

Efforts for Reducing Radiation Exposure during Facing Construction of Slope Areas

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The facing construction of slope areas is intended to reduce radiation and the inflow of groundwater into buildings. This work consists of weeding, topsoil stripping, and applying shotcrete. The areas to be covered in the construction include all slopes from the buildings at Unit 1 to Unit 4. The total area is approximately 55,500 m². Among them, the west side slope from the buildings of Units 1 and 2 and a part of the west side slope from the buildings of Units 3 and 4 have a high air dose rate of 0.3 - 1.6 mSv/h. Therefore measures described below were taken from the viewpoint of reducing radiation exposure of workers.

1. Remote recovery of debris using a large magnet

A large quantity of debris with a high radiation level was distributed on slopes due to explosions of the reactor buildings. The debris was collected remotely by using a lifting magnet equipped with a strong magnet, by which efficient works and reduction of radiation exposure were achieved.

2. Wearing a shielding vest

The workers engaged in weeding and spraying in the high radiation areas each wore a shielding vest on their protective clothes to reduce the radiation exposure from the gamma-rays.

3. Automated RCM (Rock Climbing Machine)

In order to reduce the radiation exposure of the operator of the RCM which was used in removing the top soil in the high radiation areas, the top soil was removed while operating the RCM remotely from a low radiation area which was some distance from the stripping area. It should be noted that the operation room was surrounded with shielding plates to further reduce the radiation exposure.

4. Setting of topsoil stripping depth and shotcrete thickness

The radiation level was reduced after topsoil stripping in the preliminary survey of a slope area. Surface radiation below 5 μ Sv/h could be achieved by setting the topsoil stripping thickness and shotcrete thickness appropriately.

5. Mechanization of shotcrete application

The shotcrete application had been conducted manually. However, from the viewpoint of reducing the radiation exposure of workers, efficiently implementing works, and shortening the working period, the shotcrete was applied using a machine equipped with the injection nozzle on the tip of a long arm when the machine could be installed at the bottom of the slope. (Roboshot Method)

Radiation exposure was reduced by 30% by taking the measures shown above compared to the expected exposure when not taking them.