Draft Guideline of Japan Health Physics Society for Waste Management in Existing Exposure Situations after a Nuclear Accident

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The Working Group

on radioactive waste management under the Standardisation Committee in the Japan Health Physics Society (JHPS)

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BACKGROUND

- Large amounts of RW are accumulated in environmental remediation process.
- Management of RW is an essential part of remediation process and should be optimised under the strategy to reduce the ambient dose in existing exposure situation.
- Currently available RP framework for radioactive waste management had been developed basically for planned exposure situation.
- In some cases, remediation process would not progress satisfactorily under criteria for planned exposure situation.

A guideline of RP for the management of RW in existing exposure situations is being developed.

STEPWISE APPROACH

- In existing exposure situations, intermediate reference levels can be selected to reduce exposures to people living in long-term-contaminated areas. (Pub.103, 111)
- RWM is regarded as an integral part of the remediation activities.

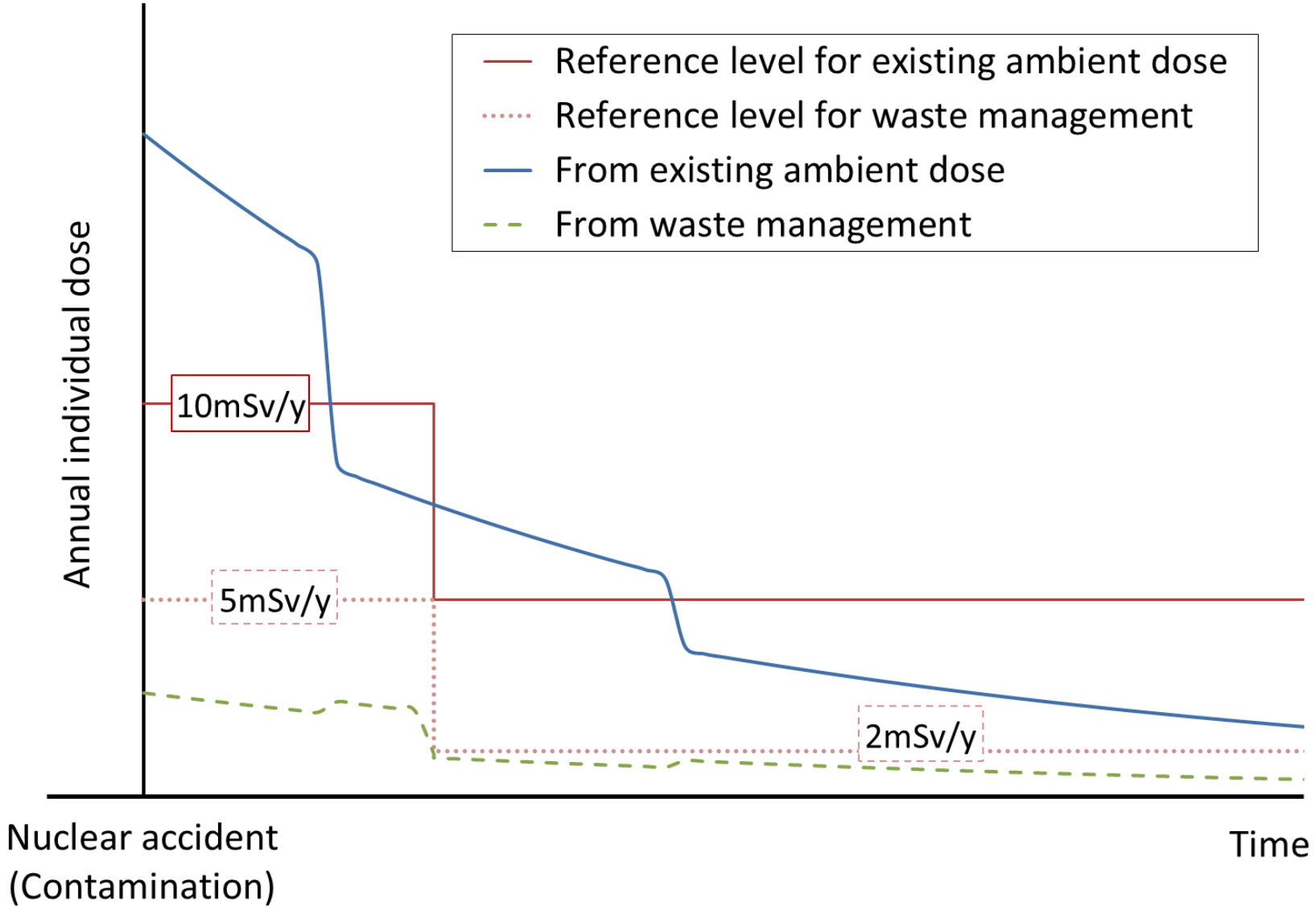
In the remediation process under existing exposure situation, stepwise reference levels for RWM can be selected below the reference level for the existing ambient dose.

Dose Band of Reference Level

- Reference level is recommended to be selected in the lower part of the 1-20 mSv/y band in the optimisation of radiation protection. (Pub.111)
- A generic reference level of 10 mSv/y above which intervention to reduce the existing exposure may be necessary is provided. (Pub.82)

Reference level for RWM can be chosen from the dose band of 1 to around 10 mSv/y.

Application of Stepwise Reference Level (Example)



Modified from: D. Sugiyama, T. Hattori, *Radiation Protection Dosimetry*, 153, 64-73 (2013).

Reference Level for Waste Disposal

- There is a desire in existing exposure situation to reduce exposures to levels that are close to or similar to situations considered as normal. (Pub.111)
- A target reference level, under which no further or little protective action is necessary, should be recommended since remedial action to reduce exposures is expected to be exempted.

Reference level at 1 mSv/y, an equivalent level to the generic intervention exemption level, can be selected as the reference level for the disposal of the waste.

Guideline for Waste Management in Existing Exposure Situations after a Nuclear Accident (Draft)

- Reference level for waste management should be selected from the dose band of 1 to around 10 mSv/y below the reference level for the existing ambient dose;
- Final target reference level for the disposal of the waste should be set at 1 mSv/y, under the relevant stakeholder involvement.

HYPOTHETICALLY SIMPLIFIED CASE STUDY (1)

Q: I removed some topsoil contaminated with radioactive caesium in my garden to reduce the ambient dose. What should I do to store the removed soil safely around my house for a while?

A: Please store the removed soil as far as possible from your house to reduce exposure to you in your house lower than the dose before the decontamination. If possible, we suggest that you store the contaminated soil so that the additional annual exposure from the contaminated soil does not exceed 1 mSv. Otherwise, you can select an intermediate target dose level from the dose band of 1 to around 10 mSv/y, e.g. at 5 mSv/y, for the additional exposure from the storage of the removed soil.

It should be important to provide alternative options of radiation protection for waste management in the environmental remediation appropriate for each situation.

HYPOTHETICALLY SIMPLIFIED CASE STUDY (2)

Q: In a contaminated area, we are collecting the removed topsoil from our garden at a storage site of our community to store it temporally prior to sending to the disposal site. What should we do to store the collected soil safely at the temporally storage site?

A: Please store the collected soil so that the additional annual exposure from the contaminated soil does not exceed 1 mSv, if practicable. But in some cases it would not be easy to shield the radiation from the collected soil with relatively high activities' radioactive caesium, or the collection of the contaminated soil would be restricted owing to limitations on the acceptance of the contaminated soil at the storage site under the single dose target at 1 mSv/y. Then you can select an intermediate target dose level from the dose band of 1 to around 10 mSv/y for the additional exposure from the storage of the collected soil below the reference level for the existing ambient dose.

It should be reasonably appropriate to reduce the existing ambient dose by keeping a balance between the load for storage of the accumulated contaminated soil and the extent of decontamination (i.e., removal of the topsoil). The stepwise approach of the proposed guideline could be practically effective to this case.

HYPOTHETICALLY SIMPLIFIED CASE STUDY (3)

Q: We want to dispose the contaminated topsoil collected during our decontamination activities. What should we do to dispose of the collected soil safely?

A: You can dispose of the contaminated soil with appropriate covering of uncontaminated soil, concrete or bentonite shielding if needed, so that the additional annual exposure from the disposed soil does not exceed 1 mSv. Until being placed the final cover on the disposed soil, you can select an intermediate target dose level from the dose band of 1 to around 10 mSv/y to store the contaminated soil according to the situation.

The stepwise approach would be also practically effective to this case. There is a need of a generic target reference level under which no further or little protective action with active control is necessary. This implies that actions to reduce the existing dose, relating the concept of 'intervention', should be exempted. Therefore, the final target reference level for the disposal of waste should be set at 1 mSv/y.

HYPOTHETICALLY SIMPLIFIED CASE STUDY (4)

Q: What should I do to manage (store or dispose) the collected litter and soil during clean-up of a hot-spot in an area under natural background radiation dose level?

A: Please store the collected contaminants as far as possible from your house. You can store or dispose of those covered with a plastic sheet or uncontaminated soil, so that the additional annual exposure from the contaminated soil does not exceed 1 mSv. Also we suggest that you did not need to carry out decontamination if the additional dose from the hot-spot did not exceed 1 mSv/y, although it was better to avoid unnecessary exposure.

Both the level of the radiation dose and the origin of the radiation source should be considered to designate an area or situation which needs the application of the stepwise approach.

SUMMARY

- The Working Group on radioactive waste management under the Standardisation Committee in JHPS proposes a guideline of the radiation protection for the management of radioactive waste in existing exposure situations on the basis of the stepwise approach.
  - Consistency and harmony with the current criteria and the previous directions by the government should be deliberately discussed.