

Dr. Schmidt

4C-3/165
1976-4-15

Memo 4C-3/165

To: Distribution
From: H.D. Lemmel *Lemmel*
Subject: Exfor completeness

1. Important keV fission data

In Memo 4C-3/48 of 1972-1-7 T. Byer listed a number of important keV fission cross-section data of which numerical values were at that time available to him. These data were published around 1970. It was suggested that these very important data should be compiled in Exfor with high priority.

This suggestion was supported in all following 4C-Meetings:

- Oct 1972: INDC(NDS)-51 page 12 item 37
- June 1973: INDC(NDS)-54 page 5 items 21 and 22
- May 1974: INDC(NDS)-58 Rev. page 29 Action 19
with particular reference to 4C-3/48.
- March 1975: INDC(NDS)-68 page 36: action 19 from previous meeting
carried over since nothing had been done.

In the Annex Memo 4C-3/48 is reproduced with indications about the availability in Exfor. The conclusions are:

Of the data sets mentioned in 4C-3/48 are

	existing in EXFOR	missing in EXFOR	completeness
Area 1	7	3	70%
2	5	8	39%
3	no such data in this area		
4	1	3	25%
all areas	13	14	48%

Exfor deadline approx. March 1976

Nearly all of the data had been available to T. Byer in 1972 and were, therefore, obtainable by the centers.

Since this statistics refers to data of top priority, the overall completeness of Exfor is unlikely to be better.

The fast fission cross-sections will be reviewed again in a Specialists Meeting at Argonne in June 1976. Serious negative consequences to the centers can be expected if this meeting cannot be provided with a reasonably complete and up-to-date Exfor retrieval for this top priority data category.

Distribution:

- L. Lesca, NDCC (5)
- S. Pearlstein, NNCSC (5)
- V. Manokhin, CJD (5)
- NDS: P.M. Attree
- M. Khalil
- R. Lessler
- H.D. Lemmel
- A. Lorenz
- K. Okamoto
- R. Yaghubian

Clearance: J.J. Schmidt

W. Schmidt

2. For less important data the example of P-31 data investigated in Memo 4C-3/159 may be typical. Analyzed by service area and publication date the Exfor completeness looks as follows:

publication date:	1950 - 1969				1970 - 1975		
	missing	existing		coverage	missing	existing	coverage
Exfor entries:		ser.1-4	ser.5-8				
Area 1	25	1	31	56%	3	3	50%
2	27	16	20	57%	9	2	19%
3	5	6	2	62%	6	6	50%
4	11	0	3	22%	4	0	0%
total	68	23	56	47%	22	11	33%

Exfor deadline: 1976-2-1

The statistical sample included in this check is very small, and a generalization of the resulting completeness figures is subject to considerable statistical uncertainty. There is also some systematic uncertainty as explained in 4C-3/159. Admittedly, a certain fraction of the missing data may be rather unimportant.

3. Conclusion: Within the limitations due to the small extent of this test, the completeness of Exfor for data since 1970 is likely to be

approx 50 % for important data,
less than 40 % for less important data.

The coverage in area 1 (and probably also in area 3 where not so many data sets exist for the nuclides considered) seems to be significantly better, in areas 2 and 4 worse.

The completeness figures reported at the last 4C-Meeting [INDC(NDS)-68 p.17,18], that is

area 1	close to	100 %
area 2	approx	50 %
area 3	approx	80 %
area 4	approx	90 %

must therefore be based on insufficient checking procedures. The methods for the coverage control of the Exfor compilations must therefore be reviewed and improved at all four centers.

Reproduced from Memo 4C-3/48, with comments added.

2. The recent evaluation of σ_f Pu-239/ σ_f U-235 and σ_f Pu-239 above 1 Kev performed by the NDS, as well as evaluations of these reactions which have been carried out by Sowerby (U.K.) and Ribon (France) have indicated that some of the most important experimental data which have been used in these evaluations, are not yet in the EXFOR system. Whether or not these data exist in the CCDN, NNCSC or CJD's internal files we are not in a position to judge without requesting specific retrievals. However, we do feel that every effort should be made to enter these data into EXFOR with high priority. Most of these data referred to below have been published in tabular form in the relevant journals: -

Ratio Data, σ_f Pu-239/ σ_f U-235

- I. Poenitz (USA), Nucl, Sci. and Engin., Vol. 40, p. 383 (1970) Ex/for
10086 2/72 *
10081 6/72 *
- II. Szabo et.al. (France), 1971 Knoxville, Vol.2, p. 573 (1971) —
- III. Lehto (USA), Nucl. Sci. and Engin., Vol. 39, p.361 (1970) 10084 D/70
- IV. Pfletschinger and Käppeler (Fed.Rep.Ger.); Nucl.Sci. and Engin., Vol.40, p. 375 (1970) 20362 9/74
- V. Farrell et.al. (USA), 1970 Helsinki, Vol, 1, p.543 (1970) (Data for ratios not given in tables here but obtained by private communication from Farrell to T.A. Byer).
- VI. Soleilhac et.al. (France), 1970 Helsinki, Vol.2, p.145 (1970). These are preliminary values, Soleilhac et.al. are re-measuring their ratios
- VII. Nesterov and Smirenkin (USSR), Soviet Atomic Energy, Vol 24, No.2, p.224 (1968). Data given in INDC (CCP)-4/G, p.339 (1967). 3 independent ratio data sets. 40027 0/72
- VIII. Smith, Henkel and Nobles (USA), Bull. of American Physical Society, II, 2, p.196 (1957). These data revised by Hansen and McGuire (WASH-1074, p.75 (1967)). Revised ratios of σ_f Pu-239/ σ_f U-235 and σ_f Pu-239/ σ_f U-238 given and obtained by private communication from Leona Stewart (LASL) to T.A. Byer.
- IX. Samsonov et.al. (USSR), INDC (CCP)-15/G
- X. Poenitz (USA), Report NCSAC-38, p.3 (1971). 10253 4/72 *

Regarding σ_f Pu -239, the following data are of special relevance:

- I. Gwin et.al (USA) ORNL-TM-3171 (1970). This is Part II of their work which supersedes Part I published in Nucl.Sci. and Engin., Vol.40, p.306 (1970) and ORNL-TM-2598 (1969). 10267 D/72
10035, 52080, 50961 *
- II. Blons et.al.(France), 1970 Helsinki, Vol. 1, p.513 (1970) and Comptes Rendus, Vol. 267, p.901 (1968). These data have been transmitted in EXFOR, but see our comments in Section.3 of this Memo. 20001
retransmitted 3/76
- III. Schomberg et.al. (U.K.), 1970 Helsinki, Vol.1, p.315 (1970). These data supersede all previous data by these authors. Some data by Patrick et.al. going back to 1968 have been transmitted in EXFOR but are superseded by Helsinki results - see Section 4 of this Memo.

→ Data & Ex/for 20002 are impeded ←

* relation between several Ex/for entries by same authors not checked. Some of them Ex/for entries may be superfluous.

- IV. James (U.K.). The documentation of James' measurements is quite frankly a mess!! There are 8 references from 1970 to 1963, with the latest being 1970 Helsinki, Vol.1, p.267 (1970). Private communications with James have failed to resolve the situation !!
- V. Farrell et.al.(USA), 1970 Helsinki, Vol.1, p.543 (1970). Average cross sections obtained from 100 eV to 1 Mev by private communication between Farrell and T.A. Byer.
- VI. Ryabov et.al.(USSR), JINR-P3-5113(1970) and 1970 Helsinki, Vol.1, p.345 (1970).
- VII. Szabo et.al (France). Two independent data sets exist: -
1. Proceedings of EANDC Symposium on Neutron Standards, Argonne 1970 p.257. These data supersede 1970 Helsinki, Vol.1, p.229 (1970).
 2. 1971 Knoxville, Vol.2, p.573 (also internal report of Cadarache DRP/SMPNF/71/06).

We have not as yet stated a similar review of the recent important data for σ_{f} U-235 however the following data sets should be entered into EXFOR if they are not: -

- I. Blons, Debril et.al.(France), 1970 Helsinki, Vol.1, p.469 (1970)
- II. Patrick et.al.(U.K.), AERE-R-6350 (1970)
- III. Käppler (Fed.Rep.Ger.) Proceedings of EANDC Symposium on Neutron Standards Argonne 1970, p.272. Käppler is performing further measurements near 1 Mev. ← 20356 9/74
- IV. Szabo et.al. (France). Same references as under σ_{f} Pu-239 (VII).
- V. Silver et.al. (USA), 1971 Knoxville. 10302 1/73
- VI. Poenitz (USA), Proceedings of EANDC Symposium on Neutron Standards, Argonne 1970, p.281. (same data?) 10333 7/74
- VII. Lemley et.al. (USA), Nucl. Sci. and Engin., Vol.43, p.281 (1971). 10120 6/72
- VIII. Samsonov et.al (USSR), INDC(CCP)-15/G.

3. The EXFOR entry 2.0001. on σ_{f} Pu-239 by Blons et.al. (France) should include a reference to 1970 Helsinki Vol.1, p.513 (1970). There are another 3 relevant references: Comptes Rendus, Vol.267, p.901 (1968) by Blons et.al.: 1966 Paris, Vol.2, p.195 by Derrien et.al. and 1965 Salzburg, Vol.1, p.205 by de Saussure et.al. The data in 1970 Helsinki and Comptes Rendus supersede the 1965 Salzburg data above 1 KeV. This was indicated in a priv. comm. from J. Blons to T.A. Byer dated October 1970. The 1970 Helsinki data may also supersede the 1965 Salzburg data below 1 KeV (this should be checked with Blons) since in our review work we were not concerned with the energy region below 1 KeV and therefore we did not clarify the situation below this energy.

Also it would be desirable to know, for what reason the data in entry 2.0001. "supersede" the Paris Conference data. This could mean that the old data have been re-analyzed, or that the earlier experiment has been repeated with better resolution. If possible, we would like to see in EXFOR those Blons data from the Salzburg and Paris Conferences which are still valid, because we have a number of DASTAR-sets by Blons et.al. and are not sure which ones can be deleted.

Revision of Exfor 20001. received in Trans 2028 3/76

4. The data in the EXFOR entry 2.0002 on ^{239}Pu by Patrick et.al. (if they do refer to the report EANDC(UK²)-96AL) are superseded by the 1970 Helsinki data of these authors. A note should be added to this X-4 entry to that effect. The authors stated at Helsinki that their Helsinki work supersedes all their previous data and publications.

no Exfor revision received