

# **Guidelines on Prevention of Radiation Hazards for Workers Engaged in Works under a Designated Dose Rate**

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## Section 1 Objectives

The "Guidelines on Prevention of Radiation Hazards to Workers Engaged in Decontamination Works" (Labour Standards Bureau Notification No. 1222-6 of 22 December 2011; hereinafter referred to as the "Guidelines on Decontamination Works") are established for the purpose of preventing radiation-related health hazards to workers engaged in decontamination and related works of materials contaminated by radiation from the accident of Fukushima Daiichi Nuclear Power Plant of Tokyo Electric Power Company (TEPCO) caused by the Great East Japan Earthquake on 11 March 2011, in conjunction with the enforcement of "Ordinance on Prevention of Ionizing Radiation Hazards Related to Work for Decontamination of Soil and Wastes Contaminated by Radioactive Materials Resulting from the Great East Japan Earthquake and Related Works" (Ordinance of the Ministry of Health, Labour and Welfare No. 152 of 2011; hereinafter referred to as the "Ionizing Radiation Ordinance for Decontamination").

The purpose of these guidelines is to comprehensively present matters provided for in the Ionizing Radiation Ordinance for Decontamination, as well as actions an employer is obligated to carry out and important matters among those provided for in the Industrial Safety and Health Act (Act No. 57 of 1972) and relevant laws and ordinances, in order to prevent radiation hazards more appropriately in restoration and reconstruction works in combination with the Ionizing Radiation Ordinance for Decontamination..

These Guidelines aim not only to prevent radiation hazards to workers, needless to say, but also to be available to self-employed workers, individual proprietors, volunteers, etc.

An employer shall endeavor to appropriately implement the matters described in these Guidelines and take measures fit for the situations of actual work sites to prevent radiation hazards.

## Section 2 Application

1 These Guidelines shall apply to employers who engage in work other than the work for decontamination, etc. in places where the average air dose rate exceeds 2.5 $\mu$ Sv/h (hereinafter

referred to as "works under designated dose rates") due to radioactive materials released from the accident of the nuclear power plant (hereinafter referred to as "accident-derived radioactive materials") (provided for in Article 2, paragraph (2) of the Ordinance on Prevention of Ionizing Radiation Hazards (Ordinance of the Ministry of Labor No. 41 of 1972; hereinafter referred to as the "Ionizing Radiation Ordinance") in the special decontamination areas, etc. (hereinafter referred to as the "employers of workers under a designated dose rate"). The "special decontamination areas, etc." mentioned in the preceding sentence (hereinafter referred to as "special decontamination areas, etc."; refer to Attachment 1) means the special decontamination areas provided for in Article 25, paragraph (1) of 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 March 11, 2011" (Act No. 110 of 2011; hereinafter referred to as the "Act on Special Measures Concerning the Handling of Radioactive Pollution") or the intensive contamination survey areas provided for in Article 32, paragraph (1) of the same Act. The matters described below shall be considered when applying these Guidelines.

Underwater operations, etc. in the sea areas close to the Fukushima Daiichi Nuclear Power Plant of Tokyo Electric Power Company are not included in the scope of application of these Guidelines. An employer who engages in underwater operations, etc., however, shall take measures, such as measurement of external exposure doses and recording of the results, for workers engaging in underwater operations, etc.

- (1) "Operations for decontamination, etc." means operations of decontamination of soil, etc., operations of waste collection, etc. or operations of handling of designated contaminated soil, etc. When performing operations of decontamination, etc., the relevant provisions of the Ionizing Radiation Ordinance for Decontamination and the Guidelines on Prevention of Radiation Hazards to Workers Engaged in Decontamination Works shall apply.
- (2) Considerations for "operations under designated doses"
  - (a) Indoor works, such as manufacturing, shall not fall under operations under designated dose rates when the average air dose rate in the indoor workplace is  $2.5\mu\text{Sv/h}$  or below even if the outdoor average air dose rate exceeds  $2.5\mu\text{Sv/h}$ .
  - (b) Driving vehicles and incidental load handling work, etc. shall fall under operations under designated doses only when (1) the unloading or loading site (excluding operations associated with restoration work of local infrastructure) is situated in a place where the average air dose rate exceeds  $2.5\mu\text{Sv/h}$ , and workers engage in work by which they are expected to stay in the place for 40 hours or longer per month, or (2) workers engage in conveyance of loads (construction machinery, construction materials, soil, gravel, etc.) associated with restoration work of local infrastructure in a place where the average air dose rate exceeds  $2.5\mu\text{Sv/h}$ .

Only passing through an area where the average air dose rate exceeds  $2.5\mu\text{Sv/h}$  shall not

- fall under operations under designated doses because the time of stay there is limited.
- (c) Places where the average air dose rate exceeds 2.5 $\mu$ Sv/h due to a controlled radiation source, such as an X-ray device, shall also be handled as controlled areas as provided for in Article 3, paragraph (1) of the Ionizing Radiation Ordinance because "operations under designated doses" are limited to operations to be performed in places with an average air dose rate in excess of 2.5 $\mu$ Sv/h due to accident-derived radioactive materials.

2 It is preferred that self-employed workers, individual proprietors and volunteers, etc. should perform necessary matters among those mentioned in Section 3 "Subjects and Methods of Radiation Exposure Dose Control", Section 4 "Measures to Reduce Radiation Exposure" and Section 5 "Worker Education" and others.

### Section 3 Subjects and Methods of Radiation Exposure Dose Control

#### 1 Basic principles

- (1) An employer engaging in a business under designated doses shall endeavor to minimize the exposure to ionizing radiation of workers who engage in operations under designated doses (hereinafter referred to as "workers engaging in operations under designated doses") or other workers.
- (2) When performing operations under designated doses, the employer shall give the highest priority to the reduction of the exposure to ionizing radiation of workers engaging in operations under designated doses, and endeavor to ensure that measures, such as decontamination, are taken in advance in workplaces.
- (a) The provision of (1) above states that employers should keep exposure to radiation during work as low as reasonably achievable based on the principles of optimization of the International Commission on Radiological Protection (ICRP).
- (b) The provision of (2) above states that when performing work that is expected to cause a certain level of radiation exposure, it is necessary to give the highest priority to the reduction of the exposure of workers engaging in operations under designated doses to radiation and endeavor to take measures, such as decontamination, before performing the work, in view of the principles of justification set by ICRP (hereinafter referred to as the "principles of justification") which requires public benefits and needs outweighing the demerits of radiation exposure in performing said work.
- (c) In light of the principles of justification and considering the fact that radiation exposure doses tend to increase in proportion to working hours and that the urgency of work in manufacturing or commercial businesses, etc. is not necessarily high, an employer engaged in such a business shall be required to take measures, such as decontamination, in and around the workplace in advance to minimize doses and, in principle, enable these workers to work under an average air dose rate that does not require radiation exposure dose control (2.5 $\mu$ Sv/h or below).

Since it is assumed that in areas where the average air dose rate set by the Nuclear Emergency Response Headquarters to control the resumption of manufacturing businesses, etc. is  $3.8\mu\text{Sv/h}$  or below, the indoor air dose rate is approximately 40% of this value, or approximately  $1.5\mu\text{Sv/h}$  or below, due to the shielding effect of buildings, indoor work in manufacturing businesses, etc. is not expected to fall under operations under designated doses if measures, such as decontamination, are appropriately taken before starting work.

## 2 Measurement of doses

- (1) When an employer engaging in a business under designated doses directs workers to perform operations under designated doses in workplaces where the average air dose rate exceeds  $2.5\mu\text{Sv/h}$ , the employer shall measure the external radiation exposure doses of the workers by means of personal dosimeters.
- (2) Given the difficulty for self-employed workers and individual proprietors in controlling radiation exposure doses, it is desirable that they avoid engaging in work falling under operations under designated doses by appropriately taking measures, such as decontamination, in advance.
  - (a) Self-employed workers and individual proprietors who inevitably have to perform operations under designated doses shall be deemed as employers engaging in a business under designated doses, and these Guidelines shall apply to them.
  - (b) Volunteers shall be permitted to work in workplaces where the average air dose rate is  $2.5\mu\text{Sv/h}$  (equivalent to approximately  $5\text{mSv/year}$  when working 40 hours per week for 52 weeks) or below, and within several dozen times (days) in a year so that the effective dose caused by the work will not exceed  $1\text{mSv/year}$ .

## 3 Radiation exposure dose limits

- (1) An employer engaging in a business under designated doses shall endeavor to keep the total of the effective doses of workers as measured in 2 (1) below the limits listed in (a) to (c) below.
  - (a) Male workers and female workers diagnosed as having no possibility of pregnancy:  $100\text{mSv}$  per five years and  $50\text{mSv}$  per year
  - (b) Female workers (excluding those diagnosed as having no possibility of pregnancy and those stated in (c) below):  $5\text{mSv}$  per three months
  - (c) Pregnant female workers:  $2\text{mSv}$  in equivalent dose on the abdominal surface during the pregnancy period
- (2) When an employer engaging in a business under designated doses directs workers who engaged in radiation work in controlled areas provided for in Article 3 of the Ionizing Radiation Ordinance or workers who engaged in operations for decontamination, etc. to engage in operations under designated doses, the employer shall keep the total of the effective dose said workers were exposed to during the radiation work or decontamination work and the effective dose as measured in 2 (1) at or below the limits specified in (1).
- (3) To perform radiation exposure control provided for in (1) and (2), an employer engaging in a

business under designated doses shall investigate whether workers engaging in operations under designated doses have a radiation exposure history (for those who have a radiation exposure history, the place, type, and period of work and other matters relating to radiation exposure shall be made known to the employer) at the time of employment or transfer to operations under designated doses based on the dose records issued to said workers from the previous employers (if workers do not have a dose record, the employer shall ask them to have the dose record reissued by the previous employers).

- (4) To properly control the radiation exposure doses of workers engaged in works under designated dose rates in multiple different workplaces, the period of "five years" prescribed in (1) (a) above should be quinquennial periods of which the first period commences on 1 January 2012 uniformly for all workplaces where works under designated dose rates are performed. The same shall apply to employers that newly start works under designated doses as their businesses during any of the quinquennial periods. In such cases, the value of 20 mSv multiplied by the number of years from the commencement date of the works till the end of the corresponding quinquennial period shall be deemed as the exposure dose limit for the period by the end of such a quinquennial period and shall be used for application of relevant regulations. The time period of "one year" prescribed in (1) (a) above shall mean each one-year period in five years commencing on the initial day of the "five years".
- (5) When the dose received from 1 January 2012 until 30 June 2012 is ascertained, radiation exposure control shall be performed by adding such value of dose to the exposure dose on or after 1 July 2012.
- (6) When any worker of an employer engaging in a business under designated doses newly engages in operations under designated doses in the employer's place of business at any point in "one year" or "five years," the employer shall confirm the radiation exposure dose from the start of said "one year" or "five years" until the day the worker starts engaging in said operations under designated doses, based on the dose record issued to said worker from the previous employer (if the worker does not have a dose record, the employer shall ask the worker to have the dose record reissued by the previous employer).
- (7) Notwithstanding the provisions of (4) and (5), an employer who primarily engages in radiation works may commence radiation exposure dose control from a different timing that is uniformly applied in the workplaces for all employers.
- (8) An employer engaging in a business under designated doses shall inform those workers engaging in operations under designated dose rates of the start of timing for exposure dose control.

#### 4 Records, etc. of measurement results of doses

- (1) An employer engaging in a business under designated dose rates shall calculate the radiation exposure doses of the workers engaging in operations under designated dose rates listed in the following items based on the measurement or calculation results referred to in 2 above, record the calculated results, and keep the records for 30 years. This provision shall also apply to investigation records referred to in 3 (3). However, this provision shall not be

applicable in the case where the employer transfers the said records to the organization designated by the Minister of Health, Labour and Welfare (Radiation Effects Association, a public interest incorporated foundation) after these records have been kept for five years or after the workers recorded therein have terminated work under the designated dose rates. Form 1 is available as an example of the recording form for such a case.

With regard to workers engaging in operations under designated doses who were radiation workers provided for in Article 4, paragraph (1) of the Ionizing Radiation Ordinance or workers engaging in operations for decontamination, etc. in special decontamination areas, etc., the doses said workers were exposed to in radiation work or operations for decontamination, etc. shall be added to the doses they are exposed to in operations under designated doses, recorded, and stored.

- (a) Totals of the effective dose of male workers or female workers diagnosed as having no possibility of pregnancy for each three-month period, one-year period and five-year period (or totals for each three-month period and one-year period for those whose effective dose for five years has not exceeded 20mSv per year)
  - (b) Totals of the effective dose of female workers having the possibility of becoming pregnant for each one-month period, three-month period and one-year period (or totals for each three-month period and one-year period for those whose effective dose will not exceed 1.7mSv per month)
  - (c) Totals of the effective dose to which the abdominal surfaces of pregnant female workers were exposed for each one-month period.
- (2) An employer engaging in a business under designated doses shall notify workers engaging in operations under designated doses of the records referred to in (1).
  - (3) When an employer of decontamination related workers engaged in work under the designated dose rates intends to discontinue business, the employer shall transfer the records referred to in (1) to the organization designated by the Minister of Health, Labour and Welfare (Radiation Effects Association, a public interest incorporated foundation).
  - (4) When any e or an employer engaging in a business under designated doses intends to terminate its business, the employer engaging in a business under designated doses shall issue a copy of the records referred to in (1) to the worker engaging in operations under designated doses worker engaging in operations under designated doses is terminated from servic.
  - (5) When an employer engaging in a business under designated doses employs a fixed-term contract worker or temporary worker, the employer shall keep the following in mind to appropriately perform radiation exposure dose control.
    - (a) When an employer engaging in a business under designated doses employs a worker under an employment contract or dispatch contract with a fixed term shorter than three months, the radiation exposure dose shall be calculated for each one-month period and recorded.
    - (b) At the end of the contract term, the employer shall total the effective dose the worker was exposed to during said contract term, calculate and record the radiation exposure dose, and issue a copy of the record to said worker engaging in operations under designated doses.

## Section 4 Measures to Reduce Radiation Exposure

### 1 Preliminary survey, etc.

- (1) When an employer performs operations under designated doses, the employer shall investigate the average air dose rate ( $\mu\text{Sv/h}$ ) in the workplace before the start of said operations and every two weeks thereafter as long as said operations are performed in the same workplace, and record the results.

However, when the measurement results of the average air dose rate are constantly below  $2.5\mu\text{Sv/h}$ , the employer shall not need to measure the average air dose rate thereafter.

- (2) The method for measuring and evaluating the average air dose rate shall conform to Attachment 2. A prior evaluation is performed to determine whether the average air dose rate exceeds  $2.5\mu\text{Sv/h}$  to require radiation exposure dose control. Therefore, if the employer determines that the average air dose rate is higher than  $2.5\mu\text{Sv/h}$  in the workplace in consideration of the results of the airborne monitoring survey, etc. published by the Nuclear Regulation Authority, the results of the airborne monitoring survey, etc. in an individual workplace may be used in place of measurement of the average air dose rate. In addition, it is not intended that the measurement is required even if the average air dose rate in the workplace is far below  $2.5\mu\text{Sv/h}$  and it can be clearly determined that the work does not fall under works under designated doses.
- (3) An employer engaging in a business under designated doses shall clearly present the date on which the survey referred to in (1) or (2) was completed, the method of the survey, and a summary of the results to workers engaging in operations under designated doses by issuing a document showing said items.

### 2 Medical examinations, etc. by physicians

- (1) An employer engaging in a business under designated doses shall direct workers who fall into any of the situations of the following items to immediately consult a doctor or receive medical treatment:
  - (a) when workers are exposed to an effective dose in excess of the radiation exposure dose limit;
  - (b) when workers accidentally inhale or ingest accident-derived radioactive materials;
  - (c) when contamination of workers cannot be reduced to or below  $40\text{Bq/cm}^2$  by body washing, etc. after they were contaminated by accident-derived radioactive materials; or
  - (d) when wounds are contaminated by accident-derived radioactive materials.
- (2) The situation of (1) (b) shall be limited to cases in which a certain degree of internal exposure is expected; for example, when a worker was buried in a large volume of earth and sand, etc. in an accident and the result of a nasal smear test exceeded the criterion, or when a worker ingested a large volume of earth and sand or contaminated water.

## Section 5 Education for Workers

### 1 Special education for workers engaging in operations under designated doses

- (1) When an employer engaging in a business under designated doses directs workers to engage in operations under designated doses, the employer shall conduct special education for said workers in the following subjects in the form of lectures in advance:
  - (a) effects of ionizing radiation on organisms and knowledge about methods for controlling doses;
  - (b) knowledge about methods for measuring radiation, etc.; and
  - (c) related laws and ordinances.
- (2) Other details of the implementation of special education shall conform to Attachment 3.

### 2 Education for other persons in need of it and other matters

- (1) It is desirable that similar education should be conducted also for self-employed workers, individual proprietors and other persons not employed by any person or entity.
- (2) It is desirable that a party who places an order for operations under designated doses should ensure in advance that a system capable of securing the required number of workers to perform the operations by the start of the operations has been established.

## Section 6 Healthcare Measures

### 1 Medical examinations

- (1) An employer engaging in a business under designated doses (or a dispatching employer in the case of medical examinations of temporary workers; the same applies hereinafter) shall conduct medical examinations of the following items by a physician for full-time workers engaging in operations under designated doses at the time of employment and once every period within a year thereafter:
  - (a) investigation of the medical history and work history;
  - (b) examinations of whether there are objective and subjective symptoms;
  - (c) measurement of height, weight, abdominal circumference, vision and hearing;
  - (d) chest X-ray and sputum examinations;
  - (e) blood pressure measurement;
  - (f) examination for anemia;
  - (g) liver function test;
  - (h) examination of blood lipid levels;
  - (i) blood sugar test;
  - (j) urine analysis; and
  - (k) electrocardiography.
- (2) With regard to workers who were examined for items listed in (f) through (i) and (k) of the



above (1) at the preceding medical examination (limited to regular medical examinations), all or some of the said items may be omitted if the occupational physician considers them unnecessary.

- (3) Items (c), (d), (f) through (i) and (k) of the above (1) may be omitted if the occupational physician considers them unnecessary based on the criteria set by the Minister of Health, Labour and Welfare.
- (4) The hearing test of item (c) of the above (1) (limited to tests conducted during regular medical examinations) may be substituted by hearing tests (excluding tests for hearing ability for 1000Hz and 4000Hz sounds), which the occupational physician considers appropriate, for workers who were examined for the said item during the preceding medical examination, or who are younger than 45 years (except those aged 35 and 40 years old).
- (5) An employer engaging in a business under designated doses shall prepare individual medical examination cards based on the results of the medical examinations set forth in (1) and keep them for five years.

## 2 Follow-ups, etc. on the results of medical examinations

- (1) An employer engaging in a business under designated doses shall ask opinions from the physician based on the results of the medical examinations set forth in 1 (limited to those in which workers were diagnosed as being abnormal with respect to any of the items of said medical examinations) according to the following provisions:
  - (a) the employer shall ask opinions from the doctor within three months from the date of a medical examination; and
  - (b) the employer shall record the opinions of the physician on the individual worker's medical examination card.
- (2) An employer engaging in a business under designated doses shall notify workers engaging in operations under designated doses, who received the medical examinations set forth in 1, of the results of the medical examinations without delay.
- (3) As a result of the medical examinations set forth in 1, if an employer engaging in a business under designated doses finds that any worker is suffering or suspected of suffering from a radiation-derived hazard, or has a risk of suffering from a radiation-derived hazard, the employer shall take necessary measures to maintain his/her health, such as changing his/her workplace, assigning another operation to him/her, reducing exposure time or changing the work method, until the hazard, suspicion or risk ceases to exist.

## Section 7 Safety and Health Control System

### 1 Integrated management of radiation exposure statuses by principal employers

A principal employer engaging in operations under designated doses shall appoint a radiation administrator to perform integrated management including radiation exposure management of workers of related contractors, and such management shall include the matters prescribed in the

following. It is desirable that the radiation administrator should be selected from among those having a national qualification in radiation or those who received a radiation management training program provided by a professional education institute, etc.

- (1) to participate in the "System of Registration and Management of Radiation Exposure Doses for Decontamination and Related Works" in order to accurately ascertain past accumulated exposure doses of workers and to prevent the leakage or loss of exposure dose records, etc.; and
- (2) to provide necessary guidance and support to ensure that the measures provided for in 3 of Section 7 are appropriately taken by related contractors.

## 2 Safety and health management systems by employers

- (1) An employer engaging in a business under designated doses shall appoint a health supervisor or safety and health promoter according to the size of the place of business to manage technical matters relating to such measures as measurement of doses and recording of measurement results.

It is desirable that a safety and health promoter should be appointed even if the number of workers of the place of business is fewer than ten.

- (2) An employer engaging in a business under designated doses shall appoint a person in charge of radiation management, regardless of the size of the place of business, to perform operations relating to such operations as measurement of doses and recording of measurement results.

## 3 Measures, etc. to maintain and promote the health of emergency workers at the Fukushima Daiichi Nuclear Power Plant of Tokyo Electric Power Company

When an employer engaging in a business under designated doses directs workers who engaged in emergency work at the Fukushima Daiichi Nuclear Power Plant of Tokyo Electric Power Company to engage in operations under designated doses, the employer shall implement the matters described in the following items:

- (1) to submit a "Control Implementation Status Report on Dose, etc. of Designated Emergency Workers, etc." (Form 3 of the Ionizing Radiation Ordinance) to the Minister of the Health, Labour and Welfare (c/o Office of Workers Health Planning for Ionizing Radiation, Industrial Health Division, Industrial Safety and Health Department of the Labour Standards Bureau, Ministry of Health, Labour and Welfare) on the last day of every three months based on Article 59-2 of the Ionizing Radiation Ordinance. This report shall be submitted, in principle, in an electromagnetic form as CSV file format.
- (2) to provide health guidance, etc. based on the "Guidelines on Maintaining and Promoting Health of Emergency Workers, etc. at the Fukushima Daiichi Nuclear Power Plant of Tokyo Electric Power Company" (Public Notice No. 5 of 2011 Guidelines on Maintaining and Promoting Health of Emergency Workers, etc. at the Fukushima Daiichi Nuclear Power Plant of Tokyo Electric Power Company) and also conduct necessary inspections, etc. for those whose radiation exposure exceeds 50 mSv during the period of emergency work.

Attachment 1 List of special decontamination areas, etc.

1 Special decontamination areas

- Subject of designation  
Restricted areas or planned evacuation areas, etc.

	Number of municipalities	Designated areas
Fukushima Prefecture	11	All areas in Naraha-town, Tomioka-town, Okuma-town, Futaba-town, Namie-town, Katsurao-village and Iitate-village. And areas that used to be designated as Warning Zones or Planned Evacuation Zones in Tamura-city, Minamisoma-city, Kawamata-town and Kawauchi-village

2 Intensive contamination survey areas

- Subject of designation  
Areas, etc. for which the radiation dose is 0.23 $\mu$ Sv/h or more

	Number of municipalities	Designated areas
Iwate Prefecture	3	All areas in Ichinoseki-city, Oshu-city, and Hiraizumi-town
Miyagi Prefecture	8	All areas in Shiroishi-city, Kakuda-city, Kurihara-city, Shichikashuku-town, Ogawara-town, Marumori-town, Watari-town, and Yamamoto-town
Fukushima Prefecture	36	All areas in Fukushima-city, Koriyama-city, Iwaki-city, Shirakawa-city, Sukagawa-city, Soma-city, Nihonmatsu-city, Date-city, Motomiya-city, Koori-town, Kunimi-town, Otama-village, Kagamiishi-town, Tenei-village, Aizubange-town, Yugawa-village, Aizumisato-town, Nishigo-village, Izumizaki-village, Nakajima-village, Yabuki-town, Tanagura-town, Samegawa-village, Ishikawa-town, Tamakawa-village, Hirata-village, Asakawa-town, Furudono-town, Miharu-town, Ono-town, Hirono-town and Shinchi-town; and areas excluding the restricted and designated areas in Tamura-city, Minamisoma-city, Kawamata-town, and Kawauchi-village
Ibaraki Prefecture	19	All areas in Hitachi-city, Tsuchiura-city, Ryugasaki-city, Joso-city, Hitachiota-city, Takahagi-city, Kitaibaraki-city, Toride-city, Ushiku-city, Tsukuba-city, Hitachinaka-city, Kashima-city, Moriya-city, Inashiki-city, Hokota-city, Tsukubamirai-city, Tokai-village, Miho-village, Ami-town, and Tone-town

Tochigi Prefecture	7	All areas in Kanuma-city, Nikko-city, Ohtawara-city, Yaita-city, Nasushiobara-city, Shioya-town, and Nasu-town
Gunma Prefecture	8	All areas in Kiryu-city, Numata-city, Shibukawa-city, Midori-city, Shimonita-town, Takayama-village, Higashiagatsuma-town, Kawaba-village
Saitama Prefecture	2	All areas in Misato-city and Yoshikawa-city
Chiba Prefecture	9	All areas in Matsudo-city, Noda-city, Sakura-city, Kashiwa-city, Nagareyama-city, Abiko-city, Kamagaya-city, Inzai-city, and Shiroy-city
Total	92	

\* Prepared by Division of Environmental Restoration, Environmental Restoration and Resources Recycling Bureau, Ministry of the Environment (January 2018)

## Attachment 2 Methods for Measuring and Evaluating Average Air Dose Rates

### 1 Objectives

The measurement and evaluation of average air dose rates is conducted by an employer when said employer directs workers to engage in operations under designated doses in order to measure and evaluate whether the average air dose rates in workplaces exceed  $2.5\mu\text{Sv/h}$  and thereby determine details of dose control to be performed.

### 2 Basic concepts

- (1) An employer shall measure average air dose rates before starting work.
- (2) When an employer continuously performs operations at the same place, the employer shall measure the average air dose rate every two weeks. Even if the measured value is below  $2.5\mu\text{Sv/h}$ , it may vary depending on weather, etc., and measurement shall, therefore, need to be continued until the measured value drops below 90% of  $2.5\mu\text{Sv/h}$  ( $2.2\mu\text{Sv/h}$ ). The average air dose rate shall also be measured whenever the ambient environment has significantly changed due to a typhoon, flooding, landslide, etc.
- (3) The measurement shall be conducted in a manner that can accurately reflect the actual situation of radiation exposure of workers.
- (4) It is not intended that measurement before starting work is required even if the employer can determine that the average air dose rate in the subject workplace is far below  $2.5\mu\text{Sv/h}$  and the work performed there does not fall under operations under designated doses, based on the air dose rates officially announced by the Nuclear Regulation Authority.

### 3 Measurement and evaluation of average air dose rates

#### (1) Common matters

- (a) The air dose rate shall be measured at a height of 1 m from the ground surface.
- (b) The measuring instrument, etc. shall conform to Article 8 of the Working Environment Measurement Standards.

#### (2) Measurements

The air dose rate shall be measured at points where the dose rate is expected to be the highest in the area of the workplace where operations are to be performed (if the total area of said workplace exceeds  $1,000\text{m}^2$ , each divided area of  $1,000\text{m}^2$  or less), at three points at a minimum, and the average of the measured results shall be adopted as the average air dose rate.

### Attachment 3 Special Education for Workers

Special education for workers engaging in operations under designated doses shall be provided by lectures.

Lectures shall be provided in the subjects listed in the left column of the table shown below, in the scopes defined in the middle column, and for at least the times prescribed in the right column.

Subject	Coverage	Duration
The impact of ionizing radiation on living organisms and the exposure dose control method.	(i) Types and properties of ionizing radiation (ii) The impact of ionizing radiation on cells, tissues, organs and entire bodies of living organisms (iii) Exposure dose limits and methods for measuring exposure doses (iv) Methods for checking and recording the exposure dose measurement results	1 hour
Knowledge about methods for measuring radiation, etc.	(i) Methods for measuring radiation (ii) Methods for monitoring of dose equivalent rate from external radiation (iii) Emergency actions in case of an abnormal event	30 minutes
Relevant laws and regulations	Relevant provisions of the Industrial Safety and Health Act, Enforcement Order of the Industrial Safety and Health Act, Ordinance on Industrial Safety and Health, and Ionizing Radiation Ordinance for Decontamination".	1 hour