The Dismantling Activities on Bio-shielding Concrete of KRR-2

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KRR-2(Korea Research Reactor-2, Type TRIGA Mark-III) is the second research reactor in Korea. Construction of KRR-2 was started in 1969 and first criticality was achieved in 1972. After 24 years operation, KRR-2 has stopped its operation at the end of 1995 due to normal operation of HANARO. KRR-2 was then decided to decommission in 1996 by government. Decontamination and decommissioning (D&D) was conducted in accordance with domestic laws and international regulations. The major D&D work was conducted safely by using conventional industrial equipment because of relatively low radioactivity and contamination in the facility. When removing activated concrete from reactor pool, it was installed a temporary containment and ventilation system. Under this plan and procedure, we set to decommission this reactor on full scale from 2001. But this study gets within the dismantling of KRR-2 reactor bio-shielding concrete. KRR-2 reactor bio-shielding concrete dimensions are 9.7m (W) x 17.4m (L) x 7.8m (H) and approximately estimated volumes are 650m^3. For the dismantling of concrete, first of all we carried out the activation analysis on bio-shielding concrete. As a consequence of analysis, we have expected activated and non-activated concrete and the cutting area etc. This work's goal surveys the activation mapping for concrete dismantling performance and the sampling objects are inside surface of the exposure room and around the thermal column and beam port nose part. The sampling carried out the method of dry core boring with diameter 50 mm and 400 mm depth. The sampling locations are 30 point and the specimen is powder type form every 1 cm of the core. These samples were analyzed according to the location, level and depth. These results of the exposure room activation are that the max. radioactivity is 4.68 Bq/g (main nuclide is Co-60, Eu-152, Eu-154). For the analysis sample on the surrounding of beam port and thermal column in the front of reactor pool, we cored 67 points. The radioactivity is maximum 200 Bq/g. We were going to cut the non activated concretes to use dry type diamond wheel saw to start with, but we could not use it because of the thickness of the shielding concrete and the deficiency of equipment. So we have used the wet type diamond wire saw. And we cut the activated concrete with back hoe, crasher, breaker and bucket etc. But we have the only over head crane of 7.5 ton capacity for treatment, we should cut size down. This is disadvantage condition. Therefore we cut bio-shielding concrete in accordance with Fig. 1. We divide 4th step in order to cut concrete shielding. First step, we dismantle top area, that is hunch, of reactor shielding concrete. Second step dismantle side middle area and third step is rest area of non-activated concrete dismantling. Final step dismantles activated bio-shielding concrete. These places are the surrounding of beam port and thermal column and as stated above, the maximum radioactivity is 200 Bq/g. And the main detection nuclides are Co-60, Eu-152, Eu-154 and Cs-134(a very small amount). The dismantling objects are about 50~60m^3. Because of high radioactivity, we set up the green house and we didn't use the diamond wire saw in the same

way cutting non-activated concrete. We cut this part with back hoe, crasher, breaker and bucket. The generating radioactive waste amounts are 256 ton and we store them at $4m^3$ container (No. 34) and 200L drum (No. 59). The duration times on activated shielding concrete dismantling work were 22 days (2005. 10. 24 ~ 11. 12) and man-powers are 44 man-days.

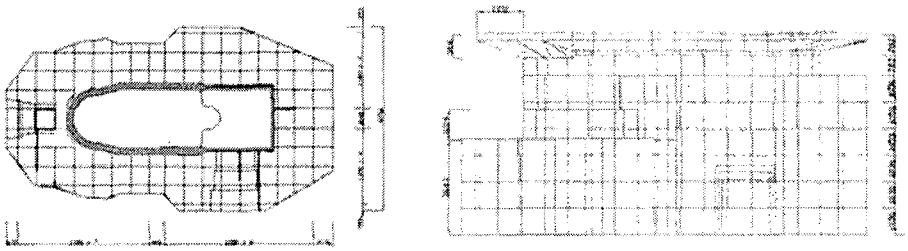

Fig. 4. The schematic diagram for the dismantling bio-shielding concrete.