## Status of nuclear power plants in Fukushima as of 22:00 March 21 (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>INES (estimated by NISA)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>460 / 1380</td>
<td>BWR-3</td>
<td>In Service -&gt; Shutdown</td>
<td>Safe</td>
<td>Level 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>784 / 2381</td>
<td>BWR-4</td>
<td>In Service -&gt; Shutdown</td>
<td>Safe</td>
<td>Level 5</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>Level 5</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>Level 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>784 / 2381</td>
<td>BWR-5</td>
<td>Outage</td>
<td>Safe</td>
<td>Level 3</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>Level 3</td>
<td></td>
</tr>
</tbody>
</table>

### Power Station: Fukushima Dai-ichi Nuclear Power Station
- **Unit 1, 2, 3 & 4**: In service → Automatic Shutdown. All the units are in cold shutdown.
- **Unit 5 & 6**: Outage. All the units are in cold shutdown.
- **Remarks**: Low

### Power Station: Onagawa Nuclear Power Station
- **Operation Status at the earthquake occurred**: In Service -> Automatic Shutdown.
- **Status**: All the units are in cold shutdown.
- **Remarks**: Safe

### Power Station: Tokai Dai-ii
- **Operation Status at the earthquake occurred**: In Service -> Automatic Shutdown.
- **Status**: In cold shutdown.
- **Remarks**: Safe

### Abbreviations
- **INES**: International Nuclear Event Scale
- **NISA**: Nuclear and Industrial Safety Agency
- **TEPCO**: Tokyo Electric Power Company, Inc.

### Source
- Governmental Emergency Headquarters: News Release (~3/21 19:00), Press conference
- TEPCO: Press Release (~3/21 15:00), Press Conference
Parameters in the Table
JAIP picks up these parameters to evaluate safety condition of the nuclear plants during this accident from the view point 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
  - Coolant capability

- Containment
  - Design base containment function
  - Fifth Barriers
    - Fuel Pellet
    - Cladding Tube
    - Reactor Pressure vessel

- Alternative Operation
  - Water injection to core (AM)
  - Water injection to Containment Vessel (AM)
  - Fuel Integrity in the spent fuel pool (AM)
  - Environmental effect (Radiation Monitor)
  - Evaluation (Order, Evacuated Area)

- 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
  - Containment vessel pressure
  - Containment vessel integrity
  - Building integrity

- Operation for containment vessel breach protection

- Environmental effect
  - Evacuation
Accidents of Fukushima Dai-ichi and Fukushima-Dai-ni Nuclear Power Stations (March 21, 2011 19:00)

1. Latest Major Incidents and Actions
   <March 19>
   05:00: AC power source provided by emergency diesel generator becomes available at unit-5 and 6. Cooling of the spent fuel pool started at unit-5.
   08:10: Radiation measured at the west gate of the power station is 830.8 μSv/h.
   22:14: Cooling of the spent fuel pool started at unit-6.
   <March 20>
   14:30: Unit-5 cold shutdown
   19:27: Unit-6 cold shutdown

2. Chronology of Nuclear Power Stations (Fukushima Dai-ichi NPS)

<table>
<thead>
<tr>
<th>Date</th>
<th>Unit 1</th>
<th>Unit 2</th>
<th>Unit 3</th>
<th>Unit 4</th>
<th>Unit 5, 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>11th 15:42</td>
<td>Report IAW Article 10* (Loss of power)</td>
<td>Report IAW Article 10* (Loss of power)</td>
<td>Report IAW Article 10* (Loss of power)</td>
<td>Water temperature in Spent Fuel Storage Pool increased at 84°C</td>
<td>Water temperature in SF Storage Pool is increasing</td>
</tr>
<tr>
<td>11th 16:36</td>
<td>Event falling under Article 15* (Loss of reactor cooling function)</td>
<td>Event falling under Article 15* (Loss of reactor cooling function)</td>
<td>Event falling under Article 15* (Loss of reactor cooling function)</td>
<td>15th 09:38 Fire occurred on 3rd floor (extinguished spontaneously)</td>
<td>18th Vent hole was opened on the rooftop for avoiding hydrogen explosion</td>
</tr>
<tr>
<td>12th 00:49</td>
<td>Event falling under Article 15* (Abnormal rise of CV pressure)</td>
<td>Event falling under Article 15* (Abnormal rise of CV pressure)</td>
<td>Event falling under Article 15* (Abnormal rise of CV pressure)</td>
<td>16th 05:45 Fire occurred (extinguished spontaneously)</td>
<td>19th 06:30 RHR-pump in the Unit-5 restarted.</td>
</tr>
<tr>
<td>12th 14:30</td>
<td>Start venting</td>
<td>14th 16:34</td>
<td>13th 13:12</td>
<td>Since 20th, operation of spraying water to the spent fuel pool continues.</td>
<td>20th 14:30 Reactor cold shutdown at Unit-5</td>
</tr>
<tr>
<td>12th 20:20</td>
<td>Seawater injection to RPV</td>
<td>14th 00:00</td>
<td>14th 11:01</td>
<td>Hydrogen explosion</td>
<td>Hydrogen explosion</td>
</tr>
<tr>
<td>12th 20:20</td>
<td>Sound of explosion, Suppression Pool damaged</td>
<td>15th 10:22 Radiation dose 400mSv/h</td>
<td>16th 06:40, 08:47 Radiation dose 400mSv/h</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th 20:20</td>
<td>Seawater injection to RPV</td>
<td>15th 08:25 White smoke reeked</td>
<td>16th 08:34, 10:00 White smoke reeked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12th 21:15</td>
<td>Operation of seawater injection to the spent fuel pool was conducted</td>
<td>Since 17th, operation of spraying water to the spent fuel pool continues.</td>
<td></td>
<td></td>
<td></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 Dai-ichi 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.