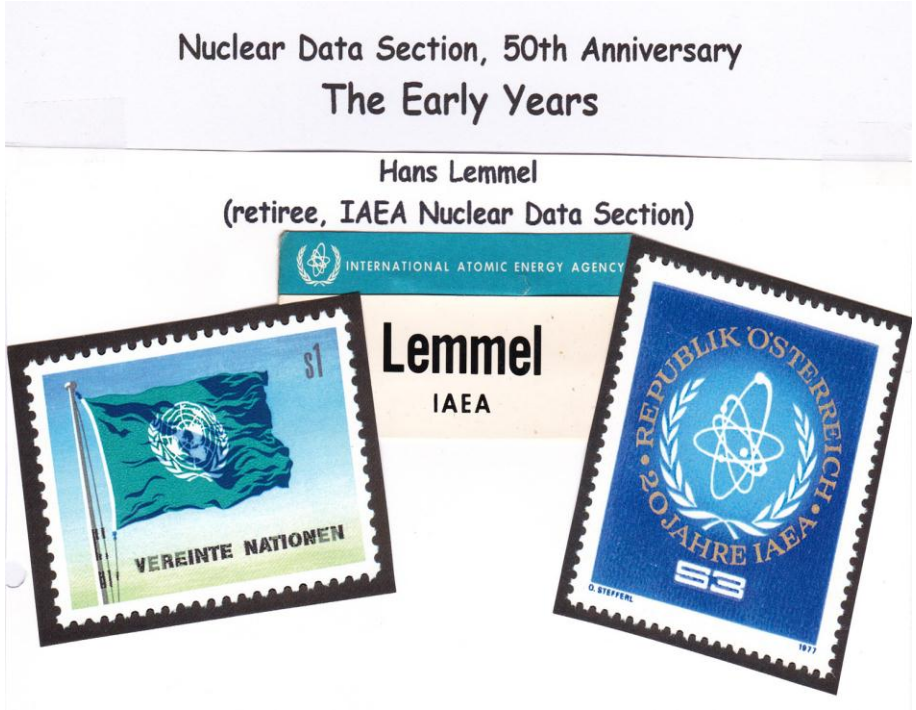
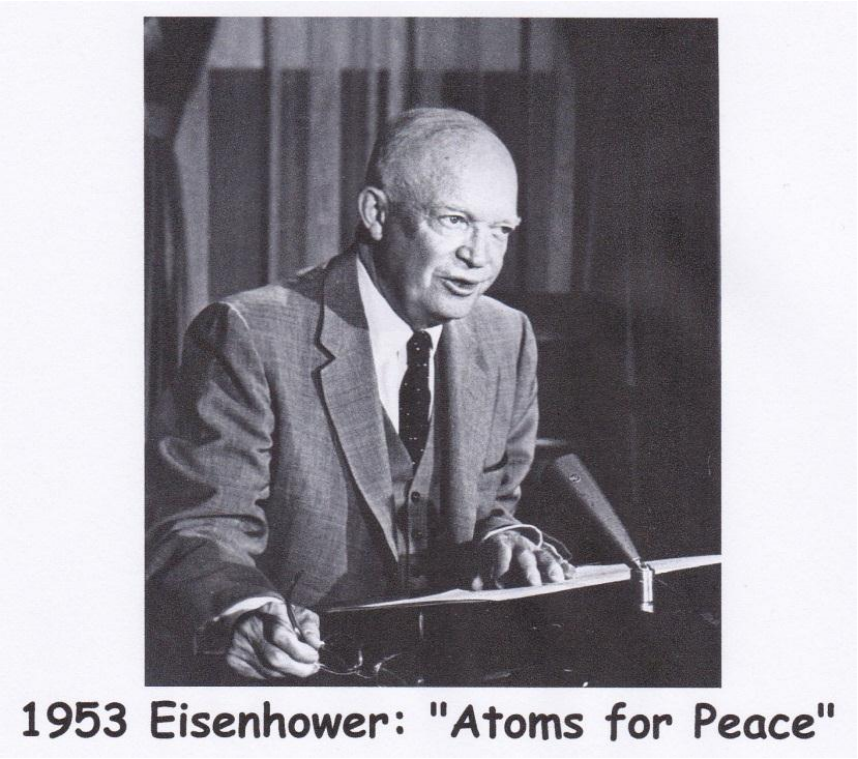
50 years Nuclear Data Section – The Early Years

H.D. Lemmel, retiree




1953 Eisenhower: "Atoms for Peace"

At the Vienna University there is an Institute of Contemporary History, and they have a project to investigate the early history of the IAEA. The starting point was President Eisenhower's historical speech on “Atoms for Peace” on 8 December 1953.

1953 Eisenhower: "Atoms for Peace"

1955 First Geneva Conference on the Peaceful Uses of Atomic Energy

1957 IAEA

1958 Second Geneva Conference

1963 INDSWG – International Nuclear Data Scientific Working Group

1964 "Nuclear Data Unit"

It was the period after Stalin's death with a unique chance of a worldwide peaceful cooperation. But ten years later, when our Nuclear Data Program started, the cold war was up, cumulating in the Cuba crisis in 1962. Why was the Agency successful in these years despite of the ongoing cold war? That is the question being investigated by the Vienna historians. And in fact: Why was our nuclear data program so successful?

- President Eisenhower's initiative led to the First International Conference on the Peaceful Uses of Atomic Energy, in Geneva in 1955. A draft statute for the proposed IAEA was submitted and discussed. Finally the Agency was founded in 1957. Delegates from 59 countries met in Vienna for the first General Conference of the IAEA, which took place in the Konzerthaus.

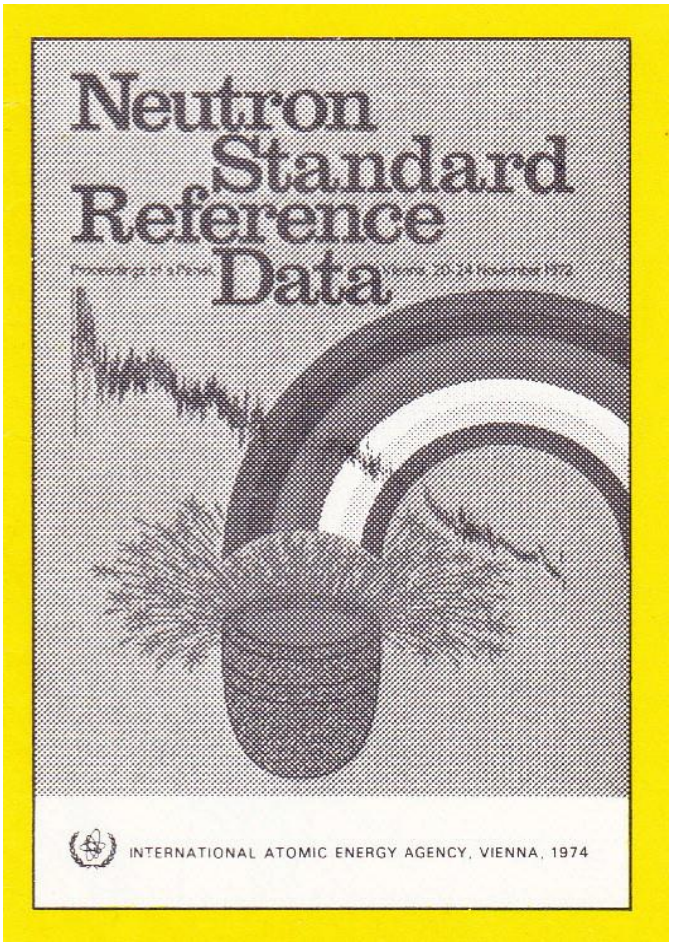
- In 1955 I had started my university studies of Physics in Germany, and in 1957 I spent a term at the Vienna University, so that I remember the flags at the Konzerthaus when the Agency was founded.

- Of course, I did not realize at that time, that this event was going to determine my future.
- At that time Vienna was dull and dirty. The pretty old buildings which had not been maintained for decades looked gray and dirty. In the streets there were few cars but a lot of old-fashioned trams. Many ruins were still visible, but the cathedral (Stephansdom), and the States Opera and the Burgtheater, which had been destroyed in 1945, were rebuilt with priority and reopened. The Soviet troops had left Austria in 1955, and the Hungarian revolution of 1956 had been shot down only ten months ago. That was Vienna when the Agency was founded.

Seligman

Several years later, was the start of our Nuclear Data Program. The Nuclear Data Section has compiled a fantastic database, and the amazing fact is that all data are freely available to scientists in all countries. In the 1950s only a very small subset of such data was known with rather poor accuracy, and these data were classified information and not publicly available. In the Geneva Conferences in 1955 and 1958 first attempts were made among USA, UK and USSR to start to publicize and exchange neutron cross-sections and other nuclear data. For this purpose the nuclear data program at the IAEA was initiated in 1963 under the DG Sigvard Eklund and the DDG Henry Seligman.

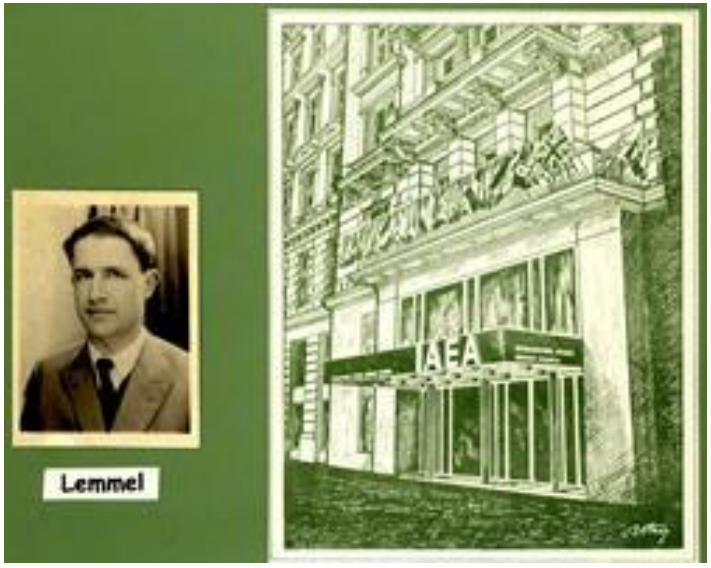
For this purpose Carl Westcott from Canada was hired as a staff member in the Physics Section under Garman Harbottle.



We all know the Westcott g-factors, and the evaluation of the thermal fission cross-sections with the related g-factors developed to a long lasting project in the frame of “Neutron Standard Reference Data”.

Westcott's secretary was Eva Kiovsky. A few years later she got married to a young staff member, Charlie Dunford, who became head of the Nuclear Data Section in the 1990s and subsequently head of the US National Nuclear Data Center.

In October 1963 Westcott hired a young programmer, Pamela Attree. But the Agency did not have a computer. Nearby there was the Vienna Technical University, and they did not have a computer either. There was not even an IBM office in Vienna. The IBM office for Europe was in Paris, and she had several duty travels to Paris until the Agency got a small computer, IBM-1401, and the Technical University a larger computer, IBM-7040, with a 32000 word memory. The Fortran code was written into an entry form, was then punched on cards and verified, then she packed the deck of punched cards into a box and marched over to the Technical University. And when there was a little mistake in the program, the job could be resubmitted only three days later, because the required computer time had to be booked in advance.



Carl Westcott hired two young physicists. The one was Kim Ekberg from Sweden, and the other one was myself.

My contract started on Monday, 1 June 1964, that is almost exactly 50 years ago. A few days before, on 28th of May, I entered the building to say hello. I was welcomed at the reception desk with the words: “Why don’t you sign your contract immediately, already today on 28th of May that will bring you one month more for your pension entitlement.” So I signed, not realizing that I would stay for nearly 33 years.

The Agency at that time had a few hundred staff members, and the guard at the entrance welcomed everybody personally by name. An identity card was not needed. In these days the term “Nuclear Data Unit” was used for the first time, as part of the Physics Section.

In my application I had stated that I had some basic knowledge of Russian language. When Carl Westcott interviewed me, it turned out that he also knew some Russian, and he tested me, and my Russian was a bit better than his. In these early years some knowledge of Russian was helpful.

The first Russian nuclear data staff was Piotr Otstavnov.

He was a very nice colleague, and he enjoyed Vienna concerts and opera, but he was not really a nuclear data man, and Carl Westcott did not prolong his contract. When we met him years later in Moscow, he admitted frankly that he was a secret service man. But he must have given a positive report on the Agency's nuclear data program.

And the next Russian scientist who came was an excellent nuclear physicist, Valja Konshin.

Many years later he was the Director of our Division. In this picture the director Konshin remembers his first term in the Agency when he organized in 1970 our Nuclear Data Conference in Helsinki, an event which was honored by a Nuclear Data postage stamp. How he looked in 1970 you can see in the next picture.

The fact that the cooperation worked well, even in cold war times, is to some extent due to the principle that there was always an east-west balance of staff. From the US there came Alex Lorenz, who served for many decades as the Deputy Head of the Section. He knew four languages fluently, including Russian, and he was an excellent manager for many meetings and contracts.

Carl Westcott's last achievement was the organization of the Conference on Nuclear Data for Reactors in Paris 1966. This event gave the Nuclear Data Unit its international recognition.

Unfortunately I cannot mention all the staff members and their merits. The nuclear data program continued to grow, and at some stage the Nuclear Data **Unit** was the Nuclear Data **Section**.

End of 1969

Standing:

Trevor Byer, Ian Battershill, Valya Konshin, Albert Koster, Alex Lorenz, Hae-Ill Bak, Leif Hjärne, Hans Lemmel, Francisco Manero, Joe Schmidt

Sitting:

Jill White, Françoise Hirschbichler, Pamela Attree, Bill Good, Marty Every, Eva Kiovsky, Edith Rogauz

This picture shows the Section at the end of 1969 with 17 staff members from 12 countries. It is the farewell picture for the temporary head Bill Good (in the middle) and the start for Joe Schmidt from Karlsruhe as the new Section Head.

Joe Schmidt was the Section Head for the next 22 years, and it is primarily due to him that the nuclear data program developed so successfully. He maintained excellent guidance to his staff and developed valuable ideas for research programs and meetings. He would have liked to talk to you today, but unfortunately he passed away 6 weeks ago.

1963 INDSWG - International Nuclear Data Scientific Working Group

3rd Meeting Nov.1964 in Warsaw

INDSWG-Meeting 1964 in Warsaw

To start the nuclear data program, Henry Seligman, Director of the IAEA Department of Research and Isotopes, had initiated an "International Nuclear Data Scientific Working Group" with the tongue-twister abbreviation "INDSWG".

It was a predecessor of the still existing International Nuclear Data Committee, INDC. The first two INDSWG meetings were in 1963 and early 1964. I remember the essential 3rd meeting which took place in Warsaw in Poland in November 1964.

INDSWG/R&C/3

INTERNATIONAL ATOMIC ENERGY AGENCY

INTERNATIONAL NUCLEAR DATA SCIENTIFIC WORKING GROUP

Report and Conclusions of the Third Meeting
held at Warsaw
9 - 13 November 1964

The following persons were present:

(a) Nationally nominated participants:

Abramov, A.I. (USSR)
Beckurts, K. (German Federal Rep.)
Bretscher, E. (United Kingdom)
Buras, B. (Poland)
Hanna, G.C. (Canada)
Joly, R. (France)
Kolstad, C.A. (USA)
Kondaiah, E. (India)
Momota, T. (Japan)
Sala, A. (Brazil)
Starfelt, N. (Sweden)

(b) Nominated as observers:

Smets, H.B. (ENEA/OECD)
Spaepen, J. (EURATOM)
Niewodniczanski, T. (Poland)

(c) Additional experts:

Colvin, D.W. (ENEA/OECD)
Havens, W.W., Jr. (USA)
Story, J.S. (United Kingdom)
Taschek, R.F. (USA)

(d) For the IAEA:

Ekberg, K.
Lemmel, H.D.
Westcott, C.H. (Scientific Secre
Yaffe, L.

The chair was taken by Mr. Hanna throughout the meeting.

The main outcome was the recommendation to the Nuclear Data Unit to arrange a full and continuing exchange of bibliographical information among the data centers of the US, ENEA, the USSR, and elsewhere, and the recommendation to the interested member states to adopt a single specialized bibliographic indexing system for nuclear data.

Here you see them all on a sightseeing tour.

The US INDSWG members were Bill Havens from Columbia University, George Kolstad from Washington, and Dick Tascheck from Los Alamos. They were called the three “musketeers”, and Dick Tascheck with a large Texas hat appeared behind the iron curtain as coming from a different planet. From Germany there was Karlheinz Beckurts from Karlsruhe who, as one of the main German promoters of nuclear energy, was murdered by terrorists in 1986. - The host was Prof. B. Buras from Warsaw. Here we met Alexander Abramov from Obninsk who was the main promoter of the cooperation from the USSR side.

John Story's laws for data evaluation

1. If there is only a single measurement, don't trust it.

2. If there are two measurements and both agree, then both may be wrong.

With this quotation he wanted to illustrate that nuclear data should be confirmed by parallel measurements with different experimental methods in different institutes, and thus to emphasize the practical importance of the international cooperation to be initiated.

Although it was tedious to talk through the interpreters, friendly personal relationships developed immediately.

The next step was the exchange of “facility lists”, including lists of experimental facilities and of ongoing nuclear data measurements to inform each other on the nuclear data research in the different countries. In the end, agreements were reached and the corner stones for an extensive and fruitful cooperation were laid.

In spring of 1965 I was sent to the United States to study the activities of their nuclear data center, the already 12 years old Brookhaven “Sigma Center” under Jack Stehn and Murray Goldberg.

Ben Magurno was producing BNL-325, the well-known neutron cross-section atlas, and his assistant was Vicky McLane (at that time Vicky May), who became a leading figure in the data exchange for 45 years until her unexpected death a few years ago. Brookhaven had started a punched-cards data file for neutron cross-sections, called “SCISRS”.

Goldstein

BIBLIOGRAPHY OF NEUTRON CROSS SECTIONS
FOR Li, C AND U^{235},
A SPECIMEN OF A CINDA TABULATION

H. Goldstein
Columbia University

M. Kalos
United Nuclear Corporation

Sincerely,
Herb Goldstein
Herbert Goldstein
Professor
Division of Nuclear Science
and Engineering

August 1963

INTERNATIONAL ATOMIC ENERGY AGENCY
MEMORANDUM

5. NOV. 1965

TO CINDA CENTERS
FROM Lemmel
SUBJECT NEW ABBREVIATIONS

PLEASE, ADD THE FOLLOWING TO THE INDICATED TABLE OR DICTIONARY

DICTIONARY I OF CINDA
DICTIONARY I OF SCISRS

INPUT	SCISRS INTERN	SCISRS OUTPUT	LABORATORY, INSTITUTION, OR COUNTRY
TRM		TROMBAY	ATOMIC ENERGY ESTABLISHMENT,TROMBAY,BOMBAY, IND
MUA		M.U.ALIGARH	MUSLIM UNIVERSITY,ALIGARH,INDIA IND

TABLE 5 OF CINDA
DICTIONARY K OF SCISRS

INPUT	SCISRS OUTPUT	COUNTRY	JOURNAL
PNS	PRC.NUC.SYMP	IND	PROCEEDINGS OF THE NUCLEAR PHYSICS SYMPOSIUM

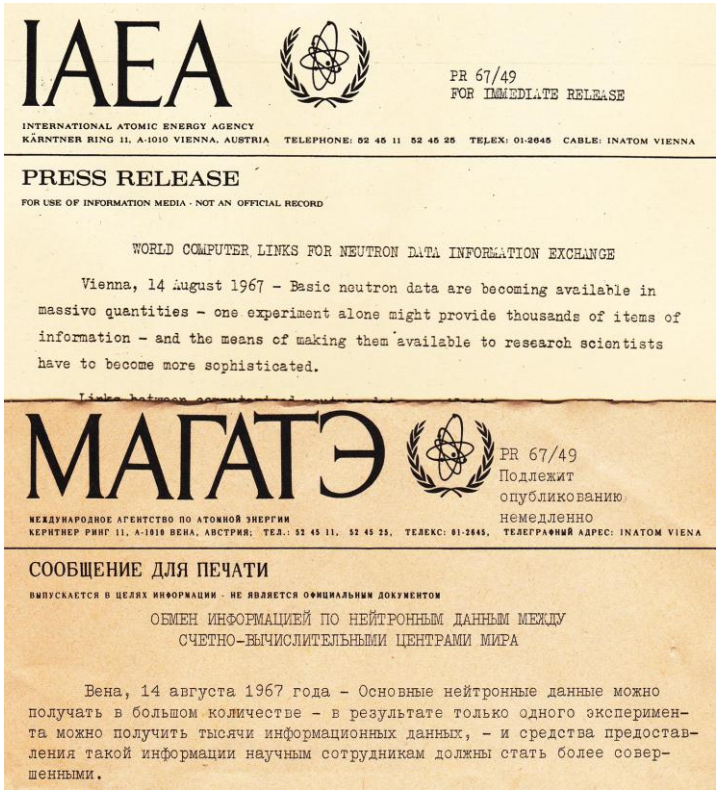
PLEASE, LET US KNOW IF THERE IS ANY OBJECTION TO THESE ABBREVIATIONS.

TO A.ABRAMOV, P.ATTREE, M.BALAKRISHNAN, D.COLVIN, H.GOLDSTEIN, B.KUCHOWICZ, H.LEMMEL, V.MAY, P.OTSTAVNOV, U.SCHULZE, J.SYMONDS, C.WESTCOTT, L.WHITEHEAD, FILE(3)

I also spent some time at the Columbia University with professor Herb Goldstein to study his newly created “Card Index to Nuclear Data” that became known as “CINDA” and developed to one of the backbones of the international nuclear data exchange. The picture shows a first specimen print of 1963.

A comprehensive CINDA compilation was first published in the US, then in 1965 by the European Nuclear Energy Agency, and 1970 by the IAEA. Its cover in 1967 documented for the first time the “Four Centers Network” of USA, USSR, Europe and IAEA.

CINDA is an **index** to available neutron cross-section data. To compile and exchange the **numerical data** themselves was the topic of the first meeting of the “Four Centers” in Vienna in August 1967.



IAEA

INTERNATIONAL ATOMIC ENERGY AGENCY
KÄRNTNER RING 11, A-1010 VIENNA, AUSTRIA TELEPHONE: 52 45 11 52 45 25 TELEX: 01-2645 CABLE: INATOM VIENNA

PR 67/49
FOR IMMEDIATE RELEASE

PRESS RELEASE

FOR USE OF INFORMATION MEDIA - NOT AN OFFICIAL RECORD

WORLD COMPUTER LINKS FOR NEUTRON DATA INFORMATION EXCHANGE

Vienna, 14 August 1967 - Basic neutron data are becoming available in massive quantities - one experiment alone might provide thousands of items of information - and the means of making them available to research scientists have to become more sophisticated.

МАГАТЭ

МЕЖДУНАРОДНОЕ АГЕНТСТВО ПО АТОМНОЙ ЭНЕРГИИ
КЕРНТНЕР РИНГ 11, А-1010 ВЕНА, АВСТРИЯ; ТЕЛ.: 52 45 11, 52 45 25, ТЕЛЕКС: 01-2645, ТЕЛЕГРАФНЫЙ АДРЕС: INATOM VIENA

PR 67/49
Подлежит опубликованию немедленно

СООБЩЕНИЕ ДЛЯ ПЕЧАТИ

ВЫПУСКАЕТСЯ В ЦЕЛЯХ ИНФОРМАЦИИ - НЕ ЯВЛЯЕТСЯ ОФИЦИАЛЬНЫМ ДОКУМЕНТОМ

ОБМЕН ИНФОРМАЦИЕЙ ПО НЕЙТРОННЫМ ДАННЫМ МЕЖДУ СЧЕТНО-ВЫЧИСЛИТЕЛЬНЫМИ ЦЕНТРАМИ МИРА

Вена, 14 августа 1967 года - Основные нейтронные данные можно получать в большом количестве - в результате только одного эксперимента можно получить тысячи информационных данных, - и средства предоставления такой информации научным сотрудникам должны стать более совершенными.

The IAEA issued a Press Release on “World Computer Links for Neutron Data Information Exchange”, in the four official languages including Russian.
The four centers and their respective service areas were defined.

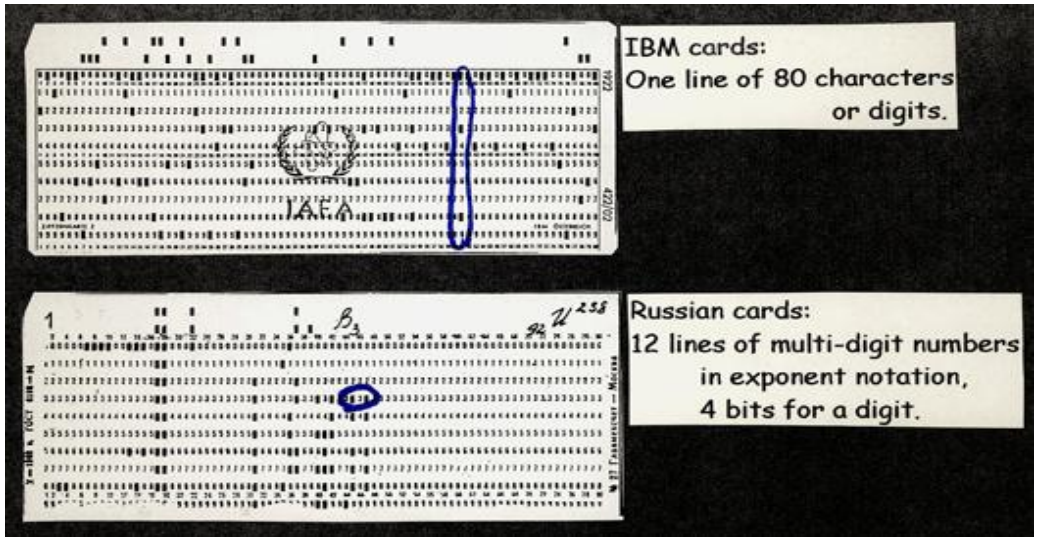
The Brookhaven National Laboratory Sigma Centre services USA and Canada.

The Neutron Data Compilation Centre of the European Nuclear Energy Agency (ENEA) services countries in Western Europe and Japan.

The Nuclear Data Information Centre in Obninsk services the USSR.

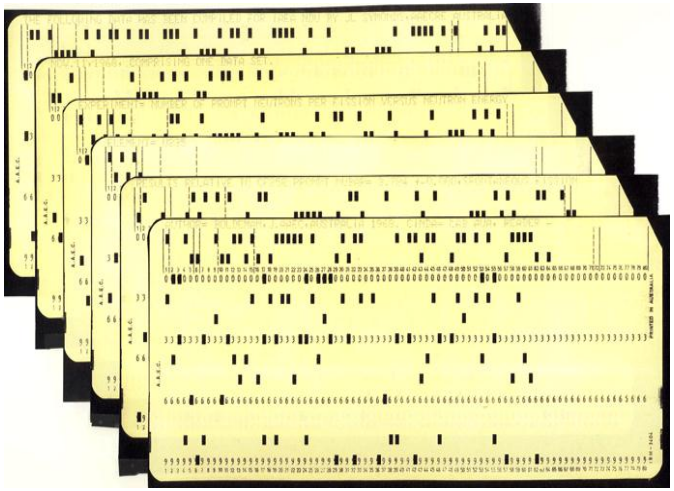
The IAEA Nuclear Data Unit in Vienna services all other countries in Eastern Europe, Asia, Africa, South and Central America, as well as Australia and New Zealand.

All four centres have agreed to exchange information with each of the others.



The history of the data exchange reflects all stages of the fast developing information technology. It started with tables written on typewriters. There were no copying machines yet and data tables were typed onto blue-print stencils. Soon after, the data transmission started on punched cards, and this was a story by itself.

The Russian punched cards had, fortunately, the same measures as the IBM cards, but the way of coding was quite different. As most of us will still remember, the IBM cards could hold one line of 80 digits or characters. The Russian cards, however, contained 12 lines of multi-digit numbers in exponent notation; there were up to 4 holes per digit and a special hole combination to indicate the decimal point and the exponent.



This way the data exchange functioned for some time during which the preparations for the next steps were made.

So I wrote a program in “Autocoder” language for the Agency’s IBM-1401 computer to do the card conversion: Russian to IBM, and IBM to Russian. This was the very first computerized East-West nuclear data exchange in 1967.

The worst problem was that the Obninsk data center issued a table of 4 columns in 4 separate card decks, one for each column. You can imagine what could happen when something got out of order. Another problem was that the mechanical adjustment of the card punch machines in Obninsk and Vienna were not always in perfect agreement. Then we had to try out different degrees of de-adjustment of the card reader until the cards could be read correctly.

In 1968 it was the Australian INDC member John Symonds who submitted data by John Boldeman on punched cards into the international data file.

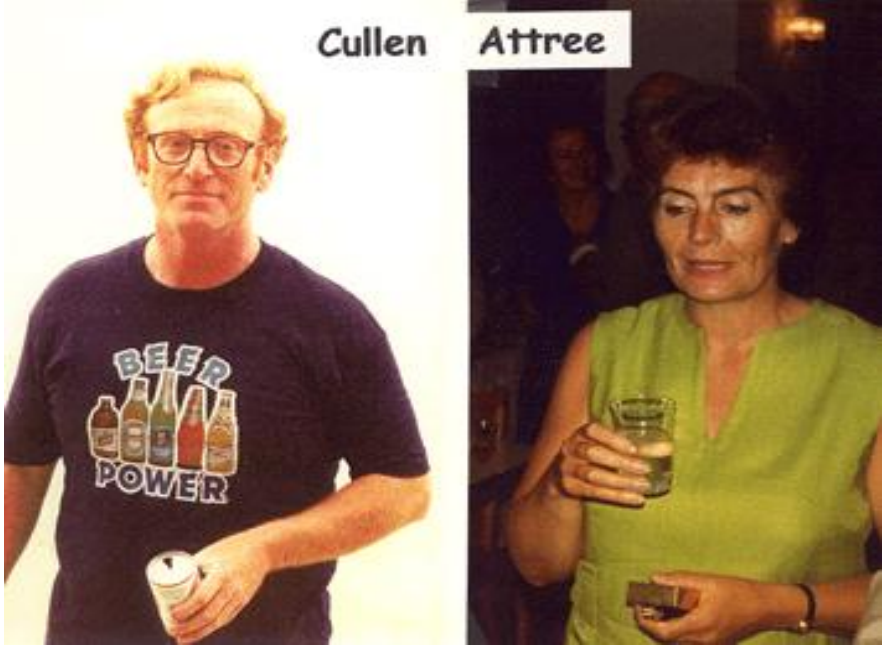
In April 1969 our programmer Pamela Attree and I travelled to Moscow for the first time. It was like an official states visit, and we were invited to watch the 1. May parade on the Red Square.

The Russian counterparts agreed to host the “Four-Centers-Meeting” in Moscow and Obninsk in November 1969.

It had become evident that it was not sufficient to compile tables of numbers, but that the numbers had to be accompanied by text information on the measurement conditions and the uncertainty analysis. Different data compilation formats were developed in the data centers according to their different computer facilities.

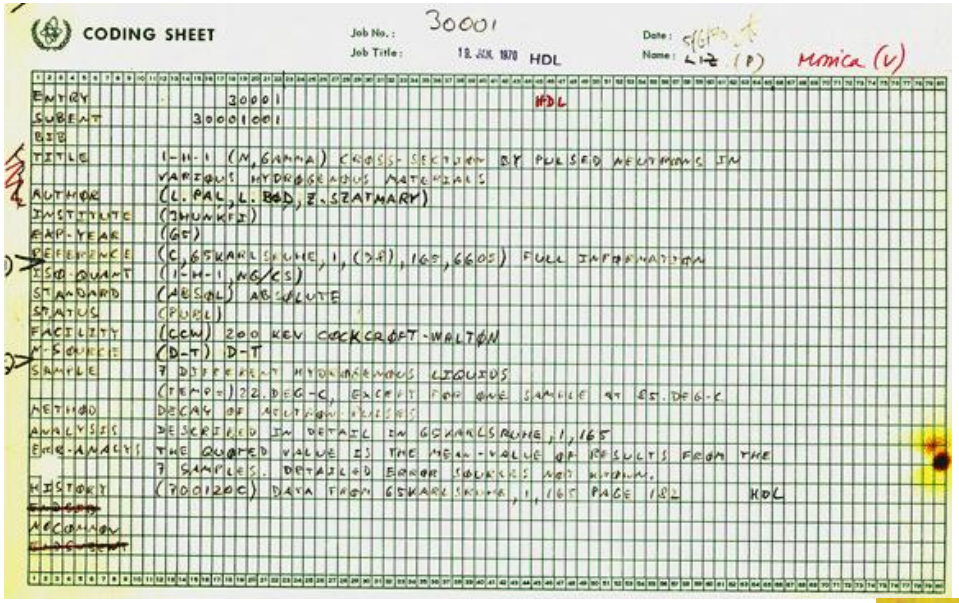
EXFOR
(exchange format for experimental nuclear data)
combining the features of the earlier systems
CSISRS (Brookhaven)
NEUDADA (NEA)
DASTAR (IAEA)

The EXFOR system was designed to combine the features of the earlier systems in use at the centers, with the goal that all experimental neutron reaction data were compiled in all countries and exchanged in identical formats and procedures. The agreement on the EXFOR principles was reached fast and in an optimistic spirit.



However, it was a meeting of physicists, and when the center heads returned home, they had to go through a thunderstorm of critique by their programmers. Consequently, a programmers' workshop was organized.

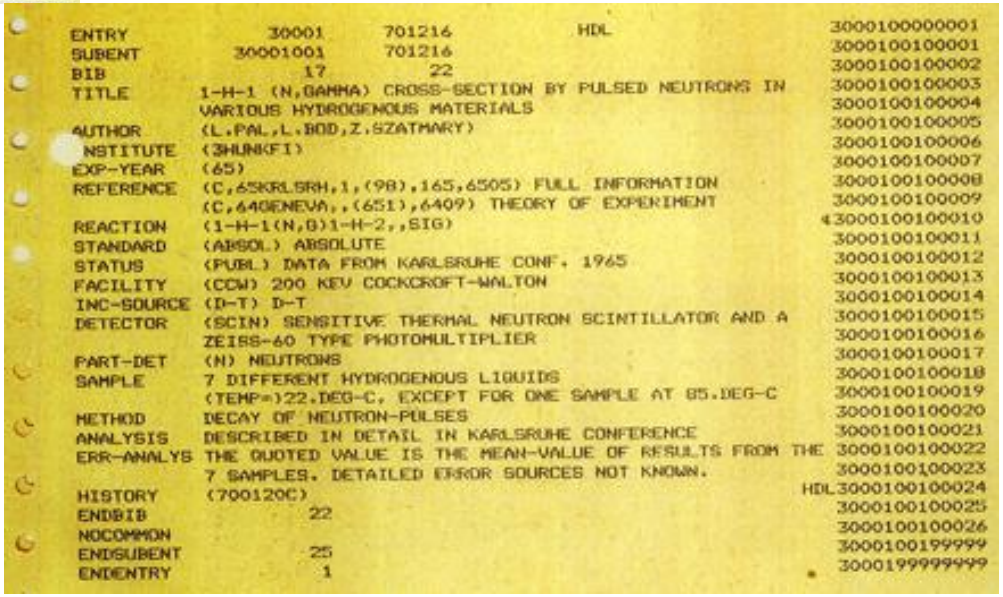
The EXFOR system was programmed by our programmer Pamela Attree and Red Cullen from USA. Years later, Red Cullen also joined the Nuclear Data Section.



CODING SHEET

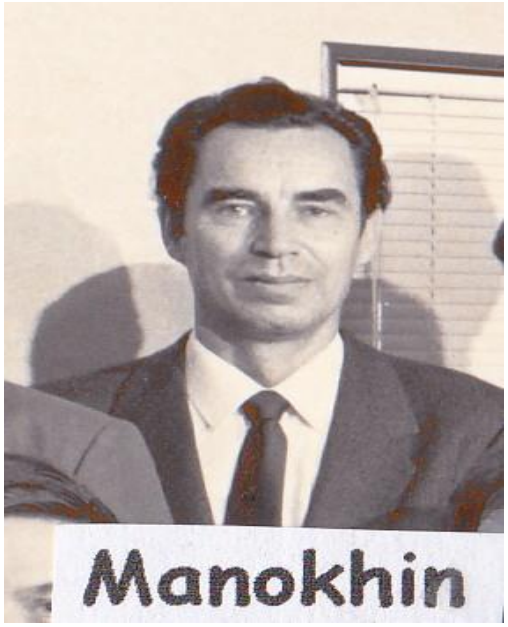
Job No.: 30001
Job Title: 18 JUN 1970 HDL
Date:
Name: L.Z. (P) Monica (V)

ENTRY	30001
SUBENT	30001001
BIB	
TITLE	1-H-1 (N,GAMMA) CROSS-SECTION BY PULSED NEUTRONS IN VARIOUS HYDROGENOUS MATERIALS
AUTHOR	(L.PAL,L.BOD,Z.SZATMARY)
INSTITUTE	(JHUNKFI)
EXP-YEAR	(65)
REFERENCE	(C,65KARLSRH,1,(98),165,6505) FULL INFORMATION
REACTION	(1-H-1(N,G)1-H-2,,SIG)
STANDARD	(ABSOL) ABSOLUTE
STATUS	(PUBL)
FACILITY	(CCW) 200 KEV COCKCROFT-WALTON
INC-SOURCE	(D-T) D-T
DETECTOR	
SAMPLE	7 DIFFERENT HYDROGENOUS LIQUIDS (TEMP=)22.DEG-C, EXCEPT FOR ONE SAMPLE AT 85.DEG-C
METHOD	DECAY OF NEUTRON-PULSES
ANALYSIS	DESCRIBED IN DETAIL IN GCKARLSRUHE,1,165
ERR-ANALYS	THE QUOTED VALUE IS THE MEAN-VALUE OF RESULTS FROM THE 7 SAMPLES. DETAILED ERROR SOURCES NOT KNOWN.
HISTORY	(700120C) DATA FROM 65KARLSRUHE,1,165 PAGE 182 KDL
ENDBIB	
NOCOMMON	
ENDSUBENT	
ENDENTRY	



ENTRY	30001	701216	HDL	3000100000001
SUBENT	30001001	701216		3000100100001
BIB	17	22		3000100100002
TITLE	1-H-1 (N,GAMMA) CROSS-SECTION BY PULSED NEUTRONS IN			3000100100003
	VARIOUS HYDROGENOUS MATERIALS			3000100100004
AUTHOR	(L.PAL,L.BOD,Z.SZATMARY)			3000100100005
NSTITUTE	(JHUNKFI)			3000100100006
EXP-YEAR	(65)			3000100100007
REFERENCE	(C,65KRLSRH,1,(98),165,6505) FULL INFORMATION			3000100100008
	(C,64GENEVA,,(651),6409) THEORY OF EXPERIMENT			3000100100009
REACTION	(1-H-1(N,G)1-H-2,,SIG)			3000100100010
STANDARD	(ABSOL) ABSOLUTE			3000100100011
STATUS	(PUBL) DATA FROM KARLSRUHE CONF. 1965			3000100100012
FACILITY	(CCW) 200 KEV COCKCROFT-WALTON			3000100100013
INC-SOURCE	(D-T) D-T			3000100100014
DETECTOR	(SCIN) SENSITIVE THERMAL NEUTRON SCINTILLATOR AND A			3000100100015
	ZEISS-60 TYPE PHOTOMULTIPLIER			3000100100016
PART-DET	(N) NEUTRONS			3000100100017
SAMPLE	7 DIFFERENT HYDROGENOUS LIQUIDS			3000100100018
	(TEMP=)22.DEG-C, EXCEPT FOR ONE SAMPLE AT 85.DEG-C			3000100100019
METHOD	DECAY OF NEUTRON-PULSES			3000100100020
ANALYSIS	DESCRIBED IN DETAIL IN KARLSRUHE CONFERENCE			3000100100021
ERR-ANALYS	THE QUOTED VALUE IS THE MEAN-VALUE OF RESULTS FROM THE			3000100100022
	7 SAMPLES. DETAILED ERROR SOURCES NOT KNOWN.			3000100100023
HISTORY	(700120C)		HDL	3000100100024
ENDBIB	22			3000100100025
NOCOMMON				3000100100026
ENDSUBENT	25			3000100199999
ENDENTRY	1			3000199999999

Here is one of the first X4 entries which had to be written into a coding sheet, then punched and verified on cards, and then printed for proof reading and further amendments.



The Section had several secretaries for keypunching and verifying. The exchange on tapes started in 1970 with trial tapes and in 1971 on a regular basis. In the beginning the exchange was hampered by frequent tape reading errors, and agreements had to be reached on density, labels and other details.

The Obninsk data center Head Vassili Manokhin, managed to link a Western magnetic tape unit to their Soviet-made computer, so that the fully computerized and free nuclear data exchange started with the Soviet Union. We believe that this event was the first electronic East-West scientific information exchange.

March 1975
Sol Pearlstein, US National Neutron Cross Section Center, Brookhaven
J.J. Schmidt, IAEA Nuclear Data Section, Vienna
Vassili Manokhin, USSR Nuclear Data Information Center, Obninsk
A. Schofield, ENEA Neutron Data Compilation Center, Saclay

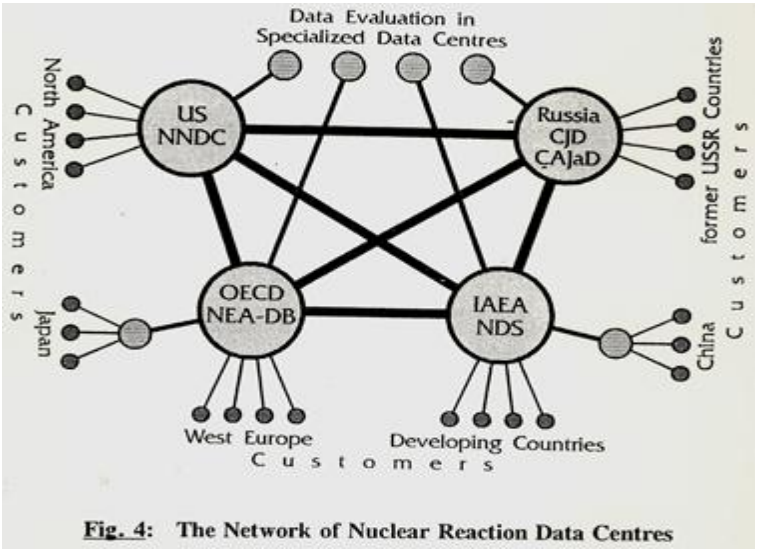


Fig. 4: The Network of Nuclear Reaction Data Centres

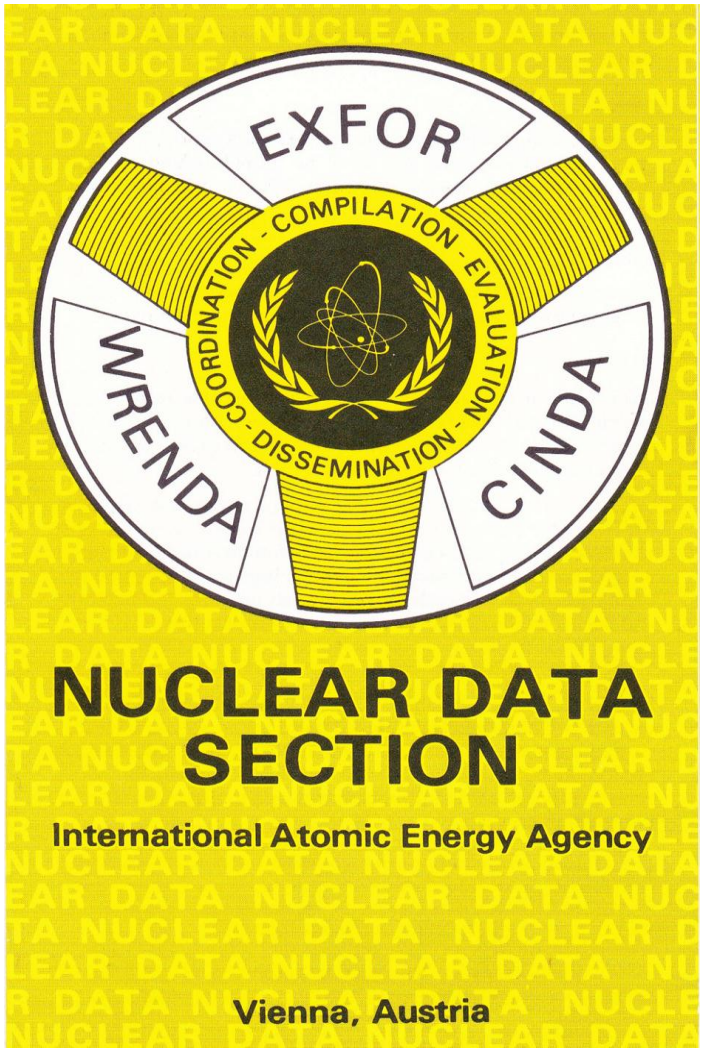
It is not known what the Soviet secret service thought about this free flow of information. There were sometimes problems when the customs officers inspected the magnetic tapes by X-rays or, occasionally, by cutting off the end of the tape to inspect the quality of the material.

Subsequently, of course, the data transmission followed the fast computer developments up to the todays well-known online services.

In the 70-ies the original 4 Centers network developed to a multicenter network. The EXFOR system, originally designed for neutron cross-sections only, was widened to include also charged-particle reaction data and photonuclear data.

Several specialized centers joined the network:

- “KaChaPaG”, Karlsruhe under Prof. Münzel
- RIKEN, Japan under Hashizume
- USSR charged-particle data center under Felix Chukreev at the Kurchatov Institute
- USSR photonuclear data center under Varlamov
- Japanese activities under Tendow and Chiba
- Chinese NDC under Cai Dunjiu.



In 1974 three systems existed:

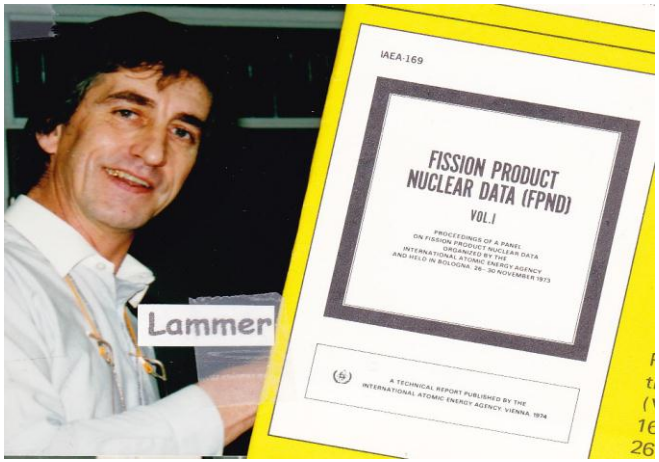
- EXFOR, the compilation and exchange of experimental nuclear reaction data,

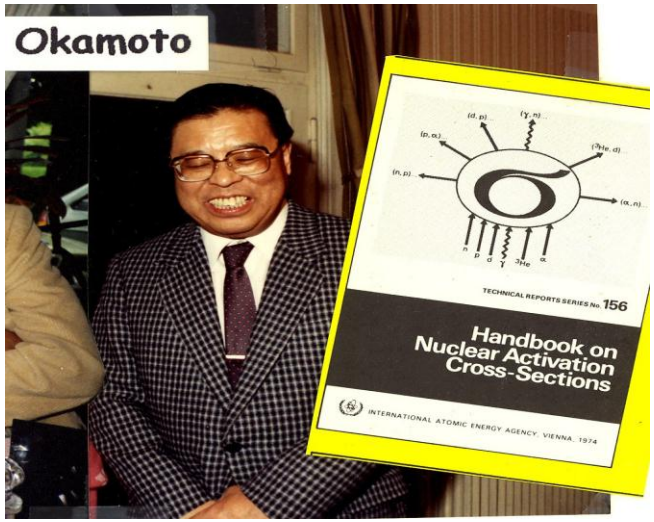
- CINDA, the bibliographic data index, and

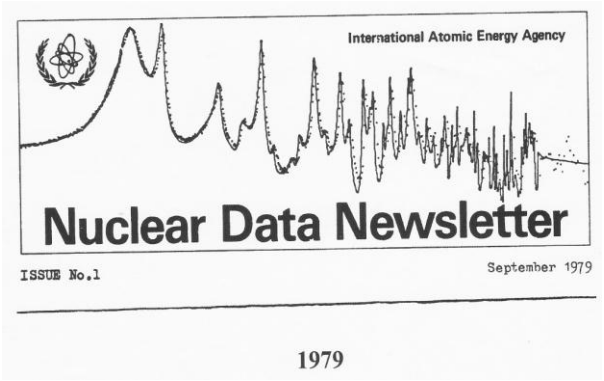
-WRENDA - a compilation of nuclear data that were needed for applications but were not known with sufficient accuracy, so that new precision measurements were requested with priority.

Input to “Request List” was provided by the INDC, the International Nuclear Data Committee.

Same as today, the INDC gave advice to the Nuclear Data Section to support and stimulate research by contracts and CRP's, Coordinated Research Programs. This became the most important part of the activities of the Nuclear Data Section.



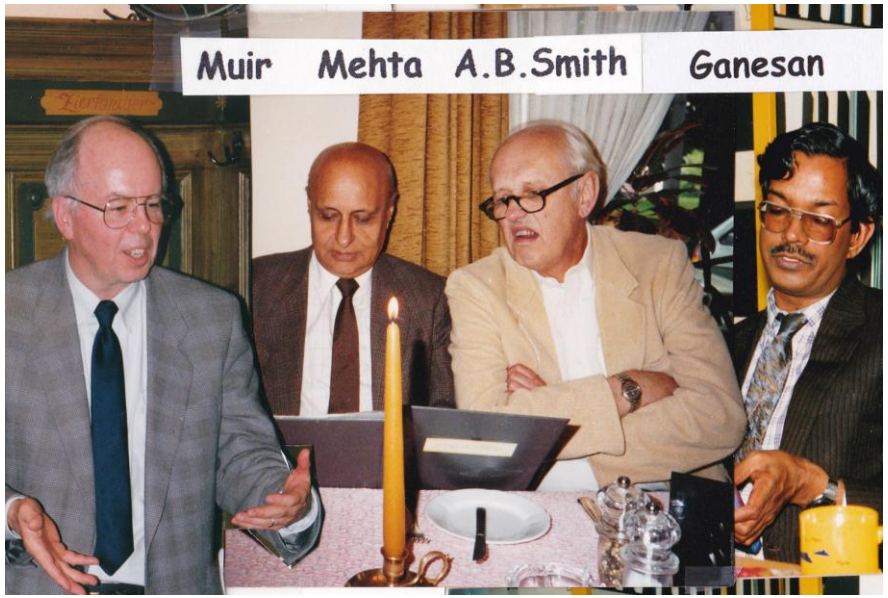




Often these programs resulted in handbooks with worldwide recognition. Here I wish to mention only two from 1974: The Handbook of Fission Product Nuclear Data by Lammer and the handbook of Nuclear Activation Cross-Sections by Okamoto.

In addition, 1979 the first issue of the Nuclear Data Newsletter appeared.

Years later our counterpart in Bratislava joined the Nuclear Data Section, Pavel Oblozinsky, and again some years later he became the head of the US nuclear data center. When he came to Vienna, he was glad that he had escaped from the socialistic bureaucracy of Czechoslovakia based on 5-years-plans for the entire economy, and he got frightened that just in this time the Agency started with 5-years-plans for the budgeting.



ENDF/B: international format for evaluated nuclear data

Many fruitful international cooperations occurred in the frame of Specialists Meetings and Coordinated Research Contracts. The picture shows a few out of many who have contributed to such efforts.

The free release and exchange of **evaluated** neutron nuclear data took a bit longer and different data formats and related computer codes continued to exist in different countries. At the INDC Meeting 1987 in China the ENDF/B format originating from the US, was adopted as international format for evaluated nuclear data.

Wiener Zeitung

CHRONIK

Dienstag, 23. August 1977

Datenzentrale für Kernfusion

IAEO in Wien wird zum Mittelpunkt der Auswertung von Forschungsergebnissen

Wien wird immer mehr zur wichtigsten Zentrale der Welt für die Sammlung, Verarbeitung und Verbreitung von Kernfusionsdaten. Die Fäden laufen dabei bei der IAEO, also der „Internationalen Atomenergie-Organisation", zusammen. Die Kernfusion, richtiger die Freisetzung von Energie durch Atomkernverschmelzung, ist der Wissenschaft bisher nur in der „H-Bombe" gelungen. Die kontrollierte, für die friedliche Nutzung geeignete allmähliche Fusion — die große Zukunftshoffnung — steht noch aus. Da das Erreichen dieses Zieles u. a. auch darauf zurückzuführen ist, daß entsprechendes Zahlenmaterial über Atomkernstrukturen und über die Vorgänge beim Zusammenstoß von Elektronen, Atomen und Molekülen fehlt, hat die IAEO folgende Aktivitäten gesetzt:

■ Seit ihrer Gründung im Jahr 1974 hat die „Nuclear Data Section" (NDS) in Wien fast drei Millionen Daten gesammelt. Das Material, das durch die von Wien aus koordinierte Zusammenarbeit von zehn Datenzentren in aller Welt erarbeitet wurde, steht Theoretikern und Praktikern der Kern- und Reaktorenphysik auf Anfrage kostenlos zur Verfügung.

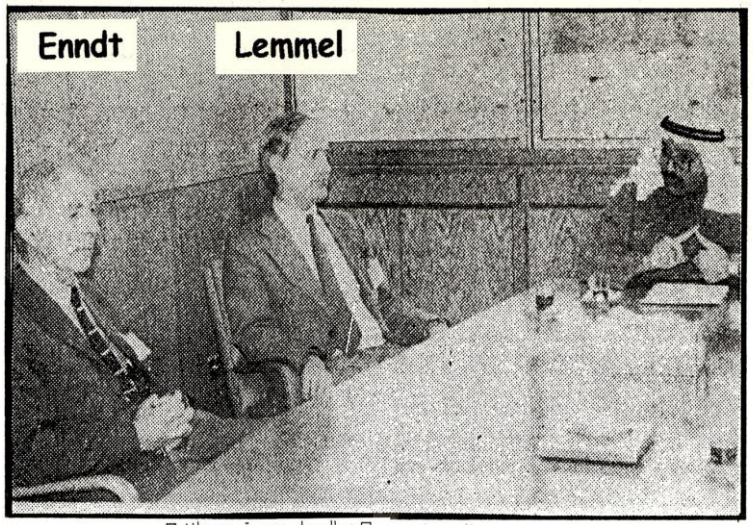
■ Weiters hat die IAEO jetzt damit begonnen, ein zunächst vierteljährlich erscheinendes Bulletin („Atomic and Molecular Data for Fusion") herauszugeben. Es soll vor allem möglichst rasch die mit der Fusionsforschung Befaßten auf alle neu herausgekommenen Berichte und verfügbaren Daten hinweisen. Ab Ende 1978 will die IAEO ergänzend dazu einen Literaturindex veröffentlichen, der es Forschern erleichtern wird, bereits publizierte Daten aufzufinden.

■ Zur Tätigkeit der IAEO auf dem „Hoffnungsgebiet" der Kernverschmelzung gehört schließlich auch die Herausgabe der Zeitschrift „Nuclear Fusion", die ab 1978 voraussichtlich monatlich erscheinen wird.

In 1977 the Agency was reported as a central database for nuclear fusion. It included a program on Nuclear Data for Fusion, the Agency's journal "Nuclear Fusion" and the new Unit for Atomic and Molecular Data for Fusion.

3 Networks of Data Centers

- Nuclear Reaction Data
- Nuclear Structure and Decay Data
- Atomic and Molecular Data



□ د. الجسار ود. بيتر ود. هانز □

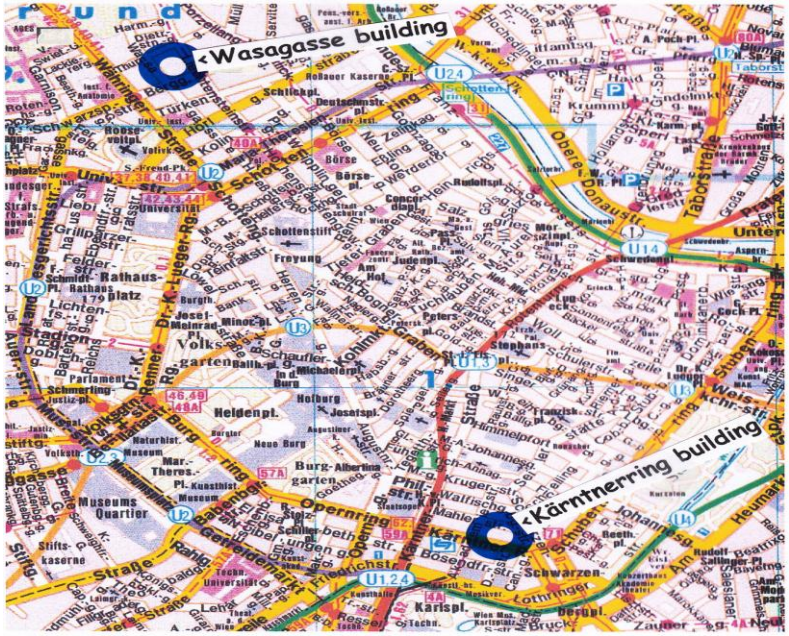
the 9th meeting of the
network of nuclear structure
and decay data evaluators
الإجتماع الدورى التاسع
للشبكة الدولية للبيانات النووية

INTERNATIONAL ATOMIC
ENERGY AGENCY

Kuwait, March 10-14, 1990

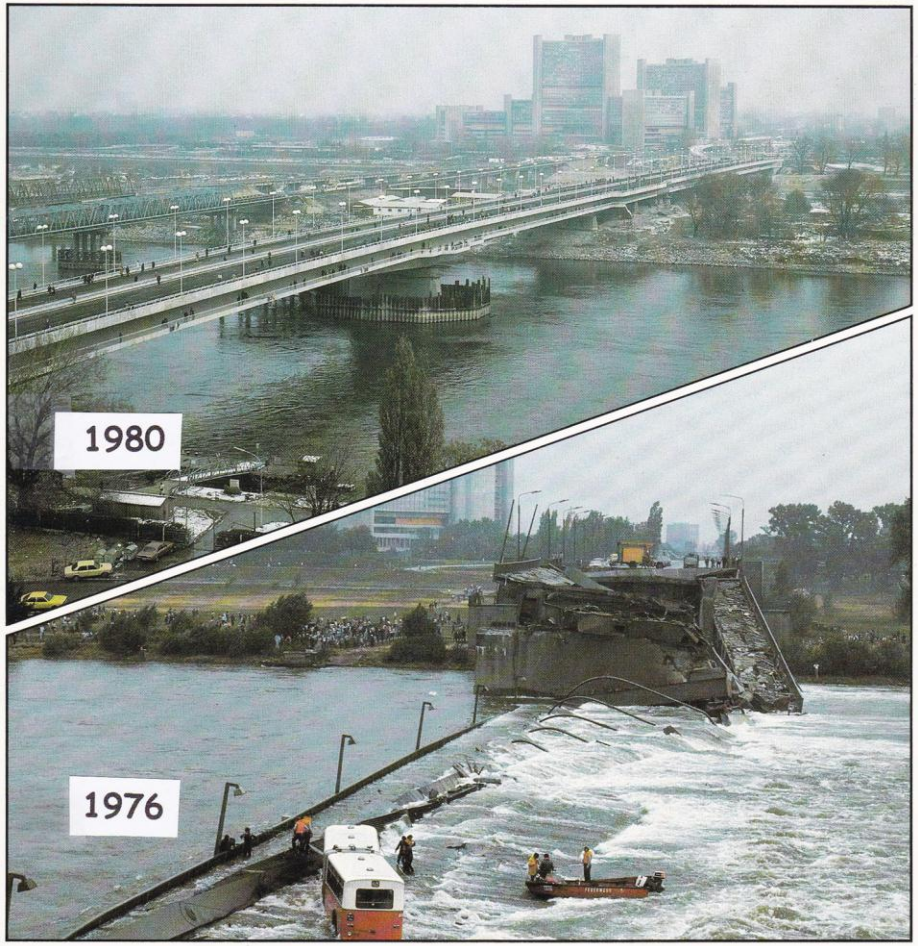
Kuwait Institute for Scientific Research
Kuwait Foundation for the Advancement of Sciences
Kuwait University

The nuclear structure and decay data system ENSDF, which originated from the US, received international cooperation through the Nuclear Data Section. An active nuclear data group existed in Kuwait, which hosted a meeting in 1990. The picture shows a press conference which was reported in the newspapers. A few months later, the oil fields were burning and the nuclear institute was destroyed. It reopened only years later.



Meanwhile the staff of the Agency had increased and the office space at the Kärntnerring building was limited.

In 1972 the Nuclear Data Section was moved to an office in the Wasagasse on the opposite side of the city. Here we enjoyed another new step of IT development. We got a telephone-line connection to the computer at the Kärntnerring. But the line was slow, and we had to travel with tapes and card decks to and back by tram. There was no U-Bahn yet. But soon the UN-building across the Danube was planned and constructed.



In 1979 the Agency moved into the new building. But 3 years earlier the bridge across the Danube had collapsed, and the new bridge with the U-Bahn line was not yet finished. Meanwhile I was involved in the Staff Council to organize seven bus lines to bring the staff from the living districts to the VIC and back, via the Floridsdorf bridge.

Here you see the Section in front of the new building.

I should have mentioned many more names, as it was a great pleasure to work together with all of them.

My special thanks are to my secretary Sofie Aung, who retired together with me 17 years ago.

I wish to come back to the question raised at the beginning. Why was the nuclear data program successful in times of difficult political situations? guess, in the beginning the politicians did not consider nuclear data as an important topic, because reactors and bombs were functioning. But then they encountered increasing requests for **more**, and more **accurate**, nuclear data for fission, fusion and various non-energy applications, so that the need for an international cooperation became obvious. We had never a formal legal instrument for the free data exchange, but the good-will of our nuclear data physicists always enjoyed the support from officials in East and West.


Congratulations, NDS!
and thanks to all!
Vlassow
Schmidt
Goulo
Arcilla