About this CR-ROM

This CD-ROM compiles seismological data (acceleration time history) recorded at Tokai No2 Power Station during the 2011 off the Pacific coast of Tohoku Earthquake and during the aftershock that occerred on the same day (march 11, 2011) off the coast of Ibaraki Prefecture.

We hope that making this data public will aid advancement in seismology, earthquake engineering, and seismic engineering among other scientific fields.

Please be advised that change in data may occur in future years as a result of advancement in data processing and analysis methods.

The directory structure of the CD-ROM is illsuatrated as follows.

```
/
| 00_readme.txt : This file
| 01_Data_File_Names.pdf
| 02_Data_Format.pdf
| 03_Maximum Acceleration.pdf
| 04_Location of Seismimeters.pdf
| 05_Geology.pdf
| 06_Seismographic_Information.pdf
+-DATA : Data flie
  |
  +- Data from Main Event
  |  |
  |  +- Borehole Data
  |  |
  |  +- Data from Building Structures
  |
  +- Data from Aftershock
     |
     +- Borehole Data
     |
     +- Data from Building Structures
```

Note

- The North direction of the seismometers concide with the NS-axis of the plant (Plant North, P.N.), along which all buildings are aligned. See file "04_Location of Seismimeters.pdf" for description of the P.N.
  However, the seismometers placed in boreholes need to be corrected according to the orientation described in File "01_Data_File_Names.pdf" .

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1. This CD-ROM may not be copied for distribution to a third person or party.
2. The Japan Atomic Power Company is to be credited as the provider of data for any outcome that result from use of this CD-ROM.

Accelerometers placed in Borehole

Location: Borehole

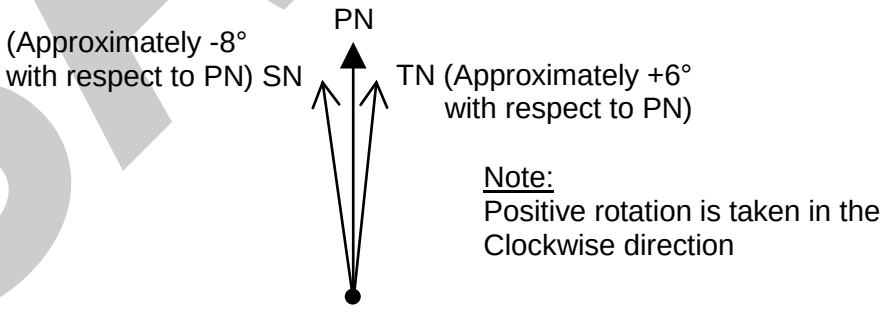
File name example: 201103111446_GR01.NS

(Time of occurrence of earthquake, followed by observation point ID)

Data Name	Observation Point	Component	Altitude (depth)	Note
GR04.NS	GR04	NS	E.L.＋8 m	Sensor is off from PN by approx. -8° (positive taken in clockwise direction)
GR04.EW		EW		
GR04.UD		UD		
GR03.NS	GR03	NS	E.L.－17 m	Sensor is off from PN by approx. -6° (positive taken in clockwise direction)
GR03.EW		EW		
GR03.UD		UD		
GR02.NS	GR02	NS	E.L.－192 m	Sensor is off from PN by approx. -4° (positive taken in clockwise direction)
GR02.EW		EW		
GR02.UD		UD		
GR01.NS	GR01	NS	E.L.－372 m	Sensor is off from PN by approx. -2° (positive taken in clockwise direction)
GR01.EW		EW		
GR01.UD		UD		

(Illustration of mismatch from Cardinal direction)

Observation Point GR04 (E.L.＋8 m) is taken as example



PN : Plant North (reference North orientation for the plant)

TN : True North (magnetic North)

SN : Sensor North (North direction as recognized by the sensor)

Data format

The data format is described using example data.

- Line 1: Header information
- Starting Line 2: Data (Unit: Gal = cm/s^2)

- Header

Line 1 (1) Location and Recorded date (2) Observation point
(3) Altitude of observation point (4) Component
(5) Number of data (6) Sampling interval
(7) Duration (8) Maximum acceleration

<Example>

1	2	3	4	5	6	7	8
TK2 201103111446	GR01	E.L.-372.0m	NS	25000	1.00000E-02	2.50000E+02	3.01934E+02

- Data (Unit: Gal = cm/s^2)

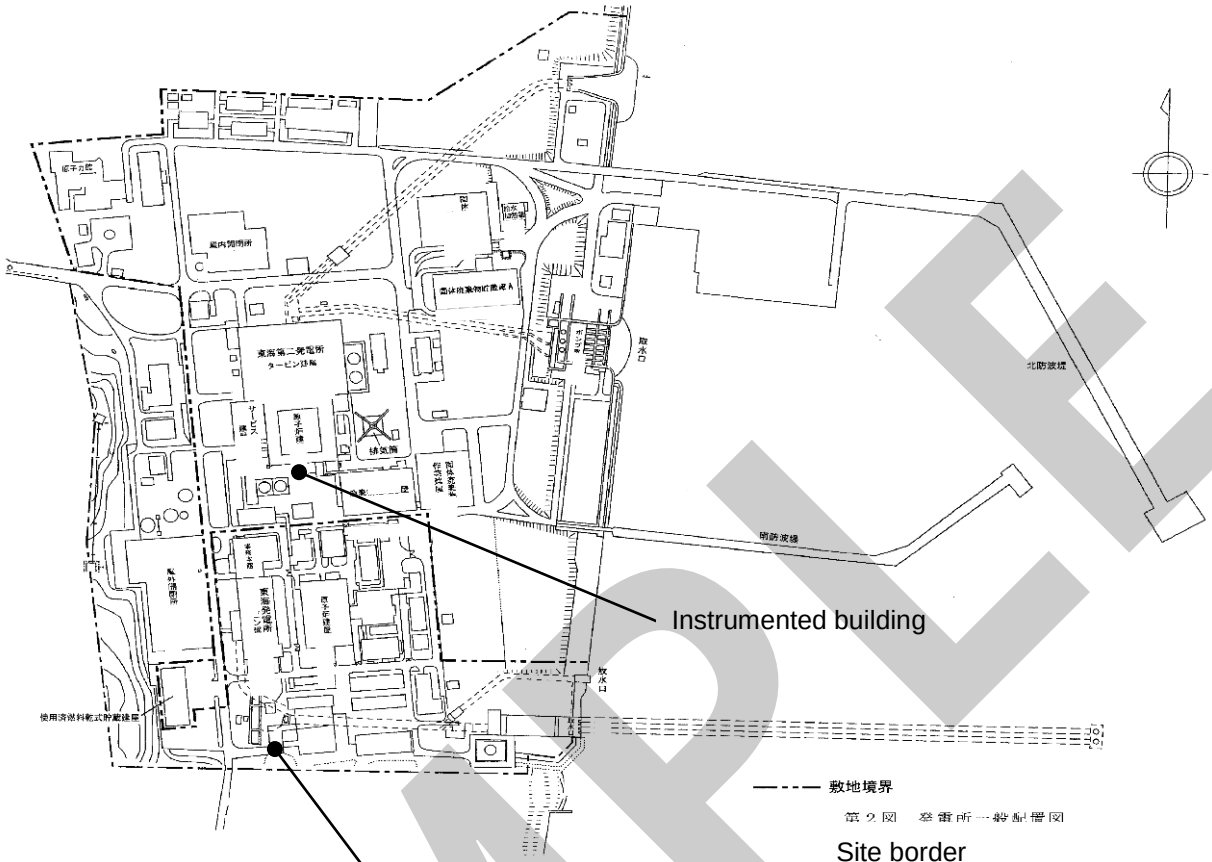
<Example>

1	2	3	4	5	6	7	8
4.40000E-03	8.10000E-03	-5.20000E-03	-1.03000E-02	1.60000E-03	2.42000E-02	-5.00000E-03	-8.00000E-03
-9.20000E-03	-5.00000E-04	5.50000E-03	-1.34000E-02	1.23000E-02	-1.17000E-02	6.00000E-04	-7.30000E-03
-8.70000E-03	2.45000E-02	-4.30000E-03	-2.90000E-03	-1.48000E-02	9.80000E-03	1.37000E-02	-1.08000E-02

Maximum Acceleration (from Borehole)

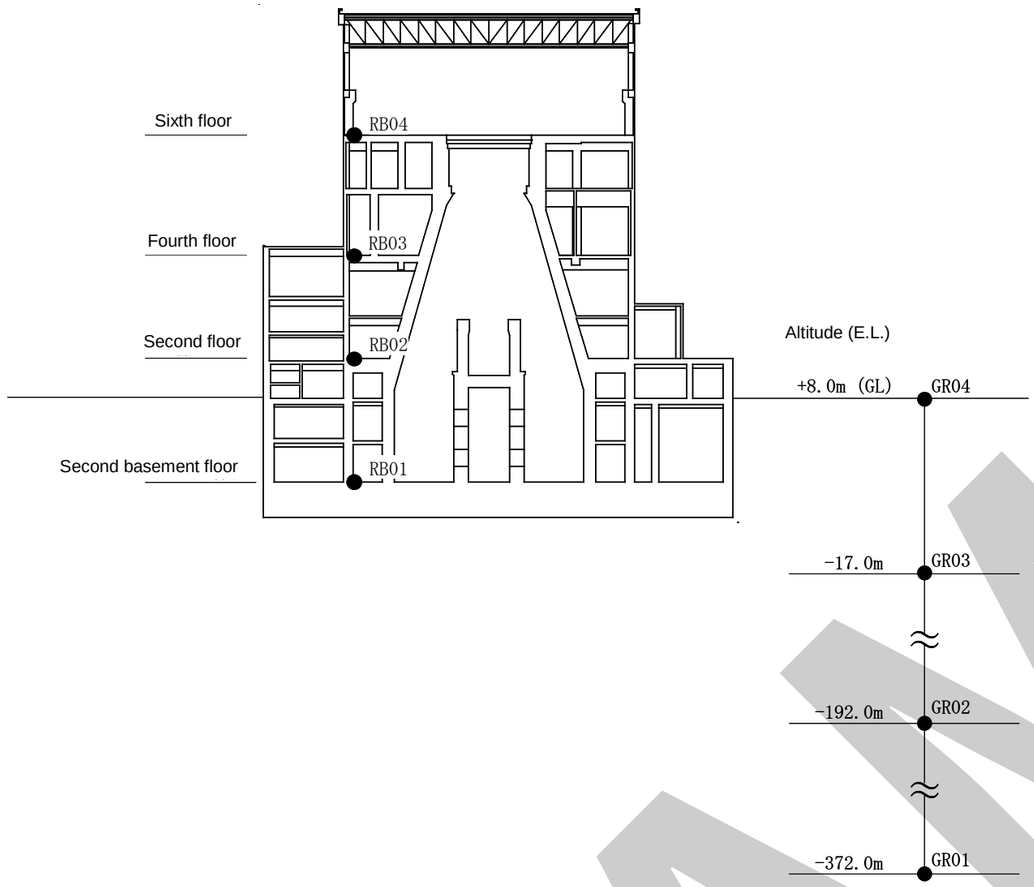
(Unit: cm/s^2)

Observation Point	Component	Altitude (depth)	2011.3.11 14:46 off the pacific coast of Tohoku Earthquake	2011.3.11 15:15 Aftershock off the coast of Ibaraki
GR04	NS	E.L.＋8m	569	222
	EW		481	181
	UD		911	158
GR03	NS	E.L.－17m	215	73
	EW		226	81
	UD		195	69
GR02	NS	E.L.－192m	233	69
	EW		206	75
	UD		126	64
GR01	NS	E.L.－372m	302	111
	EW		234	76
	UD		178	74

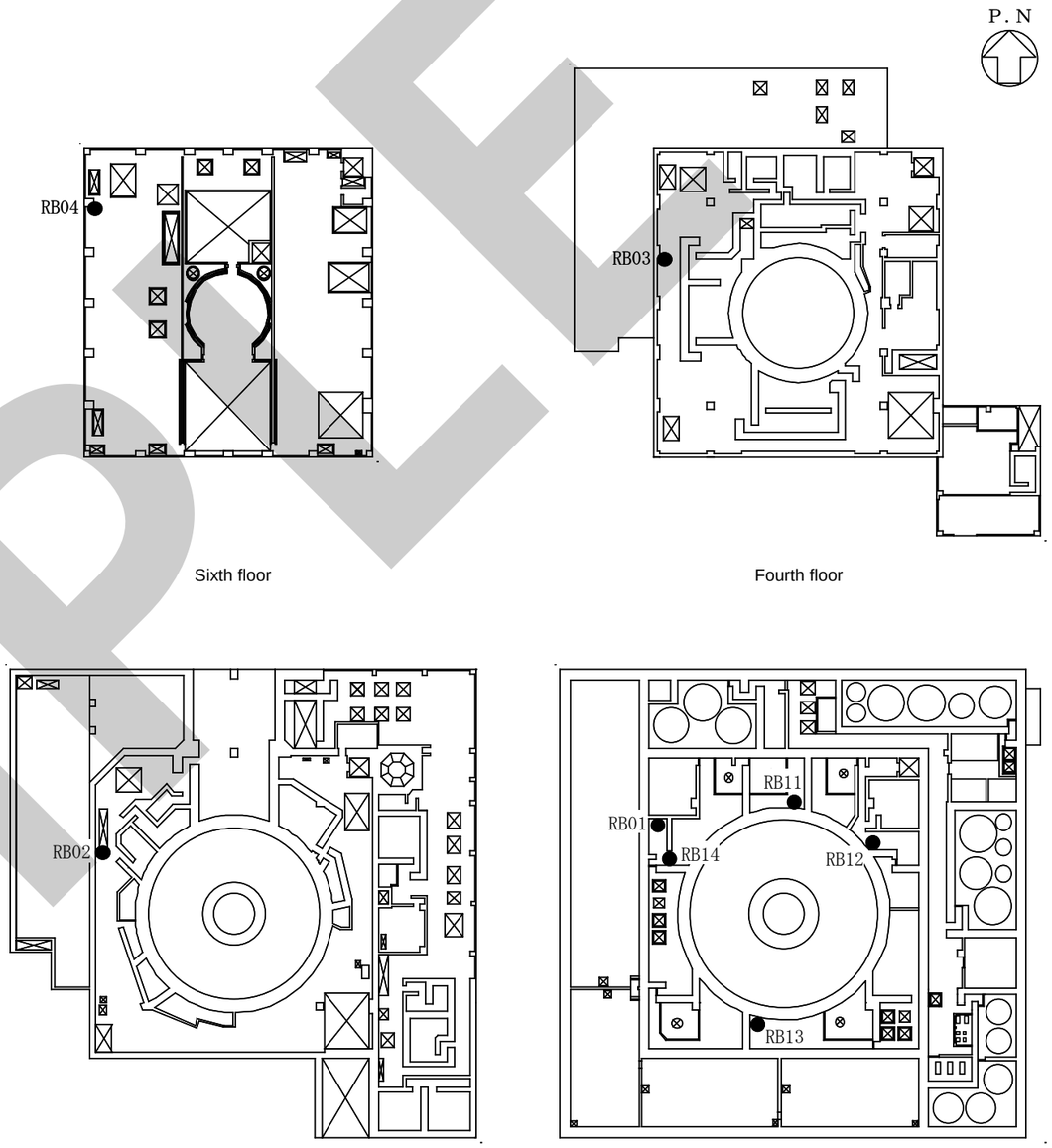


第２図　発電所一般配置図

Plant Arrangement Plan



Location of seismometers (Cross section of Reactor Building and soil)



Location of seismometers (Floor plan of Reactor Building)

Location of seismometer and soil condition

Seismometer	Altitude (E.L.) (m)	Classi-fication	Geology	Thickness (m)	Survey results		
					Density (g/cm^3)	S-Wave Velocity (m/s)	P-Wave Velocity (m/s)
● GR04	8.0	sand	Quaternary period	7.0	1.71	210	500
	1.0	sand gravel		5.0	1.66	280	1850
	-4.0	clay		3.0			
	-7.0	sand gravel		8.0	1.82	470	1850
	-15.0	sandy mudstone	Tertiary period	91.0	1.69	460	1680
● GR03	-17.0						
	-106.0			62.0	1.74	540	1760
	-168.0			92.0	1.78	590	1830
● GR02	-192.0						
	-260.0			108.0	1.82	670	1920
	-368.0			4.0	1.85	790	2000
● GR01	-372.0						

Seismographic Information (Borehole [GR01～GR04])

Equipment	Item	Specification
Detector	System	Servo Accelerometer
	Frequency Range	DC～50Hz
	Effective Measuring Range	Land surface ±2G, Underground ±1G
Measurement Instrument	Frequency Characteristic	DC～40Hz
	High-cut Filter	Anti-aliasing Filter (Brick wall FIR Filter)
	Full Scale	±1960cm/s^2
	A/D Conversion	24bit (Effective Value 19bit)
	Minimum Resolution	About 0.004cm/s^2
	Sampling Rate	100Hz
	Delay Time	15second
	Calibration	Square Wave, 1time/year
	Recording Medium	Compact Flash Memory Card 256MB (256MB×2cards)
	Maximum Recording Capacity	About 24hours
	Return from Blackout	Automatic Restoration
	Accuracy of Clock	Corrected by GPS
Uninterruptible Power System	Guarantee Time of Blackout	Over 36hours
Starting Information		
Item	Specification	Current Configuration
Starting Level	Select Level from 0.004～1960cm/s^2	0.196cm/s^2
Starting System	OR, AND	AND
Starting Channel	Arbitrary Channel	Two channel of seismometer at E.L.-192m and E.L.-372m
Recording Time	Start recording 15 seconds ago the observation reach starting level, and end 10 seconds after the observation fall below starting level.	

Frequency Characteristic