



Contribution ID: 107

Type: **Wedge Participant**

Safeguard challenges and consideration on nuclear safeguards for HTR-PM

The high temperature reactor-pebble bed modular(HTR-PM) is the first commercial demonstration nuclear power plant of modular HTR under construction in the world. And it is expected to be commissioned by the end of 2018. As a new type of nuclear power plant, on one hand, the safeguard of the nuclear plant will adopt the measures, such as isolation, which are effective for the safeguard of the conventional nuclear plant; on the other hand, since the reactor of HTR-PM differs from the PWRs, it brings some differences in the field of nuclear material accounting. These characteristics such as the pebble bed reactor and the continuous refueling, lead to the difficulties in tracing the pebble in the reactor and the measurement of the burnup history. It is difficult to follow the existing framework to accomplish the nuclear material accounting for the pebble bed HTR. However, the HTR fuel pebble is not attractive for the nuclear proliferation, because it is difficult for the proliferator to reprocess of the TRISO particles in the fuel pebble.

In order to facilitate the safeguard of the HTR-PM, the Institute of Nuclear and New Technology(INET), as designer of HTR-PM, together with the operator, Huaneng Shandong shidao bay Nuclear power Plant Company(HSNPC), had proposed some procedures and measures, that is easy to perform and effective, considering the character of the HTR-PM and the existing nuclear accounting framework. In this paper, the principle of the nuclear accounting of HTR-PM and some special measures such as the partition of the accounting regime and the burnup evaluation are presented. And although there are some challenges to accomplish the safeguard of a commercial pebble bed HTR for the first time, there still have some methods to overcome the problems, and ensure the security of the HTR-PM power plant.

Which "Key Question" does your Abstract address?

NEW1.1

Topics

NEW1

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Session Classification: [NEW] The Safeguards Challenges of New and Advanced Reactors

Track Classification: Preparing for safeguards new facilities, processes and campaigns (NEW)