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The Accident at Fukushima Nuclear Power Plant

For accurate understanding

Updated on April 9, 2011

Facts

- All Fukushima Nuclear Power Reactors are shut down now. This means the nuclear chain reaction has not occurred.
- A part of the fuel assemblies in a core could be damaged and probably a part of them could be melted down as well. They have been trying to bring the temperature down by pouring water and Boron Water into the reactor core.
- All the reported explosions so far are [hydrogen explosions](#).

As of April 9, 2011

The explosion after Mar. 12

- What occurred is Hydrogen Explosion. The fuel was not cooled down properly and the temperature elevated. Due to the high temperature, the metal piping had oxidation reaction and it generated hydrogen. Hydrogen flooded into the building and it exploded.

IT IS NOT A NUCLEAR EXPLOSION!!

This difference is very big!

About “Melt Down”


- Nuclear reactors are usually filled with water to prevent the nuclear fuel in the core from heating over a certain degree of temperature.



- If the water level goes down and the nuclear fuel is exposed, the temperature in the core goes up and the fuel starts to melt. This is called “Melt down”.

- As of Apr. 9, 2011, TEPCO confirmed some parts of the fuel in the reactor core melted down. They keep pouring fresh water into the nuclear reactors to cool them down.

The Result of Hydrogen Explosion

- As the result of releasing the containment pressure (vent), hydrogen explosion occurred and radioactivity was diffused.
 - In addition, the temperature of fuel in the spent fuel pool went up. Thus, they discharged tons of water into it. As a consequence, the water vapor with some radioactivity was diffused into the atmosphere in **Fukushima area**.
- 
- We cannot be exposed to radiation from this in Tokyo as long as cooling them continues.

The status of the power plant as of Apr. 9, 2011. (1)

Reactor No. 1 to No. 3

Fuel in the core: Damaged. (Melted partially or all)

Cooling by pouring fresh water.

Reactor pressure vessel: Unclear whether it's sound.

Reactor containment vessel: The pressure and temperature are getting more stable. (There's possibility that No. 2 is partially damaged. **They're injecting nitrogen so that another hydrogen explosion won't happen.**)

Spent fuel pool: Unclear whether the fuel in the pool is damaged. Cooling by pouring fresh water.

The status of the power plant as of Apr. 9, 2011. (2)

Reactor No. 4

Fuel in the core: No fuel in the core.

(All is in the pool due to its periodic inspection.)

Reactor pressure vessel: It's sound and no problem.

Reactor containment vessel: It's sound and no problem.

Spent fuel pool: There's possibility the fuel in the pool is damaged. Cooling by pouring fresh water.

The status of the power plant as of Apr. 9, 2011. (3)

Reactor No. 5 and No.6 (Holes were created on the roofs to release hydrogen)

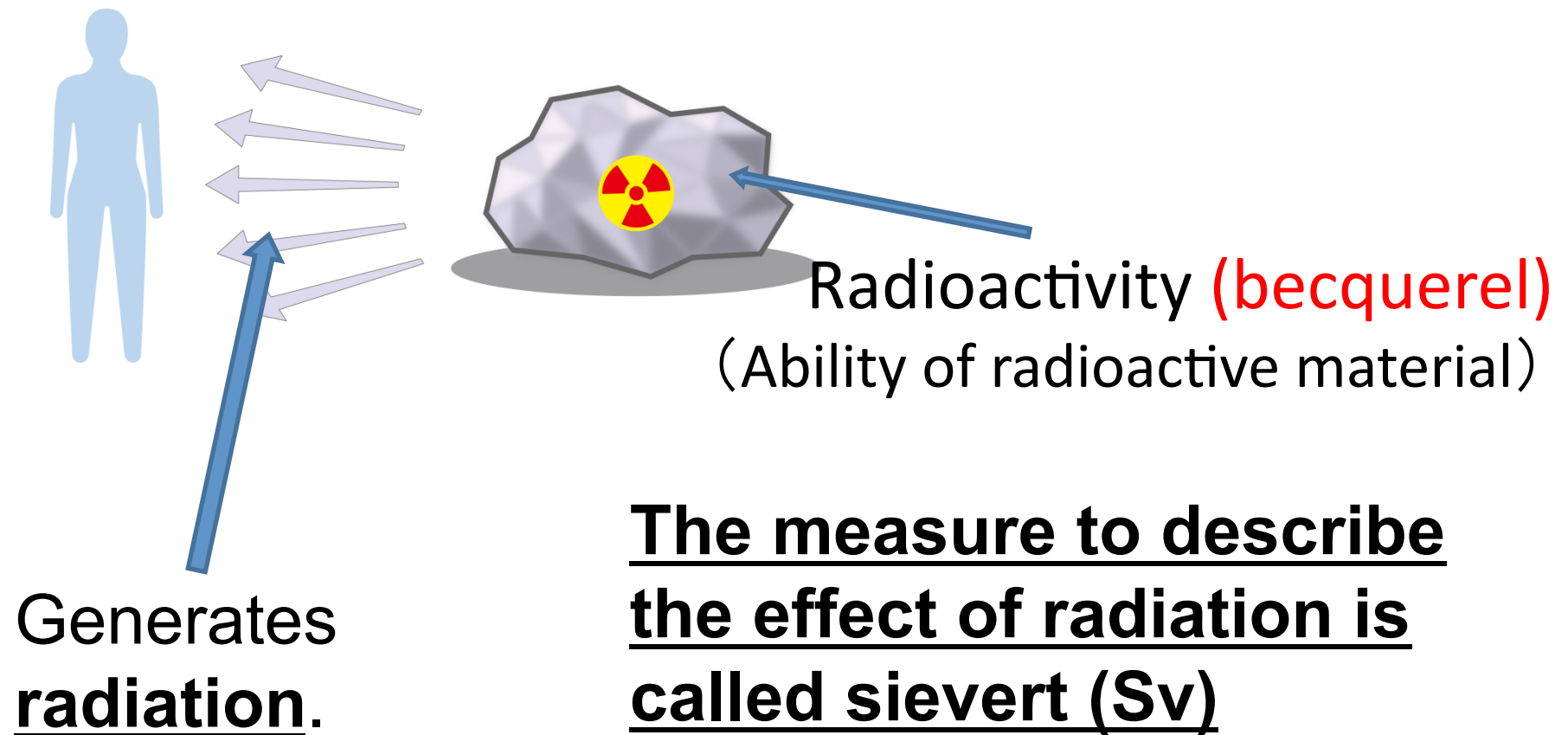
Fuel in the core: It's sound and no problem.

Reactor pressure vessel: It's sound and no problem.

Reactor containment vessel: It's sound and no problem.

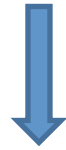
Spent fuel pool: It's sound and no problem.

What is Radioactivity?

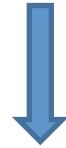


Radiation

- Radiation can be classified in two categories: natural radiation and man-made radiation.



The impact on human body is the same.



- Most of us have experienced it in everyday life, for example, when having an X-ray for stomach examination or dental treatment.

What is Exposure to Radiation?

- It is human body is exposed to radiation.

The measure to describe the effect of radiation to human body is called sievert (Sv).

- In case of exposure to radiation from a place far from your body such as x-ray, it's over if the switch is turned off, or you move away to a place the radiation can't reach.
- Even though radioactive substances are adhered directly to your body, they can be washed off with water (decontamination).

More about Exposure to Radiation

- Even only a tiny amount of radioactive substance is attached to our clothes, it's called "exposure to radiation" and in another word called "radioactive contamination".

- It is not good if the radioactive substance is inhaled from your mouth, as it will remain in your body.
(internal exposure)



- You can prevent internal exposure by wearing a mask we use for a cold or hay fever even though you're in the area to be evacuated to indoors.

Examples of Amount of Radiation

- How much cosmic radiation are we exposed to when flying round-trip from Tokyo to New York?



- A round trip between Tokyo-NY can have you exposed to 200 micro sievert of radiation.

Stomach x-ray: About 2.0 to 4.1 micro sievert

Dental x-ray: About 40 micro sievert

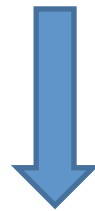
So how much exposure is it now?

- The amount of radiation after 16pm on **Apr. 9** in Shinjuku, Tokyo was **0.083 micro sievert** per hour.
- Japanese standard for ordinary people to receive radiation for daily life, medical treatment, etc per year is 1,000 micro sievert. Converting the current hourly amount into annual one, it's about 300 micro sievert lower than the standard.
 - **The amount of radiation that actually harms human body is 100,000 micro sievert.**

Other Concerns

Pollution situation of towns in Fukushima prefecture, etc

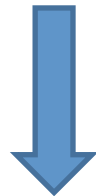
- The amount of radiation on Apr. 8 was 2.3 micro sievert per hour and there'll be no effect to human body.
- Some contamination was detected in the agricultural and fishery products, thus their shipment was suspended.



Later, the shipment suspension was lifted because the safety was confirmed. They added some more detailed management.

Another Concern

- Highly-concentrate contaminated water was drained from the power plant to the sea, but it stopped after the prevention construction was completed. (As of Apr. 6)
- More than 10,000 tons of low-level radioactive liquid waste was released to the sea!



As a result, the radiation you'll receive when you eat the seafood of this area every day for a year is acclaimed to be 1/4 of the radiation you receive from the natural world.



(Reference) 2,400 micro sievert / year

Conclusion about Tokyo?

- As easily imagined from the measured figure of radiation (0.083 micro sievert per hour as of 16pm on Apr. 9 in Shinjuku, there is no problem at this moment.
- The tap water in Tokyo is very safe to drink, however, if you worry, don't.

(The actual data shows it's safe for even infants.)

- The groceries sold in Tokyo are all safe too. Please be careful not to let rumors worry you.

【Note】 About iodine

Potassium iodide is not necessary in Tokyo at all!