

November 13, 2014  
Electric Power Development Co., Ltd.

### **Measures for Reinforcing Safety at the Ohma Nuclear Power Plant**

Electric Power Development Co., Ltd. ("J-POWER") hereby gives notice that J-POWER has concluded formulation of measures for reinforcing safety at the Ohma Nuclear Power Plant.

Based on the new safety standards, measures for reinforcing safety have been examined, including design reviews.

For design basis to prevent severe accidents, J-POWER will further strengthen earthquake and tsunami resistant measures, and for the newly established measures against severe accidents, J-POWER will incorporate measures to prevent core damage and containment vessel failure, and install a specified severe accident response facility as a countermeasure to terrorist attacks such as airplane crash.

(Main premises)

Standard seismic motion:  $650 \text{ cm/s}^2$  (previously  $450 \text{ cm/s}^2$ )

Design basis tsunami: Highest sea water level: T.P. +6.3 m (previously +4.4 m),  
Lowest sea water level: T.P. -4.1 m (previously -3.8 m)

In the Ohma Nuclear Power Plant, all measures are being implemented during construction, including the specified severe accident response facility which is subject to transitional measures for five years after the regulations are enforced, to create a safe power plant.

The construction works for measures for reinforcing safety that have been formulated this time are scheduled to commence in November 2015 toward completion in December 2020. The planned construction budget is approximately 130 billion yen.  
(The construction plan is based on J-POWER's projections, which incorporate estimations of examination and permit process durations by the Nuclear Regulatory Authority.)

Please note that explanations on the outline of the measures for reinforcing safety have been made today to Aomori Prefecture, the town of Ohma and others.

Further, this project does not affect earnings for the current period.

[Attachment]

Outline of Measures for Reinforcing Safety at Ohma Nuclear Power Plant

[Reference]

Overview of Ohma Nuclear Power Plant

Location	Ohma-machi, Shimokita-gun, Aomori Prefecture
Capacity	1,383MW
Type of nuclear reactor	Advanced Boiling Water Reactor (ABWR)
Fuel	Enriched uranium and uranium-plutonium mixed oxide (MOX)
Commencement of operations	To be determined

# Outline of Measures for Reinforcing Safety at Ohma Nuclear Power Plant

- We report on plans that have been drawn up regarding measures for reinforcing safety at the Ohma Nuclear Power Plant.
- Based on the new safety standards, measures for reinforcing safety have been examined, including design reviews.
- Including the specified severe accident response facility which is subject to transitional measures for five years after the regulations are enforced, all measures will be implemented during construction to create a safe power plant at the Ohma Nuclear Power Plant. (Main premises)
  - Standard seismic motion: 650 cm/s<sup>2</sup> (previously 450 cm/s<sup>2</sup>)
  - Design basis tsunami: Highest sea water level: T.P. +6.3 m (previously +4.4 m), Lowest sea water level: T.P. -4.1 m (previously -3.8 m)

## < Main measures >

**Installation of specified severe accident response facility \*2:**  
 Install as measures to facilitate the cooling of the containment vessel and other facilities even in situations where large-scale destruction has rendered equipment widely unusable, for example as a result of intentional aircraft crashes or other terrorist attacks, and separate to the below design basis measures

**Measures to prevent containment vessel failure:**  
 Measures to contain the accident in the event that core damage occurs

**Measures to prevent core damage:**  
 Maintaining cooling of the reactor and fuel pools  
 Ensuring alternative water injecting function, alternative power sources, water sources

**Measures to prevent damage due to external impact:**  
 Volcanic eruption: Assess feasibility of volcanic ash, etc., reaching the site  
 Tornado: Impact assessment of wind speed of tornado, flying objects  
 External fires: Impact assessment of fires such as forest fires, and fires caused by aircraft crashes

**Measures to prevent damage from earthquakes:**  
 Based on latest findings and research on past earthquakes and active faults around Ohma, formulating standard seismic motion of 650 cm/s<sup>2</sup> (previously 450 cm/s<sup>2</sup>), implementing seismic resistant designs

**Measures to prevent damage from tsunamis:**  
 Based on latest findings on the 2011 off the Pacific coast of Tohoku Earthquake Tsunami (simultaneous ruptures, slips), formulating the following design basis tsunami, implementing tsunami-resistant designs:  
 Highest sea water level (site) approx. T.P. +6.3 m (previously T.P. +4.4 m)  
 Lowest sea water level (front of intake port) approx. T.P. -4.1 m (previously T.P. -3.8 m)

## 1. Responding to new safety standards

### < Pre-existed safety standards >

Design basis to prevent severe accidents

- Consideration of natural phenomena
- Fire protection
- Reliability of power supply
- Function of other SSCs\*1
- Seismic/tsunami resistance

Against severe accidents & terrorism

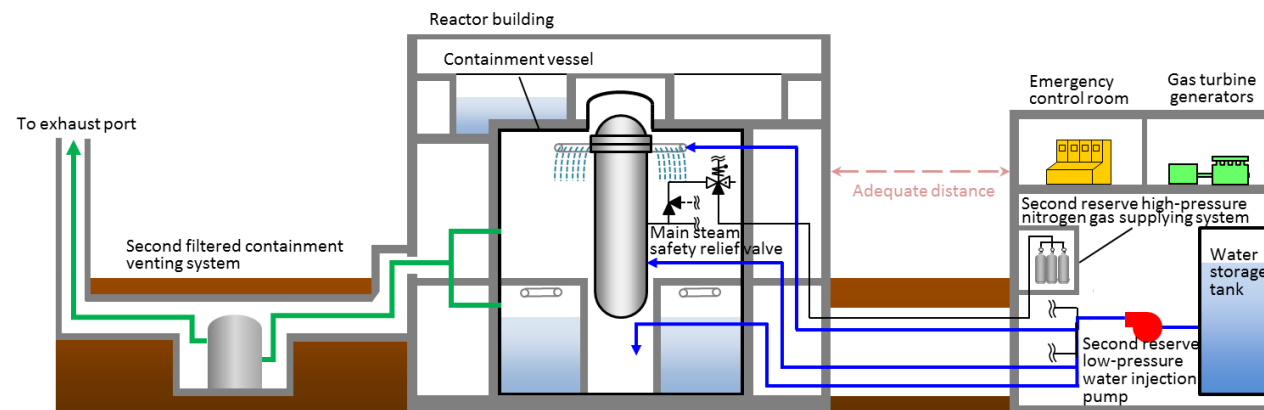
### < New safety standards >

Design basis

- Response to intentional aircraft crash (Counterterrorism)
- Measures to suppress radioactive materials dispersal
- Measures to prevent containment vessel failure
- Measures to prevent core damage (Postulate multiple failures)
- Consideration of internal flooding
- Consideration of natural phenomena (Volcanic eruptions, tornados and forest fires, etc.)
- Fire protection
- Reliability of power supply
- Function of other SSCs\*1
- Seismic/tsunami resistance

\*1 SSCs : Structure, Systems and Components

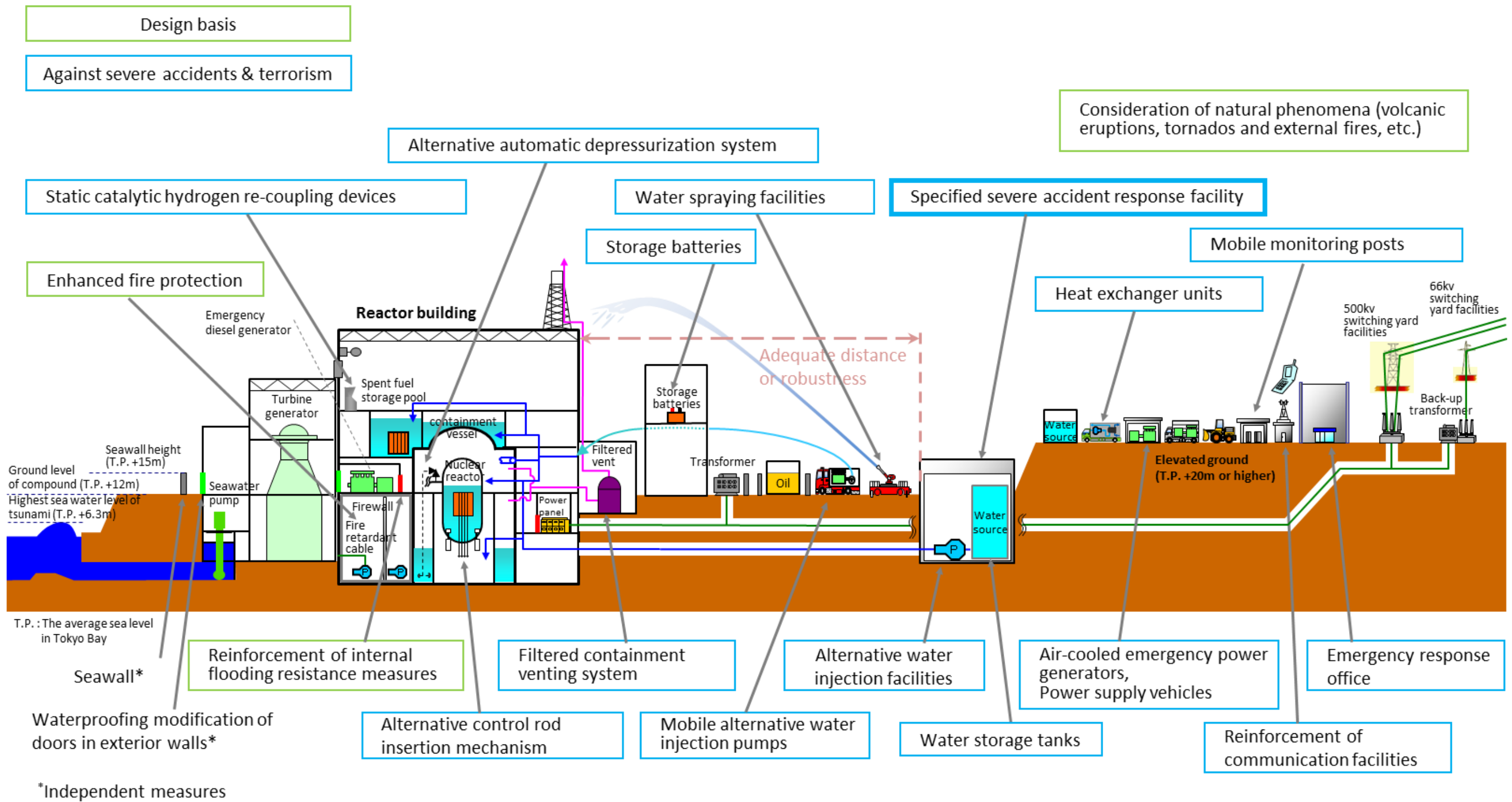
### \*2 Specified severe accident response facility



## 2. Construction plan\*

- Construction plan for measures mentioned above
  - Start of Construction: November 2015 (scheduled)
  - End of Construction: December 2020 (scheduled)

\*The construction plan is based on our projections, which incorporate estimations of examination and permit process durations by the Nuclear Regulatory Authority.



Outline of measures for reinforcing safety at Ohma Nuclear Power Plant

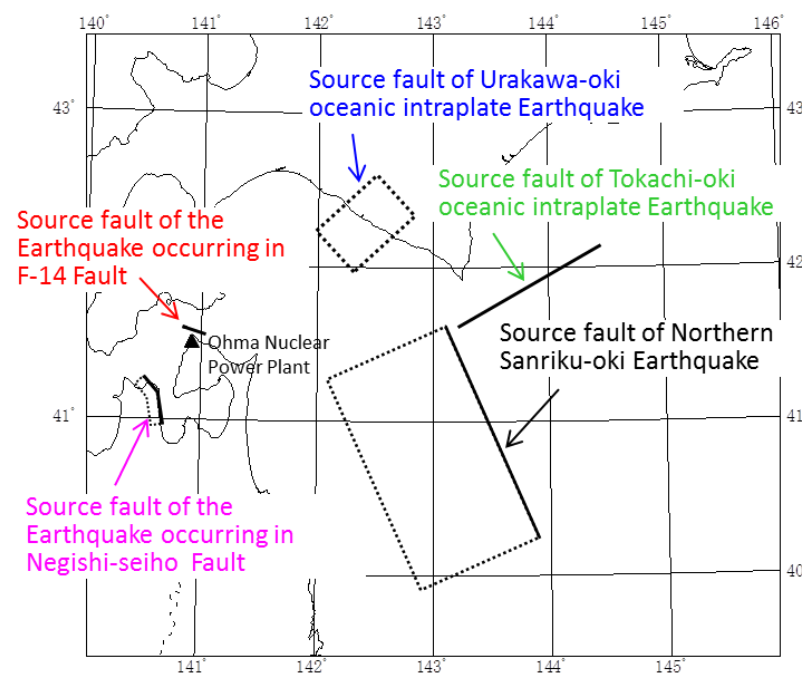
### 1. Earthquakes

- Earthquakes for investigation  
Earthquakes listed below have been investigated by each earthquake type

Earthquake type	Earthquake for investigation	Magnitude
Interplate earthquakes	Northern Sanriku-oki Earthquake* <sup>1</sup>	Mw8.3
Oceanic intraplate earthquakes	Urakawa-oki oceanic intraplate Earthquake	M7.5
	Tokachi-oki oceanic intraplate Earthquake	M8.2
Inland crustal earthquakes	Earthquake occurring in Negishi-seiho Fault* <sup>2</sup>	M7.5
	Earthquake occurring in F-14 Fault	M6.7

\*1: Evaluation considering uncertainty of simultaneous rupture of north-off Sanriku area and off Tokachi and off Nemuro areas along Kuril trench (Mw9.0), based on experience of the 2011 off the Pacific coast of Tohoku Earthquake

\*2: Newly taken into consideration after review of seismic evaluation based on latest findings of reaserches



Source faults of earthquakes for investigation

- Based on latest findings and research on past earthquakes and active faults around Ohma, formulating standard seismic motion

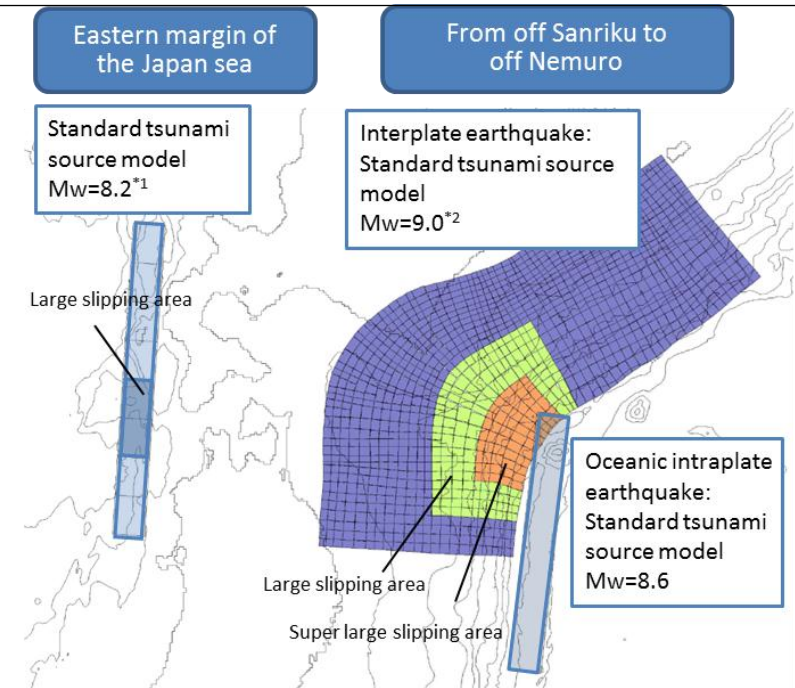


**Standard seismic motion**  
**(Maximum acceleration)**

**Horizontal 650 cm/s<sup>2</sup>**  
**Vertical 435 cm/s<sup>2</sup>**

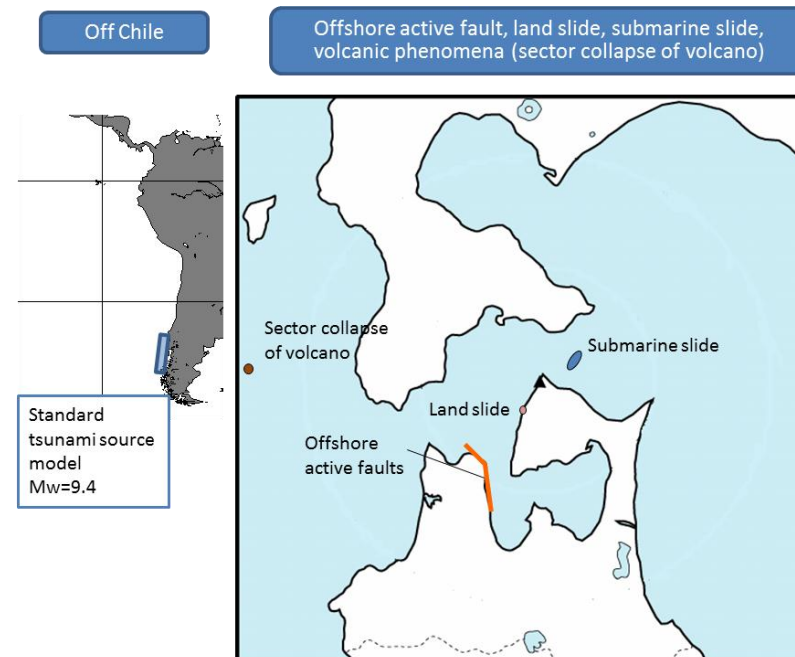
### 2. Tsunamis

- Tsunami source models based on the latest knowledge such as the 2011 off the Pacific coast of Tohoku Earthquake Tsunami
- Estimated earthquakes larger than ever considered as tsunami sources at the eastern margin of the Japan sea, from off Sanriku to off Nemuro, off Chile and offshore active faults
- Taking into consideration of non-earthquake-oriented tsunamis (caused by land slide, submarine slide, sector collapse of volcano)



\*1 Taking into consideration of  
 • simultaneous rupture of 3 areas from west-off Aomori prefecture to southwest-off Hokkaido (L=340km)  
 • heterogeneity of slip (setting of large slipping area)

\*2 Taking into consideration of  
 • simultaneous rupture in wide are, simultaneous rupture with earthquakes near trenches  
 • heterogeneity of slip (setting of super large slipping area)



- The ground level of compound is T.P. +12 m, which is higher than the highest sea water level by design basis tsunami (T.P. +6.3 m), so there is no concern about design basis tsunami reaching and flowing into the site from ground level
- Additional measures for tsunamis that are greater than design basis tsunami shall be implemented to further improve reliability
- The seawater pump is situated within turbine building that is highly robust and watertight
- In case of the lowest sea water level by design basis tsunami (T.P. -4.1 m), the sea water level recedes slightly below the foundation height of the front of the intake port, but seawater stored within the intake passage (about 6,600 m<sup>3</sup>) provides sufficient intake volumes for the nuclear reactor auxiliary machine cooling sea water system