**Sequence of events of Fukushima accident**

1. **Timeline for the Fukushima Daiichi nuclear power plant accident(until 17-8-2011)**

Source: <http://www.oecd-nea.org/press/2011/NEWS-04.html>

( The Organization for Economic Co-operation and Development (OECD) is an international economic organization of 34 countries founded in 1961 to stimulate economic progress and world trade. )

* a clear, general description of the accident

**Friday, 11 March 2011 (Day 1) “** An evacuation order is issued for persons within **3 km** of the Fukushima Daiichi NPP.”

**Saturday, 12 March 2011 (Day 2) “**The evacuation zone is extended to **20 km** around Fukushima Daiichi.  **”**

**-Why government made this plan?**

**-How to decide the range of the** evacuation zone?

1. **Timeline for the Fukushima Daiichi nuclear power plant accident(until 14-3-2011)**

Source: <http://www.bbc.co.uk/news/science-environment-12722719>

* a detail description of the accident for the first 3 days

**Sunday, 13 March 2209: “**It is worth noting that using seawater like this is terminal for a nuclear reactor. It is a last-ditch move and renders the reactor permanently unusable.**”**

**-Why sea water would make the** nuclear reactor permanently unusable?

1. **International Nuclear and Radiological Event Scale (INES)**

Source: <http://www-ns.iaea.org/tech-areas/emergency/ines.asp>

-What is INES? -What is the purpose of the INES Scale?

-How does INES operate? -Why use INES?

Why use INES?

Events are classified at seven levels: Levels 1–3 are “incidents” and Levels 4–7 “accidents”. These levels consider **three** areas of impact:
**people and the environment, radiological barriers and control, and defense in depth.** The scale is designed so that the severity of an event is about ten times greater for each increase in level on the scale. Events without safety significance are called “deviations” and are classified Below Scale/Level 0.

-Why Fukushima accident could be graded as level 7 according the above 3 aspects?

**Current status**

# Status of Fukushima Daiichi and Fukushima Daini Nuclear Power Stations after Great East Japan Earthquake

# Source: <http://www.tepco.co.jp/en/nu/fukushima-np/index-e.html>

 Progress Status of "Roadmap towards Restoration from the

 Accident at Fukushima Daiichi Nuclear Power Station, TEPCO" [(PDF 624KB)](http://www.tepco.co.jp/en/press/corp-com/release/betu11_e/images/110817e2.pdf)

 Progress Status Classified by Issues (Photos and Figures) [(PDF 5.42MB)](http://www.tepco.co.jp/en/press/corp-com/release/betu11_e/images/110817e5.pdf)

* + [mitigation](http://hk.wrs.yahoo.com/_ylt%3DA3eg.82ZP3dOqiAAM6l01Lt_/SIG%3D12s6gske2/EXP%3D1316466713/%2A%2Ahttp%3A/hk.dictionary.yahoo.com/dictionary%3Fp%3Dmitigation%26docid%3D1065118),monitoring and decontamination

 [Overview of the Earthquake & Tsunami and Nuclear Accident(1.03MB) (September 8, 2011)](http://www.tepco.co.jp/en/nu/fukushima-np/f1/images/f12np-gaiyou_e_1.pdf)

[Current Status of Fukushima Daiichi and Fukushima Daini Nuclear Power Station(1.83MB) (September 8,2011)](http://www.tepco.co.jp/en/nu/fukushima-np/f1/images/f12np-gaiyou_e_2.pdf)

# Overview, Monitoring

# Fukushima Nuclear Accident Update Log

# Source: <http://www.iaea.org/newscenter/news/tsunamiupdate01.html>

# Including the International Atomic Energy Agency (IAEA) Briefing on Fukushima Nuclear Accident from 11-3-2011 to 2-6-2011

#  - Fukushima Daiichi Nuclear Power Plant Status - Radiation Monitoring -Food Monitoring and Food Restrictions (late April) - Marine Monitoring

**Consequences of Fukushima Accident**

**Development of nuclear plants**

1. Germany's coalition government has announced a reversal of policy that will see all the country's nuclear power plants phased out by 2022.
Shares in German nuclear utilities RWE and E.On fell on the news, though it had been widely expected.
Germany's nuclear industry has argued that an early shutdown would be hugely damaging to the country's industrial base.
from <http://www.bbc.co.uk/news/world-europe-13592208>
2. The Swiss government has decided to phase out nuclear power, amid growing public hostility to the industry
from <http://www.bbc.co.uk/news/world-europe-13549985>
3. France will invest 1bn euros (£0.8bn) in nuclear power despite
warnings after the Fukushima disaster in Japan, President Nicolas Sarkozy says from <http://www.bbc.co.uk/news/world-europe-13924602>

**The economics of Japan**

1. Tokyo Electric Power (Tepco), the owner of the Fukushima nuclear plant damaged in March's earthquake and tsunami, has reported a quarterly loss of 571.8bn yen ($7.4bn; £4.5bn)
Tepco may have to pay compensation of up to $130bn over the incident.
2. The 11 March earthquake and tsunami in Japan that triggered a crisis at the Fukushima nuclear power plant hit the travel and tourism sectors hard.The disaster saw a drop of 31% in demand for domestic travel in Japan in April, compared with the previous year, according to Iata.
Internationally, Japan saw air traffic fall by 20% in April, which has knocked 1% off global international travel.
from <http://www.bbc.co.uk/news/business-13660170>
3. The mood of consumers in Japan deteriorated further in April, a survey has found, as the fallout from the devastating earthquake and tsunami continued to weigh on sentiment
from <http://www.bbc.co.uk/news/business-13387695>

**Development of nuclear power**

1. Instead, the [Ministerial Declaration](http://www.iaea.org/Publications/Documents/Infcircs/2011/infcirc821.pdf) issued on Monday "recognises" that nuclear accidents can have international consequences, talks of increasing co-operation between governments and regulators, and "underlines the benefits of strengthened and high quality independent international safety expert assessments".
In fact, the declaration's only hostage to fortune is that it recognises "the need for a global nuclear liability regime that addresses the concerns of all states that might be affected by a nuclear accident with a view to providing appropriate compensation for nuclear damage
from <http://www.bbc.co.uk/news/science-environment-13865974>
2. Public confidence in the safety of nuclear power has been badly shaken. However, nuclear power will remain important for many countries
from <http://www.bbc.co.uk/news/world-asia-pacific-13835554>

**Affect People**

1. Some 80,000 residents living close to the plant have been forced to abandon their properties.
from <http://www.bbc.co.uk/news/business-13938774>
2. Power shortages-The ongoing crisis at the Fukushima nuclear plant means big companies have been ordered to reduce their electricity consumption by 15%, and the first step for many has been to cut down on air conditioning
from <http://www.bbc.co.uk/news/business-14526293>
3. Food scares- Public concerns have been fuelled by a string of revelations about contaminated food products such as beef, leafy vegetables and milk.
On Tuesday, lobby group Greenpeace claimed it had tested fish caught in the sea 55km from the plant, and had detected higher levels of caesium than normal.
from <http://www.bbc.co.uk/news/world-asia-pacific-14463055>
The Japanese government has banned all shipments of cattle from the Fukushima prefecture on concerns about contaminated beef
from <http://www.bbc.co.uk/news/business-14198789>
4. Life on the edge of Japan's nuclear contamination zone
Displaced – for examples ,The children are fitting into the local school well, but Yukie cannot forget their old lives in Minamisoma.
At an age when most men would have retired, he's been forced to start again after losing everything.
from <http://www.bbc.co.uk/news/world-asia-pacific-14019315>

**Detection**

1. Six more workers at Japan's crippled Fukushima plant are reported to have been exposed to excessive radiation levels, bringing the total to eight.
from <http://www.bbc.co.uk/news/world-asia-pacific-13749904>
2. Low levels of radioactive iodine believed to be from the Fukushima nuclear plant in Japan have been detected in Glasgow and Oxfordshire
The agency said the value reported was consistent with reports from other European countries such as Iceland and Switzerland
from <http://www.bbc.co.uk/news/uk-scotland-glasgow-west-12892383>
3. Very low levels of iodine-131 were detected in air samples from across Scotland after the Japanese nuclear plant was crippled by an earthquake.
From <http://www.bbc.co.uk/news/uk-scotland-highlands-islands-14751113>

**Pros and cons of nuclear energy vs. other energy sources (fossil, solar, other renewable energy)**

1. **Pros and cons of different types of energy**

Sources: <http://www.nuclearpowerprocon.org/>

Provide pros and cons of different energy including Nuclear Energy, Solar Energy, Coal Energy, Natural Gas Energy etc)

1. **Comparison of Fossil Fuels and Nuclear Power**

Source: <http://www.ieer.org/ensec/no-1/comffnp.html>

1. **Non-renewable sources vs renewable sources**

Source:

<http://www.eia.gov/kids/energy.cfm?page=nuclear_home-basics> (Non-renewable)

<http://www.eia.gov/kids/energy.cfm?page=renewable_home-basics> (Renewable)

 Easy to understand

1. **World Nuclear Association**

Source: <http://www.world-nuclear.org/>

Basic knowledge of Nuclear power (Why we using nuclear power? How it works? Pros and cons, background theory etc )

Provide fact and figure ---- many graphs and figures