

Emergency Dose Control for workers at the Fukushima Daiichi NPS Accident

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Akira Suzuki
Radiological health & Safety Center TEPCO

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- 1. Application of criteria at the accident*
- 2. Consideration of dose restriction of worker at post-accident stage*



TOKYO ELECTRIC POWER COMPANY

1-1. Dose restriction of worker at the accident

Legal Dose limit (Effective Dose)

- Normal stage
20mSv per years, averaged over 5years & 50mSv in any single year

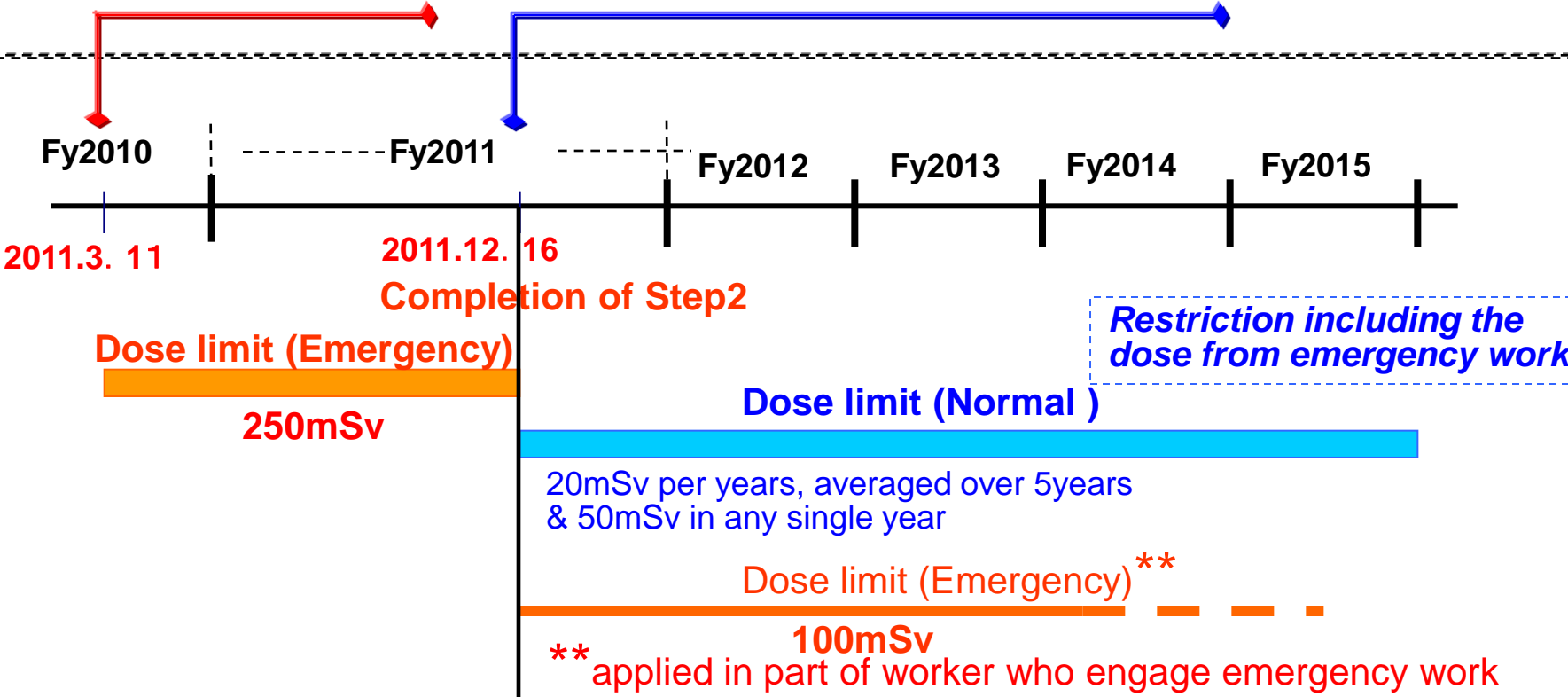
- Emergency work
100mSv

- Emergency work at FDNP
250mSv

100mSv

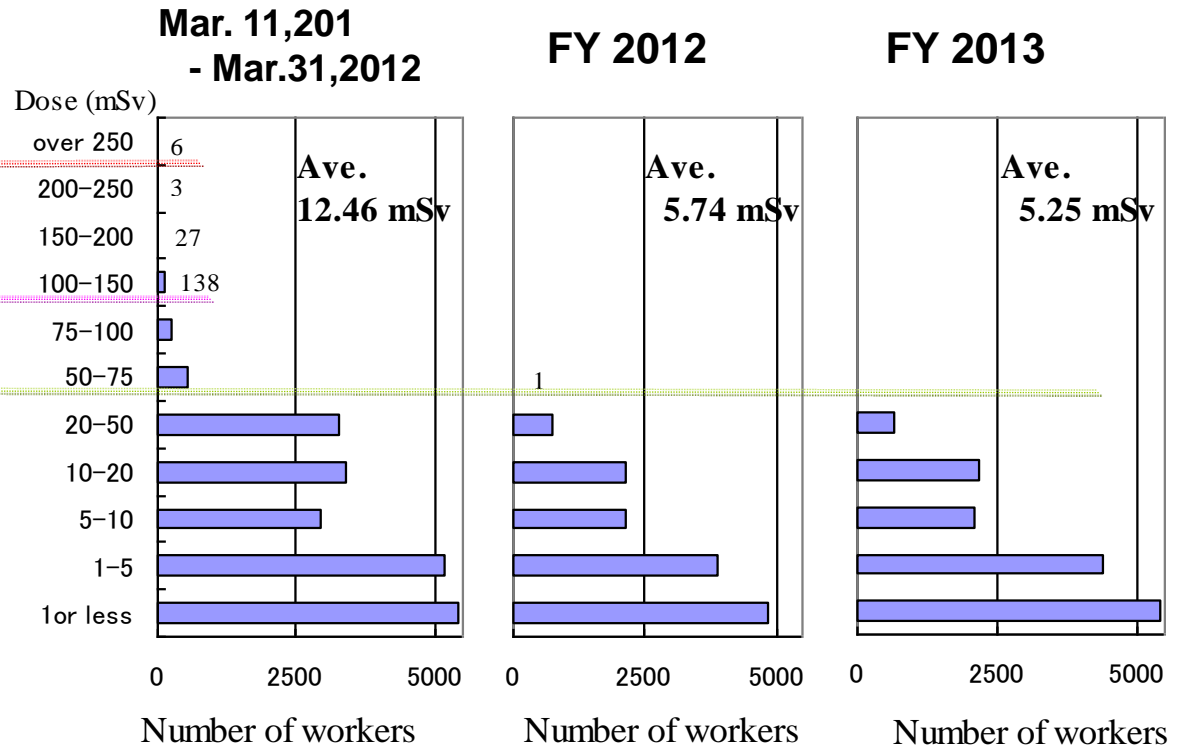
raised

downed again



1-2. Worker Dose / Application of the Dose limit

Cumulative Dose (mSv)	11 March, 2011 to 31 March, 2012		
	TEPCO	Contractor	Total
Over 250	6	0	6
200~250	1	2	3
150~200	25	2	27
100~150	118	20	138
75~100	180	65	245
50~75	261	258	519
20~50	626	2,660	3,286
10~20	490	2,892	3,382
5~10	366	2,557	2,923
1~5	563	4,621	5,184
1 or less	791	4,631	5,422
Total	3,427	17,708	21,135
Max. (mSv)	678.80	238.42	678.80
Ave. (mSv)	24.85	10.06	12.46



In six workers who exceed 250mSv, most of their doses were caused by internal exposure.

Administrative guidance by the regulator

- ◆ **Not to exceed the 100mSv per 5years including dose by emergency work at the work of engaging after the emergency.**

Totalled 174 emergency workers are not able to engage in radiation work.

- Over 250mSv : total **6 workers**
- 100mSv – 250 mSv : total **168 workers**

1-3. Regarding the future

In Japan, revising the dose restriction of emergency worker in domestic law & regulation is currently under discussion.



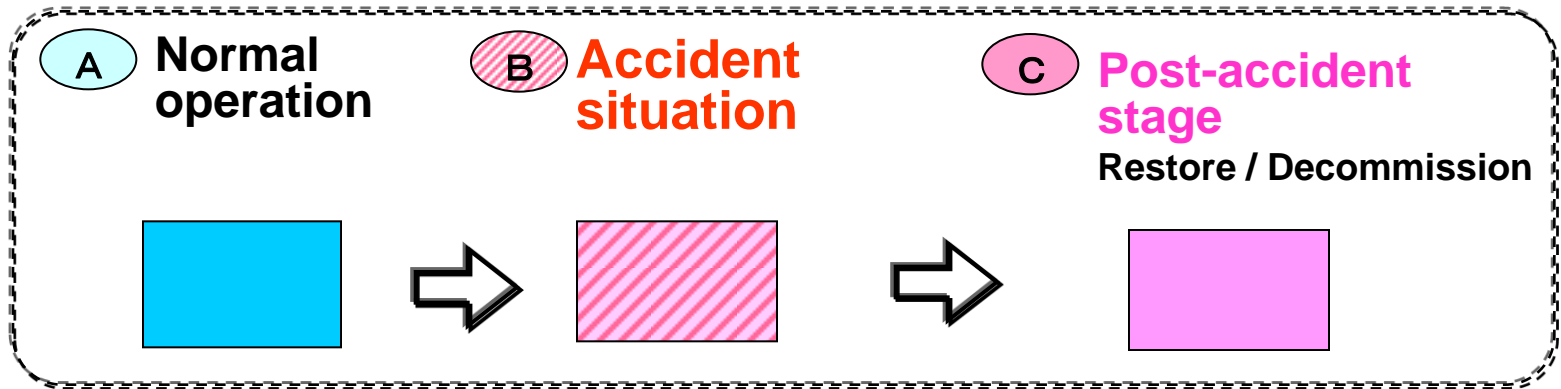
Expectations of Nuclear Operator

- Have the consistency with the globally recommended level (ICRP,IAEA)
- Prescribe as reference levels of dose depending on degree of the emergency
- Prescribe as “reference levels” (not a “dose limit”).
- Dose of exposure in emergency should be treated separately from any normal doses.

These are proposal under premise of performing an effort to reduce actual exposure dose enough in the emergency too.

2-1. Change in situation from radiological aspect

State of the plant



Exposure situation		Planned	Emergency	?
Radiation level		Low	High	High
Source control	As whole facility	Controlled (well known)	No	Controlled
	As each sources	Controlled (well known)	No	Uncertainty of information of source conditions <i>Controlling by grasping the condition by each tasks</i>
Protective criteria		Dose limit (normal)	Reference level	?

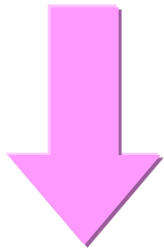
2-2. Features of the work in post-accident stage

On-site works after NPS accident

- Radiation levels of work places are still high
- There is uncertainties of information of each source conditions

Procedure or worker's protective measures are planned and controlled by grasping the source condition (radiological environment etc.) every time of tasks

- Task of decommissioning lasts to a long term
- There is a demand of decommissioning faster in the case of accident NPS.



It is clearly different from before accident Before accident:

(Sources are sealed and well controlled / Dose of worker is controlled very low)

2-3. Dose restriction of on-site worker in post-accident stage



● Exposure situation ?

 Emergency or Existing (Reference level) or Planned (Dose limit)

● Dose restriction ?

 *Isn't it reasonable introducing a new dose restriction concept ?*

For example
Establishing **more flexible** dose restriction criteria that **have the same safety (risk) levels** of dose limitation of normal occupational exposure.

200mSv per 10 years & in 50mSv any single year

 Abut **1 Sv** in a full working life (Base of Dose limit)

IAEA BSS 1996

Special circumstances

II-7. When, in special circumstances, a temporary change in the dose limitation requirements is approved pursuant to Appendix I:

(a) the dose averaging period mentioned in para. II- 5(a) may exceptionally be **up to 10 consecutive years as specified by the Regulatory Authority**, and the effective dose for any worker shall not exceed 20 mSv per year averaged over this period and shall not exceed 50 mSv in any single year,