The status of decommissioning activities of the KRR-1 & 2

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1. Introduction

In 1996, it was decided that the KRR-1 and 2 would be shutdown and dismantled. A project was launched for the decommissioning of the research reactors January 1997 with the goal of a completion by 2008. The total budget of the project is 20.0 million US dollars, including the cost for final waste disposal and for the technology development. The work scopes during the reactor decommissioning project are dismantling all facilities and removing all radioactive materials. After confirming the removal of the entire radioactivity, the site and the buildings will be released from the regulation to reuse for the non-nuclear purposes. At 2007, we are decommissioning the main five auxiliary facilities; liquid radioactive waste treatment facilities, old solid radioactive waste storage room, dilution discharge storehouse, nature evaporation facilities and KRR-1 & 2 stack. And we will decommission the residential radioactivity evaluation and site reconstruction.

2. Decommissioning activities till 2006

From 12 hot laboratories, 10 lead hot cells and 2 concrete hot cells, which were used for the experiments and the development of isotopes and related products, all the apparatus and the furniture were dismantled and the all radioactive materials were removed. A remotely operated video camera, joint with gamma camera, was fabricated and utilized for the removal of the unidentified radioactive objects from the concrete hot cells. The pool internals, including the core structure of the KRR-2 was dismantled, cut into small pieces and packed in a shielded cask under water of the pool. The highly radioactive beam port tubes, imbedded in shielding concrete, were removed with a boring machine together with concrete around the tubes. Metrics sampling and evaluation of the radioactivity of the shielding concrete was carried out and 3 dimensional mapping of the radioactivity was performed for the assessment of activated part and the design of cutting lines. The shielding concrete was cut with a diamond wire saw and the concrete pieces were taken down and discharged after measurement of the radioactivity.

Fig. 1. Dismantling of lead hot cells, core structure, shielding concrete and rad-waste in KRR-2 hall.

All solid wastes were classified to radioactive and releasable waste according to the radioactivity. The radioactive waste was packed into 4 m3 containers designed by the KAERI and well known 200 liter drums, stored in the KRR-2 building until they are transferred to the national repository facility. The releasable waste was stored in the separate ware houses and their final treatment and reuse was studied. For example, the not-contaminated concrete was released and reused for the filling agent of road bed. The dismantled pieces were decontaminated according to the radioactivity and physical, chemical properties. According to the repeated decontamination, only 17 % of all the dismantled waste could be classified into radioactive waste. The decontamination devices were a steam jet cleaner, an ultrasonic cleaner and a chemical decontaminator, designed by the Decommissioning Technology Development Center in the KAERI. And we decommissioned yard facilities;

underground LW storage facilities and independent small facilities. In order to decommissioning underground LW storage facilities, tanks for liquid waste storage and structural tanks for liquid waste storage, we installed the green houses and remove all waste and evaluate the contamination. And we performed the surface decontamination and pulling out from underground structures and move to KRR-2 waste treatment room, cutting and decontamination. We also decommission the resin regeneration facilities and LW storage building.

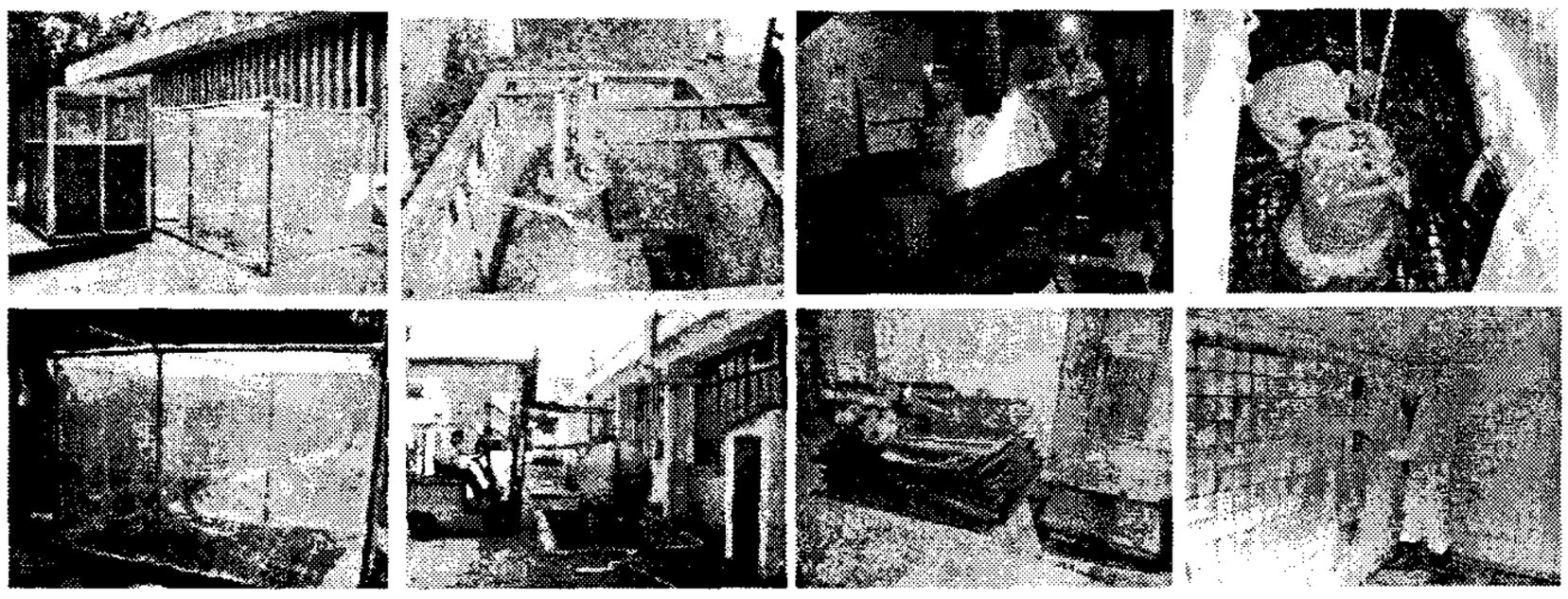

Fig. 2. The underground LW storage facilities and independent small facilities.

3. Decommissioning activities in 2007 and future works

We are decommissioning the main 5 object facilities; dilution discharge storehouse, old solid waste storage room, liquid waste treatment facilities, nature evaporation facilities and KRR-1 & 2 stack. The dilution discharge storehouse and old solid waste storage room are decommissioned and others facilities are decommissioning or going to decommissioning by year's end.

Fig. 3. The main five decommissioning object facilities.

We decommissioned the manipulator and lead glass in the concrete hot-cell at KRR-2. And we are going to perform the remaining radioactivity evaluation and the site restoration in 2008.

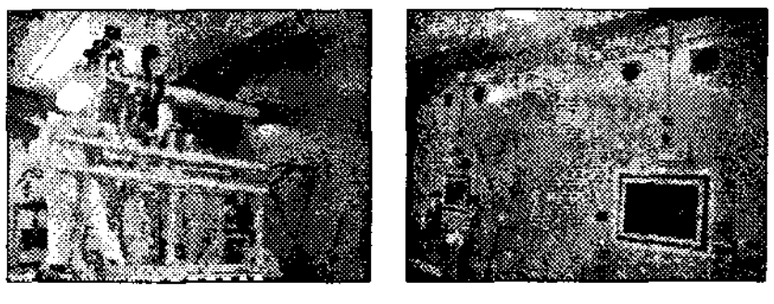

Fig. 4. The decommissioning process of the manipulator in the hot-cell

As shown in the table 1, the decommissioning radioactive wastes are generated the total 295 ton and non-radioactivity wastes 1,944 ton(200L drum : 132, 4m^3 container : 49, shielding cask : 6).

As of 2007/06/30, unit : ton

	radioactive	for release	total
metal	18	163	181
concrete	260	1,746	2,006
others	17	35	52
total	295	1,944	2,239

Table 1. The amount of the generation solid wastes(KRR-1 & 2).