

Results for large Amount of Tritium Handling Technology in JAEA for 25 years

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Tritium Process Laboratory (TPL) in Japan Atomic Energy Agency has been established as the only test facilities to handle over 1 gram of in Japan. The construction of the building of TPL was finished until 1984. The licensing of the TPL for tritium was given on 1987. To handle tritium, the TPL has a set of safety systems: glove boxes and foods; tritium removal systems; and ventilation systems. These safety systems have been operated with tritium from March 1988, after the first transportation of tritium to the TPL. The amount of tritium held at the TPL was 12 PBq at March 2009. The average tritium concentration in a stream from a stack of the TPL to environment was 2×10^{-3} Bq/cm³, and was 1/200 smaller than that of Japanese regulation value for the concentration of HTO in the air. The actual detritiation factor has been evaluated for each tritium removal system of the TPL. The failure data have been analyzed for several main components of the safety systems such as pumps, valves, and monitors. The tritium waste data has also been accumulated as liquid and solid waste from the TPL. A series of maintenance technologies for tritium contaminated components has been developed through the operation of TPL from 1984.

This paper mainly presents the above operation results for the large amount of tritium handling technologies at the TPL for about 25 years. Some licensing milestones from the period of TPL construction are also reported. Recently, it has been decided that R&D subjects for the tritium technologies towards to the DEMO plants are carried out in Broader Approach (BA) program. A part of the activities of BA is carried out at TPL. A series of demonstration tests for a prototype tritium removal system of ITER has just started to provide data related to the licensing of ITER. Some modification of the facilities of TPL required for the above recent activities are also reported with some future plans.