

Overview of the Proposed 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 (tentative title)

1. Purpose of Establishment

Environmental contamination with radioactive materials discharged by the Nuclear Power Station Accident associated with the Tohoku District Off the Pacific Ocean Earthquake that occurred on 11 March 2011 is posing a serious threat to the health of people and living environment. Minimizing the impact of the contamination on the health and the environment has become an urgent issue.

Therefore, the Act on Special Measures Concerning the Handling of Environmental Pollution by Radioactive Materials Discharged by the Nuclear Power Station Accident Associated with the Tohoku District Off the Pacific Ocean Earthquake That Occurred on 11 March 2011 (Act. No.110 of 2011, hereinafter referred to as “Act on Special Measures”) was passed into law in August 2011, and it will become fully implemented starting from 1 January 2012.

(1) The regulations established by the act are as follows :

- Treatment of waste contaminated with radioactive materials
- Actions such as decontamination of soil contaminated with radioactive materials

However, the Act does not include measures for protecting workers who engage in these tasks from health impairment caused by exposure to ionizing radiation.

(2) In addition, in the current Ordinance on Prevention of Ionizing Radiation Hazards (Ordinance No. 41 of Ministry of Labour, 1972, hereinafter referred to as “the Ionizing Radiation Ordinance”), measures are established on the premise that the radioactive sources are located at a certain place, such as at medical facilities or at nuclear power plants, where workers mainly work indoors.

Measures for responding to the types of decontamination work and collection of waste stipulated in the Act on Special Measures are not included. Furthermore, the Act was not established on the premise that the radioactive sources are dispersed over the wide range of areas, and workers mostly work outdoors.

(3) Further, under the fundamental policies based on the Act on Special Measures approved by the cabinet on 11 November 2011, it states that “ensuring the safety of workers is the highest priority when handling environmental decontamination. Therefore, employers should take great care on the safety and the health of workers engaged in work concerning decontamination of the environment, for example, by providing radiological protection guidance. In addition, they should manage the radiation dose received by the workers and provide the workers the opportunities to enhance their knowledge of safety and health.”

Considering the situation, a new ordinance should be formulated that regulates measures to properly protect workers from health impairment caused by ionizing radiation based on the nature of work such as decontamination work and waste collection work(hereinafter referred to as “the decontamination ordinance.” This Ordinance should be formulated separately from the current Ionizing Radiation Ordinance.

2. Overview of the proposed ordinance

An Ordinance shall define regulations that impose the following duties on employers involved in operations concerning works of decontamination, etc. or collection of contaminated waste (hereinafter referred to as “decontamination works”) in special decontamination areas, etc. (areas with radiation doses in excess of approximately 1 mSv/y).

(1) Fundamental principles and definitions (Chapter 1)

- (a) Employers shall strive toward minimizing exposure of ionizing radiation to the employees who engage in works involving decontamination.
- (b) “Works of decontamination, etc.” in this Ordinance shall mean the work involving decontamination of soil and wastes which are contaminated with radioactive materials discharged by the accident (hereinafter referred to as “contaminated soil and wastes”), prevention of contamination through propagating and implementing other measures at special decontamination areas (“restricted areas,” “deliberate evacuation areas”) and intensive contamination survey areas pursuant to the Act on Special Measures Concerning the Handling of Radioactive Pollution.
- (c) “Work for collecting waste, etc.” in this Ordinance shall mean the work to collect, transport, or store removed soil or waste with the radioactivity levels in excess of 10,000 Bq/kg that resulted from (b) above.
- (d) “Decontamination works” in this Ordinance shall mean (b) or (c) above.

(2) Measuring doses and monitoring the maximum dose levels (Chapter 2)

- (a) The radiation exposure dose received by workers must not exceed 100 mSv per five years and 50 mSv/y. However, they should not exceed 5 mSv per three months for female workers who may become pregnant.
- (b) The radiation exposure doses received by workers engaged in decontamination works at the special decontamination areas, etc. must be monitored, recorded, and kept for 30 years. However, this rule does not apply in the case where the records are transferred to the organization designated by the Minister of Health, Labour and Welfare, after they have been kept for five years. In addition, the workers involved must be informed of their monitored doses.
- (c) The external radiation exposure dose must be monitored at the chest for male workers and infertile female workers and at the abdominal region for female workers who may become pregnant.

Workers engaged in work at the special decontamination areas, etc. where the average ambient dose rate exceed 2.5 $\mu\text{Sv/h}$, must carry radiation dosimeters attached to their bodies.

Measurement of external radiation exposure doses for workers engaged in decontamination works at special decontamination areas, etc. where the average ambient dose rate is less than 2.5 $\mu\text{Sv/h}$, can be conducted by the alternative method established by the Minister of Health, Labour and Welfare.(*).

(*) The radiation exposure dose is calculated as that of a worker whose expected radiation exposure dose would be the average, or the average ambient dose rate in a workplace multiplied by the work hours.

- (d) For workers engaged in work at special decontamination areas, etc. with average ambient dose rate exceed 2.5 $\mu\text{Sv/h}$, and those involved in handling contaminated soil and wastes, removed soil or contaminated waste, all of which are contaminated due to radioactive materials discharged by the accident, and with radioactivity concentration levels in excess of 500,000 Bq/kg (hereinafter referred to as “highly radioactive contaminated soil and wastes”) and also those receiving dust concentration levels exceeding 10mg/m^3 , must be monitored for internal radiation exposure dose once every 3 months.

However, for those who handle highly radioactive contaminated soil and wastes and receive dust concentration levels of less than 10mg/m^3 , or those who handle contaminated soil and wastes, removed soil or contaminated waste, all of which are other than highly radioactive contaminated soil and wastes and receive dust concentration levels exceeding 10mg/m^3 , shall receive examinations for their internal radiation doses by the method established by the Minister of Health, Labour and Welfare.(*)

(*) The surface density of radioactive materials on the surface of dust masks or nasal cavities is measured.

(3) Measures for implementation of decontamination works (Chapter 3)

- (a) Radiation doses in workplaces should be surveyed and recorded before commencing work.
- (b) A work plan should be established that includes work procedures, dose monitoring methods, and the measures to minimize radiation exposure doses. This work plan should be disseminated to every worker.
- (c) Operation leader should be appointed to lead the project based on the plan described in (b) above.
- (d) In workplaces where the average ambient dose rate exceeds 2.5 $\mu\text{Sv/h}$, the work plan must be submitted to the Head of the relevant Labour Standards Inspection Office prior to commencing the project (primary contractors only).
- (e) When the radiation exposure doses received by workers exceed the maximum standardized levels, they should promptly consult a medical doctor and report the case to the Head of the relevant Labour Standards Inspection Office.

(4) Prevention of contamination (Chapter 4)

- (a) For suppression of dust, measures should be taken to keep contaminated soil and wastes or removed soil or contaminated waste in a wet condition.
- (b) When storing contaminated soil and wastes or removed soil or contaminated waste, they should, in principle, be stored in containers that meet certain criteria and have the necessary labels attached to the containers.
- (c) When workers leave their workplaces, the contamination of their bodies and belongings

must be screened. If they are contaminated above certain criteria, they need to take preventive measures such as washing their bodies. In addition, objects contaminated above certain criteria must not be removed from the workplaces.

- (d) When workers engage in the projects indicated in 2-(2)-(d) above, they must wear protective equipment.
- (e) When protective equipment is contaminated, they should not be used by workers until they are decontaminated to the levels below certain criteria.
- (f) In the workplaces where workers may potentially ingest radioactive materials, eating, drinking, and smoking must be prohibited.

(5) Education for workers (Chapter 5)

Workers who engage in decontamination works should receive special education about work procedures, the handling of machines, the effect of exposure to ionizing radiation, and relevant laws and regulations.

(6) Health care (Chapter 6)

- (a) Special medical examination for workers engaged in decontamination works should be conducted. Special medical examination must be conducted at the time of employment and reallocation for decontamination workers. From thereafter special medical examination must be routinely performed once every six months. If medical doctors confirm some items in these routine examinations are unnecessary, those items can be omitted.
- (b) Based on the results of the special medical examination, the medical examination card should be created and kept for 30 years. However, this rule does not apply when those cards are transferred to the organizations designated by the Minister of Health, Labour and Welfare after the cards had been kept for five years.
- (c) Opinions of medical doctors regarding the results of special medical examination must be received and recorded on the medical examination cards.
- (d) The results of the special medical examination must be informed to workers without delay and the report of the results must be submitted to the Head of the relevant Labour Standard Inspection Office.
- (e) Based on the medical examinations results, those workers who have or may have developed radiation related impairment, must receive needed measures to protect their health. They may need to be transferred to work in alternative positions until complete remission.

(7) Others (Chapter 7)

- (a) In principle, radiation dosimeters, that are indispensable to abide by the ordinance, must be provided.
- (b) When employers terminate their business, the records of radiation exposure dose measurement and medical examination card must be transferred to the organization designated by the Minister of Health, Labour and Welfare and the copies of record must be issued to the relevant workers.

- (c) When workers leave their jobs, such copies of records must be issued to the workers.
- (d) Radiation doses received during any work applicable to the Ionizing Radiation Ordinance must be added to those received during the decontamination works.

(8) Additional clauses

- (a) Decontamination works shall be added to the work category which requires special education.
- (b) In principle, decontamination works defined in the Decontamination Ordinance is removed from the work applicable to the Ionizing Radiation Ordinance.
- (c) The Minister of Health, Labour and Welfare will establish the criteria for designation and designate the institution for transferring workers' records of doses and medical examination cards.
- (d) A part of the Decontamination Ordinance will be revised by the addition of the Form No. 2 used for organizations involved in decontamination. This Form No.2 includes the format for the employers to record the results of special medical examination of their contract workers.
- (e) Records that must be created and stored in a written form may be processed electronically.
- (f) Implement necessary revisions for other matters.

3. Schedules

The date of promulgation: 22 December 2011 (planned)

Effective date: 1 January 2012

Employers must ensure that needed measures for minimizing radiation dose of workers engaged in the following operations are implemented: (1) decontamination of soil and (2) collection of removed soil and waste (> 10,000 Bq/kg) to minimize the environmental contamination with radioactive materials released from the nuclear accident ((1)& (2) are referred to as “decontamination works”)

1. Actions to minimize exposure

(Exposure dose limit)

- Effective dose should not exceed 100mSv per 5 years and 50mSv /y.
*Effective dose should not exceed 5mSv per 3 months for female workers who may become pregnant.

(Measurement of dose)

- External exposure dose during the decontamination works should be monitored with personal dosimeters in the areas where the radiation dose exceeds 2.5μSv/h (equivalent to 5 mSv/y, based on 52 weeks/year and 40 hours/week)^{*1}
- External exposure dose can be measured by an easier method in the areas where the radiation dose is more than 0.23 μSv/h (equivalent to 1 mSv/y, 24 hours a day) but less than 2.5 μSv/h.

^{*1}The deliberated evacuation and restricted areas are expected to fall roughly into these categories.

- Internal exposure dose of workers handling highly radioactive contaminated soil and wastes^{*2} in the work under high dust concentration^{*1} should be monitored once every 3 months.
- For other workers, screening should be implemented. If their radiation dose exceeds the screening criteria, internal radiation dose should be monitored.

^{*1} The concentration of dust containing cesium that exceeds 10 mg/m³

^{*2} The work that involves handling highly radioactive contaminated soil and wastes with a cesium concentration above 500,000 Bq/kg.

(Recording and keeping the results of the measurements of radiation dose)

- Monitored radiation doses of workers should be recorded and kept for 30 years and relevant workers should be notified of them.
(The records may be transferred to a designated organization after being kept for 5 years)

(Preliminary surveys, work plans, work manager and work notifications)

- A preliminary survey should be conducted and work plans should be established prior to commencing decontamination related works. The decontamination work should be directed by a operation reader.
- The work plan should be submitted to the Head of the relevant Labour Standards Inspection Office if decontaminating the soil or others in the areas where radiation dose rate exceeds 2.5 μSv/h.

2. Prevention of the spread of contamination

(Measures for suppressing dust dispersion)

- When the generation of high dust concentration of cesium is expected, measures should be taken to suppress the dust **dispersion** such as wetting the soil.

(Measures for preventing contamination of the removed soil storage)

- When storing removed soil, containers meeting certain requirements* should be used. In addition, measures that prohibit entrance to the storage area should be taken.
*With no possibility of dispersing /spilling of removed soil, and whose 1-cm dose equivalent rate at a distance of 1 meter from the surface of a container do not exceed 0.1 mSv/h.

(Contamination screening)

- A contamination screening point should be established near the decontamination related work area, and the bodies, clothes and other gears that the workers wear should be inspected for contamination, every time they leave their workplace.
- When contamination level exceeds 40 Bq/cm², workers should wash their bodies to reduce the contamination level below the criteria, and the gear should be taken off.
- Items removed from the workplace should be inspected for contamination. If the contamination level of any item exceeds 40 Bq/cm², it should not be removed from the site.

(Protective equipment)

- Dust masks, protective clothing, and other protective equipment should be worn when working under conditions involving high dust concentration or handling highly radioactive contaminated soil and wastes.

(Prohibition of smoking and consumption of food)

- No smoking, eating, and drinking are allowed in the workplace where radioactive materials could be ingested.

3. Education of workers and health care, etc.

(Special education for workers)

- Workers engaged in decontamination related works; should receive education on the effect of radiation, dose control, work procedures, and relevant laws and regulations.
*Requirements should be defined according to each work activity: (1) decontamination of soil, (2) transportation of removed soil, (3) transportation of contaminated waste

(Medical examination)

- Special medical examination including investigation of radiation exposure history should be conducted at the time of employment and reallocation and thereafter once every 6 months. Medical examination card should be created and kept for 30 years, and the results of medical examination should be informed to workers. (It is possible to transfer the cards to the designated organization after 5 years).
- When the results of the special medical examination indicate that a worker has radiological hazards, necessary measures are to be taken (i.e., transferring the worker to an alternative job, reduction of work hours) until the hazard is resolved.

(Issuance of radiation dose records to resigned workers)

- When workers leave their jobs or an operation is terminated, the records of radiation dose and the medical examination card of the workers should be transferred to the organization designated by the Minister of Health, Labour and Welfare, and the transcripts of those documents should be issued to the workers.

(Report on the results of the medical examination)

- Employers should report the results of routine special medical examination to the Head of the Labour Standards Inspection Office..

Target for Radiation Dose Control and its Methods

① For workers engaged in decontamination work as paid, full-time positions, the total combined doses of (A) and (B) should be controlled to the extent that does not exceed the occupational radiation dose limit (*3) ② Volunteers should work in areas outside of deliberate evacuation and restricted areas less than a few dozen times a year (effective dose received should be well below 1mSv/y. Any work with an effective dose exceeding this level is deemed as a full-time, occupation.)

Matters specified in the guidelines

Volunteers, residents, farmers, individual proprietors, local workers who decontaminate their own offices

Only workers handling decontamination as their occupations (Items in the Ordinance)

Ambient dose rate (μSv/h)

Mandatory personal radiation dose control (A)

(Effective doses 5 – 50 mSv/y)

1. Measurement of external exposure dose by personal dosimeter
2. Measurement of internal exposure dose depending on the level of dust generated and radioactivity concentration of the soil

*Expected to take place roughly within the deliberate evacuation and restricted areas (The radiation dose for the demarcation lines of the deliberate evacuation area is 3.6 μSv/h (20 mSv/y based on 24 hours/day). However, according to the recent monitoring by the MEXT, the radiation dose rate has been significantly reduced to 2.5μSv/h or less.)

Simplified Dose Control (B)

(Effective dose approx. 1-5mSv/y during the work)

(max. of 5 mSv based on working hours of 40 hours/day, 52 weeks/y)

- Dose control is mandatory but by a simplified method (i.e.) no need to use personal dosimeters, but representative measurements or evaluation from ambient dose rate is allowed.

No need for radiation dose control

(Effective dose during work significantly less than 1 mSv/y) (max. 0.6 mSv when working 8 hours/day for every 30 days exposed to 2.5μSv/h)

(*1) Decontamination work means work that involves handling of highly radioactive contaminated soil and wastes

(*2) Effective dose is limited to exposure dose received during work hours managed by employers (occupational exposure)

(*3) The ICRP limit for the occupation radiation exposure (50mSv/y, 100mSv/5 years) is applied.

0.23μSv/h

(1mSv/y based on 24 hours/day)

A few dozens of times (days)

Volunteers should work within this range. (If exceeding this range, work is deemed as a full-time decontamination related works.)

Frequency of work (times (days))