

INTERNATIONAL ATOMIC ENERGY AGENCY

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NUCLEAR DATA SERVICES

DOCUMENTATION SERIES OF THE IAEA NUCLEAR DATA SECTION

INDL/F-83

Evaluated neutron reaction data library for INTOR fusion neutronics calculations (1983 version)

by

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Abstract

The INDL/F-83 data library is a computerized library of evaluated neutron reaction data which has been assembled from a variety of other evaluated data files and is intended for use in fusion neutronics calculations of the International Tokamak Reactor (INTOR) Project. These data are available on magnetic tape from the IAEA Nuclear Data Section.

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Introduction

Because of the much faster neutron spectrum involved in fusion reactors, compared to fission reactors, the nuclear data requirements for calculations of fusion systems are quite different from the requirements for fission systems. For fusion systems cross sections and secondary angular and energy distributions up to approximately 16 MeV are important.

In an attempt to meet the needs for nuclear data to be used in INTOR calculations the IAEA Nuclear Data Section has assembled a single data file, INDL/F-83 by select: ag evaluated neutron data from four different evaluated data libraries,

- (1) ENDF/B-V standards file
- (2) ENDF/B-V dosimetry file
- (3) ENDF/B-IV general purpose library
- (4) ENDL-78 Livermore evaluated data library

Summary of contents

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The contents of this library were specifically selected to meet the need of the INTOR project; it is not a general purpose library designed to meet the need of all fusion design concepts. In addition it should be noted that in assembling this library no additional evaluation work was performed in order to improve evaluations for use in fusion systems; only existing evaluations were considered for inclusion. As such the current library must be considered only a first version which can be improved upon in the future. The materials contained in this library and their source are given in Table 1.

Two versions of INDL/F-83 available

The INDL/F-83 library is available from the IAEA Nuclear Data Section in two different forms,

(1) 'INDL/F-83': The original evaluations in which cross sections may be represented by a combination of resonance parameters and/or a background cross sections. The background cross sections may be represented using any combination of the five ENDF/B interpolation laws between tabulated points. (2) 'INDL/F-83-R': Tabulated linearly interpolable cross sections which have been reconstructed by combining the resonance and background cross section contributions. This is a convenient starting point for many calculations. However, care must be exercised in using these data since in order to represent the cross sections in this form in most cases the ENDF/B convention of allowing only a maximum of 5000 energy - cross section pairs to represent each reaction is violated. Therefore, any computer program which is limited to 5000 points per reaction will not be able to use the data in this form.

Size and format of library

The library contains evaluations for 23 targets ("materials"), in ENDF/B-V format (compare IAEA-NDS-10/102).

The version 'INDL/F-83' has 75 549 records.

The version 'INDL/F-83-R' has 153 047 records.

Review of Data in FINE-83

In the framework of the INTOR project evaluated neutron cross section data are required for calculations of

- neutron transport
- displacement damage
- gas production
- nuclear heating
- transmutation

Although it is not possible, at this point, to give a detailed appraisal of the quality of the data included in INDL/F-83 library, the following general remarks can be made:

- 1. Some cross sections, important for fusion, which have been requested, are missing in the existing files (e.g. (n,n'd) and (n,n't) for ${}^{6}Li$, (n,n'3) for ${}^{12}C$).
- The total and elastic cross sections, as well as the angular distributions for elastic scattering, satisfy the requirements for most currently considered isotopes.

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- 3. Most of the threshold reaction evaluations are satisfactory. In some cases, especially in the absence of experimental data, there is a need to perform certain evaluations using recently developed theoretical models (like the model of direct reactions or more phenomenological pre-equilibrium models).
- 4. In many cases the capture cross sections at energies higher than several MeV have been evaluated with large uncertainties (up to 10 times their value). It is possible now to improve the accuracy of

capture cross sections using more recent experiments and theoretical models, such as the statistical model with adjusted level density parameters and the direct and semi-direct capture model.

- 5. The status of neutron emission spectra for some isotopes, which were taken from the ENDF/B-V library for inclusion in this library, was examined in the report ORNL/TM-6637, 1979 by D.M. Hetrick, D.C. Larson, C.Y. Fu. Conclusion in that report is that in most cases the quality of neutron emission spectra evaluations is not satisfactory. The differential cross sections in the hard part of the spectrum are underestimated sometimes by one order of magnitude. From our point of view it would be very useful to have the secondary energy-angular distributions re-evaluated using the model of direct multistep reactions.
- 6. γ-emission spectra are missing completely for some isotopes. Using existing theoretical approaches (such as statistical and pre-equilibrium models) it should be possible to calculate an adequate description of the existing experimental data and use it for the evaluation of the γ-emission spectra of the missing isotopes.
- 7. Because the evaluations contained in INDL/F-83 originated from different evaluated data libraries, not all of these evaluations are necessarily internally consistent.

The above comments could serve as a starting point toward improving the available evaluated data for fusion (i.e. future versions of the INDL/F library). Any additional suggestions would be appreciated.

Table 1 : Contents of INDL/F-83

ZA	MAT	SOURCE
3 Li - 6	1303	ENDF/B-V standards file
3-Li-7	1272	ENDF/B-IV general purpose file
4-Be-9	1289	ENDF/B-IV general purpose file
5-B-10	1305	ENDF/B-V standards file
5-B-11	7811	ENDL-78
C-C-0	1306	ENDF/B-V standards file
8-0-16	1276	ENDF/B-IV general purpose file
13-A1-27	1193	ENDF/B-IV general purpose file
22-Ti-47	6428	ENDF/B-V dosimetry file
22-T1-48	6429	ENDF/B-V dosimetry file
23-V-0	1196	ENDF/B-IV general purpose file
24-Cr-0	1191	ENDF/B-IV general purpose file
25-Mn-55	1197	ENDF/B-IV general purpose file
26-Fe-0	1192	ENDF/B-IV general purpose file
28-N1-0	1190	ENDF/B-IV general purpose file
28-N1-58	7837	ENDL-78
28-N1-60	6434	ENDF/B-V dosimetry file
29-Cu-0	1295	ENDF/B-IV general purpose file
29-Cu-63	6435	ENDF/B-V dosimetry file
41-Nb-93	1189	ENDF/B-IV general purpose file
42-Mo-0	1287	ENDF/B-IV general purpose file
74-W- 0	7856	ENDL-78
82-Pb-0	1288	ENDF/B-IV general purpose file

Note: The materials from the ENDF/B-V dosimetry library contain only evaluations of some partial cross sections.

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Details of Contents

The following sections of this report include detailed tables described what data is available in the INDL/F-83 library and plots of all cross sections.

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3-11- 6g	Mat.No: 1303 Lat Date: SEP77 Au Ref: Can	b: LASL thor: G.HALE, L.STEWART, F.G.YQUNG rd Images: 2484	
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11.10000 / Ev (n,n') Level 1-1.10000 / 7 11.250000 / Tev (n,n') Level 1-1.250000 / 7 11.250000 / Tev (n,n') Level 1-1.25000 / 7 11.350000 / Tev (n,n') Level 1-1.35000 / 7 11.450000 / Tev (n,n') Level 1-1.45000 / 7 11.450000 / Tev (n,n') Level 1-1.5000 / 7 11.450000 / Tev (n,n') Level 1-1.5000 / 7 11.55000 / Tev (n,n') Level 1-1.5000 / 7 11.55000 / Tev (n,n') Level 1-2.72730 / 6 11.4000 / Tev (n,n') Level 1-2.72730 / 6 11.4000 / Tev (n,n') Level 1-2.72730 / 6 11.410110111011010101000000000000000000		1.10000+ 7 Ev (n,n*) Level	
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1130000+7Ev[-1.3000+7135000+7Ev[n,n'] Level114000+7Ev[n,n'] Level114000+7Ev[n,n'] Level114000+7Ev[n,n'] Level115000+7Ev[n,n'] Level11500+7Ev[n,n'] Level11500+7Ev[n,n'] Level11500+7Ev[n,n'] Level1150+7Ev[n,n'] Level1150+7Ev[n,n'] Level1150+7[n,n'] radiative capture cross section1150+7Ev[n,n'] Level1150+7[n,n'] radiative capture cross section1150+7[n,n'] radiative capture cross section1150+7[n,n'] radiative capture cross section1150+7[n,n'] radiative capture cross section1150+7[n,n'] cross section1150+7 </th <th></th> <th>11.25000+ 7 Ev (n,n') Level</th> <th> -1-25000+ 7 </th>		11.25000+ 7 Ev (n,n') Level	-1-25000+ 7
1.35000+ 7 EV (n,n') Level-1.35000+ 71.40000+ 7 EV (n,n') Level-1.45000+ 71.450000+ 7 EV (n,n') Level-1.45000+ 71.450000+ 7 EV (n,n') Level-1.45000+ 71.55000+ 7 EV (n,n') Level-1.45000+ 71.55000+ 7 EV (n,n') Level-1.55000+ 71.55000+ 7 EV (n,n') Level-3.69800+ 6Photon prod. fish.prod. yield data(h,p) cross sectionPhoton prod. Multiplicities(from neutireactions)3.55200+ 6 EV (n,n') Level1.55000+ 6(n,p) addative capture cross section1.55000+ 7(n,p) addative capture cross section1.55000+ 6(n,p) addative capture cross section1.55200+ 6(n,p) cross sect		[1:30000+ 7 Ev (n,n') Level	-1.30000+ 7
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1.45000+ 7 Ev (n,n') Level-1.45000+ 71.55000+ 7 Ev (n,n') Level-1.55000+ 7In,1 cross section4.78380+ 6In,1 cross section-2.72730+ 6In,2 cross section-2.72730+ 6In,1 cross section-2.72730+ 6In,2 cross section-3.56200+ 6In,2 cross section-3.56200+ 6In,7 radiative capture cross section-3.56200+ 6In,7 radiative capture cross section-3.56200+ 6In,1 cross section-3.56200+ 6In,2 cross section-3.56200+ 6In,2 cross section-3.56200+ 6In,1 cross section-3.56200+ 6In,1 cross section-3.730+ 6In,2 cross section-3.730+ 6In,1 cross section-3.7830+ 6	1	1.40000+ 7 Ev (n,n') Level	-1.40000+ 7
1.50000+ 7 Ev (n,n') Level-1.50000+ 71.55000+ 7 Ev (n,n') Level-1.55000+ 71.55000+ 7 Ev (n,n') Level-1.55000+ 71.15000+ 7 Ev (n,n') Level-1.55000+ 71.11111111111111111111111111111111111	l l	(1.45000+ 7 Ev (n,n*) Level	-1.45000+ 7
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IAngular dist. of Photons (from neut.reactions) [3.56200+ 6 Ev (r,n*) Level [~3.56200+ 6 I Introduction [nit7] radiative capture cross section [7.25060+ 6 I Introduction Introduction [.1017] radiative capture cross section [.1017] radiative capture cross section Introduction Introduction [.1017] radiative capture cross section [.1017] radiative capture cross section Introduction Introduction [.1017] radiative capture cross section [.1017] radiative capture cross section Introduction [.1017] radiative capture cross section [.1017] radiative capture cross section [.1017] radiative capture cross section Introduction [.1017] radiative capture cross section [.1017] radiative capture cross section [.1017] radiative capture cross section Introduction [.1017] radiative capture cross section [.1017] radiative capture cross section [.1017] radiative capture cross section Introduction [.1017] radiative capture cross section [.1017] radiative capture cross section [.1017] radiative capture cross section Introduction [.1017] radiative capture cross section [.1017] radiative capture cross section [.1017] radiative capture cross section Introduction [.1017] radiative capture cross section [.1017] radiative capture cross			
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	T s	(n _t t) cross section	1 4•/8380+ C 1
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3-L1- 7g	Mat.No: 1272 Date: DCT72 Ref:	Lab: LASL Author: R.J.LAFAUVE, Card Images: 645	L.STEWARÌ, M.BATTAT	
	File Type	· · · · · · · · · · · · · · · · · · ·	Reaction Type	Q-Value
	General Information		Descriptive data and Dictionary	, 1 1
	Resonance parameter dáta		Resonance information	1
	 Neutron cross sections 	· · · · · · · · · · · · · · · · · · ·	Total cross section(sum of partials) Elastic scattering cross section Total inelastic cross section(sum of MT=51to91) direct (in,2n) cross section (n,n'2nd) cross section 4.77600+ E Ev (n,n') Level (n,n') to the continuum ((n,r) radiative capture cross section ((n,d) cross sect	 -4.78000+ 5 -7.25200+ 6 -8.72300+ 6 -4.77600+ 5 -2.46600+ 6 2.03270* 6 -7.76000+ 6
5 1 7 7	Angular dist. of secondary her 	utrons	Elastic scattering cross section direct { n,2n } cross section (n,n*2nu) cross section 4.77600+ E Ev (n,n*) level (n,n*) & a the continuum	 -7.25200+ F -8.72300+ E -4.77600+ E -2.46600+ 6
	Energy dist. of secondary heu	trons	 direct (n,2n) cross section (h,n*2na) cross section (h,n*) to the continuum	 -7.25200+ € -8.72300+ € -2.46600+ €
	Photon prod.Multiplicities(tr	c# neut.reactions)	4.776004 € Ev (n,n') Level (n,7) radiative capture cross section	1-4.77600+ 5 2.03270+ 6
•	Angular dist. of Photons (fro	m neut-reactions)	4.77ĉ004 E Ev (n,n*) Level (n,*) rudistive capture cross section	-4.77600+ 5 2.03270+ 6

4-46- AQ	Pate: DEC71 Author: Ref: Card in	HOWERTON, PERKINS Mages: 2667	
	File Type	Reaction Type	C-Value
	General Information	Cescriptive data and Dictionary	1
	Resonance parameter dátá	Resonance information	l l
	Neutron cross sections	 Totel cross section(sum of pertials) Elastic scattering cross section	1
		1.680000⊧ € Ev (n,2n) level - first neutron 2.43000⊧ € Ev (n,2n) level - first neutron 6.26000⊧ € Ev (n,2n) level - first neutron	~1.68000+ ~2.43000+ -5.76000+
		1.12200+ 7 Ev $(n,2n)$ level - first neutron 1.68000+ \in Ev $(n,2n)$ level - second neutron	-1.12800+ -1.68000+
		[2.43000+ € Ev (n,2n) level - second neutron €.76000+ € Ev (n,2n) level - second neutron 1.12800+ 7 Ev (n,2n) level - second neutron	t-2.43000+ t-6.76000+ t-1.12800+
		((A)) rodlative capture cross section ((A)) choss section	F.82000+ -1-28300+
		(n,d) cross section (n,t) cross section (n,d) cross section	-1.46600+ -1.04400+ -6.00000+
		 <µ> Làb∷average elastic scattering cosine.	
		$\{< \gamma > S < E^{2} > (< 2 E_{2} > (< 2 E_{2} > (< 1 + 2 e^{2})) \}$	-1.04400+
		1.09170+ 7 Ev (n,t) Level	-1-09170+
	inudrial diar. Of accountly ventions	itlastic scattering cross section il.680004 € Ev (n.2n) level - first neutron	 -1.68000+
		16.760004 € Ev (n,2n) level - first neutron 16.760004 € Ev (n,2n) level - first neutron	1-6.76000+
		1.128004 7 Ev (h,2n) level - first neutron 1.680004 6 Ev (h,2n) level - second neutron	-1.12800+ -1.68000+
		<pre>[2.400004 € EV (n,2n) level - second neutron [6.760004 € EV (n,2n) level - second neutron [1.128004 2 Ev (n,2n) level - second neutron</pre>	-2•43000+ →6•76000+ -1-12800+
	 Energy dist. of secondary neutrons	1.68000+ E Ev (n,2n) level - second neutron	-1.68000+
		2.430004 € Ev (n,2n) level - second heutron 6.760004 € Ev (n,2n) level - second neutron	-2.43000+ -6.76000+
	} } }Photon prod-Multiplicities(from neut.	i1.12200+ / Ev (n,2n) level - second neutron h reactions) i(n,y) rediative capture cross section	6.82000+
		11.09170+ 7 Ev (n,t) Level	t = 1 • 09170+ 1
	Angular dist. of Photons (from neut.r) 	eactions) ((n,y) rediative capture cross section (1.091704 7 Ev (n,t) Levei	6+82000+ -1+09170+
	Energy dist. of Fhotons (from neut.re)	actions} //(n,y) radiative capture cross section 1.091704 7 Fv (n,t) Level	6-82000+ -1+09170+

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	File Type File Type General Information Resonance parameter data Restron cross sections	· · ·	Reaction Type	C-Value
	General Information Resonance parameter data Restron cross sections		Descriptive data and Dictionary	
	Resonance parameter data Restron cross sections			
	Restron cross sections		l Feadnané e Information	1
	1]otal_crcss_section(sum of partials)	1
			JElastic scattering cross section	1 7 17000.
1		-	flotal inclostic cross section(sum of mi=bitos)	1-7.170004
1			11.740004 £ Fu (mant) Level	1-1.740004
			12.154004 C EV (n.n.) Level	1-2 154000
			13.545004 ¢ Fu (n.n.) Level	1-3.585004
i			14:77400+ f Fu (n.nt) [evel	1-4.77400
			15.114004 E Fu (n.h2) Level	1-5.11400
		·	15,16600+ 6 Fu (h.h') Level	1-5-16600
i			15.183004 6 Ev (n.n*) Level	1-5,18300
i			15.92300+ € Ev (n,n*) Level	1-5.92300
i			16.02900+ 6 Ev (h.nº) Level	1-6.02900
i		·	6.13300+ E Ev (nin*) Level	j-€.13300
i			6.50000+ € Ev (n,n*) Level	1-€.50000
1			17.00000+ 6 Ev (n.n.) Level	1-7.00000
1			17.50000+ E Ev (n,n*) Level	1-7.50000
1			B;00000+ 6 Ev (n,n*) Level	1-6.00000
			18.500004 € Ev (n,n*) Level	1-8.50000
i			19.00000+ € Ev (r,n') Level	1-5.00000
,	l	• •	19:50000f 6 Ev (n,n*) Level	1-2.50000
t		•	1.00000+ 7 Ev (n.n.) Level	1-1.00000
			11.05000+ 7 Ev (n+n*) Level	1-1.05000
1	1		1.10000+ 7 Ev (n;n") Level	1-1.10000
	l i i i i i i i i i i i i i i i i i i i		11.15000+ 7 Ev (n,n') Level	1-1.15000
	1		12.20000+ 7 Ev (r+n*) Level	1-1.20000
l l			11.25000+ 7 [v (r,n') Level	1-1.25000
1	1		11.30000+ 7 Ev (nin') Level	1-1.30000
			11.350004 7 Ev (n,n') Level	1-1-35000
ļ		•	11.400004 7 Ev (h,n') Level	1-1.40000
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]			IL-DUUUU+ / EV IN-N'J Level	1-1.50000
	1		11.000004 / EV (Ryn') Level	1-1 60000
		•	11.650884 7 Ev (P+N-) Level	1+1.65000
			11.00000+ 7 Ev (n.n.) Level	1-1 70000
	T		11 750004 7 EV (P)N'J Level	1~1.75000
			11.400004 7 Ev (n.n.) Level	1-1.80000
			lin.)) thélating canture cross section	1 1.14560
	1		In p) excer section	1 2.26700
	t		lind) cress section	1-4.36100
	i		l(n.g) cross section	1 2.79000
1			(n,t2a) cress section	3.24000
			(4) Lat:average elastic scattering cosine. (4):average log energy decrement for elastic scat.	
			<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\<pre>\</pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre>	1 3 36307
	!		(In,po) ground state	1 2./6/00
	!		13.13900+ E Ev (r.p) Level	1-3.13900

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1	1 18.951	:100+ E Ev (n,p) Level	I-5.95100+ €
1	(n,a	(d) ground state	i
1	1 10.000	10004 0 Ev (n+a) Level ·	i i
1			ا م ا
1	Angular dist. of secondary neutrons [Elast	tic scattering cross section	1 1
	17.170	7000+ E Ev (n,n*) Level	1-7.17000+ E
1	11.740	1000+ E Ev (n+n*) Level	-1.74000+ €
	1 2.154	5400+ E Ev (n,n') Level	1-2.15400+ €
ļ	3.58	3500+ E Ev (n,n') Level	1-3.58500+ €
	44774	400+ € Ev (n+n') Level	-4.77400+ €
	15.11	1400+ E Ev (nyn*) Level	-€.11400+ €
	15-16	5600+ 6 EV (h,n*) Level	1-€.16600+ €
		33UU+ t EV (n,n*) Level	1-5.18300+ €
	5.92	2300+ £ Ev (h,n') Level	1-F.92300+ F
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2900+ t EV (nyn') Level	I-€.02900+ €
	[C-13	JJUO+ C EV (H,n') Level	1-€.13300+ €
		1000+ C EV (NgA') Level	[~e.50000+ e
1		UVUUT C EV (RAN') Level	1-7.00000+ €
		DOODI & Eu (man') Level	1-7. FUUUU4 6
		DOODA & Ev (Bin') Level	1-0-00000+ C
		DOOA 6 Eu (nyn') Level	1-8*20000* 6
•		10004 E EV (High') Level	1-9.00000+ C
		Andra 2 Fullmant) Level	
	1.05	500047 EV (Rent) Level	1-1.050004 7
i	1.1.1.1	1000+ 7 EV (nym) Level	1-1 10000+ 7
	1 1 1 1	$500d4 - 7 EV (high) Level \\ 500d4 - 7 EV ($	1-1 160004 7
	1.20	$\frac{1}{1000} \frac{1}{1000} \frac{1}{1000} \frac{1}{10000} \frac{1}{100000} \frac{1}{10000000000000000000000000000000000$	1-1.10000+ 7
•	1,25	5000 $7.5v$ (n;n) Level	1-1.25000+ 7
i	1.30	DOOD 7 EV (nyn y Level	1-1-300004 7
	1.35	5000+ 7 Ev (h.n.) Level	1-1.35000+ 7
i i	11.40	$0000 \neq 7 \equiv v + m_{AD} + 1 = v = 1$	1-1.40000+ 7
i	11.45	50004 7 Ev (n.n.) Level	1-1-45000+ 7
İ	1.50	00004 7 EV (n.n.) Level	1-1.50000+ 7
i i	1.55	5000+ 7 Ev (n.n') Level	1-1.55000+ 7
1	11.60	0000 7 Ev (n.n') Level	j-1.€0000+ 7
1	1 1.65	5000+ 7 Ev (n.n*) Level	1-1.65000+ 7
1	1.70	0000+ 7 Ev (n,n*) Level	1-1.70000+ 7
1	1 .75	5000+ 7 Ev (n,n') Level	1-1.75000+ 7
1	1.80	00004 7 Ev (n,n*) Level	1-1.80000+ 7
1			1
1	Photon prod.Multiplicities(frcm neut-reactions) (n#y	y) tadiative capture cross section	1.14560+ 7
!	1 10.00	0000f 0 Ev (r,a) Level	1
			1
1	[Photon prod-cross sections(from neut-reactions) / [Tota	al inelastic cross section(sum of MT=51to91)	-7.17000+ 5
Į	1 (n#p	p) cross section	2.26700+ E
!			1
!	Angular dist. of Photons (from neut-reactions) Tota	al inclastic cross section(sum of MT=51to91)	-7.17000+ 5
	(n+7	7) radiative capture cross section	1 1.145604 7
!	[n ₁ p	p) crcss section	1 2.2F700+ E
1	10.00	0000+ 0 Ev (r,o) Level	1
		• • • • • • • •	1
1	ivata covariance matrices for neutron X-sections lota	al cross section(sum of partials)	!
1	, I IEI89	stic scattering cross section	1 2 20000 1 6
1	(n,α	a) cross section	1 S*1A0004 €
1	1 (n ₁ a	ag) ground state	1
1	10.00	UUUU+ U Ev (n,a) Level	
1		0000+ 0 Ev (r.a) Level	

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5-B - 11g [Mat.No: 781] Lab: LLL |Date: MAY78 Author: R.J.HOWERTON UCRL-50400,VOL. 15 Card Images: 570 |Ref: File Type Reaction Type C-Value ------_____ [General Information **Descriptive** data and Dictionary (Resonance párameter data Fesonance Information [Neutron cross sections (Total cross section(sum of partials) 0. + 0 1 + 0 + |Elastic scattering cross section 0. 1 [Total Inelastic cross section(sum of MT=51to91) 1-2-14000+ F 1 idirett (n,2n) cross section 1-1-14600+ 7 1 |-2.14000+ € i 12.14000+ € Ev (n,n*) Level 14.46000+ E Ev (n.n') Level 1-4-46000+ € I 15+03000+ 6 Ev (n,n*) Level 1-5-03000+ 6 1 (n,n) to the continuum 10. +01 | 3.37000+ € i (n, r) radiative capture cross section (n,p) tress section 1-1.072004 7 1 (nit) cross section 1-9.5€000+ € 1 (njā) cross section 1-€.€4000+ € 1 () Lat: average elastic scattering cosine. 1 0. + 0 1 (<<u>S</u>): average log energy decrement for elastic scat. (0. + 0 + 0 1 1<1> : <E2>/<22> 1 0. [Elastic scattering cross section Angular dist. of secondary neutrons 1 0. + 0 1 {2.14000+ 6 Ev (n,n*) Level 1-2.140004 € 1 14:46000+ 6 Ev (n,n*) Level 1-4-46000+ E 15.03000+ 6 Ev (r,n') Level 1-5.03000+ 6 1 1-1.146004 7 1 |Energy dist. of secondary neutrons (diffect (n,2h).cross section (nam*) to the continuum 10. 401 [Photon prod_Multiplicities(from neut_réactions) (direct (n,2n) cross section 1-1.14600+ 7 | 1-2.14000+ F 1 12.140004 6 Ev (n,n*) Level 14.46000+ E Ev (n.n*) Level 1-4.46000+ f 1 15.030004 € Ev (n,n*) Level 1-5.03000+ 6 1 10. +01 (n,n*) to the continuum 1 3.37000+ € 1 1 (n,) raciative capture cross section 1-1-07200+ 7 1 | [n,p] crcss section | (n, a) cross section 1-6-64000+ C 1 (Angular dist. of Photons (from neut.reactions) 1-1-14600+ 7 1 direct (n;2n) cross section 1-2.14000+ € 1 12-14000+ € Ev (r,n') Level 14.46000+ € Ev (n.n*) Level 1-4.46000+ € 1 1-E.03000+ € 1 15.03000+ E Ev (r,n') Level 10. +01 '| [n,n') to the continuum 3.37000+ 6 1 (n, j) raciative capture cross section 1-1.07200+ 7 1 (n,p) cress section 1-€.€4000+ € | (n.a) cress section 1-1-14600+ 7 1 [Energy dist. of Photons (from neut.reactions) direct in.2n) cross section 1-2-14000+ 6 1 12.14000+ 6 Ev (r,n*) Level 1-4-46000+ € 1 14.46000+ € Ev (r,n*) Level 1-5.03000+ 6 1 15.03000+ € Ev (n,n') level 10. . 01 i (n,n*) to the continuum 1 3.37000+ 6 1 (n.y) raciative capture cross section

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6-C — Og	Mat.No: 1306 Date: DEC73 Ref: INDC(F/R)-7/L	Lab: CRNL Author: C+Y+FU AND F Cord images: 2537	.G.PEREY	1
	file Type	•	Reaction Type	l C-Value l
	 	۰	Descriptive date and Dictionery 	
	Tresonance parameter data		iesousuce iniormation	
	Neutron cross sections 	、 、 、	itotal cross section(sum of partials) Elastic scattering cross section Non elastic cross section(total-elastic)	r i 1 1
	1		Total Inelastic cross section(sum of MT=51to91) 14.43900+ 6 Fu (n.n.) level	1-4-43900+ € 1
	1		17.65300+ 6 Ev (r.n.) Level	1-7.65300+ 6 1
	1		19.63800+ 6 Ev (n,n') Level	-9.F3800+ 6
	ł		[].030004 7 Ev (r,n') Level	1-1.03000+ 7
]=U0400+ 7 Ev (r,n*) Level	~1.08400+ 7 1.12500 . 7
			11.17500+ 7 Ev (r,n*) Level	1-1.17500+ 7
	1		11-22500+ 7 Ev (n+n*) Level	1-1-22500+ 7
		,	(1.27500+ 7 Ev (r,n*) Level	1-1-27500+ 7
	1	•	11.375004 7 Ev (n.n.) Level	1~1.32500+ 7 1≈1.37500+ 7
	1		11.42500+ 7 Ev (r.n*) Level	1-1-42500+ 7
	1	1	11.475004 7 Ev (n.n.) Level	1-1-47500+ 7
	1		(1.525004 7 Ev (n,n') Level	1-1.52500+ 7 1
		· · · · · · · · · · · · · · · · · · ·	11.625004 7 Ev (r.n.) Level	1-1.62500+ 7
	1	•	11.67500+ 7 EV (r.n') Level	1-1.67500+ 7
	1	-	11.72500+ 7 Ev (r,n*) Level	1-1.72500+ 7
			(nin) to the continuum	1-7.27500+ ¢
		•	(n, t) radiative capture cross section	4.94700+ €
	i		Ind) cross section	1-1-37330+ 7
	1		(n,a) cress section	1-E.69500+ 6
	1		Total hydrogen production	1-1.25880+ 7
			Total deuterium production	1-1.37330+ 7
			ilotal "He production	1~5*68200+ 6
		, <u> </u>	<pre>(4) Lab:Sverage alastic scattering cosine. (ζ):sverage log energy decrement for elastic scat. (ζ): (Σ²)/(2Σ)</pre>	l 1 3
	Angular dist. of secondary n	eutrons	Elastic scattering cross section	i
	!		14.43900+ € Ev (r,n') Level	-4.43900+ €
			17.65300+ 6 Ev (r,n*) Level	1-7.65300+ €
			19.03000+ C Ev (n,n*) Level	1-9.F3800+ C
	i		11.08400+ 7 Ev (n.n ⁴) Level	I~1.08400¢ 7
	1 I		11.12500+ 7 Ev (n.n') level	1-1.12500+ 7
	1		1.17500+ 7 Ev (n,n') !.evel	1-1-1-1-500+ 7
	1		11:22500+ 7 Ev (n,n*) Level	1-1.27500+ 7
	1		1.32500+ 7 EV (n.n.) Level 1.32500+ 7 Ev (n.n.) Level	1-1.32500+ 7
	i		11.37500+ 7 Ev (n.n*) Level	1-1.37500+ 7
	1		11.42500+ 7 Ev (r,n*) Level	1-1-42500+ 7
			11.47500+ 7 Ev (n.n') Level	1-1.47500+ 7
	1		11.52500+ 7 Ev (r,n') Level	1-1-125004 7

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• • • • • • • • • • • • • • • • • • • •	11.57500+ 2 Fu (p.p.) Laval	
, .	11.62500+ 7 Ev (n.n.) Level	1=1.62500+ 7
)	11.67500+ 7 Fu (n.n.) Level	1-1.62500+ 7
	11.72E00+ 7 Ev (n.n.) Level	I=1.725004 7
i .	(find) to the continuum	1-7-27500+ 6
		1
Energy dist. of secondary neutrons	(n,n ⁴) to the continuum	-7.27500+ 6
Photon prod-Multiplicitles(from neut-reactions)	(n,y) radiative capture cross section	4.94700+ €
Photon prodecross sections(from neutereactions)	4•43900+ E Ev (n,n*) Level	 -4∙43900+ €
Angular dist. of Photóns (from neut.reactions)	 4.43900+ E Ev (n.n') Level	1-4-43900+ 6
	(n, y) radiative capture cross section	1 4.94700+ F
•		1
Data covariance matrices for neutron X-sections	[Total cross section(sum of pertials)	i
	. Elastic scattering cross section	1
(·	[Non elastic cross section(total-elastic)	1
	[Total Indiastic cross section(sum of MT=51to91)	-4.43900+ €
	[4≠43900+ € Ev (n,n*) Level	1-4-43900+ €
	17-65300+ E Ev (n,n') Level	-7.€5300+ €
	9+€3800+ € Ev (n,n*) Level	-9.63800+ C
	11.03000+ 7 Ev (n,n*) Level	-1.03000+ 7
	11:08400+ 7 Ev (n,n*) Level	1-1.08400+ 7
	11.12500+ 7 Ev (n,n') Level	-1.12500+ 7
	11.17500+ 7 Ev (n,n") Level	-1.17500+ 7
	11.22500+ 7 Ev (n,n') Level	1-1-22500+ 7
	1.27500+ 7 Ev (n;n') Level	1-1-27500+ 7
	11.32500+ 7 Ev (n,n*) Level	-1.32500+ 7
	11.07200+ 7 EV (n,n*) Level	1-1-37500+ 7
	ILGAZCUUT / EV (Nen') Level	1-1-42500+ 7
	ILATIOUT / LV (NAN') LEVEL	1-1+9/000+ 7
1	II+DZDUVT / EV (N+N*) Level	1-1-22004 7
· · · · · ·	ILCCCUUT / EV (n,n*) Level	1-1.57500+ 7
· · · · ·	II.CZCUUT / EV (N,NT) Level	1-1.62500+ 7
· · · · ·	lic/cuut / Ev (n,n*) Level	1-1.67500+ 7
· · · · · · · · · · · · · · · · · · ·	1.72500+ 7 EV (n,n*) Level	1-1.72500+ 7
1 . · ·	i(nin') to the continuum	1-7-27800+ E
	(n)) redictive capture cross section	1 4.94/00+ 6
	I(n,p) crcss section	1-1-25880+ 7
	(nya) creas section	1-1-3/330+ 7
	((n,a) cross section	1-5+63200+ E
1 '	l l	1

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8-0 - 16g	Mat.No: 1276 Date: AUG73 Ref: 	Løb: LASL Author: P.YOUNG;D.U Card Images: 5988	FOSTER, JR, G. HAI E	
	File Type		Reaction Type	C-Valu
	l General Information		l Dezcriptive data and Dictionary	1
	t Resonance parameter data		 Fesonance Information	1
ر	 Neutron cross sectioná 	,	 Total cross section(sum of partials) Elastic scattering cross section	
			0101 Inclastic cross section(sum of MI=E11091) 6.052004 E Ev (n,n*) Level 6.131004 E Ev (r,n*) Level	-€.05200 -€.05200
	1		(5.91700+ € Ev (r,n*) Level (7.11900+ € Ev (r,n*) Level	-€.5170 -7.1190
		• *	8.87200+ € Ev (n,n') Level 9.59700+ € Ev (n,n') Level 6.947004 € Ev (n,-1) Level	1-0.8720
		۱ ,	1.035404 7 Ev (n,n') Level (1.095204 7 Ev (n,n') Level	L-1.0354
		· .	1-10800+ 7 Ev (n,n') level 1-10960+ 7 Ev (n,n') Level 1-109604 7 Ev (n,n') Level	-1.1080 -1.109€
		I.	11.12004 / EV (n,n*) Level 1.14400+ 7 EV (n,n*) Level 1.152104 7 EV (n,n*) Level	-1.1260 -1.1440 -1.1521
			11.16300+ 7 Ev (n,n') Level 11.20530+ 7 Ev (n,n') Level	(-1.1€30 -1.2053
			1:24420+ 7 Ev (m,n') Level 1:25280+ 7 Ev (m,n') Level 1:27950+ 7 Ev (m,n') Level	1-1.2442 1-1.2528
			11:296704 7 Ev (h,n*) Level 11:31500+ 7 Ev (h,n*) Level	-1.2967
			1.34500+ 7 Ev (n,n*) Level 1.37600+ 7 Ev (n,n*) Level 1.40500+ 7 Ev (n,n*) Level	-1.3450 -1.3750 -1.4050
			11.43500+ 7 Ev (n,n') Level 11.46500+ 7 Ev (n,n') Level	1-1.4350 -1.4650
			1.49500+ 7 Ev (n,n*) Level 1.52500+ 7 Ev (n,n*) Level 1.55500+ 7 Ev (n,n*) Level	-1.4950 -1.6250 -1.5550
			11.58500+ 7 Ev (n,n*) Level 11.61500+ 7 Ev (n,n*) Level	1-1.5850 -1.6150
		•	1.64500+ 7 Ev (r.r*) Level 1.67500+ 7 Ev (r.r*) Level 1.705004 7 Ev (r.r*) Level	-1.€450 -1.€750 -1.7050
		-	11.73500+ 7 Ev (n,n*) Lavel 11.76500+ 7 Ev (n,n*) Level	-1.7350 -1.7650
			1.795004 7 Ev (r,n*) Levél 1.826004 7 Ev (r,n*) Level L.855004 7 Ev (r,n*) level	-1.7950 -1.8250
			(n, t) radiative capture cross section (n, p) cross section (n, p) cross section	4.1430 1-5.F390 1-5.9010
			(m,a) cross section	1-2.2139 1
			Ab:average elastic scattering cosine. :average log energy decrement for elastic scate :::::::	

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In addition In addition In addition Argular dist. of skondery neutrons If astic centering cross section If astic centering cross section In addition If astic centering cross section If astic centering cross section If astic centering cross section In addition If astic centering cross section If astic centering cross section If astic centering cross section In addition If astic centering cross section If astic centering cross section If astic centering cross section In addition If astic centering cross section If astic centering cross section If astic centering cross section In addition If astic centering cross section If astic centering cross section If astic centering cross section If addition If astic centering cross section If astic centering cross section If astic centering cross section If addition If addition If astic centering cross section If astic centering cross section If addition If addition If addition If addition If addition If addition If addition If addition If addition If addition If additif addition <			((n, q) ground state	1-2.21390+ € 1
Argular dist. of sécondery neutrons Electic scattering cross section			$\begin{bmatrix} c_1 & c_2 \\ c_1 & c_2 \\ c_2 & c_3 \\ c_3 & c_4 \\ c_4 & c_3 \\ c_4 & c_3 \\ c_4 & c_4 \\ c_4 & c_3 \\ c_4 & c_4 \\ c_$	1-E.30100+ E
Argular dist. of secondary neutrons F. Unotion Constructions F. Unotion Constructions Argular dist. of secondary neutrons F. Unotion Constructions F. Constructions C. 02200 + C f. (n,r) Level F. Constructions F. Constructions F. 1000 + C f. (n,r) Level F. Constructions F. Constructions F. 1000 + C f. (n,r) Level F. Constructions F. Constructions F. 1000 + C f. (n,r) Level F. Constructions F. Constructions F. 1000 + C f. (n,r) Level F. Constructions F. Constructions F. 1000 + C f. (n,r) Level F. Constructions F. Constructions F. 1000 + C f. (n,r) Level F. Constructions F. Constructions F. Constructions F. Constructions F. Constructions F. Constructions F. Constructions			16.099004 C EV (n, a) Level	1-5-899004 6 1
Acgular dist. of secondary neutrons Elastic cattering cross section 6.0200 f f c (n,n) local Acgular dist. of secondary neutrons Istature (n,n) local -6.0200 f c (n,n) local -6.0200 f c (n,n) local Collong f C (n,n) local -6.0200 f c (n,n) local -6.0200 f c (n,n) local -6.0200 f c (n,n) local Collong f C (n,n) local -5.0700 f c (n,n) local -5.0700 f c (n,n) local -5.0700 f c (n,n) local Collong f C (n,n) local -5.0700 f c (n,n) local -5.0700 f c (n,n) local -5.0700 f c (n,n) local Collong f C (n,n) local -5.0700 f c (n,n) local -1.0700 f n (n,n) local -1.0700 f n (n,n) local Collong f C (n,n) local -1.0700 f n (n,n) local -1.0700 f n (n,n) local -1.0700 f n (n,n) local Collong f C (n,n) local -1.0700 f n (n,n) local -1.0700 f n (n,n) local -1.0700 f n (n,n) local Collong f C (n,n) local -1.0700 f n (n,n) local -1.0700 f n (n,n) local -1.0700 f n (n,n) local Collong f C (n,n) local -1.0700 f n (n,n) local -1.0700 f n (n,n) local -1.0700 f n (n,n) local Collong f C (n,n) local -1.0700 f n (n,n) local -1.0700 f n (n,n) local -1.			1	
Constant of the set of th		Angular dist. of secondary neutrons) Flastic scattering cross section	
i i		In guill dist. Of secondary neutrons	$(f_0) = 0.000 + f_{\rm EW} (n_0 n_1) + 0.000 = 0.0000$	1-6.05200+ 6
<pre></pre>			$(f_{-})^{-1} = (f_{+})^{-1} = (f_{$	1-C+0.200+ C 1
7.11900 · C Ev (n,n) Level -7.11900 · C 6.67200 · C Ev (n,n) Level -6.67200 · C 1.67200 · C Ev (n,n) Level -6.67200 · C 1.0820 · 7 Ev (n,n) Level -7.1900 · C 1.0820 · 7 Ev (n,n) Level -7.1900 · C 1.0820 · 7 Ev (n,n) Level -7.1900 · C 1.1920 · 7 Ev (n,n) Level -1.1900 · C 1.1920 · 7 Ev (n,n) Level -1.1900 · C 1.1920 · 7 Ev (n,n) Level -1.1900 · C 1.1920 · 7 Ev (n,n) Level -1.1900 · C 1.1920 · 7 Ev (n,n) Level -1.1900 · C 1.12200 · 7 Ev (n,n) Level -1.1900 · C 1.12200 · 7 Ev (n,n) Level -1.1900 · C 1.12200 · 7 Ev (n,n) Level -1.2900 · C 1.12200 · 7 Ev (n,n) Level -1.2900 · C 1.12200 · 7 Ev (n,n) Level -1.2900 · C 1.2300 · 7 Ev (n,n) Level -1.2900 · C 1.2300 · 7 Ev (n,n) Level -1.2900 · C 1.2300 · 7 Ev (n,n) Level -1.2900 · C 1.2300 · 7 Ev (n,n) Level -1.2900 · C 1.2300 · 7 Ev (n,n) Level -1.2900 · C 1.2400 · 7 Ev (n,n) Level -1.2900 · C 1.2400 · 7 Ev (n,n) Level -1.2900 · C 1.2			(f,g) 200+ f Fy (n,n') level	1-6.91700+ 6 1
i i		i i i i i i i i i i i i i i i i i i i	17.11900+ 6 Fv (n.n') Level	1-7-11900+ F 1
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9.44700 + E V (n, *) Level -5.4700 + E 1.0560 + 7 E V (n, *) Level -1.0560 + 7 1.0560 + 7 E V (n, *) Level -1.0560 + 7 1.0560 + 7 E V (n, *) Level -1.1000 + 7 1.12600 + 7 E V (n, *) Level -1.12600 + 7 1.12600 + 7 E V (n, *) Level -1.1400 + 7 1.1400 + 7 E V (n, *) Level -1.1400 + 7 1.1400 + 7 E V (n, *) Level -1.1400 + 7 1.1400 + 7 E V (n, *) Level -1.1400 + 7 1.1400 + 7 E V (n, *) Level -1.1400 + 7 1.1400 + 7 E V (n, *) Level -1.1400 + 7 1.22400 + 7 E V (n, *) Level -1.22700 + 7 1.22400 + 7 E V (n, *) Level -1.22700 + 7 1.22400 + 7 E V (n, *) Level -1.22700 + 7 1.22400 + 7 E V (n, *) Level -1.22700 + 7 1.22400 + 7 E V (n, *) Level -1.22700 + 7 1.22400 + 7 E V (n, *) Level -1.3200 + 7 1.22400 + 7 E V (n, *) Level -1.3200 + 7 1.3200 + 7 E V (n, *) Level -1.4500 + 7 1.4500 + 7 E V (n, *) Level -1.4500 + 7 1.4500 + 7 E V (n, *) Level -1.4500 + 7 1.4500 + 7 E V (n, *) Level -1.4500 + 7 1.4500 + 7 E V (n, *) Level<		}	15.597004 € EV (n.n.*) Level	1-9-59700+ E 1
i. 1.03540 + 7 kv (n,n*) Level -1.03540 + 7 i. 10600 + 7 kv (n,n*) Level -1.10000 + 7 i. 10600 + 7 kv (n,n*) Level -1.10000 + 7 i. 10600 + 7 kv (n,n*) Level -1.10000 + 7 i. 10600 + 7 kv (n,n*) Level -1.16400 + 7 i. 10600 + 7 kv (n,n*) Level -1.16400 + 7 i. 10600 + 7 kv (n,n*) Level -1.16400 + 7 i. 10600 + 7 kv (n,n*) Level -1.16400 + 7 i. 12650 + 7 kv (n,n*) Level -1.16400 + 7 i. 12650 + 7 kv (n,n*) Level -1.16400 + 7 i. 12650 + 7 kv (n,n*) Level -1.26500 + 7 i. 12650 + 7 kv (n,n*) Level -1.3650 + 7 i. 12650 + 7 kv (n,n*) Level -1.3650 + 7 i. 12650 + 7 kv (n,n*) Level -1.3650 + 7 i. 1.36500 + 7 kv (n,n*) Level -1.3650 + 7 i. 34500 + 7 kv (n,n*) Level -1.4560 + 7 i. 45500 + 7 kv (n,n*) Level -1.4560 + 7 i. 45500 + 7 kv (n,n*) Level -1.4560 + 7 i. 45600 + 7 kv (n,n*) Level -1.4560 + 7 i. 45600 + 7 kv (n,n*) Level -1.4560 + 7 i. 45600 + 7 kv (n,n*) Level -1.4560 + 7 i. 45600 + 7 kv (n,n*) Level -1.4560 + 7 i. 45600 + 7 kv (n,n		i	19.84700+ 6 Ev (n.n') Level	1-9-84700+ € 1
i. 00520 + 7 iv (n,n') Level			11.03540+ 7 Ev (n.n') Level	1-1-03540+ 7 1
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1.10560 + 7 Ev (n,n) Level -1.10560 + 7 1.12600 + 7 Ev (n,n) Level -1.12600 + 7 1.14400 + 7 Ev (n,n) Level -1.14400 + 7 1.12600 + 7 Ev (n,n) Level -1.1600 + 7 1.12600 + 7 Ev (n,n) Level -1.1600 + 7 1.12600 + 7 Ev (n,n) Level -1.1600 + 7 1.12600 + 7 Ev (n,n) Level -1.1600 + 7 1.25260 + 7 Ev (n,n) Level -1.25260 + 7 1.25260 + 7 Ev (n,n) Level -1.31500 + 7 1.25270 + 7 Ev (n,n) Level -1.31500 + 7 1.3500 + 7 Ev (n,n) Level -1.31500 + 7 1.3500 + 7 Ev (n,n) Level -1.34500 + 7 1.3500 + 7 Ev (n,n) Level -1.34500 + 7 1.3500 + 7 Ev (n,n) Level -1.3500 + 7 1.45500 + 7 Ev (n,n) Level -1.4500 + 7 1.45500 + 7 Ev (n,n) Level -1.4500 + 7 1.45500 + 7 Ev (n,n) Level -1.4500 + 7 1.65500 + 7 Ev (n,n) Level -1.4500 + 7 1.65500 + 7 Ev (n,n) Level -1.4500 + 7 1.65500 + 7 Ev (n,n) Level -1.4500 + 7 1.65500 + 7 Ev (n,n) Level -1.4500 + 7 1.65500 + 7 Ev (n,n) Level -1.4500 + 7 1.65500 + 7 Ev (n,n) Level -1.4500 + 7 <		· ·	11.10800+ 7 Ev (n.n') Level	1-1-10800+ 7 1
1.12200+7 Ev (n,n') Level -1.12600+7 1.16200+7 Ev (n,n') Level -1.1630+7 1.16200+7 Ev (n,n') Level -1.1630+7 1.16200+7 Ev (n,n') Level -1.1630+7 1.20300+7 Ev (n,n') Level -1.1630+7 1.20300+7 Ev (n,n') Level -1.2030+7 1.20700+7 Ev (n,n') Level -1.2070+7 1.20700+7 Ev (n,n') Level -1.3100+7 1.31500+7 Ev (n,n') Level -1.34500+7 1.31500+7 Ev (n,n') Level -1.47500+7 1.3500+7 Ev (n,n') Level -1.47500+7 1.4500+7 Ev (n,n') Level -1.47500+7 1.4500+7 Ev (n,n') Level -1.47500+7 1.4500+7 Ev (n,n') Level -1.4500+7 1.5200+7 Ev (n,n') Level -1.4500+7 1.5200+7 Ev (n,n') Level -1.4500+7 <th></th> <th></th> <th>11.10960+ 7 Ev (n.n') Level</th> <th>1-1.10960+ 7 1</th>			11.10960+ 7 Ev (n.n') Level	1-1.10960+ 7 1
i.144000 + T kv (n,n') Level -1.14400 + T i.15210 + T kv (n,n') Level -1.16300 + T i.16300 + T kv (n,n') Level -1.16300 + T i.12300 + T kv (n,n') Level -1.24207 + T i.224200 + T kv (n,n') Level -1.24207 + T i.224200 + T kv (n,n') Level -1.24207 + T i.22670 + T kv (n,n') Level -1.24207 + T i.20770 + T kv (n,n') Level -1.31500 + T i.3500 + T kv (n,n') Level -1.31500 + T i.3500 + T kv (n,n') Level -1.31500 + T i.3500 + T kv (n,n') Level -1.34500 + T i.3500 + T kv (n,n') Level -1.34500 + T i.3500 + T kv (n,n') Level -1.34500 + T i.3500 + T kv (n,n') Level -1.34500 + T i.3500 + T kv (n,n') Level -1.4500 + T i.4500 + T kv (n,n') Level -1.4500 + T i.6500 + T kv (n,n') Level -1.4500 + T i.6500 + T kv (n,n') Level -1.4500 + T i.6500 + T kv (n,n') Level -1.4500 + T i.6500 + T kv (n,n') Level -1.4500 + T i.6500 + T kv (n,n') Level -1.4500 + T i.6500 + T kv (n,n') Level -1.4500 + T i.6500 + T kv (n,n') Level -1.4500 + T<		i i i i i i i i i i i i i i i i i i i	1.12600+ 7 Ev (n.n') Level	1-1.12600+ 7 1
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1.201300 7 Ev (n,n*) Level -1.201300 7 1.224200 7 Ev (n,n*) Level -1.225200 7 1.22500 7 Ev (n,n*) Level -1.25200 7 1.22500 7 Ev (n,n*) Level -1.25200 7 1.22500 7 Ev (n,n*) Level -1.25200 7 1.2910 7 Ev (n,n*) Level -1.292700 7 1.2910 7 Ev (n,n*) Level -1.292700 7 1.2910 7 Ev (n,n*) Level -1.31000 7 1.31000 7 Ev (n,n*) Level -1.43500 7 1.43500 7 Ev (n,n*) Level -1.43500 7 1.45500 7 Ev (n,n*) Level -1.43500 7 1.45500 7 Ev (n,n*) Level -1.45500 7 1.45500 7 Ev (n,n*) Level -1.45500 7 1.45500 7 Ev (n,n*) Level -1.45500 7 1.65200 7 Ev (n,n*) Level -1.65500 7 1.65200 7 Ev (n,n*) Level -1.65500 7 1.65500 7 Ev (n,n*) Level -1.65500 7 1.65500 7 Fv (n,n*) Level -1.65500 7 1.65500 7 Fv (n,n*) Level -1.75500 7 1.65500 7 Fv (n,n*) Level -1.75500 7 1.65500 7 Fv (n,n*) Level -1.75500 7 1.75500 7 Fv (n,n*) Level -1.75500 7 1.75500 7 Fv (n,n*) Level -1.75500 7 1.75500 7 Fv (n,n*) Level		1	11.16300+ 7 Ev (n.n.) Level	1-1.16300+ 7 1
1.244204 7 Ev (n,n*) Level 124204 7 1.252604 7 Ev (n,n*) Level 1252604 7 1.27500 7 Ev (n,n*) Level 127504 7 1.27507 7 Ev (n,n*) Level 127504 7 1.31500 7 Ev (n,n*) Level 127504 7 1.32607 7 Ev (n,n*) Level 127504 7 1.32607 7 Ev (n,n*) Level 127504 7 1.346007 7 Ev (n,n*) Level 137506 7 1.345007 7 Ev (n,n*) Level 137506 7 1.46500 7 Ev (n,n*) Level 137506 7 1.46500 7 Ev (n,n*) Level 146506 7 1.46500 7 Ev (n,n*) Level 146506 7 1.46500 7 Ev (n,n*) Level 145506 7 1.65500 7 Ev (n,n*) Level 165500 7 1.65500 7 Ev (n,n*) Level 162500 7 1.65500 7 Ev (n,n*) Level 162500 7 1.65500 7 Ev (n,n*) Level 162500 7 1.65500 7 F Ev (n,n*) Level 174500 7 1.65500 7 F Ev (n,n*) Level 174500 7 1.75500 7 F Ev (n,n*			11.20530+ 7 Ev (n.n*) Level	1-1.20530+ 7
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1.79500+ 7 Ev (n,n') Level-1.79500+ 7 I1.82500+ 7 Ev (n,n') Level-1.82500+ 7 I1.85500+ 7 Ev (n,n') Level-1.85500+ 7 I1.9500+ 7 Ev (n,n') Level-6.05200+ 61.900+ 7 I-6.05200+ 61.900+ 7 I-7.9130+ 6<			11.76500+ 7 Ev (n,n*) Level	1-1.76500+ 7 1
1.82500+ 7 Ev [n,n'] Level-1.85500+ 71.85500+ 7 Ev [n,n'] Level-6.05200+ 61.85500+ 7 Ev [n,n'] Level-6.05200+ 6			1.79500+ 7 Ev (n,n') Level	1-1.795004 7 1
It.855004 7 Ev (n,n*) Level -1.855004 7 IThermal neutron scattering law data Itotal inelastic cross section(sum of MT=51to91) -6.05200+ 6 Photon prod.Multiplicities(from neut.reactions) (n+7) raciative capture cross section 4.14300+ 6 Photon prod.cross sections(from neut.reactions) Itotal inelastic cross section(sum of MT=51to91) -6.05200+ 6 Photon prod.cross sections(from neut.reactions) Itotal inelastic cross section -5.63900+ 6 In,n*a) cross section -5.63900+ 6 -5.05200+ 6 In,a) cross section -5.63900+ 6 -5.63900+ 6 In,a) cross section -5.63900+ 6 -5.05200+ 6 In,a) cross section -5.63900+ 6 -5.05200+ 6 In,a) cross section -5.63900+ 6 -5.05200+ 6 In,a) cross section -5.05200+ 6 -5.05200+ 6 </th <th></th> <th></th> <th>11.82500+ 7 EV (n,n") Level</th> <th>1-1-82500+ 7 1</th>			11.82500+ 7 EV (n,n") Level	1-1-82500+ 7 1
Thermal neutron scattering law dataTotal inelastic cross section(sum of MT=51to91)-6.05200+ 6Photon prod.Multiplicities(from neut.reactions)(n+T) raciative capture cross section4.14300+ 6Photon prod.cross sections(from neut.reactions)Total inelastic cross section(sum of MT=51to91)-6.05200+ 6Photon prod.cross sections(from neut.reactions)Total inelastic cross section-5.63900+ 6Photon prod.cross sections(from neut.reactions)Total inelastic cross section-5.63900+ 6Photon prod.cross sections (from neut.reactions)Total inelastic cross section-5.63900+ 6Photon prod.cross (from neut.reactions)Total inelastic cross section-6.05200+ 6Photon prod.cross (from neut.reactions)Total inelastic cross section-5.63900+ 6Photon prod.cross (from neut.reactions)Total inelastic cross section-6.05200+ 6Photon prod.cross (from neut.reactions)Total inelastic cross section-5.63900+ 6Photon prod.cross (from neut.reactions)Total inelastic cross section-6.05200+ 6Photon prod.cross (from neut.reactions)Total inelastic cross section-6.05200+ 6Photon prod.cross (from neut.reactions)Photon prod.cross section-6.05200+ 6Photon prod.cro			1.85500+ 7 Ev (n,n') Level	1-1-85500+ / 1
Photon prod.Multiplicities(from neut.reactions)(n.r) radiative capture cross section4.14300+ €Photon prod.cross sections(from neut.reactions)Total inelastic cross section(sum of MT=51tn91)-6.05200+ €(n.n'a) cross section-5.63900+ €(n.p) cross section-2.213904 €Angular dist. of Photons (from neut.reactions)Total inelastic cross section-6.05200+ €(n.p'a) cross section-2.21390+ €		Thermal neutron scattering law data	Total Inelastic cross section(sum of MT=51to91)	-€.05200+ E
Photon prod.cross sections(from neut.reactions) Total inelastic cross section (sum of MT=51to91) -6.05200+ € (n,n^a) cross section -5.€3900+ € (n,p) crcss section -6.05200+ € (n,p) crcss section -5.€3900+ € (n,p) crcss section -6.05200+ € (n,p) crcss section -5.€3900+ € (n,p) crcss section -5.€3900+ € (n,p) crcss section -2.21390+ € <		Photon prod-Multiplicities(from neut-reactions)	(n.7) raciative capture cross section	4-14300+ €
Image Image <td< th=""><th></th><th>Photon prod.cross sections(from neut.reactions)</th><th> Total Inclastic cross section(sum of MT=51to91)</th><th>-6.05200+ 6</th></td<>		Photon prod.cross sections(from neut.reactions)	Total Inclastic cross section(sum of MT=51to91)	-6.05200+ 6
Image: Section 1.2.213904 € Image:			I (n.n.) cross section	1-5.63900+ € 1
IAngular_dist. of Photons (from neut.reactions) ITotal inelastic cross section (sum of MT=51to91) 1-6.05200+ € (n,n'a) cross section 1.4.14300+ € (n,r)'a) radiative capture cross section 1.4.14300+ € (n,r)'a) cross section 1.5.63900+ € (n,r)'a) cross section 1.5.63900+ € (n,r)'s radiative capture cross section 1.2.21390+ € (n,r)'s cross section <td< th=""><th></th><th></th><th>line) cress section</th><th>1-2.213904 E I</th></td<>			line) cress section	1-2.213904 E I
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in,n*a) crcss section in,n*a) crcss section in,143004 f in,p) radiative capture cross section in,143004 f in,p) crcss section in,25,639004 f in,p) crcss section in,22,213904 f in,p) in,a*) crcss section in,p) in,a* in,p) in,a* in,p) in,a* in,p) in,a* in,p) in,a* in,p) in,a*		Angular dist. of Photons (from neut-reactions)	Total inclastic cross section(sum of MT=51to91)	1-€.05200+ € I
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Implementation Imple	,		(n.y) radiative capture cross section	1 4.14300+ F
(n, a) crcss section -2.21390+ 6 			(n,p) cress section	1-9.63900+ F 1
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	Date: DEC73 Ref:	Author: P.G.YOUNG, Card images: 5853	D-G-FCSTER,JF.	
	File Type		Reaction Type	C-Valu
	l General Information		i Descriptive data and Dictionary	
1	l Resonance parameter data		l Fesonance Information	
1	l Neutron cross sections		 fotal cross section(sum of cartials)	1
	1		Elastic scattering cross section	i
I			[Total Inelastic cross section(sum of MT=51to91)	1-8.43000
			direct (n,2n) cross section	-1.30570
		• .	18.43000+ 5 Ev (r.n.) Level	1-6.43000
			12 210004 C EV (min") Level	1-1.01300
	1		12.732004 6 Eu (n.n.) Level	1-2-21000
	1		12.58000+ 6 Fu (n.n.) Level	1-2-75200
		· I	13.00100+ 6 EV (n.n.) Level	1-3-00100
	i		13.67800+ € Ev (n.n') Level	1-3.67800
	1	,	3.956004 E Ev (h,n*) Level	1-3.95600
	1 '		(4.05500+ E Ev (n.n*) Level	-4.05500
	•		4+40900+ € EV (n,n*) Level	1-4.40900
	•		14.50800+ E Ev (n.n*) Level	1-4.50800
	I.		14-58000+ 6 Ev (n,n') Level	1-4-58000
		•	4:81100+ € Ev (n.n') Level	1~4.81100
			15.250004 6 EV (n.n.) Level	1-5-25000
			10.70000+ 6 Ev (n.n.) Level	1-5.75000
			16 750004 C EV (R(R)) Level	1-6-20000
		•	17.250004 f Fu (h,n ⁺) [que]	1-2.25000
		- •	17.75000+ f Fu (n.n.) Level	1-7.75000
	1		18.25000+ 6 Ev (n.n') Level	1-6.25000
	i		18.75000+ E Ev (n.n.*) Level	1-6.75000
	1		19.25000+ € Ev (n,n*) Level	1-5.25000
	l .		19.75000+ E Ev (n,n') Level	1-9.75000
	I state in the second sec		1.02500+ 7 Ev (r,n*) Level	1-1.02500
	1	-	11.075004 7 Ev (n,n*) Level	1-1-07500
			11.12500+ 7 Ev (n,n*) Level	1-1.12500
		•	[1.17500+ 7 Ev (n,n') Level	1-1-17500
			11.22500+ 7 EV (r,n*) Level	1-1.22500
	1		11.2/DUU+ / EV (N.N') Level	1-1-12500
			11 325004 7 EV (ngh") Level	1-1 37500
			$(1.42500 + 7 C + (n_1) + C + (n_2))$	1-1.62500
	i		11.47500+7 Ev (n,n ⁺) (evel	1-1-47500
	i		11.52500+ 7 Ev (n.n') Level	1-1.52500
	1		11.57500+ 7 Ev (r.n') Level	1-1.57500
	1		11.62500+ 7 Ev (r,n') Level	1-1.F2500
	1		11.67500+ 7 Ev (n.n') Level	1-1.67500
	1		11.73750+ 7 Ev (r,n') level	1-1.73750
	1		1.81250+ 7 Ev (n,n') Level	1-1-61250
	1		1.88750+ 7 Ev (r,n') level	1-1.88750
	!		(n,) raciative capture cross section	7.72400
			(n.p) cress section	1-1-82780
	1		(n,d) cross section	1-6.04600
			te to an and the set of the set o	1-1.08840

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	<pre>(;): (E²)/(2))</pre>	
Angular dist. of secondary neutrons	Elastic acattering cross section	1
	(direct (n,2n) cross section	-1.30570+ 7
	[8.43000+ 5 Ev (n,n*) Level	1-8,43000+ 5
1	11.01300+ € Ev (n,n*) Level	-1.01300+ €
	12.21000+ € Ev (n,n*) Level	-2.21000+ €
	12.73200+ E EV (n,n') Level	1-2.73200+ €
	12.90000+ C EV (n.n.) Level	1-2.98000+ E
	13 678004 6 Ev (n.n.) Level	1-7 678004 6
	13 CSEDDA & Eu (nyn') Level	1-3-67600+ 6
	$[A, 055004] \in Ev (n, n') Level$	1-4.055004 E
	14.40900+ F Fu fn.n*) Level	1-4.400004 6
	14.50800+ 6 EV (n.n.) Level	1-4-50800+ E
	14.58000+ F Ev (n.n.) Level	1-4.580004 E
	14.81100+ € Ev (n,n*) Level	1-4.81100+ €
	E. 25000+ E Ev (n,n*) Level	1-E.25000+ E
	16.750004 6 Ev (n,n*) Level	-E.75000+ 6
1	16.25000+ € Ev (n,n*) Level	1-€.25000+ €
	€.76000+ € Ev (n+n*) Level	[-€.75000+ €
· · · · · · · · · · · · · · · · · · ·	7.25000+ € Ey (n,n*) Level	-7.25000+ €
	7.76000+ € Ev (n.n') Level	-7.75000+ €
	18.25000+ E Ev (n,n*) Level	1-8.260004 €
	18175000+ E Ev (n,n*) Level	1-€.75000+ €
	19.25000+ € Ev (n;n*) Level	1-9.25000+ E
	19./CUOUT C EV (nin') Level	1-5-150004 6
	11.02500+ 7 EV (nin') Level	1-1 025004 7
	11 196004 7 EV (ngn') Level	1-1 125004 7
	11.124004 7 EV (ngn) Level	1-1-12500+ 7
	11:22500+ '7 Fu (h.n") Level	1-1-22500+ 7
	11,27500+ 7 Fu (n.n*) Level	1-1-27500+ 7
	11.32800+ 7 EV (n.n ⁺) Level	1-1.32500+ 7
	1.37800+ 7 Ev (n.n*) Level	1-1.37500+ 7
	11.42500+ 7 Ev (nan') Level	1-1.42500+ 7
	1.47500+ 7 Ev (n,n*) Level	1-1.47500+ 7
1	1.52500+ 7 EV (n,n*) Level	1-1.52500+ 7
1	1.67500+ 7 Ev (n,n*) Level	1-1-57500+ 7
•	11.62500+ 7 Ev (n,n') Level	-1.€2500+ 7
	11-E7500+ 7 Ev (n,n*) Level	1-1.675004 7
	11.73760+ 7 Ev (n,n*) Level	1-1.737504 7
	1.81250+ 7 Ev (n,n*) Level 1.88750+ 7 Ev (n,n*) Level	1-1.812t0+ 7
Energy dist. of secondary neutrons	direct (n,2n) cross section	-1.30570+ 7
Photon prod-Multiplicities(from neut-reactions)	((n,y) recistive capture cross section	7.72400+ €
Photon prod.cross sections(from neut.reactions)	Total Inclastic cross section(sum of MT=51to9?)	1-8.43000+ E
	((n,n*p) cross section ((n,p) cross section	1 1-1.₽2780+ €
Angular dist. of Photons (from neut.reactions)) Total Inclastic cross section(sum of MT=51to91)	1-P.43000+ E
	tinyn pj tross section I in al andiative capture excession	7.724004 F
	I INTEL CALINE CALINE CLOSS SECTION	1-1.827A0+ 6
	fangpjeress section	1
Energy dist. of Photons (from neutoreactions)	Total inelastic cross section(sum of M1=51to91)	I-P.43000+ 5
	***************************************	Colinuad

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22-TI- 47g	Mat.No: 6428 Date: JAN77 Ref:	Leb: ANL Author: C.PHILIS,D Card Images: 76	.BERSILLCN, D.SMINH, ETC	
	File Type		Reaction Type	Q-Value
		, , ,		
	General Information		Descriptive data and Dictionary	
	Resonance parameter data		Fesonance Information	
	 Neutron cross sections 		(n)n p) cross section (n,p) cross section	-1.04€00+ 7 3.18710+ 5
	 Data covariance matrices for n 	eutron X-sections	(n+n *p) tross section (n+p) creasection	-1.04600+ 7 3.18710+ 5
22-T I- 48g	Mat.No: 6429 Date: JAN77 Ref:	Lab: ANL Author: C.PHILIS,C. Card images: 75	BERSILLON, D.SMITH ETC.	
	File' type	** ** ** ** ** ** ** ** ** ** ** ** **	Reaction Type	Ç-Value
			,	
	General Information		Descriptive data and Dictionary	
	Resonance paraméter dátá	· · ·	Resoñance information	
) Neutron cross sections 		(h,ĥ ^t p) cross section (hįþ) cross section	-1-14460+ 7 -3-20800+ 6
		A		₹ 1-1,144F0+ 7

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23-V - 0g	Date: SEF72 Aut Ref: CFNL-TM-4007(NCV72) Car	thor: S.K.PENNY, L.W.OWEN rd Images: 4650	
	File Type	Renction Type	Q-Value
	 General Information	Eesctiptive date and Dictionary	1 1 1
	i ¡Resonance parameter data	· I Resonance Information	1
	 Neutron cross sections	l (Total cross section(sum of partials)	1
		Elastic scattering cross section	Í
		[NON BLASTIC CROSS SECTION(Total-Blastic) . [Total Instance cross section(sum of MT=51to91)	1-3.190004
		direct (n.2n) cross section	1-1.10550+
		I(non'a) cross section	1-1.02970+
	1	(n,n'p) cross section	-8.05720+
	t	3:15000+ \$ Ev (n,n*) Level	-3.19000+
	1	[9-29000+ £ Ev (n,n') Level	1-9-59000+
		$1.60800 + E EV (n,n^{+})$ Level	1-1-60800+
		$1.812004 \in EV (n,n^2)$ Level	1-1-81200+
		(n, n') to the continue space section	1 7 304004
	1	l(n,)) construction	1-1-67850+
		l(n,d) creas section	1-5-83270+
	i	I (net) crcms section	1-1.05200+
		(n, d) tres section	-2.04720+
		Lab:average elastic scattering cosine.	1
		<pre><\states average loc energy decrement for electic scat. <p><</p></pre>	i I
	Angular dist. of secondary neutro	ns Elastic stattering cross section	!
		direct (n,2n) cross section	1-1-10550+
		(n,n'a) cross section	1-1.02970+
	•	[[niu]] (diase section	1-8.05720+
		$[3.190001 + EV (n, n^2)]$ Level	1-2-190004
	· ·	$13 608004 \in EV (n,n') Level$	1-1-1-60800+
		11.81200+C EV (h,h) + Level	1-1-81200+
		(n,n [*]) to the continuum	1-2.409004
	I Tenergy dist. of secondary neutron	s (direct (n,2n) cross section	-1.10550+
	1	l (n,n [*] α) cross section	1-1.029704
		(n,n'p) cross section	1-8.057204
	1	(n,n*) to the continuum	1-2.409004
	[Photon prod.Multiplicities(frcm n	eutoreactions) (Non clastic cross section(total-elastic)	i
		(direct (n,2n) cross section	1-1.10550
		(n,n'a) cross section	1-1-029704
		(n,n*p) cross section	1-2-00/204
	i	(n, 7) racialive capture cross section 	1
	Angular dist. of Photons (from ne	ut.reactions) Non elastic cross section(total-elastic)	1
		Idirect in,2n; cross section	1-1.105504
		(ninta) cross section	1-1.029704
		[(n,n'p] cross section	1-8-057204
		(n, y) radiative capture cross section	1 7.30400+
	IEnergy dist of Dhatons (from new		:

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ContInued

-1.10550+ -1.02970+ -2.05720+ 7.30400+	
direct (n.2n) cross section (n,n'a) cross section (n,n'p) cross section (n,f) radiative capture cross section 	

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24-Cr- Og	Mat.No: 1191 Date: APR74 Ref: 	Løb: BNL(NNCSC) Author: A.PRINCE Card images: 8198		
	File Type		Reaction Type	G-Val
	l General Information		Déścriptive data and Dictionary	1
	Fesonance parameter data		Festivance Information	
	Neutron cross sections		Total cross section (sum of partials)	
	1	2.10	hon elastic cross section (total-elastic)	
	1		[lotal inelastic cross section(sum of MT=51to91)	1-5.6400
			(direct [n,2n] cross section	1-7.9400
	1		(n,n'a) cross section	1-7-9270
			15.64000+ E Ev (n.n ¹) Level	1-5-6400
	i		17.831004 E Ev (n.n*) Level	1-7.8310
	1		18.348004 5 Ev (r,n') Level	1-8.3480
			1.00600+ E EV (n,n*) Level	-1.00≠0
			11-28700+ E Ev (r.n') Level	1-1.2A70
	1		11.434004 € EV (p,n") Level	1-1-4340
			114039004 C EV (P,P*) Level	1-1-1-5390
	i		12:17300+ C EV (n,n*) level	1-2.1730
	i		12.23300+ E Ev (n.n*) Level	1-2.2330
	1		2:32100+ 6 Ev (n,n*) Level	1-2.3210
		•	[2.370004 € Ev (n,n') Level	1-2.3700
	1		2.64700+ 6 Ev (n,n*) Level	1-2.6470
	1		12:66100+ € Ev (n,n') Level	1-2.6610
		•	[2.627004 6 EV (n.n.) Level	1-2.760
	i	·	12.965004 f Fu (n.n*) level	1-2-9650
	ł	•	13.084004 € Ev (n.n*) Level	1-2.0840
	1		13.11400+ 6 Ev (r,n*) Level	1-2-1140
	1	,	[3.162004 E Ev (n.n') Level	1-3.162
	1 · · · · · · · · · · · · · · · · · · ·		13.352004 6 Ev (n.n*) Level	1-3-3520
	1		[3.41400+ € Ev (n,n*) Level	1-3-4140
	1		3.593004 t Ev (n,n*) Level	1~2.8930
			13401/004 C EV (n.n.) Level	1~7 717
			13477100+ € Ev (n.n*) Level	-3.771
	i		13.98200+ E Ev (r.n.) Level	-2.982
	1		14.03900+ € Ev (n,n*) Level	1-4.039
	1		14-56300+ € Ev (n,n*) Level	1-4-563
	1		14.63000+ € Ev (r,n') Level	1-4-630
			4.83700+ E Ev (n,n') Leve]	1-4.837
			15/09/004 C EV (ren') Level	1-5-097
	1		15-585004 f Fu (n-n ⁴) [evel	1-5-585
	1		15.737004 € Ev (r.n') Level	1-5.737
	1		16.07000+ € Ev (n,n*) Level	1-E.070
	1		E.15400+ E Eu (r.n*) level	-€.1540
			(6.49000+ 6 Ev. (n.n.) Level	I-€.4900
			(6.82000+ 6 Ev (r,n*) Level	1-€.P200
			[/.U/UU0+ € Ev (r.n*) Level	1-7-0700
	1		[n,n'] to the continuum	1-1-6240
			thist) recistive capture cross section	1 2+000

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1	+((n,d) crees section	-7-36370+
1	• 10	nit) cross section	-9.96500+
1	10	nj ³ He) cross section	-61829*8-
	ic ic	(nea) cross section	1.79400+
1		(W) labiaverane electic scattering cosine	
		(T) average inc energy decrement for electic erst.	
		(1) average tog energy decrement tos etastic scat.	
i A	ngular dist. of secondary neutrons	Elastic scattering cross section	
1	10	direct (++2n) crass section	-7.94000+
1	i i i	(nynta) cross section	-7.92700+
1	10	(n,n*p) cross section	-9.56830+
1	۱؛ ۱	5.64000+ t E4 (r,n') Level	-5.64000+
1	li l	7.83100+ & Ev (n,n*) Level	-7.83100+
1	11	6.348004 E Ev (n,n') Level	-8.34800+
1	11	1.00EDO+ E Ev (n,n*) Level	-1.00F00+
1	1.	1+287004 € Ev (n+n*) Level	1-1.28700+
	2	1.434004 E Ev (n,n*) Level	-1.43400+
1	· •	1:53500+ £ Ev (n,n') Level	1-1-53900+
ļ.	· · · · ·	1,97300+ E Ev (n,n') Level	-1.97300+
		2+17300+ E Ev (n,n*) Level	-2-17300+
1	· •	2:23300+ € EV (n,n*) Level	-2.23300+
1		2:32100+ € Ev (n,n') Level	-2.32100+
		2:37000+ € Ev (n,n*) Level	-2-37000+
1		2.64700+ € Ev (n,n*) Level	1-2.€4700+
		2.66100+ E Ev (n,n') Level	-2.ff100+
		2.76800+ € Ev (n.n') Level	-2.76800+
ļ		2.82700+ € Ev (n,n') Level	-2.82700+
		2:56500+ € EV (n,n') Level	-2.96500+
		3.08400+ € EV (n,n') Level	1-3.08400+
		3-11400+ E EV (n,n') Level	-J.11400+
		3.10200+ C EV (n,n*) Level	1-3-162004
		3.302004 t LV (n,n') Level	-3.35200+
		2.41400+ C LV (N,N') Level 2.502004 6 Cu (N,N') Level	1-2 502004
		3.33300° C DV (N;R°) Level 3.613001 6 DV (N;R°) Level	1-3 617004
		a diadok é én (nt.) Level	1-3-01/00+
		$3.71000 \in St (n,n^2)$ Level	1-3-71004
	4	3 883004 6 Ev (nyn*) Level	1-3 692004
		$A = \frac{1}{2} $	1-4-03900+
		4.00500 + C CV (Hint) Level	1-4.563004
		A 630004 C GV (Hyll') Cevel	1~4.630004
		4.837004 f Eu (n.n) level	1-4-83700+
		$5.007004 \text{ f Fu} (n,n^{\dagger}) \text{ level}$	1-5-097004
1		$5.292004 f Ev (n,n^{+}) level$	1-5-29200+
i		5.58500 + f Fu (n,n2) level	1-5-58500+
		$5.73700+ f Eu (n-n^{-1}) lovel$	1-5-73700+
i		6.07000 + 6 Fu (n.n3) level	1-F.07000+
i		6.15400+ f Fv (r.n4) level	1-F.15400+
i		6.490001 f Fy (n.n') level	1-6.49000+
i		6.82000+ 6 Fv (r.n') Level	1-6-82000+
i		7.07000+ € Ev (n.n*) Level	1-7.07000+
i	'n	in,n') to the continuum	1-1-82460+
. 1	i		1
	Energy dist, of secondary neutrons [direct (n,2n) cross section	1-7.94000+
1		(nynta) cross section	1-7-52700+
ŀ	1	(non'p) cress section	1-9-56630+
1	1	(n+n') to the continuum	1-1-82460+
!	Photon mod Multiplicities(face must reactions)	(n) resistive centure cross section	1 9.23710+

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A.

 Photon prod.cross sections(from neut.reactions)
 Non elastic cross section(total-elastic)

 Angular dist. of Photons (from neut.reactions)
 Non elastic cross section(total-elastic)

 Inngular dist. of Photons (from neut.reactions)
 Non elastic cross section(total-elastic)

 Inngular dist. of Photons (from neut.reactions)
 Non elastic cross section(total-elastic)

 Inngular dist. of Photons (from neut.reactions)
 Non elastic cross section(total-elastic)

 Inngular dist. of Photons (from neut.reactions)
 Non elastic cross section(total-elastic)

 Inngular dist. of Photons (from neut.reactions)
 Non elastic cross section(total-elastic)

 Inngular dist. of Photons (from neut.reactions)
 Non elastic cross section(total-elastic)

 Inngular dist. of Photons (from neut.reactions)
 Non elastic cross section(total-elastic)

 Inngular dist. of Photons (from neut.reactions)
 Non elastic cross section(total-elastic)

 Inngular dist. of Photons (from neut.reactions)
 Non elastic cross section(total-elastic)

 Inngular dist. of Photons (from neut.reactions)
 Non elastic cross section(total-elastic)

 Inngular dist. of Photons (from neut.reactions)
 Non elastic cross section(total-elastic)

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E-Mn- Etg	Mat.No: 1197 Date: FEB74 Ref:	Leb: BNL Author: H+TAKAHASH1 Card Images: 4586		
	File Type		Feaction Type	C-Value
	General Information	· · ·	i Descriptive data and Dictionary Fadloactive nuclide production	4 1 1
	Resonance parameter dàta	·	Feionance Informátion	1
) Neutron cross sections 	· · · · · · · · · · · · · · · · · · ·	<pre>i lotal crcss section(sum of partials) iElastic scattering cross section Non elastic cross section(tctal-elastic) lotal inelastic cross section(sum of MT=51to91) idirect (n;2n) cross section (h,n*a) cross section (h,n*a) cross section (h,n*b) cross section 11.258004 € Ev (n,n*) Level 13.840004 € Ev (n,n*) Level 14.840004 € Ev (n,n*) Level 14.84004 € Ev (n,n*) Level 14.84004 € Ev (n,n*) Level 14.84004 € Ev (n,n*)</pre>	-1.25800 + -1.92250 + -1.92250 + -1.91600 + -7.53060 + -7.53060 + -1.258000 + -1.29200 + -1.528000 + -1.528000 + -1.883000 + -1.883000 + -1.809704 + -5.83880 + -1.238000 + -1.2380
			<pre>/ Lat:average elastic scattering cosine. /<e>:average log energy decrement for elastic scat. /<e>: <e<sup>3/<2E></e<sup></e></e></pre>	1
	Angular dist. of secondary n	eutrons ·	Elastic scattering cross section [direct (n,2n) cross section [(n,3n) cross section [(n,n***) cross section [(n,n***) cross section [(n,n***********************************	 -1.022504 -1.516004 -7.530604 -1.258004 -1.258004 -1.258004 -1.292004 -1.828004 -1.828004 -1.883004 -1.883004
	Energy dist. of secondary ne 	utrons	direct (n,2n) cross section in,3n) cross section n,n'n) cross section (n,n'p) cross section (n,n'p) cross section (n,n') to the continuum	-1.02250 -1.51f80 -7.53060 -7.6330 -1.88300
	Photon prod.Hultiplicities(f 	rcm neut.reactions)	Non elastic cross section(total-elastic) 1.258004 E Eu (r,n*) Level 13.840004 E Ev (r,n*) level 1.292004 E Ev (r,n*) level 1.528004 E Ev (r,n*) level 1.5883004 E Ev (r,n*) Level 1.683004 E Fv (r,n*) Level 1.693004 E Fv (r,n*) Level	-1.25800+ -5.84000+ -1.29200+ -1.52800+ -1.52800+ -1.88300+ -7.27040+

	Angular dist. of Photons (from neut.reactions) 	Non elastic cross section(total-elastic) 1.258004 \pm Ev (n,n*) Level (5.840004 \pm Ev (n,n*) Level 1.292004 \pm Ev (n,n*) Level 1.528004 \pm Ev (n,n*) Level 1.683004 \pm Ev (n,n*) Level (n, π) rédiative capture cross section	 -1.25800+ 5 -5.84000+ 5 -1.29200+ 6 -1.52800+ 6 -1.88300+ 6 -2.27040+ 6
	Energy dist. of Fhotons (from neut-reactions) 	Non elástic cross section(total-elastic) (n,j) račiative capture cross section 	7.27040+ 6
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26-Fe- Og	Mat.No: 1192 Date: JAN74 Ref: ORNL-4617(1970)	Lab: OPNL Author: PEREY, Card 1mages: 8	FU, PENNY, KINNEY, WF 1GH7 9187	
	File Type		Peaction Type	l C-Value
	l General Information		l l Descriptive to and Dictiorary	1
	l Resonance parameter data		 Fesonance Information	1
	Neutron cross sections		l Total cross section(sum of partials) Teatta contaring cross section	
	1		[Non elastic cross section(total-elastic)	1
	1		[Total Inelastic cross section(sum of MT=51to91)	1-P.46000
		· ·	(direct (n;2n) cicss section	[-1.120404
		•	$1 (n_* n^* p)$ cross section	1-1-019004
	1		18.460004 E Ev (n,n*) Level	1-8.46000
	!		(1.408004 E Ev (n,n*) Level	1-1-40800
			2+004004 C EV (Fin') Level 2+654004 F Fu (n-n*) aval	1-2-08400
	i		[2.93900+ € Ev (n,n') Level	1-5-93900
	•	1	12.95700+ € Ev (r,n') Level	1-2.95700
			. 3+11900+ € Ev (n+n') Level	1-3.11900
			3.12200+ C EV (r.n") Level 3.36900+ C Ev (r.n") (ava)	1-3-12200
			13.388004 C Ev (r.n*) Level	1-3.38800
	i		13.44600+ € Ev (n,n') Level	1-3.44500
	1		13.45000+ E Ev (n.nº) Level	1-3-45000
			[3.60000+ € Ev (n.n') Level	1-3.60000
			13-74700+ E Ev (n.n.) Level	1-3-74700
		1	3.82900+ E Ev (n,n*) Level	1-3.82900
	1		3.85600+ E Ev (r.n') Level	1-3-85600
	1 •		14.04600+ 6 Ev (r,n') Level	1-4.04600
	,		4.099004 € Ev (n,n*) Level	1-4-09900
		•	14.29A00+ É Ev (r.nº) Level	1~4.29800
		· .	4.30000+ E Ev (n,n*) Level	1-4-30000
	ł		14.38500+ € Ev (n,n*) Level	1-4.38500
			14.395004 € Ev (n,n*) Level	1-4-39500
			14.50500+ € Ev (n.nº) Level	1-4.50500
	i		(n,n') to the continuum	1-4.53100
	t		(n,) radiative capture cross section	1 7.80300
			(n+p) crcss section	1 8 90000
			[{n,d] crcss section] {n,t] ercss section	1~1.90010
	i		(n.3He) cross section	1-1.05350
			(n,a) crczs section	E-48400
	i		(v) lat:everage elastic scattering cosine.	i
			$\{< F > Paverage loc energy decrement for elastic scate \{< 7 > 1 < \Sigma^2 > / < 27 >$	1
	ingular dist. of secondary -		 	1
	Tunnan dista di secchostry n	eutrony	ldirect (n.2n) cross section	1-1.12040
	i		(n,n'a) rrcss section	1-7.f1940
	ł		(n,n'p) cress section	-].01900
	ł		[8.46000+ E Ev (r.n*) tevel	1-P-46000

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 1	11.408004 € Ev (n,n*) Level	1-1.40800+
	2:084004 € Ev (n,n*) Level	1-2.08400+
1	12.66400+ 6 Ev (n,n*) Level	1-2-65400+
	12.93900+ E Ev (n.n') Level	1+2.93900+
· · ·	12.95700+ E Ev (n.n') Level	1-2.95700+
	13.11900+ E Ev (n.n*) Level	1-3-11900+
	13+12200+ E Ev (n.n*) Level	1-3-12200+
1	3.36800+ 6 Ev (n.n.) Level	1-3.36800+
i · · ·	12.38800+ E Ev (n.n*) Level	1-3.38800+
i .	13.44E00+ 6 Ev (n.n*) Level	1-3.44500+
	13.45000+ € Ev (n.n*) Level	1-3-45000+
	13.60000¢ € Ev (n.n') Level	1-3.€0000+
	13.60600+ 6 Ev (n.n ¹) Level	1-3.60500+
	13.74700+ E Ev (n.n') Level	1-3-74700+
i	13.82900+ f Ev (n.n*) Level	1-3-82900+
	12-85600+ £ Ev (n.n*) Level	1-3-85600+
	14.04600+ f Fv (n.n') level	1-4-046004
	14:09500+ € Ev (n.n*) Level	1-4-09900+
	14.11600+ F Ev (n.n') Level	1-4,11600+
i ·	14+29800+ f Ev (n.n ¹) Level	1-4-298004
i , , , , , , , , , , , , , , , , , , ,	14.30000+ F EV (n.n.) Level	1-4-300001
	14.385004 (Ev (n.n. !) Level	1-4-389004
	14.39500+ F EV (n.n') Level	1-4-395004
	14.45300+ € Fu (n.n') Level	1-4-45300+
	14:50500+ 6 Fu (nen!) Level	1-4.50500+
	(nin ⁴) to the continuum	1-4.53100+
		1
Energy dist. of secondary neutrons	difect (h,2n) cross section	1-1.12040+
	(h,n,a) cross section	-7.61940+
	((n,n*#) cross section	-1.01900+
	(HiH) to thé continuum	1-4.531004
 Photon_prod_Multiplicities/from_neut_redetions\	l 1965 albetic crock soction(total-alastic)	
Inorow procentripricities(from neuroreactions)	10/460001 6 EV (n.n.1) Loval	1-8.460004
	$11.40.0004 \in Ev (n;n!) Level$	1-1.408004
	lieve) bédéétive conture evene section	1 7 80300
	(n))) (autacive capture closs section	1 7.00000
Angular dist. of Photons (from neut.reactions)	· Kon elastic cress section(total-elastic)	i i
	18:46000+ E Ev (n,n*) Level	1-8.460004
1	11140800+ E Ev (n,n*) Level	1-1.40800
	(n, 7) tadiative capture cross section	1 7.803004
l Ifrancy dial of thating (frin work, instations)	1	1
I Inter AA dist. OI kuorous (itom ventitesciious)	INON EIDSTIC CF025 SECTION(TOTAl=EIBSTIC)	1 7 80300
	((nfy) radiative capture cross section	1 7.003004

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28-NI- Og	(Mat.No: 1190 (Date: EEC73 (Ref:	Labi Author: Card In	BAL (NNCSC) : M.R.BHAT mages: 5533	、 	
	File Type		•	Reaction Type	G-Value
	l General Information			l Descriptive data and Dictionary	
	 Resonance parameter data			Fesonance Information	1
	l Neutron cross sections			l Total cross section(sum of partials)	1 1
				Elastic scattering cross section Total inelastic cross section(sum of MT=51to91) direct (n,2n) cross section	 ~1-17200+ -7.81950+
			~	$(1,1,7,2,0,0) \in Ev(0,1,7,1)$ Levei $(1,1,3,2,0,0,0,0) \in Ev(0,1,7,1)$ Level (1,1,3,2,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0	I-1.17200+
				2.158004 € Ev (n,n*) Level 2.286004 € Ev (n,n*) Level 2.286004 € Ev (n,n*) Level 2.459004 € Ev (n,n*) Level	-2.15800+ -2.28600+ -2.45900+
	1 1 1	. ·	• •	2.60600+ { Ev (n,n*) Level 2.62600+ { Ev (n,n*) Level 2.77600+ { Ev (n,n*) Level 2.77600+ { Ev (n,n*) Level	1-2.50600+ 1-2.62500+ 1-2.77500+
		, X f		[2.90200↓ € Ev (n,n*) Level [2.94200↓ € Ev (n,n*) Level [3.03600↓ € Ev (n,n*) Level [3.12300↓ € Ev (n,n*) Level	1-2.90200+ 1-2.94200+ 1-3.03800+ 1-3.12300+
			s '	3.264004 € EV (n,n*) Level 3.420004 € Ev (n,n*) Level (n,n*) to the continuum	1-3.26400+ 1-3.42000+ 1-3.44090+
				(n,γ) fadlative capture cross section (n,p) creas section (n,α) creas section	8.60000+ 3.94700+ 2.89020+
				$\langle v_P \rangle$ Lab: everage elastic scattering cosine. $\langle v_E \rangle$: average log energy decrement for elastic scat. $\langle v_P \rangle$: $\langle \Sigma^2 \rangle / \langle 2E \rangle$	
	Angular dist. of secondary 	eutrons		Elastic scattering cross section direct (n,2n) cross section	 -7+81950+
				((n,n*p) crcss section 1.17200+ E Ev (n,n*) Level	-8.17720+ -1.17200+
]•33200+ € EV (non') Level]•45400+ € Ev (non') Level	-1-33200+ -1-45400+
				[2.15800+ € Ev (n,n*) l.evel 2.28€00+ € Ev (n,n*) Level	-2+15800+ -2+28600+
	1			2.46900+ € Ev (n,n*) Level 2.50600+ € Ev (n,n*) Level	1-2.45900+
	1			12.62500+ 6 Ev (n,n*) Level	1-2.62500+
	i			[2.90200+ E Ev (n,n') Level	-2.90200+
	1			2.94200+ € Ev (n;n*) Level 3.03800+ € Ev (n;n*) Level	1-2-94200+ 1-3-03800+
1	1			2.12300+ C Ev (n,n') Level	1-3-12300+
				$(2:42000+ f Ev (n,n^4) Level (n,n^4) to the continuum$	1-3-42000+
	 Fnergy_dist. of secondary n				1 7 910504

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	l(h,n'p) cross section l(n,n') to the continuum	-€.17720+ € -3.44090+ €
Photon prod.Multiplicities(from neut.reactions)	l l(h,γ) radiative capture cross section	8.60000+ E
Photon prod.cross sections(from neut.reactions)	 Non elastic cross section(total-elastic)	
t Angular dist. of Photons (from neut.reactions)	 Non elastic cross section(total-elastic) (n,7) radiative capture cross section	8.60000+ F
Energy dist. of Fhotons (from neut-reactions)	Non elastic cross section(total-elastic) Non elastic cross section (n,7) radiative capture cross section	8.60000+ E

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20-N1- 589	iMat.No: 7837 Lab: LLL IDate: MAY78 Áuthor: R.J.HOWÈRTON iRef: UCRL-50400,VCl. 15 Card Images: 4368		
	File Type	Reaction Type	G-Value
	General Information	Descriptive data and Dictionary	
	Resonance parameter data	Resonance Information	
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Neutron cross sections	Total cross section (sum of partials) Elastic scattering cross section Total inelastic cross section (sum of MT=51to91) direct (n,2n) cross section In;n'p) tross section In;n'p) to the continuum In; ') to the continuum In; ') radiative capture cross section In; d) cross section	$\begin{bmatrix} 0 & + & 0 \\ 0 & + & 0 \\ 0 & + & 0 \\ -1 & 21800 + & 7 \\ -8 & 18000 + & 6 \\ 0 & + & 0 \\ 8 & 52000 + & 6 \\ -8 & 52000 + & 6 \\ 2 & 89000 + & 6 \\ 2 & 89000 + & 6 \\ 0 & + & 0 \\ 0 & + & 0 \\ 0 & + & 0 \\ 0 & + & 0 \end{bmatrix}$
	Inergy dist. of secondary neutrons	direct (n,2n) cross section	-1.2180D+ 7
ł	1	(nin'p) cross section (nin') to the continuum	1 0 • • 0
	 Photon prod-Multiplicities(from neut-fedictions)	' In,y) radiative capture cross section	 €.52000+ €
	 Photon prod.cross sections(from neutireactions)) Non elastic cross section(total-elastic)	‡ 1
	 Angular dist. of Photons (from neut.feactions) 	 Non elastic cross section(total-elastic) (n++) rédiative capture cross section	e.52000+ 6
	Energy dist. of Photons (from neut.reactions)	i Non élastic cross section(total-elastic) (n _f γ) radiátive capture cross section	8.52000+ 6

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28-NI- €0g	Mát.No: E434 Date: MAR77 Ref:	Lab: ENL Author: M.DIVADEENAM Card Images: 61	1	
	File Type	· ·	Reaction Type	l C-Value
	General Information	. '	Descriptive date and Dictionary	
	Resonance parameter data	,	Resonance Information	
	Neutron cross sections		(n,p) tras setton	-2.04110+ €
	 Data covariance matrices for n	neutron X-sections	l(n,p) crośs section	 -2.04110+ €
	1	· · · · · · · · · · · · · · · · · · ·		I

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25-Cu- 0g	Net,No: 1255 Date: NOV73 Ref: 	Lab: SPI Author: M.K. ERAKE AND M.P. FFICKE Card Images: 3262	
	File Type	Reaction Type	C-Value
	l General Information 	Descriptive data and Dictionary	
	Resonance parameter data	Resonance Information	
	Neutron cross sections	Total cross section(sum of partials) Elastic scattering cross section Non elastic cross section(total-elastic) Total lnelastic cross section(sum of MT=51to91) direct (n,2n) cross section (n,n'a) cross section (n,n'a) cross section (n,n'a) cross section (n,n'a) cross section (n,n'b) cross section (n,b) cross sect	-f.70000+ 5 -9.9000+ f -1.78100+ 7 -5.77700+ f -6.70000+ 5 -9.62000+ 5 -1.11500+ 6 -1.32600+ 6 -1.32600+ 6 -1.41200+ 6 -1.4200+ 6 -1.62300+ 6 -1.62300+ 6 -1.5000+ 6 7.75000+ 6 7.75000+ 6 -3.69700+ 6 1.69300+ 6
1	1	<pre>(:sverage log energy decrement for elastic scat. : : : : : : : :</pre>	ł
	Angular dist. of secondary ne	utrons Elestic scattering cross section $(n,3n)$ cross section $(n,3n)$ cross section (n,n^*a) cross section (n,n^*a) cross section (n,n^*a) cross section (n,n^*a) cross section (n,n^*b) cross section $(n,n^*$	$-5.9000+ \epsilon$ -1.78100+ 7 $-5.77700+ \epsilon$ $-6.12000+ \epsilon$ $-7.70000+ \epsilon$ $-7.70000+ \epsilon$ $-1.11500+ \epsilon$ $-1.41200+ \epsilon$ $-1.41200+ \epsilon$ $-1.64700+ \epsilon$ $1-1.62300+ \epsilon$ $1-1.72500+ \epsilon$ $1-1.72500+ \epsilon$ $1-1.86500+ \epsilon$
i 	Energy dist. of secondary ner	trons idirect (n,2n) cross section (n,3n) cross section	

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1	(n,n*a) cress section	1-5.77700+ €
	(n,n'p) cross section	-€•15000+ €
	((n,n') to the continuum	1-1.90000+ €
(Photon prod.Multiplicities(frcm neut.redctions)	(n _i) radiative capture cross section	7.75000+ 6
Photon prod.cross sections(from neut.reactions)	Non elastic cross section(total-elastic)	l t
Angular dist. of Photons (from neutoreactions)	 Non elastic cross section(total-elastic) (n)y) radiative capture cross section	 7.75000+ 6
 Energy dist. of Photons (from neut-feactions) 	 Non elästic cross section("total-elastic) (njy) radiative capture cross section	 7.75000+ 6

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29-Cu- 63g |Mat.No: 6435 Lab: ORNL jDate: JUL78 Author: C.Y.FU |Ref: Card images: 282 Reaction Type File Type ⊊-Value 1 ----------[General Information | Eescriptive data and Dictionary Resonance parameter data Resonance information Neutron cross sections - ((n)) radiative capture cross section 1 7.91590+ € 1 (n,a) cress section | 1.71490+ € | ¡Data covariance matrices for resonance parameters |Resonance information |Data covariance matrices for neutron X-sections (n+7) raciative capture cross section | 7.91590+ € | l(n,a) cress section I 1.71490+ € I 1. 1 1

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41-Nb- 93g	Mat.No: 1129 Date: MAY74 Ref:	Lob: ANL,LLL Author: R.HOWERTON(LLL) AND A.SMITH Card images: 2079	
	File Type	Reaction Type	
	General Information	Descriptive data and Dictionary	1
	Resonance parameter data	∖ Resonanc∈ information	1
 	Neutron cross sections	Total cross section(sum of partials)	
		itiostic scattering cross section itotal inclastic cross section(sum of MT=51to91)	1-2-90000+ 4
	i	(direct (n,2n) cross section	1~8.82600+ €
	1	l(n,3n) crcss section	~1.67180+ 7
		((nin'd) cross section 12 000004 A Fu (n -t) Lavol	1~1.94500+ €
	1	17.400004 + Ev (n,n') level	1-7.40000+ 5
	1	B.10000+ ± Ev (n,n*) Level	1-8.10000+ E
	1	19-59000+ £ Ev (n,n*) Level	1-9.59000+ 5
		{1.07000+ € EV (n,n*) Level	1-1.07000+ 6
		1.4312004 € EV (n,n') Level 1.488404 € Ev (n,n') Level	1-1-31500+ 6
		11.67400+ E Ev (n,n*) Level	1-1.67400+ €
	1	11.94700+ € Ev (n,n*) Level	-1.94700+ €
	1	12.15900+ € Ev (n,n*) Level	1-2-15900+ €
		(2.33500+ € EV (n.n') Level 12.515004 € Ev (n.n') Level	[-2.33500+ €
		$i(n \cdot n^{\dagger})$ to the continuum	1-2.54950+ 6
	i	((n,y) radiative capture cross section	1 7.21390+ €
		(n+p) crcss section (n+α) crcss section	7.19000+ E 4.91400+ E
		 <µ> Løb:sveråge elastic scattering cosine. <e>:dvefage log energy decrement for elastic scat <e>: <&²>/<2E></e></e>	-
	[Angular dist. of secondary new	trons [Elastic scattering cross section	1
		direct (n,2n) cross section	1-8-82600+ 6
		(ngan) cross section	1-1.94600+ 6
	i	2.90000+ 4 Ev (n,n*) Level	1-2.90000+ 4
	!	17.40000+ E Ev (n,n*) Level	1-7.40000+ 5
		10.10000+ E Ev (n,n') Level	[-8.10000+ 5
		9+59000+ 5 EV (n;n*) Level 1=02000+ 6 Eu (n;n*) Level	1-1.07000+ F
i	i	11.31500+ € Ev (n.n') Level	1-1.31500+ €
1	1	11.488404 € Ev (n,n*) Level	1-1.48840+ 6
	!	1.67400+ € Ev (n.n*) Level	1-1-67400+ 6
		1+94/00+ € EV (n+n*) Level 2-15900+ € Ev (n-n+) Level	1-1-94/00+ E
i	i	12-33500+ € Ev (n.n*) Level	1-2.33500+ 6
1	i	2.51900+ E Ev (n,n*) Level	1-2.51900+ e
!	!	(n,n*) to the continuum	1-2.54950+ F
1) Fnergy_distof_socondamyt	Tone I direct (p. 3p.) eroep section	1-8.82600+ 6
i	I secondary neur	fors forces section	1-1-67180+ 7
İ	i ·	l(n,n'a) cress section	1-1-94600+ €
!	1	(n,n ⁺) to the continuum	1-2.549F0+ F
I	 	l	1

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 		1
Photon prod.Multiplicities(frcm neut.reactions)	(nyy) radiative capture cross section	1 7.21390+ ()
 Photon prod.cross sections(from neut.réactions)	Non elestic cross section(total-elastic)	
 Angular dist. of Photons (from neut.réactions) 	 NDħ_elästic_crois_section(total=elastic) (ḥ,γ)_fadlative_capture_crois_section	7-21390+ ¢
 Energy dist. of Fhotons (from neut.reactions)) Non elastic cross section(total-elastic) (n ₁ }) radiative capture cross section	7.21390+ E

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42-Mo- Og	Mat.No: 1267 Lab: Date: APR74 Author Ref: Card	LLL r: R.J.HOWEFTON Amages: 1346
	File Type	Reaction Type G-Value
	General Information	Descriptive data and Dictionary
	Resonance parameter data	fesonance information
	Neutron cross sections	Total cress section (sum of partials) Elastic scattering cross section Total Inelastic cross section (sum of MT=51to91) -2.47000+ f direct (n,2n) cross section -7.80000+ f (n,3n) cross section -1.48000+ 7 (n,n') to the continuum (n,1) radiative capture cross section 7.25000+ f
		<pre>(\$\overline\$) Lat:average elastic scattering cosine.</pre> <pre><pre><pre><pre><pre><pre><pre><</pre></pre></pre></pre></pre></pre></pre>
. 1	Angular dist, of secondary neutrons	Elástic scattering cross section direct (n,2n) cross section -7-80000+ 6 in,3n) cross section -1-48000+ 7 (n,n*) to the continuum
	Energy dist. of secondary neutrons	direct (h.2n) cross section (-7.80000+ 6) (h.3n) cross section (-1.48000+ 7) (h.n*) to the continuum
	Photon prod-Multiplicities(from neut	•reactions) In+7) radiative capture cross section 7.25000+ 6
	Photon prod.crdss sections(frcm neut	.reactions) Noh elastic cross section (total-elastic)
	Angular dist. of Photons (from neut.	reactions) Non élastic cross section(total-elastic) (n;7) radiative capture cross section 7.25000+ 6
	Energy dist. of Photons (from neut.r	eactions) Noh élastic cross section(total-elastic) (n+y) radiative capture cross section 7-25000+ 6

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4-W - Og	Pat.No: 7856 Lab: LL Date: MAY78 Author: R. Ref: UCRL-50400,VLL. 15 Card image	L Junowerton 9: Joet	
	File Type	Reaction Type	C-Value
			i
	General Information	Descriptive data and Dictionary	İ
	Resonance paramèter data	Resonance Information	
	Neutron cross sections	Total bross section(sum of partials) Elastic scattering cross section Total inelastic cross section (notal inelastic cross section (n,3n) bross section (n,n*) to the continuum (n,7) radiative capture cross section (n,7) radiative capture cross section (x) Lab: average elastic scattering cosine. (x) i dreage log energy decrement for elastic scat (x) t dreage log energy decrement for elastic scat (x) t dreage log section (x) t dreage (x) decrement for elastic scat (x) t dreage (x) decrement for elastic scat	0. + 0. + -7.46000+ -1.30900+ 0. + 5.63000+ 0. + 0. + 0. + 0. + 0. + 0. + 0. +
	Energy dist. of secondary neutrons	 difect (h;2n) cross section (n;3h) cross section (n;n*) to the continuum	-7.46000+ -1.30900+ 0. +
	Photon prod.Multiplicitles(frcm neut.read	ctions) - ((n,y) ràciativé capture cross section	5.83000+
	Photon prod.cross sections(from neut.read	ctions) Non elastic cross section(total-elastic)	1
	Angular dist. of Photons (from neut.reac	tions) Non elastic cross section(total-elastic) (ni) radiative capture cross section	5.83000+
•	 Energy dist. of Fhotons (from neut.redct) 	ions) iNon elastic cross section(total-elastic) i(n,7) radiative capture cross section	5.830004

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2-fb- 0g	Fat.No: 1288 Date: JUL71 Ref:	Lab: OFNL Author: C.Y.FU AND F Card Images: 4098	.G.PEREY	
	File Type	, ,	Reaction Type	C-Value
	i General Information	· .	i t tDescriptive data and Dictionary	/
	l Resonance parameter data		l Fesonánc∉ Information	
	l Neutron cross sections		 {total cross section(sum of cartials)	 0-0006E+
	1		[Elestic scattering cross section	0.0000E+
			Non elastic cross section(tctal-elastic)	3 C.ODOCF.*
			lotal inclastic cross section(sum of Mizbito91)	1-5.7000E4
	1	t	larect injen; closs section	1-1-411054
	1		15.70000+ 5 Ev (n.n.) Level	1-5.700004
	i		[8.03000+ E Ev (n.n') Level	1-8-03000+
	1	۰.	18.580004 E Ev (r,n') Level	1-6.68000
	1		11.17500+ 6 Ev (n,n*) Level	1-1-17500
	1		(1.341004 6 Ev (n,n*) Level	1-1-341004
			1:462004 t Ev (r;n*) Level	1-1.462004
			11.682004 C EV (net) Level	1-1-682004
	i i		$(1.782004 \in Fu + (n_n)^*)$ Level	1-1.76200
			11.998004 € Ev (n.n*) Level	1-1.59800
			12-16000+ 6 Ev in,n*) Level	1-2.16000
	1		[2.340004 € Ev (r,n*) Level	1-2-34000
			12.38500+ € Ev (n,n*) Level	1-2-38500
		•	(2.61500+ € Ev (n,n*) Level	1-2.61500
			12.02900+ C EV (n,n*) Level	1~2.63400
			12.783004 C EV (n ₁ n ⁻) Level	1-2.78300
			13.017004 E Eu (n.n*) Level	1-3.01700
			13.05700+ 6 Ev (r,n*) Level	1-3.05700
	1		[3.19800+ € Ev (#,n*) Level	1-3-19800
	1 · · ·		[3.25000+ € Ev (n,n*) Level	1-3-52000
			13.38200+ E Ev (r,n*) Level	1-3-38200
	1		13.453004 € Ev (n,n*) Level	1~2.45300
	1		3.4/500+ E EV (0.0*) Level	1-3-4/500
			13.708004 C EV (n,n ²) Level	1-3.70800
•		٠	13.75000+ € Ev In.n*1 Level	1-3.75000
	i		3.85400+ € Ev (r.n*) Level	1-2.85400
	1		3.92000+ € Ev (n,n*) Level	1-3-25000
	1		3.98900+ € Ev (n≠n*) Level	1-3.98900
			14.07600+ E Ev (r.n') Level	1-4-07600
	4 •		4.12500+ t Ev (#+m*) Level	1-4-12200
	1		(4.20000+ C tV (F,N') Level 'LA 28800Å E Eu (m.m?) [ava]	1-4.28800
	1		14.33500+ € Fu ir.n*) Level	1-4.33500
	i		I (n,n*) to the continuum	1-4.40000
			(n, y) raciative capture cross section	1 5-4150E
			(<=> Lat:sverage elastic scattering cosine.	i
			<pre> <{>:everage log energy decrement for elastic scat. <{>: <p?>/<2>></p?></pre>	1
	Angular dist. of secondary ne	utrons	l Eløstic scattering cross section	10.0000E
	1		Idirect (n,2n) cross section	1-4.7330E

	l(n,3n) cress section	1-1-4110E+07
	5.700004 € Ev (n,n*) Level	1-5.70000+ E 1
	(8.03000+ E Ev (n,n*) Level	1-2-03000+ 5 1
	18.98000+ E Ev (n,n*) Level	1-8-98000+ E 1
	1.17200+ E Ev (n;n*) Level	I-1+17500+ € I
1	11.34100+ E Ev (n,n*) Level	i−1.34100+ € i
	[1.462004 E Ev (n,n') Level	1-1.46200+ E I
	11.633004 E Ev (n,n*) Level	I-1.63300+ € 1
	11.68200+ 6 Ev (n,n*) Level	1-1-68200+ C 1
1	11.76200+ E Ev (n,n*) Level	1-1-76200+ E I
	1.99800+ € EV (n,n*) Level	I-1.59800+ € I
I	12.16000+ 6 Ev (n,n') Level	I-2.16000+ € 1
	12.34000+ € Ev (n,n*) Level	1-2-34000+ E 1
	12.38500+ 6 Ev (n.n*) Level	1-2-38500+ 6 1
ł	12.61E00+ 6 Ev (n.n.) Level	1-2-61500+ 6 1
	12.62400+ € Ev (n.n') Level	1-2-62400+ 6 1
	12.63400+ 6 EV (n.n.) Level	1-2.63400+ E I
	2.78300+ € Ev (n.n') Level	1-2-78300+ 6 1
1	3.01700+ 6 Ev (n.n.) Level	1-3.01700+ € 1
	13.05700+ 6 Ev (n.n') Level	I-3.05700+ € I
	13.19800+ 6 EV (n.n') Level	1-3.19800+ € I
	13.25000+ 6 Ev (n.n') Level	1-3-25000+ C I
1	13.382004 E Ev (n,n') Level	I-3-38200+ € I
	13.45300+ 6 Ev (n.n') Level	1-3.453004 6 1
I	13.47500+ E Ev (nin') Level	I-3-47500+ € I
	13.56000+ 6 Ev (n.n') Level	1-3-56000+ C 1
l í	13.70800+ € Ev (n,n') Level	1-3.708004 € 1
	3.75000+ € Ev (n,n+) Level	1-3.75000+ E I
	3.85400+ € Év (n,n*) Level	1-2.85400+ € 1
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1	3.989004 € Ev (n.n.) Level	1-3.98900+ € 1
	14.07600+ E Ev (n,n') Level	1-4.07600+ € I
1	14.125004 € Ev (n.n.) Level	1-4-12500+ C 1
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1		1 1
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