

9-2 Preparing Reliable Waste Data Needed for Disposal

— Development of Waste Management System Covering from Generation to Disposal —

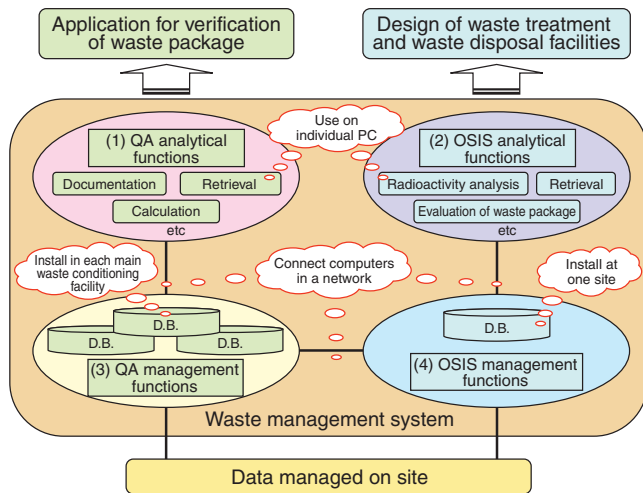


Fig.9-4 Conceptual organization and functions of “Waste Management System”

QA data and OSIS data have separate functions for data management and analysis. (QA: Quality Assurance, OSIS: Optimization Study and Information Service).

For safe disposal of radioactive waste, we have to verify that waste packages meet the acceptance criteria of disposal facilities. Various data needed for this verification has to be managed systematically, retrievable for a long period of time according to their relation to other data ranging from generation to disposal. Also, this data is needed for the design of treatment and disposal facilities. Therefore, we are developing the “Waste Management System” to manage all waste data with traceability and to analyze and count the data.

We have to prepare a large amount of data for quality assurance (QA data) of the waste packages used at stages from waste generation to final conditioning for disposal, such as generation status, waste treatment methods (incineration, compaction, etc.), materials used for solidification, calibration certificates of measurement instruments, records of worker’s training and so on. Examples of the data to be managed in this system are listed in Table 9-2.

In addition, we have to handle the waste data to be used for design of waste treatment and disposal facilities and for considering waste disposal systems. These data are managed as “Optimization Study and Information Service data (OSIS data)” in this system.

Table 9-2 Sample of QA data managed in this system
Ca. 400 items in 43 stages are to be managed

Disposal stage	Data items to be managed
Waste enclosing	generation place, enclosing date, waste ID, amount of harmful materials, mass, container class, waste classification, nuclide, radioactivity, surface dose rate, etc
Segregation	work manual ID, worker’s name, educating record ID, check sheet ID, campaign No., waste ID, separating test record ID etc
Compaction	work manual ID, compaction pressure, container No., periodic inspection record ID, treatment date, device No., treated waste ID, compaction test record ID, etc
Incineration	incinerated temperature, holding time, input interval, treatment manual ID, device No., campaign No., tray No., periodic inspection record ID, ash ID, etc
Cementation	cement input, solidification manual ID, solidified date, waste batch No., waste input, mixing revolution, curing time, solidified matter ID, container No., etc
Acceptance of cement	delivery record ID, certificate of analysis of cement ID, acceptance amount, campaign No., etc
Unconfined compressive strength measurement	ultrasonic propagation velocity, measurement date, unconfined compressive strength, device No., periodic inspection record ID, solidified waste ID, etc
Sample analysis	nuclide, activity, detection limit, device No., analytical date, sample No., analytical manual ID, analytical record by third-party ID, etc
Non-destructive assay	nuclide, activity, lower detection limit, device No., measurement date, measurement manual ID, etc

The Waste Management System consists of following four functions working upon the QA data and the OSIS data as shown in Fig 9-4.

- (1) QA analytical function: Supporting technical documentation for quality assurance of each waste package by analyzing characteristics of each waste material.
- (2) OSIS analytical function: Supporting estimation of radioactivity in each waste package and total waste package volume, design of waste treatment and disposal facilities, and so on.
- (3) QA management function: Managing QA data of each waste package so as to have traceability.
- (4) OSIS management function: Managing the OSIS data.

In our conception, the “Waste Management System” has data management functions and analytical functions that are connected through networks to PC & servers.

In the future, we will construct the concrete “Waste Management System” to be used for verification of actual waste packages, applying each of the above functions to actual QA and OSIS data. This system will be incorporated in the individual waste management systems in each of our R&D sites.

Reference

Kuroki, R. et al., Development of Waste Management System I —Concept Construction of the System—, JAEA-Technology 2009-016, 2009, 124p. (in Japanese).