The NEA Workshop on Stakeholder Involvement in Nuclear Decision Making

Session 3

Radiological protection

Ryugo Hayano, U. Tokyo, Physics
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About myself
Teach physics in Tokyo, “antimatter” research at CERN (in Geneva) since 1997

No past experience in Radiation Protection nor Risk Communication, but this ↓ irreversibly changed my life.

The number of my twitter followers

3000 → 150,000 in a few days
Situation in Fukushima
Before March 2011

- Hiroshima & Nagasaki

- Japanese Gov’t & utility companies
  “Don’t worry. It is Safe. Nothing can go wrong”.

- “Existing exposure situation” not in Japanese RP regulatory scheme

- Education - RP not in Japanese school textbooks for 30 years
but the accident DID happen
**Legend**

- Total accumulation of Cs-134 and Cs-137
  - Converted into the value as of November 5

- Evacuation zone
  - <20 km evacuated on Mar 12

- Areas where readings were not obtained

- Background image: Denshi Kokudo

**Earthquake**

- M9

- Fukushima Dai-ichi

**Table**

- Tokyo

- March 11, 2011 14:46 JST
Food, water, milk …
Strict regulatory criteria

- **Provisional regulation values for radioactive cesium**:
  - **Category**: Drinking water, Milk, dairy products, Vegetables, Grains, Meat, eggs, fish, etc.
  - **Limit**: 200 Bq/kg for Drinking water and Milk, 500 Bq/kg for Vegetables.

- **New standard limits for radioactive cesium**:
  - **Category**: Drinking water, Milk, General Foods, Infant Foods
  - **Limit**: 10 Bq/kg for Drinking water, 50 Bq/kg for Milk, 100 Bq/kg for General Foods, 50 Bq/kg for Infant Foods.

- **EU limits**:
  - 1,000 Bq/kg
  - 400 Bq/kg
  - 1,250 Bq/kg
Difficult to gain the trust of general public

- A large fraction of general public do not trust announcements made by Gov’t/TEPCO

- Communication by RP experts were not effective (Sv? Gy? Bq?)

- Lack of training for school teachers & medical doctors made it difficult to communicate to local residents
Luckily, both external and internal radiation exposures VERY low in Fukushima

- **Internal exposures** -
  - Now, >99.99% of residents are below the whole-body-counter detection limit (typically 300 Bq/body)
  - nobody is above 1 mSv/y

- **External exposures** -
  - Now, >95% of residents are below 1 mSv/y (the percentage increasing every year)
  - Even the residents who recently returned to ex-evacuation zone seldom receive 5 mSv/y
Problems still remain

- A non-negligible fraction of people still live with doubts & fear in Fukushima

- Stakeholder involvements in RP has had limited success (population approach vs individual approach)

- People demand ALAP; ALARA never worked in Fukushima

- Evacuation is easier, lifting evacuation is difficult; prolonged evacuation has destroyed families, communities, and hopes of people.

- Fukushima children reported to have been discriminated, many Fukushima people believe that the radiation exposure in Fukushima will affect descendants!

- Education and active participation of young generation essential