NEW DATA LIBRARIES
FOR TRANSNUCLEAR STUDIES

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ABSTRACT
The fuel depletion code ORIGEN-S is often used for transmutation studies. It uses three different working libraries for actinides, fission products, and light elements, which contain decay data, cross-section data and fission product yields. These data have been renewed with data based on the JEF2.2 and the EAF3 evaluated files. Furthermore, data for 201 fission products have been added to the libraries. The new data libraries are particular suitable for parameter studies and other introductory calculations. For more accurate calculations, it is advised to regularly update the cross sections of the most important actinides and fission products during the burnup sequence.

INTRODUCTION
For a quick survey of Partitioning and Transmutation (P&T) strategies, parameter studies are useful to determine the influence of neutron spectrum, flux level and irradiation time on the transmutation rate. Often, these studies consist of a sequence of burnup calculations with the code ORIGEN-S [1]. The accuracy of these calculations depends to a large extent on the data in the accompanied libraries. In this paper, new ORIGEN-S data libraries are described based on the Joint Evaluated File (JEF2.2) and the European Activation File (EAF3) [2].
The code ORIGEN-S uses three different libraries in ASCII format: one for light elements, one for actinides, and one for fission products [3]. These three libraries can be coupled and converted to binary format by the code COUPLE-S [4]. The cross sections in the ASCII libraries are given in three energy groups for thermal reactors (HTGR, LWR and MSBR), and in one energy group for the fast reactor (LMFBR). To collaps the three-group data into one group, spectral parameters named THERM, RES and FAST are used, which can be given in the input of COUPLE-S or ORIGEN-S.
Each nuclide in the libraries contains a decay-data record and four cross-section records (one for each reactor type). The first record type contains half lives, branching fractions, recoverable energy per decay, and radioactive concentration guides, and the second one contains cross sections, isomer ratios (measures for the chance that a metastable nuclide is produced after an (n,γ) or (n,2n) reaction), and fission-product yields for five actinide isotopes. Furthermore, some data is contained in the source codes of COUPLE-S and ORIGEN-S itself.
The decay-data records in all libraries have been updated with data from the JEF2.2 file [5]. The cross sections for the LWR and the LMFBR have been updated with data from the JEF2.2 file, and from the EAF3 file for nuclides not present in JEF2.2 [6,7]. In total, cross sections of 517 light elements, 65 actinides and 319 fission products have been updated. Furthermore, 201 fission products have been added to the libraries. In summary, one can say that these new libraries contain better and more consistent data for more nuclides than the old libraries.