Radwaste Building Seismic Analysis

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1.0 Introduction

The radwaste building is of reinforced concrete construction. It has 4 levels, two above grade and two below (see figures 1 through 5). A reinforced concrete frame is used to support dead load and live loads. Exterior shear walls are used to resist lateral loads like earth pressure, wind, and seismic loads. That portion of the exterior walls below grade, and the basemat shall be designed as a category 1 structure. The portion above grade is nonseismic.

2.0 Description of Analytical Model and Analysis Method

Since there are no category 1 equipment contained inside the radwaste building, No response spectra are required. The response spectrum method was used to determine the seismic response of the structure. For this analysis, Reg Guide 1.60 Response Spectrum normalized to 0.3g for 4% critical damping was used as input. A fixed base analysis neglecting embedment was performed. The results are presented in section 3.

The radwaste building major structural elements (shear walls and columns) are shown in figures 1 through 5.

The model for the seismic analysis is a simple stick model. One mass point is provided for each level of the stucture (see figure 6).

The computed natural frequencies of radwaste building are shown in table 1.

3.0 Analytical Results

The vertical forces, shear forces, and overturning moments vs height of the building are shown in table 2.

These results are considered conservative for the walls below grade. Since the actual building lower two floors are restrained by soil. This restraint will reduce the seismic loads on the lower 2 floors compared to a surface founded building.

Table 1 Radwaste Building Natural Frequencies

MODE NO.	CYCLES (hz)	Direction
1	4.60	X
2	5.57	Y
3	8.94	X
4	10.93	Y
5	11.23	Z
6	17.09	X
7	20.91	Y
8	21.64	Z
9	30.50	X

Table 2 SSE Seismic Forces, and Moments

Element	Axial (t)	X-Shear (t)	X-Moment (t-m)	Y-Shear (t)	Y-Moment (t-m)
1	8,034.	12,924.	227,618.	9,638.	206,142.
2	8,638.	12,760.	161,882.	10,242.	149,032.
3	7,222.	11,058.	99,280.	8,604.	77,250.
4	278.	440.	3,074.	344.	2,402.

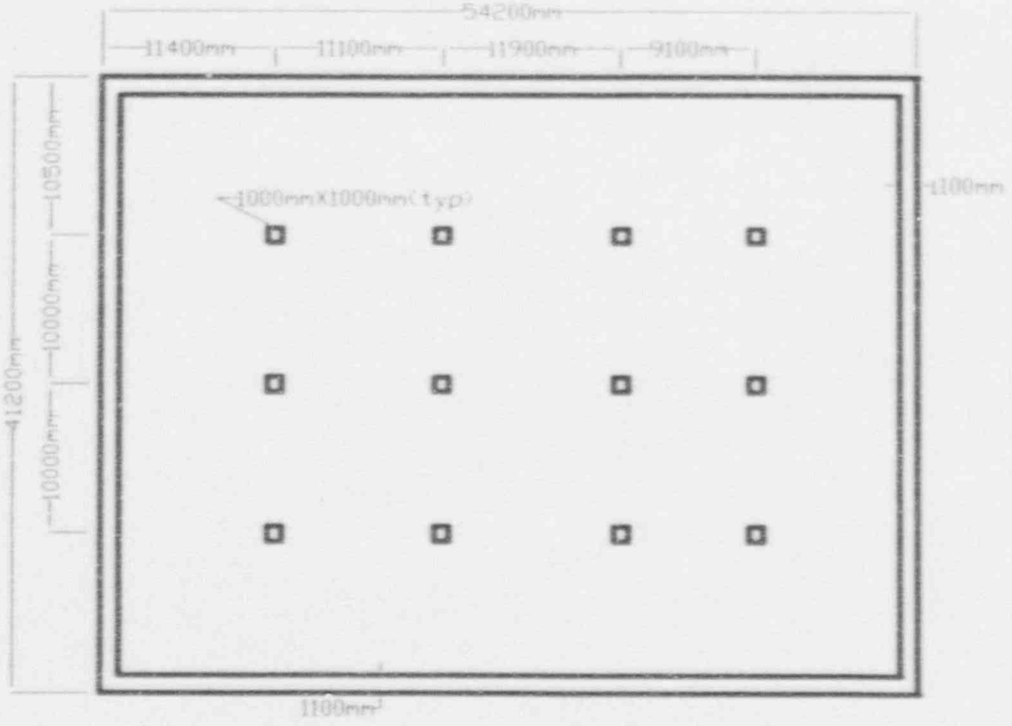
Figure 1 ABWR Radwaste Building Structure Design Drawing Plan

Elev. −6.500 TMSL

Notes: 1. All columns are 1000mmX1000mm typical except where noted
2. Slab thickness is 2500mm typical except where noted

Figure 2 ABWR Radwaste Building Structure Design Drawing Plan

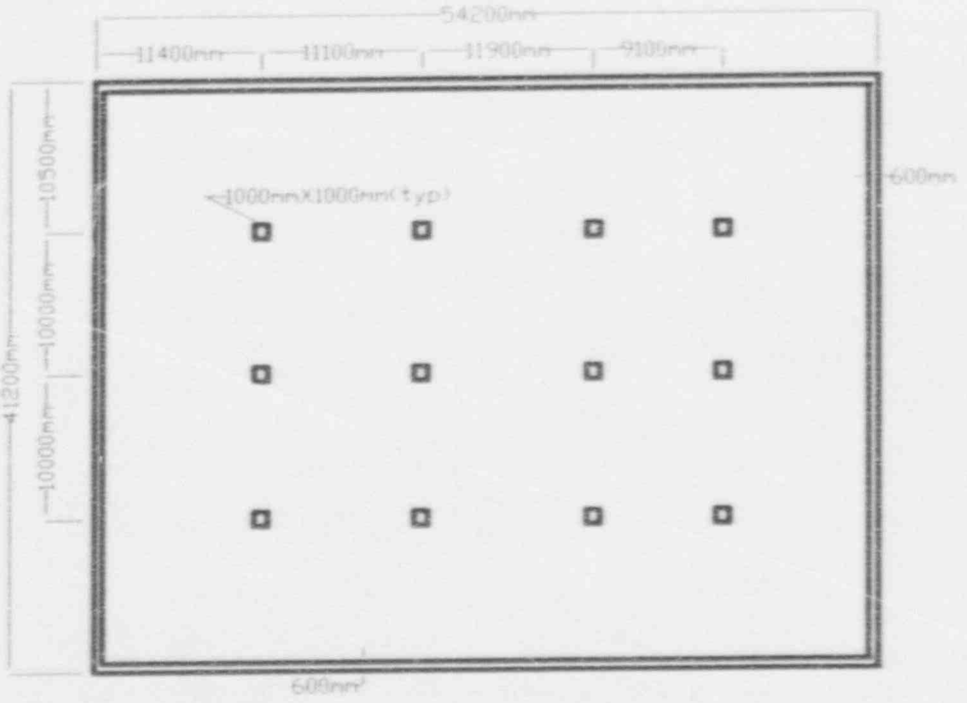
Elev. −0.200 TMSL



Notes: 1. All columns are 1000mmX1000mm typical except where noted
2. Slab thickness is 800mm typical except where noted

Figure 4 ABWR Radwaste Building Structure Design Drawing Plan

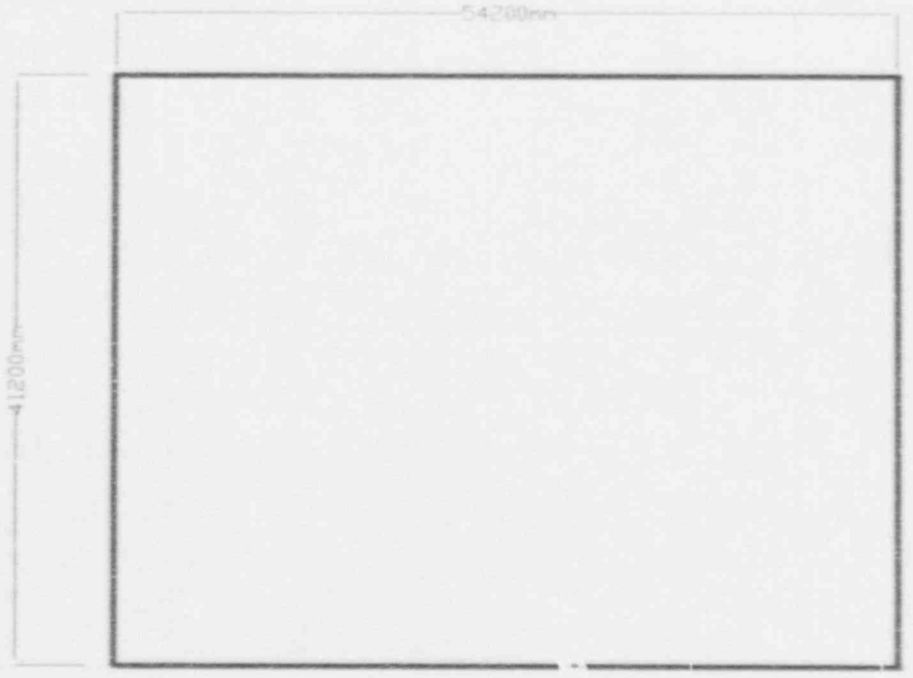
Elev. 16.000 TMSL



Notes: 1. All columns are 1000mmX1000mm typical except where noted
2. Slab thickness is 800mm typical except where noted

Figure 5 ABWR Radwaste Building Structure Design Drawing Plan

Elev. 23.000 TMSL



Note: 1 Roof thickness is 500mm typical except where noted

Figure 6 ABWR Radwaste Building

Seismic Model