



Improvement of Regulatory Framework on Radioactive Waste Management Facilities in Korea

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Overview of Major RW Management Facilities in Korea

3rd phase near surface trench (planning)

- Capacity : 160,000 drums (52,640 m³)
- Site area : 25,118m² (Max 260,000 drums)
- Disposal target : VLLW

1st phase underground disposal facility (operating, December 2014-)

- Capacity : 100,000 drums (35,200 m³)
- Site area : 206ha (Total area of WLDC)
- Disposal target : LILW

2nd phase near surface disposal facility (constructing, July 2022-)

- Capacity : 125,000 drums (32,875 m³)
- Site area : 67,490m² (Max 250,000 drums)
- Disposal target : LLW

<1st phase disposal facility>

- 1 Reception/storage building
- 2 Radioactive waste building
- 3 Support building I
- 4 Support building II
- 5 Equipment repair room
- 6 Garage
- 7 Electricity supply equipment building
- 8 Wastewater treatment building
- 9 Security office

<2nd phase disposal facility>

Vault Characteristics

- Length : 20 m
- Width : 20 m
- Wall thickness : 0.6 m
- Height : 10.5 m
- Vault capacity for 9 layers : 6800 drums
- Reinforced concrete box type vaults

Improvement of regulatory framework on RW Management Facility

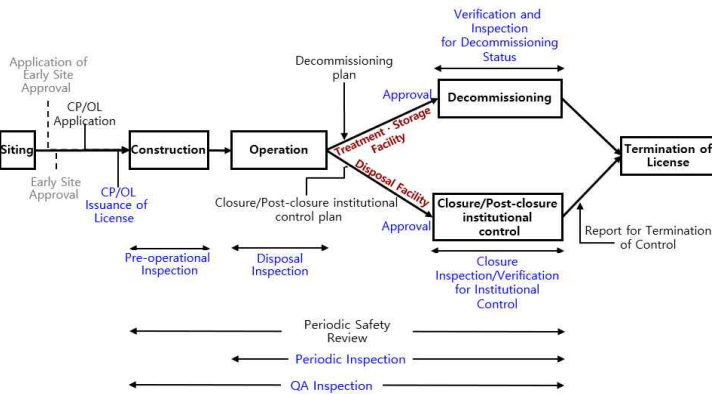
- Amendment of Nuclear Safety Act and subordinate statute of NSA (2020 ~ 2021)**
 - The regulatory system for all stages of the life-cycle of RW management facility is established.

- (Periodic Safety Review, PSR)** Requirement of PSR to be consistent with international standards
 - Considering the findings of IAEA IRRS mission in 2014 and overseas precedents, the NSA is under revision to lay a legal basis for a PSR to be performed every 10 yrs by a RW Management Facility
 - Major revisions to the NSA include the obligation of the operator to conduct a PSR and submit the results and the authority of the regulatory body to order corrective or supplementary measures when the results of the PSR or follow up actions are not sufficient

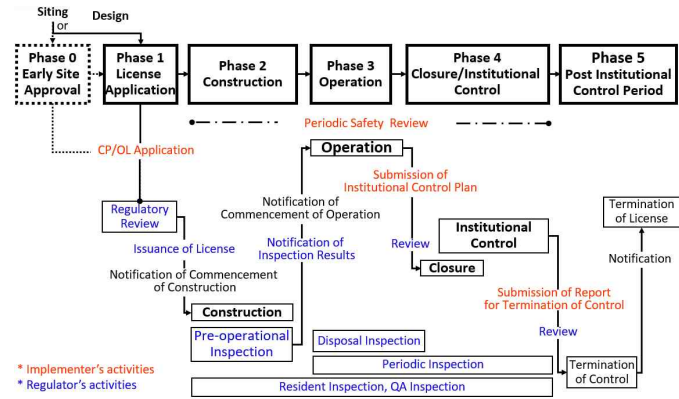
- (Decommissioning)** Establishment of regulatory procedures related to termination of operation (decommissioning of radioactive waste treatment or storage facilities, closure and post-closure institutional control of disposal facilities), with consideration of characteristics of each facility
 - The NSA is to be revised in such ways to obtain a regulatory approval for decommissioning of RW management facility and to clearly define a procedure for decommissioning approval and a list of documents (decommissioning plan, decommissioning QAP, etc.) to be submitted along with an application for decommissioning approval

- (Closure)** Establishment of regulatory procedures for closure approval of RW disposal facility
 - The closure procedure for a RW disposal facility, etc. which cover approval for closure, documents to be submitted when an application is filed (closure plan, post-closure institutional control plan, closure QAP, etc.) is to be defined

Improved Regulatory Process for Overall RW Management Facility



Regulatory Process for RW Disposal Facility



Major Regulatory Activities during Construction & Operation Phase

- Pre-operational Inspection**
 - To check prior to operation whether the construction of a disposal facility satisfies the related design and safety requirements
- Stepwise Pre-operational Inspection**
 - 1st Step - Inspection on Structure and Site**
 - Appropriateness of construction for engineering structures and site
 - 2nd Step - Inspection on Systems Installation**
 - Appropriateness of systems installation such as RW management system, Effluent RMS, Ventilation system, I&C, Fire protection system etc.
 - 3rd Step - Inspection on Systems Performance**
 - Appropriateness of system performance in connected with the 2nd step
 - 4th Step - Inspection before Operation**
 - Confirmation of operational readiness

- Periodic Inspection (on an annual basis)**
 - To confirm whether the structure, equipment and performance of disposal facility during operational phase are in conformity with technical standards.
 - To confirm whether storage, treatment and disposal of radioactive waste are in conformity with technical standards.
- Total 9 facilities subject to periodic inspection (27 inspection items)**
 - Structures (Structural Performance Monitoring System etc.)
 - Site Monitoring System
 - Electrical Power System
 - Ventilation System
 - Fire Protection System
 - Instrumentation and Control System
 - Radiation Monitoring System
 - Radioactive Waste Management System
 - Other systems necessary for the safe operation of repository

Disposal Inspection (when intend to dispose RW)

- To confirm whether the disposal of radioactive waste is in conformity with technical standards.
- As a result of the disposal inspection, when the disposal of RW is found to be in conformity with the standards, the disposal shall be deemed to be passed.

<Operator>

- Preliminary Inspection
 - Prior to delivering RW
 - Generation place
 - Operator of repository
 - Application of WAC
- Acceptance Inspection
 - After receiving RW
 - Repository on site
 - Operator of repository
 - Application of WAC
 - More detailed inspection

<Regulator>

- Disposal Inspection
 - Prior to disposal
 - Repository on site
 - Regulator
 - Application of disposal requirement

Concluding Remarks

Summary

- The regulator has been revising the Nuclear Safety Act to introduce several practice to radioactive waste management facilities to ensure that the safety regulation system related to assessment and obligation during operation is consistent with international standards
 - Periodic Safety Review (PSR)
 - Decommissioning for treatment · storage facility
 - Closure for disposal facility, etc.
- The regulatory system for all stages of the life-cycle of a radioactive waste management facility is established



- Total 4 items subject to disposal inspection**
 - Inspection on RW Management Environment**
 - Appropriateness of predisposal management/RW acceptance inspection
 - Inspection on Radiological Characterization**
 - Effectiveness of radiological characterization; method, QAP, etc.
 - Inspection on RW Packages**
 - Appropriateness of characteristics of RW disposed; Total visual inspection
 - Inspection on RW Disposal Environment**
 - Appropriateness of disposal plan, disposal environment; silo, canister, etc.