

Outline of Seismic Safety Evaluation Results for Facilities

1. PWR

(1) Seismic safety evaluation of buildings/structures important to safety

Evaluated item			Hokkaido Electric Power Company		Kansai Electric Power Company						Shikoku Electric Power Company		Kyushu Electric Power Company			Japan Atomic Power Company		
Building/structure	Part	Item	Tomari Unit 1		Mihama Unit 1		Takahama Unit 1		Ohi Unit 1		Ikata Unit 3		Genkai Unit 3		Sendai Unit 1		Tsuruga Unit 2	
Reactor building	Quake resisting walls	Maximum response shear strain <*1>	0.40 <*2>	0.80×10 ⁻³	0.25	0.50×10 ⁻³	0.35	0.69×10 ⁻³	0.46	0.91×10 ⁻³	0.32	0.63×10 ⁻³	0.27	0.53×10 ⁻³ <*3>	0.15	0.29×10 ⁻³	0.27	0.534×10 ⁻³ <*3>
Reactor auxiliary building	Quake resisting walls	Maximum response shear strain	0.14	0.28×10 ⁻³	0.29	0.58×10 ⁻³	0.10	0.19×10 ⁻³	0.32	0.63×10 ⁻³	0.42	0.84×10 ⁻³	0.12	0.24×10 ⁻³	0.14	0.28×10 ⁻³	0.10	0.197×10 ⁻³

<*1> The maximum shear strain of the evaluation standard value for buildings/structures is 2.0×10⁻³.

<*2> The values to the left in each space is its ratio with the evaluation standard value. Values of 1.0 or lower indicate that it satisfies standard values. Same applies to other tables.

<*3> For Genkai Unit 3 and Tsuruga Unit 2, it indicates the evaluation result for the reactor containment vessel.

(2) Seismic safety evaluation of equipment/piping systems important to safety

Evaluated item				Hokkaido Electric Power Company		Kansai Electric Power Company						Shikoku Electric Power Company		Kyushu Electric Power Company			Japan Atomic Power Company		
Safety function	Equipment/ piping systems	Part	Item	Tomari Unit 1		Mihama Unit 1		Takahama Unit 1		Ohi Unit 1		Ikata Unit 3		Genkai Unit 3		Sendai Unit 1		Tsuruga Unit 2	
Shut down	In-core structures	Core barrel	Structural strength (stress)	0.17	65MPa(391) <*4>	0.22	86MPa(391)	0.13	52MPa(391)	0.14	53MPa(372)	0.23	88MPa(391)	0.20	75MPa(372)	0.25	93MPa(372)	0.31	120MPa(391)
	Control rod	-	Insertability (insert time)	0.89	1.87 seconds (2.1)	0.96	1.73 seconds (1.8)	0.96	1.73 seconds (1.8)	0.88	1.93 seconds (2.2)	0.81	2.03 seconds (2.5)	0.79	1.73 seconds (2.2)	0.96	2.11 seconds (2.2)	0.88	2.19 seconds (2.5)
Cool	Steam generator	Support structure	Structural strength (stress)	0.48	176MPa(367)	0.86	382MPa(444)	0.75	312MPa(415)	0.65	278MPa(426)	0.70	55MPa(79)	0.46	196MPa(427)	0.83	412MPa(497)	0.45	70MPa(155)
	Primary coolant pipe	Main unit	Structural strength (stress)	0.33	116MPa(355)	0.38	136MPa(354)	0.70	244MPa(348)	0.77	271MPa(354)	0.33	116MPa(348)	0.30	108MPa(356)	0.39	140MPa(358)	0.37	128MPa(347)
	Residual heat removal pump	Installation bolt	Structural strength (stress)	0.01	3MPa(210)	0.05	11MPa(210)	0.11	23MPa(210)	0.21	45MPa(210)	<001	1MPa(210)	0.04	9MPa(210)	0.06	12MPa(210)	0.01	2MPa(210)
	Residual heat removal piping	Main unit	Structural strength (stress)	0.55	199MPa(361)	0.14	49MPa(360)	0.27	92MPa(342)	0.77	257MPa(333)	0.49	168MPa(343)	0.35	119MPa(344)	0.13	46MPa(361)	0.55	197MPa(361)
Contain	Reactor vessel	Support structure	Structural strength (stress)	0.34	157MPa(465)	0.26	43MPa(166)	0.82	317MPa(385)	0.96	370MPa(385)	0.58	270MPa(465)	0.13	62MPa(467)	0.42	195MPa(467)	0.49	228MPa(462)
	Containment vessel	Main unit	Structural strength (stress)	0.32	112MPa(351)	0.16	45MPa(280)	0.79	223MPa(282)	0.09	21MPa(238)	0.17	60MPa(351)	-	-	0.35	122MPa(352)	-	-

<*4> Of the values to the right of each space, the figures in paraenthesis indicate the evaluation standard value for each item. Same applies for BWR table.

2.BWR

(1) Seismic safety evaluation of buildings/structures important to safety

Evaluated item			Tohoku Electric Power Company		Tokyo Electric Power Company				Chubu Electric Power Company			Hokuriku Electric Power Company		Chugoku Electric Power Company			Japan Atomic Power Company							
Building/structure	Part	Item	Onagawa Unit 1		Higashidori Unit 1		Fukushima Daiichi Unit 5		Fukushima Daini Unit 4		Hamaoka Unit 3		Hamaoka Unit 4		Shika Unit 2		Shimane Unit 1		Shimane Unit 2		Tsuruga Unit 1		Tokai Daini	
Reactor building	Quake resisting walls	Maximum response shear strain <*5>	0.33	0.65 ×10 ⁻³	0.16	0.32 ×10 ⁻³	0.10	0.19 ×10 ⁻³	0.07	0.14 ×10 ⁻³	0.23	0.46 ×10 ⁻³	0.26	0.51 ×10 ⁻³	0.22	0.43 ×10 ⁻³	0.25	0.49 ×10 ⁻³	0.27	0.53 ×10 ⁻³	0.60	1.205 ×10 ⁻³	0.16	0.323 ×10 ⁻³

<*5> The maximum shear strain of the evaluation standard value for buildings/structures is 2.0×10⁻³.

(2) Seismic safety evaluation of equipment/piping systems important to safety

Evaluated item				Tohoku Electric Power Company		Tokyo Electric Power Company				Chubu Electric Power Company			Hokuriku Electric Power Company		Chugoku Electric Power Company			Japan Atomic Power Company							
Safety function	Equipment/ piping systems	Part	Item	Onagawa Unit 1		Higashidori Unit 1		Fukushima Daiichi Unit 5		Fukushima Daini Unit 4		Hamaoka Unit 3		Hamaoka Unit 4		Shika Unit 2		Shimane Unit 1		Shimane Unit 2		Tsuruga Unit 1		Tokai Daini	
Shut down	Core Support structure	Shroud support	Structural strength (stress)	0.37	92 MPa (250)	0.24	55 MPa (229)	0.29	86 MPa (300)	0.36	89 MPa (247)	0.61	304 MPa (501)	0.60	303 MPa (501)	0.33	87 MPa (260)	0.27	57 MPa (212)	0.36	121 MPa (334)	0.93	233 MPa (250)	0.90	224 MPa (250)
	Control rod	-	Insertability (fuel assembly relative displacement or insertion time)	0.64	25.7mm (40)	0.47	18.9mm (40)	0.35	13.8mm (40)	0.35	14.1mm (40)	0.52	20.8mm (40)	0.51	20.4mm (40)	0.96	1.38 秒 (1.44) <*6>	0.66	26.3mm (40)	0.87	34.7mm (40)	0.58	46.6mm (80)	0.09	6.8mm (80)
Cool	Residual heat removal system pump	Foundation bolt or motor platform installation bolt	Structural strength (stress)	0.79	143 MPa (181)	0.05	21 MPa (444)	0.14	29 MPa (202)	0.01	4 MPa (342)	0.06	25 MPa (444)	0.05	24 MPa (444)	0.03	9 MPa (350)	0.09	16 MPa (185)	0.03	10 MPa (350)	0.08	12 MPa (152)	0.26	46 MPa (176)
	Residual heat removal system piping	Main unit	Structural strength (stress)	0.48	176 MPa (363)	0.36	118 MPa (326)	0.54	197 MPa (364)	0.51	165 MPa (321)	-	-	-	-	0.87	317 MPa (364)	0.84	218 MPa (260)	0.59	199 MPa (335)	0.59	214 MPa (363)	0.52	175 MPa (335)
Contain	Reactor Pressure vessel	Foundation bolt	Structural strength (stress)	0.61	135 MPa (222)	0.14	72 MPa (499)	0.18	39 MPa (222)	0.02	11 MPa (492)	0.24	118 MPa (499)	0.22	111 MPa (499)	0.37	187 MPa (499)	0.28	129 MPa (467)	0.62	307 MPa (499)	0.49	102 MPa (207)	0.29	132 MPa (458)
	Reactor containment vessel	Dry-well	Structural strength (stress) or buckling evaluation	0.69	176 MPa (255)	0.41	0.41(1) <*7>	0.35	90 MPa (255)	0.10	38 MPa (380)	0.27	0.27(1) <*7>	0.38	0.38(1) <*7>	0.80	207 MPa (258)	0.30	114 MPa (382)	0.15	73 MPa (495)	0.55	181 MPa (332)	0.08	29 MPa (380)
	Main steam system piping	Main unit	Structural strength (stress)	0.46	168 MPa (363)	0.56	211 MPa (375)	0.85	356 MPa (417)	0.51	157 MPa (309)	0.90	337 MPa (375)	0.65	244 MPa (375)	0.79	294 MPa (374)	0.77	288 MPa (374)	0.67	252 MPa (374)	0.62	224 MPa (364)	0.61	211 MPa (345)

<*6> Conducted control rod insertion analysis and confirmed successful insertion within standard time because it exceeded confirmed relative displacement.

<*7> Units are dimensionless numbers because it is a buckling evaluation.