

## RSIC DATA LIBRARY DLC-26/W-M-NRSM

### 1. Name and Title of Data Library

W-M-NRSM: WANL-MSPC Nuclear Rocket Shielding Data  
Generators GANLEG-W,  
APPROPOS, NAGS, SATURN and Neutron and Photon Cross  
Section Libraries 1-6

### 2. Name and Title of Data Retrieval Program

There is no data retrieval program as such. Rather, there are a number of cross section processing codes as listed in Table 1.

### 3. Historical Background Information

By December of 1971 the shielding codes and data libraries, developed over a period of years by the Westinghouse Astronuclear Laboratory for nuclear propulsion systems, were made operable on the UNIVAC computers at the NASA Marshall Space Flight Center. At that time, the codes and data libraries were also made available to RSIC for packaging and general distribution.

### 4. Applications of the Data

Transport codes which use the data are ANISN-W, KAP-VI, DOT-IIW, MAC and SCAP. The transport codes, also available from RSIC, the cross section processing codes, and the data libraries (both available in DLC-26) altogether comprise a comprehensive radiation analysis system for both preliminary parameter analysis and detailed design analysis (see Fig. 1 and Fig. 2).

### 5. Source and Scope of the Data

The cross section processing codes included in the package are listed in Table 1. Detailed descriptions of the codes are given in Ref. 1.

The compilation of neutron and photon cross section data for MSPC is in the form of five Master Library Data Sets and a set of basic nuclear data. (See Tables 2-4).

Master Library No. 1 contains 135 microscopic, transport corrected, neutron cross sections sets for 36 elements (See Table 3) for use in the ANISN-W, DOT-IIW, and APPROPOS 413 microscopic, P1 ( $1 \leq 3$ ) neutron cross section sets for 36 elements for use in the ANISN-W, DOT IIW, and APPROPOS codes. These data are also in a 52 energy group

structure. Master Library No. 3 contains 134 sets of reaction rate cross section data for use in the representative, spatially dependent, neutron spectra obtained from WANL R-1 nuclear sub-system design work. These first three sets are obtained in a manner consistent with each other and with the nuclear and radiation analysis procedures used in the radiation analysis of reactors at the Westinghouse Astronuclear Laboratory (WANL).

Master Library No. 4 contains 510 microscopic, P1, gamma-ray cross section sets for 51 elements for use in the ANISN-W, DOT-IIW, and APPROPOS codes. These data which are in a 13 energy group structure, are averaged over a source spectrum of prompt gamma ray energy emitted from the fission of 235-Uranium.

Master Library No. 5 contains the pair-production and photo-electric gamma ray cross section data used in the KAP-VI, SCAP, MAP, and GAMLEG-W codes. Again, the data in sets 4 and 5 were obtained in a manner consistent with each other and with the radiation analysis procedures used in the radiation analysis of reactors at WANL.

Finally, a basic set of nuclear data was generated for use in the complete package of codes.

#### 6. Data Retrieval Program

See Table 1.

#### 7. Contributor

Westinghouse Astronuclear Laboratory and NASA  
George C. Marshall Space Flight Center.

#### 8. Data Format and Computer

BCD, UNIVAC 1108

#### 9. Typical Running Time

Variable.

#### 10. References

(a) Documentation available with library.

(1) R. G. Soltesz, R. S. Kaiser, and R. K. Disney, WANL-MSFC Nuclear Rocket Shielding Methods, Data Generators GAMLEG-W, APPROPOS, NAGS, SATURN, and Neutron and Photon Cross Section Libraries No. 1-6, WANL-TR(LL)-034, Vol. 3 (Aug. 1970).

(2) R. G. Soltesz, R. S. Kaiser, and R. K. Disney, Nuclear Rocket Shielding Methods, Modifications, Updates, and Input Data Preparation, Vol. 2, Compilation of Neutron and Photon Cross Section Data, WANL-PR-(II)-034 (August 1970).

## 11. Contents of the Library

The library package contains the following items:

- a. the referenced document, and
- b. a reel of magnetic tape on which is written in separate files†

GAMLEG Source and input (Library 5)  
 APPROPPOS Source and input  
 NAGS Source and input  
 SATURN source and input  
 CAML  
 Library 1  
 Library 3  
 CR-6 Source, Library 6

Persons requesting the library should send the appropriate number of full (2400 ft) reels of magnetic tape to be written as indicated below.

- (1) 7-track, 556 bpi (unblocked) - 3 reels
- (2) 9-track, 800 bpi (blocked) - 1 reel

## 12. How to obtain the Library

Inquiries or requests for the data package may be mailed to

DATA COORDINATOR  
 Radiation Shielding Information Center  
 Oak Ridge National Laboratory  
 P. O. Box X  
 Oak Ridge, Tennessee 37830

or telephoned to

Area code 615; 483-8611, extension 3-6944, or to  
 FTS xx-615-483-6944.

## 13. Date of Abstract and Current Version

February 1974