

Japan Nuclear Energy Policy: Update

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Japan Atomic Energy Commission (JAEC)

- Is responsible to plan, deliberate and decide a framework for governmental actions to promote research, development and utilization of nuclear energy for the production of energy and the promotion of science and industry, limiting them only to peaceful purposes and assuring nuclear safety and security.
- Decide the Framework of Nuclear Energy Policy that specifies government activities to pursue these purposes, including those for fostering the foundation of nuclear energy utilization such as human resource development, public involvement and international cooperation, across three different time frames; short term, mid-term and long-term.

Short-term Activities

● **The Objective**

- Improve existing activities to utilize nuclear energy technologies so as to utilize them as safely and efficiently as practicable.

● **Major activities to be promoted**

- Ensure the existence of responsible safety and quality management systems in nuclear operators so as to maintain low incident rates and high plant availabilities at their plants.
- Foster the foundation of nuclear energy policy.

Mid-term Activities

- **The objective:**
 - ◆ Add new technologies and systems that will improve the sustainability of nuclear energy supply, responding to one of the most important energy policy goals of pursuing a society with significantly reduced greenhouse gas emissions.
- **Activities to be promoted:**
 - ◆ Prepare advanced light water reactors.
 - ◆ Prepare systems to recycle nuclear fuel and systems for long-term management of nuclear waste.

Long-term Activities

- **The objective**

- ◆ Explore the possibility of radically new energy technologies that will address effectively the challenges of air pollution, climate change and energy supply insecurity.

- **Activities to be promoted**

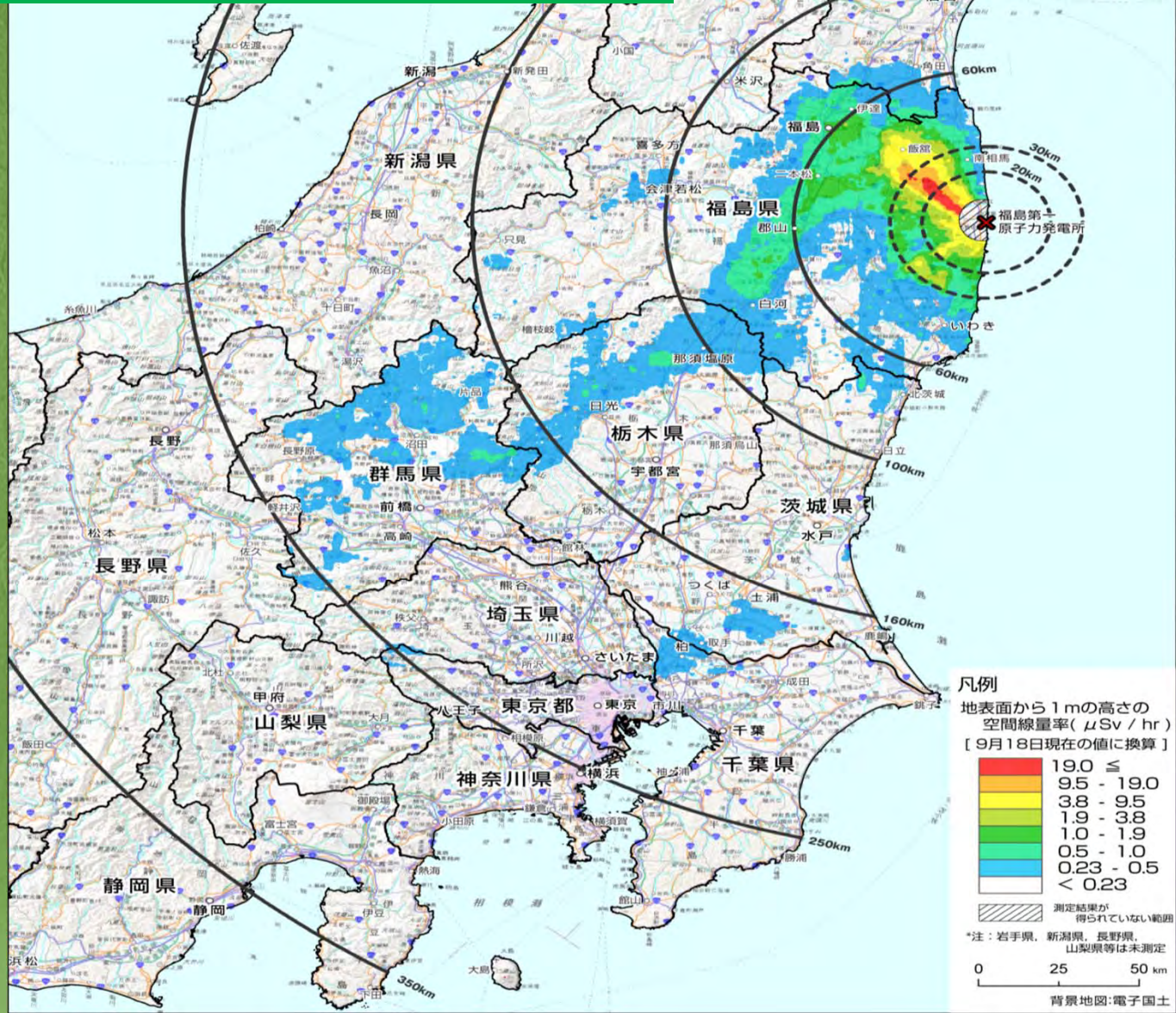
- ◆ Promote the research and development of the fourth generation fission reactors with increased sustainability and with applicability beyond electricity generation,
- ◆ Promote the research and development of nuclear fusion energy technologies,
- ◆ Promote basic and generic research that will enable us to define innovative concepts and measures on which future nuclear energy technologies could rely.

Tsunami waves are hitting TEPCO Fukushima Daiichi NPP.



On March 11, 2011 the Great East-Japan earthquake and the resulting tsunami hit people and facilities including nuclear power plants located on the Pacific coast of Japan. The attack triggered a major accident at TEPCO Fukushima Daiichi NPP.

Land contamination extends over areas within 250km or so from Fukushima Daiichi nuclear power station.

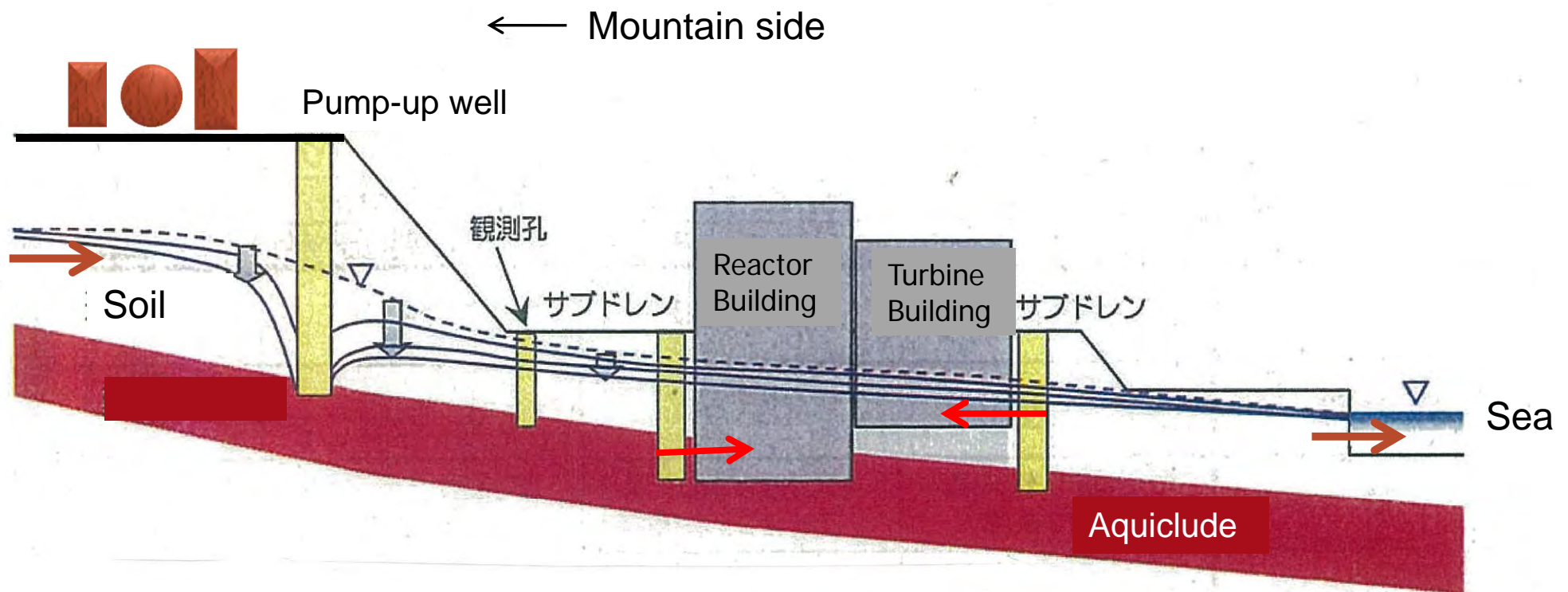




- The fact that this accident has raised concerns about the safety of nuclear power generation around the world is a matter that Japan takes with the utmost seriousness and remorse.
- Japan has received tremendous outpouring of supports and expressions of solidarity from around the world since the event. Taking this occasion, I would like to convey the Japanese people's sincere gratitude to the global community for its support.

Satellite View of the Site





The water table(-----) and groundwater flows in the aquifer at the Fukushima Daiichi site

- About 1000 tons of the groundwater flow in the direction of sea daily.
- About 400 tons of them daily intrude into RBs and TBs.
- About 300 tons of them daily flow into the seawater intake zone of the port.

Current Status of the Site (I)

● Short-term challenges:

- Assure the reliable operation of the reactor cooling system.
- Manage the groundwater flowing in the aquifer beneath the site:
 - ✓ Reduce the leakage of contaminated water in the trenches into the groundwater,
 - ✓ Collect and decontaminate it if it was contaminated, and store the decontaminated,
 - ✓ Start the deliberate release of the decontaminated water to the sea in consultation with interested parties.
- Improve working conditions and assure human resources for cleanup activities.

Leakage of Contaminated Groundwater to the Sea

- The effect of the leakage of groundwater contaminated due to the defect in the trenches is limited in the port of Fukushima Daiichi NPS, whose area is smaller than 0.3 km².
- The level of radioactivity in the open sea is below 1 Bq/L, an order of magnitude less than the limit of the concentration of radioactive Cs (Cs-134 and Cs-137) specified in the Guidelines for Radioactive Substances in Bathing Areas released by the Ministry of Environment.

Decontamination of the Damaged Units

- **Mid-and long-term challenges:**

Three phase decommissioning activities that include necessary R&D projects;

- **Phase 1:** to commence fuel removal from spent fuel pools within 2 years: it will be started in this November.
- **Phase 2:** to commence fuel debris removal from RPVs within 10 years:
- **Phase 3:** to complete the decommissioning within 30 to 40 years.

Major R&D Projects

- Various robots and remote manipulation devices for cleanup activities:
- Equipment/device to observe the fuel/debris in RPVs and PCVs, and characterize them with a view to preparing for their removal.
- Robust models and simulation tools for the analysis of severe accidents, focusing on post accidental heat removal, coolability of relocated reactor core, in-vessel core melt progression, in-vessel molten corium retention, molten-core-concrete-interaction, and corium stabilization in containment:
- Technologies for conditioning and storing radioactive waste generated in these activities.

Off-Site Consequences

- Some 80,000 people are still requested to be out of home and about the same number of peoples have made choice to leave home. They are suffering from a psychological agony due to the fear of radiation exposure, separation of family, disruption of communities, loss of work, uncertainty in the future etc.
- Though anyone has not been hurt by the radiation so far, the accident has caused one thousand or so deaths due to the worsening of diseases owing to dislocation, including emergency evacuation from hospitals, and/or stress in the life in a shelter after dislocation.
- It is sad and painful but true that the sales of the products from Fukushima Prefecture are still damaged due to consumer fears and producers are forced to choose to be out of work, even though they are not contaminated as the production of agricultural and marine produce is strictly restricted at the place where competent authorities see the danger of contamination, adopting the most stringent standard for food and water in the world.

Decontamination Activities

- In the areas where additional exposure is less than 20mSv/y, the Government has been supporting the decontamination of people's living environment with a view to reducing the estimated annual exposure of people by 50 % and that of children by 60 % in 2 years.
- In the areas where additional exposure was higher than 20mSv/y, in which 11 municipalities are located, the Government has started the decontamination work to reduce annual exposure there below 20mSv in two years, excluding areas where doses are higher than 50mSv/y.
- The decontamination has been promoted significantly only in three municipalities. There are many issues to be resolved for the promotion, including the agreement with the resident on the decontamination methods and the place for temporary storage of the decontamination wastes. It is also a difficult issue to reach agreement on the appropriate measures for decontaminating the forests that cover more than 80% of the areas.

Publication of Accident Investigation Reports

- The IAEA International Fact-Finding Expert Mission
 - ✓ There were insufficient defense-in-depth provisions for tsunami hazards.
- The Government's Investigation Committee
 - ✓ The government and TEPCO failed to prevent the disaster because they were reluctant to invest time, effort and money in protecting against a natural disaster considered unlikely: they were overly confident that events beyond the scope of their assumptions would not occur.
 - ✓ A culture of complacency about nuclear safety and poor crisis management led to the nuclear disaster.
- National Diet's Independent Investigation Commission (NAIIC)
 - ✓ What must be admitted - very painfully - is that this was a disaster 'Made in Japan'. Its fundamental causes are to be found in the ingrained conventions of Japanese culture: our reflexive obedience, our reluctance to question authority, our devotion to 'sticking with the program', our groupism and our insularity.

Where We Are Today

- The release of such judgment made it difficult for the Government to allow NPP operators to restart their plants after refueling, even after introducing emergency measures to cope with tsunami attack.
- The Government decided to wait the action taken by the Nuclear Regulation Authority (NRA), a newly established independent commission body that solely exercises nuclear regulatory authority. This is the reason why all of 50 units or so have been in shutdown state from September 15th this year.
- To compensate the loss of nuclear power generation, electric power companies have increased thermal power generation based on natural gas and oil, importing a significant amount of them from abroad. The additional payment for them amounted to 3 trillion yen or so in 2012, which aggravated the trade balance significantly. Furthermore this necessarily caused 26% increase of CO₂ emission in electricity generation sector (about 8% increase in total) over 2010.

Where We Are Today (2)

- As a set of the new safety regulation rules was established by the NRA in July, NPP operators submitted 12 applications to the NRA for review. They are young PWRs. BWR operators are promoting the installation of the CFVS to make their units eligible to apply.
- Government is in a position to support the restart of the operation of idling nuclear power plants as an important power source, when they comply with the NRA rules, as well as to support the infrastructure development in the emerging countries and supply the safe nuclear technology to them, recognizing the responsibility to share with the world the lessons of the Fukushima accident.

Where We Are Today (3)

- As the majority of the public now regards the nuclear power generation as dangerous to our society, however, it is essential for the operators to sincerely communicate with the public about their preparation for the restart and their resolve to do what they should do at the right time in a right manner and never betray the nation's right to be safe from nuclear accidents, recognizing their special responsibility to assure nuclear safety.
- The future of nuclear energy policy will be decided, paying due attention to the public perception about nuclear energy that will evolve from the efforts of nuclear energy community in this respect, and the prospects of the increased use of alternatives to nuclear power under the feed-in tariff, a policy mechanism introduced to accelerate the investments in renewable energy technologies.

Thank you for your kind attention!