International Conference on the Safety of Radioactive Waste Management, Decommissioning, Environmental Protection and Remediation: Ensuring Safety and Enabling Sustainability

Contribution ID: **110** Type: **POSTER**

Integrated Safety Analysis for Decommissioning Plan of Uranium Recovery from Phosphoric Acid Facilities, Lesson Learned from Decommissioning the Phosphoric Acid Purification Plant in Gresik, Indonesia.

The decommissioning program is the final stage in the life cycle of a nuclear facility. The organization should prepare the decommissioning program early to fulfill the construction permit requirement. The experience of implementing decommissioning will be an important lesson learned in preparing decommissioning plan and operations. Indonesia once had a uranium recovery facility from phosphoric acid. The installation only operated for four months, from April to July 1989. The licensee completed the decommissioning and demolition process of the facility at the end of 2008.

Integrated safety analysis includes identifying contaminated components, mapping the potential radiation exposure doses, decontamination planning, calculation of estimated doses to be received by decommissioning workers, and identification of any accidents leading to radiological and non-radiological accidents.

Phosphoric acid purification installations were grouped into four areas, (1) phosphoric acid preparation facility area, (2) primary extraction-stripping facility area, (3) secondary extraction-stripping facility area, and (4) settling and drying facility area. The highest level of potential radiation exposure was in area 4, which was 25 micro Sieverts per hour, followed by area 3, which was two micro Sieverts per hour. Areas 1 and 2 had low levels of radiation exposure of around 0.15 micro Sievert per hour. The remaining radioactive material was found in the storage tank and drying tank (area 4) as yellow cake powder. The total powder was estimated at 5600 liters. The remaining solvent (DEHPA-TOPO mixture in kerosene), approximately 34 m3, was found in the tank in area 1. Approximately 40 m3 of organic raffinate with a small amount of water was found in the tank in area 2. Potential non-radiological accidents at the installation include possible fire from residual solvent combustible materials, a mixture of DEHPA-TOPO, and kerosene. Initiating events are sparks originating from welding activity. The results of the integrated safety analysis identified several potential hazards, including radiological, chemical, physical, and fire hazards. The staff for removing yellow cake powder in the storage tank had the potential to receive high radiation exposure of 25 micro Sieverts per hour, so it required control of the working time. The radiological hazard level after decontamination was relatively low and was less than two micro Sieverts per hour. The chemical hazard in the form of a mixture of DEHPA-TOPO and kerosene has the potential for skin and respiratory irritation. The potential chemical hazard was in the extraction-stripping facility area. The physical hazard was the potential for heavy material to fall when dismantling tanks, piping networks, and steel structures. The fire potential was in demolition activities using a welding machine on tanks and piping networks that still had a residual flammable organic matter in the extraction-stripping facility area.

Primary author: Dr SIHANA, Sihana (Universitas Gadjah Mada INDONESIA)

Presenter: Dr SIHANA, Sihana (Universitas Gadjah Mada INDONESIA)

Track Classification: Track 5 - Practical experiences in integrating safety and sustainable development