### Status of Nuclear Power Plants in Fukushima as of 10:00 March 23 (Estimated by JAIF)

<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><strong>Fukushima Dai-ichi Nuclear Power Station</strong></td>
<td>1</td>
<td>460 / 1380</td>
<td>BWR-3</td>
<td>In Service -&gt; Shut down</td>
<td>Safe</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>784 / 2381</td>
<td>BWR-4</td>
<td>In Service -&gt; Shut down</td>
<td>Safe</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>784 / 2381</td>
<td>BWR-4</td>
<td>Outage</td>
<td>Safe</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>784 / 2381</td>
<td>BWR-4</td>
<td>Outage</td>
<td>Safe</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>784 / 2381</td>
<td>BWR-4</td>
<td>Outage</td>
<td>Safe</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>1100 / 3293</td>
<td>BWR-5</td>
<td>Outage</td>
<td>Safe</td>
<td></td>
</tr>
</tbody>
</table>

### Remarks

- Core and Fuel Integrity:
  - In Service -> Shut down
  - In Service -> Shutdown
  - Shut down
- Reactor Pressure Vessel Integrity:
  - Unknown
- Containment Vessel Integrity:
  - Not Damaged
  - Damage Suspected
- Core cooling requiring AC power 1 (Injection):
  - Not Functional
- Core cooling requiring AC power 2 (Cooling through Heat Exchangers):
  - Not Functional
- Core cooling not requiring AC power:
  - Not Functional
- Building Integrity:
  - Severely Damaged
  - Slightly Damaged
- Water Level of the Reactor Pressure Vessel:
  - Fuel exposed partially or fully
- Pressure of the Reactor Pressure Vessel:
  - Stable
- Containment Vessel Pressure:
  - Stable
- Water injection to core (Accident Management):
  - (Confirming) to be decided
- Containment venting (AM):
  - Temporarily stopped
- Fuel Integrity in the spent fuel pool:
  - Water injection to be considered
- Environmental effect:
  - Radioactive nuclides exceeding the national regulatory standard were detected in milk produced in Fukushima prefecture and spinach produced in Ibaraki, Fukushima, Tochigi, and Gunma prefectures. Also, radioactive iodine exceeding the standard set by Nuclear Safety Commission was detected in tap water in Fukushima prefecture. The level of the radioactivity detected is low enough not to do harm to the health of people who take those products or water for a limited time. Monitoring results of seawater sampled at coasts in the surrounding area of the station showed that radioactive Iodine, 1-131, and Cesium, Cs-137, 137 exceeding the regulatory limit were detected.

### Remarks

- Immediate threat is damage of the fuels in the fuel pool outside the containment vessel. The operation for spraying water to the pool is continuing at Unit 3 and 4.
- Police to recover AC power for Unit 1 through 6 is in progress. External AC power has reached to Unit 2, 4, 5 and 6 and is now available in all the units. Integrity check of electric equipment is going on in each unit, which must be done before energizing them. Lighting has been recovered at Unit 3 Main Control Room. External AC power has partly replaced with the power from emergency diesel generator in Unit 6.
- Evacuation Area: 10km from NPS
- In Service -> Automatic Shutdown
- Safe
- Low
- High
- Severe (Need immediate action)

### Source

- Government Nuclear Emergency Response Headquarters: News Release (-3/23 7:00), Press conference
- NISA: News Release (-3/22 18:00), Press conference
- TEPCO: Press Release (-3/23 7:00), Press Conference

### Abbreviations

- INES: International Nuclear Event Scale
- NISA: Nuclear and Industrial Safety Agency
- TEPCO: Tokyo Electric Power Company, Inc.
Parameters in the Table

JAP picks up these 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 these parameters in the table to nuclear power plant safety.

Nuclear Power Plant Safety and related items

- **Reactor Safety**
  - **Shutdown**
    - Design base cooling capability
  - **Cooling**
    - Design base containment function
    - Fifth Barriers
      - Fuel Pellet
      - Cladding Tube
      - Reactor Pressure vessel
  - **Containment**
    - Containment Vessel
    - Reactor Building

- **Accident Management (AM)** (Operation beyond design base accident)
  - Alternative Cooling operation
  - Operation for containment vessel breach protection
  - Water injection to core (AM)
  - Water injection to Containment Vessel (AM)
  - Containment repair (AM)

- **Operation Status at the earthquake occurred**
  - Core cooling requiring AC power
  - Core cooling not requiring AC power
  - Water level of the reactor pressure vessel
  - Pressure of the reactor pressure vessel
  - Building Integrity

- **Fuel Integrity in the spent fuel pool**
  - Fuel Integrity in the spent fuel pool (Temp, Level, Fuel integrity)

- **Environmental effect**
  - Environmental effect (Radiation Monitor)

- **Evacuation**
  - Evacuation (Order, Evacuated Area)
Accidents of Fukushima Dai-ichi and Fukushima-Dai-ni Nuclear Power Stations

(March 23rd, 2011 07:00)

1. Latest Major Incidents and Actions

14:30 Unit 5 cold shutdown
19:27 Unit 6 cold shutdown

15:55 Slightly gray smoke erupted from Unit 3 (18:02 settled)
18:22 White smoke erupted from Unit 2

12:05:44 PM direction: for the residents within 10km radius from Fukushima I to evacuate
12:17:39 PM direction: for the residents within 10km radius from Fukushima II to evacuate
12:18:25 PM direction: for the residents within 20km radius from Fukushima I to evacuate
15:11:06 PM direction: for the residents within 20-30km radius from Fukushima I to stay in-house

2. Chronology of Nuclear Power Stations

(1) Fukushima Dai-ichi NPS

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Unit</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>11th</td>
<td>Report IAW Article 10* (Loss of power)</td>
<td>Unit 1</td>
<td>-</td>
</tr>
<tr>
<td>11th</td>
<td>Event falling under Article 15* (Abnormal rise of CV pressure)</td>
<td>Unit 2</td>
<td>-</td>
</tr>
<tr>
<td>11th</td>
<td>Event falling under Article 15* (Loss of reactor cooling functions)</td>
<td>Unit 3</td>
<td>-</td>
</tr>
<tr>
<td>14th</td>
<td>Water temperature in Spent Fuel Storage Pool increased at 84℃</td>
<td>Unit 4</td>
<td>Water temperature in SF Storage Pool is increasing</td>
</tr>
<tr>
<td>14th</td>
<td>Coast of nuclear emergency was declared (Fukushima Dai-ni NPS)</td>
<td>Unit 5, 6</td>
<td>Work to recover external AC power is in progress. External AC power has reached to Unit 2.</td>
</tr>
</tbody>
</table>

3. State of Emergency Declaration

11th 19:03 State of nuclear emergency was declared (Fukushima Dai-ni NPS)
12th 07:45 State of nuclear emergency was declared (Fukushima Daiichi 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 II to evacuate
12th 18:25 PM direction: for the residents within 20km 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
The accident that brings environmental impact is going on at several units in Fukushima Daiichi nuclear power Station after the earthquake occurred on March 11th. Other nuclear power plants in Japan are in normal operation or safely shutdown.