Information on Status of Nuclear Power Plants in Fukushima

Policy on information and compilation
This JAIF-compiled information chart represents the situation, phenomena, and operations in which JAIF estimates and guesses the reactors and related facilities are, based on the latest data and information directly and indirectly made available by the relevant organizations when JAIF’s updating works done. Consequently, JAIF may make necessary changes to descriptions in the chart, once (1) new developments have occurred in the status of reactors and facilities and (2) JAIF has judged so needed after reexamining the prior information and judgments. JAIF will do its best to keep tracks on the information on the nuclear power plants quickly and accurately.
Status of nuclear power plants in Fukushima as of 12:00, May 15th (Estimated by JAIF)

<table>
<thead>
<tr>
<th>Power Station</th>
<th>Fukushima Dai-ichi Nuclear Power Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit</td>
<td></td>
</tr>
<tr>
<td>Electric / Thermal Power output (MW)</td>
<td>460 / 1380 2 784 / 2391 784 / 2391 784 / 2391 784 / 2391 1100 / 3293</td>
</tr>
<tr>
<td>Type of Reactor</td>
<td>BWR-3  BWR-4  BWR-4  BWR-4  BWR-5</td>
</tr>
</tbody>
</table>

Operation Status at the earthquake occurred
- In Service -> Shutdown

Fuel assemblies loaded in Core
- 400
- 548
- 548
- No fuel rods

Core and Fuel Integrity (Loaded fuel assemblies)
- Core and Fuel Integrity (Loaded fuel assemblies)
- Not Damaged

Reactor Pressure Vessel structural integrity
- Damage and Leakage Suspected

Containment Vessel structural integrity
- Damage and Leakage Suspected

Core cooling requiring AC power 1 (Large volumetric freshwater injection)
- Not Functional

Core cooling requiring AC power 2 (Cooling through Heat Exchangers)
- Not Functional

Influence to the people's life
- Radiation level: 392μSv/h

Influence to the people's life
- Radioactive Iodine and cesium have been detected in the seabed samples taken 15-20 km far from the plant from 15-20m deep. Level of radiation is 100 to 1,000 times above normal.

Environmental effect
- Small amount of strontium was detected in some samples of soil and plants collected in the area 20-80 km away from the power station.

Evacuation
- Shall be evacuated for within 3km from NPS
- Shall stay indoors for within 10km from NPS (issued at 05:44, Mar. 12th)
- Shall be evacuated for within 20km from NPS (issued at 18:25, Mar. 12th)
- Shall stay indoors (issued at 11:00, Mar. 15th), Should consider leaving (issued at 11:30, Mar. 25th) for from 20km to 30km from NPS
- The 20km evacuation zone

INES (estimated by NISA)
- Level 1
  - NISA: News Release (-5/13 12:00), Press conference
  - NSC: Nuclear Safety Commission of Japan
- Level 2
  - NSC: News Release (-5/13 17:00)
- Level 3
  - NSC: News Release (-5/13 12:00), Press conference

[Abbreviations]
- TEPICO: Tokyo Electric Power Company, Inc.
- NISA: Nuclear Safety Commission of Japan
- INES: International Nuclear Event Scale
- MEXT: Ministry of Education, Culture, Sports, Science and Technology

[Significancejudged by JAIF]
- Low
- Medium
- High
- Severe (Need immediate action)

#1 TEPICO’s estimation revised on Apr 27
#2 Correction: Rating was raised from 5 to 7 for the accident of Unit 1 through 3
#3 It is presumed that some of the spent fuel may have been damaged based on radioactive substance detected from the water sample taken from the pool of Unit 4.
#4 Small amount of strontium was detected in some samples of soil and plants collected in the area 20-80 km away from the power station.
#5 Correction: Rating was raised from 5 to 7 for the accident of Unit 1 through 3
### Fukushima Dai-ichi Nuclear Power Station

<table>
<thead>
<tr>
<th>Power Station</th>
<th>Unit</th>
<th>Electric / Thermal Power output (MW)</th>
<th>Type of Reactor</th>
<th>Operation Status at the earthquake occurred</th>
<th>Status</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td></td>
<td>BWR-5</td>
<td>In Service -&gt; Automatic Shutdown</td>
<td>Level 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td>BWR-5</td>
<td>Level 3 - Level 3</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td>BWR-5</td>
<td>All the units are in cold shutdown</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td></td>
<td>BWR-5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- INES (estimated by NISA): Level 3
- Remarks: All the units are in cold shutdown.
- Unit 1, 2, 3 & 4, which were in full operation when the earthquake occurred, all shutdown automatically.
- External power supply was available after the quake. While injecting water into the reactor pressure vessel using make-up water system, TEPCO recovered the core cooling function and made the unit into cold shutdown state one by one.
- No parameter has shown abnormality after the earthquake occurred off an shore of Miyagi prefecture at 23:32, Apr. 7th.
- Latest Monitor Indication: 1.7 μSv/h at 09:30, May 15th at NPS border
- Evacuation Area: 3km from NPS (3/12 7:45), 10km from NPS (3/12 17:39), 8km from NPS (4/21)

### Onagawa Nuclear Power Station

<table>
<thead>
<tr>
<th>Power Station</th>
<th>Unit</th>
<th>Operation Status at the earthquake occurred</th>
<th>Status</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>In Service -&gt; Automatic Shutdown</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td>All the units are in cold shutdown</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Remarks: 3 out of 4 external power lines in service with another line under construction broke down after an earthquake occurred off the shore of Miyagi prefecture at 23:32, Apr. 7th. All 5 external power lines have become available by Apr. 10th. Monitoring posts' readings have shown no abnormality. All SFP cooling systems had been restored after shutting down due to the earthquake.

### Tokai Dai-ichi Nuclear Power Station

<table>
<thead>
<tr>
<th>Power Station</th>
<th>Operation Status at the earthquake occurred</th>
<th>Status</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In Service -&gt; Automatic Shutdown</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>All in cold shutdown</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Remarks: No abnormality has been found after an earthquake occurred off the shore of Miyagi prefecture at 23:32, Apr. 7th.
Parameters in the Table

JAIP picks up those parameters to evaluate safety condition of the nuclear plants during this accident from the viewpoint of the principles of nuclear power plant safety, which are "Shutdown", "Cooling" and "Containment''. Then we create the chart. The following diagram is to show the correspondence relation of those parameters in the table to nuclear power plant safety.
1. Latest major event and response

May 10th
13:09-14:45 Operation of injecting water to the Unit 3 SFP was conducted
Briefly, home visit of evacuees has been started:
54 households, 92 people, have done on May 10th. More visits are planned for 50 households on May 12th and are being scheduled for 120 households. Visits of the rest are planned in the end of May.
May 11th
12:50 Water flow into a pit for the Unit 3 water intake power cables was found. Sampling of the water was conducted.
18:45 Stop of the flow water was confirmed after blocking the flow pass by injecting concrete.
May 12th
05:00 Instrumental readings of the water page of the reactor No1 went off the scale on the lower side after adjusting the gage.

2. Chronology of Nuclear Power Stations

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 10th</td>
<td>12:30 Water flow into a pit for the Unit 3 water intake power cables was found. Sampling of the water was conducted.</td>
</tr>
<tr>
<td></td>
<td>18:45 Stop of the flow water was confirmed after blocking the flow pass by injecting concrete.</td>
</tr>
<tr>
<td>May 11th</td>
<td>05:00 Instrumental readings of the water page of the reactor No1 went off the scale on the lower side after adjusting the gage.</td>
</tr>
</tbody>
</table>

*The Act on Special Measures Concerning Nuclear Emergency Preparations*
May 1 13:35 The work to block the vertical concrete tunnel outside the turbine bldg started.

May 2 12:58 Water feeding was temporarily switched from to the reactor injection pump to the fire pump to install alarm device to the reactor injection pump.

May 6 09:36 Water injected the SFP conducted

May 7 09:22 Operation of discharging water accumulated in the concrete tunnel outside turbine bldg to he waste processing facility temporally stopped while piping work for feeding water into the reactor being conducted.

May 10 13:09 Water injected the SFP conducted

May 12 15:20 Operation of discharging water accumulated in the concrete tunnel outside turbine bldg to the waste processing facility temporally restarted.

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<table>
<thead>
<tr>
<th>Major Data</th>
<th>Reactor Water level (May 13 11:00)</th>
<th>Reactor Water level (May 13 11:00)</th>
<th>Reactor Water level (May 13 11:00)</th>
<th>SFP water temperature measured with a concrete pump vehicle</th>
<th>Water temperature of SFP Unit 5 (May 13 12:00)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) lower than the scale: (B) -1750mm</td>
<td>(A) -1500mm, (B) -2100mm</td>
<td>(A) -1900mm, (B) -2200mm</td>
<td>(A) -2000mm, (B) -2200mm</td>
<td>Apr. 12 : about 90°C</td>
<td>42.8°C (May 13 12:00)</td>
</tr>
<tr>
<td>Reactor pressure (May 13 11:00)</td>
<td>Reactor pressure (May 13 11:00)</td>
<td>Reactor pressure (May 13 11:00)</td>
<td>Reactor pressure (May 13 11:00)</td>
<td>22 before spray : about 91°C</td>
<td>37°C (May 13 12:00)</td>
</tr>
<tr>
<td>(A) 0.478MPaG, (B) 1298MPaG*2</td>
<td>(A) -0.018MPaG<em>2, (B) -0.016MPaG</em>2</td>
<td>(A) -0.018MPaG<em>2, (B) -0.016MPaG</em>2</td>
<td>(A) -0.018MPaG<em>2, (B) -0.016MPaG</em>2</td>
<td>23 before spray : about 83°C</td>
<td>37°C (May 13 12:00)</td>
</tr>
<tr>
<td>CV pressure (May 13 11:00). Water pressure (May 13 11:00)</td>
<td>CV pressure (May 13 11:00). Water pressure (May 13 11:00)</td>
<td>CV pressure (May 13 11:00). Water pressure (May 13 11:00)</td>
<td>CV pressure (May 13 11:00). Water pressure (May 13 11:00)</td>
<td>23 after spray : about 66°C</td>
<td>37°C (May 13 12:00)</td>
</tr>
<tr>
<td>(A) 0.099MPaG<em>2, (B) 0.097MPaG</em>2</td>
<td>(A) -0.016MPaG<em>2, (B) -0.016MPaG</em>2</td>
<td>(A) -0.016MPaG<em>2, (B) -0.016MPaG</em>2</td>
<td>(A) -0.016MPaG<em>2, (B) -0.016MPaG</em>2</td>
<td>24 before spray : about 86°C</td>
<td>37°C (May 13 12:00)</td>
</tr>
<tr>
<td>RPV temperature (May 13 11:00)</td>
<td>RPV temperature (May 13 11:00)</td>
<td>RPV temperature (May 13 11:00)</td>
<td>RPV temperature (May 13 11:00)</td>
<td>24 after spray : about 81°C</td>
<td>37°C (May 13 12:00)</td>
</tr>
<tr>
<td>114.6°C at feed water line nozzle</td>
<td>114.6°C at feed water line nozzle</td>
<td>114.6°C at feed water line nozzle</td>
<td>114.6°C at feed water line nozzle</td>
<td>25 before spray : about 86°C</td>
<td>37°C (May 13 12:00)</td>
</tr>
<tr>
<td>Water temperature in SFP (May 13 11:00)</td>
<td>Water temperature in SFP (May 13 11:00)</td>
<td>Water temperature in SFP (May 13 11:00)</td>
<td>Water temperature in SFP (May 13 11:00)</td>
<td>26 before spray : about 86°C</td>
<td>37°C (May 13 12:00)</td>
</tr>
<tr>
<td>45.0°C</td>
<td>45.0°C</td>
<td>45.0°C</td>
<td>45.0°C</td>
<td>27 before spray : about 86°C</td>
<td>37°C (May 13 12:00)</td>
</tr>
<tr>
<td>Thermography (Apr. 29 07:30)</td>
<td>Thermography (Apr. 29 07:30)</td>
<td>Thermography (Apr. 29 07:30)</td>
<td>Thermography (Apr. 29 07:30)</td>
<td>28 before spray : about 86°C</td>
<td>37°C (May 13 12:00)</td>
</tr>
<tr>
<td>RPV temperature (May 13 11:00)</td>
<td>RPV temperature (May 13 11:00)</td>
<td>RPV temperature (May 13 11:00)</td>
<td>RPV temperature (May 13 11:00)</td>
<td>30 before spray : about 86°C</td>
<td>37°C (May 13 12:00)</td>
</tr>
<tr>
<td>155.4°C</td>
<td>155.4°C</td>
<td>155.4°C</td>
<td>155.4°C</td>
<td>31 before spray : about 86°C</td>
<td>37°C (May 13 12:00)</td>
</tr>
<tr>
<td>at feed water line nozzle</td>
<td>at feed water line nozzle</td>
<td>at feed water line nozzle</td>
<td>at feed water line nozzle</td>
<td>32 before spray : about 86°C</td>
<td>37°C (May 13 12:00)</td>
</tr>
<tr>
<td>Thermography (Apr. 26 07:30)</td>
<td>Thermography (Apr. 26 07:30)</td>
<td>Thermography (Apr. 26 07:30)</td>
<td>Thermography (Apr. 26 07:30)</td>
<td>33 before spray : about 86°C</td>
<td>37°C (May 13 12:00)</td>
</tr>
<tr>
<td>Top of R/B: 4°C</td>
<td>Top of R/B: 4°C</td>
<td>Top of R/B: 4°C</td>
<td>Top of R/B: 4°C</td>
<td>35 before spray : about 86°C</td>
<td>37°C (May 13 12:00)</td>
</tr>
<tr>
<td>Water temperature of SFP Unit 6 (May 13 12:00)</td>
<td>Water temperature of SFP Unit 6 (May 13 12:00)</td>
<td>Water temperature of SFP Unit 6 (May 13 12:00)</td>
<td>Water temperature of SFP Unit 6 (May 13 12:00)</td>
<td>36 before spray : about 86°C</td>
<td>37°C (May 13 12:00)</td>
</tr>
<tr>
<td>37°C</td>
<td>37°C</td>
<td>37°C</td>
<td>37°C</td>
<td>37°C</td>
<td>37°C (May 13 12:00)</td>
</tr>
</tbody>
</table>

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Unit 5

Water temperature measured with a concrete pump vehicle

Apr. 12 : about 90°C
22 before spray : about 91°C
23 before spray : about 83°C
23 after spray : about 66°C
24 before spray : about 86°C
24 after spray : about 81°C
3. State of Emergency Declaration
11th 19:03 State of nuclear emergency was declared (Fukushima Dai-ichi NPS)
12th 07:45 State of nuclear emergency was declared (Fukushima Dai-ni NPS)

4. Evacuation Order
11th 21:23 PM direction: for the residents within 3km radius from Fukushima I to evacuate, within 10km radius from Fukushima I to stay in-house
12th 05:44 PM direction: for the residents within 10km radius from Fukushima I to evacuate
12th 17:39 PM direction: for the residents within 10km radius from Fukushima I to evacuate
15th 11:06 PM direction: for the residents within 20-30km radius from Fukushima I to stay in-house

25th Governmental advise: for the residents within 20-30 km radius from Fukushima I to voluntarily evacuate

Abbreviations:
SFP: Spent Fuel Storage Pool
EDG: Emergency Diesel Generator
RPV: Reactor Pressure Vessel
R/B: Reactor Building
RHR: Residual Heat Removal system
CST: Condensate water Storage Tank
T/B: Turbine Building

*1 Trend data of primary parameters are available at Japan Nuclear Technology Institute’s Home Page: "http://www.gengikyo.jp/english/shokai/special_4.html".
*2 Data trend is continuously monitored.