

**DR. CARL J. COSTANTINO, P.E.
ENGINEERING CONSULTANT**

**4 Rockingham Road
Spring Valley, New York 10977**

Voice: (845) 354-2602

Fax: (845) 362-8161

c-mail: carl@cjassoc.com

16 July, 2006

To: Dr. Thomas Cheng, NRC

Re: Development of SASSI Models for GE ESBWR:
Comparison of the Stick Model given in "Revised Control Building Stick Model"
(SER-ESB-024) with SASSI HOUSE file '02.cb_1x2.sas'

Tom,

Before completing our development of the Control Building SASSI Model, we performed a quick comparison of previously provided stick models with those noted in SASSI house file. Some comments and questions on these models follow below. It would help us a great deal if GE staff could review our questions and respond as quickly as possible. Similar questions will follow later after we review the much large reactor building model. Throughout this document, italics indicate data taken from the report referenced in the title, and regular font indicates data taken from the SASSI house file.

- As shown in Table 1, the joint elevations between the SASSI house file and the report don't match up exactly. Is there a reason for these discrepancies?

Nodal Z values	
SASSI house	<i>Report</i>
-10.4	<i>-10.4</i>
-7.4	<i>-7.4</i>
	<i>-4.7</i>
-2	<i>-2</i>
	<i>1.35</i>
4.5	
4.65	<i>4.65</i>
	<i>6.855</i>
9.06	<i>9.06</i>

Table 1

MATERIAL PROPERTIES

Table 2, compares the Young's Modulus, E, given in the SASSI house file with the Young's Modulus given in the report. The units given in the report are kN/m², while the house file has gravity specified as 9.810.

- What is the correct young modulus, and what are the units for the numbers given?
- Why is the stiffness of the stick representing the facility floor in the house file out of proportion to that of the report?

Elevation			Elevation		
node1	node2	E (SASSI)	Node1	node2	E (report)
-10.4	-7.4	2.83E+06	-10.4	-7.4	2.49E+07
-7.4	-2	2.83E+06	-7.4	-4.7	2.79E+07
			-4.7	-2	2.79E+07
-2	4.5	2.83E+06	-2	1.35	2.79E+07
			1.35	4.65	2.79E+07
4.5	4.65	2.83E+06			
4.65	9.06	2.83E+06	4.65	6.855	2.79E+07
			6.855	9.06	2.79E+07

Table 2

LOCATION OF SHEAR BEAMS, AXIAL BEAMS, AND LUMPED MASSES

The horizontal X and Y locations for the axial beams, when shifted by an amount such that the locations of the lumped masses and center of gravity align, are very close to location of the centroid for every level. However, as shown in Table 3, they don't match exactly.

- Are the axial beams intended to correspond exactly to the location of the centroid?
- If not, what do they correspond to, and if so, what is the reasoning behind the differences in location between the centroid and the axial beam, in both X and Y?

					Assumed coordinate mapping values					
AXIAL BEAMS					X=-8.80	Y=-59.15	Centroid			
Beam	X	Y	Z1	Z2			X	Y	Z-1	Z-2
6	23.5	70.6	-10.4	-7.4	14.7	11.45	14.7	11.45	-10.4	-7.4
							14.76	11.45	-7.4	-4.7
7	23.5	70.6	-7.4	-2	14.7	11.45	14.76	11.48	-4.7	-2
8	23.5	70.6	-2	4.5	14.7	11.45	14.8	11.48	-2	1.325
9	23.5	70.6	4.5	4.65	14.7	11.45	14.8	11.45	1.325	4.65
							14.89	11.45	4.65	6.855
10	23.69	70.6	4.65	9.06	14.89	11.45	14.89	11.45	6.855	9.06

Table 3

GEOMETRIC PROPERTIES

The geometric properties of the SASSI house file match with the data given in Table B-1 of the report. Beams 4 and 9 do not exist in the report, and based on the beams' elevations their properties do not correspond to those given in the report.

- Why do the geometric properties for beams 4 and 9 match the geometric properties for the beam above, rather than the beam below, as would match the properties given in the report?

Beam	axial area	shear 2	shear3	Torsion	bending2	Bending3	
1	1	721.14	721.14	9.85E+04	3.40E+04	5.52E+04	OK
2	1	1	19.8	1	4.53E+03	1	OK
3	1	1	1	1	1	1	OK
4	1	39.47	31.06	1.21E+04	3.20E+03	5.84E+03	
5	1	39.47	31.06	1.21E+04	3.20E+03	5.84E+03	OK
6	721.14	1	1	1	1	1	OK
7	19.8	1	1	1	1	1	OK
8	1	1	1	1	1	1	OK
9	68.57	1	1	1	1	1	
10	68.57	1	1	1	1	1	OK

Table 4

LUMPED MASS VALUES

The data given in italics in Table 5 has been converted into Newtons. The lumped masses in the house file appear to be input as weights.

- What is the source of the differences between these values?
- What are the correct units used in the house file?

X	Y	Z	Tran X (N)	Tran Y (N)	Tran Z (N)	Rot XX (Nm2)	Rot YY (Nm2)	Rot ZZ (Nm2)
			<i>Tran X (N)</i>	<i>Tran Y (N)</i>	<i>Tran Z (N)</i>	<i>Rot XX (Nm2)</i>	<i>Rot YY (Nm2)</i>	<i>Rot ZZ (Nm2)</i>
23.36	70.37	-10.4	0	0	0	0	0	0
For fixed base, mass will not effect movement of building								
23.44	70.41	-7.4	4.26E+02	4.26E+02	4.26E+02	2.90E+04	4.70E+04	7.50E+04
			3.38E+08	3.38E+08	3.38E+08	1.63E+06	2.62E+06	4.20E+06
23.22	69.98	-2	2.05E+03	2.05E+03	2.05E+03	9.70E+04	1.57E+05	2.55E+05
			1.97E+08	1.97E+08	1.97E+08	9.50E+05	1.54E+06	2.50E+06
23.31	70.16	4.65	2.85E+03	2.85E+03	2.85E+03	1.54E+05	2.43E+05	3.96E+05
			2.47E+08	2.47E+08	2.47E+08	1.51E+06	2.38E+06	3.88E+06
23.42	70.47	9.06	3.71E+03	3.71E+03	2.57E+03	1.94E+05	3.09E+05	5.02E+05
			2.21E+08	2.21E+08	2.21E+08	1.91E+06	3.03E+06	4.92E+06

Table 5