



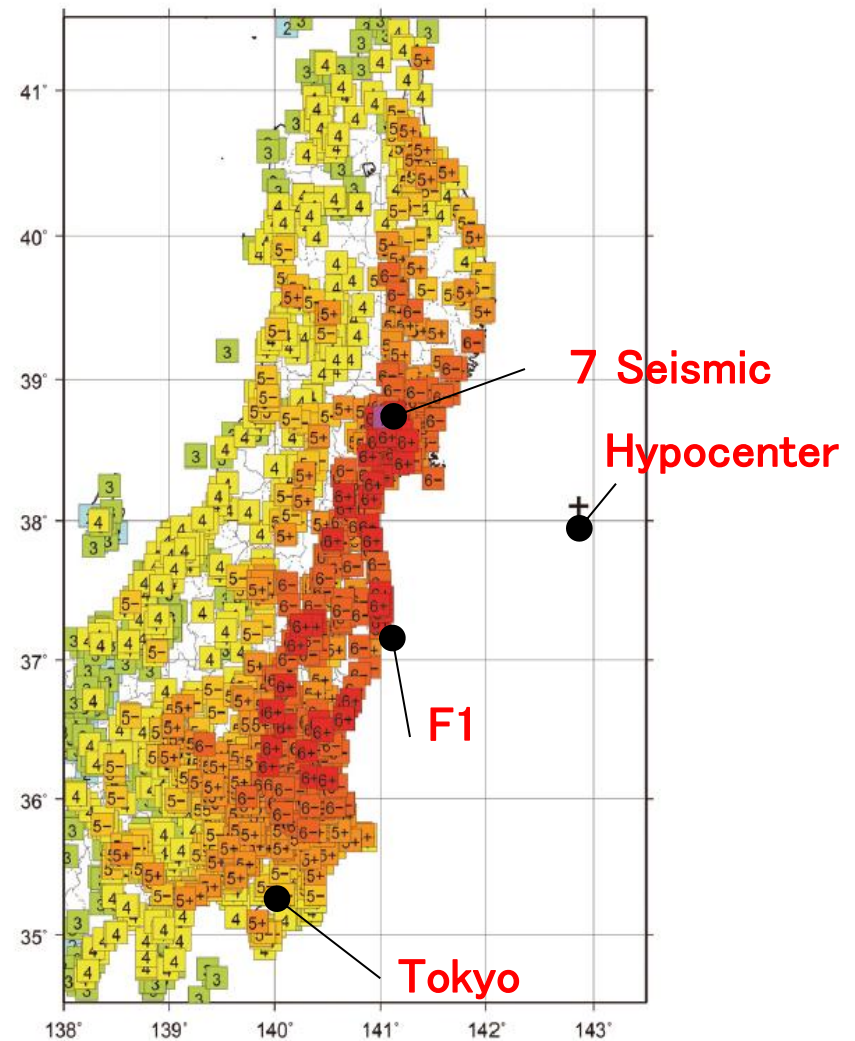
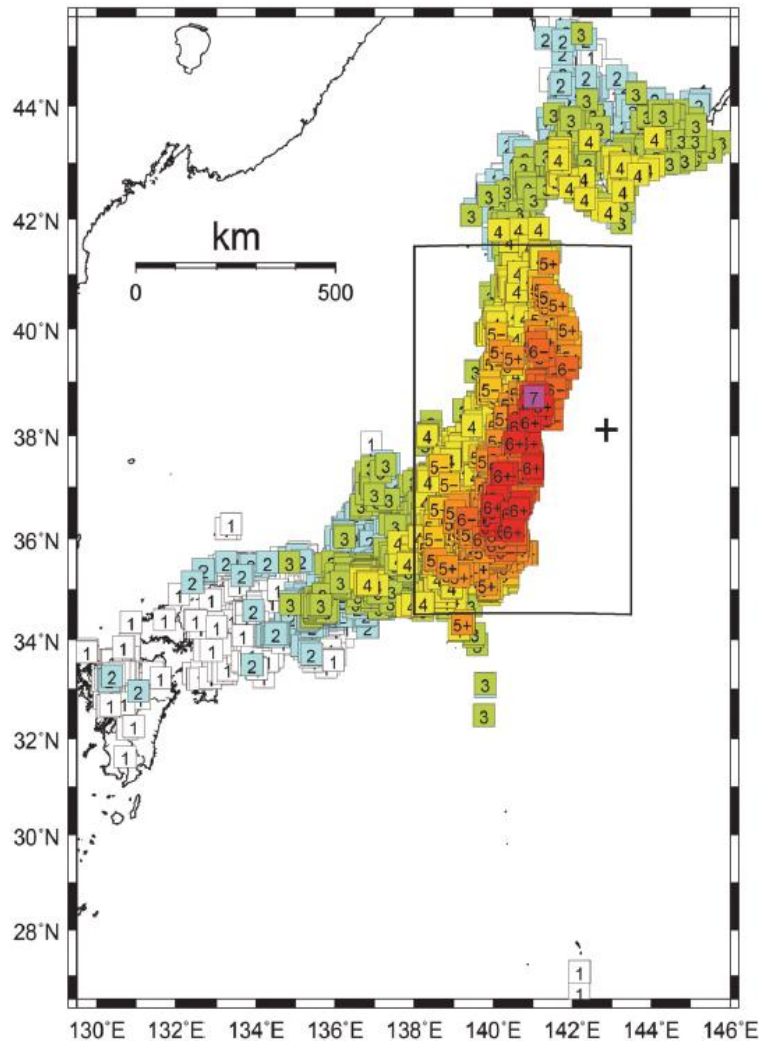
*Innovating
Energy Technology*

Current situation of radiation safety control

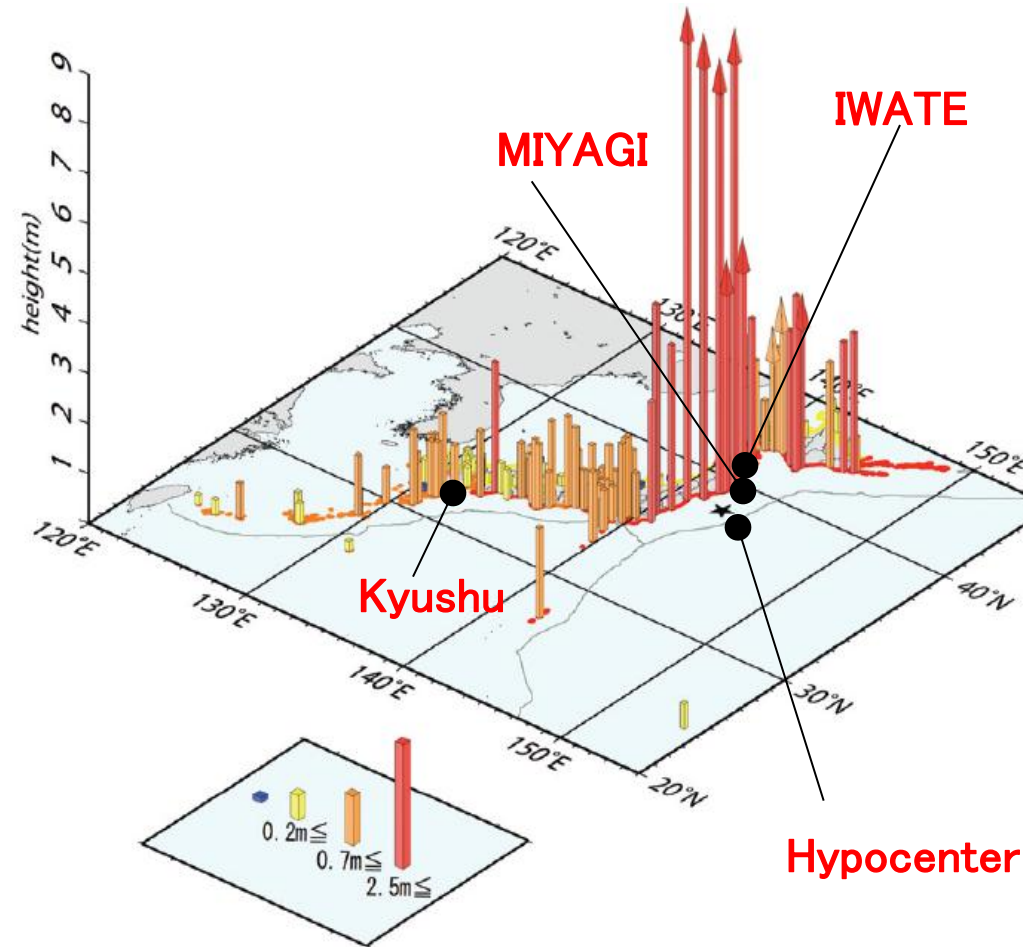
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Fuji Electric Co.,Ltd.*

Great Earthquake Occurred in Tohoku region of Japan

The great earthquake of magnitude 9.0 occurred in the Tohoku region of Japan on March 11, 2011



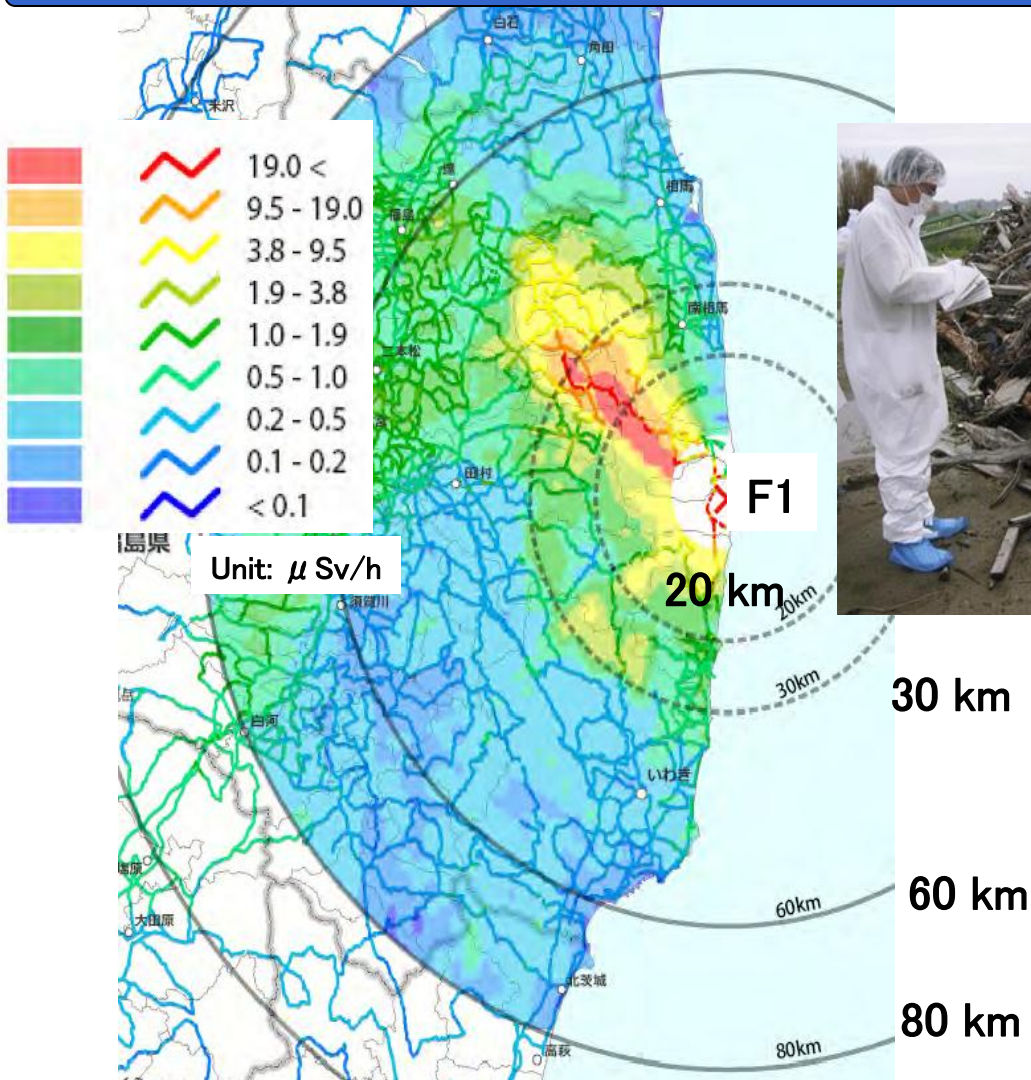
Tsunami over 20 m high attacked many districts in Iwate and Miyagi prefecture.



Reference : The Tokyo Electric Power Company, Inc.

Radioactive Substances Contained in the Wreckage Generated by Tsunami

In surrounding area of F1, the wreckage generated by tsunami happened to contain plenty of radioactive substances

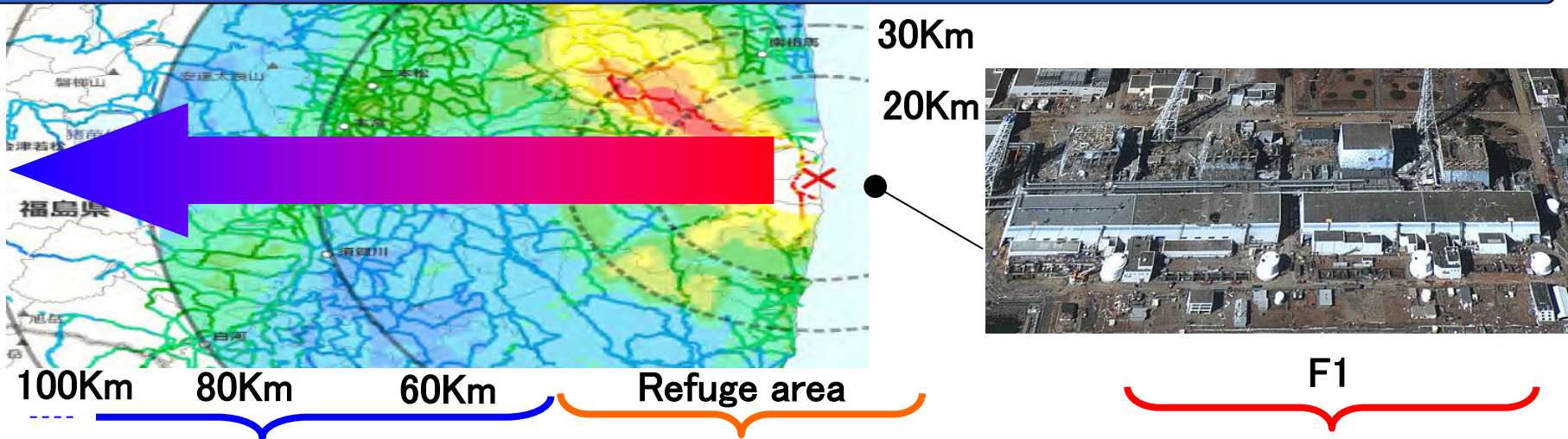


Reference:
Ministry of the Environment



Reference : Ministry of Land, Infrastructure and Transport

Relationship between distance from F1 and required the radiation sensor and equipment.



| | Outside of Refuge Area | Refuge Area | Inside of F1 |
|------------------------|---|---|---|
| Human control | – | <ul style="list-style-type: none"> ● Personal Dose Rate Meter for Resident (Low level) ● Whole Body Counter | <ul style="list-style-type: none"> ● Personal Dose Meter for Worker (High level) ● Whole Body Counter |
| Environmental control | <ul style="list-style-type: none"> ● Environmental Monitoring Post | <ul style="list-style-type: none"> ● Environmental Monitoring Post | <ul style="list-style-type: none"> ● Environmental Monitoring Post |
| Article / Food Control | <ul style="list-style-type: none"> ● Food Contamination Monitoring ● Water contamination monitoring | <ul style="list-style-type: none"> ● Radiation survey-meter ● Body surface monitor | <ul style="list-style-type: none"> ● Radiation survey-meter ● Body surface monitor |

The field of radiation protection can be classified following categories, “Human control”, “Environmental control”, and “Article / Food control”

Sensor/Equipment

Human Control

Personal Dosimeter



Portal monitor



Whole Body Counter

Hand-Foot Monitor



Environmental Control

Monitoring Car



Monitoring post



Monitoring station

Article / Food Control



Laundry Monitor



Article Monitor



Food Monitor



survey meter



Dust monitor

Human Control



Intended purpose

Measuring exposed dosage for people and measuring space radiation dose

⇒ being exposed to radiation in dairy life.

⇒ Search a contamination spot



Detection principle

Ionization of the depletion layer of a semiconductor detector by the radiation ray

⇒ Detector : Large size semiconductor detector (special-purpose detector)

⇒ Battery : Re-chargeable battery.



Feature

- High sensitivity measuring radiation dose (mSv) and dose rate (mSv/h)
 - ⇒ Suitable for the measurement of the background. (High accuracy)
 - ⇒ 200 times sensitive of the personal dose meter.
- Alarm occurs when detecting exceeds certain radiation dose (rate)
- Compact size (Cellar phone size)
- chargeable battery (exclusive holder can be provided)

Intended purpose

Realized the compact and lightweight so that outdoor radiation measurement can be carried out easily

Detection principle

Ionization of the depletion layer of a semiconductor photo sensor by the radiation ray

- ⇒ Detector : small size semiconductor photo sensor
- ⇒ Battery : AA battery

Feature

- Capable of wide range measurement from background level $0.01 \mu\text{Sv/h}$ to high-dose rate 99.9mSv/h
- Dust-proof / drip-proof according to IP54
- Capable of transferring the data through USB



Environmental control



Intended purpose

Measuring the space dose of radioactivity (outside)

⇒ Measuring radiation dose where 1m above the ground (50cm).

Detection principle

Ionization of the depletion layer of a semiconductor detector by the radiation ray

⇒ Detector : Large size detector (special-purpose detector)

⇒ Power Source : AC100V + Solar Battery.

Feature

- Transferring data by FOMA every 10minuites
- Solar battery + lead storage battery → Power is unnecessary

(available to operate by 100V AC)

Available to install to park or seaside area



Stationary type environmental radiation monitor

We provided the environment monitoring post to the elementary schools, the kindergartens and public parks in FUKUSHIMA prefecture in 2011. and Fuji is installing it now







Article / Food Control



In Japan, concern about radioactive material in food is increased since Great East Japan earthquake result in F1 accident.

Standard value of radioactive cesium in food since April 1st, 2012

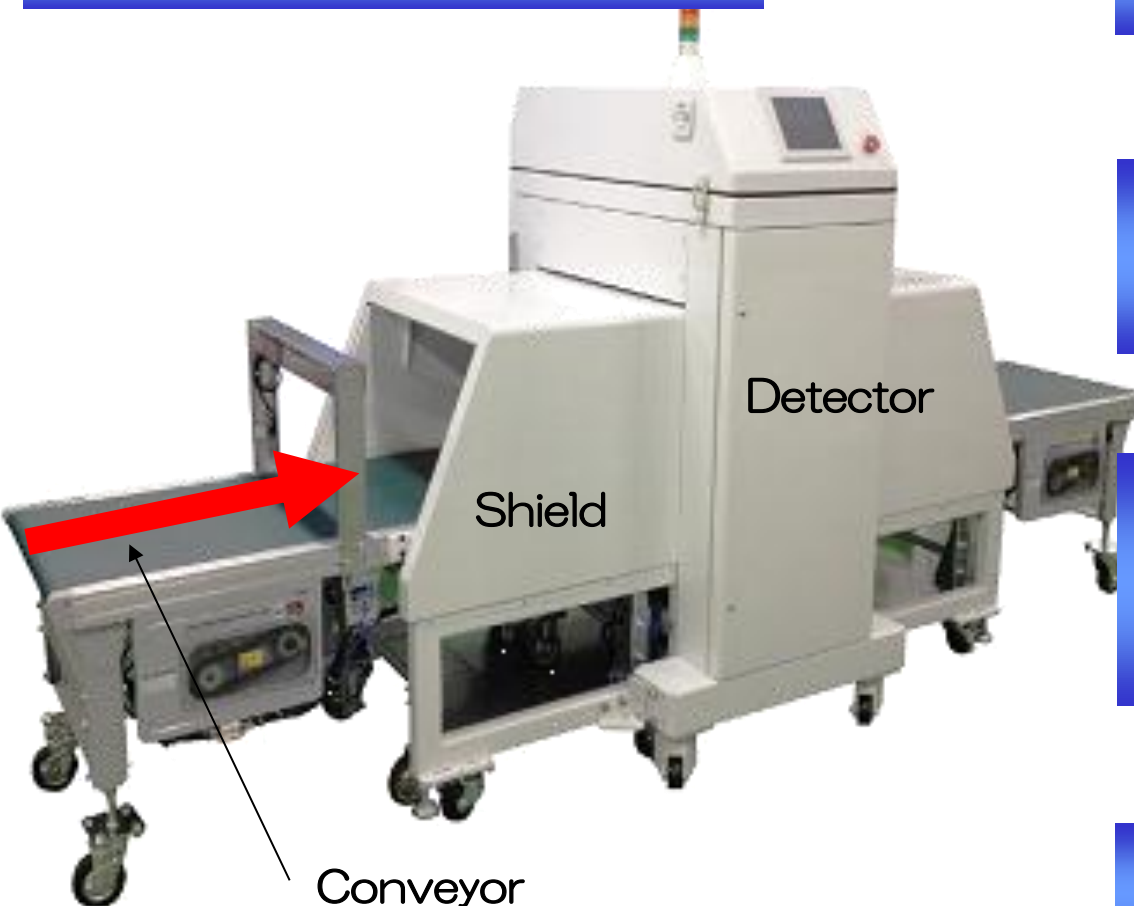
| Common food | Food for baby | Milk | Water |
|---|--|---|---|
| 100 Bq/kg | 50 Bq/kg | 50 Bq/kg | 10 Bq/kg |
|  |  |  |  |

Requirement specification of
radiation monitor in food

Screening level 50 Bq/kg

Measurement lower limit 25Bq/kg

Food contamination monitor



Placing the bag on
the conveyor



Reading the producer's
bar code and measuring the
radioactivity



Printing the QR code as the
result of radioactivity
measurement and attaching
to the rice bag



Take out the rice bag from
conveyor

Set up example of food contamination monitor in farmers' cooperative

Set up example of food contamination in Japan farmers' cooperative



Thank you for your attention

- Monitoring car which can monitor the air dose while moving
- It is utilized for detecting the local air dose at the time of disaster

Air dose detector



Monitoring room

