

## ORIGEN2.1 Cycle Specific Calculation of Krško Nuclear Power Plant Decay Heat and Core Inventory

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This paper presents ORIGEN2.1 computer code calculation of Krško Nuclear Power Plant core for Cycle 24. The isotopic inventory, core activity and decay heat are calculated in one run for the entire core using explicit depletion and decay of each fuel assembly.

Separate *pre\_ori* application which was developed is utilized to prepare corresponding ORIGEN2.1 inputs. This application uses information on core loading pattern to determine fuel assembly specific depletion history using 3D burnup which is obtained from related PARCS computer code calculation. That way both detailed single assembly calculations as well as whole core inventory calculations are possible. Because of the immense output of the ORIGEN2.1, another application called *post\_ori* is used to retrieve and plot any calculated property on the basis of nuclide, element, summary isotope or group of elements for activation products, actinides and fission products segments. As one additional possibility, with the *post\_ori* application it is able to calculate radiotoxicity from calculated

ORIGEN2.1 inventory.

The results which are obtained using the calculation model of ORIGEN2.1 computer code are successfully compared against corresponding ORIGEN-S computer code results.

**Keywords:** *ORIGEN2.1, core activity, decay heat, fuel depletion, fuel decay, activation products, actinides, fission products, ORIGEN-S, radiotoxicity, pre\_ori, post\_ori, burnup*