The status of decommissioning activities of the KRR-1 & 2 in 2007

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1. Introduction

In 1996, it was determined that two research reactors(KRR-1 and KRR-2) would be shut down and dismantled. A project was launched for the decommissioning of the research reactors in January 1997 with the goal of a completion by 2008. The total budget for the project is 20.0 million US dollars, including the cost for a final waste disposal and for the relevant technology development. The work scope during the reactor decommissioning project is dismantling all the 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. By year's end in 2007, as planned we decommissionned the five main auxiliary facilities; the liquid radioactive waste treatment facilities, the old solid radioactive waste storage room, the dilution discharge storehouse, the nature evaporation facilities and the KRR-1 & 2 stack. And we are carrying out the residential radioactivity evaluation and site reconstruction.

2. Decommissioning activities of KRR-1 & KRR-2 till 2007

The first decommissioned facility was the auxiliary facility of the KRR-2 which consisted of 12 hot laboratories, 10 lead hot cells and 2 concrete hot cells and which was used for the experiments with radioisotopes. 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.

And we also decommission the yard facilities; underground LW storage facilities and small independent facilities. In order to decommissioning underground LW storage facilities, tanks for liquid waste storage and structural tanks for liquid waste storage, we installed the greenhouses to remove all the waste and to evaluate the level of its contamination. Also, we performed the surface decontamination by moving the underground structures to the KRR-2 waste treatment room, for a cutting and decontamination. We also decommissioned the resin regeneration facilities and the LW storage building. In 2007, we decommissioned the 5 main auxiliary facilities; liquid waste treatment facilities, dilution discharge storehouse, old solid waste storage room, natural evaporation facilities and the KRR-1 & 2 stack. The liquid waste treatment facilities composed of the ion exchange treatment devices of waste fluids, desalters and 4 waste fluid storage tanks with dia. 1.8m and len. 3.7m. These were decommissioned with nibbler, oxygen cutting machine, etc.

Fig. 1. The decommissioning process of the liquid waste treatment facilities.

The dilution discharge storehouse dimensions were 3m(L)x5m(W)x3m(H) and composed of dilution discharge and waste fluid storage tank.

We decommissioned with hand grinders. We decommissioned three stacks of KRR-2 and used 100 ton power crane for main stack decommissioning.

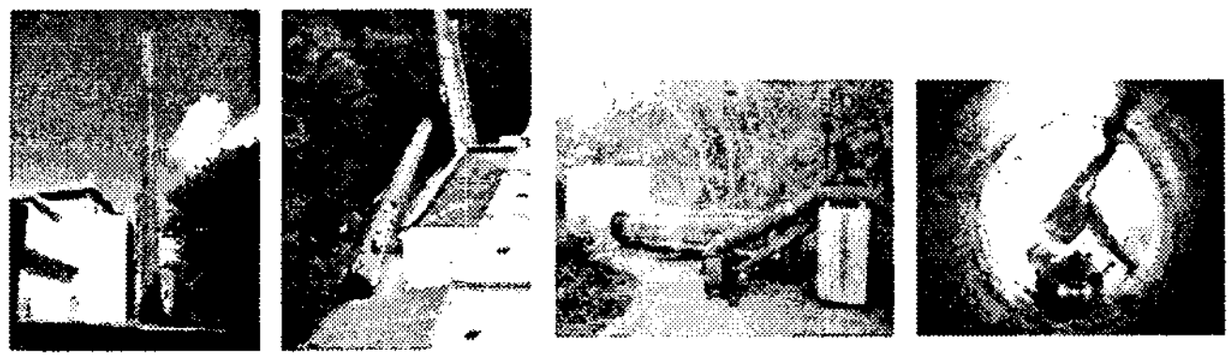

Fig. 2. The decommissioning process of the main stack on KRR site.

For the old solid waste storage room decommissioning, we installed the temporary entrance and decontaminated under the 4,600 Bq/m^2. We decommissioned the natural evaporation facilities and the manipulator and lead glass in the concrete hot-cell at KRR-2.

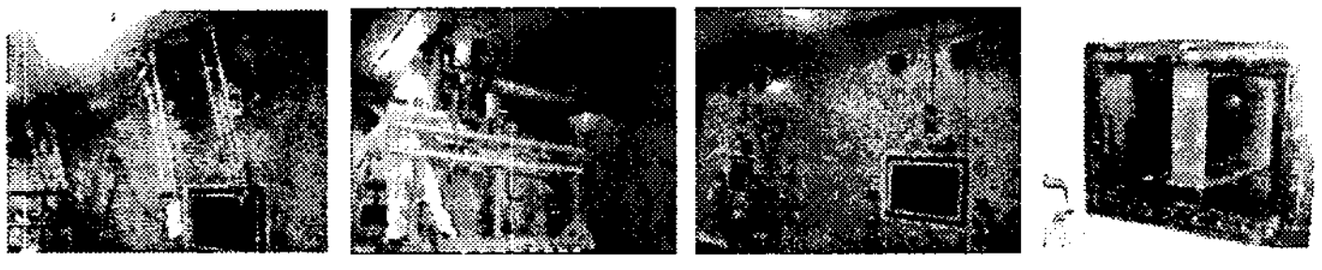

Fig. 3. The decommissioning process for the manipulator in the hot-cell.

And we performed the dose-rate measurement and gamma spectroscopy. The dose-rate distribution was measured directly on the surface of site to find impacted/contaminated area by radioactive materials. The methods were scanning all the site by using survey meter and GPS and measuring points at every were 10m × 10m (about 500 points). The detection points were 1m above a ground and the background ranges were 100~ 250 nSv/h. These measurements results were that the site around natural evaporation system was contaminated, most of the KRR site had a background level of dose rate. The gamma spectroscopy of the KRR site was conducted by two measurement methods. The comparisons were in accord with between Lab and ISOCS analysis with the exclusion of the point that waste classification work carried out at the measuring time.

As shown in the table 1, the generated decommissioning radioactive wastes were 307tons and the non-radioactivity wastes were 1,973tons (200L drums : 138 ea, 4m^3 containers : 52 ea, shielding casks : 6ea).

As of 2007/12/30, unit : ton

	radioactive	for release	total
metal	26	175	201
concrete	260	1,754	2,014
others	21	44	65
total	307	1,973	2,280

Table 1. The generated amounts solid wastes(KRR-1 & 2).

3. Decommissioning activities in 2008 and future works

The final step of decommissioning project is an evaluation of the final status survey. Return the KRR site and buildings to KEPCO for unrestricted use after removal of all the radioactive materials. It's need to classify based on the measured and calculated results

Class 1 : site installed around natural evaporation system - need a remedial action

Class 2 : site around waste transporting route.

Class 3 : most of the KRR site.

It will be continuously upgraded to develop and execute the final status survey plan.

And we have temporally stored the radioactive waste at KRR-2 reactor hall, but we are to be disposed in GyeongJu facility.