72

News Release

Ministry of Economy,
Trade and Industry (METI)

PRI-07-65

Press Release Information	Nuclear and Industrial Safety Agency (NISA), Ministry of Economy, Trade and Industry (METI)
Results of analyses of earthquake observation data obtained during "the Niigataken Chuetsu-oki Earthquake in 2007" at Kashiwazaki-Kariwa Nuclear Power Station, Tokyo Electric Power Company (Part 2).	

August 22, 2007

NISA/METI

Tokyo Electric Power Company has submitted the report (the second report) to NISA on maximum acceleration value and time-history acceleration wave-forms at the reactor building basement of Unit 1 through Unit 7 of Kashiwazaki-Kariwa Nuclear Power Station based on the observation record acquired during the aftershock of "the Niigataken Chuets-oki Earthquake in 2007" at Kashiwazaki-Kariwa Nuclear Power Station.

1. In response to "the Niigataken Chuetsu-oki Earthquake in 2007", on July 16, 2007, NISA required Tokyo Electric Power Company to report the analyses of earthquake observation data and the seismic safety assessment of the important to safety equipment (already reported on July 16, 2007).
2. In response to the request, Tokyo electric Power Company, on July 30, 2007, submitted to NISA the report (the first report (earthquake observation data of the main shock of the earthquake)) on the analyses of earthquake observation data obtained during the earthquake (already reported on July 30, 2007).
3. In addition, following the first report, Tokyo Electric Power Company, on August 22, submitted to NISA the report (the second report (earthquake observation data of the aftershock) on the analyses of earthquake observation data obtained during the earthquake. The outline of the report is as shown in the attachment.
4. NISA will make a rigorous evaluation of the reports with the help of experts.

Contacts:
Mr. Moriyama, Kawahara
Nuclear Power Licensing Division, NISA/METI
Phone: +81-3-3501-6289

C/4/15

Attachment

Summary Report (Second Report) on the Analyses of the Earthquake Observation Data obtained at the Kashiwazaki-Kariwa Nuclear Power Station during the Niigataken Chuetsu-oki Earthquake in 2007

August 22, 2007
Tokyo Electric Power Company

TEPCO is analyzing the seismic data obtained during the Niigataken Chuetsu-oki Earthquake in 2007, based on the Direction Notice* received from the Ministry of Economy, Trade and Industry (METI)/ Nuclear and Industrial Safety Agency (NISA) on July 16, 2007. As reported in the "Report (First Report) on the Analyses of the Earthquake Observation Data, obtained at the Kashiwazaki-Kariwa Nuclear Power Station during the Niigataken Chuetsu-oki Earthquake in 2007"(July 30, 2007, hereinafter called "the first report"), the time-history record of the basement of Unit 1 and 5 during the main shock of the earthquake was lost. Therefore, in order to contribute to the analysis of earthquake movement characteristics of the underground during the main shock of the earthquake, an examination using the observation record of the aftershocks will be carried out. The second report was submitted as the acquisition and compilation of the aftershock data for one month after the main shock of the earthquake had been finished and the observation records of aftershocks to be used for the future investigation had been selected.

* the Direction Notice : Regarding the Analyses of the Earthquake Observation Data obtained at the Kashiwazaki-Kariwa Nuclear Power Station during the Niigataken Chuetsu-oki Earthquake in 2007 and the Evaluation of the Consequences to the Seismic Safety (NISA Document No.1 dated July 16, 2007)

(Summary of the aftershock observation records)

Six observation records of aftershocks were selected for the future examination. These records were selected among the aftershocks (153 earthquakes) which occurred for one month after the main shock of the earthquake (up to August 17). The selected aftershocks were those with a particularly big shake and either reported by the Japan Meteorological Agency as being of seismic intensity above 4 or observed over 20 Gal on the reactor building basement. In addition to that, the record was available from ground system of Unit 1 and Unit5.

Characteristics of the main shock and six aftershocks are shown in table 1, distribution of the epicenters is shown in Fig. 1, and the location of earthquake observation points at the Kashiwazaki-Kariwa Nuclear Power Station is shown in Fig.2, respectively.

Maximum acceleration value of the main shock of the earthquake and six aftershocks at the basement of the reactor building is shown in Table 2. Of the six aftershocks, examples of time-history acceleration wave-forms at the reactor building basement of Unit 1 through 7 at the

maximum aftershock (M5.8) are shown in Fig. 3, and an example of comparison of the response spectra based on the observation record and the response spectra estimated by inputting the earthquake movement used for design into the earthquake response analysis model for design is shown in Fig.4.

In addition, examples of acceleration distribution according to seismic intensity at the service hall ground system, Unit 1 ground system, Unit 5 ground system of main shock of the earthquake and six aftershocks are shown in Fig.5. Examples of time-history acceleration wave-forms during the maximum aftershock at the service hall ground system, Unit 1 ground system, and Unit 5 ground system area shown in Fig.6 through Fig.8, and an example of response spectra according to seismic intensity in Fig.9, respectively.

In addition to continuous acquisition and compilation of the record of aftershock data, analysis of the earthquake observation data and the check of the seismic safety of equipment important to safety will be carried out using acquired and compiled observation records.

Although a part of the aftershock record was lost due to a long span of power failure to the observation device, we estimate that it is possible to perform a detailed examination using the other observed aftershock records.

Table 1 Characteristics of earthquakes covered by this report

No.	Date of Occurrence	Epicenter	North Latitude	South Latitude	Magnitude M	Earthquake Focal Depth H(km)
1	2007/07/16 10:13 Main Shock	Niigataken Jouchu etsu-oki	37° 33.4'	138° 36.5'	6.8	17
2	2007/07/16 11:00	Niigataken Jouchu etsu-oki	37° 27.4'	138° 33.9'	3.7	22
3	2007/07/16 15:37 Maximum Aftershock	Niigataken Jouchu etsu-oki	37° 30.2'	138° 38.6'	5.8	23
4	2007/07/16 17:42	Niigataken Jouchu etsu-oki	37° 24.8'	138° 33.4'	4.2	19
5	2007/07/16 21:08	Niigataken Jouchu etsu-oki	37° 30.5'	138° 37.7'	4.4	20
6	2007/07/25 06:52	Niigataken Chuuetsu-region	37° 31.9'	138° 43.2'	4.8	24
7	2007/08/04 00:16	Niigataken Jouchu etsu-oki	37° 25.2'	138° 32.2'	3.2	18

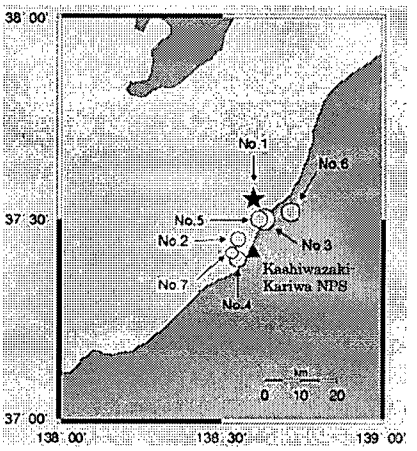


Fig.1 Distribution of epicenters covered by this report (GMT was used for drawing figure)

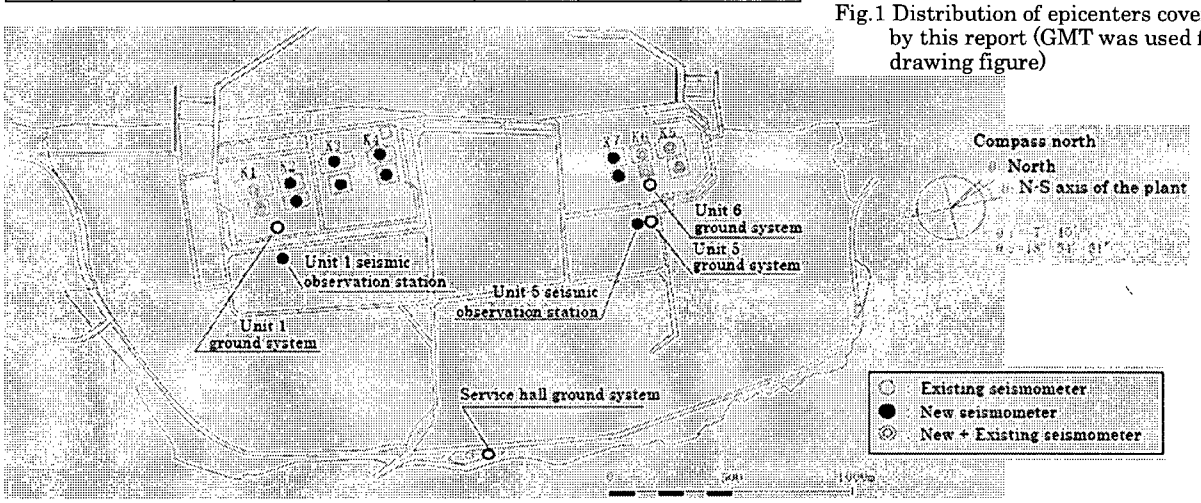


Fig. 2 Arrangement of seismometers at Kashiwazaki-Kariwa Nuclear Power Station

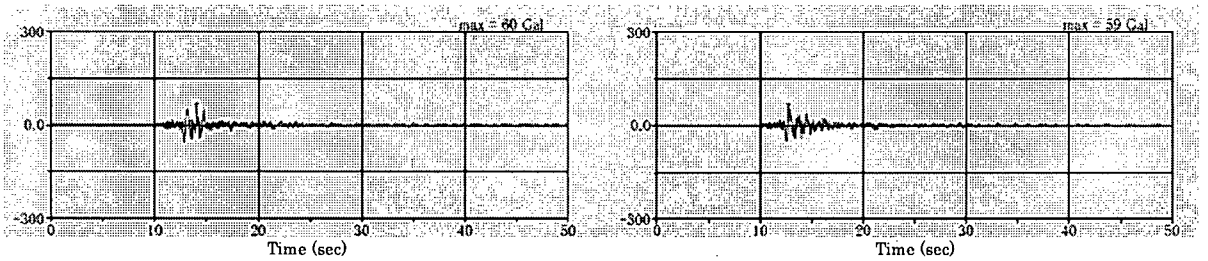
Table 2 Maximum acceleration at the reactor building basement during the main shock and six aftershocks

(Unit: Gal)

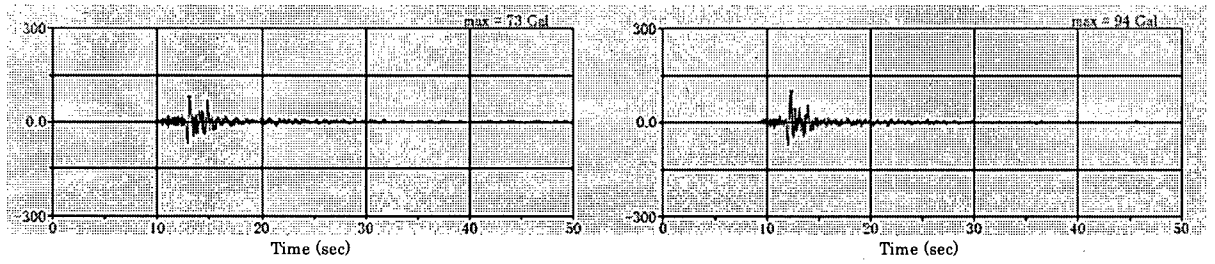
Observation Point			No.1 7/16 10:13	No.2 7/16 11:00	No.3 7/16 15:37	No.4 7/16 17:42	No.5 7/16 21:08	No.6 7/25 6:52	No.7 8/4 0:16	Maximum design acceleration response value
Unit-1	1-R2	5th Basement Floor (on the base mat)	311 680 408	4 5 9	52 60 57	62 60 32	7 10 9	14 12 10	23 13 8	274 273 -
Unit-2	2-R2	5th Basement Floor (on the base mat)	304 606 282	5 8 9	48 59 41	30 34 21	8 7 7	12 12 9	15 13 6	167 167 -
Unit-3	3-R2	5th Basement Floor (on the base mat)	308 384 311	10 13 13	66 73 52	39 37 21	10 13 15	15 12 12	15 12 8	192 193 -
Unit-4	4-R2	5th Basement Floor (on the base mat)	310 492 337	15 14 15	74 94 61	28 14 15	8 15 12	19 21 15	9 7 7	193 194 -
Unit-5	5-R2	4th Basement Floor (on the base mat)	277 442 205	16 13 11	126 102 57	10 11 8	21 32 29	29 30 14	9 6 6	249 254 -
Unit-6	6-R2	3rd Basement Floor (on the base mat)	271 322 488	24 20 14	159 114 82	14 11 6	24 19 20	39 31 24	12 10 5	263 263 -
Unit-7	7-R2	3rd Basement Floor (on the base mat)	267 356 355	17 16 12	170 135 74	15 13 10	17 16 15	49 43 23	6 8 6	263 263 -

Note-1; Upper value is for in south-north direction, middle value is for in the east-west direction and bottom value is for in the up-down direction.

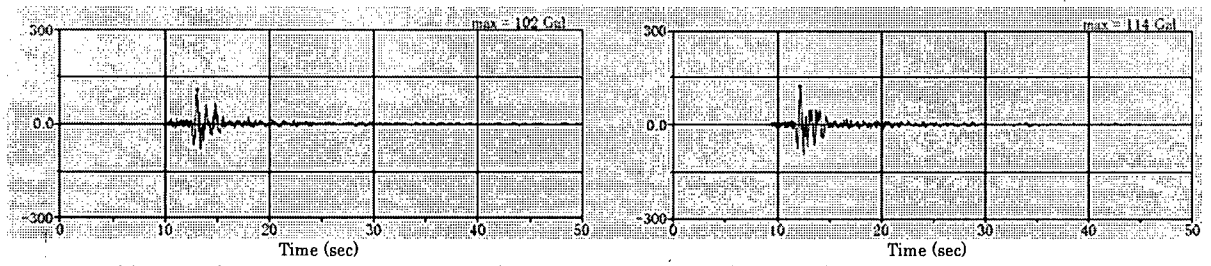
Note-2; Maximum acceleration response value used at the design stage in longitudinal direction is omitted because it was evaluated by the static design.



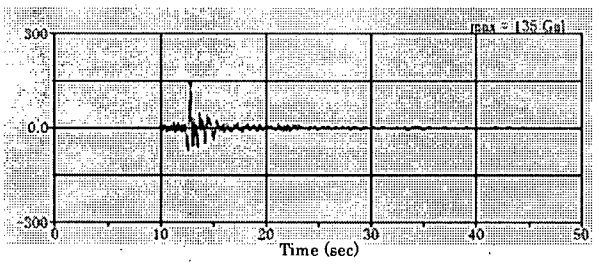
(a)Unit-1 (5BF 1-R2 observation point) (b)Unit-2 (5BF 2-R2 observation point)



(c)Unit-3 (5BF 3-R2 observation point) (d)Unit-4 (5BF 4-R2 observation point)

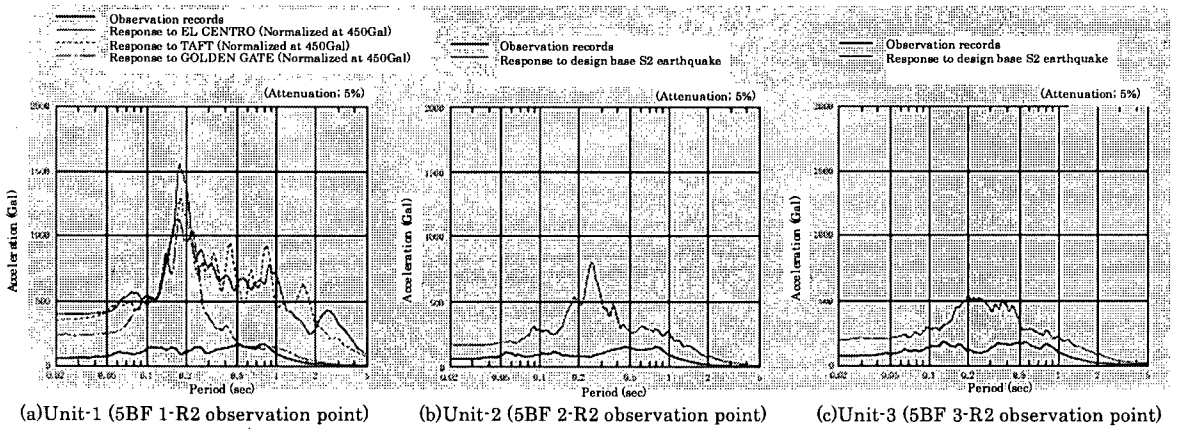


(e)Unit-5 (4BF 5-R2 observation point) (f)Unit-6 (3BF 6-R2 observation point)



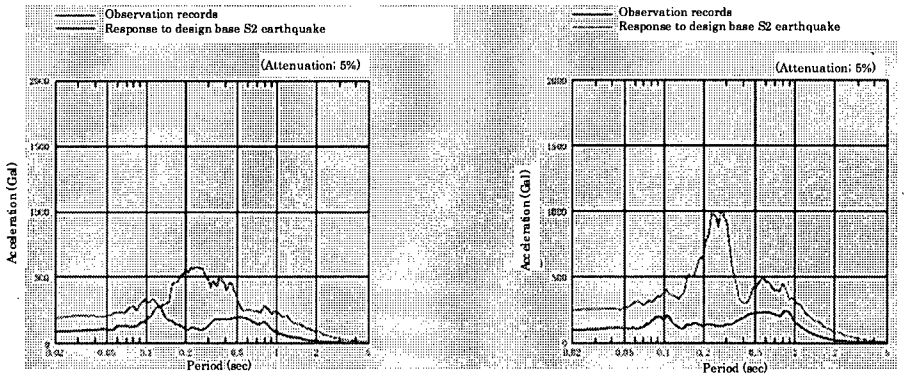
(g)Unit-7 (3BF 7-R2 observation point)

Fig.3 Acceleration time history at the reactor building basement during the maximum aftershock (in east-west direction)

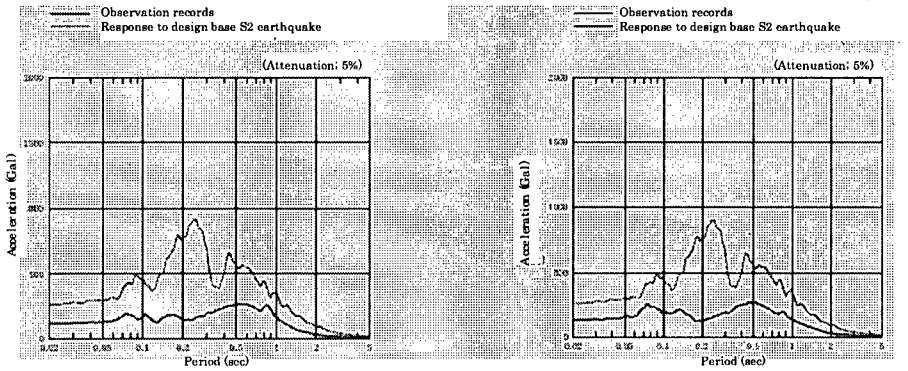


(a)Unit-1 (5BF 1-R2 observation point) (b)Unit-2 (5BF 2-R2 observation point) (c)Unit-3 (5BF 3-R2 observation point)

Fig.4 Acceleration response spectrum at the reactor building basement during the maximum aftershock (in the east-west direction)

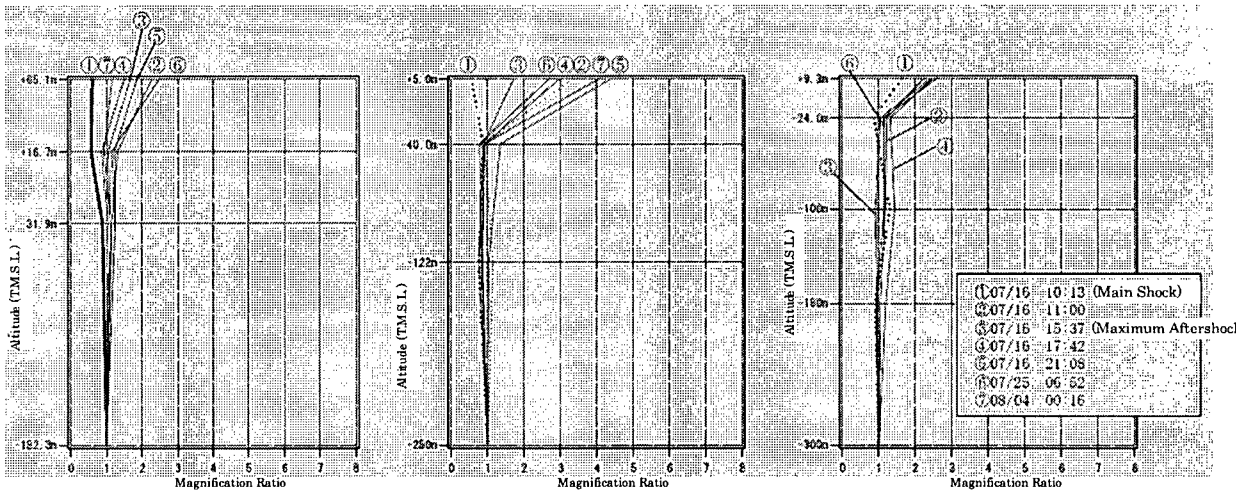


(d)Unit-4 (5BF 4-R2 observation point) (e)Unit-5 (4BF 5-R2 observation point)



(f)Unit-6 (3BF 6-R2 observation point) (g)Unit-7 (3BF 7-R2 observation point)

Fig.4 Acceleration response spectrum at the reactor building basement during the maximum aftershock (in the east-west direction : Continued)

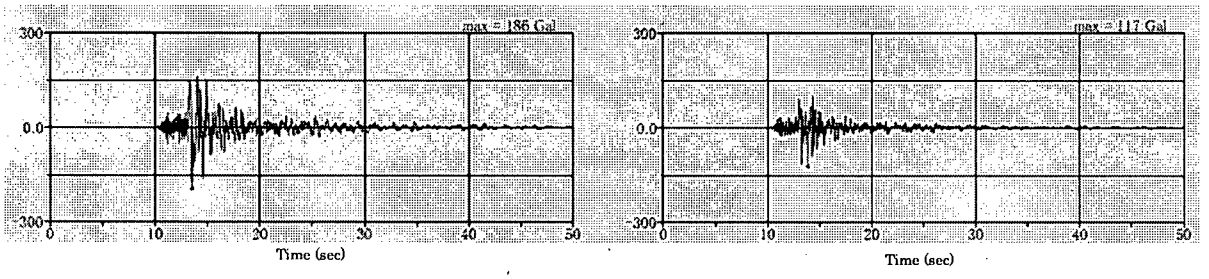


(a)Service hall ground system (b)Unit-1 ground system (c)Unit-5 ground system

Note-1; Magnification ratio is normalized by the value at the lowest earthquake observation point.

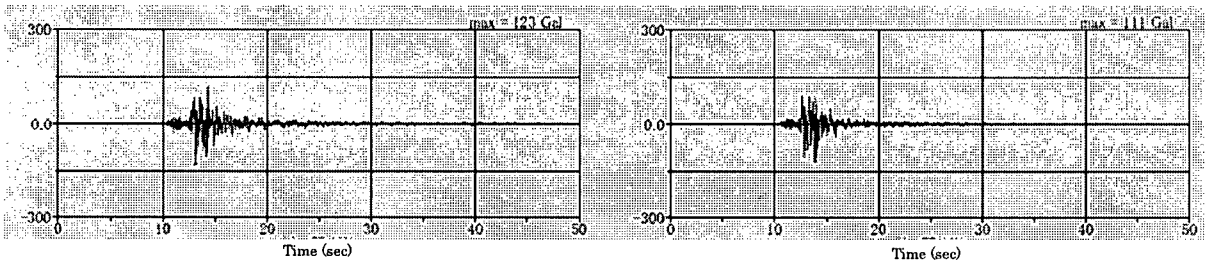
Note-2; As for the earthquakes ①② at Unit-1 ground system and the earthquakes ① at Unit-5 ground system, they are just reference values because only maximum acceleration value were observed but acceleration time histories were not observed.

Fig.5 Distribution of accelerations at various altitudes of the ground system earthquake observation points (in the east-west direction)



(a) SG1 observation point (T.M.S.L.+65.1m)

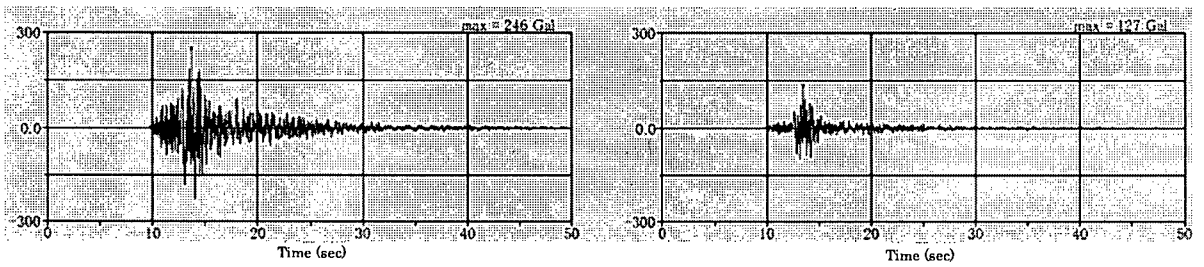
(b) SG2 observation point (T.M.S.L.+16.7m)



(c) SG3 observation point (T.M.S.L.-31.9m)

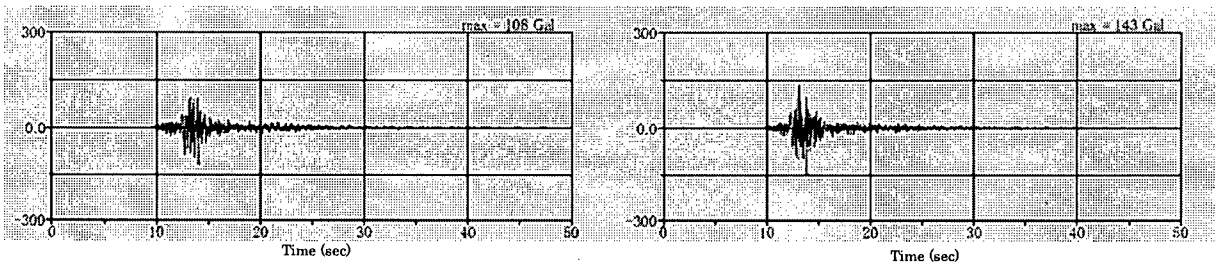
(d) SG4 observation point (T.M.S.L.-182.3m)

Fig.6 Acceleration time history at the service hall ground system during the maximum aftershock (in the east-west direction)



(a) G7 observation point (T.M.S.L.+5.0m)

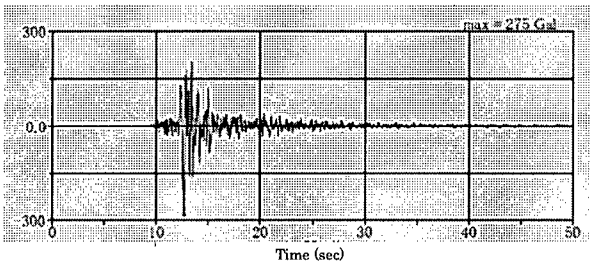
(b) G8 observation point (T.M.S.L.-40.0m)



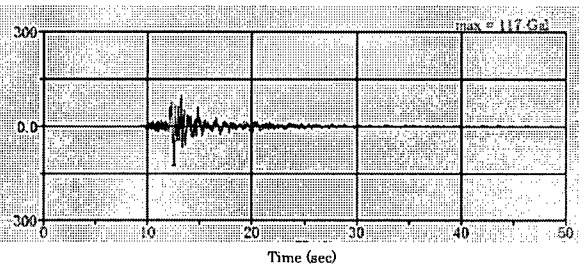
(c) G9 observation point (T.M.S.L.-122m)

(d) G10 observation point (T.M.S.L.-250m)

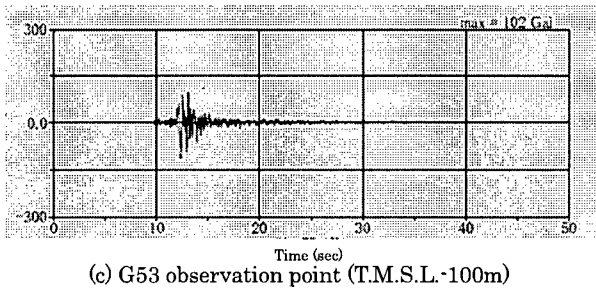
Fig.7 Acceleration time history at the Unit-1 ground system during the maximum aftershock (in the east-west direction)



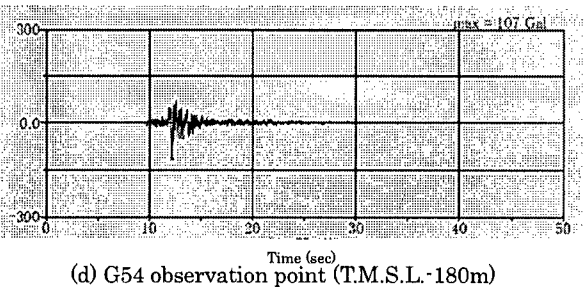
(a) G51 observation point (T.M.S.L.+9.3m)



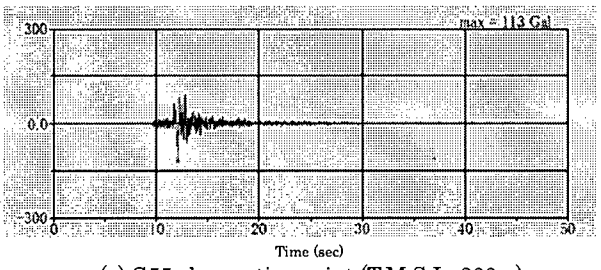
(b) G52 observation point (T.M.S.L.-24.0m)



(c) G53 observation point (T.M.S.L.-100m)

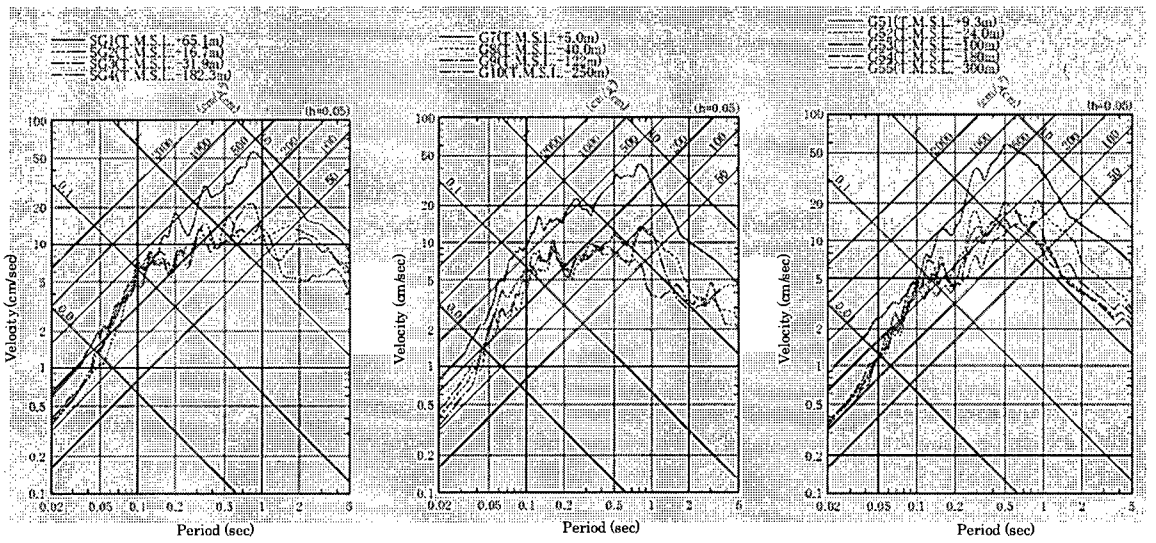


(d) G54 observation point (T.M.S.L.-180m)



(e) G55 observation point (T.M.S.L.-300m)

Fig.8 Acceleration time history at the Unit-5 ground system during the maximum aftershock (in the east-west direction)



(a)Service hall ground system (b)Unit-1 ground system (c)Unit-5 ground system

Fig.9 Depth distribution of velocity response spectrum at the ground system earthquake observation points during the maximum aftershock (in the east-west direction)