

## VERIFICATION OF COSMOS CODE USING IN-PILE DATA OF RE-INSTRUMENTED MOX FUELS

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### Abstract

Two MIMAS MOX fuel rods base-irradiated in a commercial PWR have been re-instrumented and irradiated at a test reactor. The fabrication data for two MOX rods are characterized together with base irradiation information. Both rods were re-instrumented to be fitted with thermocouple to measure centerline temperature of fuel. One rod was equipped with pressure transducer for rod internal pressure whereas the other with cladding elongation detector. The post irradiation examinations for various items were performed to determine fuel and cladding in-pile behavior after base irradiation.

By using well characterized fabrication and re-instrumentation data and power history, the fuel performance code, COSMOS, is verified with measured in-pile and PIE information. The COSMOS code shows good agreement for the cladding oxidation and creep, and fission gas release when compared with PIE data after base irradiation. Based on the re-instrumentation information and power history measured in-pile, the COSMOS predicts re-instrumented in-pile thermal behaviour during power up-ramp and steady operation with acceptable accuracy. The rod internal pressure is also well simulated by COSMOS code. Therefore, with all the other verification by COSMOS code up to now, it can be concluded that COSMOS fuel performance code is applicable for the design and license for MOX fuel rods up to high burnup.