

A Study on the Establishment of Scenario Consider to Location and Treatment for Waste Tracking System

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1. Introduction

Domestic radioactive wastes are generated in nuclear power plants, Korea Atomic Energy Research Institute, KEPCO Nuclear Fuel Company, etc. These nuclear organizations have their own waste tracking system, but they need an integrated system to track wastes more efficiently.

2. Classification of Domestic Agency

2.1. Korea Atomic Energy Research Institute

Radioactive wastes, which KAERI classified as operational wastes, are generated from operation of Hanaro, production of radioisotopes, operation of the Irradiated Material Examinations Facility, the Post Irradiation Examination Facility and radioactive wastes treatment facilities and other laboratories. Depending on the radiation dose rate from surface of the wastes, in general, less than 0.2 R/hr is classified as low-level, less than 0.2~2 R/hr as intermediate level, and 2 R/hr or more as high-level radioactive waste, and depending on the contents, the wastes are classified into combustible, non-combustible, organic liquid waste, inorganic liquid wastes [1].

Table I: Korea Atomic Energy Research Institute Radioactive waste classification standards

Large Category	Middle Category	Type
Combustible	Vinyl	Vinyl Sheet, Vinyl Glove, Disposable Gowns
	Cotton	Cotton Gloves, Cotton Mask, Cloth, Bandage,
	Plastic	Acrylic, PVC Cask, PVC Bottle, PE Container
	Timbers	Timbers
	Paper	Paper, Decontamination Paper
Non-Combustible	Concrete	Concrete, Cement
	Glass	Glass Bottle, Glass Vial, Glass Fiber

	Metal	Hoyle, Alloy, Aluminum
	Filter	Charcoal Filter, Air Purification Filter, Liquid Purification Filter
	Sludge	Sludge
Organic Waste	Organic Waste	Alcohol, Acetone
Inorganic Waste	Inorganic Waste	Water in which various salts are dissolved

2.2. KEPCO Nuclear Fuel Company

KEPCO Nuclear Fuel. KEPCO Nuclear Fuel produces the nuclear fuel used in nuclear power plants, and the nuclear fuel production process generates radioactive waste. Key radioactive waste includes the protective clothing, protective gloves and masks worn by workers for protection in the production processes in the radiation controlled area, and the metals generated in the equipment improvement process due to the deterioration of production equipment and facilities. [2].

Table II: KEPCO Nuclear Fuel Radioactive waste classification standards

Categorize	Type
Dry Active Waste	Glove, Mask, Decontamination Paper
Composite	Plastic, Rubber, cable sheath
Metallic materials	Pipe, Duct, Vessel
Calcific Deposit	Calcific Deposit in the form of sludge during liquid waste
Concrete	Sinter furnace, Concrete waste
Timbers	Wood, Plywood, Equipment packaging
Glass	Reagent bottle, fluorescent lamp, A variety of light bulbs
Sodium fluoride	By-product waste generated after disposal of waste liquid

2.3. Korea Hydro & Nuclear Power Company Co, Ltd. (Hanbit)

The Hanbit Nuclear Power Plant of KHNP is classifying wastes in consideration of the physical properties, density, amount, and substances restricted for disposal. The generated radioactive wastes are categorized into combustible and non-combustible, and then categorized into different types so that they can be treated in a way fit for disposal requirements.

Table III: Hanbit Nuclear Power Plant Radioactive waste classification standards

Large Categorize	Middle Category	Type
Combustible	Cotton	Experiment Gown, Glove, Socks
	Paper	Decontamination Paper, Other Papers
	vinyl	Tape, vinyl
	Plastic	PVC, Bottle
	Timbers	walk plate, paving, Wood
	Other combustibles	Rubber, nylon, other combustibles
Non-combustible	Iron	Metal plate, Pipe, Grating, Wire, Spray Can, H-beam, S/S
	Aluminum	Aluminum, foil
	Activated carbon	HVAC internals
	HVAC waste filter	HVAC Pre-filter, HEPA-filter
	Other Non-combustibility	sludge, asbestos, plaster, glass

3. A case of transportation for establishing a scenario and creating the scenario

Scenarios were established by analyzing the scenarios in which low- and intermediate-level radioactive wastes generated by the before development an integrated waste tracking system, Hanbit, and KAERI were moved to the Gyeongju disposal facility..

3.1. Hanbit Nuclear Power Plant Radioactive Waste WTS Scenario

Hanbit we analyzed the scenario of transporting the low and intermediate-level radioactive wastes, generated in the Nuclear Power Plant, to a disposal site, and established a scenario. The report is a report on the result of transporting low and intermediate-level waste in the 4th quarter of 2017. It deals with the case of the

waste, generated in the Hanbit Nuclear Power Plant, transported to a disposal site via Cheongjeong Nuri. [3].

According to the report, the route of movement of low and medium level radioactive waste from Hanbit Nuclear Power Plant is as follows. Radioactive wastes generated from Hanbit radioactive waste are moved to radioactive waste buildings (RWB), where waste is classified. From RWB, the secondary storage, the secondary storage, and Hanbit lighter wharf, and the Hanbit lighter wharf are transferred to WolseongLighter wharf via Cheongjeong Nuri. The final move was made from the Wolseong lighter wharf to Gyeongju disposal facility. [3][4].

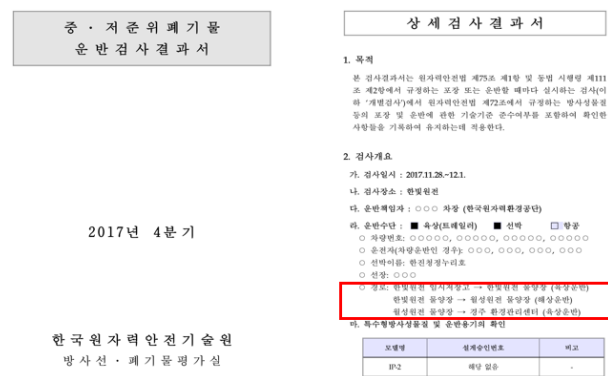


Fig 1. Low and intermediate-level waste transportation inspection result report (Hanbit)

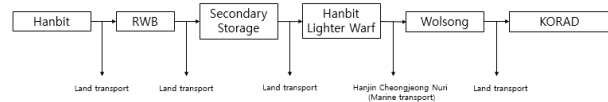


Fig 2. WTS scenario according to the report(Hanbit)

3.2. KAERI Radioactive Waste WTS Scenario

KAERI we analyzed the scenario of transporting the low and intermediate-level radioactive wastes, generated in laboratory, to a disposal site, and established a scenario. The report is a report on the result of transporting low and intermediate-level waste in the 4th quarter of 2018.

KAERI has 1st radioactive waste storage facility, 2nd radioactive waste storage facility and Radioactive waste storage facility attached facilities. According to the report, the radioactive waste generated here is transferred to a disposal facility using a dedicated transport truck.

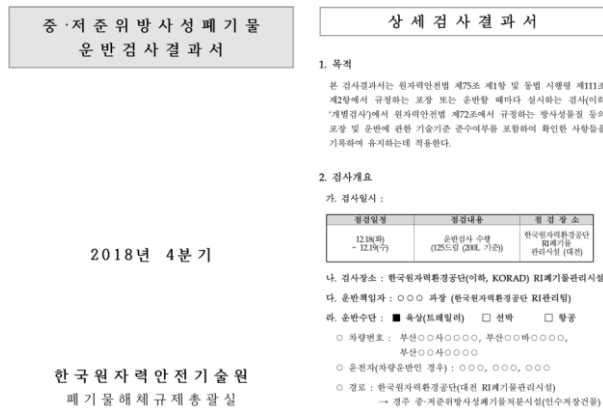


Fig 3. Low and intermediate-level waste transportation inspection result report (KAERI)

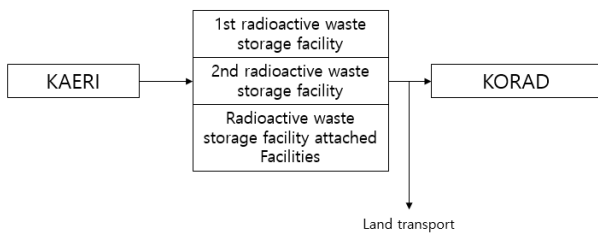


Fig 4. WTS scenario according to the report (KAERI)

4. Conclusions

This study applied the waste classification standards to the locational transportation path of the waste and created the low and intermediate-level waste transportation scenario for the Hanbit Nuclear Power Plant among nuclear power plants in Korea. If an integrated waste tracking system is developed in consideration of the location data and transportation path of agencies generating wastes, e.g. other NPPs, KAERI and KNFC, it will be possible to track wastes more efficiently.

Acknowledgements

This work was supported by Korea Institute of Energy Technology Evaluation and Planning (KETEP Project no.20171510300710) and Ministry of Trade, Industry and Energy, Republic of Korea.

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