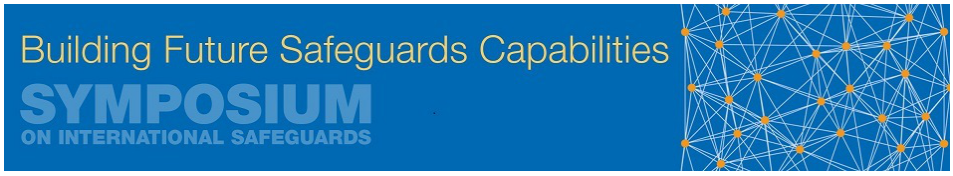

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Improved Cherenkov light prediction model for enhanced DCVD performance

Tuesday, 6 November 2018 16:29 (1 minute)

The Digital Cherenkov Viewing Device (DCVD) is an instrument used to verify irradiated nuclear fuel assemblies in wet storage based on the fuel's Cherenkov light emissions. The DCVD is frequently used for gross defect verification, verifying that 50% or more of the assembly has not been diverted. The verification methodology is based on comparison of the measured Cherenkov light intensity to a predicted intensity, based on operator declarations.

A new prediction method has been developed, considering more fuel assembly details to ensure more accurate predictions. With the new model, the irradiation history of an assembly, the assembly design and the contributions from gamma and beta decays are taken into account. The model has also been extended to account for the radiation from neighbouring fuel assemblies, which can enter the assembly being measured and create Cherenkov light.

The performance of the prediction model and the neighbour intensity prediction model has been validated against fuel measurements by the IAEA at a PWR facility of short-cooled fuel. The results show that the new model offers an improved prediction capability, allowing the fuel inventory to be verified with no fuel assemblies being identified as outliers requiring additional investigation. The prediction model will be implemented in the next DCVD software version, making it available to IAEA inspectors.

This development of the DCVD capabilities are in line with the fourth theme of the IAEA safeguards symposium, "Shaping the future of safeguards implementation", by resolving challenges related to the DCVD and by extending the capabilities of the instrument.

Which "Key Question" does your Abstract address?

SGI1.1

Topics

SGI1

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