ACTINIDE RELATED ACTIVITIES AT THE NEA DATA BANK

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INTRODUCTION.

The NEA Data Bank activities can be divided up in two main areas: the so called traditional scientific services, and the support services to other NEA divisions. The traditional scientific services comprise the Nuclear Data and the Computer Program Services, whereas the major part of the support service efforts are concentrated on the Thermochemical Data Base Project.

NUCLEAR DATA SERVICES.

Within the Nuclear Data Services there is no project exclusively devoted to the actinide nuclides but they are frequently being investigated as part of other projects.

The NEA Data Bank is one of the four centers in the world cooperating on the compilation of neutron references and data. The CINDA data base and the published CINDA books contain all references to neutron physics experiments and theoretical work ever performed in the world. In the case, where the numerical data from a neutron or, to some extent, also charged particle induced experiments are available, they are compiled into the EXFOR data base. These data are available on simple request from one of the four centers, depending on which service area one belong to. The NEA Data Bank service (at no cost to the user) Western Europe and Japan.

The Joint Evaluated File (JEF) Project is coordinated by the NEA Data Bank. The aim of the project is to create a complete evaluated nuclear data file that could be used for calculating all different types of reactors. A close cooperation with the European Fusion File (EFF) project is maintained for including also data for fusion reactor purpcses. The first version of the file (JEF-1) was issued in 1985 and since then, the file has undergone thorough benchmark testing, which revealed that the library contains very good data for, for example, the higher actinides. A large effort had been investigated in the development of a second version of the library. Special emphasis was put on the re-evaluation of the major structural materials and the major actinides, e.g. ^{235}U, ^{238}U, ^{239}Pu.

The three major nuclear data evaluation efforts: the US project ENDF, the NEA Data Bank member countries project JEF, and the Japanese project JENDL, recently agreed to establish a closer cooperation in improving the present libraries. The effort is coordinated by the NEA Science Division, and the NEA Data Bank follows this development closely, being the coordinator of the JEF project. Seven working groups have so far been set up to resolve outstanding and common problems in the data libraries, and four of these deal with actinide data: Subgroup 3 (Actinide Data in the Thermal Energy Range), Subgroup 4 (^{238}U Capture and Inelastic Scattering Cross Sections), Subgroup 5 (^{239}Pu Fission Cross Section from 1 to 100 keV), and Subgroup 6 (Delayed Neutron Data Benchmarking).

COMPUTER PROGRAM SERVICES.

The NEA Data Bank has acquired and tested over the last several years computer codes for the fast reactor design and fuel cycle. This effort continues and is beneficial to studies undertaken on actinide burner reactors.

Well known intranuclear cascade model codes have also been acquired and an increased demand for these was observed. The effort to obtain codes with improved or extended modelling in this field will continue.

THE NEA THERMOCHEMICAL DATA BASE (TDB) PROJECT

The OECD Nuclear Energy Agency (NEA) has undertaken six years ago the development of a CODATA-compatible chemical thermodynamic data base for a number of elements of interest to radioactive waste management research areas such as the safety analysis of nuclear waste repositories. The development of this data base involves, for a number of key elements, a compilation of all relevant published thermodynamic data, a critical review of the thermodynamics, a publication of a review report and the creation of an internally consistent thermodynamic data set for each key element.

Progress is reported to the Radioactive Waste Management Committee (RWMC), the Performance Assessment Advisory Group (PAAG) of the NEA, as well as the NEA Data Bank Committee.

For each key element considered, the review is being performed by a group of four to six internationally acknowledged experts in the chemical thermodynamics of that particular element. The review is being performed according to a series of guidelines that are available at the NEA Data Bank and which were developed at the NEA in consultation with reputed international experts. These guidelines ensure a consistently high qualification of the data evaluated by the different review teams. The data evaluations and selection criteria are exactly described by the reviewers in a comprehensive report for each element. The recommended data, which are basic, non

site-specific thermodynamic parameters, refer to a common reference state (25°C, 0.1 -M Pa, infinite dilution for aqueous species). The final quality assurance step is an independent peer review for each key element, according to the guideline TDB-6 (available at the NEA Data Bank). For each element, an additional report will be published containing recommendations for laboratory work required to improve and complete the data base for waste management applications.

Reviews are currently in progress on uranium, neptunium, plutonium, americium and technetium. A critical review of the actinide organic complexes is about to be started. The report on *Chemical Thermodynamics of Uranium is* at the stage of being peer-reviewed. The final report will be published in spring 1991. The volume on technetium is planned to be published before the end of 1991 and the one on americium in mid-1992.

NEA DATA BANK INVOLVEMENT IN THE OMEGA PROJECT.

The NEA Data Bank has so far coordinated two special studies for the OMEGA project. One was a “Review of fission product yields and delayed neutron data for the higher actinides". A report on this study is being presented at this meeting by R. Mills. The second study concerned a benchmark test of the uranium part of the thermochemical data base (TDB), and the report is under preparation.

The NEA Data Bank Management Committee discussed the OMEGA project at its meeting in May 1990 and agreed on a continued involvement of the Data Bank in this project, providing that the tasks were within the scope of the present activities of the Data Bank and that the involvement of Data Bank staff was kept to a minimum.

Two possible projects have been discussed:

. Fission cross section calculational benchmark.

-- It was felt that the evaluation of the fission cross section of the higher actinides would to a fairly large extent rely on theoretical calculations, and it would thus be necessary to compare codes used for these calculations. The theoretical achievable resolution of the radiological toxicity of the fuel depends on the high energy fission calculational model employed, a fact that further supports this benchmark study.

. High energy nuclear model code comparison,

-- In the last few years there has been an increasing interest in the high energy nuclear data in the Data Bank member countries; a fact that was confirmed at the Data Bank Management Committee meeting. The exact specification of the nuclear model code comparison is at present under discussion.