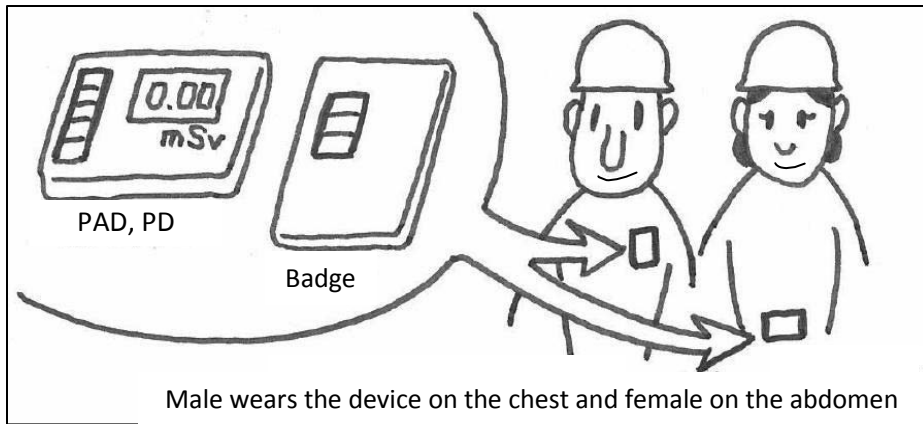


For workers engaged in work other than decontamination related work at areas where the ambient dose rate is exceeds 2.5 $\mu\text{Sv/h}$

Guidance on the Prevention of Radiation Hazards during works under a designated dose rate



Follow rules, procedures, and instructions from your operation leader and minimize radiation exposure doses.

What is the works under a designated dose rate?

Works under a designated dose rate refers to the work* other than decontamination work that is performed in areas where the average ambient dose rate exceeds 2.5 $\mu\text{Sv/h}$ (microsievert per hour) in special decontamination areas, etc. due to radioactive materials discharged by the accident.**

* The work constitutes a preliminary survey, site investigation, and conveyance work associated with construction. Indoor work such as manufacturing is not considered as the work other than decontamination work when the ambient dose rate indoors is less than 2.5 $\mu\text{Sv/h}$, even when the ambient dose rate outside is exceeds 2.5 $\mu\text{Sv/h}$.

**It includes the "special decontamination areas" as well as "intensive contamination survey areas" that are specified in the Act on Special Measures Concerning the Handling of Radioactive Pollution.

See the separate "Guidance on Prevention of Radiation Exposure during Decontamination Work" when engaging in decontamination work.

- Driving vehicles at high speed and associated loading work fall under the works under a designated dose rate, only in the cases 1) and 2) as shown below.

1)	When engaged in work for carrying loads in or out (excluding those associated with restoration work of infrastructures) in areas where the average ambient dose rate exceeds 2.5 $\mu\text{Sv/h}$ and the expected duration of stay in the areas is <u>40 hours or longer per month</u> .
2)	When engaged in transporting loads (construction machines and materials, soil, gravel, etc.) for restoration of infrastructures in areas where the average ambient dose rate exceeds 2.5 $\mu\text{Sv/h}$.
Just passing through an area where the average ambient dose rate exceeds 2.5 $\mu\text{Sv/h}$ is not considered as the works under a designated dose rate because the time spent in the area is limited.	

This brochure summarizes important points which workers, who are employed for work other than decontamination related work in areas where the average ambient dose rate exceeds 2.5 $\mu\text{Sv/h}$, need to be aware of. (works under a designated dose rate) You are encouraged to make a safety a top priority by observing safety precautions presented in this brochure and following the instructions of your operation leader.



For people, their lives,
and their future

**Ministry of Health, Labour and Welfare/ Prefectural and City
Labour Departments/ Labour Standards Inspection Office**

1

External exposure

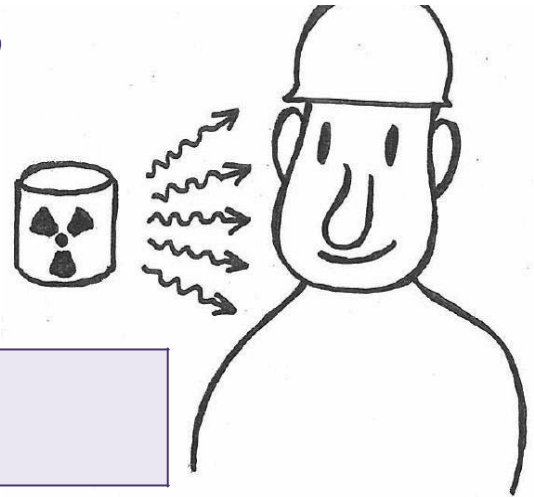
Radiation exposure you received during works under a designated dose rate is mainly external exposures. It is important for you to understand the effective measures to protect yourself from external exposures.

What is the external exposure?

You will be exposed to radiation from radioactive materials that exist in the environment. Gamma-rays with high penetration capability are the main source of concern.

Following measures are effective in protecting yourself from the external exposure:

- Removal of the radiation sources
- Shielding from radiation
- Keeping distant from the radiation sources
- Minimizing work hours



2

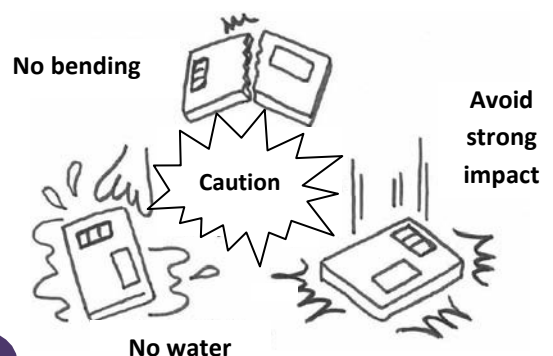
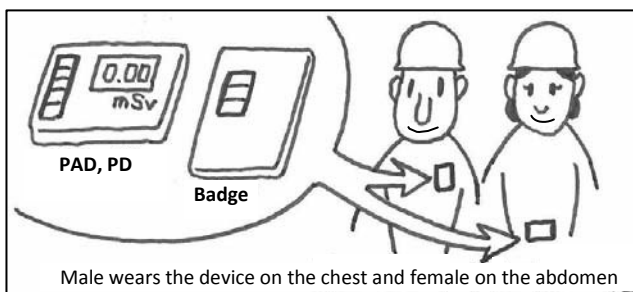
Monitoring external exposure doses

You are required to correctly monitor your exposure doses during works under a designated dose rate.

1) How to monitor external exposure doses

See page 4 for radiation and radioactivity units

Your external exposure dose is monitored by an electronic dosimeter (PAD, PD), a glass badge, or a luxel badge, which are individually worn.



2) Exposure dose limit

Exposure dose limits for works under a designated dose rate are specified in a ministerial ordinance* as shown below. You must make sure that a total exposure doses received during radiation work at nuclear power plants, etc., decontamination work and work under a designated dose rate does not exceed these limits.

In addition, your employer is expected to issue a record of your exposure doses every three months. You are expected to ensure that you received the record and keep it in a safe place.

* Ordinance on Prevention of Ionizing Radiation Hazards at Works to Decontaminate Soil and Wastes Contaminated by Radioactive Materials Resulting from the Great East Japan Earthquake and Related works (the Ionizing Radiation Ordinance for Decontamination).

100mSv per 5 years and 50mSv per 1 year

- 5mSv per 3 months for women (excluding infertile women)
- 2mSv of equivalent dose on the abdomen during pregnancy for pregnant women

3

Preparation before starting work

Ask yourself the following questions before you start works under a designated dose rate.

1) Have you received special education?

You must complete a special education program before you start works under a designated dose rate. (The special education consists of 2.5 hours of lectures)

2) Have you checked your work for the day?

Confirm in advance with your operation leader about your work for the day.

- What type of work and how long?
- What is the dose rate at the worksite?

4

Safety precautions during work

Pay attention to the following issues when engaged in works under a designated dose rate.

1) Work methods and procedures

Observe prescribed methods and work hours.

2) When injured

You may get involved in an accident during work under the designated dose rate as you would in any other outdoor work.

In case of an accident,

Help injured person/people and give them first-aid treatment

Check if any wound is contaminated with a survey meter when necessary.

Call an ambulance (119) when necessary

Follow the instructions of your operation leader and ensure safety during works under a designated dose rate.

5

Medical examinations

Receive a general medical examination at the time of employment and once a year thereafter if you are assigned to works under a designated dose rate.

6

When you leave your job

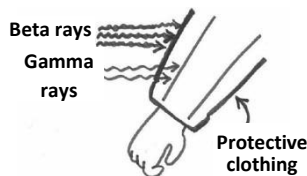
When you leave the job of works under a designated dose rate, ensure that you receive the copy of your exposure record and keep it in a safe place.

Basic knowledge of radiation

Types and characteristics of radiation

- There are various types of radiation. The major types of radiation are alpha ray, beta ray, gamma ray, and neutron.
- Radiation has the ability to penetrate materials called penetrability. The penetrability of radiation varies across the type of radiation.
- Cesium, a major concern during decontamination work, emits beta and gamma rays
- The characteristic of radiation emission (radioactivity) decreases over time. The radioactivity of cesium 137 can decrease to half of the original value in about 30 years.
- The following units are used to express intensity of radiation or radioactivity:

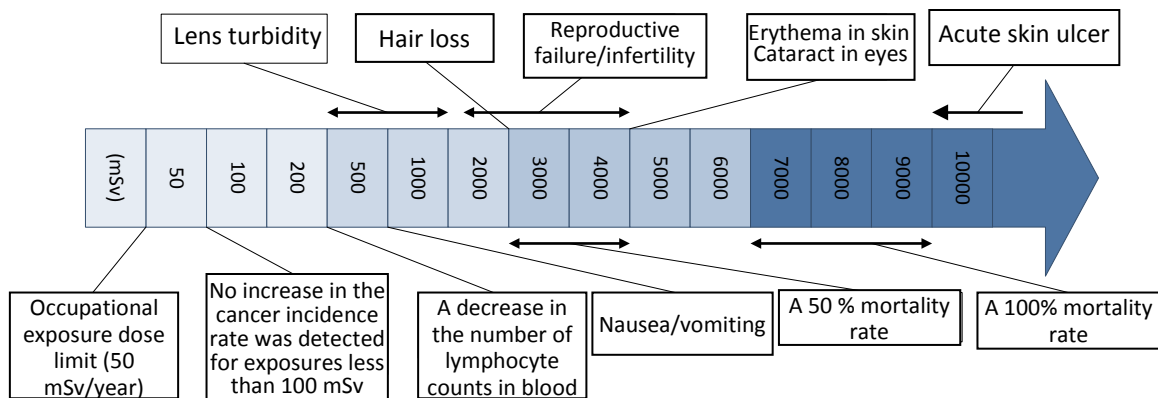
- Because beta rays have low penetrability, they are normally absorbed in the air and by protective clothing.
- Due to its high penetrability gamma rays are usually considered as the main radiation source that becomes a threat to our bodies during decontamination work.



- **Bq (Becquerel):** The unit is used to express the intensity of radioactivity. Bq/cm² is the unit used to express the degree of surface contamination. Bq/kg is the unit used to express the degree of contamination in soil.
- **Sv (Sievert):** The unit is used to express the effect of radiation on organisms. Common sub-multiples of the sievert are the millisievert (1 mSv = 1/1,000 Sv = 100 mrem), and the microsievert (1 μSv = 1/1,000,000 Sv = 0.1 mrem). The unit of μSv/h is used to express dose received over one hour.
- **cpm (count per minute):** Intensity of radioactivity measured by a radiation meter.

Effects of radiation on human body

The following schematically presents effects of radiation on each organ according to the levels of exposure dose. (source: "ICRP Pub. 60" and others)



- No clear medical evidence of the relationship between lower levels of radiation exposure (less than 100 mSv) and cancer incidence rate has been reported. Research on atomic-bomb survivors in Hiroshima and Nagasaki did not demonstrate any increase in cancer incidence rate among survivors who received radiation doses of less than 100 mSv.
- Therefore, the International Commission on Radiological Protection (ICRP) established the occupational exposure dose limit at "acceptable levels where no increase in cancer incidence has been reported." The Ionizing Radiation Ordinance for Decontamination (2-3 in page 3) adapted the same exposure limit as the ICRP.

Please contact your Prefectural Labour Bureau or Labour Standards Inspection Office should you have any questions.