

# **Revision of regulation for radiation exposure on emergency workers**

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# Contents

- Background
- Investigation of regulation for emergency workers abroad
- Point of revision of regulation
- Bases of 250mSv
- Schedule for revision of the regulation

# Background

- During accident of Fukushima Daiichi, dose limit of emergency response staff was changed from **100mSv to 250mSv** temporarily.
- Although the dose limit is returned to 100mSv now, it is important that **prepare for the accident beyond 100mSv for the worth.**
- Therefore, NRA started investigation about the **measures of radiation exposure for emergency workers** on 30 July 2014.
- NRA approved the **revision of the regulation and ordinance** on 5 August.

# Investigation of regulation for emergency workers abroad

## (How to progress)

- Confirmation of discussion about **ICRP 2007 recommendation** and **IAEA new BSS** at **Japanese Radiation Council** who issued interim report just before Fukushima Daiichi accident in 2011 March.
- Research of regulation in **foreign country**, supported by **OECD/NEA/ISOE**.

Organization/State	ICRP Pub. 103 (2007)	IAEA NO. GSR Part 3 (interim)	Japan	U.S.A.	France	Canada	Korea	Russia
Dose limit for emergency workers (mSv)	500 or 1000 (No limit for high benefit)	500	100 (2011.3.14~12.16:temporarily changed to 250)	250 (Depend on the risk analysis for life saving)	100 (300 for life saving, but less than 1,000)	500 (exceed 500 for life saving)	500 (No limit for life saving)	100

## (Terms of reference)

- Desirable **dose limit**
- **Prior measures** for workers (how to get agreement with emergency work accepting risk by education and training )
- **Subsequent measures** for workers (follow-up radiation exposure control and medical check after accident)

## Point of revision of regulation for emergency workers (1/2)

- Emergency work is limited to the radiation worker who is provided **information of risk by radiation** and **training of radiation protection measures**, and expresses **acceptance of the emergency work**.
- Effective Dose limit of **250 mSv** for an accident, which is **high probability of radioactive materials release outside the facility**, is added to current dose limit of 100mSv for emergency works.
- **Facility, Accident** and **Worker** for dose limit of 250 mSv are related **to Act on Special Measures Concerning Nuclear Emergency Preparedness** due to strengthen of countermeasures for nuclear disaster, e.g. NPP, Nuclear cycle facility, transport, etc., **severe accident** like Fukushima Daiichi NPP, **Nuclear disaster prevention staff**.

## Point of revision of regulation for emergency workers (2/2)

- Considering **reference level of ICRP or IAEA** recommendation, necessary action is ordered by NRA to operator based on law, in case of **unnecessary radiation exposure even if considering risk of public, or exposure exceed the limit due to inappropriate radiation protection.**
- As practical measures, radiation dose for emergency work and planned work are managed **separately only if specialty of the workers is necessary** to keep safe the damaged facility or operate other nuclear facility safely, although accumulated dose of lifetime should not exceed **1000 mSv** .

## Bases of 250mSv (1/2)

### ○International Standard

#### (ICRP Pub96)

Effective doses below **1000 mSv** should avoid **serious deterministic effects**; below **500 mSv** should avoid **other deterministic effects**.

#### (ICRP Pub60(1990)、Pub103(2007))

Estimates of the thresholds for tissue effects in the adult **bone Marrow** : **Depression of hematopoiesis 0.5 Sv**

#### (IAEA BSS GSR Part3)

“Guidance values for restricting exposure of emergency workers”

**500mSv** : Actions to prevent **sever deterministic effects** and actions to prevent **the development of catastrophic conditions** that could significantly affect people and the environment

## Bases of 250mSv (2/2)

### ○ Case of Fukushima Daiichi accident

Temporarily dose limit was increased from 100mSv to 250mSv during Fukushima Daiichi accident. Although 6 operators were espoused over 250 mSv due to inappropriate radiation protection for internal exposure, external exposure was 33-110mSv.

### ○ Instance Abroad

To 25 rem for life saving activates and the protection of large populations.  
(US EPA-400-R-92-001)

### ○ Medical Knowledge

Refer to a report issued by working team of Ministry of Health, Labour and Welfare on May 2015.

“Although medical knowledge dose not express clearly threshold, 250mSv is a dose level to prevent certainly decrease of immune system due to decreasing a lymphocyte.”

## Schedule for revision of the regulation

2014 July 30	Chairman of NRA asked secretariat to investigate reconsideration of regulation of emergency workers
2015 May 20, July 8	NRA discussed draft revision of regulation of emergency workers (May 21 to June 19 Public comment)
July 23, 30	NRA requested Japanese Radiation Council for advice
August 5	NRA approved the revision of regulation and order of emergency workers, considering answer from Japanese Radiation Council
August 31	Promulgation of the revision of regulation and order
2016 April 1	Enforcement Examination and Approval of revision of Operational Safety Program (add the provision of education, training and acceptance of risk)

Ministry of Health, Labour and Welfare and National Personnel Authority (for Nuclear Operational Safety Inspector) also revise the regulation and order.