

Abstract

IAEA Spent Fuel Performance Assessment and Research Programmes (SPAR II and III)

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Dry storage technology is undergoing a rapid evolution. New fuel and material design changes are coming on stream and target burnup is steadily increasing. Average fuel assembly burnup can currently approach 60 GWd/tU in LWRs, 33 GWd/tU in gas reactors, and 10 GWd/tU in CANDU reactors. Increased burnup, particularly for LWRs, results in increased cladding corrosion and fission gases leading to increased cladding stress. These changes require continued analyses and potential adaptations of the storage technologies currently used, especially taking into account that spent fuel may have to be stored for extremely long periods of time; e.g. for up to 100 years and beyond.

The IAEA provides assistance in the evaluation and research of the long term behaviour of fuel and storage components in order to realize the anticipated long storage periods and promotes international collaboration on specific technical issues.

The IAEA Coordinated Research Programme (CRP) Spent Fuel Performance Assessment and Research was initiated in 1997, and was designated as SPAR-I. A follow-up programme (SPAR-II) was started in 2002.

During the first two phases of the CRP, the participating countries contributed their R&D results and identified some potential deterioration mechanisms of spent fuel elements that required detailed investigation. Investigations of these mechanisms indicate unlikely impact of most of them on spent fuel integrity over storage periods. Thus it was concluded that various technologies for long term interim spent fuel storage could be licensed and operated safely. A final report for each stage of the CRPs was prepared and published as a Technical Document (TECDOC).

After the completion of the CRP, the IAEA decided to continue the programme and started SPAR-III this year with a slightly modified goal. New fuel and material design changes continue to be introduced, target burnups continue to rise, and spent fuel storage periods will continue to increase, therefore a reliable database to assist in the evaluation of spent fuel storage technologies for extremely long periods of time is a useful tool.

The objective of the CRP is to report not only on specific research but also on the experience gained during the long term storage of spent fuel from power reactors. It will cover aspects related to wet- and dry-storage technology, aspects related to licensing, and strategies to be adopted for storage in the future. The research outputs from the CRP will be published as a technical document with the same title at the end of the CRP cycle.

The first Research Coordination Meeting (RCM) was held in Tokyo at CRIEPI's Offices last week.