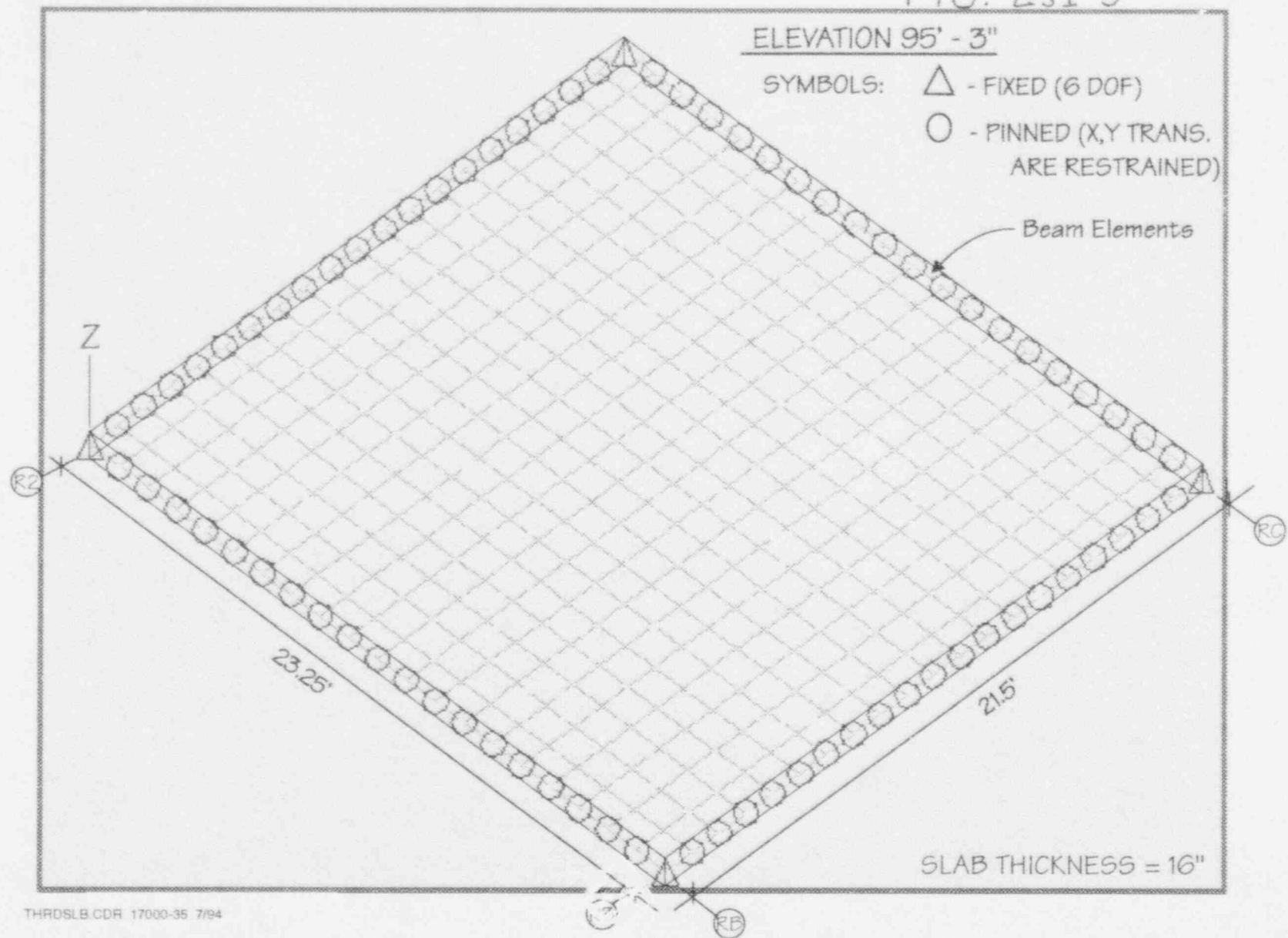
# "SECOND" SLAB

FIG. 2s1-2



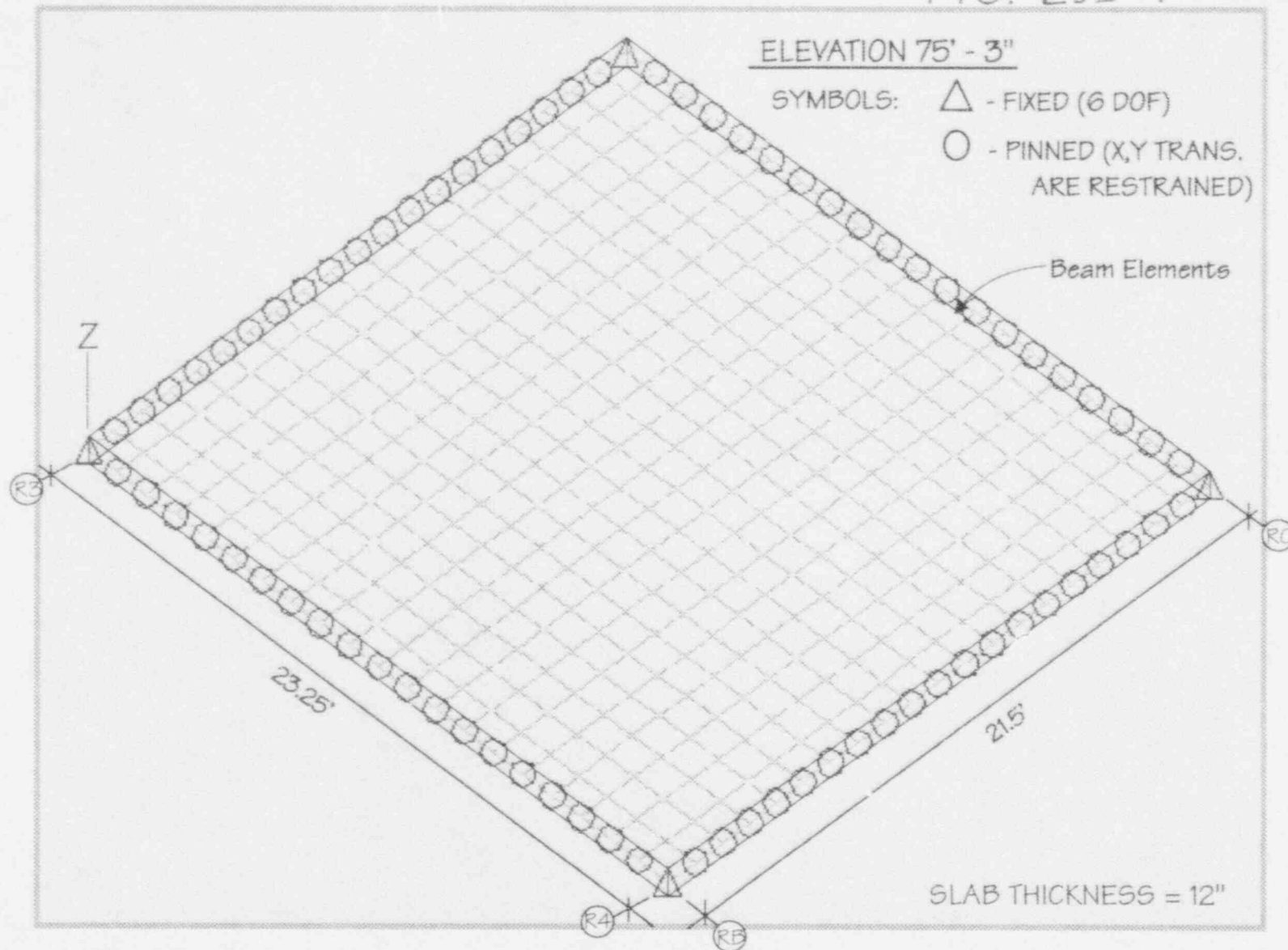
# "THIRD" SLAB

FIG. 2s1-3



# "FOURTH" SLAB

FIG. 2s1-4





**NRC QUESTION #3**

3. The staff recognizes the timing when the soil structure interaction (SSI)-sensitivity studies were performed (section 5) and the final SSRS were approved and agrees with the licensee (and its consultant) that the use of the earlier SSRS will not significantly affect the results of the sensitivity studies. However, the staff believes that the 2-D model utilized for the sensitivity studies should have been modified to get better correspondence in the results of 2-D and 3-D (figures 5-2, 5-3, 5-4). Provide justification for not modifying the 2-D model, particularly, when comparing rigid vs. flexible foundation responses.

**GPU NUCLEAR RESPONSE**

3. Sensitivity studies were conducted using the 2-D soil structure model to reduce the amount of effort. Specifically, studies for soil layer discretization, foundation rigidity and soil structure bonding were performed using the 2-D model (Ref. the EQE Report, June 1993, sections 5.1.1, 5.1.2 and 5.1.3). These studies were executed by determining the change in response due to a change in the parameters being investigated. This information was then used in the development of the 3-D soil structure model. Hence, the 2-D model needs to replicate the 3-D model only to the extent that change in response to change in input of the 2-D model would also occur in the 3-D model.

Figure 5-2 of the EQE Report shows the benchmark comparison of response spectra between the 2-D and 3-D models at three locations; elevation 51'-3" and 119'-3" in the Reactor Building and elevation 87'-5" in the Drywell. There are three elements that determine the quality of the ability of the 2-D model to replicate the 3-D model; spectral shape, spectral amplitude and the zero period acceleration (ZPA). The spectral shapes between the 2-D and 3-D models are the same, i.e., they exhibit the same slopes of spectral amplitudes as a function of frequency for all frequencies. Spectral amplitudes are nearly coincident except at the spectral peaks. The largest deviation predicted by the 2-D model is 15%, at Node 7 as shown in Table 3s-1. The ZPAs for the two models coincide. These correlations between the 2-D and 3-D models are very good and more than sufficient to assure that the 2-D model provides correct information about the 3-D model behavior.

Further, the results from the 2-D studies were used conservatively when applying them to the 3-D model. The analyses presented in Figure 5-3 of the EQE Report indicates that soil discretization at 7.0 Hz is sufficient. The 3-D soil discretization is at 12.5 Hz. Figure 5-5 in the EQE Report indicates that there is no change in response between the rigid and flexible foundation models. In the soil bonding study, Figure 5-7, only the extreme fully unbonded case shows any deviation from the other cases, and it is bounded by other considerations given in section 5.1.3.

**GPUN RESPONSE #3 (CONT'D)**

Therefore, the correlation between the 2-D and 3-D models taken together with the results of the 2-D studies and their application to the 3-D model leads to the conclusion that a better correlation in spectral peaks between the 2-D and 3-D models is not necessary.



Table 3s-1: Peak Spectral Values

| Node | 2-D Model | 3-D Model | Ratio, 2D/3D |
|------|-----------|-----------|--------------|
| 4    | 0.32      | 0.36      | 0.89         |
| 7    | 0.50      | 0.59      | 0.85         |
| 58   | 0.42      | 0.47      | 0.90         |

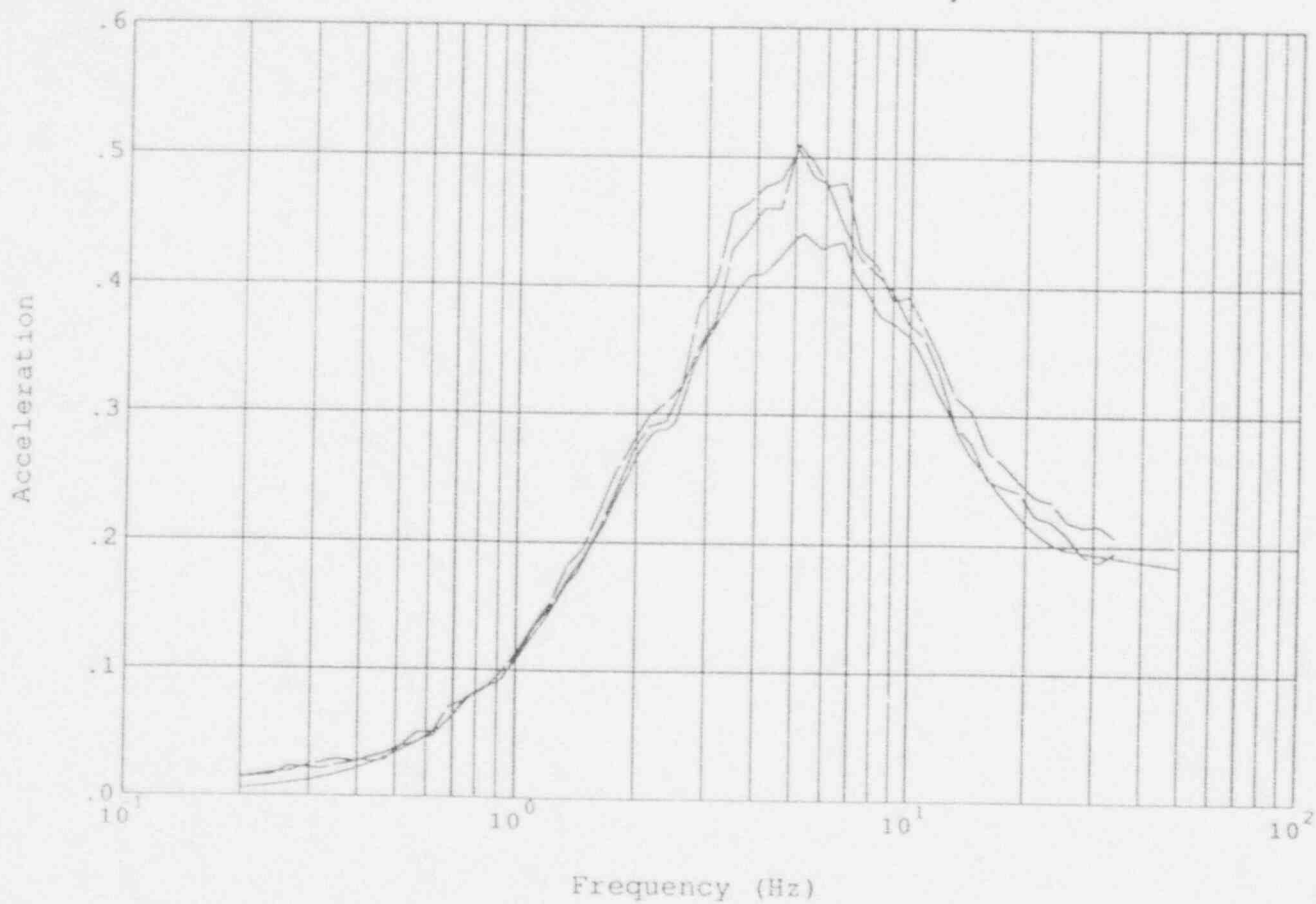
**NRC QUESTION #4**

4. Provide diskettes containing the following input-output information:
  - a. A set of final (modified) synthetic time-histories utilized in the development of in-structure response spectra (IRS), together with their response spectra and power spectral densities (PSDs) at the ground surface.
  - b. Soil and Structural model of the Reactor Building (RB) together with their parameters utilized in developing the IRS.
  - c. Horizontal and vertical spectra at El. 95 ft ( $\pm$ ) in the RB and at 50 ft ( $\pm$ ) in the Drywell (when available).

**GPU NUCLEAR RESPONSE**

4. The information included in the diskette enclosed with this letter is described below:
  - a. The time histories to be used in the final analyses. Their response spectra at 5% damping and their PSD functions at the ground surface. Figures 4-1 and 4-2 show the spectra and Figures 4-3 to 4-5 show the PSD functions.
  - b. Reactor Building model in EQE computer code MODSAP format. Table of high strain soil properties (best estimate) used in the development of impedance and scattering functions.
  - c. Spectra at elevations 95 ft. in the RB and 50 ft. in the Drywell were not generated for the study, and thus, are not available. They will be transmitted to the NRC after the final in-structure spectra are generated.

Hard copies of all files on the diskette are also enclosed.



Legend:

Horizontal Target

Component 1

Component 2

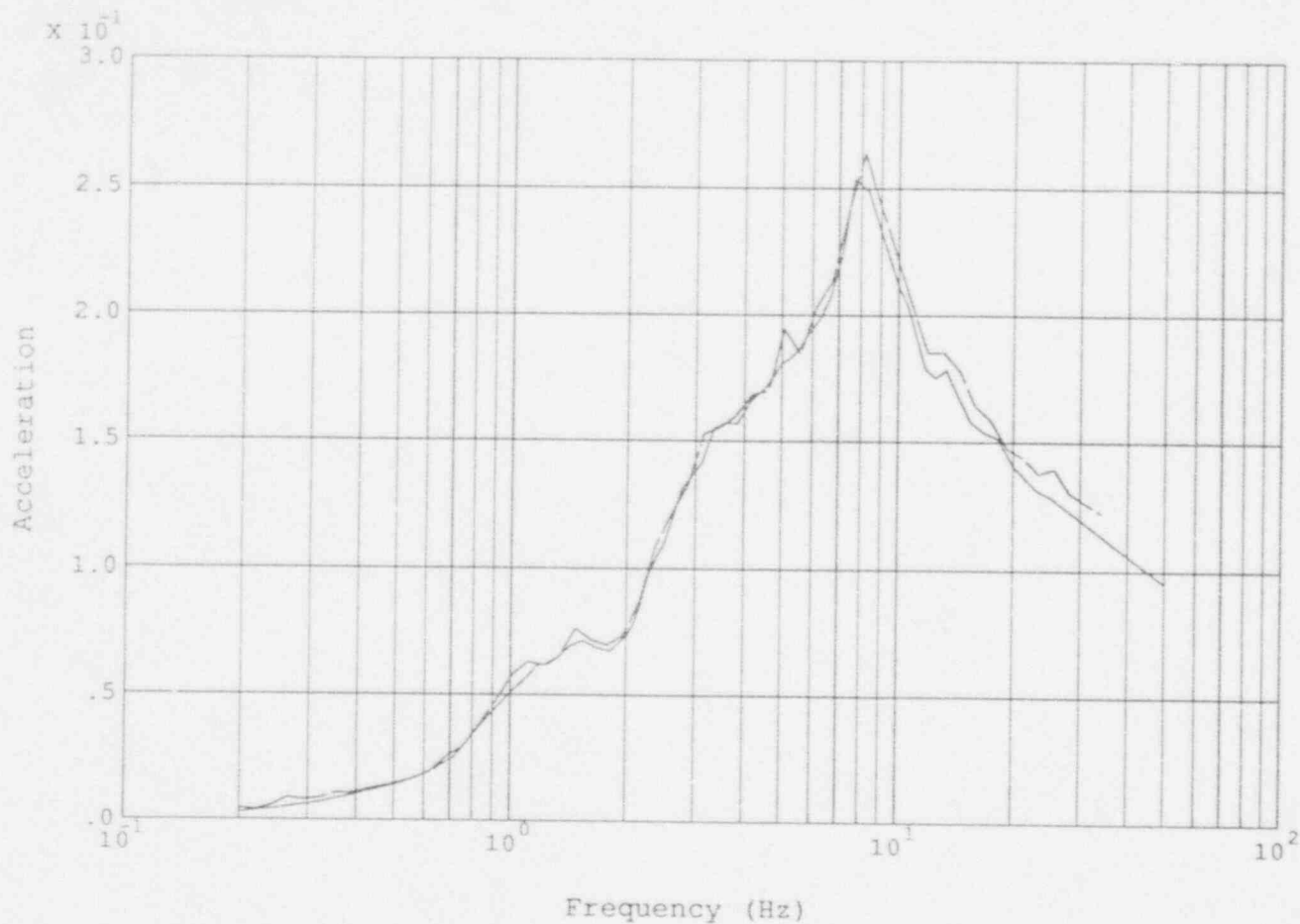
Notes:

Accelerations in g's

5% Spectral Damping

Figure 4-1:

OCNGS Final Freefield Ground Surface Time Histories  
Reactor Building, Horizontal Components



Legend:

Vertical Target  
Component 3



Notes:

Accelerations in g's  
5% Spectral Damping

Figure 4-2: OCNGS Final Freefield Ground Surface Time Histories  
Reactor Building, Vertical Component

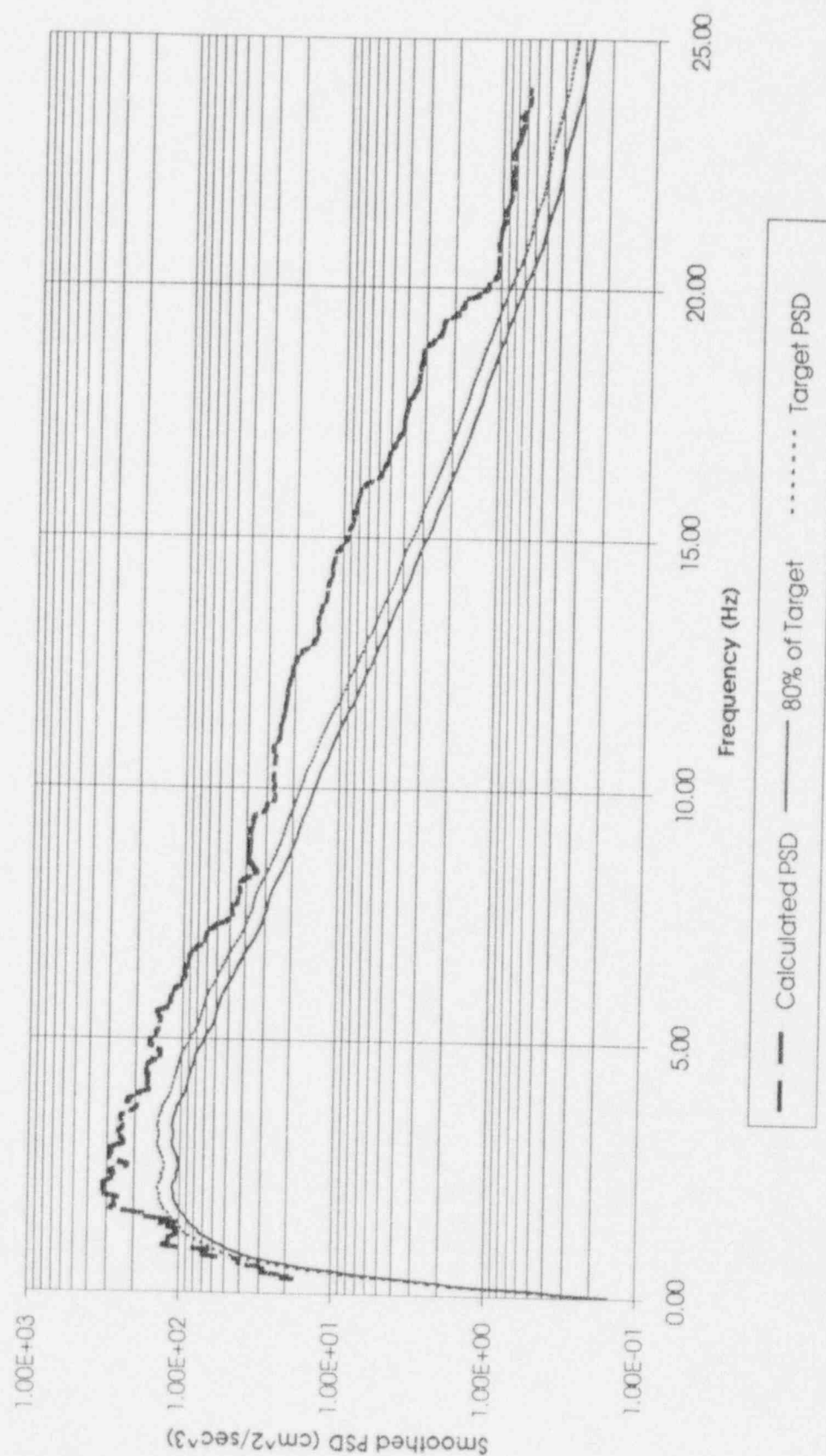


Figure 4-3: PSD Function of Final Horizontal Freefield Ground Surface Component 1, OCNGS Reactor Building

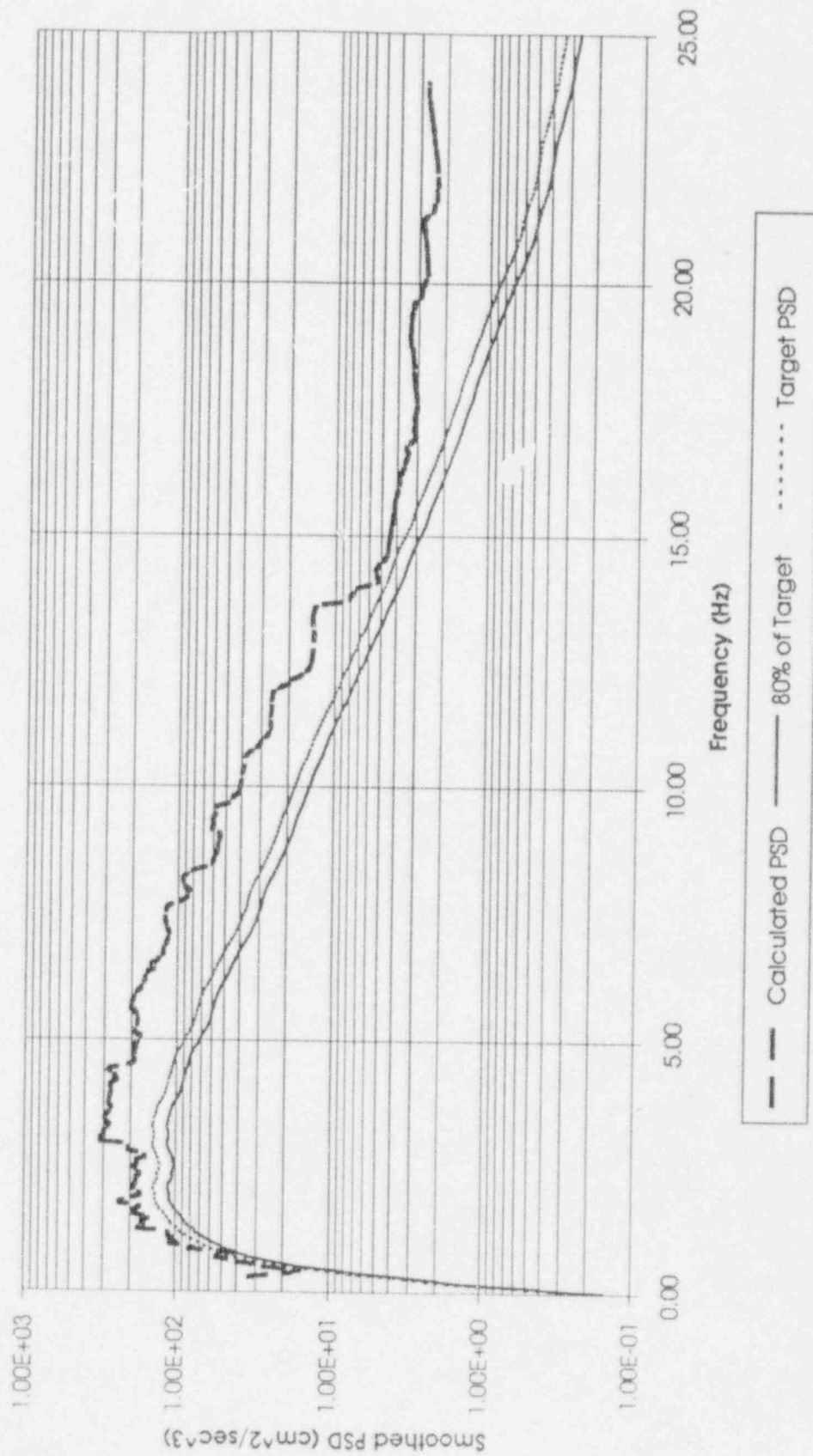


Figure 4-4: PSD Function of Final Horizontal Freefield Ground Surface Component 2, OCNGS Reactor Building

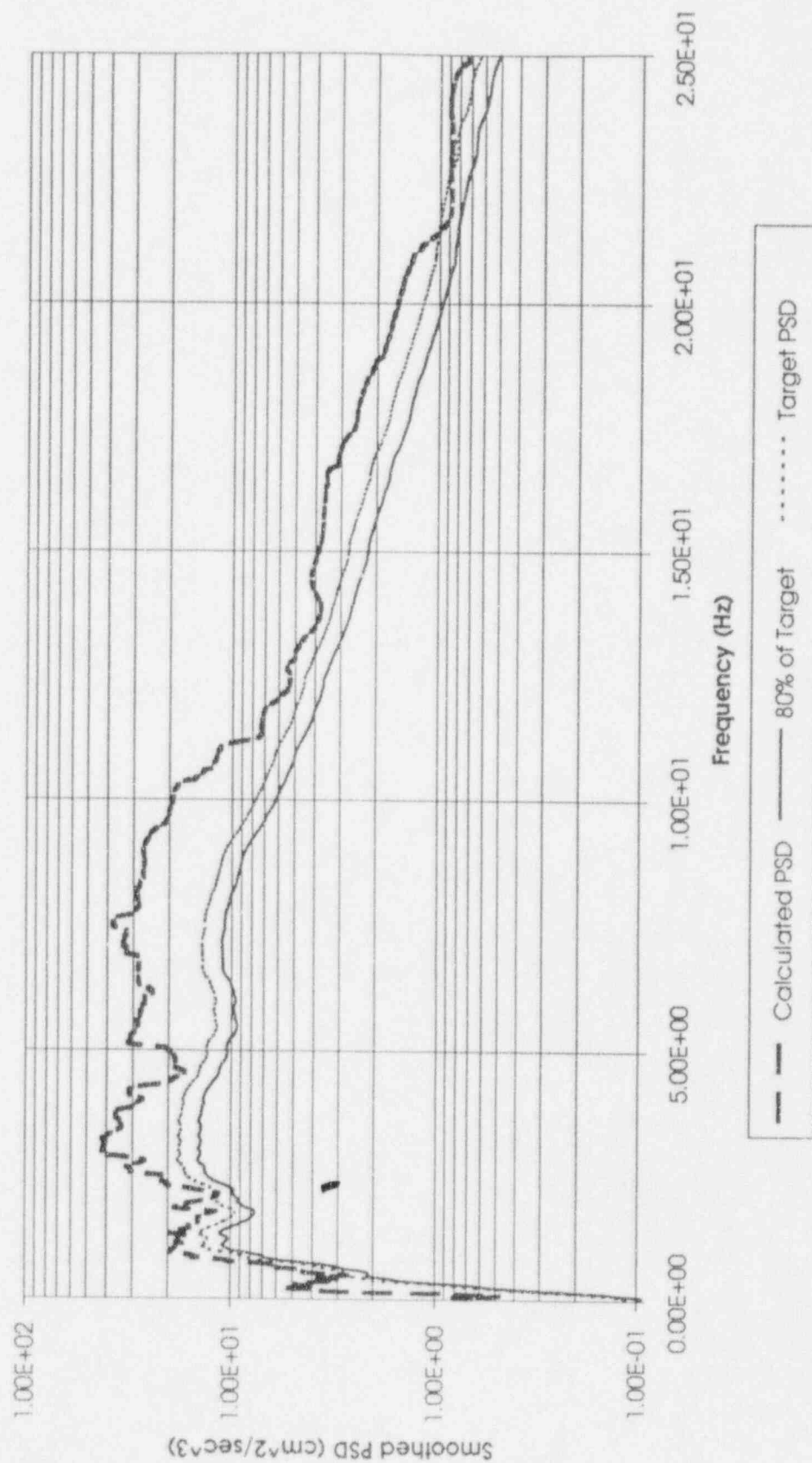


Figure 4-5: PSD Function of Final Vertical Freefield Ground Surface Component, OCNGS Reactor Building



MSAPI 1/5 MSAPI 2/5 MSAPI 3/5 MSAPI 4/5

MSAPI 5/5 MSAPI / MSAPI / MSAPI /

SOLIPFT 1/1

FINALTH 1/9 FINALTH 2/9 FINALTH 3/9 FINALTH 4/9

FINALTH 5/9 FINALTH 6/9 FINALTH 7/9 FINALTH 8/9

FINALTH 9/9 FINALTH / FINALTH / FINALTH /

PSD.HOR 1/16 PSD.HOR 2/16 PSD.HOR 3/16 PSD.HOR 4/16

PSD.HOR 5/16 PSD.HOR 6/16 PSD.HOR 7/16 PSD.HOR 8/16

PSD.HOR 9/16 PSD.HOR 10/16 PSD.HOR 11/16 PSD.HOR 12/16

PSD.HOR 13/16 PSD.HOR 14/16 PSD.HOR 15/16 PSD.HOR 16/16

PSD.VER 1/16 PSD.VER 2/16 PSD.VER 3/16 PSD.VER 4/16

PSD.VER 5/16 PSD.VER 6/16 PSD.VER 7/16 PSD.VER 8/16

PSD.VER 9/16 PSD.VER 10/16 PSD.VER 11/16 PSD.VER 12/16

PSD.VER 13/16 PSD.VER 14/16 PSD.VER 15/16 PSD.VER 16/16

FINALTH.SPC 1/1

|              |   |
|--------------|---|
| \MSAPI       | MODSAP Model of Reactor Building                          |
| \SOILPPT     | High Strain Best estimate soil properties used in study   |
| \FINALTH     | Final Reactor Building Time Histories (3 components)      |
| \PSD.HOR     | Horizontal PSD functions, for final time histories        |
| \PSD.VER     | Vertical Smoothed PSD function for final time histories   |
| \FINALTH.SPC | Response spectra of final time histories for reactor bldg |

|                    |   |
|--------------------|---|
| \MSAPI             | MODSAP Model of Reactor Building                          |
| \SOILPPT           | High Strain Best estimate soil properties used in study   |
| \FINAL\FINALTH     | Final Reactor Building Time Histories (3 components)      |
| \FINAL\PSD.HOR     | Horizontal PSD functions, for final time histories        |
| \FINAL\PSD.VER     | Vertical Smoothed PSD function for final time histories   |
| \FINAL\FINALTH.SPC | Response spectra of final time histories for reactor bldg |

## 3-D SSE Model (Vert=Z). OCNGS Reactor Building. Project 50069.01/03

|    |   |   |    |   |   |   |         |         |         |   |  |
|----|---|---|----|---|---|---|---------|---------|---------|---|--|
| 68 | 2 | 0 | 50 | 1 | 0 | 0 | 150     | 0       | 0       | 2 |  |
| 1  | 1 | 1 | 1  | 1 | 1 | 1 | 0.000   | 0.000   | -19.000 |   |  |
| 2  |   |   |    |   |   |   | 0.000   | 0.000   | 0.000   |   |  |
| 3  |   |   |    |   |   |   | -1.170  | 2.950   | 23.500  |   |  |
| 4  |   |   |    |   |   |   | -4.470  | -1.730  | 51.250  |   |  |
| 5  |   |   |    |   |   |   | 3.560   | -5.960  | 75.250  |   |  |
| 6  |   |   |    |   |   |   | 7.140   | -6.240  | 95.250  |   |  |
| 7  |   |   |    |   |   |   | 7.950   | -8.350  | 119.250 |   |  |
| 8  |   |   |    |   |   |   | 0.000   | -15.500 | 138.000 |   |  |
| 9  |   |   |    |   |   |   | 0.000   | -15.500 | 156.750 |   |  |
| 10 | 1 | 1 | 1  | 1 | 1 | 1 | -10.000 | 0.000   | -19.000 |   |  |
| 11 |   |   |    |   |   |   | 0.000   | 0.000   | 10.250  |   |  |
| 12 |   |   |    |   |   |   | -8.350  | -3.600  | 82.750  |   |  |
| 13 | 3 | 3 | 3  | 3 | 3 | 3 | 0.000   | 0.000   | 23.500  |   |  |
| 14 | 4 | 4 | 4  | 4 | 4 | 4 | -2.500  | -3.400  | 51.250  |   |  |
| 15 | 5 | 5 | 5  | 5 | 5 | 5 | -7.500  | -10.700 | 75.250  |   |  |
| 16 | 6 | 6 | 6  | 6 | 6 | 6 | -8.350  | -3.600  | 95.250  |   |  |
| 17 | 7 | 7 | 7  | 7 | 7 | 7 | 1.700   | -7.700  | 119.250 |   |  |
| 18 | 1 | 1 | 1  | 1 | 1 | 1 | -1.000  | 0.000   | 21.583  |   |  |
| 19 | 1 | 1 | 1  | 1 | 1 | 1 | 0.000   | 1.000   | 21.583  |   |  |
| 20 | 1 | 1 | 1  | 1 | 1 | 1 | -10.000 | 0.000   | 10.250  |   |  |
| 21 | 1 | 1 | 1  | 1 | 1 | 1 | -10.000 | 0.000   | 38.417  |   |  |
| 22 | 1 | 1 | 1  | 1 | 1 | 1 | -10.000 | 0.000   | 10.250  |   |  |
| 23 | 3 | 3 | 3  | 3 | 3 | 3 | -2.500  | -3.400  | 23.500  |   |  |
| 24 | 4 | 4 | 4  | 4 | 4 | 4 | -7.500  | -10.700 | 51.250  |   |  |
| 25 | 5 | 5 | 5  | 5 | 5 | 5 | -8.350  | -3.600  | 75.250  |   |  |
| 26 | 6 | 6 | 6  | 6 | 6 | 6 | 1.700   | -7.700  | 95.250  |   |  |
| 27 | 7 | 7 | 7  | 7 | 7 | 7 | 0.000   | -15.500 | 119.250 |   |  |
| 28 |   |   |    |   |   |   | 0.000   | 0.000   | 14.917  |   |  |
| 29 |   |   |    |   |   |   | 0.000   | 0.000   | 21.583  |   |  |
| 30 |   |   |    |   |   |   | 0.000   | 0.000   | 24.333  |   |  |
| 31 |   |   |    |   |   |   | 0.000   | 0.000   | 29.417  |   |  |
| 32 |   |   |    |   |   |   | 0.000   | 0.000   | 38.417  |   |  |
| 33 |   |   |    |   |   |   | 0.000   | 0.000   | 49.417  |   |  |
| 34 |   |   |    |   |   |   | 0.000   | 0.000   | 71.417  |   |  |
| 35 |   |   |    |   |   |   | 0.000   | 0.000   | 82.750  |   |  |
| 36 | 1 | 1 | 1  | 1 | 1 | 1 | -1.000  | 0.000   | 82.750  |   |  |
| 37 | 1 | 1 | 1  | 1 | 1 | 1 | 0.000   | 1.000   | 82.750  |   |  |
| 38 |   |   |    |   |   |   | 0.000   | 0.000   | 93.417  |   |  |
| 39 |   |   |    |   |   |   | 0.000   | 0.000   | 44.250  |   |  |
| 40 | 1 | 1 | 1  | 1 | 1 | 1 | -1.000  | 0.000   | 44.250  |   |  |
| 41 | 1 | 1 | 1  | 1 | 1 | 1 | 0.000   | 1.000   | 44.250  |   |  |
| 42 |   |   |    |   |   |   | 0.000   | 0.000   | 47.500  |   |  |
| 43 |   |   |    |   |   |   | 0.000   | 0.000   | 56.000  |   |  |
| 44 |   |   |    |   |   |   | 0.000   | 0.000   | 70.000  |   |  |
| 45 |   |   |    |   |   |   | 0.000   | 0.000   | 76.000  |   |  |
| 46 |   |   |    |   |   |   | 0.000   | 0.000   | 82.167  |   |  |
| 47 | 1 | 1 | 1  | 1 | 1 | 1 | -1.000  | 0.000   | 82.167  |   |  |
| 48 | 1 | 1 | 1  | 1 | 1 | 1 | 0.000   | 1.000   | 82.167  |   |  |
| 49 |   |   |    |   |   |   | 0.000   | 0.000   | 22.500  |   |  |
| 50 |   |   |    |   |   |   | 0.000   | 0.000   | 37.250  |   |  |
| 51 |   |   |    |   |   |   | 0.000   | 0.000   | 42.000  |   |  |
| 52 |   |   |    |   |   |   | 0.000   | 0.000   | 47.833  |   |  |
| 53 |   |   |    |   |   |   | 0.000   | 0.000   | 49.250  |   |  |
| 54 |   |   |    |   |   |   | 0.000   | 0.000   | 58.250  |   |  |
| 55 |   |   |    |   |   |   | 0.000   | 0.000   | 65.474  |   |  |
| 56 |   |   |    |   |   |   | 0.000   | 0.000   | 71.523  |   |  |
| 57 |   |   |    |   |   |   | 0.000   | 0.000   | 82.750  |   |  |
| 58 |   |   |    |   |   |   | 0.000   | 0.000   | 87.417  |   |  |
| 59 |   |   |    |   |   |   | 0.000   | 0.000   | 94.750  |   |  |
| 60 |   |   |    |   |   |   | 0.000   | 0.000   | 107.750 |   |  |
| 61 | 1 | 1 | 1  | 1 | 1 | 1 | -1.000  | 0.000   | 82.750  |   |  |
| 62 | 1 | 1 | 1  | 1 | 1 | 1 | 0.000   | 1.000   | 82.750  |   |  |
| 63 | 1 | 1 | 1  | 1 | 1 | 1 | -10.000 | -3.400  | 23.500  |   |  |
| 64 | 1 | 1 | 1  | 1 | 1 | 1 | -10.000 | -10.700 | 51.250  |   |  |

|    |           |         |         |           |           |           |         |         |         |
|----|-----------|---------|---------|-----------|-----------|-----------|---------|---------|---------|
| 65 | 1         | 1       | 1       | 1         | 1         | 1         | -10.000 | -7.700  | 95.250  |
| 66 | 1         | 1       | 1       | 1         | 1         | 1         | -10.000 | -15.500 | 119.250 |
| 67 | 1         | 1       | 1       | 1         | 1         | 1         | -10.000 | -3.600  | 75.250  |
| 68 | 1         | 1       | 1       | 1         | 1         | 1         | -10.000 | -3.600  | 75.250  |
| 2  | 37        | 24      | 0       | 7         |           |           |         |         |         |
| 1  | .5521e+06 | .166    |         | 0.0       |           | 0.0       |         | 0.07    |         |
| 2  | .4782e+06 | .166    |         | 0.0       |           | 0.0       |         | 0.07    |         |
| 3  | .4176e+07 | .250    |         | 0.0       |           | 0.0       |         | 0.04    |         |
| 4  | .3740e+07 | .265    |         | 0.0       |           | 0.0       |         | 0.04    |         |
| 5  | .4060e+07 | .265    |         | 0.0       |           | 0.0       |         | 0.04    |         |
| 6  | .4320e+06 | .166    |         | 0.0       |           | 0.0       |         | 0.07    |         |
| 7  | .4176e+07 | .250    |         | 0.0       |           | 0.0       |         | 0.07    |         |
| 1  | 5364.00   | 3440.67 | 3440.67 | 12.4e+06  | 9.17e+06  | 9.17e+06  |         |         |         |
| 2  | 5447.00   | 3809.09 | 3809.09 | 10.2e+06  | 7.48e+06  | 7.48e+06  |         |         |         |
| 3  | 2124.00   | 1011.91 | 1011.91 | 4.88e+06  | 2.58e+06  | 3.50e+06  |         |         |         |
| 4  | 2368.00   | 1133.01 | 1133.01 | 4.54e+06  | 2.46e+06  | 3.72e+06  |         |         |         |
| 5  | 2597.00   | 1329.07 | 1329.07 | 4.30e+06  | 2.31e+06  | 4.51e+06  |         |         |         |
| 6  | 2060.00   | 1114.12 | 1114.12 | 3.49e+06  | 2.04e+06  | 3.12e+06  |         |         |         |
| 7  | 10.58     | 1.30    | 1.30    | 1.011e+04 | .783e+04  | .110e+04  |         |         |         |
| 8  | 6.06      | 1.40    | 1.40    | 1.011e+04 | .413e+04  | .090e+04  |         |         |         |
| 9  | 4245.00   | 1669.94 | 1669.94 | 10.8e+06  | 8.02e+06  | 8.02e+06  |         |         |         |
| 10 | 37.90     | 18.95   | 18.95   | .3212e+04 | .1606e+04 | .1606e+04 |         |         |         |
| 11 | 6.66      | 3.33    | 3.33    | .4780e+03 | .2390e+03 | .2390e+03 |         |         |         |
| 12 | 276.00    | 138.00  | 138.00  | .3456e+05 | .1728e+05 | .1728e+05 |         |         |         |
| 13 | 29.90     | 14.95   | 14.95   | .4006e+04 | .2003e+04 | .2003e+04 |         |         |         |
| 14 | 21.90     | 10.95   | 10.95   | .2932e+04 | .1466e+04 | .1466e+04 |         |         |         |
| 15 | 21.00     | 10.50   | 10.50   | .2814e+04 | .1407e+04 | .1407e+04 |         |         |         |
| 16 | 22.50     | 11.25   | 11.25   | .3018e+04 | .1509e+04 | .1509e+04 |         |         |         |
| 17 | 9.34      | 4.67    | 4.67    | .2220e+04 | .1110e+04 | .1110e+04 |         |         |         |
| 18 | 5.52      | 2.76    | 2.76    | .1500e+04 | .7500e+03 | .7500e+03 |         |         |         |
| 19 | 5.52      | 2.76    | 2.76    | .1500e+04 | .7500e+03 | .7500e+03 |         |         |         |
| 20 | 24.68     | 12.34   | 12.34   | .8218e+04 | .4109e+04 | .4109e+04 |         |         |         |
| 21 | 10.64     | 5.32    | 5.32    | .9342e+04 | .4671e+04 | .4671e+04 |         |         |         |
| 22 | 13.88     | 6.94    | 6.94    | .1645e+05 | .8224e+04 | .8224e+04 |         |         |         |
| 23 | 13.68     | 6.84    | 6.84    | .1578e+05 | .7892e+04 | .7892e+04 |         |         |         |
| 24 | 16.37     | 8.19    | 8.19    | .1357e+05 | .6787e+04 | .6787e+04 |         |         |         |

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|----|----|----|----|---|----|
| 1  | 1  | 2  | 10 | 1 | 1  |
| 2  | 2  | 11 | 10 | 1 | 2  |
| 3  | 23 | 14 | 63 | 2 | 3  |
| 4  | 24 | 15 | 64 | 2 | 4  |
| 5  | 25 | 12 | 67 | 2 | 5  |
| 6  | 26 | 17 | 65 | 2 | 6  |
| 7  | 27 | 8  | 66 | 7 | 7  |
| 8  | 8  | 9  | 66 | 7 | 8  |
| 9  | 11 | 13 | 10 | 1 | 9  |
| 10 | 12 | 16 | 68 | 2 | 5  |
| 11 | 11 | 28 | 20 | 6 | 12 |
| 12 | 28 | 29 | 20 | 6 | 12 |
| 13 | 29 | 30 | 20 | 6 | 12 |
| 14 | 30 | 31 | 20 | 6 | 12 |
| 15 | 31 | 32 | 20 | 6 | 12 |
| 16 | 32 | 33 | 20 | 5 | 11 |
| 17 | 33 | 34 | 20 | 4 | 10 |
| 18 | 34 | 35 | 20 | 4 | 10 |
| 19 | 35 | 38 | 20 | 4 | 10 |
| 20 | 32 | 39 | 21 | 3 | 16 |
| 21 | 39 | 42 | 21 | 3 | 16 |
| 22 | 42 | 43 | 21 | 3 | 15 |
| 23 | 43 | 44 | 21 | 3 | 13 |
| 24 | 44 | 45 | 21 | 3 | 14 |
| 25 | 45 | 46 | 21 | 3 | 13 |
| 26 | 11 | 49 | 22 | 3 | 24 |
| 27 | 49 | 50 | 22 | 3 | 23 |

|    |    |    |    |   |    |
|----|----|----|----|---|----|
| 28 | 50 | 51 | 22 | 3 | 22 |
| 29 | 51 | 52 | 22 | 3 | 22 |
| 30 | 52 | 53 | 22 | 3 | 21 |
| 31 | 53 | 54 | 22 | 3 | 21 |
| 32 | 54 | 55 | 22 | 3 | 21 |
| 33 | 55 | 56 | 22 | 3 | 20 |
| 34 | 56 | 57 | 22 | 3 | 18 |
| 35 | 57 | 58 | 22 | 3 | 18 |
| 36 | 58 | 59 | 22 | 3 | 18 |
| 37 | 59 | 60 | 22 | 3 | 17 |

|   |    |    |   |      |
|---|----|----|---|------|
| 9 | 5  | 3  | 1 |      |
| 1 | 29 | 49 |   | 0.07 |

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| 10.  |       |
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| 0.0  | -10.0 |
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|---|----|----|--|------|
| 2 | 39 | 52 |  | 0.07 |
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| 10.  |       |
| 0.0  | 10.0  |
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| 0.0  | -10.0 |
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| 10.  |       |
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|---|----|----|--|------|
| 3 | 35 | 46 |  | 0.07 |
|---|----|----|--|------|

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| 48000.  |         |
| 0.0     | 48000.  |
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| -48000. |         |
| 0.0     | -48000. |
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| 48000.  |         |
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|----|----------|----------|----------|----------|----------|----------|
| 1  | 1660.000 | 1660.000 | 1660.000 | 2640000. | 2640000. | 5220000. |
| 2  | 607.000  | 607.000  | 607.000  | 800000.  | 800000.  | 1590000. |
| 3  | 715.000  | 715.000  | 715.000  | 1020000. | 990000.  | 1920000. |
| 4  | 527.000  | 527.000  | 527.000  | 560000.  | 750000.  | 1480000. |
| 5  | 543.000  | 543.000  | 543.000  | 490000.  | 750000.  | 1210000. |
| 6  | 474.000  | 474.000  | 474.000  | 440000.  | 750000.  | 1114000. |
| 7  | 270.000  | 270.000  | 270.000  | 280000.  | 380000.  | 670000.  |
| 8  | 25.850   | 25.850   | 25.850   | 10460.   | 17000.   | 27700.   |
| 9  | 16.340   | 16.340   | 16.340   | 17000.   | 28000.   | 45000.   |
| 30 | 43.760   | 43.760   | 43.760   | 2740.    | 2740.    | 5480.    |
| 33 | 38.390   | 38.390   | 38.390   | 1378.    | 1378.    | 2755.    |
| 34 | 36.490   | 36.490   | 36.490   | 1546.    | 1546.    | 3093.    |
| 38 | 21.340   | 21.340   | 21.340   | 904.     | 904.     | 1808.    |
| 42 | 13.350   | 13.350   | 13.350   | 895.     | 895.     | 1791.    |
| 43 | 11.490   | 11.490   | 11.490   | 770.     | 770.     | 1540.    |
| 44 | 9.940    | 9.940    | 9.940    | 665.     | 665.     | 1331.    |
| 45 | 8.110    | 8.110    | 8.110    | 543.     | 543.     | 1087.    |
| 49 | 11.985   | 11.985   | 11.985   | 3457.    | 3457.    | 6914.    |
| 50 | 5.716    | 5.716    | 5.716    | 1693.    | 1693.    | 3387.    |
| 52 | 5.047    | 5.047    | 5.047    | 1107.    | 1107.    | 2216.    |
| 55 | 4.182    | 4.182    | 4.182    | 696.     | 696.     | 1393.    |
| 56 | 1.840    | 1.840    | 1.840    | 306.     | 306.     | 613.     |
| 57 | 1.197    | 1.197    | 1.197    | 163.     | 163.     | 325.     |
| 59 | 2.451    | 2.451    | 2.451    | 333.     | 333.     | 666.     |
| 60 | 1.771    | 1.771    | 1.771    | 211.     | 211.     | 421.     |



0 0 0 0.0 0.0

| Layer<br>Number | Thickness<br>(ft) | Shear<br>Modulus<br>(ksf) | Damping<br>Ratio<br>(%) | Poissons<br>Ratio | Unit<br>Weight<br>(kcf) | Soil<br>Type |
|-----------------|-------------------|---------------------------|-------------------------|-------------------|-------------------------|--------------|
| 1               | 7.50              | 1085                      | 0.038                   | 0.39              | 0.120                   | Sand         |
| 2               | 7.50              | 1210                      | 0.049                   | 0.39              | 0.120                   | Sand         |
| 3               | 8.00              | 1717                      | 0.045                   | 0.49              | 0.115                   | Clay         |
| 4               | 8.00              | 2097                      | 0.044                   | 0.49              | 0.115                   | Clay         |
| 5               | 9.00              | 2662                      | 0.041                   | 0.49              | 0.125                   | Sand         |
| 6               | 9.00              | 2989                      | 0.041                   | 0.48              | 0.125                   | Sand         |
| 7               | 3.00              | 4386                      | 0.035                   | 0.48              | 0.125                   | Sand         |
| 8               | 6.50              | 5248                      | 0.033                   | 0.47              | 0.125                   | Sand         |
| 9               | 6.50              | 4122                      | 0.038                   | 0.48              | 0.125                   | Sand         |
| 10              | 10.00             | 3951                      | 0.040                   | 0.48              | 0.125                   | Sand         |
| 11              | 2.00              | 5007                      | 0.037                   | 0.47              | 0.125                   | Sand         |
| 12              | 5.00              | 6474                      | 0.034                   | 0.47              | 0.125                   | Sand         |
| 13              | 7.50              | 6847                      | 0.034                   | 0.46              | 0.125                   | Sand         |
| 14              | 7.50              | 6236                      | 0.036                   | 0.47              | 0.125                   | Sand         |
| 15              | 8.00              | 4931                      | 0.043                   | 0.48              | 0.125                   | Clay         |
| Halfspace       | -                 | 9326                      | 0.020                   | 0.46              | 0.125                   | Sand         |

SURF

Freefield Time Histories, For OCNCS Reactor Building  
 50069-C-707Rev OTime History 60% Rule, RB  
 OCNCS Reactor Building Final Freefield Ground Surface Time H  
 3 1504 0.010 1

Freefield Horizontal Component 1, OCNCS Reactor Building

|          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|
| .028378  | .038864  | .021756  | .011985  | .020124  | .025903  |          |          |
| .021862  | .021803  | .030237  | .031355  | .024318  | .016420  |          |          |
| .005729  | .016942  | .024461  | .029454  | .025065  | .015246  |          |          |
| .046302  | .067725  | .071923  | .050170  | .030771  | .032767  |          |          |
| .023348  | .002820  | -.011936 | -.013773 | -.007828 | -.000524 | .002115  | -.005363 |
| -.016888 | -.020284 | -.012778 | -.001113 | .003141  | -.008613 | -.027987 | -.037186 |
| -.034406 | -.032402 | -.035505 | -.042606 | -.056618 | -.075412 | -.079471 | -.061178 |
| -.040356 | -.031438 | -.035505 | -.020560 | -.011722 | .000145  | .013688  | .025145  |
| .027077  | .012333  | -.001185 | .001524  | .018645  | .021960  | .011889  | -.004408 |
| -.021500 | -.023602 | -.017323 | -.025715 | -.030565 | -.008251 | .011975  | .006768  |
| -.004558 | -.012792 | -.018502 | -.013751 | -.017203 | -.045478 | -.060175 | -.032840 |
| .002443  | .016118  | .016374  | .011427  | .007253  | .011321  | .014517  | .008032  |
| -.000239 | -.006040 | -.008792 | -.003231 | .001715  | -.006993 | -.016374 | -.011190 |
| -.001650 | .002721  | .005254  | .004086  | .000796  | .004021  | .005446  | -.006010 |
| -.014785 | -.007766 | .000782  | .003118  | .010036  | .021923  | .028971  | .026793  |
| .012576  | -.010010 | -.026551 | -.031052 | -.029726 | -.024807 | -.017046 | -.011490 |
| -.009162 | -.008713 | -.011724 | -.015649 | -.014366 | -.008208 | -.002992 | -.000569 |
| .005294  | .019073  | .030015  | .023731  | .004251  | -.016005 | -.035215 | -.051906 |
| -.056719 | -.046370 | -.028026 | -.011694 | -.007854 | -.018038 | -.025997 | -.017687 |
| -.002747 | .005515  | .015336  | .036412  | .056515  | .064320  | .069607  | .079777  |
| .084061  | .071889  | .044777  | .013707  | -.003609 | .002153  | .019294  | .033124  |
| .043820  | .051935  | .045272  | .017576  | -.013384 | -.025708 | -.022695 | -.022566 |
| -.031924 | -.049078 | -.072372 | -.091556 | -.095176 | -.085043 | -.065823 | -.040240 |
| -.019699 | -.013601 | -.017430 | -.024081 | -.025825 | -.015194 | -.003104 | -.004243 |
| -.004482 | .012358  | .030562  | .036868  | .044261  | .058444  | .068067  | .065421  |
| .046068  | .015472  | .000133  | .015739  | .045753  | .072696  | .090907  | .094546  |
| .089587  | .085913  | .069753  | .030528  | -.011634 | -.040360 | -.056145 | -.054742 |
| -.040409 | -.029056 | -.021541 | -.016871 | -.025226 | -.040488 | -.048088 | -.047390 |
| -.030689 | .008927  | .048208  | .064013  | .054876  | .022286  | -.013659 | -.022458 |
| -.017771 | -.028097 | -.038826 | -.036273 | -.038082 | -.048466 | -.059846 | -.074572 |
| -.081906 | -.069013 | -.047707 | -.028239 | -.011554 | -.005899 | -.003948 | .012419  |
| .031317  | .036772  | .044175  | .060358  | .064186  | .044409  | .008658  | -.028080 |
| -.041754 | -.021702 | .008724  | .023676  | .023637  | .018287  | .012490  | .012107  |
| .018114  | .021643  | .017006  | .005420  | -.011552 | -.025887 | -.025284 | -.010295 |
| .010321  | .031885  | .045448  | .043455  | .034328  | .021924  | -.004869 | -.038497 |
| -.047845 | -.019878 | .022920  | .048471  | .048274  | .038683  | .029123  | .018128  |
| .016958  | .030385  | .036016  | .019312  | -.011677 | -.044175 | -.053293 | -.024612 |
| .005310  | -.001141 | -.027928 | -.048831 | -.057598 | -.053947 | -.058010 | -.090646 |
| -.126754 | -.133563 | -.114267 | -.075299 | -.022067 | .022585  | .051791  | .076570  |
| .089461  | .088258  | .094021  | .107861  | .108814  | .090962  | .060934  | .031418  |
| .023094  | .038286  | .054142  | .051447  | .022284  | -.027300 | -.065552 | -.065307 |
| -.040057 | -.018439 | -.010730 | -.011792 | -.004309 | .026539  | .062438  | .073636  |
| .066221  | .056971  | .031453  | -.020192 | -.069934 | -.094178 | -.103549 | -.109872 |
| -.104558 | -.083451 | -.066236 | -.073859 | -.097934 | -.110633 | -.093674 | -.045364 |
| .016540  | .058413  | .064329  | .045687  | .010646  | -.030792 | -.051410 | -.042349 |
| -.023714 | -.005814 | .015144  | .042858  | .081540  | .119006  | .132659  | .121789  |
| .088201  | .027178  | -.030774 | -.053358 | -.062824 | -.077405 | -.076501 | -.061284 |
| -.045484 | -.015429 | .023521  | .040312  | .037804  | .039148  | .048404  | .062713  |
| .071421  | .055341  | .018024  | -.019755 | -.049573 | -.068082 | -.069639 | -.057225 |
| -.040873 | -.029135 | -.020578 | -.006007 | .010558  | .015422  | .009573  | .000145  |
| -.010583 | -.014412 | -.008650 | -.004768 | -.008296 | -.021318 | -.050740 | -.088922 |
| -.118552 | -.130327 | -.112120 | -.061576 | -.008361 | .021508  | .033519  | .037074  |
| .034893  | .033001  | .032691  | .032073  | .032550  | .031109  | .027127  | .026086  |
| .020864  | .004293  | -.003969 | .012205  | .033424  | .040832  | .043633  | .046698  |
| .039235  | .025644  | .020060  | .019233  | .017552  | .014941  | -.002054 | -.033764 |
| -.049828 | -.046907 | -.054865 | -.072582 | -.083715 | -.094250 | -.093413 | -.061864 |
| -.022135 | .002085  | .022701  | .046870  | .071693  | .097733  | .114069  | .117339  |
| .115411  | .095848  | .061025  | .041968  | .028183  | -.005955 | -.030588 | -.029949 |
| -.042661 | -.079716 | -.122159 | -.163561 | -.177286 | -.133810 | -.054906 | .021703  |
| .073354  | .082055  | .061888  | .049453  | .049533  | .050756  | .051903  | .043504  |
| .025517  | .021762  | .042217  | .075886  | .106695  | .112076  | .089734  | .066103  |

|          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|
| .048808  | .027512  | .011978  | .009984  | .007798  | .000202  | -.005732 | -.010478 |
| -.018461 | -.031348 | -.046313 | -.052830 | -.041256 | -.014553 | .010331  | .014542  |
| -.002903 | -.028956 | -.056477 | -.079896 | -.091525 | -.092320 | -.080817 | -.052114 |
| -.021090 | -.003223 | .011841  | .029562  | .037478  | .034274  | .027125  | .018032  |
| .010190  | .001419  | -.014099 | -.032000 | -.052018 | -.078183 | -.094944 | -.087024 |
| -.062686 | -.030589 | .004253  | .028356  | .038419  | .041952  | .038505  | .031471  |
| .030959  | .036717  | .045808  | .053635  | .041310  | .000707  | -.045600 | -.075680 |
| -.089146 | -.091680 | -.085208 | -.072385 | -.060849 | -.055592 | -.046342 | -.020270 |
| .017670  | .054484  | .080760  | .087872  | .076651  | .059879  | .048028  | .047053  |
| .057667  | .069759  | .074557  | .068801  | .043158  | -.002945 | -.047360 | -.069923 |
| -.068292 | -.048985 | -.026318 | -.016702 | -.025480 | -.049324 | -.079076 | -.097729 |
| -.092151 | -.064428 | -.029054 | -.002332 | .011522  | .019008  | .022992  | .025962  |
| .034778  | .048889  | .062965  | .076493  | .086052  | .086260  | .077786  | .063962  |
| .055095  | .061136  | .065712  | .047797  | .020665  | .002131  | -.015365 | -.034780 |
| -.045272 | -.041982 | -.021753 | .011808  | .037805  | .046394  | .052029  | .062715  |
| .069485  | .061472  | .032554  | -.012715 | -.059572 | -.093929 | -.104674 | -.089846 |
| -.066836 | -.056847 | -.064721 | -.082324 | -.094635 | -.087088 | -.061015 | -.031594 |
| -.011774 | -.006550 | -.011010 | -.012279 | -.001939 | .018953  | .043898  | .061460  |
| .061359  | .045371  | .026727  | .019418  | .027436  | .042996  | .056321  | .062886  |
| .063677  | .063759  | .064168  | .059523  | .050299  | .041448  | .030757  | .017161  |
| .004742  | -.009986 | -.031234 | -.052726 | -.067940 | -.070677 | -.051910 | -.017876 |
| .010199  | .020944  | .016260  | .004201  | -.001821 | .003805  | .013126  | .017205  |
| .008629  | -.012488 | -.025540 | -.011002 | .022750  | .056445  | .079338  | .087089  |
| .085956  | .086086  | .081588  | .062010  | .034457  | .010451  | -.010430 | -.029929 |
| -.043568 | -.050073 | -.055102 | -.063029 | -.072456 | -.078352 | -.073063 | -.055271 |
| -.041161 | -.045152 | -.054044 | -.047174 | -.023568 | .009917  | .045015  | .065570  |
| .065612  | .054127  | .032514  | .003491  | -.013819 | -.012071 | -.008304 | -.016140 |
| -.036165 | -.062115 | -.078418 | -.072765 | -.051901 | -.031461 | -.020215 | -.016349 |
| -.013635 | -.013064 | -.018413 | -.023452 | -.022452 | -.019567 | -.015661 | -.007342 |
| .002850  | .010605  | .014988  | .022325  | .044439  | .075159  | .093230  | .099914  |
| .104818  | .096736  | .085244  | .105294  | .144372  | .158042  | .147532  | .132211  |
| .101263  | .050964  | .001443  | -.031233 | -.036428 | -.019493 | -.013064 | -.032486 |
| -.055083 | -.061772 | -.048369 | -.014246 | .022718  | .037353  | .026764  | -.000526 |
| -.035485 | -.060850 | -.068168 | -.068613 | -.071105 | -.074693 | -.076127 | -.069169 |
| -.052698 | -.035388 | -.021894 | -.011012 | -.004119 | -.002546 | -.008245 | -.023747 |
| -.042381 | -.053233 | -.052471 | -.037924 | -.009106 | .025940  | .057587  | .076819  |
| .072505  | .045400  | .012557  | -.009448 | -.011311 | .006592  | .029335  | .043426  |
| .050999  | .055998  | .056420  | .051559  | .040242  | .023160  | .010702  | .012703  |
| .027353  | .045622  | .052852  | .033378  | -.013540 | -.072159 | -.121568 | -.138257 |
| -.108206 | -.050330 | -.004361 | .012155  | .011833  | .007096  | .000083  | -.004402 |
| -.000952 | .008650  | .020903  | .032776  | .039297  | .037508  | .025513  | .001273  |
| -.028168 | -.049764 | -.058608 | -.054781 | -.038571 | -.017136 | .001702  | .016993  |
| .026148  | .027836  | .030195  | .036990  | .040677  | .037292  | .029924  | .021122  |
| .012140  | .003000  | -.005599 | -.011099 | -.014989 | -.019048 | -.017472 | -.006177 |
| .011502  | .030266  | .039624  | .032003  | .019689  | .017117  | .019355  | .019722  |
| .021298  | .025807  | .035390  | .051317  | .063365  | .062950  | .056263  | .049685  |
| .042437  | .035498  | .031660  | .030711  | .028073  | .018532  | .005508  | -.003261 |
| -.009527 | -.018799 | -.030269 | -.042279 | -.052933 | -.058065 | -.058681 | -.058648 |
| -.057505 | -.055847 | -.055571 | -.054523 | -.051211 | -.044624 | -.030384 | -.009819 |
| .008228  | .018898  | .022170  | .018928  | .012114  | .003845  | -.004255 | -.008123 |
| -.007508 | -.006485 | -.005771 | -.005369 | -.006293 | -.006631 | -.007504 | -.011893 |
| -.013262 | -.006495 | -.001627 | -.006793 | -.015335 | -.019956 | -.021857 | -.025305 |
| -.032791 | -.042396 | -.049049 | -.050558 | -.050465 | -.053268 | -.056484 | -.053596 |
| -.045884 | -.038107 | -.027342 | -.012700 | -.001953 | .001525  | .000315  | -.002580 |
| .000754  | .012491  | .017317  | .004550  | -.016176 | -.032826 | -.041027 | -.040690 |
| -.037874 | -.037131 | -.034030 | -.025901 | -.015931 | -.005544 | .004405  | .012527  |
| .019577  | .025662  | .031890  | .041308  | .050068  | .051214  | .047077  | .043549  |
| .043114  | .048574  | .058457  | .065708  | .068131  | .065878  | .055597  | .039553  |
| .025654  | .017458  | .016412  | .021102  | .021726  | .013818  | .007117  | .005804  |
| -.001300 | -.022967 | -.054492 | -.083312 | -.096857 | -.090947 | -.073319 | -.056676 |
| -.050598 | -.055493 | -.059958 | -.052151 | -.034292 | -.017531 | -.008771 | -.008541 |
| -.012103 | -.011719 | -.005570 | .000501  | .002099  | .000387  | .001423  | .012386  |
| .031111  | .047886  | .060510  | .070304  | .070626  | .058991  | .044984  | .035554  |
| .030224  | .027143  | .021680  | .011300  | .001510  | -.004406 | -.010332 | -.018426 |
| -.027262 | -.033947 | -.034713 | -.030722 | -.027803 | -.029894 | -.039750 | -.055893 |
| -.067686 | -.067078 | -.057485 | -.045604 | -.037541 | -.036157 | -.034113 | -.023522 |

|          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|
| -.008524 | .002351  | .003910  | -.003881 | -.010926 | -.006136 | .008531  | .024273  |
| .032792  | .027843  | .015127  | .006421  | .000758  | -.004961 | -.001336 | .014638  |
| .029589  | .033249  | .027109  | .017130  | .009853  | .008816  | .013241  | .021466  |
| .030430  | .035526  | .034420  | .027646  | .018471  | .012020  | .009781  | .009823  |
| .012392  | .018253  | .026460  | .036008  | .043219  | .043889  | .041435  | .040664  |
| .037166  | .026783  | .015974  | .011389  | .010402  | .007870  | .001936  | -.007097 |
| -.015868 | -.020552 | -.023931 | -.030597 | -.036906 | -.036769 | -.029951 | -.018079 |
| -.004349 | .005217  | .010387  | .014717  | .014835  | .008918  | .004607  | .006561  |
| .012926  | .021320  | .024710  | .017256  | .006074  | -.001017 | -.006594 | -.012886 |
| -.019671 | -.029211 | -.039572 | -.046444 | -.051647 | -.055635 | -.053393 | -.045910 |
| -.040946 | -.040950 | -.039488 | -.029478 | -.012271 | .004844  | .018503  | .028544  |
| .032915  | .031549  | .027373  | .022783  | .021742  | .027236  | .035124  | .040769  |
| .045482  | .050047  | .051942  | .049687  | .043357  | .034692  | .027483  | .023067  |
| .017962  | .008821  | -.002878 | -.013867 | -.024552 | -.036176 | -.046042 | -.052089 |
| -.055517 | -.056250 | -.054367 | -.050748 | -.042291 | -.029008 | -.020412 | -.022019 |
| -.028563 | -.034077 | -.034793 | -.029185 | -.021207 | -.014356 | -.008872 | -.006074 |
| -.003078 | .005916  | .017286  | .024369  | .027845  | .028646  | .028754  | .033334  |
| .037321  | .031624  | .021681  | .014731  | .007453  | -.000404 | -.005677 | -.009834 |
| -.011211 | -.007832 | -.006229 | -.009599 | -.012635 | -.012630 | -.008599 | .000224  |
| .007601  | .008557  | .008152  | .009697  | .008761  | .002808  | -.005940 | -.014201 |
| -.018374 | -.016507 | -.010832 | -.004535 | -.000227 | .000920  | -.000972 | -.004022 |
| -.005818 | -.006235 | -.006328 | -.005237 | -.002049 | .002042  | .004747  | .003195  |
| -.002922 | -.009353 | -.013781 | -.016941 | -.015839 | -.008669 | -.000968 | .003455  |
| .006163  | .007441  | .008036  | .010247  | .012598  | .013465  | .015013  | .018048  |
| .022301  | .028205  | .032427  | .031697  | .029554  | .029779  | .030842  | .031024  |
| .030311  | .027287  | .019158  | .005069  | -.011085 | -.023577 | -.030336 | -.032676 |
| -.032998 | -.033551 | -.033184 | -.029025 | -.022159 | -.015539 | -.010449 | -.007498 |
| -.004639 | .001274  | .008079  | .012308  | .014836  | .016066  | .015356  | .014015  |
| .011339  | .005994  | .000856  | -.001986 | -.003037 | -.000943 | .004122  | .008809  |
| .011458  | .010730  | .005173  | -.002306 | -.007663 | -.010158 | -.010842 | -.012349 |
| -.015988 | -.019424 | -.023301 | -.029802 | -.034374 | -.033814 | -.032852 | -.033414 |
| -.032880 | -.030189 | -.022599 | -.010065 | -.001978 | -.004089 | -.010271 | -.014384 |
| -.015523 | -.013974 | -.011129 | -.008035 | -.004802 | -.002154 | .001752  | .008479  |
| .011922  | .006538  | -.003025 | -.010362 | -.014175 | -.014476 | -.012260 | -.009759 |
| -.007251 | -.004181 | -.001374 | .000448  | .001686  | .003439  | .006402  | .010054  |
| .013723  | .016472  | .016942  | .015801  | .014742  | .014458  | .017239  | .024660  |
| .032625  | .036797  | .036855  | .032286  | .023845  | .015172  | .007157  | -.000292 |
| -.004225 | -.004758 | -.005456 | -.006746 | -.008330 | -.010727 | -.011530 | -.009773 |
| -.008674 | -.009011 | -.008945 | -.008123 | -.005877 | -.002103 | .000377  | -.000276 |
| -.003314 | -.007507 | -.010112 | -.008680 | -.004982 | -.001479 | .002767  | .008081  |
| .011144  | .009245  | .003842  | -.002142 | -.007293 | -.010793 | -.012486 | -.013090 |
| -.011226 | -.005239 | .001520  | .004845  | .005166  | .003661  | .001064  | -.000230 |
| -.000303 | -.001486 | -.003012 | -.004483 | -.008345 | -.013751 | -.017118 | -.017384 |
| -.015007 | -.011233 | -.007877 | -.004504 | -.000417 | .003097  | .005990  | .008814  |
| .010551  | .011083  | .010278  | .007174  | .004389  | .005339  | .008277  | .010763  |
| .013192  | .015244  | .016235  | .016416  | .015189  | .011947  | .006496  | -.001675 |
| -.011192 | -.019141 | -.023414 | -.021891 | -.014183 | -.003396 | .008015  | .018877  |
| .027066  | .032314  | .035321  | .034377  | .029353  | .022792  | .015975  | .010747  |
| .009166  | .010176  | .013884  | .021646  | .030194  | .036677  | .042866  | .048563  |
| .051900  | .052466  | .047621  | .036754  | .026184  | .019483  | .013069  | .004283  |
| -.006206 | -.016018 | -.021757 | -.023254 | -.023478 | -.023129 | -.020303 | -.013859 |
| -.006331 | -.002321 | -.000946 | .001829  | .003266  | .000412  | -.001626 | .000367  |
| .004164  | .008673  | .010920  | .008542  | .007958  | .013639  | .019300  | .019936  |
| .016681  | .010961  | .005219  | .001202  | -.003123 | -.008051 | -.011367 | -.013906 |
| -.018125 | -.024123 | -.028747 | -.027750 | -.021859 | -.016782 | -.016244 | -.020376 |
| -.025638 | -.025459 | -.018496 | -.009501 | -.000873 | .005690  | .007446  | .007053  |
| .008708  | .012013  | .016078  | .019001  | .017483  | .013268  | .009674  | .006892  |
| .005919  | .005587  | .002923  | .000969  | .001528  | .001654  | .004527  | .011967  |
| .018407  | .025394  | .034383  | .037084  | .035228  | .035583  | .031776  | .025079  |
| .025207  | .025192  | .020904  | .021472  | .023958  | .028706  | .044706  | .055494  |
| .052969  | .064511  | .078076  | .049668  | .004830  | -.004925 | .002938  | -.000238 |

Freefield Horizontal Component 2, OCNCS Reactor Building

|          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|
| .007271  | .013184  | .016134  | .018477  | .020822  | .022771  | .025069  | .027402  |
| .029326  | .031053  | .031545  | .030425  | .028661  | .025238  | .019178  | .012578  |
| .006733  | .000804  | -.004747 | -.009007 | -.012556 | -.015953 | -.019309 | -.022565 |
| -.025016 | -.026353 | -.026894 | -.026424 | -.024963 | -.022981 | -.019994 | -.015684 |



|          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|
| -.011065 | -.006791 | -.002782 | .000747  | .003709  | .006192  | .007925  | .008670  |
| .008352  | .007195  | .006053  | .005284  | .004391  | .003472  | .002756  | .001503  |
| -.000612 | -.002869 | -.004814 | -.006280 | -.006921 | -.006569 | -.005199 | -.002890 |
| .000078  | .003396  | .006475  | .008630  | .010001  | .010968  | .011263  | .010840  |
| .009972  | .008452  | .006325  | .004258  | .002569  | .001373  | .001036  | .001697  |
| .003280  | .005683  | .008712  | .012483  | .017015  | .021422  | .024842  | .027227  |
| .028550  | .028649  | .027507  | .024963  | .021197  | .017073  | .013285  | .010202  |
| .008375  | .008205  | .009586  | .011872  | .014325  | .017268  | .021633  | .026788  |
| .030846  | .032975  | .033542  | .032755  | .030333  | .026048  | .020390  | .014420  |
| .008839  | .004025  | .000650  | -.000397 | .001611  | .006517  | .012886  | .019541  |
| .026521  | .033128  | .037127  | .037138  | .034065  | .029636  | .024641  | .018957  |
| .012865  | .007044  | .001315  | -.004884 | -.011356 | -.017995 | -.025265 | -.033220 |
| -.041572 | -.049925 | -.057062 | -.061547 | -.063056 | -.061798 | -.057615 | -.050796 |
| -.042768 | -.034569 | -.025127 | -.013427 | -.002063 | .004867  | .006831  | .006107  |
| .003756  | .000002  | -.003499 | -.004465 | -.001788 | .004297  | .012249  | .019130  |
| .022332  | .022142  | .020745  | .018904  | .016361  | .013976  | .012464  | .011525  |
| .011373  | .011396  | .008897  | .003580  | -.000801 | -.003408 | -.009202 | -.020482 |
| -.031243 | -.035149 | -.034586 | -.035940 | -.039304 | -.038919 | -.031866 | -.021817 |
| -.014519 | -.010880 | -.006152 | .001855  | .007209  | .004100  | -.002950 | -.004344 |
| .000852  | .003948  | .000322  | -.004292 | -.004962 | -.005526 | -.009593 | -.012830 |
| -.009699 | -.000903 | .008573  | .015076  | .020132  | .028529  | .040537  | .050303  |
| .055673  | .062423  | .072341  | .075100  | .061232  | .036100  | .011452  | -.008544 |
| -.023587 | -.029893 | -.025078 | -.011983 | .005222  | .021703  | .031769  | .034219  |
| .032102  | .023963  | .004944  | -.019821 | -.034995 | -.034982 | -.032022 | -.035551 |
| -.036226 | -.021633 | .003239  | .022538  | .029008  | .028106  | .026773  | .024154  |
| .013420  | -.007799 | -.028766 | -.033534 | -.022059 | -.012147 | -.012128 | -.009562 |
| .001229  | .003993  | -.011703 | -.031236 | -.039564 | -.044205 | -.057693 | -.074722 |
| -.083035 | -.080779 | -.068764 | -.045604 | -.020270 | -.002263 | .019283  | .050627  |
| .066424  | .052283  | .037546  | .040810  | .038321  | .021727  | .013991  | .010956  |
| -.008628 | -.026785 | -.026943 | -.041850 | -.081210 | -.098350 | -.087740 | -.096431 |
| -.113341 | -.087693 | -.044248 | -.039271 | -.052523 | -.042838 | -.029044 | -.029922 |
| -.021897 | -.000630 | .012913  | .026976  | .052328  | .061592  | .046731  | .048661  |
| .079844  | .102872  | .109394  | .126265  | .144059  | .131439  | .101359  | .086111  |
| .078803  | .054358  | .011541  | -.035885 | -.075822 | -.099153 | -.108744 | -.113181 |
| -.101663 | -.059717 | -.009692 | .010208  | -.001555 | -.021266 | -.041621 | -.067116 |
| -.095222 | -.117504 | -.117886 | -.086257 | -.046769 | -.029272 | -.015668 | .025539  |
| .073790  | .089304  | .075186  | .055694  | .038325  | .027870  | .028340  | .023884  |
| .004933  | -.005882 | .003005  | .006076  | -.005346 | -.004207 | .011511  | .009611  |
| -.014669 | -.037481 | -.057321 | -.083173 | -.096020 | -.076516 | -.041057 | -.011218 |
| .016459  | .042733  | .050741  | .039772  | .028512  | .016275  | -.008940 | -.031124 |
| -.028668 | -.016552 | -.019058 | -.029514 | -.032183 | -.031405 | -.035293 | -.039157 |
| -.039836 | -.042677 | -.043911 | -.029226 | .000928  | .028603  | .045210  | .056749  |
| .066576  | .074205  | .080948  | .085299  | .083754  | .076936  | .068155  | .059654  |
| .052277  | .049065  | .054752  | .062503  | .055297  | .033568  | .015884  | .006365  |
| -.005610 | -.018175 | -.018751 | -.005402 | .009488  | .016877  | .023576  | .031982  |
| .025210  | -.000900 | -.024258 | -.030223 | -.017934 | .007496  | .021484  | .007634  |
| -.019689 | -.065711 | -.139641 | -.181257 | -.139741 | -.070556 | -.030335 | -.000246 |
| .025557  | .031350  | .037292  | .046848  | .029986  | -.003707 | -.027010 | -.044132 |
| -.052052 | -.051130 | -.079664 | -.136689 | -.154274 | -.108840 | -.049880 | -.011286 |
| .012013  | .030136  | .052199  | .077394  | .088724  | .080850  | .069653  | .064227  |
| .060165  | .062019  | .083632  | .120499  | .144709  | .136493  | .100862  | .051241  |
| .001796  | -.031340 | -.047205 | -.063652 | -.087751 | -.105076 | -.105854 | -.097997 |
| -.090180 | -.079387 | -.059119 | -.031412 | -.006810 | .006724  | .013781  | .025818  |
| .042094  | .047807  | .040375  | .038282  | .048634  | .048241  | .014543  | -.041913 |
| -.087827 | -.098383 | -.072521 | -.026545 | .020003  | .054688  | .074280  | .077885  |
| .061629  | .027198  | -.010987 | -.040227 | -.063563 | -.085581 | -.095263 | -.080418 |
| -.051385 | -.031710 | -.028455 | -.028291 | -.018264 | .005690  | .041039  | .074510  |
| .090661  | .092710  | .094047  | .090818  | .070037  | .038529  | .017635  | .017839  |
| .036442  | .065054  | .086699  | .085519  | .066614  | .043024  | .008485  | -.042036 |
| -.079607 | -.076345 | -.055421 | -.056462 | -.072018 | -.065138 | -.030056 | .002479  |
| .006391  | -.013368 | -.026272 | -.009051 | .019677  | .020530  | -.005218 | -.020922 |
| -.025885 | -.055129 | -.103247 | -.124713 | -.110729 | -.092324 | -.078621 | -.057978 |
| -.038691 | -.035149 | -.038321 | -.034153 | -.026439 | -.026262 | -.039920 | -.065420 |
| -.085297 | -.078598 | -.048859 | -.015326 | .021090  | .066653  | .099554  | .092402  |
| .061597  | .048074  | .055382  | .050439  | .024054  | .008752  | .026624  | .054132  |
| .056832  | .032668  | .000804  | -.031464 | -.069386 | -.109472 | -.133373 | -.123367 |

|          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|
| -.081284 | -.029526 | .009753  | .030056  | .029446  | .001617  | -.042790 | -.065576 |
| -.042277 | .000853  | .021654  | .016693  | .011213  | .014948  | .019364  | .023731  |
| .036677  | .057468  | .072063  | .068244  | .049695  | .033048  | .028911  | .028938  |
| .019661  | .005797  | .005872  | .024907  | .047424  | .060245  | .066562  | .070053  |
| .057591  | .013619  | -.050769 | -.103293 | -.128816 | -.138752 | -.138800 | -.118866 |
| -.080976 | -.044077 | -.015189 | .014376  | .043198  | .058197  | .057053  | .048769  |
| .038283  | .029257  | .029039  | .035386  | .036386  | .033078  | .037698  | .044901  |
| .034864  | .009686  | -.001608 | .019807  | .060370  | .092091  | .099309  | .086993  |
| .070705  | .057138  | .034208  | -.009284 | -.056410 | -.075478 | -.061787 | -.040848 |
| -.027843 | -.012352 | .011889  | .030833  | .032715  | .023840  | .012994  | -.001291 |
| -.020220 | -.035983 | -.040086 | -.032309 | -.018779 | -.005237 | .005640  | .009044  |
| -.004107 | -.032326 | -.051919 | -.040497 | -.009665 | .009386  | .011080  | .018069  |
| .036330  | .039112  | .007442  | -.038718 | -.065397 | -.064268 | -.053050 | -.044316 |
| -.027847 | .010580  | .059998  | .088259  | .078096  | .045828  | .018101  | .001882  |
| -.013323 | -.032293 | -.047003 | -.052073 | -.054859 | -.064876 | -.078753 | -.079761 |
| -.052912 | -.001623 | .052326  | .087098  | .095460  | .081782  | .054216  | .023041  |
| -.001728 | -.014149 | -.010296 | .009415  | .027646  | .018106  | -.016723 | -.039414 |
| -.031065 | -.020582 | -.035000 | -.056171 | -.056168 | -.042236 | -.037579 | -.042447 |
| -.036419 | -.004853 | .046282  | .093593  | .116822  | .120187  | .120337  | .114059  |
| .083303  | .033587  | -.002907 | -.008292 | .001093  | .000100  | -.016443 | -.033958 |
| -.039788 | -.040460 | -.052580 | -.076346 | -.089322 | -.072892 | -.035421 | -.001233 |
| .015810  | .018610  | .012906  | .000146  | -.013967 | -.015019 | .004897  | .030246  |
| .036354  | .025516  | .028697  | .059084  | .086272  | .076384  | .039305  | .013644  |
| .017320  | .033727  | .038356  | .021200  | -.011150 | -.041842 | -.058167 | -.066668 |
| -.082613 | -.102082 | -.103517 | -.080326 | -.050322 | -.028354 | -.010568 | .009702  |
| .029772  | .046240  | .060747  | .074658  | .088203  | .101948  | .111668  | .110310  |
| .100794  | .094491  | .092208  | .080801  | .054181  | .025105  | .008269  | -.000782 |
| -.019388 | -.049941 | -.070289 | -.062565 | -.041752 | -.036181 | -.044775 | -.038742 |
| -.006795 | .026121  | .030362  | .004179  | -.028255 | -.042249 | -.037499 | -.036866 |
| -.053477 | -.070898 | -.071061 | -.062603 | -.057938 | -.043013 | .000324  | .057988  |
| .098744  | .113978  | .117605  | .114467  | .089703  | .030495  | -.049156 | -.109757 |
| -.120080 | -.090164 | -.058023 | -.043157 | -.031175 | -.006551 | .021663  | .036838  |
| .040434  | .046327  | .058906  | .071650  | .082949  | .096281  | .103056  | .084376  |
| .040550  | .002808  | -.000492 | .021362  | .035668  | .026787  | .009231  | .005818  |
| .021477  | .038388  | .038446  | .028583  | .029494  | .037464  | .022415  | -.025134 |
| -.072983 | -.090232 | -.084039 | -.075014 | -.065134 | -.051354 | -.044433 | -.053577 |
| -.071604 | -.086864 | -.093676 | -.089212 | -.075833 | -.062269 | -.049934 | -.029496 |
| -.001877 | .014572  | .009054  | -.006419 | -.014316 | -.008754 | .007177  | .027338  |
| .044643  | .054049  | .052151  | .036032  | .008224  | -.023269 | -.053895 | -.080844 |
| -.093001 | -.081089 | -.058116 | -.047960 | -.051324 | -.043664 | -.010169 | .035540  |
| .072026  | .094103  | .108406  | .113627  | .097120  | .054807  | .006206  | -.021063 |
| -.019994 | -.007656 | -.001075 | -.001083 | -.002298 | -.006863 | -.019254 | -.034673 |
| -.043447 | -.044308 | -.044908 | -.050151 | -.054800 | -.047975 | -.025196 | .004798  |
| .029381  | .046118  | .059934  | .070452  | .072685  | .065766  | .052016  | .035584  |
| .028573  | .043168  | .069916  | .082519  | .072126  | .057767  | .056452  | .059722  |
| .044279  | -.002629 | -.065302 | -.104906 | -.094175 | -.047066 | -.000456 | .028164  |
| .047150  | .064128  | .076301  | .082394  | .083790  | .077526  | .062134  | .042636  |
| .020853  | -.006549 | -.035787 | -.058515 | -.077489 | -.100719 | -.122246 | -.127622 |
| -.114333 | -.092642 | -.073069 | -.059743 | -.046326 | -.022725 | .000466  | -.008185 |
| -.054995 | -.100141 | -.107890 | -.088579 | -.066493 | -.039690 | .002787  | .052522  |
| .092018  | .114438  | .122451  | .119730  | .106089  | .077306  | .036350  | .000965  |
| -.014850 | -.018638 | -.021228 | -.016630 | -.001094 | .009218  | .004785  | .005801  |
| .032410  | .068859  | .082431  | .067495  | .048701  | .044744  | .048417  | .045389  |
| .037489  | .037311  | .045508  | .045280  | .025073  | -.000339 | -.005434 | .009617  |
| .018275  | .010805  | .011182  | .031763  | .041066  | .009540  | -.038309 | -.056883 |
| -.042892 | -.026149 | -.018595 | -.012583 | -.010271 | -.016740 | -.018982 | -.002472 |
| .023174  | .035717  | .027101  | .008708  | -.001645 | .000608  | -.005062 | -.040397 |
| -.089732 | -.114942 | -.109312 | -.096418 | -.080414 | -.047916 | -.012126 | -.000352 |
| -.005143 | .002243  | .022215  | .034646  | .039075  | .049685  | .067325  | .080572  |
| .075825  | .039673  | -.023149 | -.078820 | -.098770 | -.090911 | -.075031 | -.055468 |
| -.037256 | -.030969 | -.025069 | .004142  | .046133  | .067326  | .070464  | .088840  |
| .120969  | .127304  | .094310  | .050905  | .019837  | -.004398 | -.030577 | -.057599 |
| -.081999 | -.096513 | -.091945 | -.073055 | -.054866 | -.038115 | -.012470 | .017498  |
| .038920  | .055035  | .070620  | .069727  | .044077  | .020231  | .020660  | .026940  |
| .018017  | .009075  | .016853  | .025374  | .017675  | .001649  | -.018477 | -.053282 |
| -.094150 | -.109540 | -.085525 | -.037751 | .012936  | .049110  | .057081  | .042693  |



|          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|
| .026240  | .010129  | -.016934 | -.041558 | -.035216 | -.002908 | .023071  | .033193  |
| .039411  | .036406  | .012569  | -.012916 | -.010438 | .012604  | .023884  | .015583  |
| .008664  | .016735  | .033113  | .047869  | .058571  | .068654  | .083110  | .097977  |
| .095584  | .064014  | .015314  | -.031537 | -.074207 | -.114315 | -.136262 | -.123555 |
| -.085925 | -.047454 | -.016012 | .015694  | .046705  | .065046  | .065535  | .056857  |
| .050387  | .047648  | .039147  | .015862  | -.017143 | -.042510 | -.049965 | -.049164 |
| -.054709 | -.061542 | -.050517 | -.021641 | -.002120 | -.010284 | -.030857 | -.041241 |
| -.043646 | -.052350 | -.064494 | -.064268 | -.048390 | -.031460 | -.027827 | -.035335 |
| -.037607 | -.023698 | -.003365 | .007379  | .013284  | .033237  | .065646  | .083952  |
| .073065  | .049740  | .038704  | .044488  | .054636  | .059164  | .058021  | .053507  |
| .041856  | .015579  | -.025120 | -.066464 | -.090998 | -.092782 | -.079338 | -.059598 |
| -.035489 | -.008231 | .012645  | .015387  | .001136  | -.015367 | -.021845 | -.017357 |
| -.004179 | .018643  | .048767  | .075668  | .088356  | .084114  | .067228  | .043257  |
| .016132  | -.011446 | -.035552 | -.051413 | -.059580 | -.066860 | -.074492 | -.071380 |
| -.048010 | -.012262 | .017678  | .032847  | .037006  | .032826  | .016881  | -.007409 |
| -.023525 | -.018750 | -.000997 | .011501  | .013258  | .013737  | .018255  | .018895  |
| .008357  | -.006453 | -.011581 | -.002811 | .010087  | .015803  | .014738  | .015740  |
| .020634  | .020379  | .009423  | -.005642 | -.016470 | -.023106 | -.029477 | -.036943 |
| -.045665 | -.055624 | -.064430 | -.068434 | -.064487 | -.048565 | -.019186 | .015355  |
| .041745  | .055051  | .058492  | .052572  | .036545  | .017889  | .007833  | .008759  |
| .014532  | .020116  | .023727  | .023063  | .015884  | .003554  | -.008304 | -.012884 |
| -.008107 | -.000108 | .003280  | .001912  | -.000527 | -.007524 | -.025903 | -.050871 |
| -.067036 | -.067334 | -.060304 | -.055008 | -.049214 | -.037940 | -.024311 | -.015232 |
| -.012217 | -.011059 | -.006481 | .004477  | .020208  | .035551  | .046635  | .052517  |
| .051615  | .041526  | .023788  | .004139  | -.012867 | -.025901 | -.034989 | -.040990 |
| -.044035 | -.040948 | -.029687 | -.015659 | -.005628 | .002130  | .012327  | .021505  |
| .022442  | .015669  | .008370  | .006247  | .011915  | .025299  | .041129  | .051556  |
| .053195  | .046882  | .032860  | .012895  | -.006433 | -.019269 | -.025734 | -.027661 |
| -.024563 | -.017259 | -.010156 | -.007068 | -.008026 | -.010494 | -.010840 | -.006062 |
| .002736  | .010266  | .012790  | .011185  | .006521  | -.002941 | -.017308 | -.031595 |
| -.040309 | -.043003 | -.042475 | -.039647 | -.033305 | -.023790 | -.013955 | -.006353 |
| -.000994 | .004093  | .010471  | .017325  | .021771  | .020893  | .013312  | -.000292 |
| -.017139 | -.033004 | -.043846 | -.047761 | -.045511 | -.038769 | -.028642 | -.016736 |
| -.005784 | .002414  | .008061  | .011625  | .013217  | .014095  | .016197  | .019095  |
| .019474  | .015281  | .008705  | .003262  | -.000134 | -.002322 | -.003804 | -.005423 |
| -.008248 | -.011516 | -.013386 | -.013972 | -.014810 | -.015788 | -.015252 | -.012470 |
| -.008079 | -.003091 | .001204  | .004055  | .007032  | .012907  | .021875  | .031029  |
| .037770  | .041107  | .039776  | .032528  | .020932  | .008941  | -.000545 | -.006401 |
| -.007949 | -.005996 | -.003487 | -.002222 | -.001139 | .000102  | -.000905 | -.005440 |
| -.010787 | -.013497 | -.013426 | -.012679 | -.012553 | -.013658 | -.017211 | -.023724 |
| -.031231 | -.036456 | -.037296 | -.033777 | -.027129 | -.018140 | -.006876 | .005470  |
| .015862  | .021789  | .023323  | .021877  | .018166  | .012457  | .005720  | -.000772 |
| -.006325 | -.010479 | -.012470 | -.011598 | -.007677 | -.001364 | .005762  | .012379  |
| .018504  | .024361  | .029245  | .032564  | .034601  | .035730  | .036371  | .037566  |
| .039974  | .042369  | .042435  | .039338  | .034551  | .029911  | .025942  | .022471  |
| .019786  | .018591  | .019075  | .020183  | .020377  | .019421  | .018426  | .017746  |
| .016186  | .012797  | .008316  | .004178  | .000770  | -.002413 | -.005171 | -.006519 |
| -.006174 | -.004862 | -.003299 | -.001914 | -.001136 | -.001301 | -.002452 | -.004291 |
| -.006098 | -.007002 | -.006680 | -.005530 | -.004002 | -.002201 | -.000721 | -.000880 |
| -.002983 | -.005747 | -.008451 | -.011456 | -.013905 | -.014000 | -.012152 | -.010722 |
| -.010556 | -.010633 | -.010379 | -.009820 | -.008596 | -.006740 | -.004929 | -.003038 |
| -.000535 | .001630  | .002007  | .001096  | .000482  | .000466  | .000420  | .000246  |

# Vertical Component

|          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|
| .010400  | .009300  | .007500  | .006600  | .006800  | .005900  | .007500  | .007200  |
| .006500  | .006000  | .005100  | .003400  | .001600  | .000400  | -.001000 | -.001800 |
| -.003100 | -.004700 | -.005500 | -.005600 | -.004900 | -.003500 | -.002100 | -.001500 |
| -.001500 | -.001000 | .000000  | .000000  | -.001500 | -.003900 | -.006100 | -.007800 |
| -.008100 | -.006800 | -.003800 | -.001000 | .000800  | .003700  | .007000  | .007800  |
| .006300  | .004100  | -.000300 | -.004300 | -.007800 | -.009200 | -.010500 | -.011800 |
| -.010300 | -.007900 | -.008000 | -.009600 | -.008200 | -.008600 | -.008400 | -.005600 |
| -.001000 | .001300  | .004200  | .006800  | .008300  | .007700  | .007100  | .008300  |
| .006800  | .002500  | .002900  | .006400  | .010500  | .015200  | .017200  | .017400  |
| .018300  | .018400  | .019600  | .022800  | .012500  | .007700  | .009900  | .009700  |
| .002400  | .002100  | -.001800 | -.008000 | -.006900 | -.001800 | -.001100 | -.004400 |
| -.005500 | -.006900 | -.009700 | -.008200 | -.004200 | -.009400 | -.016700 | -.015500 |
| -.017300 | -.010900 | -.001600 | .001900  | .007000  | .007300  | .007900  | .010500  |

|          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|
| .020500  | .018300  | .019000  | .016600  | .019000  | .011300  | .006900  | -.007400 |
| -.017500 | -.023900 | -.019800 | -.015100 | -.014100 | -.011600 | -.000900 | .001600  |
| .011600  | .020100  | .014800  | .003400  | .004400  | -.008000 | -.014800 | -.008900 |
| -.011400 | -.021000 | -.020600 | -.024100 | -.027100 | -.014800 | -.006700 | -.004900 |
| -.007800 | -.006300 | -.003600 | .006900  | .011600  | .010100  | .005300  | .001700  |
| .004200  | .004200  | -.003300 | -.003900 | -.013300 | -.014400 | -.011100 | .001400  |
| .008800  | .018100  | .008500  | .019300  | .016500  | .022500  | .016700  | .006500  |
| -.012900 | -.006900 | -.016700 | -.021300 | -.007300 | -.006000 | -.015900 | -.009400 |
| .002800  | .004800  | .026300  | .024900  | .012900  | .012200  | .013800  | -.002500 |
| -.009300 | -.010400 | -.012700 | -.009700 | .000500  | .009200  | .019400  | .022000  |
| .019700  | .020800  | .023900  | .022200  | .011700  | -.006900 | -.006200 | -.007800 |
| -.004100 | -.006600 | -.018000 | -.027500 | -.017600 | -.032300 | -.036200 | -.017000 |
| -.009300 | -.006900 | .012200  | .020900  | .021300  | .024700  | .019600  | -.001400 |
| -.009200 | -.016900 | -.030500 | -.041200 | -.027300 | -.009400 | -.005400 | -.000100 |
| .010600  | .013000  | .012400  | .016300  | .002500  | -.006100 | -.003200 | -.012400 |
| -.010800 | .000200  | .002600  | -.012200 | -.003800 | -.014200 | -.022300 | -.014800 |
| -.001300 | -.021300 | -.009600 | -.001400 | -.007400 | -.024900 | .003700  | .008400  |
| .004600  | -.009700 | -.008600 | -.017200 | -.005200 | .006100  | .010700  | .005700  |
| .004900  | .014100  | .005800  | -.001400 | -.005300 | .011800  | .022700  | .018700  |
| .011200  | .009100  | -.007700 | -.010100 | -.003500 | .005600  | .013100  | .002300  |
| .011800  | .009200  | .005800  | .020200  | .028200  | .021100  | .017000  | .010500  |
| .000500  | -.019800 | -.020000 | .004700  | -.009000 | -.021500 | -.023200 | -.039600 |
| -.062100 | -.057100 | -.053400 | -.040700 | -.007900 | .026200  | .042000  | .052300  |
| .038100  | .012000  | .011900  | .002500  | -.022300 | -.019000 | -.027000 | -.024500 |
| .005600  | .037800  | .028800  | .034700  | .051200  | .053100  | .024800  | .013200  |
| .007800  | .002600  | .015200  | .017500  | .009100  | -.000100 | -.022500 | -.030600 |
| -.025100 | -.039700 | -.024900 | -.001200 | -.010100 | -.024200 | -.027300 | -.007300 |
| .017200  | .029700  | .024600  | .006800  | -.021800 | -.015700 | -.016100 | -.024000 |
| -.016800 | -.002900 | .011600  | .012800  | .003300  | -.004700 | .019500  | .027500  |
| .029200  | .036100  | .043300  | .040100  | .034600  | .027700  | .006100  | -.025800 |
| -.034400 | -.034800 | -.033900 | -.015000 | .014500  | .034700  | .050500  | .033100  |
| .000000  | -.006700 | -.014700 | -.022700 | -.024100 | -.036700 | -.053100 | -.028100 |
| .013800  | .047000  | .048300  | .044100  | .055400  | .031000  | .003200  | .014900  |
| .033100  | .029800  | .051300  | .050400  | .012400  | .007600  | .004000  | -.013400 |
| -.023600 | -.040000 | -.045600 | -.043200 | -.033000 | -.006900 | .013400  | .010100  |
| .021100  | .014100  | -.008700 | .001100  | -.009500 | -.013900 | .016500  | .002600  |
| -.032100 | -.024200 | -.001300 | .003700  | .024700  | .029400  | .019100  | .021500  |
| .015200  | .017700  | .001900  | -.005100 | -.003100 | .018000  | .002800  | .007800  |
| .007000  | -.026900 | -.054900 | -.037100 | -.026700 | -.033100 | .003200  | .008400  |
| -.005900 | -.020400 | -.007200 | -.026400 | -.006900 | -.014600 | -.032400 | -.055600 |
| -.047200 | -.043700 | -.019400 | -.014900 | -.023100 | -.010700 | .007200  | .005600  |
| .017900  | .024700  | .017100  | .004800  | .004600  | -.010100 | -.008400 | -.010600 |
| -.003500 | .006900  | -.003200 | .007700  | .034100  | .031600  | .029700  | .041300  |
| .040800  | .043700  | .022600  | .009100  | -.008700 | -.023200 | -.021400 | -.011300 |
| -.028400 | -.019800 | -.016600 | -.047300 | -.057600 | -.040300 | -.015600 | .013700  |
| .042100  | .022700  | .022400  | .012200  | -.021200 | -.013800 | .021100  | .007500  |
| .019200  | .029000  | .012500  | .009400  | .014300  | .007100  | -.012000 | -.013200 |
| -.013900 | -.033100 | -.029700 | .003600  | .001900  | .026500  | .027400  | .025500  |
| .017000  | .021700  | .008700  | -.003900 | .003000  | -.010300 | -.022700 | -.011000 |
| -.004600 | -.007400 | .016400  | .008900  | .019000  | .024200  | .008400  | -.013300 |
| -.024400 | -.029600 | .005200  | .007900  | .007600  | -.001300 | .008700  | -.016000 |
| -.003200 | -.016100 | -.030400 | -.022000 | .000900  | -.018200 | -.017500 | -.010100 |
| -.000100 | .004100  | .019100  | .027500  | .023500  | -.011700 | -.016400 | -.016100 |
| .000700  | .012900  | .050300  | .061400  | .050000  | .066200  | .064000  | .030500  |
| .008200  | .010300  | -.041700 | -.049500 | -.062800 | -.059300 | -.050400 | -.050000 |
| -.054000 | -.016100 | -.007200 | -.034300 | -.024600 | -.016600 | -.048700 | -.036700 |
| -.011000 | .011700  | .015800  | .037400  | .037100  | .048700  | .031000  | .020100  |
| .004000  | -.012600 | -.031500 | .000700  | .009500  | -.023400 | .003300  | .037100  |
| .017600  | .007800  | .008300  | -.012800 | -.028600 | -.028400 | -.026600 | -.020800 |
| -.003600 | .000800  | .019800  | .027400  | .035300  | .002800  | .023300  | .003500  |
| -.010300 | -.018200 | .009100  | -.034000 | -.010600 | .010600  | .024800  | .025700  |
| .053700  | .058800  | .045100  | .022400  | .004700  | -.007700 | -.019600 | -.005400 |
| .021500  | .016300  | -.012400 | -.019300 | -.025500 | -.049600 | -.039500 | -.038200 |
| -.021500 | -.024000 | -.013800 | -.011000 | .012000  | .025600  | .033200  | .012000  |
| -.006900 | -.028900 | -.021900 | -.003900 | -.013100 | -.005800 | .017700  | .007000  |
| -.027000 | -.008800 | .020500  | .006900  | .022200  | .024700  | .002000  | -.006600 |

|          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|
| .008700  | -.011400 | -.026600 | -.021700 | .019500  | .022100  | .009300  | .008800  |
| .014600  | -.013400 | -.001000 | -.004000 | -.014100 | -.005900 | .006500  | -.009400 |
| -.002700 | -.002900 | .026400  | .040000  | .015600  | -.004100 | .004100  | .000000  |
| -.004400 | .000300  | -.026800 | -.025100 | -.011700 | .015000  | -.007200 | -.003200 |
| -.004500 | .034000  | .043400  | .046300  | .030100  | .006300  | -.018300 | -.009400 |
| -.024800 | -.031900 | -.035200 | -.033900 | -.002600 | .040600  | .045500  | .049300  |
| .046500  | .001700  | -.038100 | -.043200 | -.047800 | -.029800 | -.007200 | -.008200 |
| -.019000 | .006600  | .010400  | .024300  | -.001200 | -.021500 | -.042800 | -.021600 |
| -.011300 | .008900  | .008200  | .015800  | .010800  | -.004100 | -.006800 | -.003000 |
| -.016600 | -.007100 | .007600  | -.004300 | .002000  | .023900  | .015000  | .030000  |
| .044600  | .038800  | .040500  | .028000  | -.004000 | .010800  | .005100  | -.004700 |
| .008500  | .001000  | -.030100 | -.026900 | -.005600 | -.003300 | .000000  | .000800  |
| -.001500 | -.003300 | .015900  | .036200  | .028400  | .008300  | .011700  | .025500  |
| .012500  | .018400  | .007800  | -.023000 | -.040300 | -.033800 | -.042400 | -.032500 |
| -.035300 | -.050100 | -.046400 | -.033400 | -.018200 | -.000200 | .019700  | .005000  |
| -.018500 | -.030800 | -.019500 | -.013400 | -.025300 | .017600  | .054800  | .077600  |
| .098400  | .089100  | .017800  | .009600  | -.004700 | -.022300 | -.019000 | -.015500 |
| -.057100 | -.047500 | -.027600 | -.024900 | .006600  | .023600  | -.014600 | -.023600 |
| -.009000 | -.006300 | -.003900 | -.004000 | .009700  | .014700  | -.009000 | -.000600 |
| .012000  | .016100  | .003500  | .000600  | .015600  | .014600  | .008800  | .012700  |
| -.000300 | -.010500 | -.009200 | -.006000 | -.028400 | -.049100 | -.040500 | -.016300 |
| -.026300 | -.015100 | -.012600 | -.011900 | -.026200 | -.044900 | -.024600 | -.014500 |
| -.043700 | -.018300 | .024100  | .015000  | .013600  | .033400  | .012000  | .001500  |
| .025100  | .031500  | -.010400 | -.019700 | .001400  | -.011500 | -.009400 | .011800  |
| .034500  | .049800  | .067100  | .049900  | .041600  | .027000  | .024200  | .001600  |
| -.004800 | -.026300 | -.044200 | -.039100 | -.018400 | -.026200 | -.009100 | .011700  |
| .016400  | .000300  | .005000  | .027100  | .011300  | .030700  | .041600  | .032100  |
| .004400  | .003400  | -.032300 | -.016600 | .003400  | .004000  | .018900  | .033700  |
| .032300  | .044600  | .048600  | .026900  | -.005900 | -.021300 | -.031500 | -.049000 |
| -.053000 | -.039500 | -.045900 | -.027600 | -.003200 | -.009300 | -.009000 | .016100  |
| .001900  | -.007000 | .011500  | -.001800 | -.013900 | -.000100 | .017900  | .001000  |
| .007600  | .015800  | .005600  | -.003200 | .011000  | -.016400 | -.046500 | -.031600 |
| -.033500 | -.030000 | -.001600 | .026400  | .035800  | .048100  | .036500  | .032600  |
| .016700  | -.006200 | -.011700 | -.009300 | -.008200 | .005200  | .003800  | -.003000 |
| .028800  | .042400  | .040400  | .027000  | .020900  | -.023700 | -.025800 | -.037700 |
| -.041900 | -.046500 | -.025600 | -.042800 | -.034800 | -.016800 | .002400  | -.006500 |
| .018700  | .011800  | -.001600 | .018000  | .037400  | .008200  | .003400  | .009900  |
| -.009000 | -.001000 | .000400  | -.020000 | -.033300 | -.034600 | -.027200 | -.011300 |
| -.003800 | .015800  | .023600  | .024600  | .022100  | .007500  | -.022000 | -.018600 |
| -.029200 | -.005600 | .013800  | .013500  | .009700  | .035500  | -.003800 | -.025800 |
| -.008100 | -.004300 | -.008000 | -.003600 | -.024700 | -.011800 | .025000  | .064400  |
| .064400  | .022400  | -.025200 | -.017500 | .000300  | .006000  | .018300  | -.000100 |
| -.004600 | -.001000 | .031000  | .021700  | .017700  | .016200  | .036300  | .034400  |
| .010300  | -.010300 | -.020800 | -.059500 | -.051300 | -.029300 | -.021400 | -.007500 |
| .030300  | .012600  | .010300  | -.025900 | .007500  | .018000  | .032600  | .006300  |
| .019100  | .022300  | .028600  | .020600  | .040600  | .019000  | .006400  | .002100  |
| -.007000 | -.017700 | .001500  | .019400  | .023200  | -.011700 | -.018200 | -.028800 |
| -.044300 | -.056700 | -.042600 | -.014300 | -.030400 | -.007300 | .006400  | -.020200 |
| -.037700 | -.025900 | -.040800 | -.020400 | -.008700 | -.024400 | .012300  | .041600  |
| .066700  | .082600  | .080500  | .027500  | .026500  | .023700  | .004800  | -.006100 |
| -.002900 | -.020100 | -.030700 | -.005000 | .011700  | .010100  | -.017900 | -.003900 |
| .010100  | .013300  | .018000  | .005300  | -.025200 | -.038800 | -.042200 | -.038600 |
| -.004500 | .030300  | .051800  | .041700  | .006100  | -.020700 | -.026900 | -.040100 |
| -.042600 | -.017700 | -.027200 | -.013400 | -.005600 | .004300  | .030400  | .067100  |
| .028500  | .020400  | .009900  | -.008400 | -.036600 | -.009500 | -.001800 | .009500  |
| -.004900 | -.016000 | -.046700 | -.049100 | -.046200 | -.031600 | -.045600 | -.027400 |
| -.001000 | .027900  | .034500  | .051000  | .071700  | .066700  | .029400  | .012600  |
| .003700  | -.015200 | .004300  | .023300  | .029100  | .033800  | .029800  | .007800  |
| .005500  | .003300  | -.021100 | -.009800 | .006600  | .008100  | .000300  | .027600  |
| .005200  | .000100  | .020400  | .017700  | -.034700 | -.015000 | -.000500 | .016600  |
| .024900  | .002100  | -.010800 | .006000  | .013700  | .021000  | .028400  | .016100  |
| -.004300 | -.000800 | -.000600 | -.020300 | -.007800 | -.003700 | -.024000 | -.036200 |
| -.022300 | .002600  | .015900  | .023800  | .031300  | .035500  | -.001600 | .002000  |
| .017500  | .012900  | -.011400 | -.025500 | -.062800 | -.063800 | -.030800 | -.031400 |
| -.017800 | .005300  | .006900  | .024700  | .040000  | .029500  | .023100  | .014000  |
| -.043000 | -.055500 | -.041700 | -.028200 | -.018600 | .006900  | .003900  | .004200  |

|          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|
| -.004900 | -.016500 | -.033200 | -.040400 | -.042200 | -.028100 | -.013300 | -.000400 |
| .022700  | .048700  | .044200  | .054100  | .068200  | .053600  | .023500  | .025100  |
| .004000  | -.016800 | -.026900 | -.014200 | -.036200 | -.003000 | .029300  | .038400  |
| .048700  | .052200  | .028800  | .034000  | .022100  | -.012800 | -.018000 | -.023100 |
| -.027100 | -.010000 | .001800  | .003400  | .006800  | .010300  | -.003500 | -.016900 |
| -.025000 | -.005400 | .009300  | .023900  | .014200  | .015800  | .008100  | .003100  |
| -.004500 | -.001000 | -.030600 | -.060200 | -.051000 | -.044200 | -.048600 | -.007700 |
| .007100  | -.006800 | .010100  | .019400  | -.004800 | -.005500 | -.006200 | -.020800 |
| -.014200 | -.001500 | .002000  | .003300  | -.007400 | -.009700 | .010000  | .016700  |
| .011700  | -.011200 | -.032300 | -.030200 | -.011500 | -.006900 | .008000  | .007200  |
| -.007800 | -.014400 | -.033500 | -.039400 | -.027600 | -.023000 | -.038800 | -.039300 |
| -.017000 | .004200  | .012300  | .024600  | .021300  | .024000  | .014700  | .019200  |
| -.009000 | -.026600 | -.024100 | .010300  | .000200  | .035000  | .047700  | .024500  |
| .008100  | .030600  | .030100  | .025100  | .022600  | .004900  | -.014000 | -.024100 |
| -.023200 | -.012500 | -.010200 | -.016000 | -.000600 | .004700  | .023200  | .025300  |
| .019000  | .022900  | .020000  | .004900  | .016900  | .010600  | -.002700 | .025500  |
| .041800  | .024200  | .016700  | .038400  | .023600  | -.006700 | -.019800 | -.030200 |
| -.016300 | -.000900 | .011300  | -.001000 | -.033100 | -.045500 | -.027100 | -.034600 |
| -.048500 | -.049500 | -.040500 | -.003700 | .005800  | .002900  | .003100  | -.001100 |
| -.003100 | .015300  | .034200  | .010300  | .011500  | .016900  | .009700  | -.005300 |
| .002200  | -.009400 | -.006200 | -.021000 | -.010800 | .019000  | .030500  | .022500  |
| .033200  | .000500  | -.037400 | -.029800 | -.016400 | -.017000 | -.041300 | -.037700 |
| -.021600 | -.010600 | .003600  | .019700  | -.008000 | -.021100 | -.020600 | -.019000 |
| -.032000 | -.021800 | -.016400 | -.009800 | -.005700 | .013200  | .029100  | .039900  |
| .024800  | .012000  | .006100  | -.009400 | -.011000 | -.001700 | -.016700 | -.022300 |
| -.012600 | -.011200 | -.006900 | -.005500 | -.012100 | -.018600 | -.023700 | -.024700 |
| -.013800 | -.015300 | -.010200 | .005500  | .027500  | .031900  | .039700  | .027700  |
| .013200  | .003800  | .004500  | -.010700 | -.005100 | -.006100 | .004200  | .010600  |
| .019400  | .020400  | .033300  | .023000  | .003200  | -.015100 | -.016000 | -.017300 |
| -.008900 | -.004400 | -.002100 | -.006800 | .010000  | .016800  | .018400  | .022900  |
| .020700  | .004600  | .004400  | .007700  | .007200  | .015100  | .027200  | .028300  |
| .027000  | .021200  | .008500  | -.001800 | .000100  | -.001500 | -.012800 | -.009200 |
| -.003900 | -.002700 | -.000800 | .007800  | .002000  | .007200  | .002700  | -.004600 |
| -.013200 | -.014500 | -.014000 | -.009200 | -.007600 | -.004100 | .002700  | .001200  |
| -.001000 | -.001800 | -.006000 | -.009000 | -.009700 | -.006900 | -.004800 | -.003600 |
| -.003400 | -.000500 | .002200  | .001600  | -.001500 | -.005500 | -.009300 | -.011800 |
| -.009100 | -.004400 | -.003100 | -.001000 | .001500  | .003700  | .001000  | .005300  |
| .006800  | .008100  | .007700  | .011600  | .009800  | .006800  | .005900  | .006300  |
| .005300  | .005800  | .007600  | .005500  | .004500  | .005700  | .005600  | .008200  |
| .011000  | .013400  | .013400  | .013700  | .010200  | .010100  | .008900  | .008200  |
| .004900  | .004500  | .004200  | .005200  | .007000  | .010000  | .010000  | .010100  |
| .012000  | .013300  | .013400  | .015200  | .016000  | .015000  | .015900  | .014200  |
| .010700  | .005800  | .000300  | -.004500 |          |          |          |          |



| Smooth PSD |             |             |
|------------|-------------|-------------|
| Frequency  | Component 1 | Component 2 |
| .3000E+00  | .1784E+02   | .3289E+02   |
| .3232E+00  | .2107E+02   | .3002E+02   |
| .3463E+00  | .2067E+02   | .2527E+02   |
| .3695E+00  | .1822E+02   | .2264E+02   |
| .3927E+00  | .2256E+02   | .1763E+02   |
| .4158E+00  | .2831E+02   | .1697E+02   |
| .4390E+00  | .2757E+02   | .1542E+02   |
| .4622E+00  | .2590E+02   | .1700E+02   |
| .4853E+00  | .2812E+02   | .2156E+02   |
| .5085E+00  | .2918E+02   | .2747E+02   |
| .5317E+00  | .3018E+02   | .2786E+02   |
| .5548E+00  | .3788E+02   | .2948E+02   |
| .5780E+00  | .4177E+02   | .3184E+02   |
| .6012E+00  | .4016E+02   | .3713E+02   |
| .6243E+00  | .4066E+02   | .4264E+02   |
| .6475E+00  | .4015E+02   | .4191E+02   |
| .6707E+00  | .3979E+02   | .4902E+02   |
| .6938E+00  | .4571E+02   | .5444E+02   |
| .7170E+00  | .5857E+02   | .5241E+02   |
| .7402E+00  | .6770E+02   | .4690E+02   |
| .7633E+00  | .6921E+02   | .4159E+02   |
| .7865E+00  | .7263E+02   | .4216E+02   |
| .8097E+00  | .7334E+02   | .5227E+02   |
| .8328E+00  | .6977E+02   | .6731E+02   |
| .8560E+00  | .6355E+02   | .8076E+02   |
| .8792E+00  | .9111E+02   | .7662E+02   |
| .9023E+00  | .1190E+03   | .8206E+02   |
| .9255E+00  | .1284E+03   | .9460E+02   |
| .9487E+00  | .1245E+03   | .1040E+03   |
| .9718E+00  | .1251E+03   | .1078E+03   |
| .9950E+00  | .1160E+03   | .9898E+02   |
| .1018E+01  | .1177E+03   | .9783E+02   |
| .1041E+01  | .1185E+03   | .9548E+02   |
| .1065E+01  | .1184E+03   | .9847E+02   |
| .1088E+01  | .1162E+03   | .1092E+03   |
| .1111E+01  | .1112E+03   | .1110E+03   |
| .1134E+01  | .1056E+03   | .1113E+03   |
| .1157E+01  | .1051E+03   | .1111E+03   |
| .1180E+01  | .1068E+03   | .1121E+03   |
| .1204E+01  | .1085E+03   | .1208E+03   |
| .1227E+01  | .1024E+03   | .1684E+03   |
| .1250E+01  | .1034E+03   | .1775E+03   |
| .1273E+01  | .1113E+03   | .1703E+03   |
| .1296E+01  | .1275E+03   | .1608E+03   |
| .1319E+01  | .1371E+03   | .1606E+03   |
| .1343E+01  | .1332E+03   | .1612E+03   |
| .1366E+01  | .1191E+03   | .1670E+03   |
| .1389E+01  | .1034E+03   | .1670E+03   |
| .1412E+01  | .1037E+03   | .1592E+03   |
| .1435E+01  | .1173E+03   | .1509E+03   |
| .1458E+01  | .1481E+03   | .1441E+03   |
| .1482E+01  | .1659E+03   | .1525E+03   |
| .1505E+01  | .1752E+03   | .1679E+03   |
| .1528E+01  | .1758E+03   | .1825E+03   |
| .1551E+01  | .1755E+03   | .1934E+03   |
| .1574E+01  | .2002E+03   | .1898E+03   |
| .1597E+01  | .2329E+03   | .1889E+03   |
| .1621E+01  | .2628E+03   | .1854E+03   |
| .1644E+01  | .2779E+03   | .1791E+03   |
| .1667E+01  | .2804E+03   | .1738E+03   |
| .1690E+01  | .2654E+03   | .1742E+03   |
| .1713E+01  | .2660E+03   | .1914E+03   |
| .1736E+01  | .2694E+03   | .2158E+03   |
| .1760E+01  | .2750E+03   | .2319E+03   |

F 11.1  
PSD 11.1

|           |           |           |
|-----------|-----------|-----------|
| .1783E+01 | .2753E+03 | .2344E+03 |
| .1806E+01 | .2592E+03 | .2257E+03 |
| .1829E+01 | .2554E+03 | .2228E+03 |
| .1852E+01 | .2557E+03 | .2059E+03 |
| .1875E+01 | .2656E+03 | .1864E+03 |
| .1899E+01 | .2853E+03 | .1772E+03 |
| .1922E+01 | .3101E+03 | .1716E+03 |
| .1945E+01 | .3115E+03 | .1733E+03 |
| .1968E+01 | .3040E+03 | .1810E+03 |
| .1991E+01 | .3051E+03 | .1886E+03 |
| .2014E+01 | .3176E+03 | .1936E+03 |
| .2038E+01 | .3127E+03 | .1940E+03 |
| .2061E+01 | .3136E+03 | .1914E+03 |
| .2084E+01 | .3149E+03 | .1890E+03 |
| .2107E+01 | .3168E+03 | .1874E+03 |
| .2130E+01 | .3175E+03 | .1875E+03 |
| .2153E+01 | .3091E+03 | .1852E+03 |
| .2177E+01 | .3018E+03 | .1874E+03 |
| .2200E+01 | .2909E+03 | .1891E+03 |
| .2223E+01 | .2782E+03 | .1878E+03 |
| .2246E+01 | .2665E+03 | .1820E+03 |
| .2269E+01 | .2604E+03 | .1832E+03 |
| .2292E+01 | .2603E+03 | .1779E+03 |
| .2316E+01 | .2689E+03 | .1739E+03 |
| .2339E+01 | .2793E+03 | .1748E+03 |
| .2362E+01 | .2833E+03 | .1807E+03 |
| .2385E+01 | .2882E+03 | .1840E+03 |
| .2408E+01 | .2753E+03 | .1838E+03 |
| .2431E+01 | .2545E+03 | .1854E+03 |
| .2455E+01 | .2343E+03 | .1873E+03 |
| .2478E+01 | .2229E+03 | .1885E+03 |
| .2501E+01 | .2207E+03 | .1819E+03 |
| .2524E+01 | .2315E+03 | .1814E+03 |
| .2547E+01 | .2485E+03 | .1797E+03 |
| .2570E+01 | .2558E+03 | .1764E+03 |
| .2594E+01 | .2559E+03 | .1705E+03 |
| .2617E+01 | .2746E+03 | .1820E+03 |
| .2640E+01 | .2877E+03 | .1699E+03 |
| .2663E+01 | .2889E+03 | .1607E+03 |
| .2686E+01 | .2876E+03 | .1593E+03 |
| .2709E+01 | .2884E+03 | .1602E+03 |
| .2733E+01 | .2804E+03 | .1667E+03 |
| .2756E+01 | .2830E+03 | .1791E+03 |
| .2779E+01 | .2864E+03 | .1934E+03 |
| .2802E+01 | .2898E+03 | .2042E+03 |
| .2825E+01 | .2873E+03 | .2069E+03 |
| .2848E+01 | .2782E+03 | .2054E+03 |
| .2872E+01 | .2651E+03 | .2138E+03 |
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| .3011E+01 | .2426E+03 | .3218E+03 |
| .3034E+01 | .2472E+03 | .3168E+03 |
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| .3080E+01 | .2565E+03 | .3017E+03 |
| .3103E+01 | .2563E+03 | .2994E+03 |
| .3126E+01 | .2564E+03 | .2981E+03 |
| .3150E+01 | .2551E+03 | .2972E+03 |
| .3173E+01 | .2526E+03 | .2961E+03 |
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| .3242E+01 | .2399E+03 | .2821E+03 |
| .3265E+01 | .2386E+03 | .2795E+03 |
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| .3428E+01 | .2453E+03 | .2954E+03 |
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| .3682E+01 | .1998E+03 | .2749E+03 |
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| .3775E+01 | .2233E+03 | .2712E+03 |
| .3798E+01 | .2210E+03 | .2728E+03 |
| .3821E+01 | .2120E+03 | .2745E+03 |
| .3845E+01 | .2002E+03 | .2761E+03 |
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| .4076E+01 | .1676E+03 | .2724E+03 |
| .4099E+01 | .1681E+03 | .2707E+03 |
| .4123E+01 | .1663E+03 | .2649E+03 |
| .4146E+01 | .1670E+03 | .2602E+03 |
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| .5605E+01 | .1289E+03 | .2014E+03 |
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| .6184E+01 | .1007E+03 | .1630E+03 |
| .6208E+01 | .9898E+02 | .1615E+03 |
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| .6277E+01 | .9619E+02 | .1608E+03 |
| .6300E+01 | .9608E+02 | .1564E+03 |
| .6323E+01 | .9847E+02 | .1536E+03 |
| .6347E+01 | .9884E+02 | .1473E+03 |

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|-----------|-----------|-----------|
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| .6416E+01 | .9575E+02 | .1502E+03 |
| .6439E+01 | .9563E+02 | .1538E+03 |
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| .6856E+01 | .7980E+02 | .1195E+03 |
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| .6903E+01 | .7577E+02 | .1172E+03 |
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| .7134E+01 | .6944E+02 | .1154E+03 |
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| .7366E+01 | .5236E+02 | .1204E+03 |
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| .7459E+01 | .4866E+02 | .1210E+03 |
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| .7621E+01 | .4860E+02 | .1146E+03 |
| .7644E+01 | .4813E+02 | .1099E+03 |
| .7667E+01 | .4699E+02 | .1032E+03 |
| .7690E+01 | .4584E+02 | .9688E+02 |
| .7713E+01 | .4525E+02 | .9545E+02 |
| .7737E+01 | .4494E+02 | .9153E+02 |
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| .7806E+01 | .4483E+02 | .8695E+02 |
| .7829E+01 | .4433E+02 | .8571E+02 |
| .7852E+01 | .4395E+02 | .8490E+02 |
| .7876E+01 | .4377E+02 | .8457E+02 |

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| .7968E+01 | .4351E+02 | .8738E+02 |
| .7991E+01 | .4365E+02 | .8908E+02 |
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| .8038E+01 | .4388E+02 | .9122E+02 |
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| .8200E+01 | .3965E+02 | .9182E+02 |
| .8223E+01 | .3799E+02 | .8925E+02 |
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| .8362E+01 | .3427E+02 | .7225E+02 |
| .8385E+01 | .3496E+02 | .6725E+02 |
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| .1066E+02 | .2627E+02 | .3613E+02 |
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| .1079E+02 | .2748E+02 | .3133E+02 |
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| .1086E+02 | .2659E+02 | .3022E+02 |
| .1089E+02 | .2614E+02 | .3020E+02 |
| .1091E+02 | .2587E+02 | .2983E+02 |
| .1093E+02 | .2561E+02 | .2896E+02 |

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| .1114E+02 | .2462E+02 | .2602E+02 |
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| .1119E+02 | .2464E+02 | .2593E+02 |
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| .1123E+02 | .2466E+02 | .2609E+02 |
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| .1156E+02 | .2317E+02 | .2572E+02 |
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|           |           |           |
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| .1265E+02 | .1845E+02 | .1408E+02 |
| .1267E+02 | .1839E+02 | .1408E+02 |
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| .1318E+02 | .1413E+02 | .1402E+02 |
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| .1323E+02 | .1422E+02 | .1402E+02 |
| .1325E+02 | .1427E+02 | .1405E+02 |
| .1327E+02 | .1425E+02 | .1400E+02 |
| .1330E+02 | .1430E+02 | .1400E+02 |
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| .1381E+02 | .1267E+02 | .7958E+01 |
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| .1392E+02 | .1246E+02 | .7439E+01 |
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| .1397E+02 | .1238E+02 | .7228E+01 |
| .1399E+02 | .1239E+02 | .6867E+01 |

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|-----------|-----------|-----------|
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| .1406E+02 | .1232E+02 | .5529E+01 |
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| .1413E+02 | .1214E+02 | .5232E+01 |
| .1415E+02 | .1206E+02 | .5238E+01 |
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| .1529E+02 | .8663E+01 | .4253E+01 |
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| .1545E+02 | .8561E+01 | .4185E+01 |
| .1547E+02 | .8508E+01 | .4159E+01 |
| .1550E+02 | .8485E+01 | .4148E+01 |
| .1552E+02 | .8454E+01 | .4144E+01 |



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| .1568E+02 | .8191E+01 | .4111E+01 |
| .1571E+02 | .8153E+01 | .4087E+01 |
| .1573E+02 | .8131E+01 | .4077E+01 |
| .1575E+02 | .8107E+01 | .4062E+01 |
| .1578E+02 | .8072E+01 | .4045E+01 |
| .1580E+02 | .8035E+01 | .4025E+01 |
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| .1842E+02 | .3230E+01 | .3211E+01 |
| .1844E+02 | .3223E+01 | .3217E+01 |
| .1846E+02 | .3211E+01 | .3218E+01 |
| .1849E+02 | .3191E+01 | .3202E+01 |
| .1851E+02 | .3177E+01 | .3208E+01 |
| .1853E+02 | .3164E+01 | .3213E+01 |
| .1856E+02 | .3156E+01 | .3218E+01 |
| .1858E+02 | .3152E+01 | .3225E+01 |

|           |           |           |
|-----------|-----------|-----------|
| .1860E+02 | .3135E+01 | .3232E+01 |
| .1863E+02 | .3133E+01 | .3242E+01 |
| .1865E+02 | .3130E+01 | .3246E+01 |
| .1867E+02 | .3126E+01 | .3246E+01 |
| .1869E+02 | .3123E+01 | .3249E+01 |
| .1872E+02 | .3104E+01 | .3265E+01 |
| .1874E+02 | .3103E+01 | .3294E+01 |
| .1876E+02 | .3094E+01 | .3321E+01 |
| .1879E+02 | .3054E+01 | .3341E+01 |
| .1881E+02 | .2976E+01 | .3351E+01 |
| .1883E+02 | .2959E+01 | .3333E+01 |
| .1886E+02 | .2867E+01 | .3336E+01 |
| .1888E+02 | .2792E+01 | .3344E+01 |
| .1890E+02 | .2743E+01 | .3356E+01 |
| .1893E+02 | .2702E+01 | .3368E+01 |
| .1895E+02 | .2686E+01 | .3365E+01 |
| .1897E+02 | .2636E+01 | .3369E+01 |
| .1900E+02 | .2568E+01 | .3370E+01 |
| .1902E+02 | .2499E+01 | .3370E+01 |
| .1904E+02 | .2450E+01 | .3370E+01 |
| .1907E+02 | .2436E+01 | .3353E+01 |
| .1909E+02 | .2414E+01 | .3354E+01 |
| .1911E+02 | .2402E+01 | .3355E+01 |
| .1913E+02 | .2391E+01 | .3357E+01 |
| .1916E+02 | .2376E+01 | .3360E+01 |
| .1918E+02 | .2364E+01 | .3345E+01 |
| .1920E+02 | .2355E+01 | .3345E+01 |
| .1923E+02 | .2352E+01 | .3344E+01 |
| .1925E+02 | .2348E+01 | .3345E+01 |
| .1927E+02 | .2338E+01 | .3346E+01 |
| .1930E+02 | .2325E+01 | .3330E+01 |
| .1932E+02 | .2311E+01 | .3326E+01 |
| .1934E+02 | .2267E+01 | .3319E+01 |
| .1937E+02 | .2179E+01 | .3307E+01 |
| .1939E+02 | .2075E+01 | .3293E+01 |
| .1941E+02 | .2063E+01 | .3277E+01 |
| .1944E+02 | .1973E+01 | .3264E+01 |
| .1946E+02 | .1916E+01 | .3253E+01 |
| .1948E+02 | .1898E+01 | .3243E+01 |
| .1951E+02 | .1893E+01 | .3235E+01 |
| .1953E+02 | .1883E+01 | .3218E+01 |
| .1955E+02 | .1864E+01 | .3216E+01 |
| .1958E+02 | .1833E+01 | .3215E+01 |
| .1960E+02 | .1794E+01 | .3203E+01 |
| .1962E+02 | .1758E+01 | .3172E+01 |
| .1964E+02 | .1747E+01 | .3155E+01 |
| .1967E+02 | .1731E+01 | .3106E+01 |
| .1969E+02 | .1730E+01 | .3048E+01 |
| .1971E+02 | .1726E+01 | .2990E+01 |
| .1974E+02 | .1705E+01 | .2941E+01 |
| .1976E+02 | .1698E+01 | .2926E+01 |
| .1978E+02 | .1639E+01 | .2892E+01 |
| .1981E+02 | .1543E+01 | .2878E+01 |
| .1983E+02 | .1454E+01 | .2877E+01 |
| .1985E+02 | .1397E+01 | .2870E+01 |
| .1988E+02 | .1390E+01 | .2854E+01 |
| .1990E+02 | .1349E+01 | .2832E+01 |
| .1992E+02 | .1315E+01 | .2806E+01 |
| .1995E+02 | .1279E+01 | .2790E+01 |
| .1997E+02 | .1242E+01 | .2785E+01 |
| .1999E+02 | .1236E+01 | .2770E+01 |
| .2002E+02 | .1214E+01 | .2772E+01 |
| .2004E+02 | .1205E+01 | .2762E+01 |
| .2006E+02 | .1205E+01 | .2741E+01 |
| .2008E+02 | .1206E+01 | .2713E+01 |
| .2011E+02 | .1206E+01 | .2713E+01 |

|           |           |           |
|-----------|-----------|-----------|
| .2013E+02 | .1192E+01 | .2684E+01 |
| .2015E+02 | .1159E+01 | .2660E+01 |
| .2018E+02 | .1120E+01 | .2644E+01 |
| .2020E+02 | .1084E+01 | .2640E+01 |
| .2022E+02 | .1084E+01 | .2640E+01 |
| .2025E+02 | .1055E+01 | .2643E+01 |
| .2027E+02 | .1044E+01 | .2651E+01 |
| .2029E+02 | .1044E+01 | .2658E+01 |
| .2032E+02 | .1046E+01 | .2662E+01 |
| .2034E+02 | .1046E+01 | .2662E+01 |
| .2036E+02 | .1047E+01 | .2664E+01 |
| .2039E+02 | .1049E+01 | .2664E+01 |
| .2041E+02 | .1047E+01 | .2663E+01 |
| .2043E+02 | .1040E+01 | .2663E+01 |
| .2046E+02 | .1040E+01 | .2663E+01 |
| .2048E+02 | .1032E+01 | .2665E+01 |
| .2050E+02 | .1026E+01 | .2667E+01 |
| .2052E+02 | .1028E+01 | .2671E+01 |
| .2055E+02 | .1031E+01 | .2675E+01 |
| .2057E+02 | .1031E+01 | .2675E+01 |
| .2059E+02 | .1034E+01 | .2680E+01 |
| .2062E+02 | .1036E+01 | .2685E+01 |
| .2064E+02 | .1038E+01 | .2691E+01 |
| .2066E+02 | .1038E+01 | .2697E+01 |
| .2069E+02 | .1038E+01 | .2697E+01 |
| .2071E+02 | .1038E+01 | .2703E+01 |
| .2073E+02 | .1036E+01 | .2709E+01 |
| .2076E+02 | .1036E+01 | .2715E+01 |
| .2078E+02 | .1038E+01 | .2721E+01 |
| .2080E+02 | .1038E+01 | .2721E+01 |
| .2083E+02 | .1039E+01 | .2729E+01 |
| .2085E+02 | .1041E+01 | .2737E+01 |
| .2087E+02 | .1044E+01 | .2744E+01 |
| .2090E+02 | .1043E+01 | .2749E+01 |
| .2092E+02 | .1043E+01 | .2749E+01 |
| .2094E+02 | .1039E+01 | .2754E+01 |
| .2097E+02 | .1031E+01 | .2758E+01 |
| .2099E+02 | .1021E+01 | .2761E+01 |
| .2101E+02 | .1015E+01 | .2765E+01 |
| .2103E+02 | .1015E+01 | .2765E+01 |
| .2106E+02 | .1015E+01 | .2771E+01 |
| .2108E+02 | .1014E+01 | .2780E+01 |
| .2110E+02 | .1013E+01 | .2788E+01 |
| .2113E+02 | .1012E+01 | .2795E+01 |
| .2115E+02 | .1012E+01 | .2795E+01 |
| .2117E+02 | .1011E+01 | .2801E+01 |
| .2120E+02 | .1006E+01 | .2808E+01 |
| .2122E+02 | .9955E+00 | .2816E+01 |
| .2124E+02 | .9863E+00 | .2819E+01 |
| .2127E+02 | .9863E+00 | .2819E+01 |
| .2129E+02 | .9803E+00 | .2807E+01 |
| .2131E+02 | .9688E+00 | .2777E+01 |
| .2134E+02 | .9533E+00 | .2726E+01 |
| .2136E+02 | .9456E+00 | .2661E+01 |
| .2138E+02 | .9456E+00 | .2661E+01 |
| .2141E+02 | .9465E+00 | .2591E+01 |
| .2143E+02 | .9487E+00 | .2527E+01 |
| .2145E+02 | .9502E+00 | .2478E+01 |
| .2147E+02 | .9511E+00 | .2449E+01 |
| .2150E+02 | .9511E+00 | .2449E+01 |
| .2152E+02 | .9503E+00 | .2437E+01 |
| .2154E+02 | .9460E+00 | .2432E+01 |
| .2157E+02 | .9373E+00 | .2421E+01 |
| .2159E+02 | .9260E+00 | .2396E+01 |
| .2161E+02 | .9260E+00 | .2396E+01 |
| .2164E+02 | .9147E+00 | .2361E+01 |

|           |           |           |
|-----------|-----------|-----------|
| .2166E+02 | .9054E+00 | .2332E+01 |
| .2168E+02 | .9001E+00 | .2321E+01 |
| .2171E+02 | .8966E+00 | .2324E+01 |
| .2173E+02 | .8966E+00 | .2324E+01 |
| .2175E+02 | .8904E+00 | .2330E+01 |
| .2178E+02 | .8820E+00 | .2332E+01 |
| .2180E+02 | .8741E+00 | .2334E+01 |
| .2182E+02 | .8682E+00 | .2338E+01 |
| .2185E+02 | .8682E+00 | .2338E+01 |
| .2187E+02 | .8667E+00 | .2341E+01 |
| .2189E+02 | .8695E+00 | .2335E+01 |
| .2191E+02 | .8709E+00 | .2321E+01 |
| .2194E+02 | .8671E+00 | .2305E+01 |
| .2196E+02 | .8671E+00 | .2305E+01 |
| .2198E+02 | .8604E+00 | .2295E+01 |
| .2201E+02 | .8535E+00 | .2295E+01 |
| .2203E+02 | .8480E+00 | .2301E+01 |
| .2205E+02 | .8449E+00 | .2306E+01 |
| .2208E+02 | .8449E+00 | .2306E+01 |
| .2210E+02 | .8442E+00 | .2308E+01 |
| .2212E+02 | .8437E+00 | .2306E+01 |
| .2215E+02 | .8430E+00 | .2303E+01 |
| .2217E+02 | .8430E+00 | .2304E+01 |
| .2219E+02 | .8430E+00 | .2304E+01 |
| .2222E+02 | .8438E+00 | .2309E+01 |
| .2224E+02 | .8454E+00 | .2318E+01 |
| .2226E+02 | .8484E+00 | .2326E+01 |
| .2229E+02 | .8502E+00 | .2331E+01 |
| .2231E+02 | .8502E+00 | .2331E+01 |
| .2233E+02 | .8469E+00 | .2333E+01 |
| .2236E+02 | .8382E+00 | .2335E+01 |
| .2238E+02 | .8303E+00 | .2337E+01 |
| .2240E+02 | .8291E+00 | .2342E+01 |
| .2242E+02 | .8291E+00 | .2342E+01 |
| .2245E+02 | .8322E+00 | .2349E+01 |
| .2247E+02 | .8342E+00 | .2357E+01 |
| .2249E+02 | .8352E+00 | .2366E+01 |
| .2252E+02 | .8351E+00 | .2373E+01 |
| .2254E+02 | .8351E+00 | .2373E+01 |
| .2256E+02 | .8336E+00 | .2379E+01 |
| .2259E+02 | .8341E+00 | .2386E+01 |
| .2261E+02 | .8357E+00 | .2395E+01 |
| .2263E+02 | .8358E+00 | .2404E+01 |
| .2266E+02 | .8358E+00 | .2404E+01 |
| .2268E+02 | .8365E+00 | .2413E+01 |
| .2270E+02 | .8383E+00 | .2421E+01 |
| .2273E+02 | .8382E+00 | .2428E+01 |
| .2275E+02 | .8350E+00 | .2435E+01 |
| .2277E+02 | .8350E+00 | .2435E+01 |
| .2280E+02 | .8255E+00 | .2442E+01 |
| .2282E+02 | .8116E+00 | .2448E+01 |
| .2284E+02 | .8057E+00 | .2454E+01 |
| .2286E+02 | .8083E+00 | .2460E+01 |
| .2289E+02 | .8083E+00 | .2460E+01 |
| .2291E+02 | .8056E+00 | .2465E+01 |
| .2293E+02 | .7953E+00 | .2471E+01 |
| .2296E+02 | .7839E+00 | .2476E+01 |
| .2298E+02 | .7728E+00 | .2482E+01 |
| .2300E+02 | .7728E+00 | .2482E+01 |
| .2303E+02 | .7647E+00 | .2489E+01 |
| .2305E+02 | .7625E+00 | .2496E+01 |
| .2307E+02 | .7600E+00 | .2503E+01 |
| .2310E+02 | .7527E+00 | .2511E+01 |
| .2312E+02 | .7527E+00 | .2511E+01 |
| .2314E+02 | .7461E+00 | .2519E+01 |
| .2317E+02 | .7449E+00 | .2526E+01 |

|           |           |           |
|-----------|-----------|-----------|
| .2319E+02 | .7452E+00 | .2533E+01 |
| .2321E+02 | .7428E+00 | .2540E+01 |
| .2324E+02 | .7428E+00 | .2540E+01 |
| .2326E+02 | .7395E+00 | .2549E+01 |
| .2328E+02 | .7377E+00 | .2559E+01 |
| .2330E+02 | .7363E+00 | .2568E+01 |
| .2333E+02 | .7355E+00 | .2577E+01 |
| .2335E+02 | .7355E+00 | .2577E+01 |
| .2337E+02 | .7377E+00 | .2586E+01 |
| .2340E+02 | .7406E+00 | .2593E+01 |
| .2342E+02 | .7411E+00 | .2600E+01 |
| .2344E+02 | .7417E+00 | .2608E+01 |
| .2347E+02 | .7417E+00 | .2608E+01 |
| .2349E+02 | .7419E+00 | .2617E+01 |
| .2351E+02 | .7341E+00 | .2626E+01 |
| .2354E+02 | .7192E+00 | .2635E+01 |
| .2356E+02 | .7066E+00 | .2642E+01 |
| .2358E+02 | .7066E+00 | .2642E+01 |
| .2361E+02 | .6989E+00 | .2650E+01 |
| .2363E+02 | .6924E+00 | .2661E+01 |
| .2365E+02 | .6867E+00 | .2673E+01 |
| .2368E+02 | .6796E+00 | .2682E+01 |
| .2370E+02 | .6796E+00 | .2682E+01 |
| .2372E+02 | .6722E+00 | .2689E+01 |
| .2375E+02 | .6699E+00 | .2694E+01 |
| .2377E+02 | .6694E+00 | .2700E+01 |
| .2379E+02 | .6659E+00 | .2705E+01 |
| .2381E+02 | .6659E+00 | .2705E+01 |
| .2384E+02 | .6646E+00 | .2705E+01 |
| .2386E+02 | .6672E+00 | .2701E+01 |
| .2388E+02 | .6691E+00 | .2694E+01 |
| .2391E+02 | .6716E+00 | .2688E+01 |
| .2393E+02 | .6716E+00 | .2688E+01 |
| .2395E+02 | .6733E+00 | .2687E+01 |
| .2398E+02 | .6707E+00 | .2693E+01 |
| .2400E+02 | .6684E+00 | .2706E+01 |

# PSD Function for Component 3 (Vertical)

Frequency Smooth PSD

|           |           |
|-----------|-----------|
| .2441E-01 | .6586E+00 |
| .4880E-01 | .8087E+00 |
| .7319E-01 | .5273E+00 |
| .9758E-01 | .4777E+00 |
| .1220E+00 | .9086E+00 |
| .1464E+00 | .2309E+01 |
| .1708E+00 | .3783E+01 |
| .1951E+00 | .3859E+01 |
| .2195E+00 | .5195E+01 |
| .2439E+00 | .4984E+01 |
| .2683E+00 | .4042E+01 |
| .2927E+00 | .4790E+01 |
| .3171E+00 | .4701E+01 |
| .3415E+00 | .4154E+01 |
| .3659E+00 | .3280E+01 |
| .3903E+00 | .2843E+01 |
| .4147E+00 | .3024E+01 |
| .4390E+00 | .3763E+01 |
| .4634E+00 | .3228E+01 |
| .4878E+00 | .2676E+01 |
| .5122E+00 | .3360E+01 |
| .5366E+00 | .4268E+01 |
| .5610E+00 | .4511E+01 |
| .5854E+00 | .4359E+01 |
| .6098E+00 | .4842E+01 |
| .6342E+00 | .5934E+01 |
| .6586E+00 | .6554E+01 |
| .6829E+00 | .6282E+01 |
| .7073E+00 | .6767E+01 |
| .7317E+00 | .8493E+01 |
| .7561E+00 | .1033E+02 |
| .7805E+00 | .1056E+02 |
| .8049E+00 | .1285E+02 |
| .8293E+00 | .1514E+02 |
| .8537E+00 | .1512E+02 |
| .8781E+00 | .1584E+02 |
| .9025E+00 | .1903E+02 |
| .9268E+00 | .1933E+02 |
| .9512E+00 | .1926E+02 |
| .9756E+00 | .1903E+02 |
| .1000E+01 | .1870E+02 |
| .1024E+01 | .1855E+02 |
| .1049E+01 | .1698E+02 |
| .1073E+01 | .1718E+02 |
| .1098E+01 | .1709E+02 |
| .1122E+01 | .1753E+02 |
| .1146E+01 | .1829E+02 |
| .1171E+01 | .1776E+02 |
| .1195E+01 | .1797E+02 |
| .1220E+01 | .1850E+02 |
| .1244E+01 | .1750E+02 |
| .1268E+01 | .1654E+02 |
| .1293E+01 | .1832E+02 |
| .1317E+01 | .1936E+02 |
| .1341E+01 | .1942E+02 |
| .1366E+01 | .1765E+02 |
| .1390E+01 | .1638E+02 |
| .1415E+01 | .1578E+02 |
| .1439E+01 | .1584E+02 |
| .1463E+01 | .1580E+02 |
| .1488E+01 | .1546E+02 |
| .1512E+01 | .1525E+02 |
| .1537E+01 | .1438E+02 |
| .1561E+01 | .1433E+02 |

FINISH  
PSD 10.



|           |           |
|-----------|-----------|
| .1585E+01 | .1437E+02 |
| .1610E+01 | .1429E+02 |
| .1634E+01 | .1433E+02 |
| .1659E+01 | .1379E+02 |
| .1683E+01 | .1381E+02 |
| .1707E+01 | .1341E+02 |
| .1732E+01 | .1242E+02 |
| .1756E+01 | .1178E+02 |
| .1781E+01 | .1451E+02 |
| .1805E+01 | .1736E+02 |
| .1829E+01 | .1860E+02 |
| .1854E+01 | .1823E+02 |
| .1878E+01 | .1751E+02 |
| .1902E+01 | .1665E+02 |
| .1927E+01 | .1591E+02 |
| .1951E+01 | .1491E+02 |
| .1976E+01 | .1380E+02 |
| .2000E+01 | .1304E+02 |
| .2024E+01 | .1244E+02 |
| .2049E+01 | .1204E+02 |
| .2073E+01 | .1184E+02 |
| .2098E+01 | .1165E+02 |
| .2122E+01 | .1145E+02 |
| .2146E+01 | .1181E+02 |
| .2171E+01 | .1304E+02 |
| .2195E+01 | .1442E+02 |
| .2220E+01 | .1566E+02 |
| .2244E+01 | .1715E+02 |
| .2268E+01 | .1974E+02 |
| .2293E+01 | .2026E+02 |
| .2317E+01 | .2015E+02 |
| .2341E+01 | .2053E+02 |
| .2366E+01 | .2142E+02 |
| .2390E+01 | .2138E+02 |
| .2415E+01 | .2149E+02 |
| .2439E+01 | .2152E+02 |
| .2463E+01 | .2142E+02 |
| .2488E+01 | .2154E+02 |
| .2512E+01 | .2524E+02 |
| .2537E+01 | .2881E+02 |
| .2561E+01 | .3058E+02 |
| .2585E+01 | .3047E+02 |
| .2610E+01 | .3049E+02 |
| .2634E+01 | .3110E+02 |
| .2659E+01 | .3178E+02 |
| .2683E+01 | .3139E+02 |
| .2707E+01 | .2962E+02 |
| .2732E+01 | .2756E+02 |
| .2756E+01 | .2657E+02 |
| .2781E+01 | .2605E+02 |
| .2805E+01 | .2694E+02 |
| .2829E+01 | .2914E+02 |
| .2854E+01 | .3321E+02 |
| .2878E+01 | .3937E+02 |
| .2902E+01 | .3992E+02 |
| .2927E+01 | .4007E+02 |
| .2951E+01 | .4079E+02 |
| .2976E+01 | .4176E+02 |
| .3000E+01 | .4146E+02 |
| .3024E+01 | .4147E+02 |
| .3049E+01 | .4143E+02 |
| .3073E+01 | .4145E+02 |
| .3098E+01 | .4145E+02 |
| .3122E+01 | .4035E+02 |
| .3146E+01 | .4078E+02 |
| .3171E+01 | .4122E+02 |

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|-----------|-----------|
| .3195E+01 | .4161E+02 |
| .3220E+01 | .4179E+02 |
| .3244E+01 | .4043E+02 |
| .3268E+01 | .3990E+02 |
| .3293E+01 | .3891E+02 |
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| .1495E+02 | .3909E+01 |
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.1924E+02 .1793E+01  
.1927E+02 .1787E+01

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| .1934E+02 | .1764E+01 |
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| .2039E+02 | .1509E+01 |
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| .2054E+02 | .1483E+01 |
| .2056E+02 | .1474E+01 |
| .2059E+02 | .1465E+01 |
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| .2071E+02 | .1421E+01 |
| .2073E+02 | .1415E+01 |
| .2076E+02 | .1403E+01 |
| .2078E+02 | .1393E+01 |
| .2080E+02 | .1385E+01 |
| .2083E+02 | .1378E+01 |
| .2085E+02 | .1370E+01 |
| .2088E+02 | .1359E+01 |

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| .2093E+02 | .1358E+01 |
| .2095E+02 | .1357E+01 |
| .2098E+02 | .1342E+01 |
| .2100E+02 | .1322E+01 |
| .2102E+02 | .1303E+01 |
| .2105E+02 | .1303E+01 |
| .2107E+02 | .1278E+01 |
| .2110E+02 | .1254E+01 |
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| .2146E+02 | .1004E+01 |
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| .2156E+02 | .9550E+00 |
| .2159E+02 | .9492E+00 |
| .2161E+02 | .9397E+00 |
| .2163E+02 | .9258E+00 |
| .2166E+02 | .9258E+00 |
| .2168E+02 | .9137E+00 |
| .2171E+02 | .9053E+00 |
| .2173E+02 | .8991E+00 |
| .2176E+02 | .8933E+00 |
| .2178E+02 | .8933E+00 |
| .2180E+02 | .8883E+00 |
| .2183E+02 | .8847E+00 |
| .2185E+02 | .8827E+00 |
| .2188E+02 | .8812E+00 |
| .2190E+02 | .8812E+00 |
| .2193E+02 | .8796E+00 |
| .2195E+02 | .8781E+00 |
| .2198E+02 | .8772E+00 |
| .2200E+02 | .8772E+00 |
| .2202E+02 | .8772E+00 |
| .2205E+02 | .8771E+00 |
| .2207E+02 | .8767E+00 |
| .2210E+02 | .8763E+00 |
| .2212E+02 | .8764E+00 |
| .2215E+02 | .8764E+00 |
| .2217E+02 | .8768E+00 |
| .2220E+02 | .8768E+00 |
| .2222E+02 | .8760E+00 |
| .2224E+02 | .8749E+00 |
| .2227E+02 | .8749E+00 |
| .2229E+02 | .8753E+00 |
| .2232E+02 | .8774E+00 |
| .2234E+02 | .8785E+00 |
| .2237E+02 | .8778E+00 |
| .2239E+02 | .8778E+00 |
| .2241E+02 | .8776E+00 |
| .2244E+02 | .8784E+00 |
| .2246E+02 | .8785E+00 |
| .2249E+02 | .8789E+00 |

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.2254E+02 .8810E+00  
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.2402E+02 .8859E+00  
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.2407E+02 .8903E+00  
.2410E+02 .8903E+00



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|-----------|-----------|
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| .2415E+02 | .8850E+00 |
| .2417E+02 | .8826E+00 |
| .2420E+02 | .8797E+00 |
| .2422E+02 | .8797E+00 |
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| .2434E+02 | .8762E+00 |
| .2437E+02 | .8730E+00 |
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| .2493E+02 | .7288E+00 |
| .2495E+02 | .7288E+00 |
| .2498E+02 | .7111E+00 |
| .2500E+02 | .6894E+00 |

| Frequency | Component  |            |            |
|-----------|------------|------------|------------|
|           | 1          | 2          | 3          |
| 0.200     | .13754E-01 | .13566E-01 | .45348E-02 |
| 0.220     | .14823E-01 | .16121E-01 | .41304E-02 |
| 0.242     | .15856E-01 | .17827E-01 | .57051E-02 |
| 0.266     | .22648E-01 | .18423E-01 | .90037E-02 |
| 0.293     | .21645E-01 | .22821E-01 | .82982E-02 |
| 0.322     | .20630E-01 | .25608E-01 | .89459E-02 |
| 0.354     | .23627E-01 | .28258E-01 | .10997E-01 |
| 0.389     | .25849E-01 | .27062E-01 | .10897E-01 |
| 0.428     | .29765E-01 | .27246E-01 | .12579E-01 |
| 0.471     | .33246E-01 | .27968E-01 | .13946E-01 |
| 0.518     | .38999E-01 | .39224E-01 | .15404E-01 |
| 0.569     | .41852E-01 | .49403E-01 | .17049E-01 |
| 0.626     | .47316E-01 | .50205E-01 | .20146E-01 |
| 0.689     | .60551E-01 | .71046E-01 | .25810E-01 |
| 0.757     | .77734E-01 | .76119E-01 | .29520E-01 |
| 0.833     | .85914E-01 | .84240E-01 | .38265E-01 |
| 0.916     | .90852E-01 | .97767E-01 | .47258E-01 |
| 1.007     | .11293E+00 | .11469E+00 | .57535E-01 |
| 1.108     | .13325E+00 | .13531E+00 | .62756E-01 |
| 1.218     | .14982E+00 | .15368E+00 | .61608E-01 |
| 1.340     | .17119E+00 | .18227E+00 | .65252E-01 |
| 1.474     | .18871E+00 | .19580E+00 | .75870E-01 |
| 1.621     | .21136E+00 | .22477E+00 | .71552E-01 |
| 1.783     | .23569E+00 | .25508E+00 | .69490E-01 |
| 1.960     | .27120E+00 | .27715E+00 | .73208E-01 |
| 2.156     | .29061E+00 | .29716E+00 | .85847E-01 |
| 2.371     | .29404E+00 | .30838E+00 | .10819E+00 |
| 2.608     | .32100E+00 | .32238E+00 | .12086E+00 |
| 2.868     | .35208E+00 | .38397E+00 | .13231E+00 |
| 3.154     | .37250E+00 | .40376E+00 | .15266E+00 |
| 3.469     | .42931E+00 | .45718E+00 | .15526E+00 |
| 3.815     | .44414E+00 | .46474E+00 | .15987E+00 |
| 4.195     | .46086E+00 | .47745E+00 | .16816E+00 |
| 4.614     | .46016E+00 | .48234E+00 | .16966E+00 |
| 5.074     | .51062E+00 | .50663E+00 | .19439E+00 |
| 5.581     | .49622E+00 | .48519E+00 | .18448E+00 |
| 6.138     | .47409E+00 | .47840E+00 | .20333E+00 |
| 6.750     | .44412E+00 | .48069E+00 | .21343E+00 |
| 7.423     | .42195E+00 | .42913E+00 | .24071E+00 |
| 8.164     | .41048E+00 | .41730E+00 | .26366E+00 |
| 8.979     | .39680E+00 | .38943E+00 | .24314E+00 |
| 9.875     | .37152E+00 | .39230E+00 | .22388E+00 |
| 10.860    | .36038E+00 | .36969E+00 | .20404E+00 |
| 11.943    | .33129E+00 | .34393E+00 | .18521E+00 |
| 13.135    | .29241E+00 | .31408E+00 | .18533E+00 |
| 14.446    | .27800E+00 | .30326E+00 | .17800E+00 |
| 15.887    | .25035E+00 | .27260E+00 | .16396E+00 |
| 17.472    | .24465E+00 | .26244E+00 | .15808E+00 |
| 19.215    | .24083E+00 | .24891E+00 | .14759E+00 |
| 21.133    | .22212E+00 | .23665E+00 | .14408E+00 |
| 23.241    | .21846E+00 | .23354E+00 | .13769E+00 |
| 25.560    | .20824E+00 | .21840E+00 | .13952E+00 |
| 28.111    | .19300E+00 | .21450E+00 | .13021E+00 |
| 30.915    | .18785E+00 | .21559E+00 | .12614E+00 |
| 34.000    | .19528E+00 | .20679E+00 | .12247E+00 |

FINAL X

FINAL Y