Gesellschaft für Anlagen- und Reaktorsicherheit (GRS) mbH

WINRE '92

3rd Workshop on Information Management in Nuclear Safety, RadiationProtection, and Environmental Protection

GRS - 96

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3rd Workshop on Information Management in Nuclear Safety, Radiation Protection, and Environmental Protection

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WELCOMING

H.-Peter Butz
Gesellschaft für Anlagen- und Reaktorsicherheit, Köln

Ladies and gentlemen, dear collegues,

let me welcome you on behalf of Gesellschaft für Anlagen- and Reaktorsicherheit to our third "Workshop on Information Management in Nuclear Safety, Radiation Protection and Environmental Protection". I would like to thank you all for coming to Cologne to take part in this event. We are delighted to have guests from Russia, the Ukraine, Poland, Rumania, Bulgaria and Hungary with us today. Needless to say, we are also glad to welcome the participants from Western Europe, coming from Britain, France, Switzerland and Germany. Last but not least it gives me great pleasure to welcome representatives from such international organisations as the IAEA and the OECD as well as from the European Community.

There is an encouraging increase in the interest which this topic area attracts, and this is also reflected in the growing number of participants in this workshop. In all, there are about 60 of us at this meeting.

I would like to point out once more the basic issue of this workshop: after the opening of the various national borders in Eastern Europe, it wants to contribute to getting the exchange of information as regards nuclear safety and related radiological issues off the ground.

The safety of nuclear facilities in Eastern Europe gives cause for concern. Following a German initiative, the World Economic Summit in Munich last July decided on a multilateral action programme to achieve a clear improvement of the situation. Here, the transfer of know-how in the field of modern information management technology is of some importance. The Federal Minister for the Environment, Nature Conservation and Nuclear Safety, the BMU, has long been supporting these activities among its fields of work.

As on the two previous occasions, Gesellschaft für Anlagen- und Reaktorsicherheit (GRS) has once again prepared and organised this, which is now the third East-West workshop, on behalf of the BMU. At this point I would like to take the opportunity to thank the BMU for his ideal and financial support. I must also express my gratitude to Frau Courage of GMD-Birlinghoven and to the GRS office in Moscow for establishing the contacts with the participants from the Central and Eastern European countries.

It is the objective of the workshop to clarify the various fields of application of international cooperation in the field of information management. The fast provision of factual and organisational information available throughout the world is an important basis for international projects, for science, as well as for economy and management issues, as all these aspects can also be applied especially with regard to the support of Eastern European countries. For the supply of these various pieces of information, it nowadays is necessary to use methods of active information management in order to call up quickly the needed information from electronic information technology media. In order to tackle multi-disciplinary tasks in the fields of nuclear safety, radiation protection and environmental protection, all different kinds of information are gathered from national and international scientific and economic research; this information is usually stored in data banks containing references, facts, or full texts. The task here is to process many different ways of enquiry and to perform searches in worldwide available electronic data banks. The whole range reaches from specific technical-scientific questions up to full-text services concerning current issues provided by press data banks. At present, there are about 5,000 such data banks commercially available via public telecommunication networks. All it needs to contact them is a modern PC. GRS, for example, has long been using and further developing these information management tools for the fast and effective answering of the various enquiries made by its customers, its scientific staff, as well as by the media and the general public.

Like in the two previous years, the workshop once again puts much emphasis on the exchange of experience between experts from the West and from the Central and Eastern European countries. The representatives from the various countries and organisations that are here with us today are going to introduce their respective data banks, products, or services. The combination of papers and practical presentations will, I hope, provide us all with a qualified and comprehensive insight into the tried and tested as well as the new information management technologies in the specialist

areas of nuclear safety, radiation protection, and environmental protection. Furthermore, it should also contribute to the promotion of the transfer of know-how between experts throughout the whole of Europe.

For the following working sessions, I wish that you will learn about many new aspects of our shared interest in information management, and that you will have fruitful discussions with your colleagues from abroad.

Now let me introduce you to Herrn Dr. Seidel who will be your chairman this morning for the first session. Herr Seidel is Ministerialrat with the Bavarian State Ministry for the Land Development and Environmental Issues, where he is the person in charge of basic questions of nuclear safety and radiation protection.

SESSION I
HOSTS / PRODUCERS

Chairman: E. R. Seidel

STN - Databases in Nuclear Safety, Radiation Protection and Environmental Protection

W. Detemple
STN International, Karlsruhe

STN INTERNATIONAL

The Scientific & Technical Information Network

is operated cooperatively by

FACHINFORMATIONSZENTRUM KARLSRUHE
(FIZ Karlsruhe)

AMERICAN CHEMICAL SOCIETY CHEMICAL ABSTRACTS SERVICE COLUMBUS OHIO
(CAS Columbus)

JAPAN INFORMATION CENTER OF SCIENCE AND TECHNOLOGY TOKYO
(JICST Tokyo)

FIZ KARLSRUHE

- founded 1977

- produces
  own databases in energy, physics and mathematics
  such as PHYS, MATH, COMPUSCIENCE and ENERGIE

  cooperate in database production:
  ENERGY, INIS, NTIS and ICSD

- offers these and other international databases
  such as COMPENDEX, INSPEC, and METADEX
  via STN International

- implementing further databases for STN

- 330 staff members, among than 100 scientists and
  engineers

THE STN NETWORK

- decentralized service centers linked e.g. via satellite lines

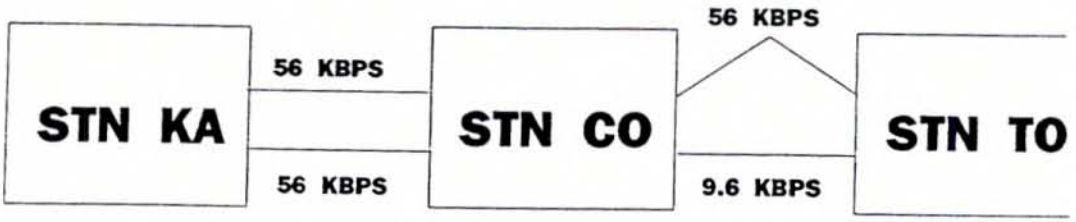
- same software for connecting the service centers and for retrieval language

- on behalf of database suppliers on prime cost basis

- all databases available from every service center

- each database at only one site saves financial resources

TECHNICAL OPERATIONS



Public Access via

DATEX-P (80)	CompuServe	DDX-TP
IBM-IN (30)	IBM-IN	JICST-Net
TYMNET (32)	INTERNET	VENUS-P
WIN (IXI, 80)	SprintNet	
	TYMNET	
private connections	private connections	

- up to 222 concurrent users at Karlsruhe
- operating 24 h per day, six days per week
- usage weighted availability higher 98 %
- low telecommunication costs for access to the regional service centres
- reversed charging

DATENBANKEN IN NATURWISSENSCHAFT UND TECHNIK

			seit	Anzahl Dok. in m
*	INPADOC	Patente	1968-	18.1
	SCI	Wissenschaft	1974-	10.7
*	REG	Chemie	1957-	10.9 +
*	CA	Chemie	1967-	9.6
*	BIOSIS	Biowissenschaften	1969-	7.4
*	MEDLINE	Biomedizin	1964-	6.5
	DERWENT	Patente	1963-	5.1
*	EMBASE	Medizin	1974-	4.3
*	INSPEC	Elektr.+Telekomm.	1969-	3.8
*	BEILSTEIN	Org. Chemie	1830-	3.5 +
*	ENERGY	Energieforschung	1974-	2.4
*	IFI-CLAIMS	U.S. Patente	1950-	2.5
*	COMPENDEX	Ingenieurwesen	1969-	2.7
*	BIBLIODATA	Alle Wissensgebiete	1966-	1.8
*	PATDPA	Deutsche Patente	1968-	2.0
	NASA	Luft und Raumfahrt	1962-	1.7
*	GEOREF	Geowissenschaften	1961-	1.7
*	NTIS	Wissensch.+Technik	1964	1.5
*	INIS	Kernforschung	1970-	1.5
*	PHYS	Physik	1979-	1.5

\+ Chemische Strukturen und Substanzen
* verfügbar auf STN

```
=> DISPLAY CLUSTER

ENTER (ALL), OR A LIST OF CLUSTER NAMES:all
CLUSTER NAME       COMMENT
---------------- ----------------------------------------
AGRICULTURE        Agriculture Cluster
BIOSCIENCE         Bioscience Literature Cluster
BUSINESS           Scitech Business and News Cluster
CASRNS             CAS Registry Numbers Cluster
CHEMDATA           Chem Properties and Data Cluster
HEMENG             Chemical Engineering Cluster
CHEMISTRY          Chemical Literature Cluster
CHEMTEXT           Fulltext Chemistry Files Cluster
CONSTRUCTION       Building and Construction Cluster
CURRENT            Current file environment Cluster
ELECTRICAL         Electrical Engineering, Computer Science
ENGINEERING        Engineering and Technology Cluster
ENVIRONMENT        Environment Cluster
FUELS              Energy Sources Cluster
FULLTEXT           ACS Chemical Journals Online Cluster
GEOSCIENCE         Earth and Geo-sciences Cluster
GOVREGS            Governmental Regulations Cluster
HEALTH             Health Sciences Cluster
HUMANITIES         Social Sciences Cluster
MATDATA            Materials Data Cluster (Numeric Data)
MATERIALS          Materials Science Cluster
MEDICINE           Medicine and Medical Science Cluster
METALS             Metals Cluster
METDATA            Metals Data Cluster (Numeric Data)
PATENTS            Patents Cluster
PETROLEUM          Petroleum Cluster
PHARMACOLOGY       Pharmaceutical Science Cluster
PHYSICS            Physics Cluster
PLASDATA           Plastics Data Cluster (Numeric Data)
POLYMERS           Polymer Science Cluster
REACTION           Reactions Cluster
RESEARCH           Research Cluster
SAFETY             Occupational Health and Safety Cluster
SESSION            Current files with L-numbers Cluster
STRUCTURE          Structure Searching Cluster
SUPPLIERS          Product Directories and Suppliers Cluster
```

=>HELP CLUSTER NAMES

CLUSTER NAME	CLUSTER DEFINITION
BIOSCIENCE	ANABSTR, BIOSIS, CA, CABA, CEBA, CIN, CJACS, CJELSEVIER, EMBASE, FSTA, GENBANK, MEDLINE, NTIS, JICST-E
CHEMISTRY	ANABSTR, CA, CABA, CAPREVIEWS, CEBA, CERAB, CIN, CJACS, CJAOAC, CJELSEVIER, COMPENDEX, GENBANK, INSPEC, CJRSC, CJVCH, CJWILEY, JICST-E, KKF, METADEX, NTIS, PHYS, RAPRA, SILICA, VTB
ENGINEERING	CEDB, CIN, COMPENDEX, ENERGY, ENERGIE, FTN, GEOREF, INSPEC, JICST-E, MDF, NISTCERAM, NTIS, PLASNEWS, SIGLE, TA, TITUS, TRIBO
ENVIRONMENT	APILIT2, BIOSIS, CA, CABA, CIN, CJACS, COMPENDEX, CSNB, EMBASE, ENERGIE, ENERGY, GEOREF, JICST-E, MEDLINE, NTIS
FUELS	APILIT2, CA, CIN, COMPENDEX, ENERGIE, ENERGY, FTN, GEOREF, INSPEC, JICST-E, NEI, NTIS, SESAME
HEALTH	BIOSIS, CA, CHEMLIST, CIN, CSNB, ENERGY, EMBASE, JICST-E, MEDLINE, MSDS-CCOHS, NTIS, RTECS
MATERIALS	CA, CERAB, CIN, COMPENDEX, EMA, INSPEC, IPS, JICST-E, MATBUS, MDF, METADEX, PHYS, PLASNEWS, PLASPEC, RAPRA, SILICA, SIGLE, TRIBO
MEDICINE	BIOSIS, CA, EMBASE, JICST-E, MEDLINE
PATENTS	APIPAT2, IFIPAT, IFIRXA, INPADOC, PATDD, PATDPA, PATOSDE, PATOSEP, PATOSWO
PHARMACOLOGY	BIOSIS, CA, CIN, CJACS, EMBASE, JICST-E, MEDLINE
PHYSICS	ENERGY, FTN, GEOREF, INSPEC, JICST-E, MATH, NTIS, PHYS, SIGLE
PLASDATA	IPS, PDLCOM, PLASPEC
POLYMERS	CA, CIN, CJWILEY, JICST-E, KKF, PLASNEWS, RAPRA
REACTION	CASREACT
RESEARCH	DERES, FHGPUBLICA, FORIS, FORKAT, FTN, INFOR, JGRIP, NEI, NTIS, SESAME, SOLIS, TA, UFORDAT, VADEMECUM
SAFETY	CA, CHEMLIST, CIN, CSNB, MSDS-CCOHS, RTECS

SESSION	Current files with L-numbers Cluster
STRUCTURE	BEILSTEIN, CASREACT, GMELIN, MARPAT, REGISTRY
SUPPLIERS	BIOQUIP, COPPERDATA, CSCHEM, CSCORP, DEQUIP, DETEQ, PLASPEC
TOXICOLOGY	BIOSIS, CA, CABA, CHEMLIST, EMBASE, ENERGY, FSTA, JICST-E, MEDLINE, MSDS-CCOHS, RTECS

```
=> FIL ENERGY INIS ENERGIE NTIS PHYS CA

FILE 'ENERGY' ENTERED AT 20:34:36 ON 12 OCT 92
COPYRIGHT (c) 1992 USDOE for the IEA-Energy Technology Data
Exchange

FILE 'INIS' ENTERED AT 20:34:36 ON 12 OCT 92
COPYRIGHT (c) 1992 IAEA and INIS members

FILE 'ENERGIE' ENTERED AT 20:34:36 ON 12 OCT 92
COPYRIGHT (c) 1992 FACHINFORMATIONSZENTRUM KARLSRUHE (FIZ KARLS-
RUHE)

FILE 'NTIS' ENTERED AT 20:34:36 ON 12 OCT 92
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Service of the Department of Commerce of the United States of
America. All rights reserved. (1992) (NTIS)

FILE 'PHYS' ENTERED AT 20:34:36 ON 12 OCT 92
COPYRIGHT 1992 (c) FACHINFORMATIONSZENTRUM  KARLSRUHE (FIZ KARLS-
RUHE)

FILE 'CA' ENTERED AT 20:34:36 ON 12 OCT 92
USE IS SUBJECT TO THE TERMS OF YOUR CUSTOMER AGREEMENT
COPYRIGHT (C) 1992 AMERICAN CHEMICAL SOCIETY (ACS)
```

```
=> S (CHERNOBYL## OR TSCHERNOBYL##) AND FALLOUT##

FILE 'ENERGY'
L8        1812 (CHERNOBYL## OR TSCHERNOBYL##) AND FALLOUT##

FILE 'INIS'
L9        1753 (CHERNOBYL## OR TSCHERNOBYL##) AND FALLOUT##

FILE 'ENERGIE'
L10        269 (CHERNOBYL## OR TSCHERNOBYL##) AND FALLOUT##

FILE 'NTIS'
L11        394 (CHERNOBYL## OR TSCHERNOBYL##) AND FALLOUT##

FILE 'PHYS'
L12         30 (CHERNOBYL## OR TSCHERNOBYL##) AND FALLOUT##

FILE 'CA'
L13        968 (CHERNOBYL## OR TSCHERNOBYL##) AND FALLOUT##

TOTAL FOR ALL FILES

L14       5226 (CHERNOBYL## OR TSCHERNOBYL##) AND FALLOUT##
```

```
=> S 114 AND (CESIUM## OR CAESIUM##)
FILE 'ENERGY'
L15         979 L8 AND (CESIUM## OR CAESIUM##)

FILE 'INIS'
L16         957 L9 AND (CESIUM## OR CAESIUM##)

FILE 'ENERGIE'
L17         124 L10 AND (CESIUM## OR CAESIUM##)

FILE 'NTIS'
L18         208 L11 AND (CESIUM## OR CAESIUM##)

FILE 'PHYS'
L19          16 L12 AND (CESIUM## OR CAESIUM##)

FILE 'CA'
L20         692 L13 AND (CESIUM## OR CAESIUM##)

TOTAL FOR ALL FILES
L21        2976 L14 AND (CESIUM## OR CAESIUM##)


=> S L21 and PY>=1992

TOTAL FOR ALL FILES
L28         118 L21 AND PY>=1992

=> DUPLICATE L28

ENTER REMOVE, IDENTIFY, ONLY, OR (?):REMOVE
DUPLICATE PREFERENCE IS 'ENERGY, INIS, ENERGIE, CA'
KEEP DUPLICATES FROM MORE THAN ONE FILE?  Y/(N):N
PROCESSING COMPLETED FOR L28
L29           65 DUPLICATE REMOVE L28 (53 DUPLICATES REMOVED)
```

```
=> DISPLAY 1-10 ALL

ENTER (L29), L# OR ?:.

L29   ANSWER 1 OF 65  COPYRIGHT 1992 USDOE/IEA-ETDE    DUPLICATE 1
AN    92(17):127863  ENERGY
TI    Experimental verification of dynamic radioecological models
      after the Chernobyl reactor accident.
      Experimentelle Verifizierung dynamischer Radioecologiemodelle in
      der Folge von Tschernobyl.
AU    Voigt, G.; Mueller, H.; Proehl, G.; Stocke, H.; Paretzke, H.G. (GSF
      - Forschungszentrum fuer Umwelt und Gesundheit GmbH, Neuherberg
      (Germany). Inst. fuer Strahlenschutz)
CS    GSF - Forschungszentrum fuer Umwelt und Gesundheit GmbH, Neuherberg
      (Germany); Bundesministerium fuer Umwelt, Naturschutz und
      Reaktorsicherheit, Bonn (Germany) (9204154; 9202276)
NC    BMU St.Sch. 1055
NR    GSF--40/91
SO    1992. 70 p. Also published as report BMU--1991-292, 1991, 71 p.
      OSTI as DE92548185; NTIS (US Sales Only); INIS.
DT    Report
CY    Germany
LA    German
FA    AB; ABDE
AB    The comparitive analysis uses model data and data derived from
      field experiments. The translocation factors for Cs-134 and Cs-137
      in edible plants have been determined after spraying of fields with
      Chernobyl fallout rainwater, considering the time of irrigation in
      relation to plant growth, and are shown to be the following: 0.002
      - 0.13 in winter wheat, 0.003 - 0.09 in spring wheat, 0.002 - 0.27
      in winter rye, 0.002 - 0.04 in barley, 0.05 - 0.35 in potatoes,
      0.02 - 0.07 in carrots, 0.04 - 0.3 in bush beans, 0.1 - 0.5 in
      cabbage. The weathering half-life in lettuce is 10 days. The
      transfer factors for Cs-137 uptake by the roots have been
      determined to be 0.002 on the avarage for grain, 0.002 for
      potatoes, 0.004 for white cabbage, 0.003 for bush beans and
```

The STN Software Package

- **STN Mentor**
- **STN Mentor Laboratory**
- **STN Express**
- **STN Personal File System**

STN Mentor Laboratory

This training program allows the user to search realistically in small training files using the basic functions of the Messenger command language.

It is the ideal tool to design and create STN-like training files for use on Personal Computers in a very cost-effective way.

- **Mentor Laboratory System Disk**
- **PHYSLab**
- **INSPECLab**
- **CALab**
- **BIOSISLab**
- **CEBALab**
- **PATDPALab**

STN Express 3.1

STN Express is the STN International Communication and Front-End software package.

- **Communication with STN International and other online vendors via asynchroneous lines and networks.**
- **Sophisticated online features such as text/graphics scrolling, chemical structure upload, visible hit term highlighting etc.**
- **Retrieval and printing of text/graphics or capturing this information for later use.**
- **Offline drawing of chemical structures and uploading of these structures in STN files like BEILSTEIN, REGISTRY and MARPAT.**
- **Offline preparation of search strategies.**
- **STN Express 3.1 with the Microsoft Windows interface or Apple Macintosh interface.**
- **Download of 3-D coordinates from the REGISTRY File for use with ALCHEMY II.**

STN Personal File System 3.0

It allows the creation of STN-like databases on a Personal Computer, the storage and retrieval of data in these Personal Files as well as the use of them as the basis for individual applications.

- **Creation of STN-like Personal Files.**
- **Customized design of Personal Files**
- **Manual input into Personal Files.**
- **Flexible index generation features for efficient search features.**
- **Command mode retrieval interaction almost identical to Messenger on STN.**
- **Menu mode retrieval interaction.**
- **Automatic conversion of STN data into Personal Files.**
- **Automatic conversion of data from non-STN sources into Personal Files**

- **Report and Export features for individual processing to Personal File data**

- **Link to other software packages such as STN Express, PSIBASE etc.**

QUESTEL

Chr. Wolff
WIND GmbH, Köln
on behalf of IuK Information Service GmbH, Freiburg
German representative for QUESTEL

Questel Société Anonyme is the biggest French host situated near Paris with a capital of 33 Mio. FF. Questel belongs to the France Telecom Group and was founded in 1979. Questel has representatives in Belgium, Germany, Japan, the United Kingdom and the USA.

Questel's main subjects are patents, trademarks, chemistry, business, news, politics, social sciences, sciences, products & technologies. Moreover Questel offers three gateways to the hosts FT Profile, DIALOG - the biggest US host - and to Orbit.

Questel was the first host to launch graphical structure search in the field of chemistry. This system is called DARC. In addition Questel was the first to develop and to introduce a system to search structure formulas in chemical patents: MARKUSH DARC. This technique is applicable to the World Patents Index and MPHARM, the French pharmaceutical patents database.

Questel offers more than 70 databases in the above mentioned subjects. Those important for information on nuclear energy, nuclear safety and environmental protection are marked with a grey bar on the list of databases (figure 3).

AECO is the database of the French news agency AFP - Agence France Presse. Company information is very important for cooperation between companies. There are e. g. the databases BILAN, BODACC with entries in the French trade register and DBFM. The Chemical Abstracts Database CAS not only provides chemical information like technics and patents but also information on the neighbouring fields. Therefore a search in CAS with over 11 Mio. records is imperative when looking for information on nuclear energy and environmental protection. CAS covers more than 12,000 journals and adds an average of 39,000 citations every month. The occupational safety and health database CIS is produced by the International Labour Organisation and also touches the field of nuclear energy production besides safety engineering and accident prevention.

EDF-DOC is made by Electricité de France and covers all aspects of energy sources, production, transmission, distribution and environmental problems.

Very essential information on nuclear safety and effects on the environment is included in patent databases because all international patent offices refuse to grant a patent if this information has been published before even if the inventor is the publisher himself. Consequently if the invention might be of economic interest, the inventor has to have a patent registered with the patent office before publishing it in journals. This means:
Environmental technology and nuclear technology with economic relevance comes in the form of patents first and much later, or possibly never, in journals. Questel offers several patent databases such as EPAT all European patents, JAPIO Japanese patents, PCT international patents (WIPO) and the World Patents Index WPI/L produced by Derwent with the special feature of newly written abstracts.
Two other databases are worth mentioning:
the multidisciplinary database PASCAL and the database Predicasts Promt, a leading source of worldwide industrial business and market information, which also contains citations from patent literature.
PASCAL is produced by the French CNRS Centre National de la Récherche Scientifique and covers data since 1973 on life sciences, earth sciences, physical sciences, engineering sciences and here energy, metallurgy, pollution and transportation and many more. With about 9 Mio. records PASCAL is one of the biggest databases besides Compendex, CA and Science Citation Index. Data in PASCAL looks like the example on figure 5, a recent publication on caesium pollution in Croatia. PASCAL is indexed in 4 European languages: English, French, German and Spanish. You can find numerous citations about nuclear power or nuclear energy in this database as shown in the search history (figure 6). The EDF-DOC database is produced by Electricité de France and covers all aspects on energy production since 1972. This database contains about 400,000 records. French and international journals are indexed. An example for a citation in this database is shown as well (figure 7).

As I said before the patent databases are a very important source of informatin on nuclear science & environmental protection. QUESTEL offers 8 different patent databases: EPAT, EDOC, ECLATX, FPAT, JAPIO, PCTPAT, PHARMPAT and finally the biggest which is WPI/L (see example on figure 8).

These databases are on French patents, Japanese, European and World Patents and worldwide families from 33 patent offices. Furthermore there are databases on French, German and European jurisprudence for patents. A special software allows structure searching of pharmaceutical patents.

The search history in CA (figure 10) shows how much information on nuclear energy can be found in the Chemical Abstracts database. PROMT (Predicasts Overview of Markets and Technology) contains abstracts and fulltext records on products, markets, companies as well as applied technologies for all industries (figure 11). Information is drawn from more than 1,000 of the world's important business publications, such as trade journals, trade and business newsletters, research studies, local newspapers and regional business publications, corporate news releases and more.

QUESTEL's complete offer of databases on chemistry, patents and trademarks is shown on figure 12.

***Questel** S.A.*

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Subjects

Patents

Trademarks

Chemistry

Business

News, Politics & Social Sciences

Sciences, Products & Technologies

Gateways:

FT PROFILE

DIALOG

ORBIT

Questel

> 70 Databases

1	ACIDOC	ACID RAIN
2	ADHEMIX	GLUES ON THE FRENCH MARKET
3	AECO	AFP ECONOMIC NEWS
4	AFPE	AFP ENGLISH - WORLD NEWS
5	AFPS	AFP SPANISH - NOTICIAS DEL MONDO
6	AGRA	AFP GENERAL NEWS
7	BELGI	MODEL BELGI
8	BENELUX	BENELUX ENTREPRISES
9	BILAN	FRENCH COMPANY DESCRIPTIONS
10	BIOETHICS	BIOMEDICAL ETHICS
11	BODACC	CURRENT ENTRIES IN TRADE REGISTER
12	CAS	CASearch 1967 to date
13	CIB	IPC Text, French Version
14	CIM	CEMENTS AND HYDRAULIC BINDINGS
15	CIS	OCCUPATIONAL SAFETY AND HEALTH
16	CUADRA	Directory of online databases
17	DAUGAZ	Natural gas and other gaseous fuels
18	DBCH	SUISSE/LIECHTENSTEIN ENTREP.
19	DBES	SPANISH ENTREPRISES
20	DBFM	FRENCH COMPANIES
21	DBIT	ITALIAN ENTREPRISES
22	DKMARK	DANISH TRADEMARKS
23	DMARK	WEST GERMAN TRADEMARKS
24	ECLATX	EPO Internal Classification Scheme
25	ECOMINE	MINING ECONOMICS

26	EDF-DOC	ELECTRICITY, ENERGY, ENVIRONMENT
27	EDOC	EPO documentation
28	EPAT	EUROPEAN PATENTS
29	ESSOR	FRENCH INDUSTRIAL COMPANIES
30	EUROPA	European Companies
31	FMARK	French trademarks
32	FPAT	FRENCH PATENTS
33	FRANCIS	SOCIAL SCIENCES AND HUMANITIES
34	GEOBANQUE	FRENCH UNDERGROUND WORKS
35	HOPGER	GERMAN ENTREPRISES
36	IALINE	AGRICULTURE AND FOOD INDUSTRIES
37	IMARK	Italian Trademarks
38	ITALI	Italian Companies
39	JANSSEN	Chemical product catalog
40	JAPIO	PATENT ABSTRACTS OF JAPAN
41	JUREP	EUROPEAN PATENTS JURISPRUDENCE
42	JURGE	GERMAN PATENTS AND TRADEMARKS JURISPRUDENCE
43	JURINPI	FRENCH PATENTS TRADEMARKS JURISPRUDENCE
44	LOGOS	FRENCH POLITICAL, SOCIAL INFO
45	M-ESSOR	
46	MEDLINE	WORLD'S FIRST MEDICAL DATABASE
47	MEETING	FUTURE MEETINGS and CONGRESSES
48	MRCK	The MERCK Index 11th edition
49	NORIANE	AFNOR: STANDARDS IN FORCE
50	ODMARK	EAST GERMAN TRADEMARKS
51	ORIADOC	French documentation centers
52	PASCAL	MULTIDISCIPLINARY : SCIENCE/TECHNOLOGY

53	PCTPAT	PCT PATENT DATABASE
54	PHARM	Pharmsearch
55	PROMT	PROMT
56	QUESTA7	FRENCH NATIONAL ASSEMBLY 7th
57	QUESTA8	FRENCH NATIONAL ASSEMBLY 8th
58	QUESTA9	FRENCH NATIONAL ASSEMBLY 9th
59	SCRL	FRENCH COMPANIES BANKRUPTCIES
60	TELEDOC	TELECOMMUNICATIONS
61	TMINT	INTERNATIONAL TRADEMARKS
62	TRANSIN	TECHNOLOGY TRANSFERS
63	URBAMET	PLANNING/URBAN ENVIRONMENT
64	WPI	Derwent world patents index
65	WPIL	Derwent world patents index latest
66	ZCAS	CAS training file
67	ZDMARK	DMARK TRAINING FILE
68	ZEPAT	Epat training file
69	ZIMARK	IMARK TRAINING FILE
70	ZMEDLINE	MEDLINE TRAINING FILE
71	ZPASCAL	PASCAL TRAINING FILE
72	ZPHARM	Pharmsearch training file
73	ZWPI	Derwent training file

Questel

Sciences, Products & Technologies

PASCAL

1973 - today

9 Mio. Records

Life Sciences

Earth Sciences

Physical Sciences

Engineering Sciences: Energy,

Metallurgy, Pollution, Transportation...

PASCAL

3/23 - (C) CNRS
NO : PASCAL-ZOOLINE 92-0306518 INIST
ET : **(137)Cs in flowers, pollen and honey from the republic of Croatia four years after the Chernobyl accident
AU : BARISIC D; LULIC S; KEZIC N; VERTACNIK A
AF : Rudjer Boskovic inst., cent. marine res./Zagreb Croatia/YUG
DT : Periodique; LA
SO : Apidologie; ISSN 0044-8435; Coden APDGB5; DEU; DA. 1992; VOL. 23; NO. 1; PP. 71-78; ABS. fre/ger; BIBL. 5 ref.
LA : ENG
FA : Jusqu'à présent une quantité importante de radionucléides a été produite et s'est répandue dans l'atmosphère. Parce que le dépot se fait à la fois par la voie sèche et la voie humide, la majeure partie des radionucléides s'est déposée à la surface de la terre sous forme de retombées. Déterminer les mouvements des radionucléides dans le sol présente actuellement un grand intérêt en raison de la forte variabilité naturelle des plantes concernant l'absorption des radionucléides. Bien que l'ingestion de miel par l'homme ne représente pas un facteur important dans la contamination radioactive, la radioactivité du miel est particulièrement intéressante pour suivre la contamination radioactive due aux retombées.
CC : 002A36C02C1; 260
FD : Sol; Absorption; Radioisotope; Césium; Fleur; Pollen; Miel; Pollution radioactive; Accident; Centrale nucléaire; Yougoslavie; Tchernobyl
ED : Soils; Absorption; Radioisotope; Cesium; Flower; Pollen; Honey; Radioactive pollution; Accident; Nuclear power plant; Yugoslavia
GD : Absorption; Caesium; Unfall; Kernkraftwerk; Jugoslawien
SD : Suelo; Absorción; Radionúclido; Cesio; Flor; Polen; Miel; Polución radioactiva; Accidente; Central nuclear; Yugoslavia
LO : INIST-14943.354000021782500080

P A S C A L (Cont.)

Search History

File : PASCAL

SS	Results	
1	3797	NUCLEAR W ENERGY
2	7427	NUCLEAR W POWER
3	5471	NUCLEAR 2D PLANT
4	23	(OR 1, 2, 3) AND (OR CAESIUM, BERYLLIUM, HAFNIUM)

E D F - D O C

135/235 - (C) Edf-Doc
NUMERO EDF: 77H206516
TITRE FRAN: RADIOACTIVITE-PREMIERE FUITE EN VILLE
AUTEURS : BROMHEAD L.
TYPE DOC. : ARTICLE DE REVUE; (P)
SOURCE : SCIENCES ET AVENIR; N.360; pp.134-139
COD SOURCE: 0036-8636
DATE PUBLI: 1977-02-21
LANGUE : FRE
ABREGE : PRESENTATION DES CIRCONSTANCES DANS LES-QUELLES S'EST PRODUITE UNE DEFAILLANCE DANS LE FONCTIONNEMENT DU REACTEUR NUCLEAIRE A HAUT FLUX DU CENTRE D'ETUDES NUCLEAIRES DE GRENOBLE ET DE L'INSTITUT LAUE-LANGEVIN. DEFAILLANCE A L'ORIGINE DE LA POLLUTION DE LA NAPPE PHREATIQUE DE L'ISERE ET CAUSEE PAR UNE ERREUR D'USINAGE DE L'ENVELOPPE DU "BRIQUET D'ALLUMAGE" DE LA REACTION (PETITE QUANTITE D'ANTIMOINE 124 ET DE ***BERYLLIUM***). LA NON RECUPERATION DE L'"ALLUMETTE" PERMIT A L'ANTIMOINE DE SE DISSOUDRE DANS L'EAU DE LA PISCINE DE PROTECTION. LES LECONS A TIRER DE CET INCIDENT.
DESCRIPT. : CONTAMINATION RADIOACTIVE; DECONTAMINATION; EFFLUENT RADIOACTIF; GRENOBLE; INCIDENT DE FONCTIONNEMENT; NAPPE PHREATIQUE; PISCINE DE REACTEUR; POLLUTION; RADIOACTIVITE; RADIOPROTECTION; REACTEUR A HAUT FLUX; REACTEUR NUCLEAIRE; SURETE NUCLEAIRE

W P I L

6/20 - (C) Derwent
AN - 89-375775 [51]
XA - C89-166809
TI - Control rod for nuclear reactor - comprises solid metal ***hafnium* neutron absorbing rods which have uneven surface or hollow structure for high surface area (J5 28.5.82)**
DC - K05
PA - (NIGJ) NIPPON GENSHIRYOKU JIGYO
(TOKE) TOSHIBA KK
NP - 2
PN - J89055439 B 891124 DW8951
J57086086 A 820528 DW8951
PR - 80JP-161367 801118
AP - 80JP-161367 801118
IC - G21C-007/24
AB - J89055439 Control rod for nuclear reactor comprises neutron absorbing ion rods made from a solid metal Hf capable of absorbing neutrons. The solid metal is treated to have an uneven surface on a hollow structure to increase the surface area.
USE - Used for ***nuclear*** ***power*** plants.
(J57086086-A) (4pp Dwg.No.0/4)

Search History

File : WPIL

SS	Results	
1	82	NUCLEAR W ENERGY
2	4983	NUCLEAR W POWER
3	3844	NUCLEAR 2D PLANT
4	20	(OR 1, 2, 3) AND (OR CAESIUM, BERYLLIUM, HAFNIUM)

C A S

4/1017 - (C) Acs
AN - 116-183346
IS - 116-18
TI - A low-alpha [specific power] nuclear electric propulsion system for lunar and Mars missions
AU - Coomes E P; Dagle J E
AF - Pac. Northwest Lab.; Richland; 99352; WA; USA (US)
LA - Eng
DT - Journal
SO - AIP Conf. Proc. (APCPCS,0094243X); 92; Vol.246 (Proc. Symp. Space Nucl. Power Syst., 9th, 1992, Pt. 3); pp.878-83
SC - S71-013/1992
SX - S52/1992
IT - 25658-43-9 (NU):
(space nuclear power systems using molybdenum base-rhenium-hafnium matrix with highly enriched)
- 139463-96-0 (Hf.Mo.NU.Re):
(in space nuclear elec. propulsion system for lunar and Mars missions)
- 140609-19-4 (W99):
(nuclear auxiliary power system using uranium nitride fuel in matrix of)
- -Alkali metals-, uses:
(cermet-fueled fast reactor with boiling, for nuclear elec. propulsion system for lunar and Mars missions)
- -Nuclear auxiliary power systems-:
(for elec. propulsion in lunar and Mars missions, low-alpha)
KW - elec nuclear propulsion system space; power system auxiliary nuclear space; lunar mission elec propulsion system; MARS mission elec propulsion system; moon mission elec propulsion system; cermet fuel space nuclear auxiliary power

C A S (Cont.)

Search History

File : CAS

SS	Results	
1	47615	NUCLEAR W ENERGY
2	8053	NUCLEAR W POWER
3	4953	NUCLEAR 2D PLANT
4	1711	(OR 1, 2, 3) AND (OR CAESIUM, BERYLLIUM, HAFNIUM)
5	56608	OR 1, 2, 3
6	31225	CAESIUM OR BERYLLIUM OR HAFNIUM
7	1017	6 L 5

P R O M T
Predicasts

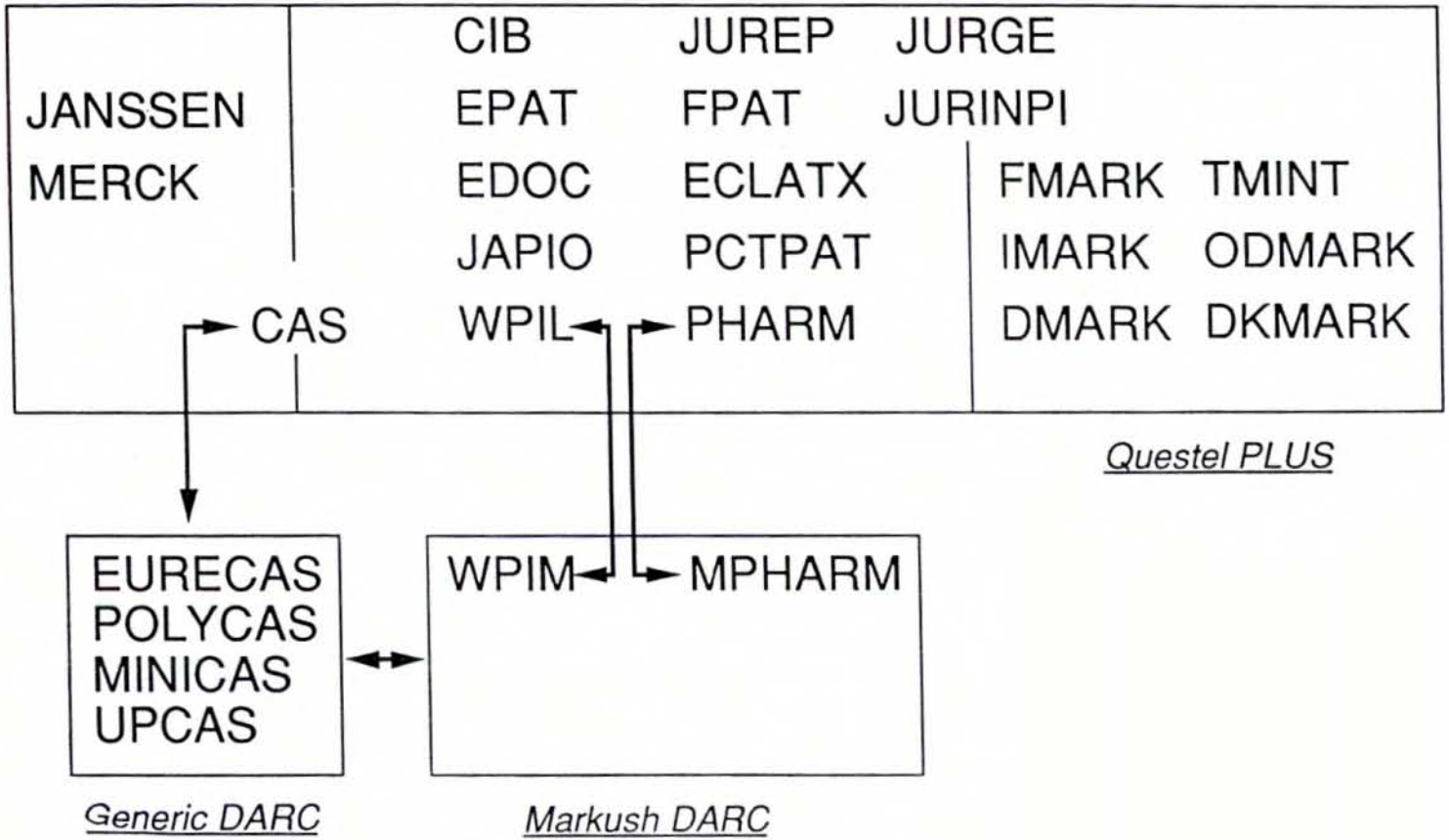
2/90 - (C) PREDICASTS
AN : 4040431
SO : Journal of Commerce; September 21, 1992; Page(s) : 2A;
ISSN : 0361-5561
TI : Mexico Is First Nation to Sign Chemical Safety Convention.
AT : Mexico: Govt radified convention guaranteeing chemical industry employee safety
TX : Mexico: The govt has radified the convention guaranteeing chemical industry employee safety, according to the Intnl Labor Organization. The convention requires chemical labeling of hazardous materials and gives workers the right to exit an area when the use of certain chemicals presents an imminent danger of bodily harm. About 5-10% of the the world's 80,000 chemicals are considered hazardous.
PN : *Chemicals & Allied Products (*2800000)
EN : *Government Regulation (cont) (94)
CN : *Mexico (*3MEX)
UP : 92-09-28

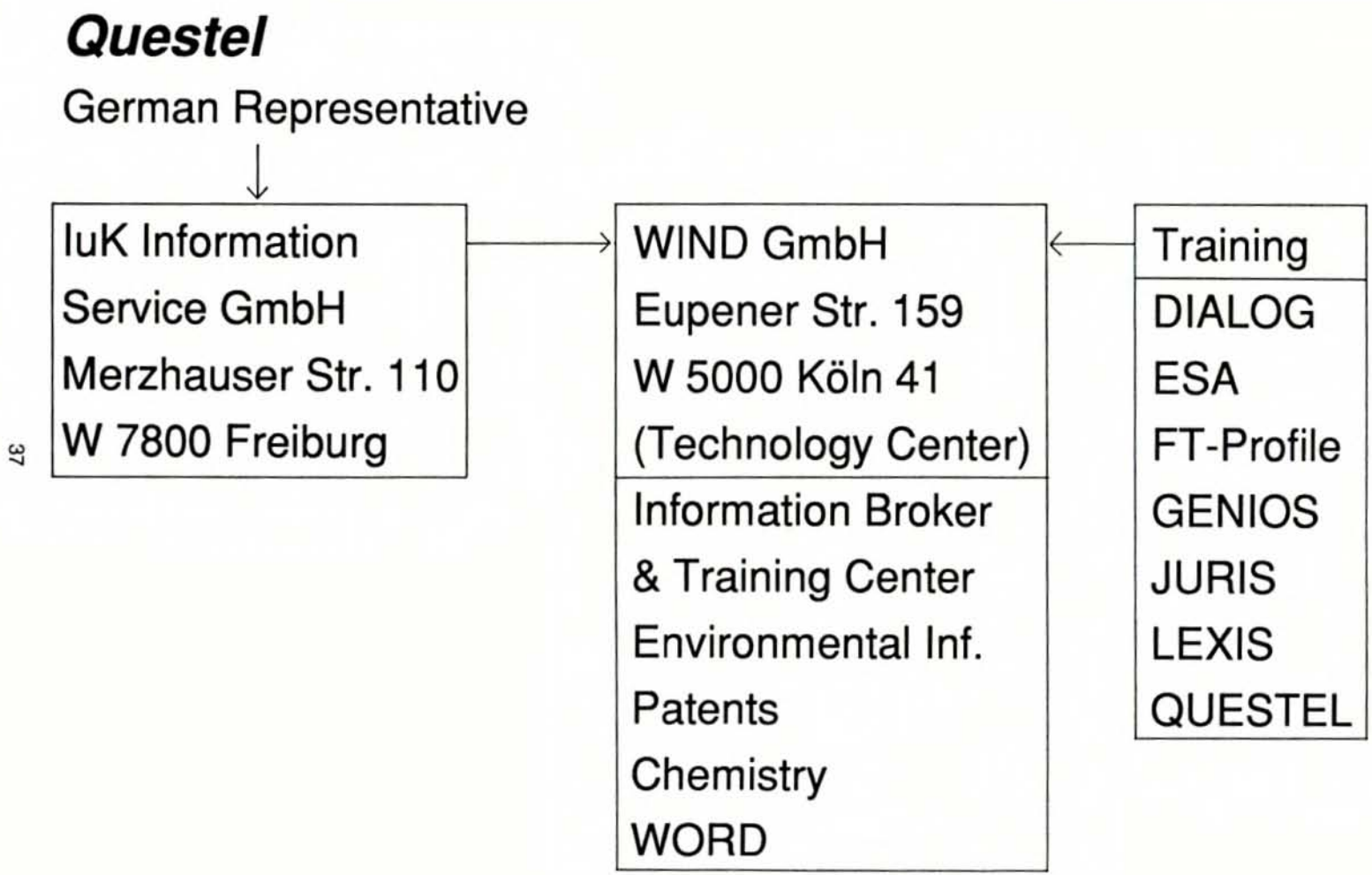
Search History

File : PROMT

SS	Results	
1	372	NUCLEAR 5D SAFETY
2	90	CHEMICAL 2D SAFETY

L'offre Brevets Marques Chimie




Questel
German Representative
IuK Information
Service GmbH
Merzhauser Str. 110
W 7800 Freiburg
WIND GmbH
Eupener Str. 159
W 5000 Köln 41
(Technology Center)
Information Broker
& Training Center
Environmental Inf.
Patents
Chemistry
WORD
Training
DIALOG
ESA
FT-Profile
GENIOS
JURIS
LEXIS
QUESTEL

Databases in the fields of Toxicology, Occupational and Environmental Healt at DIMDI

Elisabeth Bystrich
DIMDI - Deutsches Institut für medizinische Dokumentation und Information - Köln

Operators of chemical and nuclear power plants should have quick and easy access to information systems providing answers to the broad spectrum of questions that might occur in relation to their work. Many of the databases available at DIMDI can be very useful for solving problems concerning occupational and environmental health, prevention, diagnosis and treatment of occupational diseases, radiation injuries, radiation protection, toxic and ecotoxic effects of hazardous substances.

DIMDI, the German Institute for Medical Documentation and Information, is a governmental institute and affiliated to the Federal Ministry for Health. It was founded in 1969 in Cologne. At present DIMDI hosts about seventy international and national bibliographic and factual databases in the field of biosciences, such as medicine, public health, pharmacology, toxicology, occupational and environmental health, nutrition, biology, psychology, sociology, sports, and agricultural sciences. The most important databases with toxicological and ecotoxicological information, which contain data useful for managers of chemical and nuclear power plants are the factual databases HSDB, ECDIN, SIGEDA, RTECS, and CCRIS, and the bibliographic databases TOXALL, ENVIROLINE, SCISEARCH, MEDLINE, EMBASE, and BIOSIS PREVIEWS.

Factual databases

In the factual databases chemical substance information can be found, such as terminology, chemical and physical properties, manufacturing and use, safety and handling, toxicity and biochemical effects, environmental fate, standards and regulations, and monitoring methods. When selecting a database the user should consider not only the subject fields covered but also the number and types of substances contained in the databases.

Short description of the factual databases at DIMDI

HSDB (Hazardous Substances Data Bank) is produced by the National Library of Medicine (NLM), USA on demand of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of the USA. It contains about 4,300 substances (Oct. 1992). Updating is done quarterly. All substance use classes are covered. Chemicals are selected according to amount of usage and general hazard potential. Data are evaluated by a peer review committee of the NLM.

ECDIN (Environmental Chemicals Data and Information Network) is produced by the Joint Research Centre (JRC) of the Commission of the European Communities. About 122,400 substances (Oct. 1992) are stored. Updating occurs twice a year. All substances from the official EINECS list (European Inventory of Existing Commercial Chemical Substances) are included, partly with limited information (only terminology). For substances with a significant danger potential to the environment there is detailed and often very comprehensive information. Data are evaluated by experts.

SIGEDA (Siemens Gefahrstoffdatenbank), produced by Siemens AG, Germany, contains data for about 2,800 substances and mixtures (Oct. 1992). The database is updated quarterly. Substances are selected according to hazard potential at occupational exposure. Experts evaluate the data.

RTECS (Registry of Toxic Effects of Chemical Substances) is produced by the National Institute for Occupational Safety and Health (NIOSH), USA. It contains about 114,200 substances (Oct. 1992). Updating is done quarterly. All substance use classes are covered. There is no evaluation of the data, which mainly come from journal articles.

CCRIS (Chemical Carcinogenesis Research Information System) is produced by the National Cancer Institute (NCI), USA. It contains about 3,300 substances (Oct. 1992). Updating occurs quarterly. Only substances tested for carcinogenicity, mutagenicity, tumor promotion and inhibition are selected for the database. Data are evaluated by experts of the NCI.

Besides SIGEDA, which is a German language database, all databases are in English language.

Structure and contents of the unit records

Much effort is made to present the unit records in the different databases in a common structure. The work of harmonization is still in progress. Usually there is one unit record for a defined substance. The data for the substances are stored within the record in data fields. The structure of the unit records in HSDB was taken as prototype and adapted to other databases. In HSDB about 140 fields are arranged in twelve field groups (identified by two plus signs (++)) and partly even subgroups (identified by one plus sign (+)). According to the subject coverage of the other databases not all twelve field groups are present (see Table 1). We also take much care to designate data fields containing comparable content with the same field labels in the different databases.

Table 1: Field groups present in the databases

		HSDB	ECDIN	SIGEDA	RTECS	CCRIS
++ DAT	DATAMAINTENANCE	X	X	X	X	X
++ IDEN	IDENTIFICATION OF SUBSTANCE	X	X	X	X	X
++ MANU	MANUFACTURING/USE INFORMATION	X	X	X		X
++ CHEM	CHEMICAL/PHYSICAL PROPERTIES	X	X	X		
++ SAFE	SAFETY AND HANDLING	X	X	X		
++ TOXI	TOXICITY/BIOMEDICAL EFFECTS	X	X	X	X	X
++ ENVI	ENVIRONMENTAL FATE/ECOTOXICITY	X	X			
++ STAN	STANDARDS AND REGULATION	X	X	X	X	
++ MONI	MONITORING AND ANALYSIS METHODS	X	X	X		
++ PHAR	PHARMACOLOGY	X				
++ REFE	REFERENCES, ADDITIONAL	X				
++ EXP	EXPRESS UPDATE	X				

(++ group name)

When applicable conceptually related data fields are arranged in subgroups, especially in HSDB and in SIGEDA (see examples in Table 2).

Table 2: Field groups and subgroups present in the databases for group SAFE

		HSDB	ECDIN	SIGEDA	RTECS	CCRIS
++ SAFE	SAFTY AND HANDLING	X	X	X		
+ HAZA	HAZARD INFORMATION	X	X			
+ MASSN	COUNTERMEASURES IN ACCIDENTS			X		
+ FIRE	FIRE FIGHTING INFORMATION	X		X		
+ PREV	PREVENTIVE MEASURES	X	X	X		

(++ group name, + subgroup name)

Many fields do not belong to any subgroup. They are directly affiliated to a group (see fields marked with a point (.) in Table 3).

Table 3: Field groups, subgroups and data fields present in the databases; example: group SAFE (shortened)

		HSDB	ECDIN	SIGEDA
++ SAFE	SAFETY AND HANDLING	X	X	X
+ HAZA	HAZARD INFORMATION	X	X	
HAZS	HAZARDS SUMMARY	X		
DANG	DANGER POTENTIAL		X	
. DOT	DOT EMERGENCY GUIDELINES	X		
. EMERG	EMERGENCY ACTIONS		X	
. FMAID	FIRST AID		X	
. SYM	SYMPTOMS, FIRST AID		X	
+ MASSN	COUNTERMEASURES IN ACCIDENTS			X
MSFW	FURTHER COUNTERMEAS. IN ACCID.			X
NENT1	EMERGENCY DISPOSAL			X

(++ group name + subgroup name,
. field not affiliated to a subgroup)

The field groups usually comprise numerous data fields. Some of them occur only in one database while others can be found in several databases. A user tool which will give a complete survey of the presence of fields in the various databases is under preparation. Individual memocards for the databases contain lists of the data fields in alphabetic order and additionally in the sequence as presented in the unit records. However, when indicated a group or a field is available in a database, this does not mean that it is present for every substance. Especially records for substances from the EINECS list (European Inventory of Existing Commercial Chemical Substances), which are included in ECDIN, mainly contain only terminological information.

Search possibilities

Searches can be carried out in the factual databases by means of a menu driven user guidance. It is no longer necessary to learn the retrieval language GRIPS in order to be able to perform searches. Searching with the menu driven user guidance is easy. Menus and search possibilities are very similar in the different databases. There is a "Substance Search" and a "Search for the most important Term". The first option is the preferred search type. The user wants to retrieve data for a special substance.

The screen for the start of the "Substance Search" in ECDIN is shown in in Table 4. It is possible to begin the search with a substance name or fragments of it or with numbers specific for the substance, such as CAS (Chemical Abstracts Service) Reg. Number or EINECS (European Inventory of Existing Commercial Chemical Substances) Number. It is even possible to enter the molecular formula or fragments of it. For the retrieved substance the names of field groups present in the record are shown. After having chosen a group, the names of fields available for the substance are displayd for selection. The user sees which data are stored and he/she can choose fields of interest for the output. If the complete unit record is needed, all fields can be shown, printed, or downloaded. But the user should bear in mind that the record length in factual databases differs very much, even within one database. Some records in HSDB and ECDIN are very long, e. g. 655,000 characters for cadmium in ECDIN or 162,000 characters for formaldehyde in HSDB, others, mainly of the EINECS list in ECDIN, are rather short, about 100 characters. Therefore in every unit record the approximate record length is stated in the first line. As the output of characters has a considerable influence on the costs, we advice to choose only the necessary fields or field groups.

For the second option "Search for the most important Term" concepts or properties are entered with the intention to find substances pertinent to them, e. g. a search for "liver toxicity" will retrieve substances for which this effect is stated in the unit record. Both search types can be combined with one another during the course of the user guidance, e.g.: liver toxicity of dichlorobenzene. It is possible to restrict the output to those fields which contain the entered search terms. By this way it is not necessary to scan the complete record, which may be very comprehensive, to find the desired data.

Table 4: User Guidance

```
2.11 Substance Search

   The database ECDIN contains                          122,467 records

 Enter either the substance name (e.g.: Phenol) or one or more fragment
 names (e.g.: chloro nitro benzene) or one of the specific numbers or the
 molecular formula.
 For identification, the input must be preceded by one of the following
 abbreviation:

  Examples:  TE:Phenol   or CR:108-95-2

TE:   substance name
NF:   name fragment(s)
ND:   ECDIN number
CR:   CAS REGISTRY number
EI:   EINECS number
EE:   EG Nummer
MF:   molecular formula
FF:   formular fragment(s)

or   8 for HELP,  9 for END,  0 for MENU

Please enter here:
```

It is planned for the near future to have the possibility to search all or selected factual databases at one step with a common user guidance. The result for a special substance could be similar to the list in Table 1 (broad survey of search result) or Table 3 (specific search result).

Searchers familiar with the retrieval language GRIPS can do their searches using GRIPS commands. GRIPS (General Relation based Information Processing System) fulfils all demands of the Common Command Language (CCL) as proposed by the Commission of the European Communities (CEC). The standard SHOW command for the output offers similar to the user guidance lists of group and field names present ("table of contents").

Bibliographic databases

One of the most important bibliographic database for toxicological questions is TOXALL (up to end of 1987 called TOXLINE), produced by the National Library of Medicine (NLM), USA. It is a comprehensive bibliographic database in English language, composed of several subunits derived from toxicologically important parts of databases (Chemical Abstracts, MEDLINE, BIOSIS PREVIEWS) and complete contents of various special data collections (see list of subunits in Table 5).

Table 5: Subunits in TOXALL

ANEUPL	:Aneuploidy
BIOSIS/HEEP	:Biosis Prev, Health Effects of Environmental Pollutants
CA	:Chemical Abstracts (selected sections)
DART	:Developmental and Reproductive Toxicology
EMIC	:Environmental Mutagen Information Center File
EPIDEM	:Epidemiology Information System
ETIC	:Environmental Teratology Information Center File
FEDRIP	:Federal Research in Progress
HAYES	:Hayes File on Pesticides
HMTC	:Hazardous Material Technical Center File
ILO	:International Labor Office
IPA	:International Pharmaceutical Abstracts
NIOSH	:National Institute for Occupational Safety and Health
PESTAB/HAPAB	:Pesticide Abstracts
PPBIB	:Poisonous Plants Bibliography
RPROJ	:Research Projects Directory
TD3	:Toxicology Document and Data Depository
TMIC	:Toxic Materials Information Center File
TOXBIB	:Toxicity Bibliography
TSCATS	:Toxic Substances Control Act Test Submissions

There are about 3,5 millions records resp. project descriptions since 1965 (approx. 20,000 citations from 1940 to 1965). The annual growth rate is about 150,000 references. Updating is done quarterly. The unit records contain bibliographic data, such as author(s), title, source, index terms, CAS Reg. No., and for about 82 % abstracts.

There is no common controlled vocabulary for the different subunits of TOXALL. Therefore freetext searches have to be carried out. As the formulation of sufficient and comprehensive freetext search profiles with collections of synonyms and spelling variations can be very time consuming, DIMDI offers specific help to the searcher. Synonyms and CAS Reg. Numbers for chemical substances can be found with help of a menu driven user guidance called GRIPS CHEM, which makes use of the terminological database CHEMLINE. The second assistance for a freetext search consists in the availability of Preprocessed Searches (PPS). The PPS are based on broad mainly textword search profiles for special topics. They can be used to limit a search to these subjects by simply entering the names of the PPS. There are at present fifteen PPS for TOXALL (see Table 6).

Table 6: Preprocessed Searches (PPS) in TOXALL

Adverse Drug Reactions
Analysis
Animal
Cancer
Ecotoxicity
Heavy Metals
Human
In Vitro Testing Methods
Mutagenicity
Neoplasms
Occupational Exposure
Pharmacokinetics
Poisoning
Teratogenicity, Embryotoxicity, Reproductive Toxicology
Toxicology, General

At the end of a TOXALL search retrieved duplicates, caused by the overlap of the contents of the different subunits, can easily be removed by a duplicate checking command.

Following NLM's policy of offering parts of TOXALL at reduced licence fees, DIMDI created the subfiles TOXLIT and TOXLINE. TOXLIT represents about two thirds of TOXALL and contains the subunits BIOSIS/HEEP, CA (Chemical Abstracts) and IPA (International Pharmaceutical Abstracts). TOXLINE is composed of the remaining subunits and can be used at fairly reduced licence fees.

If complete toxicological information for a special question is needed, one should consider to use in addition to TOXALL other bibliographic databases, such as EMBASE, ENVIROLINE and SCISEARCH. The toxicological relevant parts of MEDLINE and BIOSIS PREVIEWS are already included in TOXALL. Retrieved duplicates of citations in the different databases can again be eliminated by the duplicate checking command. Copies of the original literature can quickly be ordered at libraries in Germany and abroad using the online document ordering service at DIMDI.

Costs

Besides the administration charge of DM 100,-- on the occasion of issuing a user code and at the start of every calender year the user pays only fees, when he/she uses the system. DIMDI connect hour costs can range from about DM 27 to DM 67. This calculation is based on the average user, who transmits 54,000 characters per hour and whose connect hour is composed of 3 minutes "system time" and 57 minutes "thinking time". Which price in this range has to be paid, depends on the user class (favoured user: public authorities; non favoured: private institutions), the usage volume per quarter and the database class. Also charged are characters shown online or downloaded, offline printed sheets, offline loaded diskettes, magnetic tapes or casettes, standing orders, database manuals, courses, and shipping. In addition to the DIMDI charges royalty fees of the database producer and value added tax have to be paid.

Perspectives

DIMDI will implement further databases, especially factual databases, on potentially dangerous substances, e. g. AGROCHEMICALS, produced by the Royal Society of Chemistry (UK) will be loaded next. Further software developments will enable the user to search several databases at one step. The menu driven user guidance will soon become available for all databases. By this way searching will become more and more easier.

October 1992

EUROBASES

K. Gläser
Commission of the European Communities, Brussels

I am conscious of the fact that by participating in a seminar organized by GRS you might above all expect information focussed on the technological aspects of nuclear power and nuclear safety.

This, Eurobases cannot provide. (There might be one exception: the SESAME database, listing a series of projects in radiation protection and decommissioning of nuclear installations).

But, as you may know, technology needs a legal framework, an overall political structure in which it must be incorporated. Information on these aspects we can very well provide: up-to-date, reliable and affordable.

Let me point out, however, that various Commission services produce databases dedicated to Research and Technical Development that are open to the public, such as CORDIS, Esprit and Eurocontact (produced by the Directorate-General for Telecommunications, Information Industries and Innovation) and REM (produced by the Community's Joint Research Centre in Ispra).

Data available via Eurobases are not desseminated by us exclusively, for in a free information market monopolies have become anachronistic. Thus over 30 organizations disseminate our EC databases or parts of them, among them well-known players in the online market such as Data Star, STN, MDC, JURIS, FT Profile, to name but a few.

Before listing the seven databases we give access to (you can see that we are quite small compared to other hosts offering hundreds of databases), let me stress the characteristics which are common to all of them:

- They are multilingual
  This is due to our tradition of working in several (to be precise: nine) languages. (There is, however, one exception: the SESAME database). This is rather unique

in the online market where in 1989 nine out of ten databases produced in Europe were availabe in only one language.

- They contain raw/untreated information
  Data disseminated by Eurobases are not tailored to specific needs (custom-made) and are rather general even on specific subjects. They need interpretation by information brokers or mid-users.

- They are authentic
  Every file is compiled by European Commission services directly or by firms working under contract for the CEC. Information you access on EC subjects will thus be official and validated, some of it (like CELEX) will even be legally binding.

Before giving you details on our databases, let me classify them into three categories:

1. First category

Here we provide files for preliminary navigation within the world of EC information. Here you will find databases which:

- are highly up-to-date (sometimes updated several times a day like INFO 92)
- contain easy-to-understand documents in full text, with concise information on specific subjects
- offer information prior to publication in the Official Journals of the EC or in official documents
- are comparatively small in size (no more than 10.000 records)

These databases are: RAPID, EUROCRON, INFO 92. Among them, RAPID will come closest to the needs of somebody involved in information management in the field of nuclear safety.

2. Second category

This category encompasses referential tools for expanding your searches. Searches can now be historically oriented. Here you will find databases:

- with a medium update frequency (3 to 4 times a month)

- which contain short abstracts and referential information from varying sources (not only EG sources) analyzed by Commission services
- whose references are introduced following official publication
- whose number of records is in the range of 100.000.

These databases are: SCAD and ECLAS. SCAD will come closest to the needs of somebody involved in information management in the field of the nuclear safety.

3. Third category

Within this category, you will find full text/factual databases for performing expert searches:

- with a medium update frequency (weekly)
- which contain the full text or a highly structured description of the contents of the source document
- whose texts are introduced following official publication.

These databases are:

CELEX: a database ideally suited for sophisticated legal searches, which accounts for 60 % of our turnover. Celex offers you:

- availability of full text for legislation and case law, references for preparatory documents
- a means to establish links between various aspects of EC law (legislation, case law, national implementation, treaties).

SESAME: an inventory of energy projects (national and EC sponsored). SESAME provides you with:

- exhaustive information on each project such as contractors, aim, budget allocated, time span, etc.
- information on particular events (workshops organized by the Commission) and on supporting documentation available.

EUROBASES

Online access to important multilingual EC information sources

CELEX: European Community Law

INFO 92: completing the Internal Market

RAPID: daily press-release service

SCAD: EC bibliography

ECLAS: Commission Library

EUROCRON: user-friendly statistics

SESAME: energy-technology projects

Online access to Eurobases:

X25 public networks

no subscription fees; pay-as-you-go invoicing

User Support Services:

- a multilingual help desk

- a training programme offering frequent 1, 2 or 3-day sessions in Brussels

- a full range of user documentation including manuals, pocket-guides, etc.

- a monthly newsletter

RAPID

Public Access to the Commission's Press-Release Service

PRODUCER: EC Spokesman's Service

TIME SPAN: from 1985

NUMBER OF RECORDS: + 11 000

GROWTH: 1000 documents per year

UPDATING: daily

LANGUAGES: English, French, German

SEARCH LANGUAGE: Menu-driven or BASIS

RAPID

The Commission is News!

5 Types of Documentary Information:

P NOTES: Press releases designed to present a basic summary of an important policy proposal or decision.

IP NOTES: Shorter press releases announcing a specific news item intended to be of immediate interest.

MEMOS: Background information notes addressed to journalists on a non-attributable basis

SPEECHES: Selected speeches by Members of the Commission

KEY DOCUMENTS: Communiques of the European Council and the European Summits

A User-Friendly Database

offering easy-to-use, menu-driven searching

S C A D

Offers bibliographic entries for the following types of documents:

- Community acts and related preparatory documents

(FR & EN)

- Official publications and documents of the European Institutions

(FR, EN, DE)

- Articles from over 2000 periodicals published worldwide

(original language)

- Statements and opinions from the two sides of industry, e.g. employers associations, trade unions

(original language)

ECLAS

"European Commission's Library Automated System"

•

- PRODUCER: Central Library of the European Commission
- SOURCES: Books, Community publications, intergovernmental publications, specialist periodicals
- TIMESPAN: from 1978
- NUMBER OF RECORDS: 90 000
- GROWTH: 7 000 per year
- UPDATING: 3-4 times per month
- LANGUAGES: original language
- SEARCH LANGUAGE: menu-driven or BASIS

CELEX

Interinstitutional Documentation System for Community Law

PRODUCER: The Community Institutions

SOURCE: Official Journal L & C Series, European Court Reports, COM Final Documents, etc.

TIMESPAN: Varies according to type of document

NUMBER OF RECORDS: 130 000

GROWTH: 5 000 per year

UPDATING: Weekly

LANGUAGES: 7 Community languages

SEARCH LANGUAGE: Mistral

C E L E X

The Entire Body of European Community Law

- Celex covers:

- Legislation including the Treaties, regulations, directives, decisions, agreements

- Preparatory Documents including Commission proposals, EP resolutions,...

- Court of Justice case-law including judgments, orders, opinions of the Advocates-General

- Parliamentary Questions

- References to National Measures implementing Community Directives

SESAME

Gateway to the European Commission's energy-technology projects

PRODUCER: Directorate-General for Energy; Directorate-General for Science, Research & Development

TIME SPAN: Hydrocarbons projects since 1975; other projects since 1978

NUMBER OF RECORDS: 13,000 projects

GROWTH: 1,000 projects per year

UPDATING: weekly

LANGUAGE: English

SEARCH LANGUAGE: Mistral

SESAME:

- provides information on innovative energy-technology projects supported by the EC and European countries

- is a contact point with hundreds of contractors

- lists many of the manufacturers of energy equipment used in the projects

Sesame contains information on projects in the following sectors:

- energy saving

- biomass & energy from waste

- geothermal energy

- solar & wind energy

- hydrocarbon technology

Deutsche Presse Agentur (dpa), Hamburg

R. Decker

dpa is the leading news agency in the German speaking world.

As an international agency, it distributes news services throughout the world. In the Federal Republic, these include the pfoto services.

Outside Germany, dpa distributes the European service in German, Spanish language services to Latin America, Spain and Portugal, English language services to North America, Asia, Africa and the Middle East and the dpa International service to the Middle East in Arabic language.

dpa is owned by the German media and free of all official and political influence. One of its services to the media is the dpa-database. First of all: The dpa-database contains only german text.

The essential part of our database is the dpa-Nachrichtendatenbank, the dpa-news database. It contains the original text of all news items distributed by the agency in the Federal Republic during the last 2 years. That means news distributed via the domestic wire of dpa with national and foreign news items and 12 regional wire services (Berlin/Brandenburg, Schleswig-Holstein/Hamburg, Niedersachsen/Bremen, Nordrhein-Westfalen, Hessen, Südwest for Baden-Württemberg, Bayern, Mecklenburg-Vorpommern, Sachsen-Anhalt, Thüringen, Sachsen).

These services comprise a daily total of about 1200 news items in the field of politics, economics, culture, sports and miscellaneous events.

The dpa-news database is organized in quarterly pools established for the domestic service and the regional services. The youngest pool each of the domestic and the regional wires contains the news dpa distributed since the 1st of October until last night.

You may say that in the dpa-news database are to be found most of the news one has read in the newspapers during the last 2 years - and more than that, given the fact that any newspaper publishes only a small part of the news distributed by agencies.

To facilitate the search in our news database (and in the other dpa-databases I will come to later) dpa organized the materials in 38 categories, so called CODES. 2 of these codes will be of special interest to you: Energy and environment.

Under ENERGY you find news items concerning

- energy policy
- coal, oil, gas
- electricity
- nuclear energy
- solar energy
- water-supply

Under ENVIRONMENT you find news items concerning

- politics concerning environment
- pollution of environment,
  pollution of air and water,
- waldsterben (as you are aware has become an international term),
- dangerous chemicals
- radioactivity

as well as preservation of natural beauty and wildlife.

The dpa-news databank doesn't contain specialized or scientific reports but only news items presumed to be of interest to the reader of newspapers. Typical searches could be for example:

How many people died at the plane crash in Amsterdam last week?
What are the results of the reform in the German health system?
Why is Mr. Gorbatshow forced to stay at home?

In total the dpa-news databank contains more than 600.000 news items. Of those the catagory energy alone comprises of about 9.000, the category environment about 22.000 news items.

In addition to our news databank there are other databanks which I would like to describe as follows.

One of them for example contains only short news items: The dpa-kurznachrichten.

Basis of this databank is a special wire containing spot news. This provides clients with 80 to 100 items daily covering only the more important events worldwide concerning politics, economics, culture, sports, and miscellaneous fields. None of these items is longer than 12 lines.

This special news service is organized in our data bank in 2 pools: One dates back to the 1st of July 1989 and ends at the 30th of June 1991, the other one begins at the 1st of July 1991 and will remain open up to the end of June 1993. Updates are concluded last night.

dpa established this databank upon request of our databank users asking for a databank without quarterly pools in addition to the dpa-news databank.

One of my favourite databanks is what we call the dpa-chronik. In this databank are stored only the most important news items on a monthly basis and in a very compact form. That means if you look for the day, Mr. Konrad Lorenz died, you will find the answer in the dpa-chronik without going through masses of material. Or when you need last years winner of a NOBELPREIS you will find that easily in this databank.

You find also answers to questions as

"Was there a smog alarm in Berlin in 1987?"
"What's about the balances of VEBA in 1989 and 1990?"
"Where there any problems with Krümmel during the last years?"

If you need detailed information you switch (for example) to the dpa-news databank, where you find the original text of the news items very quickly now that you know the exact date of the event.

The dpa-chronik dates back to the 1st of January 1987 and contains about 9.000 items. That shows that we really stored only the most important news items. In comparison I may remind you that we are entering about 8.500 news items in the news databank weekly.

Of course the dpa-chronik can't be as up to date as the databanks I described before: You can't know which are the most important news of a month until the month is over. Then there is the dpa-background, where you find compact explanations to complicated topics and topical events as well as descriptions of personality since March 1983.

Last but not least I'll spend a few words of explanation on our database: The list of governments. In this databank you find all the governments of the world; besides the local governments of Germany too.

Now I would like to introduce you to 2 others of our Databanks which we opened for external users at the end of last year.

First there is the databank called dpa-kurzdokumentation. In contrary to the dpa-chronik with the extremely short texts you find in this data bank extensive texts. This databank contains historic listings of major events mainly concerning politics and catastrophies. (There might not be such a difference). Some of these listings date back to the beginning of this century as for example
"the worst accidents in tunnels".
You can search for *"catastrophies concerning oil transport"* as well as political themes as *"presidents of the BND"* or *"women in parlaments"*.

Then there is an other sort of texts in the dpa-kurzdokumentation: The so called slug words which is a sort of lexikon where terms are to be found as Formaldehyd for example.

You can imagine that it takes a lot of journalistic and documentary work to produce these texts, especially the historic listings.

This was a short description of our databases - further information you can get at a practical demonstration. Information about fees etc. you find in our information maps.

Using News Databases for an Inhouse Press Cutting Service

B. Madlung
Data-Star Marketing GmbH, Frankfurt/Main

RadioSuisse AG, Berne, Switzerland offers

RadioSuisse Services

Data-Star

250 Online Databases
searchable via command language

Data-Star FOCUS

All major online databases
searchable via hostbased menues

Tradstat

Official trade statistics of 22 countries
numerical database

Gateways to

Official Airline Guide
IDD Tradeline
Microbial Strain Data Network
FIZ Technik
Europeenne de Donnees

Data-Mail

Professional electronic mail service
and bulletin boards

Data-Star

Online Database Service since 1981

Now >250 international databases on one system

2 retrieval modes: - command language DSO
- menuedriven FOCUS

Wide range of subjects:

business, news, ec information, biomedicine, chemistry, technology, environment, social sciences, materials

Technical requirements:

Access via packet switching networks (e.g Datex-P)
PC + modem + telecommunications software
Data-Star User-ID

Costs:

No base charge
Individual prices for each database
Connect time + document charge

Information, customer support, help-desk, seminars:

For Germany + Austria:
D-S Marketing GmbH
Ostbahnhofstr. 13
6000 Frankfurt 1
Tel: 069- 490643
Fax: 069-442084

Other offices in:
Berne, Switzerland
Paris, France
London, UK
Goteborg, Sweden
Philadelphia, USA
San Francisco, USA

'News' on Nuclear Safety, Radiation Protection and Environmental Protection

Selected Data-Star databases

Newswires/Newspapers:

Swiss News Agency

in German, French and Italian,
updated every 30 minutes
archive back to 1983

Reuters Textline

(in detail later)

Specialised Newsletters:

Full-text of newsletters

e.g. - East European Energy Report
- Power in Europe
- Nuclear Waste News
- World Environment Report

in

Predicasts Newletter Database

Financial Times Business Reports
- Energy and Environment

EC Legislation:

Celex

Full-Text of EC Legislation

Spicers Centre for Europe

Information on EC policies, initiatives
and legislation

Reuter Textline on Data-Star

Producer: Reuters Ltd., London

Corporate, industrial, economic, political and European Community ne

200 international newspapers, magazines and wire services

High Currency:
Many sources available within 24 hours of publication

Very large database: > 8 million articles since 1980
> 1,5 new articles added per year
several thousand stories added each day

Approximately 85% of articles in full-text

17 languages translated into Englisch abstracts

German Language Section

Index codes for companies, countries, industries and category

Files on Data-Star:		
	TXLD	Todays news
	TXLN	1990 to date
	TX89	1980 to 1989
	TXZZ	1980 to date

Updating: up to 7 x per day

Sample Search on Data-Star:

Search for the latest news (last 4 weeks) on
'Safety of nuclear power plants in Eastern Europe'.

Save the search strategy to repeat it approximately every four weeks.

Database: Reuter Textline
File TXLN 1990 to date (13 Oct 1992)

```
**************************************************************************

TXLN   10_: ..d all                              <-- display search strategy

  QN DATABASE      DOCS SEARCH TERMS                    __
   1   TXLN       52441 NUCLEAR$ OR RADIOACTIV$
                        OR RADIATION
   2   TXLN       28166 POWER ADJ (STATION$1                    free text
                        OR PLANT$1)                           search
   3   TXLN       97365 SAFETY
   4   TXLN        2166 1 AND 2 AND 3                  __
   5   TXLN        6255 NUCLEAR-POWER
                        OR POWER-STATION-CONSTRUCTION         descriptor
   6   TXLN       35294 HEALTH-SAFETY                        search
   7   TXLN         177 5 AND 6                       __
   8   TXLN        2246 4 OR 7
   9   TXLN        1026 8 AND EEURZ          <--   restrict to all
END OF DISPLAY                                     eastern european
                                                   countries
D-S - SEARCH MODE - ENTER SEARCH TERMS
TXLN   10_: ..save ps grs1                   <-- store search strategy
                                                 under name GRS1
YOUR SEARCH HAS BEEN SAVED

D-S - SEARCH MODE - ENTER SEARCH TERMS
TXLN   10_: ..l dt>920915                    <-- restrict result to articles
                                                 published after 15 Sept 92
    RESULT       40

D-S - SEARCH MODE - ENTER SEARCH TERMS
TXLN   11_: ..p ti,dt 1-40                   <-- show titles and publication
                                                 dates for all hits
                                                 (for intellectual scanning,
                                                  free of charge)
       1  TXLN
TI BULGARIA:  Planned  measures to avoid winter restrictions
   on electricity supply.
   (BBCMS) (BBCEE).
DT 921015.

       2  TXLN
TI FINLAND:  Imatran  Voima  programme  to improve safety at
   Kola nuclear power stations.
   (BBCMS) (BBCEE).
DT 921015.
```

```
      3  TXLN
TI JAPAN: Survey Team to Examine Chernobyl Effects.
   (JIJI).
DT 921009.

      4  TXLN
TI UKRAINE:  SVT  OF  GERMANY  IS  TO INSPECT FIRE SAFETY AT
   CHERNOBYL POWER STATION.
   (FZ).
DT 921008.

<...>

     40  TXLN
TI EC:  MEETING  OF THE G24 NUCLEAR SAFETY GROUP - BRUSSELS,
   14/15 SEPTEMBER 1992.
   (RAPD).
DT 920916.

END OF DOCUMENTS IN LIST

D-S - SEARCH MODE - ENTER SEARCH TERMS
TXLN   11_: ..p free,h 4                    <-- format 'free' shows all
                                                free paragraphs, used for
      4  TXLN                                    refining search
Accession number                                'h' for header displays
   210080207-4N89N2 921008.                     the full paragraph names
Title
   UKRAINE:  SVT  OF  GERMANY  IS  TO INSPECT FIRE SAFETY AT
   CHERNOBYL POWER STATION.
   (FZ).
Date
   921008.
Company
   SYSTEM-UND-VERFAHRENSTECHNIK-GFR,   (SVTGFR);   BERLINER-
   BANK-GFR, (BLNBNK).
Industry codes
   Banks-discount-houses,     (I81402);    Industrial-Plant-
   Steelwork, (I32000).
Category codes
   CORPORATE,  (CCAT);  CONTRACTS-ORDERS,  (C33);  PRODUCTS-
   SERVICES, (C21).
Country & regional codes
   GERMANY,   (GFR);  UKRAINE,  (UKRN);  EUROPEAN-COMMUNITY,
   (EEC).
Length
   1,920 Characters, approximately 1 PC screen.

              END OF DOCUMENT
```

```
..p medium,m 4                          <-- format 'MEDIUM' shows
                                            title, source and text.
                                            'm' suppresses paragraph names
```

UKRAINE: SVT OF GERMANY IS TO INSPECT FIRE SAFETY AT CHERNOBYL POWER STATION.
(FZ).
Frankfurter-Allgemeine-Zeitung-English-Abstracts, FZ 8/10 /92 P20.
SVT System- und Verfahrenstechnik Verwaltungs-GmbH of Seevetal (near Hamburg) has trained five employees from the Chernobyl nuclear power station in the Ukraine in the techniques of passive fire fighting (inbuilt fire fighting systems). The five were trained in Seevetal on an EC Commission contract. In addition a delegation of fire-fighting experts from SVT is to travel to Chernobyl this month to inspect the plant on behalf of the EC Commission. SVT Brandschutz Vertriebs-GmbH International has signed a provisional agreement with the Ukraine for the supply of DM 4m worth of fire protection materials in 1992/93. The company has also won orders from nuclear power stations in Lithuania, Bulgaria and Czechoslovakia. SVT's managing director Burkhard Schoenfeld said that the company saw itself as an eastern European specialist because of its team of Russian speaking technicians and long-standing supply links with the former Soviet Union. This year the SVT group will record turnover of around DM 80m, of which 10% will come from abroad. The group has 180 employees, while a further 500 work in associated installation companies. The DM 4m share capital is 51% owned by managing partner Siegfried Donner and 49% by Berliner Bank Beteiligungs-Gesellschaft. SVT's customers include vehicle, chemicals and electronics companies as well as power companies.
Original article approx 350 words.

Significance of FIZ Technik Databases in Nuclear Safety and Environmental Protection

N. K. Das
Fachinformationszentrum Technik e.V., Frankfurt

Introduction

Time has proven that the written word is a more effective medium than the spoken word. Although the spoken word can produce momentary impact when delivered with emotion, it is the written word which certifies and immortalizes the developments of science and technology. Publishing affords the opportunity to share developments and experiences and broadcast the information to a wider circle of interested people who read publications to learn from the related experience of others. Scientific articles are one of the most useful and timeless publications. Their contribution to the related field is to establish a benchmark on the road to future evolution and provide valuable background on the subject. In addition to technical and scientific publications there are numerous trade journals, manuals, standards and regulations.

All of the information contained in published articles is useful, either to keep in touch with the state of the art, which can assist the scientific reader in tracking the development of the subject, or to observe and exploit new technologies, which can help manufacturers to rationalize the manufacturing process and to develop superior products to maintain their superiority in the marketplace.

Steps of technical and scientific activities

The curve of Fig. 1 shows the relation between the different types of information stored in a database and their influence on each other. It also shows the time required from research and development to manufacturing a product or to installing a plant.

It is a closed-cycle system. A "cut-off" of the cycle means that information is not transferable and the dire consequence of it is the loss of experience of the past. The contemporary scientist or engineer will thus be forced to to find a solution to a problem which has already been solved by others.

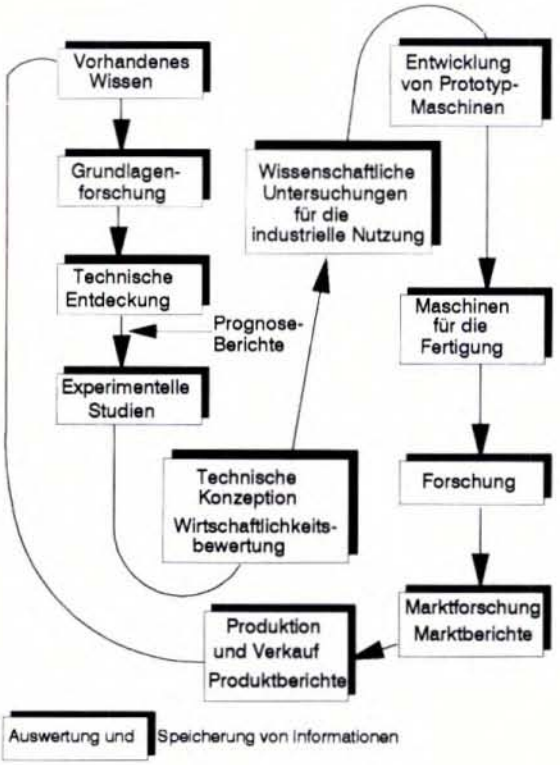


Fig. 1: Steps of technical and scientific activities

FIZ Technik products and services

FIZ Technik produces and offers the following databases:

- DOMA (Machinery and Plant)
- ZDE (Electrical Engineering & Electronics)
- TOGA (Textile Technology)
- SDIM (Metallurgy)
- SILI (Ceramics & Glass)
- ITEC (Information Technology)
- BEFO (Management and Organisation)
- MEDI (Biomedical Engineering)

It should be mentioned that the language of the abstracts of the FIZ Technik databases is primarly German (e.g. DOMA 80%; SDIM 70%). Furthermore FIZ Technik offers licence databeses on engineering and technology, management, manufacturers, products, contacts, standards and specifications, geosciences and natural resources. The contents and structure of the databases are described in the FIZ Technik bluesheets and the database ***news***. With some examples I shall try to show the significance of the FIZ Technik databases DOMA, ZDEE, SDIM, SILI and MEDI in nuclear safety and environmental protection.

Nuclear engineering

It is a complicated and sensitive field of engineering. It covers the subjects of physics, chemistry, biology, meteorology, metallurgy, mechanical engineering, electrical engineering and industrial process engineering. Well-known, problems such as population growth, increase in energy consumption (in particular electricity) or debts of developing countries, and new problems such as the needs of Eastern European countries and the Gulf war, demonstrate the need of nuclear power plants.

By the end of 1990, 423 reactors were in operation and about 80 reactors under construction. Due to technological advancement, some of the older reactors do not comply with present safety thinking.

Acceptable risks (WASH 740/1) are only tolerated by the society according to needs, status of technology and trust in regulatory bodies to enforce safety.

If nuclear power is to make a significant contribution to electricity production in the future (about 14% at present in the world) and is to help in curbing CO2 emission, an increase of about one thousand reactors will be necessary. This will require significant improvements in nuclear safety and might require basic changes in technology.

Examples

The following references out of the FIZ Technik databases will reflect the advancements in nuclear technology and safety requirements for present, older and new reactors for the future:

Reference 1:

Prof. Dr. Birkhofer gives a review of recent developments in reactor safety. One of the figures (Fig. 2) of this article shows the reduction of radiation stress on the operating staff of nuclear power stations with Pressurized Water Reactors (PWR) in West Germany.

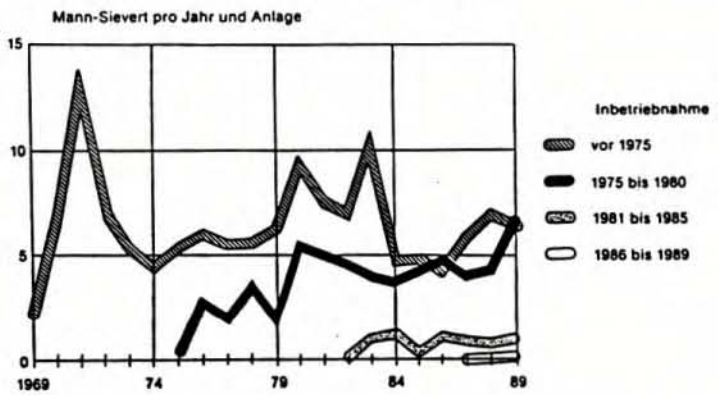


Fig. 2: Radiation stress on the operating staff of nuclear power stations with Pressurized Water Reactors (PWR) in the Federal Republic of Germany

Reference 2:

The authors Meyer, Kroll, Schulze, Skrock and Volkmann describe the operating experience with the reactors WWER 440/W-230. Figure 3 of this article shows the advancement of monitoring systems to observe the environment of nuclear power plant Greifswald.

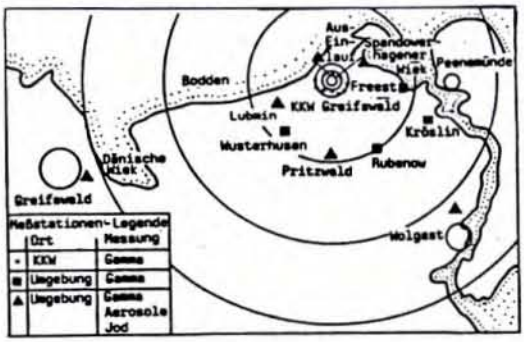


Fig. 3: Monitoring systems to observe the environment of the Greifswald nuclear power plant

These few examples show that the FIZ Technik databases give information on problems related to failure detection systems (noise, vibrations, leakage, displacement), stress analysis of reactor components, safety analysis of reactor pressure vessels, toxicological and ecological risk assessment, advancement in nondestructive materiales testing, etc. This information can help to solve the problems in nuclear safety, radiation and environmental protection.

The value, validity and quality of the information should be judged by the users of the databases.

FIZ Technik full-text service

Immense volumes of information must be disseminated before their value as a problem solving tool can be utilized. In addition to articles concerning the subject directly, other articles relating indirectly to the subject may contain random information which might be of value. Therefore, a great deal of screening work must be done before any published information can be applied to a problem.

Desk-top research is most successful when the known and verifiable results are studied, understood and plotted to analyze the trend of progress compared to earlier results and the present state of the art. For this purpose, reading of original publications is unavoidable.

Time delay to gaining access to the original publications can disturb the link of thinking or work. It may make the desk-top research useless. FIZ Technik is aware of this problem and has solved by its own full-text service. The users of the FIZ Technik databases can get the required original publications within a few hours.

Reference 3:

In this paper Dr. Niehaus discussed the safety requirements for present, older and new reactors for the future. He also mentioned the recent development of an international 7-level scale (Fig. 4, Table 1) to rate the safety significance of nuclear events (precursors of accidents).

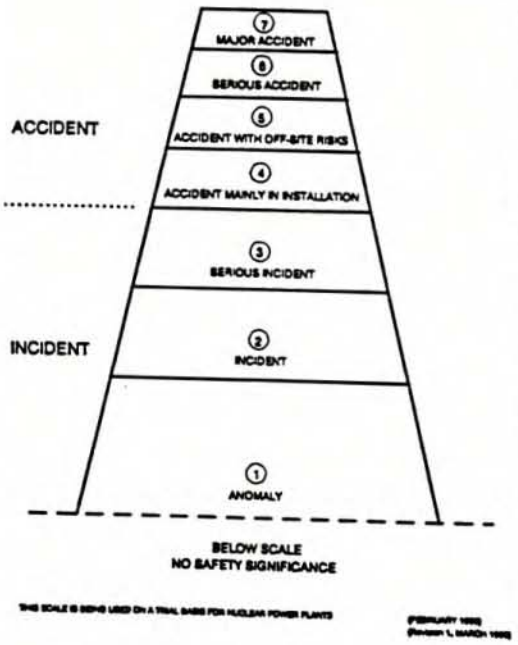


Fig. 4: The international Nuclear event Scale (INES) for prompt communication of safety significance

Level/ Descriptor	CRITERIA		
	Off-site impact	On-site impact	Defence-in-depth degradation
7 Major accident	Major release: Widespread health and environmental effects		
6 Serious accident	Significant release: Full implementation of local emergency plan		
5 Accident with off-site risks	Limited release: Partial implementation of local emergency actions	Severe core damage	
4 Accident mainly in installation	Minor release: Public exposure of the order of prescribed limits	Partial core damage Acute health effects to workers	
3 Serious incident	Very small release: Public exposure at a fraction of prescribed limits	Major contamination Overexposure of workers	Near accident Loss of defence-in-depth provisions
2 Incident			Incidents with potential safety consequences
1 Anomaly			Deviations from authorized functional domains
0 Below scale			No safety significance

Table 1: Criteria for categorizing events

Information management

This is a very important and responsible job. A successful information manager must have an enquiring mind and carefully catalogue his findings. He must have experience to select the proper database and to search (consult) through the selected database to solve his problem. He must have extensive knowledge to recognize the value of an article (information) or the validity of its references.

One of the most satisfying circumstances an information manager can encounter is being confronted with a **new** problem to which he has already a solution.

An open international information exchange is necessary for the further research and development of nuclear power plants and for the sake of humanity as well as for environmental protection. To fulfil this purpose the use of databases is unavoidable.

For all these reasons information managers should be considerd as consultants for scientists, engineers or managing directors.

DB DOMA, Copyright FIZ Technik.
AN M90120359641.
MJ Reaktorsicherheit; Entwicklungsstand; Forschung.
TI Neuere Entwicklungen in der Reaktorsicherheit - ein Ueberblick.
Recent developments in reactor safety - a review.
AB In nahezu allen Laendern, die Kernenergie nutzen, wird derzeit an der Entwicklung weiterfuehrender Reaktorkonzepte gearbeitet. Dabei stehen weitere Verbesserungen der Sicherheit im Vordergrund. Vor allem in den USA werden auch Fragen einer groesseren Wirtschaftlichkeit diskutiert. Charakteristische Entwicklungstendenzen sind geringere Komplexitaet, groessere Diversitaet, passive Nachwaermeabfuhr, groessere Unabhaengigkeit der Barrierenfunktion des Sicherheitsbehaelters gegenueber Belastungen bei schweren Unfaellen sowie die Nutzung des technischen Fortschritts in anderen Bereichen wie der Informationstechnik. 1
AU Birkhofer-A.
IN GRS, Garching, D.
SO Zeitschriftenaufsatz: VGB Kraftwerkstechnik, Band 70 (1990) Heft 11, Seite 895-900 (6 Seiten, 7 Bilder).
LG DE German.
AV MF 290977.

DB ZDEE/ZDE, Copyright FIZ Technik.
AN E91053124200.
MJ Betriebserfahrung; Kernreaktor WWER-40/W-220.
TI Betriebserfahrungen mit den Reaktoranlagen WWER-440/W-230.
Operating experience with the reactors WWER 440/W-230.
AB Aus sicherheitspolitischen Gruenden wurde frueher kaum detailliert ueber Betriebsergebnisse der Kraftwerke in Greifswald berichtet. Um den falschen Eindruck, der durch die Presse entstanden ist, zu berichtigen, wird ueber einige wichtige Erkenntnisse aus dem Betrieb berichtet. Besonders wird auf die Ueberwachungs-, Ertuechtigungs- und Schulungsmassnahmen eingegangen, die es ermoeglichten, trotz Konstruktions- und anderer Sicherheitsmaengel einen sicheren Betrieb zu gewaehrleisten. Zunaechst wird detailliert auf den technologischen Aufbau der Anlage eingegangen. Ein Grundschaltbild des Primaer- und Sekundaerkreislaufs ist angegeben. Bei den Betriebserfahrungen wird dann auf die nukleare Sicherheit und den Strahlenschutz, die Verfuegbarkeitsanalyse eingegangen und eine Bewertung des Betriebsverhaltens ausgewaehlter Anlagen vorgenommen. 2
AU Meyer-R; Kroll-P; Schulz-K-D; Skrock-K-H; Volkmann-B.
IN Kernkraftwerk Greifswald, D.
SO Zeitschriftenaufsatz: Atomwirtschaft - Atomtechnik, Band 36 (1991) Heft 4, Seite 180-187 (8 Seiten, 10 Bilder, 7 Tabellen, 3 Quellen).
LG DE German.

DB ZDEE/ZDE, Copyright FIZ Technik.
AN E91103953040.
MJ Reaktorsicherheit.
TI Sicherheitstechnische Anforderungen an eine zukuenftige Kerntechnik.
AB Kernenergie kann einen bedeutenden Beitrag zur zukuenftigen Energieversorgung leisten, unter der Voraussetzung einer andauernden 3

Verbesserung der Sicherheit. Technischer Fortschritt und eine umfassende 'Sicherheitskultur' ermoeglichen ein Sicherheitsnivau fuer zukuenftige Reaktoren der heutigen Generation mit einer Wahrscheinlichkeit von weniger als 10(exp -5) Kernschmelzunfaellen und weniger als 10(exp -6) Freisetzungen radioaktiver Substanzen pro Betriebsjahr. Es gibt jedoch alte Reaktoren, die in wesentlichen Punkten nicht dem heutigen Sicherheitsdenken entsprechen. Die Ergebnisse einer kuerzlich durchgefuehrten Untersuchung des Sicherheitskonzeptes der WWER 440/230 Rekatoren werden kurz zusammengefasst. Fortgeschrittene evolutionaere Konzepte bieten die Moeglichkeit, die Wahrscheinlichkeit radioaktiver Freisetzungen auf weniger als 10(exp -7) pro Jahr zu verringern. (Kernenergie: Heute, morgen. Tagung, VDI-Gesellschaft Energietechnik, Aachen, D, 18.-19. Maerz 1991).

AU Niehaus-F.

IN IAEA, Wien, A.

SO Konferenz-Einzelbericht: VDI-Berichte, Band 884 (1991) Duesseldorf: VDI-Verlag, Seite 55-70 (16 Seiten, 6 Bilder, 2 Tabellen, 17 Quellen) , ISBN 3-18-090884-X.

LG DE German.

AV TIB-ZA3503(884).

DB DOMA, Copyright FIZ Technik.

AN M90123357561.

MJ zerstoerungsfreie Pruefung; Reaktordruckbehaelter.

TI Zerstoerungsfreie Bestimmung der mikrostrukturellen Ermuedungsschaedigung. Abschlussbericht.
Nondestructive detection of microstructural fatigue damage. Final report.

AB An einem Reaktordruckbehaelterstahl (A533, B class 1) wurden sowohl Ultraschall- als auch magnetische Untersuchungen zur Ermittlung des Einflusses von Ermuedungsbeanspruchung auf elastische bzw. magnetische Werkstoffeigenschaften durchgefuehrt. Dazu wurden an zwei unterschiedlich beanspruchten Probensaetzen (R = -1 bzw. R = 0.1) eine Reihe von Werkstoffkenngroessen wie Ultraschallgeschwindigkeit, Ultraschallabsorption, Koerzitivfeldstaerke, Ueberlagerungspermeabilitaet u.a. als Funktion der verbrauchten Lebensdauer ermittelt und ausgewertet. Nur im Falle groesserer plastischer Verformung wurden signifikante Aenderungen in den zf-Messgroessen festgestellt. Ansonsten sind die auftretenden Effekte so gering, dass eine zerstoerungsfreie Erfassung von durch Ermuedungsbeanspruchung hervorgerufenen mikrostrukturellen Aenderungen vor der Rissbildung unter praktischen Bedingungen (z.B. Druckbehaelter) mittels der benutzten Verfahren als nicht durchfuehrbar erscheint. 4

AU Willems-H; Persch-H; Voss-B; Falk-L.

SO Report: Inst. fuer zerstoerungsfreie Pruefverfahren der Fraunhofer-Ges., Freiburg, (1989) Mar, Seite 1-80 (80 Seiten, 58 Bilder, 5 Tabellen, 17 Quellen), Report-Nr. 890102-TW.

LG DE German.

AV TIB-RN5380(890102).

DB ZDEE/ZDE, Copyright FIZ Technik.
AN E91120037280.
MJ Kernkraftwerk; Sicherheitsbewertung.
TI Novellierung des Atomgesetzes aus der Sicht der Technik.
AB Der Artikel beschaeftigt sich mit den Fragen der Sicherheitsbewertungen von Kernkraftwerken. Der Autor geht auf drei technische Bereiche ein, die den Massstab fuer Sicherheitsbewertungen, Anforderungen an aeltere Anlagen und Weiterentwicklung bei kuenftigen Kernkraftwerken betreffen. Bewertungsmassstaebe wie Anforderungen des Schutzkonzepts, Sicherheitskonzepts und Sicherheitsbewertungen werden angefuehrt. 5
Formuliert werden Schwerpunkte, die bei der Ueberpruefung des KKW Obrigheim erhalten wurden.
AU Birkhofer-A.
SO Zeitschriftenaufsatz: Energiewirtschaftliche Tagesfragen, Band 41 (1991) Heft 11, Seite 722-726 (5 Seiten, 2 Bilder, 2 Quellen).
LG DE German.
AV MF-550442.

DB DOMA, Copyright FIZ Technik.
AN M92033527679.
MJ DWR; Containment; Kernschmelzen.
TI Auslegung eines DWR-Containments zur Aufnahme der Belastung bei einem Kernschmelzunfall.
Layout of a pressurized water reactor containment designed to carry the load during a core meltdown accident.
AB Das Containment moderner Siemens-Druckwasserreaktoren, das fuer den Kuehlmittelverluststoerfall ausgelegt ist, besitzt auch bei einem Kernschmelzunfall ein erhebliches Rueckhaltepotential. Dies haben Forschungsarbeiten am Kernforschungszentrum Karlsruhe gezeigt. Die mechanischen Belastungen in einem solchen Fall sind: Dampfexplosion, Wasserstoffdetonation, RDB-Versagen unter hohem Druck. Die 6
Moeglichkeiten einer Containmentverbesserung ist eine Verbundstruktur innerer Stahlliner / aeusserers Betoncontainment. Dynamische Belastungen von 230 bar ueber 5 ms und 30 bar statisch koennen aufgenommen werden. Mit einer Corecatcherkonstruktion kann die Durchdringung des Fundamentes vermieden und die Nachwaerme passiv abgefuehrt werden.
AU Hennies-H-H.
IN Kernforschungszentrum Karlsruhe, D.
SO Zeitschriftenaufsatz: Kernenergie, Band 34 (1991) Heft 6, Seite 239-244 (6 Seiten, 3 Bilder, 14 Quellen).
LG DE German.
AV MF 282510.

DB DOMA, Copyright FIZ Technik.
AN M92024204679.
MJ DWR; Reaktorsicherheit; Betrieb.
TI Die Nutzung von Sicherheits- und Betriebssystemen zur Verminderung des Risikos bei auslegungsueberschreitenden Ereignisablaeufen in Druckwasserreaktoren. 7
Utilization of safety and operating systems for risk mitigation with

non-designed accidents in pressurized power reactors.
AB Die Sicherheitssysteme von Kernreaktoren wurden aufgrund von Auslgungsstoerfaellen festgelegt. Die Anforderungen wurden durch einen hohen Grad an Automatisierung erfuellt. Studien und Stoerfaelle in Kernkraftwerken haben jedoch gezeigt, dass Handlungen des Betriebspersonals insbesondere auslegungsueberschreitende Ereignisse beeinflusst werden koennen. Die Notwendigkeit anlageninterner Notfallschutzmassnahmen und ihre Wirksamkeit wird in der Arbeit diskutiert. Im Detail werden folgende Schutzzielkategorien betrachtet: Erreichen der Unterkritikalitaet, Sicherstellung der Kernkuehlung, Erhaltung der Integritaet des Sicherheitsbehaelters und Minimierung der Spaltproduktfreisetzung in die Umgebung.
AU Hicken-E-F.
IN Ges. f. Reaktorsich., Garching, D.
SO Zeitschriftenaufsatz: Kernenergie, Band 33 (1990) Heft 6, Seite 245-249 (5 Seiten, 10 Bilder).
LG DE German.
AV MF 282393.

DB DOMA, Copyright FIZ Technik.
AN M92044031679.
MJ DWR; Reaktorsicherheit; Schutzsystem.
TI Aspekte bei der Pruefung des Steuerungs- und Schutzsystems an Druckwasserreaktoren in Kernkraftwerken.
Aspects of testing the control and protection system of pressurized water reactors in nuclear power plants.
AB Die Notwendigkeit und Bedeutung der Pruefung des Steuerungs- und Schutzsystems an Druckwassereaktoren wird diskutiert. Bei der Pruefung wird untersucht, ob die Bauelemente, Baugruppen, Komponenten und Teilsysteme die erforderlichen Funktionen erfuellen. Die Pruefungen werden waehrend der gesamten Lebensdauer durchgefuehrt. Das umfangreiche Literaturverzeichnis fuehrt wesentliche Stanards und Empfehlungen zur Pruefung des Steuerungs- und Schutzsystems auf. In der Arbeit werden die wichtigsten Pruefmethoden und Pruefmittel behandelt. Eine rechnergestuetzte Pruefung besitzt Vorteile gegenueber der klassischen Pruefung. 8
AU Rehfeld-G.
IN Staatl. Amt. f. Atomsich. u. Strahlenschutz, Berlin, D.
SO Zeitschriftenaufsatz: Kernenergie, Band 34 (1991) Heft 7-8, Seite 285-289 (5 Seiten, 2 Bilder, 1 Tabelle, 52 Quellen).
LG DE German.
AV MF-282615.

DB ZDEE/ZDE, Copyright FIZ Technik.
AN E92073654040.
MJ Kernkraftwerk; Lebensdauer; Verlaengerung.
TI Lebensdauerverlaengerung von Kernkraftwerken.
Lifetime extension of nuclear power plants.
AB Eine amerikanische Referenzanlage stellt dieses Jahr den formellen Antrag auf Verlaengerung der Lebensdauer um 20 Jahre. Mit der Bewilligung wird im Jahre 1995 gerechnet. Damit waere der Weg fuer die Lebensdauerverlaengerung frei fuer andere Reaktoranlagen. Fuer 9

die Schweizer Kernkraftwerke koennen folgende Schlussfolgerungen gezogen werden: Aufbauend auf den amerikanischen Erfahrungen kann das 'WIE' der Lebensdauerverlaengerung erarbeitet werden. Auf die Frage des 'WANN' helfen ebenfalls die Erfahrungen: Fuer eine Ueberpruefung eines Kernkraftwerkes koennen 4-5 Jahre angesetzt werden. Die Abstimmung mit der Behoerde kann man mit 3-4 Jahren ansetzen. Danach kommt die Umsetzung in eine optimale Planung fer Lebensdauerverlaengerung mit minimalen Abschaltzeiten: insgesamt etwa 10 Jahre. Aufgrund dieser Zeitabschaetzung wird empfohlen, den Planungsprozess nicht spaeter als im 25. Lebensjahr der Anlage zu beginnen.

AU Franke-T.

IN Westinghouse Energy Systems, Doettingen, D.

SO Konferenz-Einzelbericht: SVA-Informationstagung: Wie alt werden Kernkraftwerke? Schweizerische Vereinigung fuer Atomenergie, Bern, CH, 16.-17. September 1991, (1991) Seite R5.1-R5.14 (14 Seiten, 5 Bilder).

LG DE German.

AV TIB-HC1529.

DB ZDEE/ZDE, Copyright FIZ Technik.

AN E92073653040.

MJ Leichtwasserreaktor; Sicherheitsforschung.

TI Sicherheitsforschung fuer Leichtwasserreaktor-Kernkraftwerke.
Safety recovery for light-water-moderated reactor nuclear power plants.

AB Die Reaktorsicherheits-Forschung ist in der Schweiz am PSI konzentriert und besitzt dort einen sehr hohen Stellenwert. Das langfristig angelegte Forschungsprogramm wird in enger Zusammenarbeit mit den Kernkraftwerksbetreibern und den Sicherheitsbehoerden abgestimmt und traegt den Beduerfnissen der schweizerischen Kernkraftwerke und insbesondere jener aelterer Bauart Rechnung. Die in diesen Aktivitaeten taetigen Gruppen am PSI sind verhaeltnismaessig klein, die Thematik dagegen breit. Es wird deshalb versucht, diese Aktivitaeten moeglichst in internationalen Forschungsprogramnen einzubetten, um den Informationsfluss und den Erfahrungstransfer zu gewaehrleisten. Die Aufnahme der PSI-Aktivitaeten in diese Programme aber auch die finanzielle Unterstuetzung der KKW und der HSK zeugen von der Notwendigkeit und der Qualitaet der PSI-Sicherheitsforschung. Langfristig ist die nukleare Sicherheit in das Umfeld der allgemeinen Sicherheitstechnik einzubetten; alle konkurrierenden Energiesysteme sind sowohl sicherheitsmaessig als auch aus der Sicht der Umweltbelastung und der Wirtschaftlichkeit mit einheitlichen Methoden und gegen einheitliche Kriterien zu beurteilen. Insbesondere neue Energieversorgungssysteme sind hinsichtlich Minimierung ihrer Risiken so frueh wie moeglich entwicklungsbegleitend zu erforschen. Es wird deshalb mittelfristig der Aufbau einer Kapazitaet auf dem Gebiet der Sicherheit nicht nuklearer industrieller Systeme angestrebt. 10

AU Kroeger-W; Knoglinger-E; Kottowski-H.

IN Paul Scherrer Inst., Wuerenlingen, D; Paul Scherrer Inst., Villigen, D.

SO Konferenz-Einzelbericht: SVA-Informationstagung: Wie alt werden

Kernkraftwerke? Schweizerische Vereinigung fuer Atomenergie, Bern, CH, 16.-17. September 1991, (1991) Seite R4.1-R.4.18 (18 Seiten, 11 Bilder, 2 Tabellen, 2 Quellen).
LG DE German.
AV TIB-HC1529.

DB DOMA, Copyright FIZ Technik.
AN W92086064404.
MJ akustische Ueberwachung; Kernkraftwerk.
TI Acoustic monitoring systems. System concept and field experience. Akustische Ueberwachungssysteme. Systemkonzept und Anwendungserfahrung.
AB Es wird eine Uebersicht ueber Ueberwachungssysteme fuer verlorene (liegengebliebene) Teile, Lecks und Risse im primaeren Kreislauf in Kernkraftwerkskomponenten mittels akustischer Verfahren gegeben, die in den letzten Jahren entwickelt und eingesetzt wurden. Die Systeme sichern eine fruehe Erkennung von Fehlern, erleichtern die Fehlererkennung, verhueten Nachfolgeschaeden und reduzieren die Pruefkosten und Strahlungsbelastungen. Jede Anwendung erfordert 11
spezielle Ueberwachungstechniken und Auswertemethoden. Speziell werden das computergestuetzte Komponenten-Ueberwachungssystem (KUe S-86) und das Leck-Ueberwachungssystem (ALUeS-86) ausfuehrlich beschrieben. Beim KUeS-86 wird auf die Ueberwachungstechnik, das Triggersystem und die Alarmkonzepte, sowie auf das Auswertekonzept eingegangen. Das ALUeS-System beruht auf den Voraussetzungen, dass die von Lecks ausgehenden Schallgeraeusche breitbandig bis zum MHz-Bereich sind. Sie sind daher vom eingegebenen Schall trennbar. Es besteht ein fast linearer Zusammenhang zwischen Lecksignalgroesse und Leckrate. Unter geraeuscharmen Bedingungen sind Leckraten von 5 kg/h mit 40 % Genauigkeit nachweisbar. (Becker).
AU Streicher-V-J.
IN Siemens, Erlangen, D.
SO Zeitschriftenaufsatz: Nuclear Engineering and Design, Band 129 (1991) Heft 2, Seite 151-162 (12 Seiten, 12 Bilder, 5 Quellen).
LG EN English.

DB DOMA, Copyright FIZ Technik.
AN W92086063404.
MJ Leichtwasserreaktor; Ueberwachung.
TI Vibration, neutron noise and acoustic monitoring in Germans LWRs. Ueberwachung von LWRs in Deutschland durch Analyse von Schwingungs-Neutronenrausch- sowie Ultraschallsignalen.
AB Die Gesellschaft fuer Reaktorsicherheit befasst sich seit Jahren mit Fragen der On-line Anlagenueberwachung in Kernkraftwerken. Im vorliegenden Beitrag werden der derzeitige Stand dieser Technik dargestellt sowie einige neue Ueberwachungssysteme vorgestellt. Die Schwingungsanalyse (fuer Primaerkreiskomponenten) wird im allgemeinen durch Beschleunigungsaufnehmer und Abstandsmesssysteme ausgefuehrt. Kuerzlich wurde gezeigt, dass auch die Messung des Neutronenflusses 12
ausserhalb der Reaktorkernumhuellung (Neutronenrauschen) Aenderungen der Prozessparameter anzeigen kann. Ueber ein Multi-Sensor-System werden mehr als 40 Sensoren fuer Abstand, Kuehlmitteldruck und

Neutronenrauschen betrieben. Nach der Anwendung von schneller Fouriertransformation bzw. Korrelationstechniken werden spezifische Signale ermittelt und gespeichert. Diese Daten werden an das GRS-Diagnostik-Zentrum nach Garching weitergeleitet und dort mit einem neu entwickelten Computersystem analysiert, wobei alle Ergebnisse in einer Datenbank gespeichert werden. Die akustische Ueberwachung wird in erster Linie zur Ortung und Identifikation von losen Teilen eingesetzt. Das bei der GRS entwickelte System arbeitet im Audiofrequenzbereich und kann burstartige Signale, wie sie bei Stoessen von Metall auf Metall entstehen, analysieren. Zur Unterstuetzung der Operatoren im Kernkraftwerk vor Ort wurde eine transportable Version eines Pruefsystems entwickelt, wobei durch eine Verbindung mit der Datenbank in Garching unbekannte Signaturen identifiziert werden koennen. (Walte).

AU Wach-D.
IN Gesellschaft fuer Reaktorsicherheit m.b.H., Garching, D.
SO Zeitschriftenaufsatz: Nuclear Engineering and Design, Band 129 (1991) Heft 2, Seite 129-150 (22 Seiten, 28 Bilder, 19 Quellen).
LG EN English.

DB DOMA, Copyright FIZ Technik.
AN W92086055404.
MJ Primaerkuehlkreislauf; Leckpruefsystem; Reaktor.
TI Methods for leak detection for KWU pressurized and boiling water reactors.
Verfahren der Leckpruefung fuer die Druckwasserreaktoren und Siedewasserreaktoren der KWU.
AB Zur Gewaehrung der Reaktorsicherheit muss die druckfuehrende Umhuellung des Primaerkuehlkreislaufs auf Lecks ueberwacht werden. Dadurch ist der Bruch von Rohren an beiden Enden zu verhindern, wenn unterkritische Risse rechtzeitig vor ihrer Ausdehnung zu kritischen Rissen nachgewiesen werden. Beschrieben wird ein Leck-Ueberwachungssystem der KWU fuer Druckwasserreaktoren, das auf einer thermodynamischen Analyse beruht. Dabei werden folgende Parameter gemessen: die Taupunkttemperatur, das in Luftkuehlern akkumulierte Kondensat, die Lufttemperatur, das Sumpfwasserniveau und der Abfluss. In den Siedewasserreaktoren der KWU wird das gleiche Instrumentarium mit nur leicht modifiziertem Messkonzept verwendet. Im Beitrag werden die Messsysteme und ihre einzelnen Komponenten beschrieben. An zusaetzlichen Methoden werden ein akustisches Leckpruefsystem (Ueberwachung auf Ausstroemgeraeusche und Moeglichkeit der Leckortung) und ein Feuchtigkeitsmesssystem (LASP), bei dem die in einem Messrohr gesammelte Feuchtigkeit in regelmaessigen Abstaenden gemessen wird, beschrieben. In der Naehe von schwer zugaenglichen Schweissnaehten werden feuchtigkeitsempfindliche Bandagen, die bei Wasseraufnahme ihren elektrischen Widerstand aendern, zur Ueberwachung eingesetzt. (Voelkel). 13
AU Fischer-K; Preusser-G.
IN Siemens, Erlangen, D.
SO Zeitschriftenaufsatz: Nuclear Engineering and Design, Band 128 (1991) Heft 1, Seite 43-49 (7 Seiten, 7 Bilder, 4 Quellen).
LG EN English.

DB DOMA, Copyright FIZ Technik.
AN W92086056404.
MJ Reaktordruckbehaelter; Schweissnahtpruefung.
TI Recent development for inservice inspection of reactor pressure vessels.
Neuere Entwicklung bei der Wiederholungspruefung von Reaktordruckbehaeltern.
AB Es wird ein System beschrieben, das eine Pruefung der Laengs- und Umfangsschweissnaehte im Rhythmus von vier Jahren erlaubt, wobei die erste Pruefung vor Inbetriebnahme erfolgt. Fuer Wanddicken ueber 100 mm wird die Tandem-Technik benutzt. Je nach Fehlerlage werden unterschiedliche Referenzfehler angegeben. Die Registrierung erfolgt ab 6 dB ueber Rauschen. Auf dieser Basis werden internationale Vergleichsuntersuchungen in den Programmen PISC und DDT durchgefuehrt. Es wird ein Programm mit neuem Manipulator fuer die Betriebsueberpruefung vorgestellt, der bis zu 12 Pruefkoepfe enthaelt. Damit werden Laufzeiten gemessen, um damit eine Pruefung nach der ALOK-Technik durchzufuehren. Daneben werden A- und B-Bilder aufgenommen. Zur Datenreduzierung werden Filter verwendet. Die Rekonstruktionsalgorithmen sind analog L-SAFT. Weiterhin erfolgen Pruefungen an der Duese fuer eine Dampfturbine. Fuer die Fehlerzuordnung zu den Pruefergebnisssen wurde ein Programm auf der Grundlage der Finite-Elemente-Methode entwickelt. Es wird die Gruppenstrahler-Technik angewendet, um eine Echotomographie zu erhalten. Die Pruefung vor Ort dauerte 7 Tage. Die Reproduzierbarkeit der Ergebnisse war sehr gut. (Tietz). 14
AU Fischer-K; Engl-G; Rathgeb-W; Heumueller-R.
IN Siemens, Erlangen, D.
SO Zeitschriftenaufsatz: Nuclear Engineering and Design, Band 128 (1991) Heft 1, Seite 51-65 (15 Seiten, 19 Bilder, 12 Quellen).
LG EN English.

DB DOMA, Copyright FIZ Technik.
AN M89042187603.
MJ Kreiselpumpe; Doppelwandsystem.
TI Geschlossen und dicht. Hermetische Kreiselpumpen mit integrierter Doppelwandtechnik haben hohe Betriebssicherheit.
High perating safety of hermetical centrifugal pumps with doublewalled technique.
AB Das Prinzip selbstansaugender Kreiselpumpen mit Laufradzellenspuelung wird erlaeutert. Fuer besonders aggresive Fluide wurde eine hermetische Chemiepumpenreihe mit Permanentmagnetkupplung entwickelt, die nahezu korrosinsbestaendig ist. Analog zur Kupplung kann auch ein Direktantrieb elektromagnetisch mit Hilfe eines Drehstrom-Spaltrohrmotors erfolgen. Solche Vakuumpumpen und Verdichter sind auch im Havariefall noch dicht und entsprechen den hohen Sicherheitsanforderungen auch in Kernkraftwerken. Mit dem absolut dichten Ringfluessigkeitskreislauf ist ein voellig leckagefreier Betrieb gewaehrleistet. Betriebsfluessigkeit kann weder in die Atmosphaere noch in die Entsorgungsanlage gelangen. Beim neuartigen System der Doppelwandtechnik wird der Spalttopf mit einer zweiten Umhuellung umgeben. Solche Pumpen verfuegen ueber die dreifache 15

Dichthuelle. (Schulz).
AU Kraemer-R; Neumaier-R.
SO Zeitschriftenaufsatz: Der Maschinenmarkt, Band 85 (1989) Heft 14, Seite 30-34 (5 Seiten, 3 Bilder, 2 Quellen).
LG DE German.
AV MF 250492.

DB DOMA, Copyright FIZ Technik.
AN M92024146545.
MJ Fliessgewaesser; Kobaltisotop; Kernkraftwerk.
TI Zum Verhalten der Kobaltisotope 58.Co und 60.Co aus Kraftwerken in Fliessgewaessern am Beispiel des Rheins.
On the behaviour of the radioisotopes 58.Co and 60.Co from nuclear power plants in the case of the Rhine River.
AB Die Arbeit enthaelt Untersuchungsergebnisse ueber das Verhalten von Kobaltisotopen, die durch Vorfluter in den Rhein geleitet werden. Anhand bekannter Emissionsdaten und gemessener Nuklidfrachten wurde innerhalb einer Bilanzierung die Aufteilung auf Wasser-, Schwebstoff- und Sedimentphase ermittelt. Kenndaten zur Beschreibung des Sedimentationsverhaltens entlang der Fliessstrecke konnten ebenfalls abgeleitet werden. In einer Bewertung werden die radiologischen Auswirkungen beider Kobaltisotope, besonders im Stillwasserbereich (z eine hypotetisch externe Strahlenexposition in Abhaengigkeit von Aufenthaltsdauer und Sedimentschichtdicke abgeschaetzt. Die Auswirkungen der Ableitung radioaktiver Stoffe konnte, anhand der vorliegenden Untersuchungsergebnisse, ueber grosse Entfernung vom Verursacher nachgewiesen werden. Beide Nuklide wurden meist in partikularer Form innerhalb der Schwebstoffphase (groesser als 90 %) transportiert, der in der Wasserphase verfrachtete geloeste oder kolloidale Anteil (10 %) konnte vernachlaessigt werden. (Sudek). 16
AU Mundschenk-H.
IN Bundesanstalt f. Gewaesserkunde, Koblenz, D.
SO Zeitschriftenaufsatz: Zeitschrift fuer Wasser- und Abwasser-Forschung, Band 24 (1991) Heft 6, Seite 268-284 (17 Seiten, 25 Bilder, 1 Tabelle, 25 Quellen).
LG DE German.
AV MF 315027.

DB DOMA, Copyright FIZ Technik.
AN M91090468633.
MJ Kernreaktorsicherheit; Wasserstoffbrand; Forschung.
TI Wasserstoffverbrennung im Verlauf auslegungsueberschreitender Stoerfaelle in Kernkraftwerken.
The burning of hydrogen during the course of faults in nuclear power stations which exceed design criteria.
AB Bei moeglichen Kernschmelzunfaellen in Kernkraftwerken kann in groesseren Mengen Wasserstoff freigesetzt werden, so dass sich in Verbindung mit der Umgebungsluft und Wasserdampf ein brennbares Gemisch bildet. Ob durch das Abbrennen dieses Wasserstoffs der Druckbehaelter gefaehrdet wird, ist gegenwaertig ein wichtiger Gegenstand der Sicherheitsforschung in Kernkraftwerken. Der Beitrag gibt einen Ueberblick ueber den derzeitigen Stand der Forschung und 17

zukuenftige Forschungsvorhaben. Die verschiedenen Arten der Verbrennung, stille Oxidation, Diffusionsflamme, Deflagration und Detonation sowie der Uebergang Deflagration und Detonation (DDT) werden beschrieben. Ueber Versuchsexperimente mit trockenen Wasserstoff-Luftgemischen in verschiedenen Groessenmassstaeben wird berichtet. Grundlagenuntersuchungen zum DDT und zur turbulenten Flammenbeschleunigung werden dargestellt. Es sind Konzepte in der Diskussion, die eine gesteuerte Zuendung des Freigesetzten Wasserstoffs zum Ziel haben. (Flake).

AU Beauvais-R; Mayinger-F; Strube-G.
IN TU Muenchen, D.
SO Zeitschriftenaufsatz: VGB-Kraftwerkstechnik, Band 71 (1991) Heft 8, Seite 755-758 (4 Seiten, 7 Bilder).
LG DE German.
AV MF 305360.

DB DOMA, Copyright FIZ Technik.
AN M91071032663.
MJ Lebensdauer; Kernkraftwerk; Service.
TI Gezielte Praevention haelt lange jung. Lebensdauer der Kernkraftwerke.
AB 1990 erhoehte sich die weltweit installierte Kernkraftwerkskapazitaet auf ueber 326000 Megawatt. Der Anteil der Kernenergie an der gesamten Elektrizitaetserzeugung betraegt gegenwaertig rund 17 %. Eine rasche Abkehr von der Nukleartechnologie zoege katastrophale Folgen nach sich. Sicherheit gegenueber Mensch und Umwelt sind demzufolge die wesentlichen Kriterien bei Kernkraftanlagen. Eine moderne Instandhaltungsstrategie mit vorbeugendem Austausch von gealterten oder geschaedigten Komponenten ist moeglich, und damit ist eigentlich die Lebensdauer fuer keine Komponente eines Kernkraftwerkes begrenzt. 18
Ein Programm zur Lebensdauerverlaengerung von Kernkraftwerken wurde von der Siemens KWU entwickelt. Stark zunehmend ist das Servicegeschaeft der Siemens KWU. Schwerpunkt sind Nachruestungen, um den Stand neuester Sicherheitstechnik zu halten. Im Bereich der Komponentenentwicklung liegt das Hauptaugenmerk auf der Erprobung und Qualifizierung von sicherheitstechnischen Einrichtungen fuer Kernkraftwerke. (Motschmann).
AU Behrend-H-J.
IN Siemens KWU, Karlstein, D.
SO Zeitschriftenaufsatz: Schweizer Maschinenmarkt, Band 91 (1991) Heft 28, Seite 40-41, 43, 45 (4 Seiten, 4 Bilder).
LG DE German.
AV MF 299868.

DB DOMA, Copyright FIZ Technik.
AN M91050537689.
MJ Tschernobyl; Reaktorkatastrophe; Analyse.
TI Katastrophe war unausweichlich. Nicht der Mensch, sondern die Technik hat in Tschernobyl versagt.
AB Der Ereignisablauf der Reaktorkatastrophe in Tschernobyl im Jahre 19
1986 wird zeitmaessig erlaeutert. Die eigentlichen Unfallursachen waren Fehler in der Auslegung des Reaktors, der Schnellabschaltung

und der Betriebshandbuecher. Sie zeigen, dass wichtigste Sicherheitskriterien groeblichst verletzt wurden. Der Unfall machte deutlich, dass die Sicherheit eines Kernkraftwerkes nicht auf Vorschriften beruhen darf. Automatische Schutzeinrichtungen muessen so aufgebaut sein, dass sie nicht willkuerlich abgeschaltet werden koennen. Technische Defizite im Reaktorschutz koennen nicht durch Menschen ausgeglichen werden. Der Unfall in Tschernobyl mit einem nur in der Sowjetunion gebauten RBMK-Reaktor war unausweichlich und fuehrte zu einem umfangreichen Nachruestprogramm. (Schulz).
AU anonym.
SO Zeitschriftenkurzaufsatz: VDI-Nachrichten, Band 45 (1991) Heft 17, Seite 35 (1 Seite, 1 Bild).
LG DE German.

DB DOMA, Copyright FIZ Technik.
AN M91040667674.
MJ Stoerfall Biblis A; Systemverlaesslichkeit.
TI Stoerfall in Biblis A - Theoretische und pragmatische Ueberlegungen zu einer systemischen Betrachtung der Ereignisse.
The incident in Biblis A: theoretical and practical considerations for a systemic study of the events.
AB Anhand der Ereignisablaeufe bei einem Stoerfall des Blocks A des Kernkraftwerkes Biblis im Dezember 1987 werden Ansaetze vorgestellt zu einer systemischen Betrachtung der Operationsbedingungen soziotechnischer Prozesse hohen Risikopotentials. Dabei wird ein erweiterter Ergonomiebegriff gefordert, der Teilaspekte auch der Fehlhandlungsbedingungen einzelner Arbeitsplaetze als funktionale Bestandteile uebergreifender Systemzusammenhaenge auffasst. Anhand oeffentlich zugaenglicher Informationen wurden etwa 20 kontribuierende Faktoren identifiziert, die das Entstehen und den Verlauf des Stoerfalls massgeblich beeinflusst haben. Es handelt sich dabei um vielfaeltige und wechselseitige Bedingungskonstellationen von Ereignissen, Einschaetzungen, Design- und Konstruktionsmerkmalen, die historisch und organsiatorisch weitab vom schliesslich aufgetretenen Stoerfall liegen. Im einzelnen werden zunaechst die technischen Rahmenbedingungen sowie der Ereignisablauf geschildert. Im Rahmen der systemischen Interpretation der Vorgaenge in Anlehnung an das Buch von Reason (Reason, J.: Human Error. New York 1991) werden als 'residente Pathogene' Beispiele fuer Design-Maengel sowie organisatorische, soziale und individuelle Bedingungsfaktoren aufgefuehrt. (WST). 20
AU Wilpert-B; Klumb-P.
IN TU Berlin, D.
SO Zeitschriftenaufsatz: Zeitschrift fuer Arbeitswissenschaft, Band 45 (1991) Heft 1, Seite 51-54 (4 Seiten, 1 Bild, 12 Quellen).
LG DE German.
AV MF 296184.

DB ZDEE/ZDE, Copyright FIZ Technik.
AN E92020132237.
MJ Fusionskraftwerk; Sicherheit.
TI Die Sicherheit von Fusionskraftwerken.

AB Ausgehend von den juengsten Erfolgen in der Fusionsenergieforschung wird die Frage der Sicherheit kuenftiger Fusionskraftwerke diskutiert. Im Vergleich zu den Kernkraftwerken, die mit der Uranspaltung arbeiten, gibt es bei den Fusionskraftwerken beim Abschalten keine Nachwaermeerzeugung. Die Erzeugung der Fusionsenergie wird schlagartig unterbrochen, wenn es zu einer Stoerung der im Hochvakuum ablaufenden Fusion der Atomkerne des Deuteriums und des Tritiums kommt. Gleichfalls gibt es keine chemisch aktive oder radioaktive Verbrennungsasche. Die beim Fusionsprozess auftretende radioaktive Gefaehrdung sowie Massnahmen der Gefaehrdungsvermeidung werden eroertert. Auch hierbei sind die Risiken deutlich geringer als bei der Kernspaltung. Zusammenfassend wird eingeschaetzt, dass Fusionskraftwerke nicht frei von Risiken sind, ihr Gefaehrdungspotential aber geringer als das von Kernkraftwerken ist. 21
AU Cap-F.
SO Zeitschriftenaufsatz: Oesterreichische Zeitschrift fuer Elektrizitaetswirtschaft, OeZE, Band 45 (1992) Heft 1, Seite A 13-A 14 (Sonderteil) (2 Seiten).
LG DE German.
AV MF-552297.

DB ZDEE/ZDE, Copyright FIZ Technik.
AN E91094369200.
MJ Kernkraftwerk; Risikomanagement.
TI Risikomanagement des Anlagenbetriebs.
Risk management in plant operation.
AB Die probabilistische Sicherheitsbewertung (Probabitistic Safety Assessment, PSA) ist ein Analysewerkzeug um technische Anlagen im Hinblick auf die Sicherheit zu untersuchen und optimal zu gestalten. Darueber hinaus ist PSA auch geeignet die Betriebsfuehrung einer Anlage so zu unterstuetzen, dass bei Komponentenausfaellen sicherheitstechnisch vernuenftig (minimales Risiko) bezueglich Reparatur, Ersatzschaltungen und Stoerfall-Management reagiert wird. Dies setzt eine speziell modellierte und auf einem Rechner verfuegbare PSA voraus auf deren Gestaltung in diesem Beitrag eingegangen wird. Nach Darstellung der Problemstellung bei der Risikoanalyse in modernen technischen Anlagen unter Beruecksichtigung oekologischer und oekonomischer Randbedingungen wird im Beitrag die Zielsetzung und Funktionsweise eines Risiko-Monitors erlaeutert und die Realisierung sowie der Betrieb beschrieben. Einige Empfehlungen und Schlussfolgerungen runden den Beitrag ab. 22
AU Kafka-P.
IN Gesellschaft f. Reaktorsicherheit (GRS), Garching, D.
SO Zeitschriftenaufsatz: Atomwirtschaft - Atomtechnik, Band 36 (1991) Heft 8/9, Seite 421-424 (4 Seiten, 2 Bilder, 12 Quellen).
LG DE German.

DB DOMA, Copyright FIZ Technik.
AN W92086065404.
MJ Reaktordruckbehaelter.
TI Detection and analysis of defects in reactor pressure components by 23

location and interpretation of acoustic emission sources.
Nachweis und Analyse von Fehlern in Reaktordruckbehaelter-Komponenten durch Ortung und Interpretation von Schallemissionsquellen.

AB Die Autoren berichten ueber die Erfahrungen der Schallemissionspruefung bei Druckproben und Ermuedungsversuchen an drei Druckbehaeltern (Grossbehaelter der MPA, HDR-Druckbehaelter und dem ZB2-Druckbehaelter). Diese Behaelter enthielten eine grosse Anzahl von kuenstlichen sowie quasinatuerlichen Fehlern. Zur Pruefung wurde neben konventionellen Schallemissionsgeraeten auch ein System eingesetzt, das die Anwendung moderner Signalanalyseverfahren ermoeglicht. Der Schallemissionsquellort wird im allgemeinen durch eine Triangulation mittels drei SE-Sonden gefunden, wobei die Schallgeschwindigkeit bekannt sein muss. Da dies aber oft nicht der Fall ist, wurde ein Verfahren entwickelt, das mit vier Sonden arbeitet, wobei die Schallgeschwindigkeit nicht bekannt sein muss. Ein wichtiger Parameter von SE-Signalen ist ihre Anstiegszeit. Es wurde gefunden, dass Signale mit kurzen Anstiegszeiten (kleiner als 100 Mikrometer) von Rissfortschrittsprozessen, Signale mit langen Anstiegszeiten von Rissreibgeraeuschen stammen. Weiterhin ist der Spannungszustand im Rissgebiet wichtig. Ist dieser Spannungszustand gross und aendert er sich rasch, so zeigen auch Fehler, die nicht wachsen, grosse Rissuferreibgeraeusche, die sich mit den heutigen SE-Systemen nachweisen lassen (z.B. bei Thermoschockvorgaengen). Aendern sich die Spannungen nur langsam, wie bei Druckproben, so entsteht nur eine geringe Schallemission, die oft nicht nachweisbar ist. Risswachstum liess sich in allen Faellen nachweisen, wenn die Risszuwachsflaeche einige mm(exp 2) betrug. (Walte).

AU Deuster-G; Sklarczyk-C; Waschkies-E.
IN Inst. fuer zerstoerungsfreie Pruefverfahren, Saarbruecken, D.
SO Zeitschriftenaufsatz: Nuclear Engineering and Design, Band 129 (1991) Heft 2, Seite 185-190 (6 Seiten, 10 Bilder, 6 Quellen).
LG EN English.

DE DOMA, Copyright FIZ Technik.
AN N92086066404.
MJ Ueberwachung; Kernkraftwerk.
TI Acoustic monitoring techniques for structural integrity.
Akustische Ueberwachungstechniken fuer die Strukturintegritaet.

AB Neben drei passiven Verfahren (Lecknachweis, Ueberwachung loser Teile und der Schallemissionspruefung) wird auch ein aktives Verfahren (akustische Tomographie) diskutiert. In vielen Faellen wird zur Leckpruefung das Instrumentarium der Schallemissionspruefung benutzt. Im vorliegenden Bericht wird ein Luftschall-Leck-Detektionssystem vorgestellt. In diesem Fall wird ein Mikrophon mit einer Bandbreite bis 40 kHz eingesetzt. In besonderen Faellen, z.B. zur Ueberwachung von Schweissnaehten, wird nach Entfernung der Rohrisolierung die Schweissnaht direkt mittels zweier Mikrophone ueberwacht. Die Ausstroemgeraeusche eines kleinen Lecks lassen sich klar vom Hintergrundrauschen und dem Stoerungsgeraeusch in der Rohrleitung unterscheiden. Lose Teile, z.B. im RDB oder im Dampferzeuger, erzeugen beim Klappern akustische Signale, die vom Hintergrundrauschen getrennt werden koennen. Bei mehreren Schallaufnehmern gelingt eine Ortung durch den Vergleich der

24

Laufzeiten von jeweils zwei Sonden. Durch 4 bis 8 Schallemissionssensoren koennen groessere Bereiche einer Struktur ueberwacht werden, wobei mit modernen Analysegeraeten zwischen primaeren (Risswachstum) und sekundaeren (Rissreibung) Signalen unterschieden werden kann. Vorgestellt werden Schallemissionsmessungen an einem 1:5-Modell-Reaktor-Druckbehaelter waehrend Druckproben und Ermuedungsbelastungen, wobei Schallemission ueberwiegend durch Rissreibgeraeusche auftritt. Fuer die akustische Tomographie wird ein quadratisches Schallemissionsarray ueber der zu pruefenden Stelle montiert. Jeder Schallwandler arbeitet einmal als Sender, wobei alle anderen als Empfaenger arbeiten. Gemessen wird das Reflexions- bzw. Durchschallungsverhalten an der Grenzflaeche Reaktor bzw. Rohrleitungswandung zum Wasser. Durch diese Technik lassen sich Heiss- oder Kaltwasserstroemungen sowie Gasblasen nachweisen. (Walte)

AU Macleod-I-D; Rowley-R; Beesley-M-J; Olley-P.
IN AEA Technol., Risley, GB.
SO Zeitschriftenaufsatz: Nuclear Engineering and Design, Band 129 (1991) Heft 2, Seite 191-200 (10 Seiten, 15 Bilder, 7 Quellen).
LG EN English.

DB DOMA, Copyright FIZ Technik.
AN W92084656400.
MJ Eisenlegierung; cobaltfrei; Kernkraftwerk.
TI Development of cobalt free wear resistant alloys for nuclear applications.
Entwicklung von cobaltfreien verschleissbestaendigen Legierungen fuer kerntechnische Anwendungen.
AB Wichtigste Strahlungsquelle bei der Stillegung von Kernreaktoren ist das Radionuklid Co 60, das sich aus den Stellit-Legierungen entwickelt, die als verschleissfeste Legierungen im Reaktor eingesetzt werden. Urspruengliche Versuche, diese Co-Legierungen durch Ni-Cr-B-Legierungen zu ersetzen, waren bei der Erprobung von Prototypen nicht erfolgreich. In einer Versuchsreihe wurden die Co-Legierung Stellite 6, verschiedene Co-freie Nickellegierungen, verschleissfeste Staehle sowie die Co-freien Eisenlegierungen Delcrome 90, Delcrome 910 und der nichtrostende Stahl EB 5183 untersucht. Neben dem Fressverschleiss (bei 300 Cel und Raumtemperatur) wurden zusaetzliche Verschleiss- und Korrosionspruefungen sowie Schweissbarkeitsuntersuchungen durchgefuehrt. Die Ni-Legierungen zeigten nur mittelmaessiges Verschleissverhalten, ausgenommen Colmonoy 5, das in geringem Masse durch die Temperatur beeinflusst wurde. Die Eisenlegierungen und EB 5183 waren in ihrem Verhalten mit der Stellite 6 vergleichbar mit Ausnahme von Delcrome 910, das bei 300 Cel nur maessige Eigenschaften zeigte.
AU Burdett-M-B.
IN Rolls-Royce a. Assoc., Derby, GB.
SO Zeitschriftenaufsatz: Surface Engineering, Band 8 (1992) Heft 2, Seite 131-135 (5 Seiten, 5 Bilder, 1 Tabelle, 3 Quellen).
LG EN English.

SESSION II
PRODUCTS

Chairman: K.-A. Höpfner

The First European Information System for the Protection of Man and the Environment on CD-Room

U. Hebgen
Springer Verlag GMBH & Co KG, Heidelberg

The Dangerous Goods CD-ROM provides data for over 126 000 environmentally risky substances. A super index containing more than 400 000 compound names, synonyms and product names - also "exotic" ones - gives easy access to all seven databases:

- HOMMEL, Handbook of Dangerous Goods
- CHEMDATA* (Harwell Laboratory UKAEA)
- OPERATION FILES for chemical incidents of the Swiss Fire Brigades Association
- FOPH Toxic Substances Lists (poison classes of chemicals and products published by the Swiss Federal Health Office)
- SUVA (safety codes of liquids and gases)
- MERCK-CATALOGUE (technical data, industrial health and safety standards for the chemicals supplied by this company)
- VCI (Handbook of Firms in the chemical industry)

The first edition of the Dangerous Goods CD-ROM was launched by Springer-Verlag in May 1988 and has since been employed by companies and authorities. Users' suggestions were incorporated in subsequent versions and further databases were added so that the initial 20 000 substances have in the meantime increased to the present total of 126 000. Information on emergency measures to be taken after an accident is available for each of these substances.

Major advantages of this information system are the following:

- enormous storage capacity in a compact form (a single CD-ROM has enough space for at least 200 000 to 220 000 printed pages, German standard paper size)
- search speed ("hits" are displayed within seconds after entry of the search term)
- easy handling (a help menu can be called from any part of the program)

- unlimited availability of the information (the CD-ROM is independent of data lines and host computers)
- data safety (data can neither be erased nor overwritten)

The edition of 1988 contained English and French names only in the index, the present version additionally offers the complete databases in German and English (CHEMDATA) and in German, English and French (OPERATION FILES, FOPH lists, MERCK-CATALOGUE, SUVA).

Following the suggestion of many users, a new feature has been implemented to allow storage of existing inhouse data and its retrieval integrated in the overall system via the search software OptiSearch. Users can thus develop databases corresponding precisely to their own needs.

Searches can be made via:
substance name / product name
UN number, danger number
CAS number
carriage classification
hazard label

In the menu, "cargo description", also via colour, consistency and smell in the menu, "OptiSearch", free text searches in defined fields, numerical searches for exact values and ranges of values, the standard Boolean operators allow for searches on up to five bracket levels.

Searches proceed over all seven databases, the number of hits in each one is indicated on a hit screen. Here, the program branches off into the individual databases. If more than one document is found per database a list of the substance names with the UN numbers is displayed. The databases provide different aspects of substance information:

HOMMEL is the most detailed database; in addition to general emergency instructions for fire brigades, it comprises advice on medical treatment, first aid, as well as the different carriage classes, data on water pollution and precise descriptions of the sustan-

ces according to colour, consistency, smell and reactions on contact with air and water.

OPERATION FILES and CHEMDATA have been compiled by fire brigades and reflect their special information requirements.

MERCK-CATALOGUE comprises the entire chemicals program supplied by this company including industrial health and safety standards, R- and S-Phrases, technical data, carriage classes, waste management, and references to other databases.

FOPH Toxic Substances Lists are published by the Federal Health Office of Switzerland and cover the poison classes as well as the packing labels with the symbols of products for public and commercial use. The database also contains the directory of goods of the Swiss customs authority with substance names and synonyms in German, French and Italian.

SUVA gives information on the safety codes of liquids and gases.

VCI (Handbook of Firms) lists the addresses, telephone, FAX and telex numbers of the German chemical manufacturers and wholesalers in context with the requested substances.

The display screens are graphically enhanced showing the danger labels according to the dangerous goods regulations, the "danger diamond" (including the NFPA code) and pictograms for information at a glance. All this is presented on the first screen so that the major hazards can be appraised at once.

The entire document or parts of it can be printed. A search record showing date, time, user name, entries, and number of hits is automatically stored so that the steps taken can be retraced at any time.

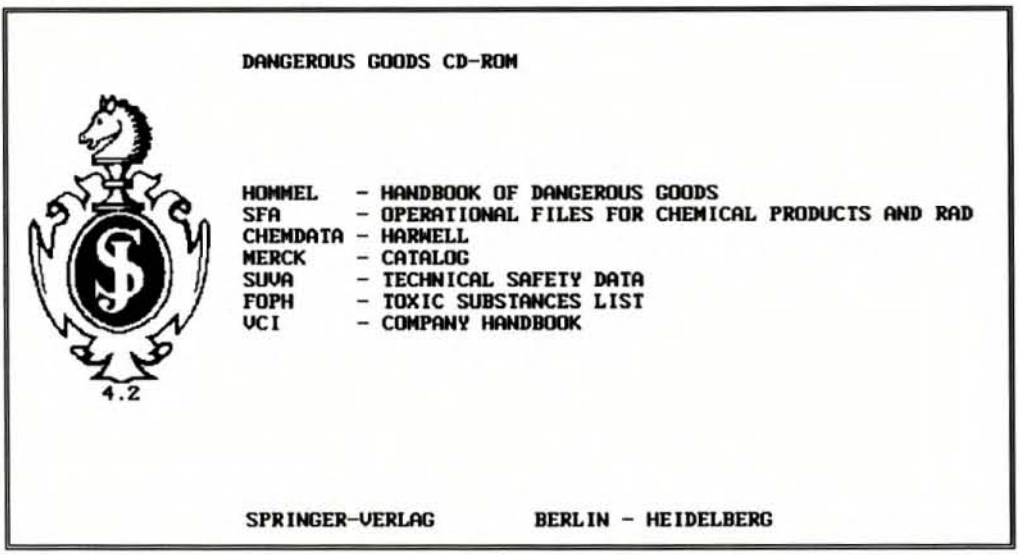
Hardware requirements:

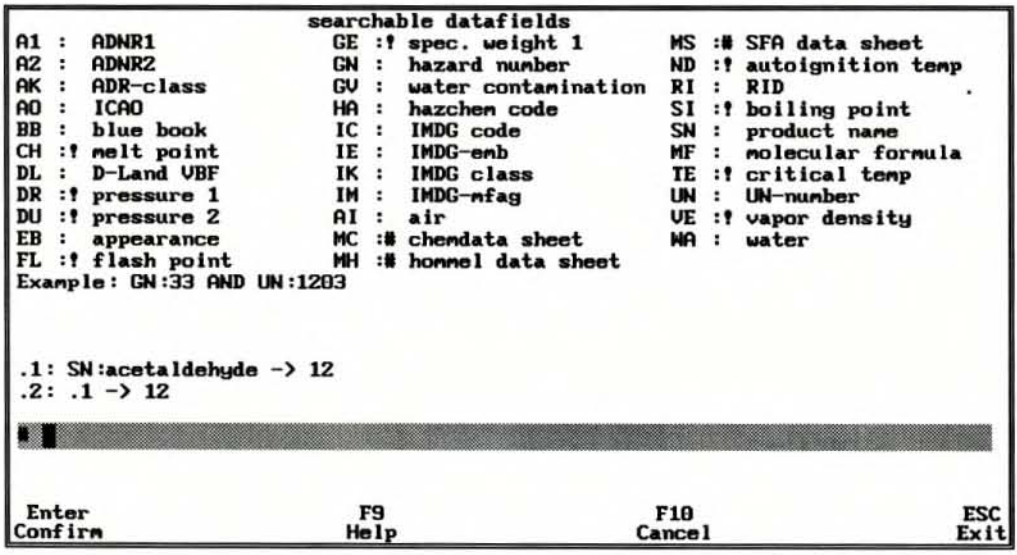
IBM AT or compatible,
minimum RAM 640 KB,
hard disk,

EGA or VGA graphics card,

DOS 3.0 or higher,

CD-ROM player with an MSCDEX drive 2.0 (or higher).


DANGEROUS GOODS CD-ROM
HOMMEL - HANDBOOK OF DANGEROUS GOODS
SFA - OPERATIONAL FILES FOR CHEMICAL PRODUCTS AND RAD
CHEMDATA - HARWELL
MERCK - CATALOG
SUVA - TECHNICAL SAFETY DATA
FOPH - TOXIC SUBSTANCES LIST
VCI - COMPANY HANDBOOK
4.2
SPRINGER-VERLAG BERLIN - HEIDELBERG


searchable datafields
A1 : ADNR1
A2 : ADNR2
AK : ADR-class
AO : ICAO
BB : blue book
CH :! melt point
DL : D-Land VBF
DR :! pressure 1
DU :! pressure 2
EB : appearance
FL :! flash point
GE :! spec. weight 1
GN : hazard number
GV : water contamination
HA : hazchem code
IC : IMDG code
IE : IMDG-emb
IK : IMDG class
IM : IMDG-mfag
AI : air
MC :# chemdata sheet
MH :# hommel data sheet
MS :# SFA data sheet
ND :! autoignition temp
RI : RID
SI :! boiling point
SN : product name
MF : molecular formula
TE :! critical temp
UN : UN-number
VE :! vapor density
WA : water
Example: GN:33 AND UN:1203
.1: SN:acetaldehyde -> 12
.2: .1 -> 12
Enter Confirm
F9 Help
F10 Cancel
ESC Exit

Data entry screen		
Orange label	:	
UN-Number	:	
Product name	: acetaldehyde	
CAS number	:	
ADR/RID code	: Cl.:___ No.:__ Letter.:__	
IMDG code	: Cl.:___ UN-No.:____ Page:_____	
FOPH-T/G Number	:	
Waste Code (CH)	:	
Personal data base	:	

START SEARCH

F1Description F2OPTISEARCH F3Hazard label F10Cancel SpacebarSelect EnterConfirm F9Help

HOMMEL-Handbook of Dangerous Goods			Doc 01/01	Profile Select 1/1(4)
MB no. 0001	UN no. 1089	Hazard no. 33	Formula	C2-H4-O
Product n		Acetaldehyde		

HEALTH HAZARD
Dangerous! Enter danger zone only with breathing apparatus and basic protective clothing.

FIRE HAZARD
Extremely flammable at all temperatures.

REACTION DANGER
Explosive when heated or strongly agitated. Establish safety zone. Fire fight only from safe shelter.

SPECIAL INSTRUCTIONS

Emergency action 2YE
Water mist
Special respirator
Consider evacuation
Containment measures

Hazard quick reference

9 Categories:1Product info.
F1Fire dept. F2Police F3Ambulance F4Select F5All F6←→Category F7Profile F8Protocol
HomeRefs EndPersonal data base PgUpPgDnDoc ↑↓Page F9Help F10Cancel

SIGEDA

SIEMENS Gefahrstoff-Datenbank
SIEMENS DANGEROUS GOODS DATABASE

by
Ulrich Kämper
Wissenschaftlicher Informationsdienst
WIND GmbH Cologne

Compared with other Dangerous Goods databases like SPRINGER's CD ROM that we have seen before, SIGEDA supplies specialised information on dangerous goods for the needs of the electronic industry. It is produced by the SIGEDA Centre of SIEMENS AG from different sources and has significant overlap with SPRINGER's CD-ROM. However, to be informed completely you need both databases. Additionally there is an online version of the Siemens Dangerous Goods CD ROM. Both the online version and the CD ROM are called SIGEDA Siemens Gefahrstoff Datenbank (Siemens Dangerous Goods Database).

The only host providing this Database online is DIMDI in Cologne, which is the leading host worldwide for health sciences and medicine, toxicology and agriculture.

SIGEDA is built, maintained, reviewed and updated within the responsibility of the SIGEDA centre at Siemens AG in Munich. SIGEDA contains information on 2828 chemicals, including numerous mixtures of chemicals. SIGEDA is organized by Chemical Record. Substances and mixtures of chemicals are selected with special regard to occupational safety and health. The database is updated every 3 months. During the last update approx. 800 new chemical substances were added to the database.

Data sources of SIGEDA (Appendix 2) are chemical data sheets of firms producing chemicals, original research results, German and international standard regulations on chemicals and last but not least the initial base of the database "KÜHN-BIRRET's Merkblätter gefährlicher Arbeitsstoffe" a leaf collection comparable to the HOMMEL-Handbook, the printed backbone of SPRINGER's CD-ROM.

From the KÜHN-BIRRETT-Collection approx. 800 hazardous substances are entered and the SIGEDA centre has added around 2000 mixtures of chemicals. The

database has numerous different data fields but DIMDI has managed to give an easy overview even for less skilled searchers.

Appendices 3 and 4 show a description of **subject groups and datafields**. On the right side you find the field codes which can be used for searching and displaying.

For details about techniques how to search questions and display results look at Appendix 5-10. Substance searches can be carried out via names or substance registry numbers e. g. the CHEMICAL ABSTRACTS registry number, molecular formulas or formula fragments. This database is completely compatible with the other 4 toxicological databases RTECS, ECDIN, HSDB and INTOX at the DIMDI host. The technique to search for the information is the same in all these 5 databases. Consequently you can search for complete information within a few minutes in this online-system. Even in case of emergencies you can use any telephone with accoustic coupler or MODEM to search on DIMDI 24 hours a day.

SIGEDA on DIMDI is also available in a menue driven dialog version. If you are out of online practice do not hesitate to contact the system. You can easily CALL MENU and then you will be guided by the system.

Now you should get some information on pricies. You have heard that CD ROMs are quite expensive, but they can be cheap if you need them frequently. So this online version is ideal for people who do not need the information every day, or need it in context with scientific bibliographic databases respectively.

SIGEDA on DIMDI is rather cheap. As you see on the table (Appendix 10) 1000 characters cost 2.50 DM. The sample record COPPER CHLORIDE has little more than 5000 characters. Multiply this by 2.50 DM and get the information at 12.50 DM. Additionally you have to pay 40 DM per hour for the service of the host computer and 5 DM for 10 minutes telecommunication connect time. If you assume 20 - 30 DM total charges for this kind of search you see this is a very cheap source for information on toxicity and the environment in general. On the other hand, this source is by far not sufficient for obtaining complete information. It has to be searched in context with the other toxicological factual databases.

Ulrich Kämper
Cologne 14th October

WIND in Cologne is an independent information broker specialized on Chemistry, Environment, Life Sciences and Patents.

S I G E D A

built, maintained, reviewed and updated
within the responsibility of
the SIGEDA centre
at Siemens AG Munich.

S I G E D A

contains Information on
2,828 chemical substances
and mixtures of chemicals.

S I G E D A

is organised by chemical record.
Substances and mixtures of chemicals are
selected with special regard to occupational safety
and health.

DATA SOURCES

- ❒ Chemical data sheets of firms
- ❒ Original published research results
- ❒ German and international standards and regulations on chemicals
- ❒ "Kuehn-Birett, Merkblaetter Gefaehrlicher Arbeitsstoffe"

In addition to the approx. 800 hazardous substance monographs in Kuehn-Birett, SIGEDA contains data on approx. 2,000 mixtures of chemicals ("Zubereitungen").

SUBJECT GROUPS AND DATA FIELDS

- ❒ Substance Identification (Names, Synonyms, CAS-, EINECS-, RTECS-, EEC-, UN-Numbers, Molecular Formulas, etc., and ingredients of the 2,004 chemical products) — IDEN

- ❒ Chemical and Physical Properties — CHEM

- ❒ Monitoring Methods — MONI

- ❒ Safety and Handling information — SAFE
  including subgroups
  + Precautions, Preventive Measures — PREV
  + Accident Countermeasures — MASSN

- ❒ Toxicity and Biomedical Effects — TOXI
  including subgroups
  + Toxicity Summary and Mechanism of Action — TOXS
  + First-Aid Measures in accidental poisoning — FMAID
  + Therapy hints for physicians — THER

SUBJECT GROUPS AND DATA FIELDS
(continued)

- ❒ Standards and Regulations information — STAN

  including subgroups

  - ☛ Regulations according to German law — REG
  - ☛ Risk Assessment — EINST

    as noticed in the Gefahrstoffverordnung

    (German Dangerous Substances Directive),
  - ☛ German and International

    Threshold Limit Values,

    MAK, BAT, TRK, TLV — TLGERM, TLINT
  - ☛ Transport Regulations — TRANSP
  - ☛ Environmental Protection Measures — ENVP

SEARCHING
Techniques

SUBSTANCE SEARCHES via
names, substance registry numbers,
molecular formulas, formula fragments

FIND TE=anilin

FIND CR=50-00-0

FIND FF=(C6 AND CL6)
retrieves all compounds with
6 C and 6 Cl atoms

VIEW to INDEX

D KUPFER

1.01	59 KUPFER
1.02	1 KUPFERAKTIVIERUNGSSALZ
1.03	1 KUPFERBAD
1.04	1 KUPFERBADKONZENTRAT
1.05	1 KUPFERBADZUSATZ
1.06	1 KUPFERCARBONAT
1.07	1 KUPFERCHLORID
1.08	1 KUPFERCYANID
1.09	1 KUPFERDEAKTIVATOREN
1.10	3 KUPFERFARBEN
1.11	2 KUPFERFARBENE
1.12	1 KUPFERFARBENES
1.13	1 KUPFERHYDROXID

MORE

F 1.07

2.00 NUMBER OF HITS IS 1

DISPLAY Techniques

SHOW F=CONTENTS

Nomenclature information and overview on the fields present in the unit record, without data

SHOW F=EINEC;STAN

EINECS-Number,Standards + Regulations

SHOW F=SAFE;PREV;TOXI

Safety, Preventive Measures, Toxicity

SHOW F=ALL

Complete document

SIGEDA on DIMDI
is available in a menu-driven dialogue version.

S F=CONTENTS

```
2.00/000001 DIMDI: -SIGEDA /COPYRIGHT SIEMENS
++ ND       SIGEDA-NUMMER: 10108   approx. RL:  5314
++ IDEN     SUBSTANZIDENTIFIZIERUNG
            NAME:  High Speed Accu Guard Starter
            UN      UN-NUMMER: 2810
++ CHEM     CHEM.-PHYSIK. EIGENSCHAFTEN
++ SAFE     SAFETY, SICHERHEITSMASSNAHMEN
 + PREV     PRAEVENTIVMASSNAHMEN
 + MASSN    MASSNAHMEN IM SCHADENSFALL
++ TOXI     TOXIZITAET, BIOMED. WIRKUNG
++ STAN     STANDARDS, RICHTLINIEN
 + REG      REGELUNGEN, VORSCHRIFTEN
 + EINST    EINSTUFUNG NACH GefStoffV
 + TLGERM   KONTROLLGRENZEN DEUTSCH
 + TLINT    THRESHOLD LIMITS INTERNAT.
 + TRANSP   TRANSPORTVORSCHRIFTEN
 + ENVP     UMWELTSCHUTZ
 + ASW      AUSLOESESCHWELLEN
```

; **F=SAFE;PREV;TOXI**

00/000001 DIMDI: -SIGEDA /COPYRIGHT SIEMENS
+ SAFE SAFETY, SICHERHEITSMASSNAHMEN
- PREV PRAEVENTIVMASSNAHMEN
TPREVZ TECHN. SCHUTZMASSN.-2:
- Nicht in Kanalisation, Gewaesser und Erdreich gelangen lassen.
- Fuer ausreichende Be- und Entlueftung sorgen (Arbeitsplatzabsaugung).
- Gebinde nicht offen stehen lassen, nicht in der Naehe von Zuendquellen aufbewahren.
FPREVZ VORBEUG. BRANDSCHUTZ-2:
- Von Zuendquellen fernhalten. - Rauch- und Schweissverbot.
PPREVZ PERSOENL. SCHUTZMASSN.-2:
- Von Nahrungsmitteln, Getraenken und Futtermitteln fernhalten.
- Beim Umgang mit der Chemikalie nicht essen, trinken, rauchen.
- Haut- und Augenkontakt vermeiden. Schutzbrille, geeignete Schutzhandschuhe und Schutzanzug tragen.
- Daempfe/Nebel nicht einatmen; ggf. Atemschutz verwenden.
- Vor der Pause und nach Arbeitsende verschmutzte Hautpartien (z.B. Haende) mit Wasser und Seife waschen sowie mit Hautschutzsalbe einreiben.
- Verschmutzte, getraenkte Kleidung wechseln.
SICHK SICHERHEITSKENNZEICHEN:
- Zutritt fuer Unbefugte verboten. (Dieses Sicherheitskennzeichen anbringen, falls ein unmittelbarer Zutritt durch Betriebsfremde moeglich ist.)
- Augenschutz tragen. (Dieses Sicherheitskennzeichen anbringen, falls ein Augenkontakt mit der Chemikalie nicht sicher ausgeschlossen werden kann.)
FILTA ATEMFILTER : Gasfiltertyp: K
FILTP PARTIKELFILTER : Zur Ergaenzung ist ein Partikelfilter P2 notwendig

SIGEDA
Licence fees

Online batchsearch per hour

connecttime or realtime:

prime time	**DM**	**15.00**
non-prime time	**DM**	**12.00**

additionally per 1000 characters

displayed	**:**	**DM**	**2.50**
printed	**:**	**DM**	**2.50**
downloaded online	**:**	**DM**	**5.00**
downloaded offline	**:**	**DM**	**5.00**

In addition there are fees

for service (40 DM / hour)

Meta-Databanks of Data-Sources for Environmental Chemicals

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ABSTRACT

In response to the need for finding chemical information we have set up a system to identify and access appropriate data-sources. This Information System for Environmental Chemicals consists of the following meta-databanks:
DAMA: Databank of Manual Sources
DADB: Databank of Online Databases
DACD: Databank of CD-ROMs
Data-fields of the Databank of Manual Sources (DAMA) will be explained in detail. Manual sources like handbooks, reports, proceeding volumes, directories and grey literature, Online databases of 12 international hosts including two Russian hosts and CD-ROMs (offline databases) are evaluated and compared according to some chemical-relevant parameters like identification, production and use, detection in the environment, physical-chemical properties, environmental transport and fate, ecotoxicity, mammalian toxicity genotoxicity, and workplace exposure aspects.

Keywords: Manual sources, databanks, databases, bibliographic databases, numeric databases, CD-ROMs, environmental chemicals, existing chemicals, hosts, Russian databases, Russian hosts.

1. INTRODUCTION

Every day about 20.000 scientific/technical publications appear worldwide, that corresponds to around 5 million publications a year. In chemistry and related fields some 600.000 papers, scientific articles etc. are published every year. Between 1830 and 1960 about 1.5 million chemical compounds were described that means an average of 11.500 compounds a year. Between 1960 and 1980 another 3.5 million compounds were described, that corresponds to an average of 175.000 compounds a year (1). All theses chemical substances are described in various data-sources. These sources are so numerous and diverse that it is difficult to know where to find the information needed for a particular task. Being aware of this problem a couple of directories have been established , like for example in the field of databases Computer-Readable Databases (2), CUADRA (3), DIANEGUIDE (4) and especially for CD-ROMs the International Guide CD-ROMs in Print (5) or the Directory of CD-ROMs (6). Valuable directories which are particulary concerned with the subject of science and technology are the Handbuch der Datenbanken für Naturwissenschaft, Technik und Patente (7), the Umweltdatenbankführer (8) and Datenquellen für Umweltchemikalien (9). Although these directories give a very good overview of the online and CD-

ROM market, they do not give detailed information on the problem of data on chemical substances. In response to the need for finding chemical information that is useful in evaluating environmental conditions, we have developed a system to identify and access appropriate data-sources.

2. DATABANK OF DATA-SOURCES FOR ENVIRONMENTAL CHEMICALS

This so-called Information System for Environmental Chemicals is a research project granted by the Bavarian State Ministry for Country Development and Environmental Protection. It consists of three different databanks which describe the contents, accessibility, and costs of retrieving information from numerous sources. These databanks are:
DAMA: Databank of Manual Sources
DADB: Databank of Online Databases
DACD: Databank of CD-ROMs (offline databases)
We use a commercially available database software package (10) to build up this databanks. This database system is explicitly developed for IBM AT compatible microcomputers under MS-DOS since version 3.X with a memory of at least of 640 KB. For the retrieval of information the commonly known Boolean operators can be used. Front, middle, and end truncation is possible.

2.1 DATABANK OF MANUAL SOURCES (DAMA)

The Databank of Manual Sources for environmental chemicals contains 816 documents so far. 109 sources are secondary literature which do not encompass data on chemical substances. Hence only 707 manual sources are relevant for our evaluation of this databank. The set-up of the databanks and the organization of data-fields is of upmost importance for the future effective work with these meta-databanks. The database software LARS distinguishes mainly between alphanumeric, integer, text and fulltext fields (10). In our three meta-databanks we make a distinction between administrative fields, bibliographical fields, technical fields (only for CD-ROMs) and fields which describe the content of a source. The exact data-field description of all three databanks DAMA, DADB and DACD is given in our final report of phase 2 of our research project mentioned above (11). In this paper we confine ourselves to the description of the data-fields in our Databank of Manual Sources.

This databank of manual sources contains 23 different fields. Positions 1 to 5 are reserved to merely administrative functions. Then the so-called bibliographical fields like author, title, publisher, publishing year etc. are given. The most important fields of our databanks of data-sources for environmental chemicals are those which describe the content of the source, like the descriptor field, the test-set of chemicals and the number of chemicals field. These fields are exacly the same

Table 1: Data-fields in DAMA

Pos.	Abbr.	Field-name	Field-type	Entries
1	DO	Document number	Integer	Single
2	DA	Date	Date	Single
3	DT	Document type	Alphanum.	Single
4	LO	Location	Alphanum.	Single
5	OF	Official in charge	Alphanum.	Multiple
6	AU	Author	Alphanum.	Multiple
7	CO	Corporate Source	Alphanum.	Multiple
8	TI	Title	Text	Multiple
9	SU	Subtitle	Text	Multiple
10	PU	Publisher	Alphanum.	Single
11	LP	Loc. of Publisher	Alphanum.	Single
12	PY	Publication Year	Integer	Single
13	IB	ISBN-Number	Alphanum.	Single
14	IS	ISSN-Number	Alphanum.	Single
15	LA	Language	Alphanum.	Single
16	VO	Volume	Alphanum.	Single
17	PR	Price in DM	Integer.	Single
18	PA	Number of Pages	Alphanum.	Single
19	**NC**	**Num. of Chemicals**	**Integer**	**Single**
20	**DE**	**Descriptors**	**Alphanum.**	**Multiple**
21	**TE**	**Testset Chemicals**	**Alphanum.**	**Multiple**
22	RE	Remarks	Alphanum.	Multiple
23	UP	Update	Alphanum.	Multiple

in all our three different meta-databanks. For a comprehensive description of the content of a source we developed a thesaurus containing the key words which are of interest to the problem of environmental chemicals. We tried to incoporate in this thesaurus not only environmental aspects but also health and workplace exposure aspects. The thesaurus encompasses for example the identification of chemicals, data on detection of chemicals in the environment, use of chemicals, economic data, physical-chemical properties, degradation/accumulation data, ecotoxicity, effects on wildlife, toxicity/effects on mammals, effects on human organisms, information in relation to the workplace etc. Each term of the bibliographical aspect and each field of the thesaurus can either be retrieved individually or in combination with other terms. Hence an effective search for data-sources where specific information is needed, will be guaranteed by using the system described above. Because of the diverse nature of the data pertinent to the problem of environmental chemicals, we decided that the best way of evaluating the utility of databanks of data-sources was the collection of data on a testset of chemicals. We chose a testset of 68 chemicals. These chemicals have been evaluated in a different approach as potential food contaminants and results have been discussed in our previous publications (12, 13, 14).
As there are manual sources which contain thousands of chemicals and others which only describe a couple of hundred, we created the field "number of chemicals". Therefore a rough estimation of the probability of success using a specific source is possible.

2.2 DATABANK OF ONLINE DATABASES (DADB)

In DADB we incorporated relevant databases of the following hosts: BRS, CIS (Chemical Information Service), DATASTAR, DIALOG, DIMDI (Deutsches Institut für Medizinische Dokumentation und Information), ECHO (European Communities Host Organization), ESA (European Space Agency), ICSTI (International Centre for Scientific and Technical Information), ORBIT, Questel, STN (Scientific and Technical Information Network), VINITI (The All Russian Institute of Scientific and Technical Information) and some small hosts which offer only a few databases. With the exception of the two big Russian hosts ICSTI and VINITI we have online access to all other hosts mentioned above. We only started to evaluate the databases of the Russian hosts ICSTI and VINITI recently. As we have no online access to these Russian databases we have to rely on secondary information like personal communications, directories, reports etc. Very valuable were the information material and demonstrations presented at the Second East-West Online Information Meeting, 28 September - 2 October, 1992, Moscow, Russia (15).

DADB has 336 entries so far. Among these chosen databases 203 are bibliograhical databases, 84 numeric ones, 38 full-text databases and 11 reference databases. For our analysis we chose the bibliographic and numeric and fulltext databases. We do not take into consideration the reference databases which do not provide actual data and information on chemical substances. Hence we only consider 325 databases.

We evaluated the chemical-relevant databases of the following 12 major hosts shown in Table 2 (16).

Table 2: Distribution of Chemical-Relevant Databases Among Hosts

Host	No. of DBs	BIB	NU
BRS	19	10	8
CIS	32	4	27
DataStar	43	30	12
DIALOG	54	35	15
DIMDI	37	23	14
ECHO	6	6	-
ESA	23	22	1
ICSTI	11	11	-
Questel	13	9	3
ORBIT	25	19	5
STN	64	33	30
VINITI	4	1	2
others	5	-	5
	336	203	122

In Table 2 the total number of databases and the number of bibliographic and numeric/fulltext databases are given. STN and DIALOG have the highest number of relevant databases in their database offer closely followed by DataStar. CIS, DIMDI and ESA have also a great variety of environmental chemical-relevant databases to offer. As shown in Table 2 about 60 % of the total of the chosen databases are bibliographic ones whereas only about 40 % are numeric ones. The distribution is about the same for most of the hosts with the exception of CIS (Chemical

Information Service) and STN (Scientific and Technical Information Network) where most of the relevant databases are factual ones.

2.2.1 Load Status Statistics and Results

As already mentioned above, DAMA has 707 and DADB encompasses 325 relevant entries. The load status of a databank indicates the number of hits and the load percentage of the databank. To show the load status of DADB we chose a couple of important criteria as an excerpt shown in the graphical illustration in Figure 1.

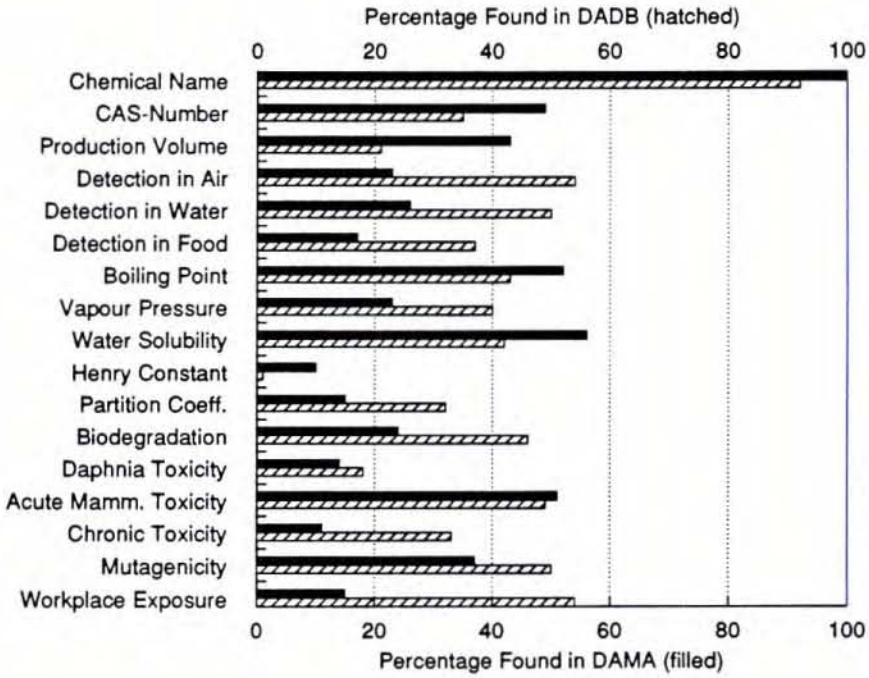

Figure 1: Comparison of DAMA with DADB

We notice that searching by CAS Registry Number is only possible in 35 % of the entity of the evaluated online databases, wheras about 50 % of the written documentation includes CAS Registry Numbers. As we mentioned several times in our previous publications searching by CAS-Number is far more efficient than trying to retrieve the information wanted using the chemical name (11, 13). We compared the results of CAS-Number and chemical name searching in a special publication treating this main topic (14). It is rather unfortunate that many databases especially bibliogra-

phic ones do not incorporate the CAS-Number at all. None of the Russian databases goes by CAS-Number searching so far. Russian databases can be searched by their own defined numbering system (15). Most physical-chemical properties are well represented. The parameter water solubility can be retrieved in 42 % of the chosen online databases and in 56 % of the manual sources. Quite often only qualitative descriptions like "slighty soluble", "very soluble" etc. are given. This piece of information is only of little value. Physical-chemical parameters which are important for models calculating the behaviour of chemicals in the environment, like e.g. the Henry Law Constant or the n-Octanol-Water-Partition Coefficient are extremely badly represented in all data-sources. The data situation for these parameters is even worse in online databases than in printed documents. Ecotoxcity parameters like daphnia toxicity and chronic mammalian toxicity are poorly represented in comparison to acute mammalian toxicity data and information on mutagenicity, carcinogenicity and teratogenicity. Although ecotoxicity, degradation and accumulation and chronic toxicity parameters are lower in percentage than the other parameters, their number of hits is striking. The reason for that is the practised search strategy in bibliographic databases, where any article will be retrieved where the chosen term is incorporated, either in the title, key words or abstract. In numeric databases the parameter can only be found if the field for a specific parameter is defined.

2.3 DATABANK OF CD-ROMs (DACD)

Data compilations on CD-ROMs have only been available for a couple of years. Compact Disk - Read Only Memory (CD-ROM) technology and applications have come of age in the early 1990s. The question nowadays is not whether or when to utilize CD-ROM products, but which ones to buy (17). This industry branch continues to grow immensely. In our Databank of CD-ROMs we incorporated 140 data-sources relevant for chemical substances. Two years ago we had only 71 relevant CD-ROMs in our database (18). As prices for CD-ROMs are still quite high we did not have the opportunity to test all of our CD-ROMs mentioned in DACD. So we had to rely in great part on the data supplied by publishers, data providers and software houses. Very helpful for our work proofed to be standard CD-ROM reference manuals like CD-ROMs in Print (5) and The CD-ROM Directory (6).

Administrative, and data-fields which describe the content of a source are the same as described in our Databank of Manual Sources (DAMA). Bibliographic data-fields however differ slighly from those of DAMA. Treating the subject of CD-ROMs bibliographic information on the provider, publisher and distributors become important. Furthermore technical information regarding installation and operation of CD-ROMs are incorporated in our DACD. These technical subjects treat for example topics like CD-ROM players, floppy drives, monitors, printers, input devices, space on hard disk etc.

In Figure 2 we compare the load status of our databank of databases (DADB) with the databank of CD-ROMs (DACD).

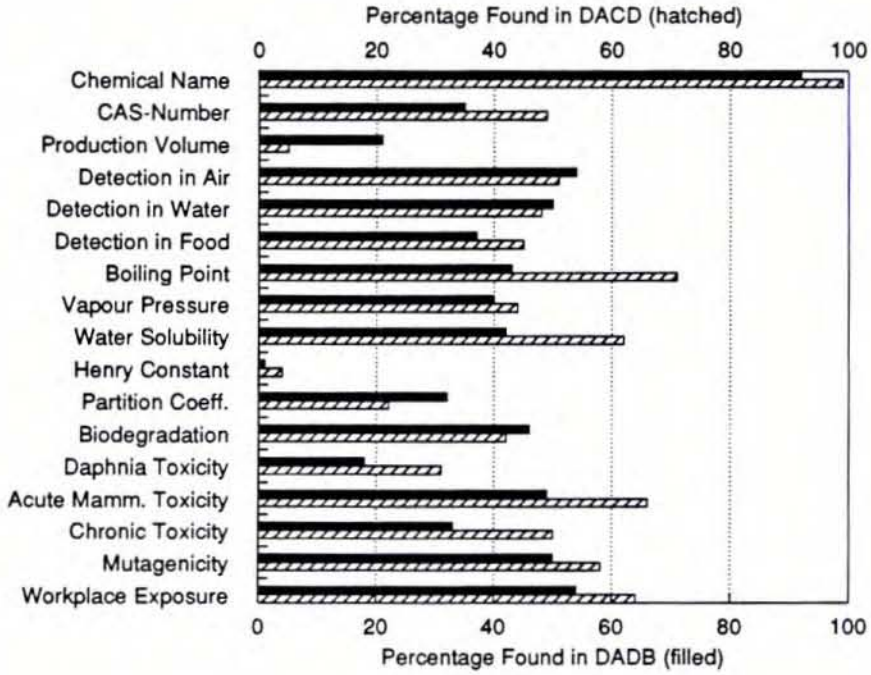

Figure 2: Comparison of DADB with DACD

We choose a couple of important criteria as an excerpt in the graphical illustration in Figure 3. First one can easily state that in 50 % of the CD-ROMs compared to only 35 % of online databases searching by Chemical Abstract Service Registry Number is possible. It seems that producers of databases for this new media take into consideration the importance of this identification parameter. On the other side still 50 % of the chemical-relvant CD-ROMs can only be searched by chemical name or synonym. The data situation on economical parameters like production volume, import and export data is extremely bad in online databases and even worse in data compilations on CD-ROM. It only exists a small amount of data-sources on this subject. These kind of information has to be given by producers and/or distributors of chemicals. As discussed earlier, most common physical-chemical parameters e.g. melting point, boiling point, vapour pressure, water solubility etc. are rather well represented. This applies not only to online but also to offline databases. Acute toxicity parameters as well as carcinogenicity, mutagenicity and teratogenicity can be found in around 50 % of the chemical-relevant databases (online and offline). On the whole, one notices that the data situation on CD-ROMs is slightly better than in online databases. This especially applies to physical

chemical parameters and health related ones. Many CD-ROMs treat health related and toxicological subjects or cover identification parameters and physical-chemical subjects. Given the nearly 600 megabyte capacity of compact disks (CDs) to store the equivalent of more than 200.000 pages or 1 million catalog cards, it is understandable that in many cases more than one data-source can be found on a CD-ROM. In this particular case one talks about a multi-database disk (17).

3. CONCLUSIONS

The information market is huge and still growing. This applies especially to data-sources in science and technology. The evaluation, comparison, and selection of the appropriate data-source, either manual source, online or offline database will become increasingly important with the growing number of publications. We therefore decided to build up reference databanks of data-sources and put the emphasis on the evaluation of sources regarding chemical-relevant information parameters. Scientists, chemical engineers and others are showing increasing interest in the subject of information retrieval on chemicals. We therefore present our approach at conferences, workshops and seminars. On top of that we offer our own training courses. Intersted parties are invited to contact us for further information. Moreover our databanks are available for scientists working in German governmental institutions.
We update our three meta-databanks regularly and incorporate new sources with a special emphasis on databases of the Eastern Bloc countries. We plan to continue this work as long as the need is evident.

4. REFERENCES

1. K. Lankenau, STN International Germany, Economic Aspects of Database Production, Distribution of Information and Database Usage, in: Learned Information Ltd. Oxford, International Centre for Scientific and Technical Information Moscow, 2nd East-West Online Information Meeting, 28 September - 2 October, 1992, Moscow, Russia, 1992.
2. Computer-Readable Databases, Host: DIALOG, Palo Alto (1992).
3. CUADRA, CUADRA Directory of Online Databases, Host: DATASTAR, DIALOG, London (1992).
4. DIANEGUIDE, Host: ECHO, Luxembourg (1992).
5. N. Desmarais, CD-ROMs in Print 1992, An International Guide to CD-ROM, CD-I, CDTV & Electronic Book Products, Meckler Publishing, Westport (1992).
6. J. Mitchell, The CD-ROM Directory 1992, TFPL Publishing, London (1992).
7. Scientific Consulting, Dr. Schulte-Hillen BDU, Handbuch der Datenbanken für Naturwissenschaft, Technik, Patente, 1991, Verlag Hoppenstedt & Co, Darmstadt (1991).

8. A. Ottahal, Umwelt-Datenbank-Führer, Verlag TÜV Rheinland, Köln, (1989).

9. K. Voigt and H. Rohleder, Datenquellen für Umweltchemikalien, 2. Auflage, Ecomed Verlagsgesellschaft, Landsberg/Lech (1990).

10. WEKA Software für Wirtschaft und Verwaltung GmbH: LARS, Bedienungsanleitung und Handbuch, WEKA, Frankfurt (Friesenstr. 26) (1992).

11. K. Voigt and T. Pepping, Informationssystem Umweltchemikalien, Abschlußbericht, GSF-Bericht 10/92, GSF-Forschungszentrum für Umwelt und Gesundheit GmbH, Neuherberg (1992).

12. W. Mücke., K. Voigt and H. Schulze, Approach for Identification of Hazardous Environmental Chemicals in Food, Toxicological and Environmental Chemistry **13**, 129-140 (1986).

13. K. Voigt., J. Benz and W. Mücke, Registering and Analysing Data on Detection of Chemicals in the Environment, Chemosphere, **21**, 12, 1429-1434 (1990).

14. K. Voigt, T. Pepping, E. Kotchetova and W. Mücke, Testing of Online Databases in the Information System for Environmental Chemicals with a Testset of 68 Chemicals, Chemosphere, **24**, 7, 857-866 (1992).

15. K. Voigt, M. Matthies and T. Pepping, Chemical-Relevant Databases in Russia Incorporated in the Information System for Environmental Chemicals, Proceedings, 16th International Online Information Meeting, 08.-10. Dezember 1992, London, in print.

16. K. Voigt, M. Matthies, T. Pepping, Information System for Environmental Chemicals - Comparison and Evaluation of Meta-Databanks of Data-Sources, ECOINFORMA 1992, Bayreuth 14. - 18. September 1992, Toxicological and Environmental Chemistry, accepted

17. P. Jacso, CD-ROM Software, Dataware, and Hardware, Evaluation, Selection, and Installation, Libraries Unlimited, Inc., Englewood, CA (1992).

18. K.Voigt, T. Pepping, J. Benz., Comparison of Data-Sources for Environmental Chemicals, 14th International Online Information Meeting, Proceedings, 11.-13. December 1990, London , pp 261-268 (1990).

19. K. Voigt, T. Pepping and M. Matthies, Chemical-Relevant Databases in Germany, Online Databases, CD-ROMs, Grey Data-Sources, in: Learned Information Inc., Proceedings of the National Online Meeting, New York, May 5-7, Medford, N.J., pp 407-416 (1992).

IMIS - The German Integrated Radioactivity Information - and Decision Support System

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Abstract

IMIS is set up as part of the German Government's National Response Plan for dealing with the consequences of a large scale radioactive contamination of the environment. The legal basis for the establishment is the "Act on the Precautionary Protection of the Population against Radiation Exposure" (Strahlenschutzvorsorgegesetz) from December 1986.

The IMIS System has three action levels. Level 3 of the system applies state of the art radiation monitoring networks, collection of laboratory data and provides computing and communication techniques appropriate to the various needs. The computing facilities ensure standardized collection and quality control of the measured data and provide the possibility for the standardized presentation of the measured data and of the results of transport and dose assessment models (Level 2). Level 1 includes the evaluation of the data, the management of the consequences of a given sitatuion, the legal enforcement of protective measures and the information of the public.

The IMIS system was commissioned by the Ministry of Environment, Nature Conservation, and Reactor Safety and is being supplied under the turnkey contract by a consortium led by DIGITAL equipment in conjunction with DORNIER. The responsibility for the contract is with the Federal Office for Radiation Protection.

In its final stage the IMIS system consists of a total of 75 RISC computers which are linked together by an efficient packet-switched Wide Area Network, WAN (X.25). Due to various demands of the individual users three different types of RISC computers are used. The system software includes ULTRIX, TCP/IP and X windows. The relational database management system ORACLE is used together with the query language SQL plus. Statistical analyses are carried out with the standard product SAS. The geographical information system TERRA provides all the tools necessary for a detailed geographic presentation of the data.

1. Introduction

The Chernobyl accident has clearly demonstrated how important it is to have adequate early warning and monitoring systems which provide competent authorities with timely information on any changes in radiation levels and which enable them to take appropriate protective measures and to inform the public. The effectiveness of the systems installed depends upon the organisation and the skills of the competent authorities as well as upon the provision of adequate instrumentation for measurement, data transmission, and data analysis.

In order to faciliate both rapid data exchange and model calculations, a fast communication infrastructure and a computer-based information system is needed. The advantage is that

- all relevant informations and data can readily be made available almost at the same time at all levels of the system,
- the data can be made comparable and therefore objective and reliable,
- more complex assessment procedures like the application of real-time models and of decision support systems become feasible.

The German Integrated Measurement and Information System, IMIS, is considered a state of the art solution to the questions envisaged in a large scale contamination situation. The system is being set up under the responsibility of the Federal Office for Radiation Protection. Parts of the final system have been in operation for several years up to now, others are still to be developed. In the following chapters the basic ideas of the design and of the operation of IMIS as well as its present status are described.

The legal basis for the establishment of IMIS is the "Act on the Precautionary Protection of the Population against Radiation Exposure (Strahlenschutzvorsorgegesetz)" from December 1986 (1).

2. Requirements for the instrumentation for measurement and for the models for dose assessment

During a large scale contamination of the environment human beings may be affected via three pathways, e.g.,

- the external exposure due to gamma radiation emitted by airborne radionuclides and by radionuclides deposited on the ground,
- the internal exposure due to airborne radionuclides incorporated via inhalation,
- the internal exposure due to radionuclides incorporated via ingestion.

Other pathways may be of importance in certain kinds of accidents.

The most important data for a rapid determination of the dose contributions via these pathways are the gamma doserate, the radionuclide concentration of the air, and the specific activity of relevant food- and feedingstuff. The spatial and the time resolution of the data must be suitable for a representative dose assessment. The detection limits and the upper levels of detection of the instrumentation used must cover a wide range of possible contamination levels.

In the early phase of a large scale contamination protective measures may have to be taken rather fast, i.e, within a few hours but at least within the course of the first day after the contamination has occurred. Rapid detection methods, fast and reliable systems for the collection and the transport of the data, and dedicated radioecological computer codes have to be employed to obtain the required information without delay. In this phase dose estimates can only be based on results of measurements of on-line monitoring systems and rapide detection methods, e.g., the gamma doserate, the radionuclide concentration of air and the contamination of the ground.

After the early phase when the overall situation has become clearer, a detailed assessment of the dose particularly via ingestion and of the effectiveness of protective measures like food bans become of great importance. This detailed information can be made available by additional laboratory analyses of samples of food- and feedingstuff. Sampling should be based on preconceived strategies which ensure representativeness of the dose estimates.

In both phases atmospheric and aquatic transport models and radioecological models can efficiently support the work of decision makers by describing and predicting the long range transport of radionuclides in the relevant transport media (air, water bodies) and estimating the dose. The most important transport models of IMIS are those which describe and predict the long-range transport of atmospheric radioactivity. The results of such models are used in two ways. In the early phase of an event they indicate where and when a contamination might be expected to appear in subsequent days and what its severity might be for a postulated or known release magnitude. After contamination data become available the models can be used to interpolate between the stations for which data are available. The results which will be provided by the German Weather Service (2) are based on

- foreward and backward air mass trajectories,

- transport and deposition models of Eulerian and Lagrangian type (grid 10 to 50 km) which provide diagnoses and prognoses of the atmospheric concentration, of the contamination of the surface by wet and dry deposition, and of precipitation.

The radioecological models must cover all relevant exposure pathways in sufficient detail. Their modes of opertion must be flexible in order to take into account special features of a given situation such as time dependent input and transfer of different radionuclides, season of the year, state of vegetation, nuclide

vector, consumers habits etc. Their results are needed shortly after any change of a given contamination situation. All these requirements can hardly be met by a single model. The radioecological model PARK (3) which is part of IMIS therefore has two modes of operation. AUTOPARK provides detailed, nation-wide

- diagnoses of the expected radiation exposure of the population
- prognoses of the contamination of relevant foodstuffs and feeding stuff
- diagnoses and prognoses of the effect of certain protective measures like sheltering and food bans on the expected dose.

The input to AUTOPARK are the data from the on-line networks of IMIS and diagnoses and prognoses of the contamination situation of the air and of the ground provided by the German Weather Service. The model calculations are based on realistic assumptions on consumers habits. As these may not be representative for a given situation a second code of PARK (DIAPARK) is available which provides much higher flexibility in terms of the use of input and model parameters. In addition DIAPARK provides tools for the thorough investigation of the effectiveness of various protective measures. The drawback of DIAPARK is that its operation is more time consuming than that of AUTOPARK and does a priori not give information on the synoptic situation on the territory of Germany. In an actual case results from both models are required to obtain all the informations needed in order to fully understand the situation.

The computer codes of PARK as well as that of RODOS which is being developed for the EC are based on the radioecological model ECOSYS. In this way a high degree of harmonization of dose assessment is achieved.

3. Design and operation of IMIS

The information system IMIS is designed as an hierarchic system with three action levels (Fig. 1):

level 1: evaluation of the data, management of the consequences of the situation, application and legal enforcement of protetive measures, and information of the public

level 2: processing and quality control of the measured data, estimation of the dose

level 3: collection of data and information

Level 3 includes both monitoring networks and laboratory facilities. The advantage of this approach is that most of the relevant data and informations needed for a quick dose assessment can be obtained from on-line detection systems of the monitoring

networks whereas the laboratory measurements can provide a deeper and more detailed picture of the situation with some delay.

The nation-wide networks of IMIS monitor the following parameters:

- gamma dose rate at 1m above ground
- activity concentration of airborne radionuclides (aerosols: gamma spectra, total alpha- and beta-activity and the estimated "non natural" beta activity; gaseous I-131)
- precipitation rate
- ground contamination
- gamma and beta dose rate in continental rivers and coastal marine surface waters.

During routine operation of IMIS the networks provide rapid informations on any abnormal increase of the environmental radiation levels.

The number of on-line stations required in order to obtain representative results depends on the type of measurement. Taking into account the number and the position of nuclear power plants in Europe, the population density in Germany, and the potential of diagnostic weather codes to interpolate between individual stations a total number of about 50 stations is considered to be required on the territory of Germany for air monitoring purposes. The required number of stations is operated by the German Weather Service and the Federal Environmental Office.

In a contamination situation the spatial variability of the gamma dose rate measured near ground highly depends on the occurence and the length scale of precipitation events. From the experience gathered during many decades of environmental monitoring we know that the length scales of relevant deposition processes can be of the order of 10 to 20 km only. Unfortunately the "visibile range" of a gamma detector is of the order of some 10 meters only. In order to get representative information on the mean spacial variability of the deposition, the dimension of the mesh of a gamma doserate network must be chosen appropriately. For the situation in Germany the resulting number of about 2000 monitoring stations is operated by the Federal Office for Civil Defence (4).

A time of two hours has been chosen in IMIS for the integration of the data of the monitoring networks. In addition integrated 10-minute values of the gamma doserate can be made available on request.

The on-line data of the "atmospheric" networks (gamma doserate and activity concentration of the air) are supplemented by off-line data obtained by rapid measuring techniques like in situ gamma spectrometry. A summary of all the parameters obtained by these networks is given in Table 1. From these data the quality of the contamination, the size of the contaminated aera, and any changes of the situation can be derived without unacceptable delay.

The strategy for the collection of environmental samples for a detailed analysis of a contamination situation is based on synoptic sets of data obtained from the networks. The existing

laboratories can perform all the analytical techniques which may become important in such a situation, e.g., high resolution Alpha- and Gamma-spectrometry as well as H-3 and Sr-90 measurements; the most important technique is the high resolution Gamma-spectrometry.

In the early phase of a contamination, sampling and analysis will concentrate on those environmental samples and radionuclides which are relevant to the dose, e.g., for example I-131 in milk and in leavy vegetables. In later phases other samples and radionuclides will be analyzed as well in order to increase and complete the overall understanding of the situation.

At level 2 of the system all the data collected at level 3 are summarized and permanently stored. Preconceived procedures of quality control and of data processing are applied in order to minimize the risc of faulty data and to estimate the representativenes of the data. The quality-controlled data of the on-line networks are automatically fed into AUTOPARK in order to obtain detailed results of the dose on a time scale of 2 hours.

The competent authority for the implementation of the German government's national response plan for dealing with large scale contaminations of the environment (level 1) is the Federal Ministry for Environment, Nature Conservation, and Nuclear Safety. All the data and informations collected at level 2 and 3 of the IMIS system are available at this level in a comprehensive way. Together with informations obtained from other sources such as bilateral or multilateral agreements these data and informations provide the basis for the evaluation of a given situation and for decision making. The management of the situation at this level includes the application and the legal enforcement of protective measures and the information of the public.

Decisions on any protective measures taken at level 1 are based on the concepts of ICRP 40 with a recommended lower intervention level of 5 mSv for the exposure pathway ingestion and an upper level of 50 mSv for the radiation exposure during the first year of an event. For practical purposes secondary intervention levels of the specific activity of contaminated food and of other environmental samples have been derived from the intervention levels of the dose (5). By decision of the Council of the EC (6) these pre-defined secondary intervention levels will be enforced by all member states of the EG if necessary. Below these intervention levels protective measures are considered not to be required. Nevertheless - depending on the extent of an event - specific rules of action can be recommended to the population to keep the radiation exposure as low as reasonably achievable by simple means. A catalogue of several hundert rules and protective measures will be available in IMIS to support the work of the decision makers.

4. Participating organisations and their obligations

At its final stage 75 Federal and State organisations will be integrated in the information system IMIS.

At level 3 five on-line networks and 44 laboratories will be operating together with 1 subcenter for the 3 atmospheric networks (IAR) and 16 subcenters for the data obtained from in the 44 laboratories in the Federal States.

Level 2 will include 9 computer systems. The most important of these systems is the central computer facility of IMIS operated by the Federal Office for the Surveillance of the Environmental Radioactivity (ZdB).

Level 1 will include 2 systems. One is installed at the competent authority for IMIS, e.g., the Ministry for Environment, Nature Conservation, and Nuclear Safety. A second system will be operated by the Ministry of Defence.

The names of the organisations and their obligations for the surveillance of the environmental radioactivity are summerized and described in Table 2.

5. Modes of operation

There are two modes of operation of IMIS, e.g., routine and intensive operation. The major difference between the two modes is the frequency of data collection and -transfer. The change from normal to intensive operation and vice versa is enforced by the competent authority for IMIS.

During routine operation the networks of IMIS permanently monitor the environmental radioactivity. If the monitoring results exceed pre-defined threshold values alert signals are automatically sent to certain subcenters of IMIS where specialized personal is available on a 2 hour basis for their reception and verification. The Institute for Atmospheric Radioactivity, for example, is the subcenter for the alert signals originating from the "atmospheric" networks of IMIS and from the international data exchange. During routine operation of IMIS the transport of data from the monitoring networks is typically on a daily basis. During intensive operation synoptic sets of data are collected every two hours. The overall transport time of synoptic data sets from the detection systems of the networks to the competent authority of IMIS, including quality checks, is of the order of 2 hours.

Laboratory measurements of spot samples of food and feedingstuff are performed on the basis of pre-defined sampling programmes. The samples are collected at the production sites. The most important difference between routine and intensive operation of IMIS is the frequency of sampling and analysis, e.g., weekly to monthly sampling during routine operation vs. daily sampling during intensive operation. The available laboratory capacity enables an increase of the sampling and measuring frequency by about two orders of magnitude. The number of about 1000 milk samples for example which is routinely analyzed in Germany per

year can be analyzed if necessary per day. During intensive operation of IMIS additional samples are collected at consumers level, e.g., for example in supermarkets, stores etc. in order to verify and enforce certain food bans that may have to be applied.

Air mass trajectory analyses are routinely performed by the Germany Weather Service twice a day for some 80 sites in Europe. Selected results can be made available in IMIS on request at any time. During routine operation of IMIS results of the transport models of the German Weather Service are not available. During intensive operation diagnoses will be available in IMIS twice a day together with prognoses over 12, 24, 48, and 72 hours.

During routine operation of IMIS AUTOPARK is not operated except for training purposes or during exercises. During intensive operation of IMIS AUTOPARK supplies detailed diagnoses and prognoses of the dose and on the effectivity of certain protective measures on a 2 hourly basis.

6. Technical aspects of the information system

The establishment of a complex information system like IMIS with 75 computer systems requires a high degree of standardization of the hardware components, the standard- and the enduser software, and of telecommunication (4). For the different users of IMIS with a wide spectrum of obligations three types of RISC computers have been chosen. The hardware systems of the competent authority and of the Federal Office for the Surveillance of Environmental Radioactivity are installed as fully redundant systems in order to obtain high figures of the availability. An efficient packet-switched Wide-Area-Network, WAN, (x.25) connects all systems. Local-Area-Networks are based on Ethernet (IEEE-802.3). They are connected to WAN through a CISCO router. The operating system ULTRIX includes TCP/IP and X-windows. Documents are exchanged via electronic mail using Qoffice. Statistical analyses are carried out with the standard product SAS, which is connected with the relational database management product ORACLE through SQL interface. ORACLE is connected with the network through SQL-Net. SQL-Plus is the interface to the database. From any terminal of the system queries can be carried out in such a way that the selected data can be visualized at the push of a button. The geographical information system TERRA provides all the tools necessary for a detailed geographical presentation of the data. As an example two ways of presenting synoptic sets of the gamma doserate are shown in Fig. 2.

7. Present state and outlook

The networks and the laboratories of IMIS are in operation to a high degree with the exception of those on the territory of the former GDR. The establishment of 8 laboratories and the completion of the existing networks in this part of Germany has been started in 1991.

The most are important parts of the computer based information system IMIS has been in routine operation since January 1991. These parts are the networks which monitor the gamma doserate (BZS) and the activity concentration of the air (DWD), and the IMIS computer facilities of the Federal Office for Radiation Protection (IAR, ZdB) and of the Ministry for Environment, Nature Conservation, and Reactor Safety. Synoptic sets of data of the networks are routinely collected, quality-controlled and sent to the competent authority of IMIS on a daily basis. The system has been in intensive operation during several incidents reported for some eastern nuclear power plants and during exercises.

Additional atmospheric networks and two computer systems in one of the Federal States (one lab and one subcenter) have been integrated into this system in a second step. This subsystem already provides many of the features of the enduser software of the final IMIS system. Further steps towards the completion of IMIS are the integration of the remaining two networks which monitor surface waters, of the specialized federal agencies, which support the Federal Office for the Surveillance of the Environmental Radioactivity and of the large number of computer systems in the Federal States.

A dedicated computer system is used for the operation of the model system PARK. While the model itself is operating as a stand alone system, the interface with the IMIS database is still under development.

According to the present time schedule the estabilshment of the final IMIS system will be finished early in 1993.

8. Acknowledgement

The establishment of an information system of the complexity of IMIS requires the support of a large number of experts in various fields. In the Federal Office for Radiation Protection this work is organized by a project team. The members of this team are W. Weiss and H. Leeb, A. Fritsch, K. Gehrcke, D. Mayer, D. Noßke, and U. Stöhlker. The work of the project team is supported by a large number of experts and their co-workers: A. Bayer, M. Ehret, K. Jung, Ch. Höbler, H. Keller, J. Lieser, M. Neumann, M. Stanko, and C. Wittler.

9. Literature

1. Gesetz zum vorsorgenden Schutz der Bevölkerung gegen Strahlenbelastung (Strahlenschutzvorsorgegesetz - StrVG), Bundesgesetzblatt Teil I, S. 2610, 1986.

2. T. Steinkopff, W. Kiesewetter, I. Jacobsen, Environmental Radioactivity Measurements in the Field Network of Deutscher Wetterdienst, Methods and Data Transfer, in: Real Time Radioactivity Monitoring and its Interface with Predictive Atmospheric Transport Modelling, CEC, EUR 12990, EN, p. 7 - 23, 1990

3. P. Jacob, J. Ecklund, J. Gregor, H. Müller, H.G. Paretzke, G. Pröhl, M. Richter, R. Stapel, Erstellung eines Echtzeit-EDV-Experten-Systems zur Abschätzung und Begrenzung radiologischer Konsequenzen in der Bundesrepublik Deutschland von Unfällen kerntechnischer Anlagen, GSF-Bericht 33/91, ISSN 0721-1694, 1992

4. Bestandsaufnahme IMIS-IT, Seminar zum Projektstand IMIS am 3. Mai 1991, BfS-Schriften, 6/92, ISSN 0937-4469, 1992

5. Scientific Basic Concepts for the Assessment of Derived Levels of Dose and Contamination According to Section 6 of the Precautionary Radiological Protection Act (Strahlenschutzvorsorgegesetz), Veröffentlichungen der Strahlenschutzkommission, Band 10, Gustav Fischer Verlag, ISBN-3-437-11233-3, Stuttgart, 86-114, 1988

6. Verordnung (EURATOM) Nr. 2218/89 des Rates vom 18.7.89 zur Änderung der Verordnung (EURATOM) Nr. 3954/87 zur Festlegung von Höchstwerten an Radioaktivität in Nahrungsmitteln und Futtermitteln im Falle eines nuklearen Unfalls oder einer anderen radiologischen Notstandssituation, Amtsblatt der Europäischen Gemeinschaft Nr. L 211/1-3 vom 22.7.89

action levels of IMIS

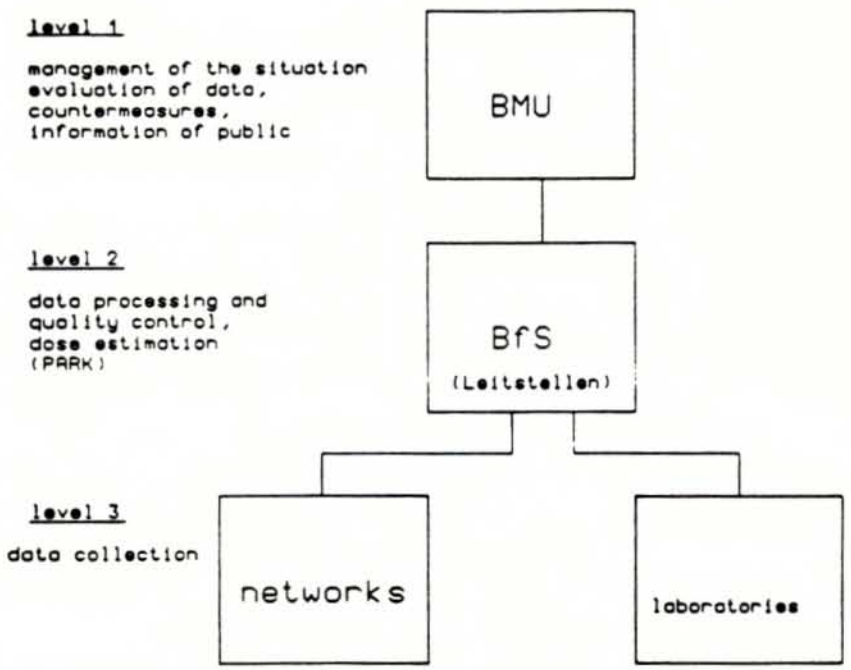

Figure 1

Figure 2

Gamma-Ortsdosisleistung

BR Deutschland

2h-Mittelwerte (MES/B)
10.08.1992 12:00 UTC
Datenquelle: BZS, DWD

Skalierung: linear
µGy/h

- > 2.0e-01
- 1.7e-01 - 2.0e-01
- 1.4e-01 - 1.7e-01
- 1.1e-01 - 1.4e-01
- 8.0e-02 - 1.1e-01
- < 8.0e-02

Flüsse
Seen
Landeshauptstädte
Bundesländer
Staatsgrenze

0 50 100 km

IMIS
Bundesminister für Umwelt, Naturschutz und Reaktorsicherheit
for001/Benut/25.08.92 15:39/K04025

Gamma-Ortsdosisleistung

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- 8.0e-02 - 1.1e-01
- < 8.0e-02

Flüsse
Seen
Landeshauptstädte
Bundesländer
Staatsgrenze

0 50 100 km

IMIS
Bundesminister für Umwelt, Naturschutz und Reaktorsicherheit
for001/Benut/25.08.92 15:37/K04025

Table 1

Type and frequency (2h) of the collection of data by different networks of IMIS (cf. chapter 2). Data which are not collected by on-line detection systems are reported as soon as possible (asap).

type of data	- IMIS networks -					
	BZS/ IAR	UBA/ IAR	FhG/ IAR	DWD	BfG*)	BSH**)
Gamma doserate (nGy/h)	2h		2h	2h		
in-situ spectrometry (Bq/m^2)						
Gamma-spectromety	asap			asap		
aerosols (Bq/m^3)						
gross-Beta		2h	2h	2h		
gross-Alpha		2h	2h	2h		
Gamma-spectrum			2h	2h		
I-131 (gaseous)		2h	2h	2h		
Sr-89/90				asap		
Alpha-spectrum				asap		
precipitation (Bq/l)						
Gamma-spectrum				asap		
Alpha-spectrum				asap		
Sr-89/90				asap		
H-3				asap		
gross-Beta				asap		
precipitation rate (mm)				asap		
surface waters (Bq/l)						
gross-Beta					2h	
gross-Gamma					2h	2h
gross-Alpha					asap	
H-3					asap	asap
Sr-89/90					asap	asap
Gamma-spectrum					asap	asap
Alpha-spectrum					asap	asap
suspended particulates (Bq/kg)						
Gamma-spectrum					asap	asap
sediment (Bq/kg)						
Gamma-spectrum					asap	asap

*) Rivers
**) North Sea, Baltic Sea

Table 2

Participating organisations of IMIS and their obligations

	organisations	obligations
1.action level 1		
1.1 networks	German Weather Service (Deutscher Wetterdienst; DWD)	Monitoring of the air and of the precipitation. Forecast of atmospheric transport and of the deposition of airborne radioactivity
	Federal Environmental Office (Umweltbundesamt; UBA)	Monitoring of the air
	Federal Office for Civil Defence (Bundesamt für Zivilschutz; BZS)	Monitoring of the gamma-dose-rate, surface contamination
	Federal Office for Radiation Protection, Institute for Atmospheric Radioactivity (IAR)	Assessment and quality control of data provided by the above federal networks. Reception and verification of early warning messages of the above federal networks and alert of the Government. National contact point for the data exchange according to international and bilateral agreements
	Federal Institute for Hydrology (Bundesanstalt für Gewässerkunde; BfG)	Monitoring of the surface waters of the Federal waterways with the exception of coastal waters, of suspended particulates, and of sediments. Forecast of the radioactivity transport

		in rivers
	Federal Marine and Hydrographic Agency (Bundesamt für Seeschiffahrt und Hydrographie, BSH)	Monitoring of the surface water of the North Sea and the Baltic Sea, including coastal waters, suspended particulates, and sediments Forecast of marine transport
1.2 laboratories	45 labs and 16 subcenters	Surveillance of foodstuffs, animal feed, drinking water, tobacco products, commodities, medical drugs and their basic substances, groundwater and surface waters sewage sludge, residual and waste material, soil and plants, organic fertilizer
2.action level 2		
2.1 Federal Office for the Surveillance of the Environmental Radioactivity		Operation of the radioecological model PARK Administrative and technical support of the Ministry for Environment, Operation of the IMIS information systeme
2.2 specialized federal agencies		
	-Federal Institute for Hydrology (Bundesamt für Gewässerkunde; BfG)	Surveillance of surface water (except Federal Waterways)
	-Federal Research Institute for Nutrition (Bundesforschungsanstalt für Ernährung; BfE)	Surveillance of foodstuffs (except milk and milk products, fish and fish products)
	-Federal Institute for Milk	Surveillance of

	Research (Bundesanstalt für Milchforschung; BfM)	milk, milk products soil, plants, animal feed, organic fertilizer
	-Federal Research Institute for Fishery (Bundesforschungsanstalt für Fischerei; BfE)	Surveillance of fish, fish products, crustacea, mollusca
	-Institute for Water, Soil, and Air Hygiene of the Federal Health Office (Institut für Wasser-, Boden- und Lufthygiene des Bundesgesundheitsamtes, WaBoLu)	Surveillance of drinking water, groundwater, sewage, sewage sludge, residual, waste material
3.action level 3		
	Ministry of Environment, Nature Conservation and Reactor Safety	Competent authority for the evaluation and the management of a large scale contamination of the environment. Application and legal enforcement of protective measures. Information of the public

AVK - A Documentation System for Radioactive Waste

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1 Introduction

The AVK is a documentation system for radioactive wastes from nuclear power plants. AVK is the acronym for Abfallfluß-Verfolgungs- und Produkt-Kontrollsystem. Translated into English, this means "waste flow tracking and quality assurance system".

In 1987 some German and Belgian radioactive wastes have been swapped in Mol in Belgium. The investigation of this incident was hampered by a lack of documentation about the wastes involved. Prompted by this affair, the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety published in 1988 "The Guideline on the Control of Radioactive Wastes with Negligible Heat Generation", which is colloquially known as "The Waste Control Guideline". The objective of the Waste Control Guideline is to regulate the documentation and control procedures for such radioactive wastes, which do not have to be delivered to public interim storage facilities.

The Guideline precisely prescribes the information which has to be documented about radioactive wastes and makes the producer of the wastes responsible for the book-keeping. Furthermore, it requires that the waste producer keeps track of his wastes, which means that he must always know the exact location and the state of treatment of his wastes. In view of these requirements, a book-keeping system had to be developed, which could keep track of the origin, type, quantity, radioactive inventory, state of treatment and location of radioactive wastes. Using such a book-keeping system, the waste producer would be able to provide the responsible authority upon request with the latest information about his wastes.

However, even before the Guideline was put in force, the waste producers started with the consent of the Federal Ministry of Environment a voluntary self-control campaign. The nuclear power plants commissioned a company (DWK) to prepare a book-keeping system, which could satisfy the requirements imposed by the authorities. Later on, a service company of the nuclear power plants (GNS) took over the manage-

ment and commissioned GRS/IST to develop an appropriate computer program and to implement it at the nuclear power plants. The corresponding software is developed by subcontractors, in this case PARAR and FORMAT (data base aspects) as well as by GRS/IST (scientific problems). This led to the development of a program for personal computers, which is known as AVK.

The program AVK is a decentralized data base system for book-keeping of radioactive wastes from German nuclear power plants. It keeps track of radioactive wastes from their origin to their disposal in a final repository. AVK ensures that the exact location and the state of treatment of any nuclear waste can be accurately determined at any time required.

2 Overview

A particular radioactive waste is registered in AVK as soon as it exists as a closed unit, which is not subject to any further operational changes. The data, which have to be registered, are

- the general data (mass, volume, package label, package characteristics, type of treatment, location, etc.);
- the radioactive inventory and radiological data;
- data related to quality assurance, which are required by the Guideline and by "The Preliminary Requirements for the Final Disposal in the Repository KONRAD".

The data in AVK have to be updated following every relocation or modification of the waste. Provided that the treatment of a waste results in the production of a new waste package, this has to be registered with reference to the predecessor. In this way, AVK provides a complete track of each radioactive waste package.

The participants in AVK are

- the producers of radioactive wastes;
- the waste treatment plants;
- the external interim storage facilities;
- the central office.

The waste producers are the nuclear power plants and, to a minor extent, the waste treatment plants and the external interim storage facilities. All waste treatment plants, irrespective of their actual location are run by GNS, the service company of the nuclear power plants seated in Essen. The external interim storage facilities are located in Gorleben, Mitterteich and at the nuclear power plant Unterweser in Rodenkirchen. The central office is run by GNS too, but is independent of the waste treatment plants.

All AVK-participants, other than the central office, use the PC program AVK (The central office uses a different PC program, cf. below). The necessary data exchange between the AVK-participants takes place via off-line data carriers.

The AVK-program includes the following features:

- Data base system with encoded data files and a hierarchical access system;
- Data transfer to the data base after data input is only possible after inspection by a second person;
- Input support by reference files, which are called via list boxes during the data input;
- Four distinct modules for waste data input, storage data input and transport data input;
- Report generator to create free lists, standard lists and other documents;
- Determination of the activity inventory by means of various procedures.

The radioactive inventory of a waste package can be either directly specified using measured data as input, or computed using nuclide correlations, representative nuclide distributions and/or surface dose rates. The parameter required for such calculations, like geometries, densities, and shielding characteristics, are determined automatically using the existent data.

The central office runs its own PC computer code for the autonomous control of the AVK-system. The objective of this computer code is to

1. archive all AVK-data:
2. inspect the data for mistakes and changes;
3. balance the AVK-data between the individual AVK-participants;
4. evaluate the complete AVK-data base of all participants.

The quality assurance measures carried out during the data input (data input by two persons, data input support, plausibility checks) and the inspection of the data of all the AVK-participants by the central office ensures an appropriate quality level of the radioactive waste data base. Thus, the requirements for a documentation system for radioactive waste tracking are fully met.

3 Organisational Structure

The cooperation between all institutions participating in the AVK and their organisational integration in the AVK-system are regulated in the AVK Organisation Handbook. In this handbook all AVK-participants are named, their tasks within the system are described, the data exchange between the AVK-participants is regulated and further specifications are defined.

The tasks of the waste producers, waste treatment plants and the interim storage facilities, which are described in the Organisation Handbook, are the following:

- creation of waste package records and of subsequent records by waste producers and waste treatment plants
- Reception of externally created waste package records by waste producers, waste treatment plants and interim storage facilities
- Updating of waste package records
- Input of nuclide specific activity measurements by waste producers, waste treatment plants and interim storage facilities
- Keeping of the accompanying documentations
- Transfer of AVK-data sets to the central office
- Data security measures

Once in three months all AVK-participants send a back up of their AVK-data sets to the central office. This back-up comprises all waste package data sets, program files and auxiliary files, which are necessary to run the AVK. All files are checked for virus and topicality. Afterwards a comparison is made between the recent back-up and the last one, which was archived at the central office. Any changes of the data sets are re-

corded and if there are inconsistencies or incorrect files the AVK-participants will be informed about the result of the comparison in a so-called control message.

If there are no complaints, the waste package data are copied into a work file and archived.

The work file with all waste package records of all AVK-participants is checked for consistency. Should any inconsistencies arise between the data of the individual AVK-participants, for instance with respect to the location of the waste packages, the participants concerned receive a message to clear and correct their data sets.

Apart from the data exchange with the central office, a data exchange between the AVK-participants takes place in connection with transport, in case of necessary updating procedures and for organisational reasons. The data are exchanged on disks or on paper. The form and content of the data and the accompanying documentation as well as deadlines and other organisational measures are laid down in the Organisation Handbook.

The Guideline (cf. above) about wasteflow surveillance regulates the scope of the reports, which the waste producers, waste treatment plants and interim storage facilities have to supply to their responsible authorities. In order to standardize all the reports made by the AVK-participants, organisational regulations about form and content are given and are implemented in the AVK-code.

Other regulations defined within the organisational framework are related to areas of responsibility of the AVK-participant, regulations about system maintenance and data security as well as the keeping of the accompanying documentation.

The organisational instructions as a whole ensure, that the AVK is used consistently by all AVK-participants and that a continual waste data input and a wasteflow surveillance is guaranteed. The supplementing control concept in checking all AVK-data by the central office ensures a sufficient level of data security and a high quality level of the input data.

4 The AVK-Code

The AVK-program is a data base system which runs under the operation system DOS and which is implemented at the AVK-participants. The AVK consists of modules for waste data, transport data and storage data input, for system maintenance and for activity calculation.

For the use of the AVK three levels of authorization are realized:

- authorization for data output
- authorization for data input
- authorization to act as supervisor for system maintenance

The user's identification and his password enable the program to recognize the user's level of authorization. If the data base is not in a correct state, only the supervisor is authorized to log in.

The AVK-program is menu-driven and comprises the following menus:

1. MADA (Module for raw waste data input)
2. MOTRA (Module for transport data input)
3. MOZILA (Module for interim storage data input)
4. MOKON (Module for data input of treated wastes)
5. MOPRO (Module for activity determination and quality assurance)
6. MOBERI (Module for reports)
7. MOSERV (Service module for system maintenance).

The waste package data are registered using the modules MADA and MOKON. The input is standardized by extensive use of reference files. The AVK-program automatically supplies each new waste package record with a unique identification number, the AVK-ID. This ensures that a specific AVK-ID occurs only once within the entire AVK-system.

The input fields are either obligatory or optional. The obligatory fields must be filled in during the registration of a waste package, whereas the optional fields can be comple-

ted later. A waste package record can not be saved before all obligatory fields are filled. Following the treatment of a waste package, a new data record must be created. In this case, the old data record is automatically saved, so that the complete history of the waste-flow is always consistently documented.

The registered waste package data are saved in a buffer. These data must be inspected by a second user before they can be transferred to the master data base. The AVK-program does not allow a single user to register the waste package data and transfer them to the master data base.

The module MOTRA enables the transportation data to be registered. A transport data record contains essential transport data together with the AVK-IDs of the waste packages, which are transported. The AVK-program automatically assigns unique labels to each transport in a manner similar to the AVK-ID assignment discussed previously. Following dispatch, the AVK-program registers the waste packages as being underway. The recipient of a transport must inform the dispatcher about the receipt. The dispatcher then registers the date of the receipt and the new location of his waste packages in his AVK-data base. Thus, the transport history of each waste package is always transparently documented.

The module MOZILA serves exclusively for the supplementing of the location data.

The module MOPRO computes the radioactive inventory for radionuclides, which have to be declared according to the Guideline but for which no experimental data are available. The experimentally known activities have always higher priority than calculated values and are never overwritten by computed data. Using the available information, MOPRO automatically decides which is the best calculation method for each activity to be computed. The data which can be used by MOPRO to compute an activity include

- the experimentally known activities of representative radionuclides (Co60 and Cs137);
- the total β/γ activity of the γ emitting radio-nuclides;
- the total α activity;
- the dose rate;
- the experimentally determined mixing ratios of radio-nuclides (e.g. in the primary coolant);

- the humidity of the waste package (relevant for the computation of the H3 activity).

The calculation method for each computed activity is carefully documented in AVK .

The module MOPRO permits the activities to be computed for any particular date and the computational results to be presented in any of the several output formats. In addition, MOPRO inspects the radioactive inventory as to whether the declaration limits of the Guideline have been exceeded and whether the preliminary KONRAD waste acceptance requirements are met. The result of this inspection is the assignment of the waste package to the corresponding waste product category.

The module MOBERI enables the waste package data records to be selected and the standard lists and documents to be displayed, printed or saved in a file. The standard lists are predefined output formats, in which the AVK user can list the selected waste package records. The standard documents are reports to the regional authorities (cf. above).

The module MOSERV is used for system maintenance, i.e. it is used for

- import and export of data;
- the transfer of waste package records from the buffer to the master data base;
- defining of free lists using a list generator (the arrangement of the fields in the list can be predefined, group sums can be formed, etc.);
- editing of the reference data bases;
- editing of the master data base.

At the end of each session, the user is prompted to save his data base on an external data carrier.

The AVK version 2.0, which is described above, was installed in April 1992 at all AVK-participants other than the central office. AVK 2.0 is an upgrade of AVK 1.0 and was programmed using the 9 months of practice and experience of the AVK-participants with AVK 1.0. Version 2.0 differs from 1.0 in that the user dialogue was improved and the obligatory reports to the authorities were technically realized.

The IAEA Data Bases Releated to Nuclear Safety Technical Assistance to Eastern Europe

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1. INTRODUCTION

The safety of nuclear power plants in Eastern Europe has become a major concern for the nuclear community throughout the world.

In order to assist Eastern European countries, including Russia, in identifying deficiencies and developing and implementing safety improvements, the International Atomic Energy Agency (IAEA) has established a series of programmes of technical assistance.

In connection of this programmes, two data bases have been in use. The first one deals specifically with the findings and recommendations of the programme on safety of WWER-440/230 type reactors. The second data base, which is being developed within the Community of European Countries (CEC) with the support of the IAEA deals with all the projects related to nuclear safety in Eastern Europe and the CIS.

This paper, describes the objectives and contents of this two data bases and discuss possible application of the data bases as management and technical analysis tools.

2. THE WWER-440/230 SAFETY ISSUES DATA BASE (WWERISSUE)

The IAEA project on safety of WWER-440/230 nuclear power plants was established to assist countries operating this type of plants to identify design and operational weaknesses. This should form the technical basis for the safety decisions to be taken by the operators and national authorities to improve safety.

The initial phase of the project included a conceptual design review[1,2] and a series of plant specific missions in what could be considered a fact-finding phase.

Each safety review mission involved 15 to 17 experts who review six areas of the design (core design, system analysis, component integrity, instrumentation and control, electric power, accident analysis) and six areas of operation (management, conduct of operation, maintenance, training, fire protection, emergency planning). The reviews consisted of 3 weeks on site work involving the review of records and documentation, observation of activities, and discussion with plant counterparts. Reports containing the experts' recommendations were prepared on site and finalized by the IAEA Secretariat [3-6]. Reports from preceding missions were used in subsequent reviews, constituting a progressive learning process and providing, at the conclusion of the 4 missions, a comprehensive review with a broad international perspective.

In addition to the safety review missions, additional missions were carried out in order to address two other specific areas: review of operational experience and seismic design.

The reports from the various missions contain a large number of specific recommendations. Most of these are generic to all WWER-440/230 plants, although some of the plants may have already overcome the identified weakness by taking appropriate backfitting measures.

Due to the large number of recommendations, it was considered necessary to summarize them in a data base which contains the essential information from the reports.

The format of the data base is presented in Table I, together with the description of the fields.

In order to permit a more deep analysis of these information, it was necessary to group the recommendations into safety "issues" that could be evaluated according to their impact on safety and classified into four severity "categories".

Some 1300 recommendations were analyzed by an expert group and grouped into 97 safety issues.

A IAEA Technical Document[7] was published describing the issues and developing conceptual recommendations for each one of them. This document, and the data base itself, has been used extensively by the organizations involved in developing backfitting programmes for these plants.

The IAEA has also utilized the data base when preparing follow up missions to the plants, in order to assess the implementation status of the recommendations.

The results of the follow up missions is being also incorporated to the data base, which in this way has become a living management tool which can provide at each time a picture of the progress of the safety level of the wwer-440/230 nuclear power plants.

3. THE DATA BASE ON NUCLEAR SAFETY PROJECTS IN EASTERN EUROPE

The political changes in Eastern Europe, including in the former Soviet Union , together with the identification of the safety deficiencies of their plants brought to light by the Chernobyl accident and the initial review of WWERs by Western experts has given place to numerous projects of assistance in the field of nuclear safety. This initiatives, both on a bilateral basis or through multinational programmes, where, at the beginning, uncoordinated, leading to duplication of efforts in certain areas and lack of coverage in others.

Realizing this problem, both the IAEA and the CEC have tried to correct it.

The CEC, acting as coordinator for the G-24, has established a small secretariat in order to monitor the assistance to Eastern Europe, including Russia.

The IAEA has been proposed by the countries receiving the assistance to play a role as a repository of the technical information developed within the projects in order to facilitate

the exchange of information. To this end, it was proposed that the IAEA should develop a data base with technical data on all the assistance projects in the field of nuclear safety.

Negotiation with CEC have identified the existence of a already developed data base within the G-24 coordination, which contained management data on all CEC projects, both nuclear and non-nuclear related.

The final joint decision was to modify and extend this data base in the sector of nuclear energy to allow the collection of the additional technical data necessary for the technical analysis of projects in the field of nuclear safety.

The objective of the modified data base is therefore to collect data on all projects in the field of nuclear safety, including multi-national, bilateral and national projects.

The new extended structure of the data base is presented in Table II, together with the definition of the fields.

The most important addition is the relation of the projects with technical areas and safety functions, which will allow to identify projects which are related, areas were duplication of work is occurring and areas which are left without adequate coverage. This relation is expressed by identifying related areas in up to 3 levels depending on the generality or specificity of the project.

The first level only distinguish between projects related to Design, Operation or to Safety Authorities. The second level identify areas or safety functions within the first level (e.g. controlling the power, seismic safety or maintenance). The third level specify more detailed topics within the second level for those projects which are of narrow application (e.g. in service inspection, LOCA analysis or development of procedures).

In addition, for the WWER-440/230, identification of the related safety issue will permit the correlation between this data base with the WWERISSUE data base described above.

At the present stage, all CEC (41) and IAEA (24) projects have been included in the data base. Questionnaires are being prepared for collection of data on other national and bilateral projects. A data base management programme has been developed to allow direct data transfer by countries in diskettes.

The IAEA and the CEC continue to work together in this area, with an effort to collect the data, check their accuracy, continuously update and maintain, analyze and draw conclusions which should guide further assistance to Eastern European countries.

REFERENCES:

1. "Working Material: Conceptual Design Review of WWER-440 Model 230 Plants." WWER-rd-019, International Atomic Energy Agency, Vienna (Feb. 4-15, 1991).

2. C. Almeida et al., "IAEA Programme on Safety of WWER-440/230 Nuclear Power Plants," Proc. Int. Topl. Mtg. Safety of Thermal Reactors, Portland Oregon, July 1991, p.617, American Nuclear Society.

3. "WWER-440/230 Project: Bohunice Safety Review Mission Report," WWER-RD-022, International Atomic Energy Agency, Vienna (April, 1991).

4. "WWER-440/230 Project: Kozloduy Safety Review Mission Report," WWER-RD-033, International Atomic Energy Agency, Vienna (June, 1991).

5. "WWER-440/230 Project: Novovoronezh Safety Review Mission Report," WWER-RD-034, International Atomic Energy Agency, Vienna,(August, 1991).

6. "WWER-440/230 Project: Kola Safety Review Mission Report," WWER-RD-35, International Atomic Energy Agency, Vienna,(September, 1991).

7. "Ranking of Safety Issues for WWER-440/230 Nuclear Power Plants," IAEA-TECDOC-640, International Atomic Energy Agency, Vienna (February, 1991).

TABLE I

Structure for database: C:\DBASE\WWER\WWERISS1.DBF
Number of data records: 1332
Date of last update : 27/07/92

Field	Field Name	Type	Width	
1	ISSUENUM	Numeric	4	: Number of the recommendation
2	ISSUECOD	Character	10	: Reference to Mission Report
3	SHORTTIT	Character	30	: Title of the recommendation
4	ASPECT	Character	5	: Operation or Design aspect
5	AREA	Character	10	: Technical Area of review
6	ISSUE	Memo	10	: Summary text of recommendation
7	REFREPORT	Character	10	: Mission Report (Plant name)
8	CLASS	Character	10	: Classification of Safety Function
9	SEVERITY	Character	5	: Severity Category
10	DESIGNREV	Character	10	: Position at Design Review Meeting
11	BOHUNICE	Character	10	: Status at Bohunice NPP
12	KOZLODUY	Character	10	: Status at Kozloduy NPP
13	NOVOVORONE	Character	10	: Status at Novovoronezh NPP
14	KOLA	Character	10	: Status at Kola NPP
15	PROJECTREV	Character	10	: (not used)
16	BROISSUE	Character	40	: Safety ISSUE
** Total **			195	

TABLE II

Structure for database: C:\DBASE\PROJECTS\IDENTPRO.DBF
Number of data records: 74
Date of last update : 01/09/92

Field	Field Name	Type	Width
1	IDENT	Character	2 : User identifier (for access)
2	CODEPRO	Character	8 : Project reference number
3	CODESEC	Character	6 : Reference for 2 page projects
4	DATE_RAP	Date	8 : Date of last update
5	CODEDON	Character	3 : Donor country code
6	DON_INSTIT	Character	50 : Donor institution
7	DON_CONT	Character	50 : Contact person at donor institution
8	DON_TEL	Character	25 : Telephone of contact person (donor)
9	DON_TFX	Character	25 : Fax of contact person (donor)
10	NAME_PROG	Character	50 : Technical assistance programme
11	CODESEC1	Character	6 : Code for sector of assistance
12	CODESEC2	Character	6 : Code for secondary sector of assistance
13	CODESEC3	Character	6 : Code for tertiary sector of assistance
14	TITLE1	Character	40 : Title of project
15	TITLE2	Character	40 : Title of project (continuation)
16	TITLE3	Character	40 : Title of project (continuation 2)
17	CODEREC	Character	3 : Code of recipient country
18	DETAIL_REC	Character	50 : Details about recipient institution
19	RESP_AUTH	Character	50 : Responsible authority at recipient side
20	REC_CONT	Character	50 : Contact person at recipient institution
21	REC_TEL	Character	25 : Telephone of contact person (recipient)
22	REC_TFX	Character	25 : Fax of contact person (recipient)
23	PROJ_LOC	Character	50 : Project location
24	IMPLEMENT	Character	50 : Implementation organization
25	CODEDEG	Character	3 : Degree of commitment of the project
26	COSTPRO	Numeric	20 : Cost
27	DEV_COST	Character	3 : Monetary unit (for cost)
28	CODEAID	Character	6 : Type of aid
29	CONTR_DON	Numeric	20 : Contribution from donor
30	DEV_CONTR	Character	3 : Monetary unit (for contribution)
31	GRANTS	Numeric	20 : Grant contribution
32	DEV_GRANTS	Character	3 : Monetary unit (for grant)
33	OTHER_DON1	Character	50 : Other donor
34	OTHER_DON2	Character	50 : Other donor 2
35	DATE_FINAN	Date	8 : Date of financial approval
36	DATE_START	Date	8 : Project starting date
37	DATE_COMPL	Date	8 : Project ending date
38	SOURCE	Character	50 : Source of the information (for data base)
39	CODEPRO_D	Character	8 : Project reference number by the donor

40	CODEPRO_R	Character	8 : Project reference number by the recipient
41	DESCRIPT	Memo	10 : Description of the project
42	ADDINFO	Memo	10 : Additional information (also references)

ADDITIONAL FIELDS PROPOSED BY IAEA:

43	IMPL_CONT	Character	50 : Contact person at implementation organization
44	IMPL_TEL	Character	25 : Telephone of contact person (implementation)
45	IMPL_TFX	Character	25 : Fax of contact person (implementation)
46	MILESTONES	Memo	10 : Milestone schedule of the project
47	FINAL_PROD	Character	25 : Final product of the project
48	INSTALLATI	Character	25 : Installation to which it apply
49	INST_TYPE	Character	25 : Installation type
50	REL_AREA1	Character	25 : Related technical area (1st. level)
51	REL_AREA2	Character	25 : Specialized related technical area (2nd. level)
52	REL_AREA3	Character	50 : Detailed related technical area (3rd. level)
53	REL_ISSUE	Character	50 : Related safety issue (for WWER-440/230 only)
54	CAT	Character	5 : Severity of related safety issue (WWER-440/230 only)

** Total ** 1297

INIS Database on CD-ROM

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SUMMARY

INIS, as the world's leading information system, is an international bibliographic database covering every aspect of the peaceful uses of nuclear science and technology. The annual increase is about 90,000 documents. INIS Database on CD-ROM is a new output product of the INIS system, produced by SilverPlatter and the International Atomic Energy Agency, available in the INIS Member States and via the International Organizations which are participating in the INIS system. It contains at present 1,359,249 references from January 1976, updated quarterly by approximately 20,000 citations. It is searchable via IBM compatible PC and CD-ROM player without specific requirement for the hardware by application of a very simple software SPIRS from SilverPlatter. For detailed information the corresponding INIS Liaision Officer is to be contacted.

INTRODUCTION TO INIS

INIS is the world's leading information system on the peaceful uses of nuclear energy. The acronym INIS stands for International Nuclear Information System. It is operated by the International Atomic Energy Agency (IAEA) in collaboration with its Member States and co-operating international organizations.

INIS provides a comprehensive information announcement service for literature in nuclear science and technology. To do this, INIS processes most of the world's scientific and technical literature that falls within its subject scope. Its subject scope, mirroring the activities of the IAEA, includes information on every aspect of the peaceful uses of nuclear science and technology.

The fields covered are as follows:
- General physics
- High energy physics
- Neutron and nuclear physics
- Chemistry
- Earth science
- All effects and various aspects of external radiation in biology
- Radioisotope effects and kinetics
- Applied life sciences
- Health, radiation protection and environment
- Radiology and nuclear medicine
- Isotopes and radiation sources
- Isotope and radiation applications
- Engineering
- Fission reactors
- Specific fission reactor types and their associated plants
- Instrumentation
- Waste management
- Economics and sociology
- Nuclear law
- Nuclear documentation
- Safeguards and inspection

- Mathematical methods and computer codes
- Miscellaneous (general relevant documents)

INIS HISTORY

The origins of INIS go back to 1965. In that year the IAEA, recognizing that it had a statutory obligation to foster the exchange of nuclear information amongst its members, invited consultants from the USSR and from the USA to outline a scheme for an international information system that would adequately cover the expanding amount of literature on the peaceful uses of nuclear energy.

The consultants proposed a co-operative decentralized system, one that would serve the information requirements of countries at varying levels of development with differing backgrounds and traditions in the methods and techniques of information handling.

The consultants' proposals were then submitted by the IAEA to a number of international panels of experts for discussion and elaboration into a detailed systems design. In February 1969, the Board of Governors of the IAEA approved the setting up of INIS. The first output products, the printed journal **INIS Atomindex** and associated computer tapes, were issued in April 1970.

THE INIS PHILOSOPHY

The basis of INIS is international co-operation. It is the first international information system in which both the collection of input and the dissemination of output to users are decentralized. Only the data processing and output production are centralized in the INIS Secretariat. This decentralizated approach to input and output was selected because its results in the most comprehensive coverage of the nuclear literature, the most effective methos of handling information in different languages, and the most satisfactory services for users of the information (Figure 1).
The success of the INIS philosophy is demonstrated by

- more than 1 000 000 items in the INIS file;
- annual growth averaging 80 000 items;
- a collection of scientific reports, brochures, dissertations, patents etc. in microfiche form exceeding 190 000 documents;
- the worldwide use of **INIS Atomindex**, the printed abstract journal for the literature of nuclear science and technology.

INIS MEMBERS

Membership in INIS is open to states who are members of the IAEA, to United Nations organizations and to other subject-oriented international or intergovernmental organizations. Since 1969 there has been a standing invitation to join INIS directed to all potential members by the Director General of the IAEA. At the time of writing, 80 Member States and 15 international organizations are participating in INIS.

To join INIS, a formal request is to be made by the appropriate national or organizational authority to the Director General of the IAEA, expressing the wish to participate in INIS and undertaking to supply input regularly to the System. Every INIS member is represented in the System by a Liaison Officer officially appointed by the national authority, or the Executive Head in the case of an international organization.

The secretariat function of the System is vested in the INIS Section, Division of Scientific and Technical Information of the IAEA.

The INIS Liaison Officers play a key role: they are responsible for organizing the collection of information and the preparation of input on a national or organizational level. They are also responsible for the dissemination of INIS products through national or organizational information services and for encouraging their utilization.

The INIS Liaison Officers provide the INIS Secretariat with advice on matters relating to the administration, operation, and development of INIS. Regular communication takes place by correspondence and through the annual Consultative Meetings of the INIS Liaison Officers. An important contributing factor to the success of INIS has been the spirit of mutual understanding and co-operation that has developed among individual Liaison Officers, the Liaison Officers as a group and the INIS staff at the IAEA (Figure 2).

HOW INIS OPERATES

In line with the decentralization philosophy, INIS Members are responsible for:

- collecting descriptions of the nuclear literature produced within their borders or organizational confines, both that which is readily available through normal commercial channels as well as that not available through such channels;
- preparing the associated input in accordance with INIS guidelines and submitting it to the IAEA;
- providing INIS information services and products to users within their borders or organizational confines.

Besides its responsibilities as an INIS Member, the IAEA, through its INIS Secretariat, collects the input submitted by other INIS Members, provides quality control and produces the output products.

It is very important for the quality of INIS output products to ensure a common understanding of the INIS standards and rules by the staff of all inputting centres of INIS Members. For this reason, the **INIS Training Programme** plays a significant role in INIS activity.

INIS DATABASE THROUGH STN INTERNATIONAL

The INIS Database on STN (Scientific and Technical Information Network) contains up to 1992 about 1.6 Million records updated twice a month by 4,600 citations. As a mission orientated database it covers all types of literature, conventional and non-conventional journal articles (58 %), reports (23 %), books (8 %), Patents (11 %) etc.; 30 % of all citations are conference literature.

In addition, titles are always included in the original language. Summaries are available in English (about 70 %), French or German (about 10 %).

INIS CD-ROM

INIS CD-ROM (Compact disc-read only memory) is the newest INIS product, produced by the Dutch firm SilverPlatter and the IAEA. The INIS CD-ROM is available in the INIS Member States and Member Organizations. FIZ Karlsruhe sells the INIS CD-ROM within Germany. At the moment, it consists of four archival discs covering the years 1976-1988 and a current set from January 1989 to the present with quarterly updates of 225,000 citations per update. The total amount of records is 1.36 million on CD-ROM (Figure 3).

Figure 4 shows a search example retrieved on CD-ROM. The search term is Gesellschaft fuer Reaktorsicherheit as a free text term with 262 records. The newest record of this subject and the description of the fields are shown on this example.
Bibliographic data are retrieved by a easy to handle SilverPlatter software SPIRS (SilverPlatter Information Retrieval System). For this purpose you need the following hardware and software: a PC XT or AT or PS/2 or compatible with 640 KByte RAM; a hard disk of any size with 2 MByte free disk space; a CD-ROM player supporting Microsoft extensions and the ISO 9660 standard with interface for PC or PS/2 (recommended: Hitachi, Philips, Sony, Toshiba), PC-DOS or MS-DOS Version 3.1 or higher, and MS-DOS CD-ROM Extension Version 2.1 or higher. There is no specific requirement for colour or mono monitor, printer or word processor (Figure 5).
Special user aids such as a SilverPlatter Users' Manual, SilverPlatter Quick Reference Cards and the SilverPlatter onscreen documentation including a DATABASE GUIDE support your efforts in quickly learning the system.
Price discussions are ongoing in FIZ Karlsruhe and will be finished at the end of the year 1992. Responsible for the distribution of the INIS CD-ROM are the national representatives, the INIS Liaison Officers (Liaison Officer of Germany is Prof. Dr.-Ing. G.F. Schultheiß of FIZ Karlsruhe). With the beginning of the year 1993 marketing activities about INIS CD-ROM will be intensified.
Besides the CD-ROM marketing, selling activities of the online database will also be done.
Plans to sell both CD-ROM and online database as a package solution will be made, whereas the CD-ROM might also supply a specialized market, and because the online database also has a better response time it serves for crossfile-searches on STN International.
FIZ Karlsruhe looks forward to test the CD-ROM market and to have another interesting output product of INIS.

For all further information about INIS CD-ROM on STN International please contact:

For the INIS CD-ROM:
Fachinformationszentrum Karlsruhe
Division I, Energy and Technology

7514 Eggenstein-Leopoldshafen 2

Tel.: +49 / 7247 / 808-200 or 808-330
Tfx.: +49 / 7247 / 808-132

For Information about STN International:

FIGURE 1

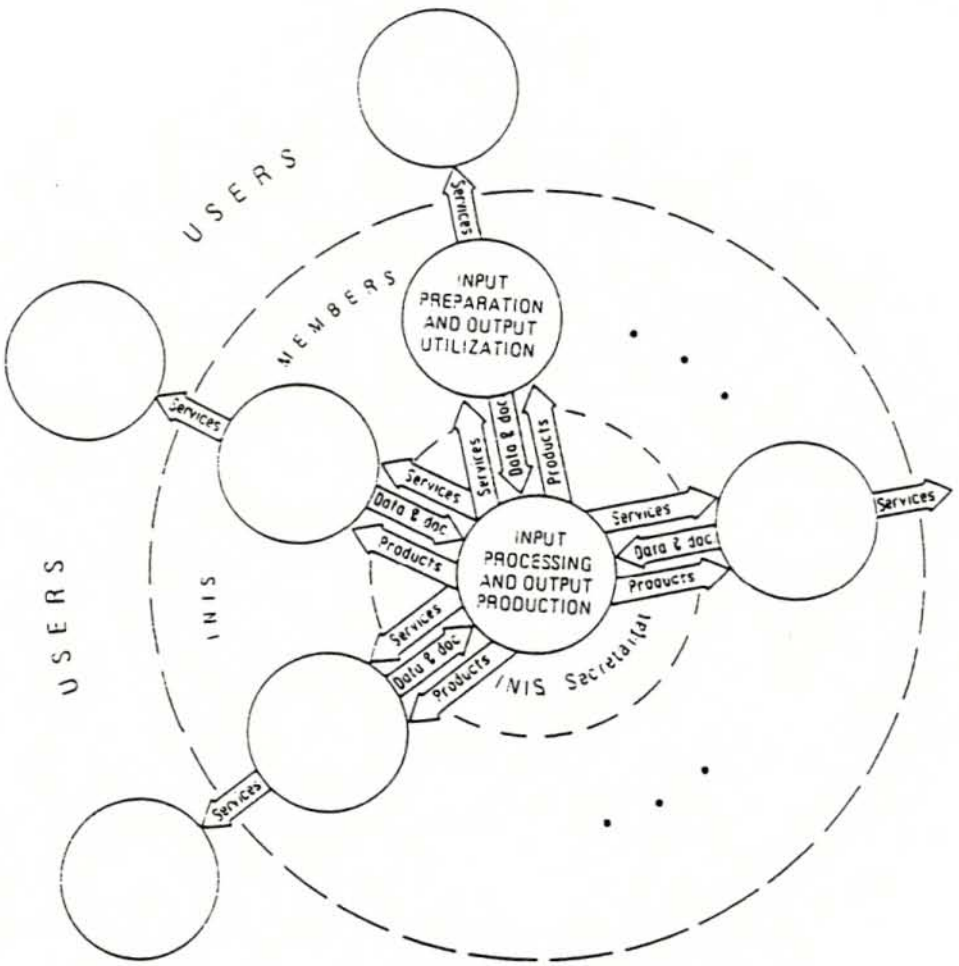
USERS
MEMBERS
INPUT PREPARATION AND OUTPUT UTILIZATION
Services
Data & doc
Products
INPUT PROCESSING AND OUTPUT PRODUCTION
INIS
USERS
INIS Secretariat

FIGURE 2

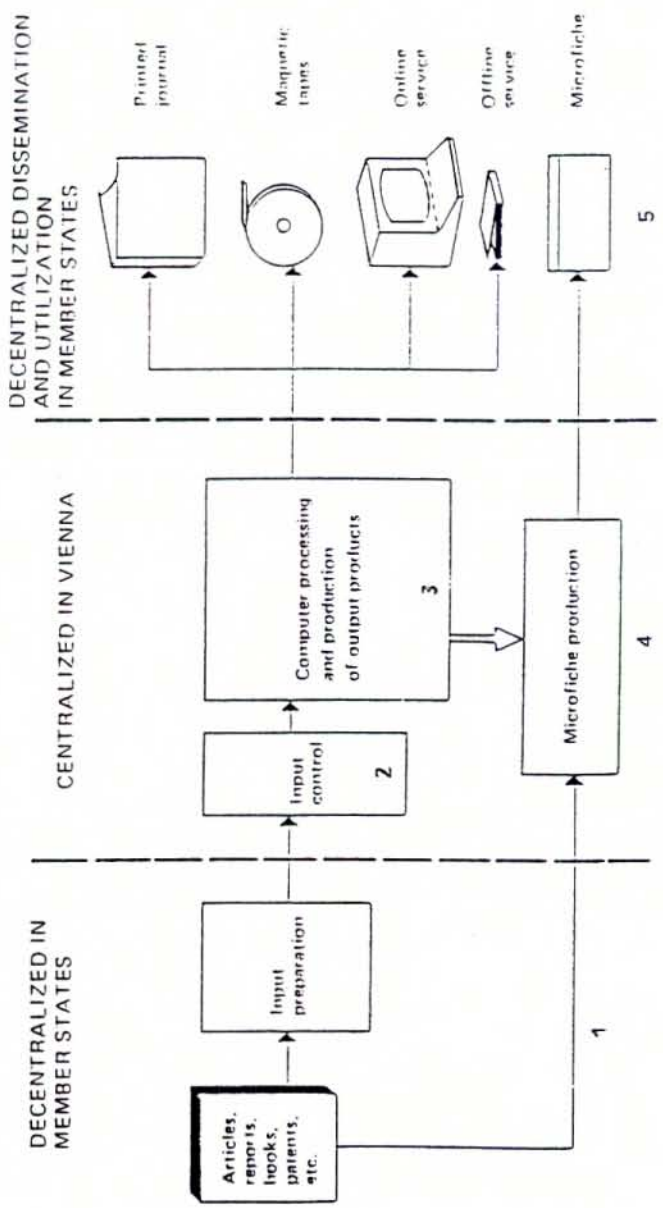
DECENTRALIZED IN MEMBER STATES
CENTRALIZED IN VIENNA
DECENTRALIZED DISSEMINATION AND UTILIZATION IN MEMBER STATES
Articles, reports, books, patents, etc.
Input preparation
Input control
2
Computer processing and production of output products
3
Microfiche production
4
Printed journal
Magnetic tapes
Online server
Offline server
Microfiche
5
1

FIGURE 3

INIS on CD-ROM

Disc	Coverage	Citations
1	76 - 79	276 267
2	80 - 83	312 353
3	84 - 86	250 292
4	87 - 89	294 318
5	90 - 6/92	226 019
Total		**1 359 249**

FIGURE 4

No.	Records	Request
1:	262	GESELLSCHAFT FUER REAKTORSICHERHEIT

TI: International comparison of radiation exposures of LWR plant personnel.
OT: Vergleich der Personal-Strahlenexposition in LWR-Kernkraftwerken.
AU: Gewehr,-K. (Gesellschaft fuer Reaktorsicherheit mbH, Garching (Germany))
SO: Atw.-Atomwirtschaft,-Atomtechnik. (Feb 1992). v. 37(2) p. 85-89
PY: 1992
LA: German
CI: Germany
PT: J (Journal-Article)
AB: Reducing the radiation exposure of nuclear power plant personnel is a international goal. An overview of the status attained in a number of countries is obtained from a comparison of individual and collective doses. ...
DE: reactor-operators; bwr-type reactors; comparative-evaluations; dose-commitments; dose-equivalents; in-service-inspection; occupational-exposure; personnel-dosimetry; pwr-type reactors; radiation-protection; repair-
IS: ISSN 0365-8414. CODEN AWAKA.
CC: C5500; E3100; E3200
C1: C5500
CD: Dosimetry-and-Monitoring; Power-Reactors,-Non-Breeding,-Light-Water-Moderated,-Boiling-Water-Cooled-(BWR,-etc.,-Types); Power Reactors,-Non-Breeding,-Light-Water-Moderated,-Non-Boiling-Water-Cooled-(PWR,-etc.,-Types)
UD: 2312
AN: 23-035371

TI:	TITLE (ENGLISH)	AB:	ABSTRACT
OT:	ORIGINAL NON-ENGLISH TITLE	DE:	DESCRIPTORS
AU:	AUTHOR(S)	IS:	INTERNATIONAL STANDARD NUMBERS
SO:	SOURCE (BIBLIOGRAPHIC CITATIONS)	CC:	ALL SUBJECT CATEGORY CODES
PY:	PUBLICATION YEAR	C1:	PRIMARY SUBJECT CATEGORY CODE
LA:	LANGUAGE OF TEXT	CD:	EXPLANATIONS OF CATEGORY CODES
CI:	COUNTRY OF INPUT	UD:	UPDATE CODE
PT:	PUBLICATION TYPE		
AN:	INIS ACCESSION NUMBER AND RELATED RECORD		

FIGURE 5

INIS on CD-ROM

Technical Requirements

- Hardware:
  - * PC XT or AT or PS/2 or compatible minimum 640 KByte RAM
  - * hard disk with 2 MByte free disk space
  - * CD-ROM player, interface card
- Software:
  - * PC-DOS or MS-DOS Version 3.1 or higher
  - * MS-DOS CD-ROM Extension Version 2.1 or higher
  - * SPIRS

Developments on the IAEA Power Reactor Information Systems

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1. The IAEA Power Reactor Information System

1.1 PRIS Products and Services

The IAEA has been collecting operating experience data for nuclear power plants in the IAEA Member States since 1970. In order to facilitate an analysis of nuclear power plant performance as well as to produce relevant publications, all previously collected data supplied from the questionnaires were computerized in 1980 and the Power Reactor Information System was implemented.

The PRIS data is made available to the Agency by circulating questionnaires to the Member States through designated national correspondents and the Statistical Office of the European Communities (CEC) on an annual basis. Two different questionnaires are used: one for basic information, i.e., general and design information on a particular reactor, and the other is an annual questionnaire covering the operating experience with a particular power reactor during that year.

The PRIS database is used

- to produce two annual IAEA publications printed directly from PRIS, and to provide material for other IAEA publications;
- to carry out statistical analysis either for use within the IAEA or on request from Member States and outside organizations;
- to provide access to the collected data for external users in IAEA Member States, making it possible for them to process the data.

The two annual publications produced directly from PRIS are:

- Operating Experience with Nuclear Power Plants in Member States published since 1971;
- Nuclear Power Reactors in the World (Reference Data Series No.2) published since 1981.

In 1989 the PRIS database was made available on-line for direct access via the international public data networks or public switched telephone system. This service, called PRIS ON-LINE, was kept operating free of charge. Currently, 60 users in 25 Member States and 3 international organizations (WANO, WISE and OECD) have on-line access. More information on PRIS ON-LINE is given in Annex A.

In parallel with the on-line access system, the Agency has offered MICROPRIS to the Member States, free of charge, since January 1991. This is a personal computer (PC) version of data available on diskette in a form readily accessible by standard, commercially available PC packages.

MICROPRIS contains a subset of the full PRIS database. Calculated fields, monthly production data and some of the design parameters of nuclear power plants are not contained in MICROPRIS.

The product is a result of a project that started in the middle of 1989 on the basis of a research contract between the IAEA and the Nuclear Information Center of the Czechoslovak Atomic Energy Commission. Currently 142 subscribers in 50 Member States and 5 international organizations (CEC, OECD, WANO, WISE and UNSCEAR)[1] have the MICROPRIS package. More information on MICROPRIS is provided in Annex B.

Currently, the IAEA is developing a new version of the data bank, which will be presented in section 2 of this report.

1.2 Database Description and Coverage

PRIS covers two kinds of data: general and design information on power reactors, and data on operating experience with nuclear power plants. It has to be stressed that only those data which at some time before had been contributed by the Member States can be retrieved from PRIS.

General and design information covers data on all reactors that are in operation, under construction, or shut-down in the IAEA Member States, and in Taiwan, China.

Operating experience data cover most operating reactors in the IAEA Member States. There are, however, occasions where some Member States did not provide contributions for a specific year or reactor. The overall historical coverage of operating experience is about 89.5%. At the end of 1991, the number of recorded reactor years of power production and of recorded reactor outages exceeded 6,000 and 40,000, respectively, and 98% of the world operating experience was recorded in PRIS.

The PRIS database consists of several logically related files, each file containing information on well-defined aspect of nuclear power. So one of the PRIS files contains information, among others, on the design details of nuclear power reactors; in another file information is recorded on the power production of most reactors described in the former file. A third file contains information on outages of reactors for which the design data are stored in the first file and production data in the second.

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[1] UNSCEAR, UN Scientific Committee on Effects of Atomic Radiation
WISE, World Information Service on Energy

The PRIS fields are stored using a generalized database management system called ADABAS, developed and marketed by SOFTWARE AG in the Federal Republic of Germany. The query language used to retrieve and process the PRIS data is called NATURAL and is also a product of SOFTWARE AG.

A file in turn is a collection of records relating to individual specified subjects of the user's interest: in one file there may be one record for each reactor, in another, one record for each outage of a reactor. The records consist of a set of fields, which are the basic units of the database in which the data are stored. For a particular file, the set of fields making up the individual records is always the same; the objective of a file is thus given by the set of fields constituting the records. In searching PRIS and displaying data, both file and fields are referred to by their names.

Fields exist in PRIS which can be found in more than one file. This is a consequence of the logical relation between the files, all files deal with nuclear power reactors, so fields which serve the identification of particular reactors or reactor groups, or the identification of particular reactor characteristics will be common to several files. Also, the accomplishment of certain statistical calculations using PRIS data necessitates the coupling of files; in writing NATURAL programs such common fields may be used for this purpose.

The fields in PRIS files are of two sorts. Some contain data as they were collected by the IAEA, i.e., as reported by the Member States or a statistical office or found in the literature and checked by the IAEA staff, they might be called primary data. Other fields contain data which were calculated from these primary data. An example of the former may be the field in which the net energy is recorded, produced by a particular reactor during a particular month. An example of the latter would be the load factor for that reactor and month, calculated from the net energy actually produced and the net energy which would have been produced at maximum capacity under continuous operation.

In the following, a description will be given of the four files. Three of them are the main PRIS files and are called PRIS-REACTOR, PRIS-PRODUCTION and PRIS-OUTAGES. The fourth file, called PRIS-CODES, can be used to obtain the meaning and explanation of codes used in PRIS.

FILE PRIS-REACTOR

This file contains general and design information on all nuclear power reactors in operation, under construction, shut-down or planned. There is one record for each reactor, with numerical and textual data on the location of the reactor, its status (in operation, under construction, shut-down), its type and category, on the reactor's owner and operator, the supplier of the nuclear steam supply system and of the turbine generator, gross and net output of the reactor, the dates of construction start, first criticality, connection to the grid, commercial operation and shut-down, and data on a number of reactor core characteristics and on the plant systems.

There is further a large group of fields in file PRIS-REACTOR which describe the reactor core characteristics and the power plant systems. The fields are not descriptors and are not currently used in any IAEA computer analysis. The data in these fields are not complete for all reactors: they may, however, be of use for the external user.

Table 1 presents the information contained in file PRIS-REACTOR.

FILE PRIS-PRODUCTION

Unlike file PRIS-REACTOR which contains one record for each reactor, file PRIS-PRODUCTION contains several records for one particular reactor: one record for each year in which the reactor produced energy or at least, having been connected to the grid, was assumed to do so.

In the records are fields with data on the energy production and performance factors of the reactors, including the net capacity of the reactor, the net energy produced, the energy lost due to planned and unplanned reasons, the time the reactor was connected to the grid, the operation factors, availability factors and unavailability factors due to planned and unplanned causes. The energy production data and performance factors are recorded both for the whole year and for each month of the year.

Table 2 presents the information contained in file PRIS-PRODUCTION.

A number of fields are used for recording the energy produced (or lost due to power reductions) and the hours of operation of a particular reactor. The data on energy produced or lost and on reactor capacity (both yearly and monthly values) are gross values for the years before 1973, whereas from 1973 onwards net values are recorded.

Another important group of data recorded in the file PRIS-PRODUCTION are the so called performance factors which represents the performance of a power reactor over a given period of time. These factors are actually ratios and are all stored as percentages.

The indicators load factor, operation factor, energy availability factor and four unavailability factors, have been used in PRIS since the beginning of the database operation. In 1990, two international indicators, i.e. unit capability factor and unplanned capability loss factor were implemented in PRIS.

In order to harmonize PRIS and international definitions, recommended also by the AGM on Performance Analysis of Nuclear Power Plants, held in the IAEA headquarters, in Vienna, in 1989 and 1990, there was an effort to use, where adequate, the definitions and descriptions of performance indicators as used by UNIPEDE.

In a number of records in file PRIS-PRODUCTION the yearly information on operating experience with nuclear power reactors is supplemented with textual information.

FILE PRIS-OUTAGES

File PRIS-OUTAGES contains one record for each reported significant reactor outage, i.e., one record for each significant unavailability of each power reactor in operation. By definition, a significant outage is a power reduction resulting in a loss of energy corresponding to at least 10 hours continuous operation at maximum reactor capacity. The number of records in the file is considerably larger than the number of records in the other two main PRIS files, since generally several outages are recorded for a particular year of operation of a particular reactor.

In the records information is stored on the type (whether planned or unplanned, full or partial) and cause of the outage, on the energy lost, on the date the outage started and on its duration, and a short description of the outage is given.

It happens that the Member States reporting operating experience to the IAEA, sometimes report unavailability with a loss of energy smaller than would result from 10 hours operation at maximum capacity. Records of such outages are also stored in the file without explicit distinction. The user should bear this in mind when performing statistical analysis in which the incorporation of both significant (requested reporting) and less-than-significant (not required) outages may lead to biased results, it is possible to make the necessary distinction in the NATURAL programs.

Table 3 presents the information contained in file PRIS-OUTAGES.

FILE PRIS-CODES

As indicated by its name, in file PRIS-CODES the codes stored are those which are used in the PRIS data base. As is the case with other computerized information systems, PRIS also is highly codified. Such codes, being a sort of abbreviations, are more efficient in terms of computer storage and help to alleviate the problem of incorrect spellings.

For an on-line user of PRIS it is therefore necessary to either know all the codes used, to have a reference list, or to know the way of obtaining immediately an up-to-date list of all the possible values of a coded field together with the corresponding meanings. In PRIS-CODES, texts explaining a vast majority of codes used in PRIS are contained and can be retrieved. Table 4 presents the fields contained in file PRIS-CODES.

2. Developments on PRIS

2.1 New System Configuration

PRIS is a system that has evolved over a long period of time. During this time, changes have been made to accommodate new requirements. A few small changes do not necessarily impact overall data base structure significantly and are therefore made without regard for the total system design. However, many small changes made over a long period of time eventually add up to one or more design alterations.

The current redesign and migration of PRIS provides the opportunity to make the system more comprehensive and user friendly and to implement it according to the IAEA's standard technology architecture, which recommends to go to decentralized LAN-based environment using client-server architecture for database systems.

The data base is installed on Microsoft SQL server under OS/2 operating system using LANMAN net work software.

The primary objectives of the new design are to improve flexibility of data entry, reduce complexity of relational operations required and provide user-friendly interfaces for database maintenance and end users.

The PRIS logical data model is presented in Figure 1. The data base design includes eight primary tables which provide power reactor descriptive information and performance data : Reactor, Country, Site, Cycles, Outages, Monthly Production, Annual Production and Country Annual Production. The design also includes tables for validating input and describing of codes in outage and reactor tables.

The graphical user interface has been developed using front-end (client) tool Object View under Microsoft Windows.

The new system contains two different interfaces, one for data base maintenance and a second the reporting subsystem. The reporting subsystem is divided in two parts, the first called Reactor Information with detailed information about a country, its reactor sites and nuclear power plants. It presents the information contained in the Reactor, Production and Outage files. The second one is called 'Statistics' and enables the user to make flexible queries using a set of selection criteria. The statistical part presents tables or charts and enables to down load data to a spreadsheet (Excel format), to a DBase or to a word processor (Word for Windows) software. The new system is scheduled to be completed by the middle of next year.

The advantage of the new system is the easy way of retrieving data. The user does not need to know any query language, as he can specify the selection criteria as well as the desirable output, i.e. table, chart, text.

2.2 New information in PRIS

Although, data on PRIS make it useful for identifying operational problem areas, performance trends and in the occurrence of an accident in providing background information on the site and plant characteristics, the information on plant characteristics is still not sufficient to identify the mode of operation of different type of reactors.

Following the recommendations of an Advisory Group Meeting held in 1990 and to meet the requirements of the IAEA's Emergency Response System, the IAEA started a project in co-operation with ENEA/DISP, Italy for improving this part of the data base. In the first phase of this project the needed information on reactor characteristics for BWR's and PWR's reactors have been determined. The second phase deals with information on other types of reactors (PHWR, GCR, AGR, FBR, etc) and the third phase consists of reviewing and implementing the modifications in the PRIS data base.

Currently, the data needed for PWR and BWR were determined and together with data for other types of reactors will be discussed in a meeting to be held in the last week of October, in the IAEA Headquarters in Vienna. The additional technical characteristics cover items related to the mode of plant operation, safety characteristics, safety features, existence of safety analysis report and of emergency plans, plant environment, etc. this information, available but spread over a large number of documents, will be added to the new PRIS configuration system by the end of 1993. The preliminary list developed for PWR and BWR reactors is provided in Annex C.

3. Uses of PRIS

Systematic Analysis

The IAEA's PRIS can be used to assess nuclear power performance and outage causes in a systematic and homogeneous manner. It covers the largest amount of world-wide statistical information on operating experience. The data contained in the system make it specially useful for identifying problem areas and overall trends and the amount of operating experience data available permits statistical analysis to be made.

Performance Analysis

The fundamental objective of a nuclear power plant is to generate electricity in an economic, safe and reliable manner. A plant is performing well when it fulfills this objective under overall satisfactory conditions. There is no simple way to measure overall plant performance, nor is there a single indicator which could be used for this purpose, because the conditions of economic competitive safety and reliability must be fulfilled simultaneously and each has its own particular aspects to be taken into account.

In order to assess plant performance, indicators are used. The principal nuclear power performance indicators cover: plant availability and unavailability: planned and unplanned outages; nuclear safety related events; unavailability of safety systems and support functions; worker safety related events; radiation exposure; fuel reliability; and volume of radioactive waste.

Among those, PRIS provides information on availability and unavailability factors, load factor, planned unavailability factor, unplanned unavailability factors due to causes in the plant and external to the plant.

Care should be taken not to give priority to a single performance indicator, such as load factor, as this could distort the overall impression. Performance indicators are a tool to identify problem areas, where improvements are necessary but they do not provide either the root cause or the solutions.

Outage analysis provides indications on reasons for unavailability.

Statistical analysis as well as studies performed on the level of individual units or utilities do provide indications about which are the usual problem areas and what remedial actions and measures can be applied to achieve performance improvements.

Examples on the use of PRIS in the form of charts are presented in Annex D.

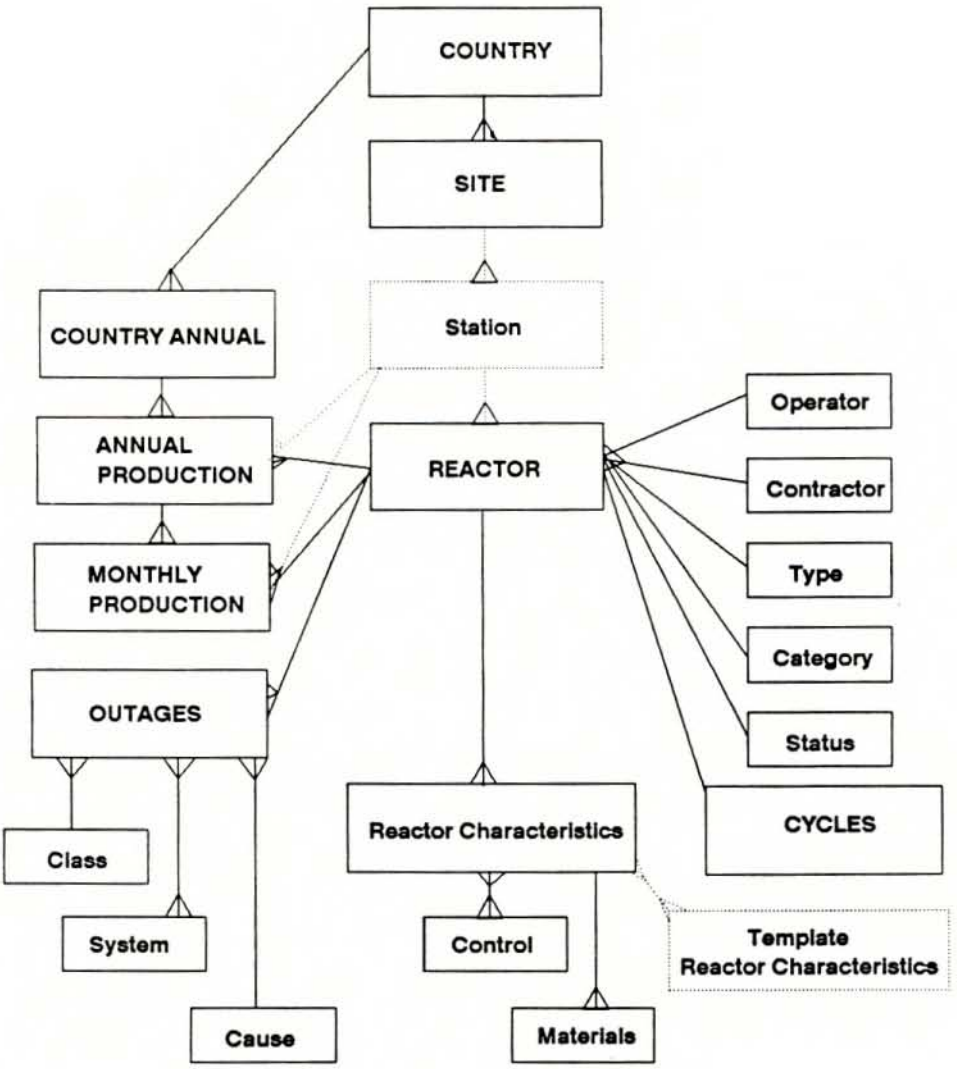


Figure 1 - PRIS Data Model

Table 1 - List of PRIS-REACTOR fields

Name	Header
ISO-CODE	ISO/Code
REF-NO	Ref./Code
UNITS	Unit/Code
STATUS	Status
SUSP-CODE	Suspension/Code
TYPE	Type
CATEGORY	IAEA/Category
CATEGORY-EXCLUSION	IAEA/Category/Exclusion
STATION	Station Name
REGION	Region
STATE	State
OPERATOR	Operator/Code
CONTRACTOR	Contractor/Code
SUPPLIER-COUNTRY	Supplier/Country
TURBINE-SUPPLIER	Turbine/Supplier/Code
OWNER	Owner/Code
THERMAL-POWER	Thermal/Power/MW
GROSS-ELEC	Gross/Elec/Power/MWe
NET-ELEC	Net/Elec/Power/MWe
DESIGN-NET-ELEC	Design/Net/Elec/Power/MWe
CONST-DATE	Construction/Date
CRIT-DATE	Critical/Date
GRID-DATE	Grid/Date
COMM-DATE	Commercial/Date
SHUT-DATE	Shutdown/Date
REACTOR KEY	Reactor Key
STATION-KEY	Station Key
CONST-YEAR	Construction Year
CRIT-YEAR	Critical Year
GRID-YEAR	Grid Year
COMM-YEAR	Commercial Year
SHUT-YEAR	Shutdown Year

Table 1 - List of PRIS-REACTOR fields
(cont.)

Name	Header
FUEL-MATERIAL	Fuel Material
NO-ASSEMBLIES	No. of Fuel/Assemblies
NO-RODS	No. of Rods/per Assembly
INITIAL-ENRICHMENT	Av. Initial/Enrichment/%
RELOAD-ENRICHMENT	Av. Reload/Enrichment/%
CORE-CLAD-MATERIAL	Core/Cladding/Material
CORE-CLAD-THICKNESS	Core/Cladding/Thickness/mm
FUEL-LOAD	Fuel Load/tonne U
FUEL-DENSITY	Power Density/in Fuel/kW per kg U
LINEAR-DENSITY	Power Density/in Core/kW per lit
DISCHARGE-BURNUP	Discharge/Burnup/MWd per t
REFUEL-METHOD	Refuelling/Method
REFUEL-FREQ	Refuel/Frequency/months
CORE-WITHDRAWN	Part of /Core/Withdrawn/%
MEANS-CONTROL	Means of Reactivity Control
VESSEL-MATERIAL	Reactor Vessel/Basic Material
VESSEL-CLADDING	Reactor Vessel/Cladding Material
PRIMARY-DESCRIPTION	Primary System/Description
NO-PUMPS	No. of/Primary/Pumps
COOLANT	Coolant
COOLANT-FLOW	Coolant Flow/Through Core/t per h
COOLANT-OUTLET-TEMP	Coolant/Outlet/Temp. C
COOLANT-OUTLET-PRESS	Coolant/Outlet/Press./kg cm2
STEAM-GEN-TYPE	Steam Generator Type
NO-STEAM-GEN	No. of/Steam/Generators
NO-TURBINES	No. of/Turbines
TURBINE-RATING	Turbine Rating
INLET-TEMP	Turbine Inlet/Temperature C
INLET-PRESS	Turbine Inlet/Press/kg per cm2
INLET-MOISTURE	Turbine Moisture/%
INLET-LOW	Turbine/Mass Flow/t per h
CONTAINMENT	Containment Description

Table 2 - List of PRIS-PRODUCTION fields

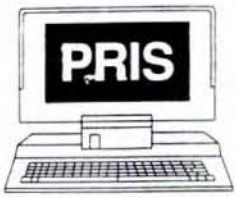
Name	Header
ISO-CODE	ISO/Code
REF-NO	Ref./Code
UNITS	Unit/Code
YEAR	Year
AGE	Comm/Age/Yrs
CATEGORY	IAEA/Category
PRODUCTION-EXCLUSION	IAEA/Production/Exclusion
OUTAGE-EXCLUSION	IAEA/Outage/Exclusion
LIFETIME-GEN	Lifetime/Generation/GW.h(e)
OPERATING-FACTOR	O.F./%
LOAD-FACTOR	L.F./%
AVAIL-FACTOR	A.F/%
UNAVAIL-FACTOR	U.F./%
UNAVAIL-PLAN	P.U.F./%
UNAVAIL-UNPLAN	U.U.F./%
UNAVAIL-EXTERN	X.U.F./%
NET-CAP	Net/Capacity/MW(e)
ENERGY	Energy/Production/GW.h(e)
ENERGY-LOSS	Total/Energy/Loss/GW.h(e)
ENERGY-LOSS-PLAN	Planned/Energy/Loss/GW.h(e)
ENERGY-LOSS-UNPLAN	Unplann/Energy/Loss/GW.h(e)
ENERGY-LOSS-EXTERN	External/Energy/Loss/GW.h(e)
HOURS-ON-LINE	Hours./on/Line
TOTAL-HOURS	Total/Hrs.
M-OPERATING-FACTOR	O.F./%
M-LOAD-FACTOR	L.F./%
M-AVAIL-FACTOR	A.F/%
M-UNAVAIL-FACTOR	U.F./%
M-UNAVAIL-PLAN	P.U.F./%
M-UNAVAIL-UNPLAN	U.U.F./%
M-UNAVAIL-EXTERN	X.U.F./%
M-NET-CAP	Net/Capacity/MW(e)
M-ENERGY	Energy/Production/GW.h(e)
M-ENERGY-LOSS	Total/Energy/Loss/GW.h(e)
M-ENERGY-LOSS-PLAN	Planned/Energy/Loss/GW.h(e)
M-ENERGY-LOSS-UNPLAN	Unplann/Energy/Loss/GW.h(e)
M-ENERGY-LOSS-EXTERN	External/Energy/Loss/GW.h(e)
M-HOURS-ON-LINE	Hours/on/Line
M-TOTAL-HOURS	Total/Hrs.
SUMMARY-TEXT	Summary Text
REACTOR-KEY	Reactor Key
STATION-KEY	Station Key
CATEGORY-EXCLUSION	IAEA/Category/Exclusion

Table 3 - List of PRIS-OUTAGES fields

Name	Header
ISO-CODE	ISO/Code
REF-NO	Ref./Code
UNITS	Unit/Code
YEAR	Year
AGE	Comm/Age/Yrs
CATEGORY	IAEA/Category
OUTAGE-EXCLUSION	IAEA/Outage/Exclusion
OUTAGE-NUMBER	/Number
OUTAGE-DATE	/Date/YYMMDD
OUTAGE-CLASS	/Type
OUTAGE-CODE	/IAEA/Code
OUTAGE-HOURS	/Duration/Hours
OUTAGE-LOSS	Energy/Loss/GW.h(e)
OUTAGE-DESC	/Description
REACTOR-KEY	Reactor Key
STATION-KEY	Station Key
EVENT-KEY	Event Key
ENERGY-LOSS	Energy/Loss/GW.h(e)
OUTAGE-TYPE	Type
OUTAGE-FULL	Extent
CAUSE-CODE	Cause Code
SYSTEM-CODE	Plant System Code
CATEGORY-EXCLUSION	IAEA/Outage/Exclusion

Table 4 - List of PRIS-CODES fields

Name	Header
NAME	NAME
NAME30	NAME
NAME12	NAME
NAME8	NAME
TEXT	TEXT
ISO-CODE	ISO/Code
CONTRACTOR	Contractor/Code
CONTRACTOR-COUNTRY	Contractor/Country
OPERATOR	Operator/Code
STATUS	Reactor/Status/Code
CATEGORY	Reactor/Category/Code
TYPE	Reactor/Type/Code
MATERIAL	Reactor/Materials/Code
CONTROL	Reactor/Control/Code
CAUSE-CODE	Cause/Code
SYSTEM-CODE	System/Code



PRIS Database Online at IAEA

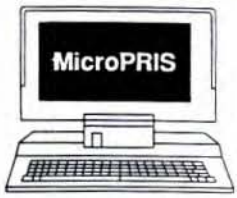
Fact Sheet (September 1992)

What is PRIS?	The **Power Reactor Information System**, the IAEA's collection of operating experience data for nuclear power plants since 1970
Contributors to PRIS	30 countries
Subject scope	Worldwide coverage of general and design information on power reactors in operation, under construction, planned or shutdown, and data on operating experience with nuclear power plants in IAEA Member States
Contents of files	• Reactor status, name, location, type, supplier, turbine generator supplier, plant owner and operator, thermal power, gross and net electrical power, date of construction start, date of first criticality, date of first synchronization to grid, date of commercial operation, date of shutdown, and data on reactor core characteristics and plant systems; • Energy produced, planned and unplanned energy losses, energy availability and unavailability factors, operating factor, load factor; • Information on significant outages/unavailabilities: starting date of outage, type of outage (planned or unplanned, full or partial), cause of outage, plant systems affected, duration of outage, energy loss and a short description of the outage.
Availability to the public	Available to users in the countries contributing to PRIS
Database producer	**International Atomic Energy Agency (IAEA)** P.O. Box 100, A-1400 Vienna, Austria Telephone (1) 2360. Telex 1-12645. Facsimile 43 1 234564 Electronic mail via EARN/BITNET
Online file name	PRIS
Type of database	Factual
Language of database	English
Time span hosted	1970 to the present
Update frequency	Annual
Online service	Connect time for interactive searching
Charges	Database usage is free of charge until further notice. However, network data transmission charges will be paid by the user.
Operating hours	Central European Time (CET): • 07:00–23:30 Monday, Wednesday, Friday • 07:00–18:30 Tuesday, Thursday Not available on official holidays of the IAEA

Host software	ADABAS V4, NATURAL V2.1 (product of SOFTWARE AG)
User aids	• IAEA-TECDOC-507: **Power Reactor Information System (PRIS) Reference and On-line Access Manual**, Vienna, 1989 • **NATURAL Programmer's Guide**, Version 2 • **NATURAL Reference Manual**, Version 2 • **Using NATURAL to Access PRIS**, Vienna, 1989
User hardware	Dumb start/stop terminal, or PC with asynchronous communications card or an X.25 (packet-switching) 3270 emulation card, telephone with modem
User software	Asynchronous communication software to emulate a TTY-compatible terminal (line mode), or full-screen 3270 emulation software for X.25 (packet-switching) communication
Communication parameters	300 baud, half duplex, even parity (applies to IAEA host, but users should set their parameters to those of the packet-switching networks, where applicable)
Dial-up to IAEA computer	Within Austria: 0043 222 235576. Outside Austria: 0043 1 235576. (TTY emulation.)
Telecommunication networks	Public telephone and telex networks, national and international data packet-switching networks
IAEA Network User Address (NUA)	Within Austria: 23226221047 for line mode (TTY emulation) and full-screen mode (3270 emulation) Outside Austria: 023226221047 for line mode (TTY emulation)

Other PRIS products and services	• Ad-hoc retrieval service from the full PRIS database by IAEA staff
	• PRIS database on PC diskette — MicroPRIS
	• IAEA publications, produced annually from the full PRIS database:
	  • **Operating Experience with Nuclear Power Stations in Member States**
	  • **Nuclear Power Reactors in the World, Reference Data Series No. 2**

Contacts at host	1. Ms. R. Spiegelberg, Nuclear Power Engineering Section, IAEA Telephone (1) 2360 2788 or 2360 2789. EARN/BITNET ID NES@IAEA1 2. Mr. M. Raatz, Nuclear Power Engineering Section, IAEA Telephone (1) 2360 2852. EARN/BITNET ID XIM@IAEA1 3. Mr. F. Huell, Computer Services Centre, IAEA Telephone (1) 2360 2928 or 2360 2961. EARN/BITNET ID X03@IAEA1
IAEA Member States contributing to PRIS	Argentina, Belgium, Brazil, Bulgaria, Canada, China, Cuba, Czechoslovakia, Finland, France, Germany, Hungary, India, Islamic Republic of Iran, Italy, Japan, Republic of Korea, Mexico, Netherlands, Pakistan, Romania, South Africa, Spain, Sweden, Switzerland, UK, USA, former USSR, Yugoslavia; plus one non-IAEA Member State



MicroPRIS — PRIS Database on PC Diskette

Fact Sheet (September 1992)

What is PRIS?	The **Power Reactor Information System**, the IAEA's collection of operating experience data for nuclear power plants since 1970
Contributors to PRIS	30 countries
Subject scope	Worldwide coverage of general information on power reactors in operation, under construction, and shutdown, and data on operating experience with nuclear power plants in IAEA Member States
Contents of PRIS files	• Reactor status, name, location, type, supplier, turbine generator supplier, plant owner and operator, thermal power, gross and net electrical power, date of construction start, date of first criticality, date of first synchronization to grid, date of commercial operation, date of shutdown, and data on reactor core characteristics and plant systems; • Energy produced, planned and unplanned energy losses, energy availability and unavailability factors, operating factor, load factor; • Information on significant outages/unavailabilities: starting date of outage, type of outage (planned or unplanned, full or partial), cause of outage, plant systems affected, duration of outage, energy loss and a short description of the outage.
Description of MicroPRIS	MicroPRIS consists of a set of PC diskettes containing a subset of the full PRIS database (only calculated fields, monthly production data and some of the design parameters of nuclear power plants are not contained in MicroPRIS), installation program, selection and conversion program to enable the selection of all or part of the data and its conversion into either a spreadsheet (Lotus 1-2-3) format or a standard PC database (dBase III+) format, and a user's guide
Availability to the public	Available to users in the countries contributing to PRIS
Producer and copyright holder	**International Atomic Energy Agency (IAEA)** P.O. Box 100, A-1400 Vienna, Austria Telephone (1) 2360. Telex 1-12645. Facsimile 43 1 234564 Electronic mail via EARN/BITNET
Type of database	Factual
Language of database	English
Time span	1970 to the present
Update frequency	Annual
User aid	**MicroPRIS User's Guide**, Vienna, 1991

User hardware	• IBM PC-XT or AT or IBM PS/2 or compatible • Hard disk with at least 5MB free space • One 3.5" low density (720kB) or 5.25" high density (1.2MB) diskette drive
User software	MS-DOS Version 3.0 or higher
Charge	Free of charge, until further notice
Special condition	Superceded diskette must be returned to IAEA within 30 days after receipt of current diskette

Other PRIS products and services	• Connect time for interactive searching in the full PRIS database online at IAEA
	• Ad-hoc retrieval service from the full PRIS database by IAEA staff
	• IAEA publications, produced annually from full PRIS database:
	  • **Operating Experience with Nuclear Power Stations in Member States**
	  • **Nuclear Power Reactors in the World, Reference Data Series No. 2**

Contacts at producer	1. Ms. R. Spiegelberg, Nuclear Power Engineering Section, IAEA Telephone (1) 2360 2788 or 2360 2789. EARN/BITNET ID NES@IAEA1 2. Mr. M. Raatz, Nuclear Power Engineering Section, IAEA Telephone (1) 2360 2852. EARN/BITNET ID XIM@IAEA1
IAEA Member States contributing to PRIS	Argentina, Belgium, Brazil, Bulgaria, Canada, China, Cuba, Czechoslovakia, Finland, France, Germany, Hungary, India, Islamic Republic of Iran, Italy, Japan, Republic of Korea, Mexico, Netherlands, Pakistan, Romania, South Africa, Spain, Sweden, Switzerland, UK, USA, former USSR, Yugoslavia; plus one non-IAEA Member State

I. PLANT DESIGN AND CLIMATIC CONDITIONS DESCRIPTION

(Preliminary)

1. BASIC INFORMATION

1. Station Name: Unit number:
2. PRIS reactor code:
3. Current Status:
4. Number of nuclear units in the same site:

GENERAL INFORMATION

5. Country:
6. Township and Region:
7. Station coordinates latitude (degrees, minutes):
   longitude (degrees, minutes):

   Specific environmental conditions of site that affect energy production (e.g. wind, low temperature, etc.)
8. Reactor type:
9. Operator:
10. Owner:
11. Reactor System Supplier:
12. Turbine Generator Supplier:
13. Architect Engineer:
14. Nearest population centre:
15. Average population density around the site within 5 km:
    within 10 km or more:
16. Site design earthquake (in % g) - vertical component:
    - horizontal component:
17. Is a PSA available? If yes at which level?

OUTPUT PER REACTOR UNIT

18. Thermal power (MW):
19. Net electrical output (MW):
20. Gross electrical power (MW):

DATE OF:

21. Start of Construction (day, month, year):
22. First criticality (day, month, year):
23. First synchronization to grid (day, month, year):
24. Commercial operation (day, month, year):
25. Shut down (day, month, year):

MAILING ADDRESSES

Station address:

Station telephone:
telex:
fax:

Utility address:

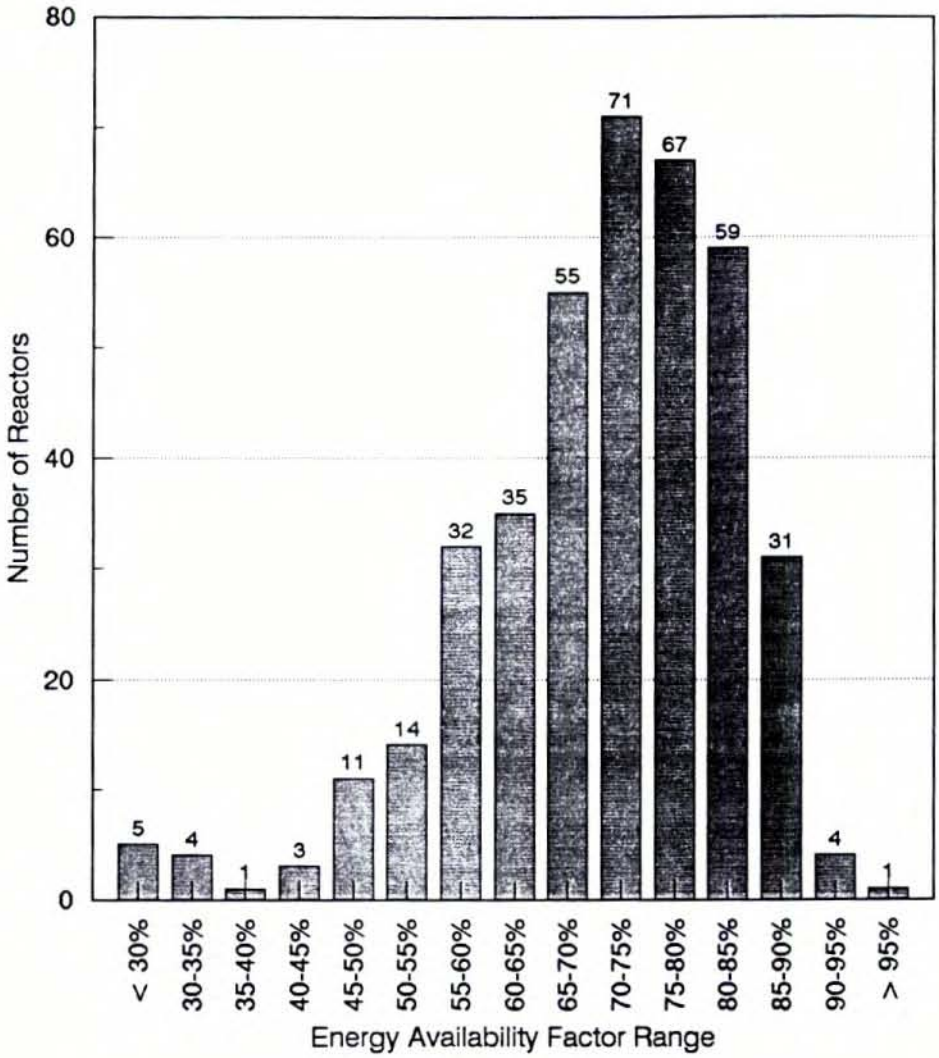
Utility telephone:
telex:
fax:

II. GENERAL PLANT DESCRIPTION

(Preliminary)

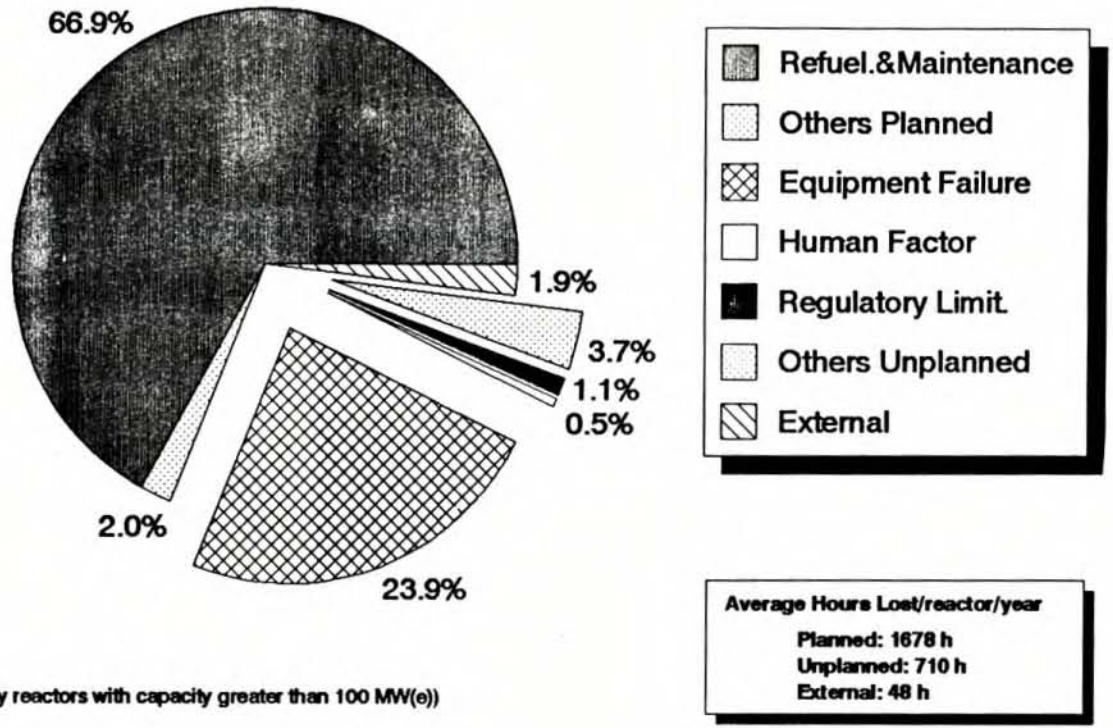
I. CORE AND REACTIVITY CONTROL	
1. Fuel material:	
2. Fuel inventory (ton):	
3. Average core power density (KW/dm^3):	
4. Average fuel power density (KW/KgU):	
5. Average discharge burnup (MWd/t):	
6. Average initial enrichment (%):	7. Average reload enrichment (%):
8(a). Refuelling frequency (month):	8(b). Type of refuelling (on/off-power):
9. Part of core withdrawn (%):	
10(a). Active core height (m):	10(b). Active core diameter (m):
11. Number of fuel assemblies:	
12. Number of fuel rods per assembly:	
13. Rods array in assembly:	
14. Fuel rod/pellet diameter (mm):	
15(a). Clad material:	15(b). Clad thickness (mm):
16. Number of control rod assemblies:	
17. Number of control rods per assembly:	
18. Control rod neutron absorber material:	
19. Soluble chemical neutron absorber:	
20. Other burnable neutron absorber:	
II. REACTOR COOLING SYSTEM	
21. Type of reactor coolant:	
22. Design/rated coolant mass flow through core (t/s):	
23. Number of primary recirculation (or cooling) loops:	
24. Number of primary recirculation (or coolant) pumps:	
25. Pump design capacity (m^3/s):	26. Pump design/rated head (m of H_2O):
27. Pump driving power (KW):	
28. Number of jet pumps (BWR):	
Pressurizer (PWR)	
29. Pressurizer total volume (m^3):	
30(a). Number of heaters	30(b). Installed heat power (KW):

ANNEX D1 - Lifetime Energy Availability Factors up to 1991.



(only reactors with capacity greater than 100 MW(e) and with more than one year of commercial operation)

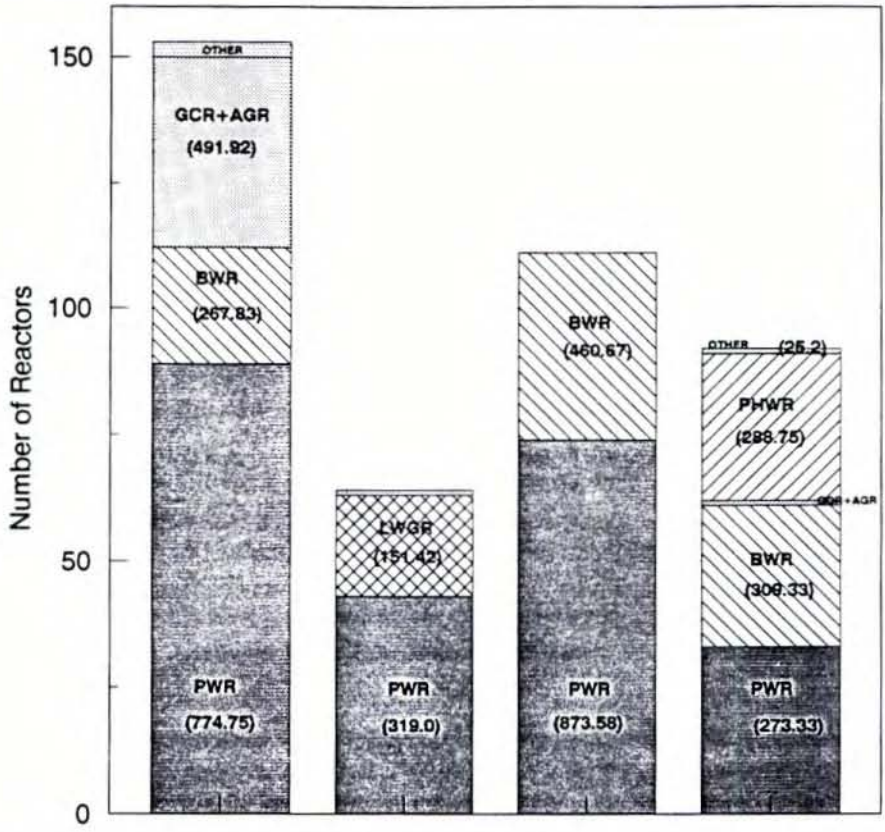
ANNEX D2 - Distribution of Outages up to 1991



(only reactors with capacity greater than 100 MW(e))

ANNEX D3 - Distribution of Nuclear Power Plants by Reactor Type and Region.

(as of December 1991)



Region	Western Europe	Eastern Europe	USA	Other
PWR	89	43	74	33
BWR	23	0	37	28
GCR+AGR	38	0	0	1
PHWR	0	0	0	29
LWGR	0	20	0	0
OTHER	3	1	0	1
Total	153	64	111	92

Note: The numbers between parenthesis represent the reactor-years of experience
Source: IAEA PRIS Data Bank.

TECDO - Status and Recent Developments

U. Riedel, K. A. Höpfner
Gesellschaft für Anlagen- und Reaktorsicherheit (GRS) mbH, Köln

TECDO, Information Retrieval System for Technical Documents

The purpose of the closed, though company-wide accessible, information retrieval system, TECDO, is to provide central electronic storage for all technical documents that have any importance to the safety evaluation of nuclear power plants and other nuclear facilities. This information material is made easily accessible to all installations of the GRS throughout Germany, and also to the BMU in Bonn, through the local and wide area networks (WAN/LAN) that connect these installations. In this role as the central information retrieval system of the GRS, TECDO must provide considerable end-user friendliness such that even the occasional user is quickly supplied with comprehensive information without each time requiring a crash course on the how-to of PC operation.

TECDO is, currently, being converted from the original DBMS, STAIRS, to the relational data base management system ORACLE. In its recently available version, ORACLE finally also enables full-text retrieval (i.e. inverted word lists, stop word lists, thesauri). The different tools of ORACLE, foremost SQL*Forms, make it possible to create the end-user friendliness that we aspire. Furthermore, socalled "user exits" are available that should make it possible to interface with other data bank management systems (e.g. System 2000) and gaining acces to their information without requiring the user to leave the environment of ORACLE (**Fig. 1**).

The GRS was ß-tester for version 2 of ORACLE SQL*TextRetrieval which is now in production stage. In the GRS ORACLE is installed in a socalled client/server configuration where the users converse in an x-windows emulation, HCL Exceed, from their PCs with a SUN workstation in Garching through dedicated telecommuniction lines in the wide area network of the GRS (**Fig. 2**). The SUN workstation is the client handling the RDBMS logic and the application software of ORACLE. The central host computer, IBM ES/9000, in turn, is the database server handling the storage and retrieval operations of the extensive files (**Fig. 3**).

Types of Documents in TECDO

As of today, TECDO contains some 70.000 pages of full-text retrievable texts and tables and the corresponding small and large frame images which are accessible through their individual bibliographic data. TECDO contains all kinds of documents pertaining to nuclear facilities, e.g.,safety analysis reports, system descriptions, operation certifications, emergency manuals, quicklook reports, but also NRC Information Notices and nuclear standards (KTA safety standards). Most of these documents were entered into TECDO by applying various scanning and OCR procedures. Of course whenever available, an electronic form (ASCII, EBCDIC) of the documents is used as input to the databank. This still requires reformatting to customize the text to the different screen display of computer terminals but it cuts out the time consuming proof reading usually required with OCR techniques. In this way we have included the 10CFR and NRC regulatory guides, FSARs for two American nuclear power plants, the safety analysis report for KONVOI and even the KWU German-English dictionary of nuclear terms, to name a few. Likewise, techical reports of the GRS are being included in TECDO via electronic transfer. Electronic transfer is, however, not without its problems. Today's powerful text processors with their WYSIWYG functions (AmiPro, Word for Windows, tpo name a few) seem to have in common that they treet the trusted data exchange format ASCII like an unloved cousin. Furthermore, due to the wide variety of text processing software, it seems that as many individual ASCII conversion procedures must be developed as there are different source of electronically available data.

Image Fliles

The original solution of an electronic documentation under STAIRS required that any referenced image had to be located in the socalled Common Picture Library on the central host computer. Only then was the user able to simultaneously access both texts and images from his or her terminal. Under the current configuration with ORACLE, the images will eventually be stored in three identical image servers in the local area networks of the major GRS facilities. This will remove the current bottleneck of unacceptably long image transfer times. Images will be transported through the LAN in compressed form to be decompressed by software and/or hardware

components in the user's PC (U'ware's FastFind; KOFAX video card: printer video interface). This will achieve considerably faster image switching and zooming - and printouts - than under the current system (STAIRS/CPL) where the uncompressed image is transported through the WAN.

A fast handling of images will also make new concepts of documentation possible. For instance, a well structured document like the operating manual of a nuclear power plant could well be accessed by leafing through its pages in an image file. Provided, its table of context is full-text retrievable, the only further requirement would be, e.g., a link from the page number in the table of context to the storage location in the image file. This form of documentation would allow handling, i.e scanning and storing, of considerably larger document volumes per time unit than so far possible.

Hard-Copy Archiving

Another aspect of TECDO is the archiving of large scale drawings and of important, though out-of-date, documents. Last year some twenty thousand large scale technical drawings have been collated into a central drawings archive. Additionally, they were microfilmed and their bibliographical data (title, plant ID, drawing number) entered into a central data bank. Copies of the microfilm cards were distributed to the two other facilities of GRS in Garching and Berlin whereas the original paper drawings and one set of microfilm cards stay in Cologne. The central data bank is now the basis for locating the drawings in the file cabinets or in the microfilm card drawers. When this project is completed, some 80.000 drawings found throughout the three houses will have been catalogued and, thereby made accessible to all in GRS.

Out-of-date documents have proven, over the years, one one hand to be a storage burden but, on the other, to be an important basis for knowledge transfer. In the GRS, the problem of storage was drastically reduced from about 300 m^2 of cellar storage to one small file cabinet by transferring these files - roughly 1.5 million sheets of paper - to microfilm cassettes. Each file was supplied with a cover sheet describing its contents (project no., title, date span, name of the originator, number of the film cassette and film slide of the starting page). A full-text retrieval data bank on these data sheets now allows easy access to formerly almost inaccessible data.

Outlook

The near future will bring the application phase of the new ORACLE environment and the trial phase of large volume document storage through more efficient image handling.

TECDO will remain a closed system with respect to outside users mainly because a large portion the data contained is of proprietary nature. These documents were made available to the GRS under the strict condition that only members of the GRS and, of course, the contractor of this project BMU, have access to this material. However, the GRS is also a major contributor to many international projects, e.g. program code development in reactor safety, that require a rapid, extensive and international exchange of information, be it code manuals or the code sections themselves. Today, this is carried out via hardcopy using the postal system. With the advent of ORACLE, however, it should soon become possible to grant access to outside users (via a package switched network X25 or DatexP) by restricting their access to certain sections of TECDO, thereby simplifying, and speeding up considerably, this national and international data exchange.

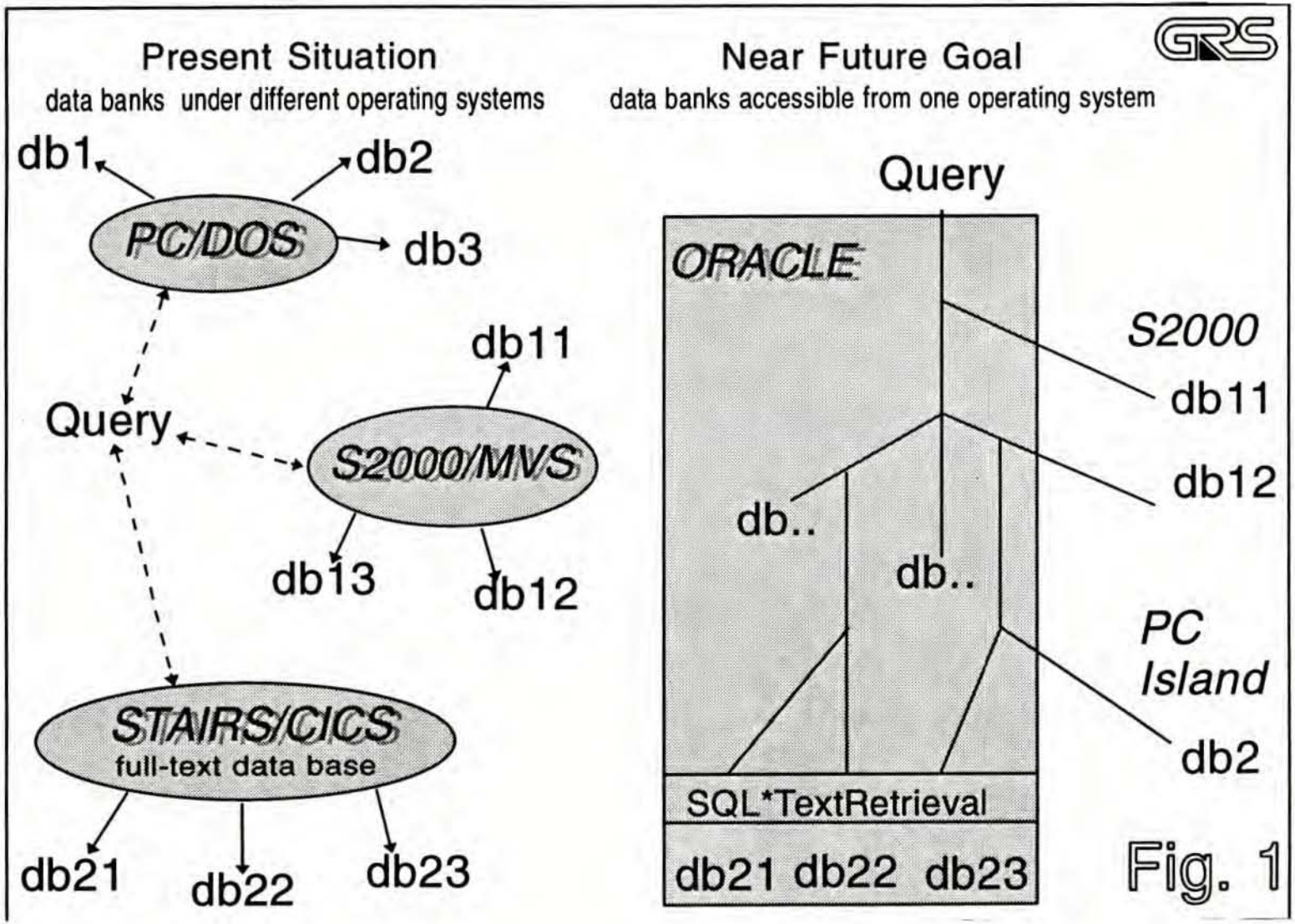

Present Situation
data banks under different operating systems
db1
db2
PC/DOS
db3
db11
Query
S2000/MVS
db13
db12
STAIRS/CICS
full-text data base
db21
db22
db23
Near Future Goal
data banks accessible from one operating system
Query
ORACLE
S2000
db11
db12
db..
db..
PC
Island
db2
SQL*TextRetrieval
db21 db22 db23

Fig. 1

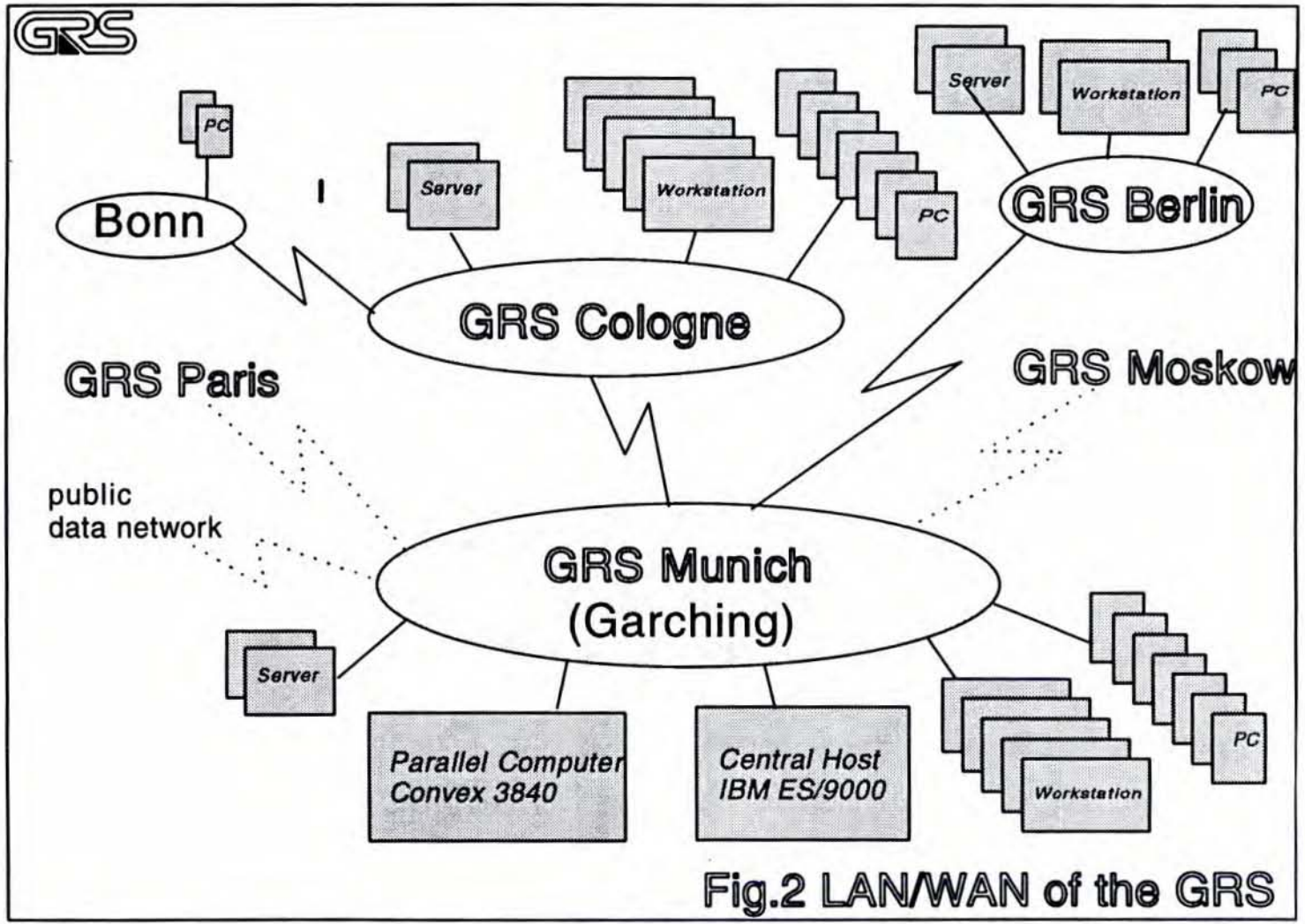


Fig.2 LAN/WAN of the GRS

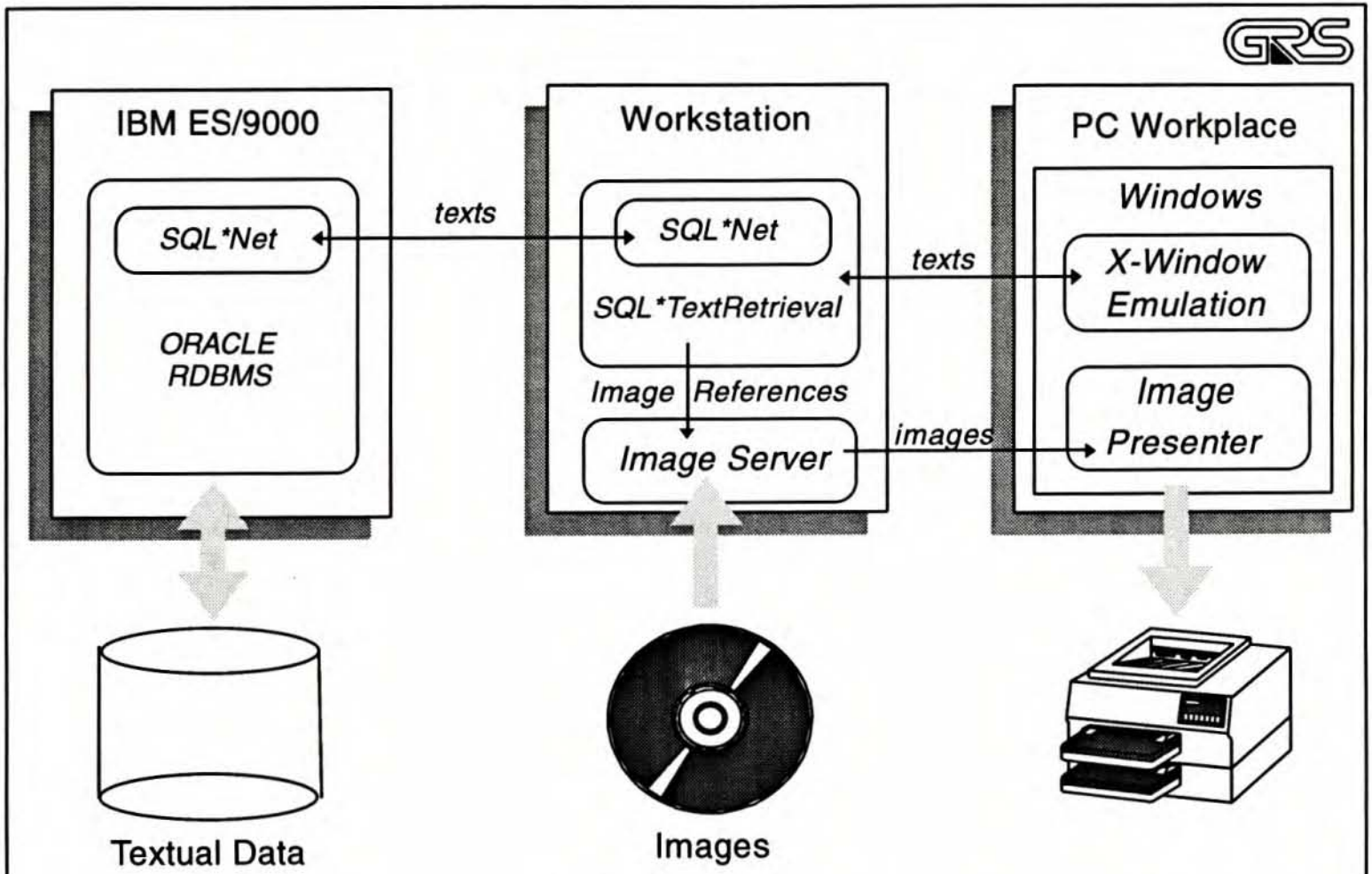


Fig. 3 System Configuration TECDO

SESSION III
SERVICES

Chairmen: L. Weil, H.-P. Berg

Atominform's Activities as the Information and Analytical Center of Nuclear Industry and Power of Russia

Y.V. Reshetko,
Atominform, Moscow

The Central Research Institute of Management , Economics and Information, Atominform, is a division of information-analytical support of scientific, production and commercial efforts of the nuclear industry and is also involved in the most "traditional" information activity.

These "traditional" lines of activity include: compilation and maintenance of all types of data bases and their reference facilities; library activities; information support; information analysis; preparation and publishing of analytical reviews; arrangement of information flows both between the nuclear industry enterprises and through exchange with information bodies of the state system of scientific and technical information and other branches of the national economy; introduction of the state-of-the-art information technologies into the information practice.

At the present time, the Atominform's library alone has over 1.5 mln archive entries (national and foreign monographs, books, journals, brochures, preprints, etc) and over 2 mln of secondary documents in the reference-retrieval facilities.

The participation of Atominform in the International Nuclear Information System of the IAEA, as a national INIS center, plays an important role in the information support of the nuclear industry.

We have mastered the CD-ROM technology for supplying information to our users. Thus, over 1 mln INIS abstracts which have been input in this system since 1986 are available for our users.

In addition, we supply information on optical disks prepared by international and national information centers (e.g. NTIS, COMPENDEX, etc).

The Information-Retrieval System of Automated Dissemination of Information (SARI) of the nuclear industry is very similar to these systems; SARI is based on the ideology and principles which are almost identical to those of the INIS. SARI ensures a vital in-

formation support in the dialog mode of over 300 collective users of the nuclear industry and national economy. A retrospective SARI data base containing about 500.000 descriptions of documents is compiled and available.

The compilation of the information funds of Atominform and enterprises of the nuclear industry is also ensured through subscription to foreign and national scientific literature as well as interdepartmental and interindustrial scientific and technical publications. Information exchange with foreign partners plays an important role: 130 organizations in more than 100 countries of the world co-operate with us, to say nothing about the co-operation, as the National INIS Center of Russia, with 79 states and 16 international organizations.

We believe that the completion of the information funds of nuclear industry enterprises with information on machine-readable media generated by the information centers of other industries can also be attributed to this line of activities. According to rough estimates, since 1984 the enterprises have received over 5 mln machine-sensible descriptions of documents for completion of their local data bases.

Atominform accumulated a unique fund of records of the State System of Accounting for and Registration of Research and Developments Projects; the fund contains data on 27.000 R/D projects realized by the nuclear industry as well as 84.000 information cards-reports on R/D results and over 78.000 microfiche copies of reports.

The presented data do not exhaust the list of data bases compiled by Atominform's divisions. Such data bases are, as a rule, of local and highly specialized nature and are oriented at specific problems to be solved under direct contracts with nuclear industry enterprises and national economy. Here, as an example, we can enumerate information entries on the technology for production of super pure substances, industrial catalogues, data on NPP economy and performance, information on domestic and foreign scientific and technical promotional efforts, radiation dosemeters, metal-working equipment, address information, etc.

Atominform, as all other industrial information centers of Russia, ensures the so called "uprising flow" of information in the national economy (information bulletins, records of the State System of Accounting for and Registration of Research and Development Projects, information on machine-readable media from SARI and INIS).

The utilization of unique scientific funds and prompt study of vital foreign periodicals gave impetus to the establishment of another line of activities related to the analysis of information; preparation and publishing of reviews; analytical studies and forecast of the status and development of nuclear power and industry abroad as well as trends in scientific and technical progress in this area.

The above investigations encompass: in the nuclear fuel cycle - feedstock resources and level of mining, separation of isotopes of nuclear materials, nuclear fuel fabrication; in nuclear power-performance of foreign NPPs, comparison of their characteristics with those of fossil-fuel thermal power plants, promising NPP designs, nuclear plant safety problems.

In addition, economic potential of foreign countries, including the production of special nuclear materials, conversion problems of nuclear industry and many other topics, is analyzed.

The introduction of update information technologies into information practice is an essential condition for a successful development of the information activities (mastering and adaptation of applied software packages and DBMSs for maintenance of literature and factual data bases; development of converters, information input and control systems, automated descriptive cataloguing facilities, dictionaries, thesauruses; introduction of technologies and hardware of local information networks; interaction with external information systems in the telecommuncation acces mode; utilization of information on optical disks).

Now let me dwell in more detail upon the problems of nuclear and radiation safety and environmental protection.

We participate in the information support of the activities undertaken within the scope of State programs of social insurance of the population and reclaim of territories subjected to radiation effects as well as programs for reprocessing and disposal of radwaste.

Local data bases containing documents related to the problems of the Chernobyl accident, reprocessing and disposal of rad waste, etc., are set up. Data on radiologic situation in the 30-km zone of the Chernobyl NPP in 1986-1987 are collected and analyzed.

Information on equipment and methods of dosimetric and radiometric monitoring is acquired.

System of Automated Dissemination of Information (SARI)

List of Topical Information Collatings of NPP Safety and Environmental Protection

1. Reactor operation. Quality assurance and control:
   Quality assurance and control during the start up and operation, maintenance and repair of reactors. Problems of NPP operation reliability. Effect of tests and final check prior to and during operation on the reliability of pressurized reactor vessels. Role of the operator and safety services in QA during NPP operation, etc.

2. NPP siting:
   Selection of NPP construction sites taking into account a possible emergency situation. Calculational and experimental design of sesmically resistant equipment. Environmental protection problems. Seismic surveys and investigations for NPP siting purposes.

3. System analysis and risk theory related to NPP safety assurance:
   Analysis of vast statistic data on NPP failures and defects. Risk of an accident at NPPs with LWRs. Quantitative probabilistic safety analysis of NPPs with WWER-1000 reactors. System of indicators of risk assessment, criteria of risk analysis in case of low-probability severe-aftereffect accidents. System analysis of failures of a system. Program of investigations into reactor safety.

4. Decontamination after reactor accidents:
   Decontamination of reactor rooms. Decontamination of the site and waters after a reactor accident. Filtration of releases from the reactor containment, etc.

5. Chernobyl accident aftereffects and their mitigation and accident recovery:
   Analysis of all aspects of the Chernobyl accident: causes and consequences, response, radiation safety problems, medical and biological aspects of the accident, recommendations on various aspects of radiation safety. Radiation monitoring, propagation of radionuclides in the European countries, radioactive contamination of air, water, soil, food. Dosimetric monitoring of the environment, content of Cs-137, I-131, etc., in the human body, radiation doses, etc..

6. Environmental protection (EP):

   EP data bases cover the following topics:

   a) Industrial pollution of the environment;
   b) Radioactive contamination of the environment;
   c) Techniques of investigations of the environment and environment protection;
   d) Impact of contaminants of human beings, flora, fauna and natural resources;
   e) Environmental pollution countermenouses. Pollution monitoring;
   f) Decontamination of sewage. Equipment;
   g) Ecological aspects of NPP safety. NPP accident consequences;
   h) Waste, waste management. Waste-free technology;
   i) Legal aspects of the environmental protection;
   k) International agreements and legislation on industrial and radioactive contamination of the environment;
   l) Assessment and forecasting of the status of the environment and natural resources, including monitoring systems.

Notes:

1. The documents of a topical collating contain: name, summary, name of the source, collation, descriptors, subject category. A part of abstracts of foreign books is included in the topical collating in English. National documents published before 1989 have no summaries (they have descriptors).

2. Documents are presented in the form of printouts.

3. EP data bases rely on SARI of the nuclear industry, International Nuclear Information System (INIS). EP data bases are distributed on diskettes and paper medium. Full EP data base or its specific section can be presented to the user in compliance with his order. Utilization of data bases on magnetic carriers makes the access thereto in the dialogue mode convenient for the user. Ep data bases are of interest to a wide range of specialists related to corresponding topics.

The Electronic Published Information Environment in a Major Pharmaceutical Research Company

P. T. Bysouth
Glaxo Group Research Ltd., Ware, Hertfordshire

Glaxo's future success will continue to be based on the quality and outcome of its research activities. Access by our scientists to the valued resource of the World's published information is a routine part of their quest.

Glaxo Group Research (GGR) has a major library facility on each of its two UK research sites together holding a total bookstock of over 38000 volumes and subscribing to around 1500 journal titles. A survey has estimated that during 1991 these libraries were visited on 73000 separate occasions and that the staff handled 18000 telephone calls.

In addition to these traditional hard-copy literature sources our 2600 PhD and graduate scientists are supported by the provision of a substantial and growing electronic published information (EPI) environment.

GGR's EPI environment consists of three components; database access provided by online host services, databases leased and mounted on Glaxo's in-house VAX computer network and more recently CD-ROM databases.

Whilst the relative proportions of the three EPI components may vary, we see this mixed environment continuing for the foreseeable future. It is our aim to maintain strategic liaisons with a limited number of database hosts, database and other electronic publishers vital to GGR's published information needs. We actively seek to influence the content, quality and functionality of these suppliers' EPI products and services together with the necessary freedom to use an EPI product or service within the context of GGR's requirements. It is vital also, of course, that the information is available to us at the right price.

Within the Company, EPI sources are successfully exploited by a mix of information professionals and large numbers of the end-users themselves. Our 23 library and information specialists provide the Business with a range of hard-copy and electronic alerting services together with a mediated scientific, technical and business enquiry answering service. End-user online searching was first introduced during 1987 after extensive internal market research and comparative field trials [1,2,3] and further extended to include CD-ROM sources in 1990.

Online Host Services

GGR relies heavily on online databases having been actively exploiting them for information retrieval since 1976.

A core number of online host services currently satisfy the vast majority of our database needs - they are as follows:

STN
Data-Star
Dialog
IMSWorld
Dun & Bradstreet
Infomat (UK - Ziff Communications Co)
FT Profile
Mead Data
MSDN (Microbial Strains Data Network, Cambridge)
PFDS (Pergamon Financial Data Services)

Among our information professionals the most extensively used databases include the Chemical Abstracts' Registry and CA files (via STN), Medline/Embase/Biosis (via Data-Star) and Scisearch/Ringdoc/Biotechnology Abstracts (via Dialog).

Our end-user training programme allows chemists to access the CA Registry File, using structure input for single compound searches but not sub-structure searches, and the bibliographic CA File via STN. The preferred vehicle for our biomedical end-users is the Dialog Medical Connection (DMC) where they are trained primarily to search Medline and Biosis using initially "Menu Mode" but now increasingly DMC "Command Mode".

In total we have almost 300 registered end-user online searchers ranging from all levels of laboratory scientists to senior managers. The newest recruits to our online searcher population are several buyers from GGR's Purchasing Department who now have access to Dun & Bradstreet and Kompass Online.

In-house VAX-based Services

In addition to various chemical/drug structure files from Molecular Design (MDL), the Current Chemical Reactions (CCR) file from ISI and the Standard Drug File (SDF) from Derwent, GGR's Information Services have developed several published information applications utilising the BASIS text management system from Information Dimensions (Battelle Corporation). These files are mounted on a VAX 6000-560 512 MByte machine and accessed locally by scientists throughout the Company.

Current Contents:

We take a weekly Current Contents tape from ISI, with author abstracts, that covers 3 sections of CC, ie Life Sciences, Clinical Practice and Physics, Chemistry and Earth Sciences. The tapes are mounted on a weekly basis with no cumulation. Our information specialists use the CC material as their main source of biomedical current awareness profiles which are distributed electronically to the researchers. At the present time approximately 100 project profiles generate around 1000 electronic mail messages each week. End-users can access the service themselves to scan any of these profiles or to use a tailored menu search system using keywords or journal titles. ISI customise the tapes with tagging of GGR's journal titles to indicate whether they are held by one or other of our 2 research libraries.

Scrip:

This important pharmaceutical industry newsletter from PJB Publications is downloaded (under licence) daily from the online version available on Data-Star. The full text, excluding any graphics and all the adverts, is made available as a 5 day rolling file which can be scanned or searched using keywords.

F-D-C Publications:

This is our latest Basis application, involving the downloading of both the "Pink Sheets" *(The US equivalent of Scrip)* and Health News Daily direct from the publisher's private bulletin board, is at the beta-test stage.

Health & Safety Bulletin:

We subscribe to the Royal Society of Chemistry's database "Chemistry Safety NewsBase" (CSNB) delivered regularly on floppy diskette. One of our health and safety information specialists transfers the data into a Basis file (RSC1) for evaluation and editing before transferring to a live file (RSC2) that forms our internal "Hazards Database". This file, available to a selected audience, contains cumulative information going back to 1987.

Videotext (VTX) Services:

The Company-wide "VIDEOTEX Information System", utilising a module of DEC's "All-in-One", electronic messaging office automation software, is available to all staff. Menu options include:

News	Including share price, local roadworks etc.
Human Resources	Including job vacancies
Company Information	Including Corporate SOPs
Staff Information	Including lunch menus

Published information applications include the previously mentioned "Scrip" file under News and "Inform", a daily listing of the new journal issues received by our two libraries.

CD-ROM Databases

GGR's use of CD-ROM by the Information Services Department began in 1989 in the area of health and safety information with our information specialist acquiring such sources as:

CHEM-BANK	Databank of potentially hazardous chemicals
OSH-ROM	Occupational Safety & Health Data
MSDS	Sigma-Aldrich Material Safety Data Sheets

Later in 1990, saw the introduction of stand-alone CD-ROM drives in our two central research libraries. These drives initially offered our end-users just the Medline database but during the last 12 months we have added CHEM-BANK, MSDS and the Gastroenterology

sub-set of Elsevier's Embase. More recently, we have begun to extend our range of CD-ROM facilities by the provision, locally in research departments, of more specialist databases, eg The Dictionary of Natural Products mounted in the Structural Chemistry Department, Drug Information Sources mounted in the Pharmacy Department and FDA-ON CD-ROM in the Regulatory Affairs Department.

Our current aim is to further extend access to our CD-ROM by the use of networks. We are, in fact, at the beta-test phase of our first network that utilises a Novell file server with 8 gbyte of magnetic storage onto which we have copied, under licence, our CD-ROM version of the Medline database, ie we are using the disks simply as the delivery medium. This network can then be accessed via other LANs using special software that limits access to 8 simultaneous users.

We believe that the following 1991 statistics show that our EPI environment is successfully enabling the Business to exploit published information to a very high degree:

Expert-mediated scientific/technical enquiries	=	3189
Expert-mediated bibliographic & business enquiries	=	730
End-user online (via host) search sessions	=	6464
End-user CD-ROM search sessions	=	2609
Inter-library loans (books & reprints) processed	=	18130

We will continue to maintain and further develop the mixed EPI Environment within GGR especially working towards the integration of the various facilities at the users desk-top.

References:

1. Assessing the potential need for end-user online literature searching by scientists within a research organisation.
   PT Bysouth, End-User Searching - The Effective Gateway to Published Information (Ed. PT Bysouth), 93 - 104, ASLIB, The Association for Information Management, London, 1990 (ISBN 0-85142-238-1).

2. Evaluating the use of several approaches to online literature retrieval by research scientists.
   PT Bysouth, 105 - 124, Ibid.

3. End-user searching within Glaxo Group Research Ltd : An evaluation of the DIALOG Medical Connection.
   T Boyd and K Warne, 125 - 134, Ibid.

Information Services for the Hungarian Academic Community

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The aim of my presentation is to give you a short overview about the information infrastructure and services available for the Hungarian academic community. Needless to say that our infrastructure is far less developed, our financial capabilities are far more modest, as that of yours. The economic situation in Hungary is hard, the budget is limited, however in spite of all the difficulties - as you will see it - we have set up a working information infrastructure.

The majority of the work was done by the Institute for Automation and Computer Science, where I come from, and where I am the Head of the Department for Information Services. The Institute employing about 200 high qualified research workers is one of the largest one belonging to the Hungarian Academy of Science. The main task of the institute - beside doing basic research in computer science - is to give information services for the Hungarian academic community.

The basis of the Hungarian academic infrastructure is a packet switched data network. 5 years ago, when we have begun to plan the network, importing of high technology was prohibited and strongly controlled by the so called Cocom regulations of the USA. We were forced to "reinvent the wheel" and we have done it.

We have designed a family of microprocessor based devices meeting the requirements of international ISO/OSI standards and CCITT recommendations for data communication with packet switching technology. One of it is the so called H, a standalone X.25 switch and PAD. Another popular device is the COMX board to be plugged into an IBM PC - the most widely used computers in Hungary for the time being. The COMX board provides X.25 access to an MS/DOS user - either working at a single PC or even at a PC in a Novell LAN network.

Now nearly thousand such devices are in operation in Hungary. Almost all of the Hungarian universities and academic institutions are already networked together, thus forming the so called Hungarian Academic Research Network. The network has full compatibility with other European X.25 networks, such as DATEX-P in Germany. That way

Hungarian users can easily access network services all over the world and vica versa - as wou will see.

The two most important information service based on the network are electronic mail and on-line information service.

There is a "Made in Hungary" e-mail system called ELLA. ELLA has a client-server architecture. The ELLA post-office program handles the user's ELLA mailboxes and runs under VM/SP operating system on an IBM 4381 in our institute. The ELLA client program runs in the user's IBM PC under MS/DOS. If the client initiates it, the two programs begin to communicate with each other through the network or through ordinary telephone lines. All of the services common in any e-mail system or even more are available through a nice, menu driven interface.

The on-line information service situation can be characterized in the following way.

There are several mainframe host computers with network connection in Hungary holding relatively large number of databases. However these databases have two serious drawbacks. First of all the majority of these databases are in Hungarian language having little value for international use. Secondly the database management system used is ISIS in almost every case. ISIS is a program developed in distributed by UNESCO free of charge. That's the reason why ISIS is so much preferred in Hungary. As some years ago UNESCO ceased to develop and support the mainframe version of ISIS we came tot he conclusion that it's impossible to maintain a reliable on line information service based on ISIS.

The Hungarian academic community also owns a relatively large IBM 4381 type mainframe computer for providing ISIS based on line information services. By the end of 1991 it was decided to change the database management software on its IBM 4381 mainframe computer to a professional one. After a lengthy evaluating process the final decision was met in June 1992. The choice fell on BRS/SEARCH, an American software with very good support and good capabilities for nationalising - another important point of view.

Now all of the ISIS databases are under reload to BRS/SEARCH. The work will be finished by the end of 1992. For that time one can have network access to about 24 BRS/SEARCH database.

Some of those databases wich may arouse one's interest (in brackets are the number of records in the database).

KIDA	Who is who in Hungary	7.000
SZAB	Hungarian Standards	20.000
SZIR	Hungarian Patents	30.000
CCO	Current Contents on Line	100.000
NPA	National Periodical Database	24.000

These databases are only examples. Furthermore you can find out from this book how to login into our computer, how to obtain userids and passwords and finally a short summary about the most important BRS/SEARCH instructions.

International Center for Scientific and Technical Information (ICSTI) - Center for Regional Information Exchange -

A. Butrimenko
ICSTI, Moscow

The ICSTI was established in 1969 and since then changed very significantly. Being up to now an international intergovernmental organization it works like international share-holder company. It is now completely self-supporting and provides variety of information services for its clients in CIS countries as well as many countries of Europe, Asia and America. ICSTI activities, involving preparation of data bases and rendering of information services, are also characterized by a certain shift in priorities. The first shift concerns encouraged preparation of referral data bases on organizations and experts in specific fields of science and technology. When purchasing data bases ICSTI prefers data bases with market, technological and economic information. ICSTI also carries out match-making services in facilitating business contacts between prospect partners and sale of products, used in information activities.

The recent decisions of ICSTI governing body - the Committee of Plenipotentiary Representatives - allow for membership in this organization not only at government level but at the level of companies and firms from non-member states. Such organizations attain the status of an associated partner and carry out commercially based joint projects with ICSTI. There are now 18 associated partners.

In using data base ICSTI acts as:

- a host-center, allowing on-line access to data bases with the total volume reaching 2.5 mln records
- a center, providing local access to data bases on CD-ROMs with a total of 1.5 mln records
- a center, providing local access to data bases on micro computers with a total up to 60 thousand records.

A list of local data bases maintained by ICSTI is shown in Table.

The changed economic conditions for business operations persuade ICSTI to increase joint exploitation of data bases with producers rather than purchase such bases directly. Such trends fall in line with the generall practice of Western information ser-

vices. Naturally this cooperation brings economic benefits to both partners only when large volumes of data bases are used by clients in on-line mode.

At present ICSTI runs 6 data on CD-ROMs, covering subjects in various fields of science, technology, economy, business and management, medicine and health care, agriculture and education.

These data bases, apart from providing information services, familiarize the end-user with the technologies and methods of searching for information on CD-ROM data bases and their application in the activities of enterprises, companies and information organization. ICSTI renders organizational support to interested partied in purchasing CD-ROM data bases and technical means for their use.

In general two trends can be identified in creating ICSTI information resources:

- in production of data bases with a partner a definite shift to encourage cooperation with organizations, holding economic and market information (exchanges, business, associations and other commercial bodies)
- information about industrial technologies and products.

These trends have developed during three years and caused significant changes in the structure of the information potential of ICSTI. If in 1989 scientific and technical information accounted for 80 % of the total information resources, while economic and market information - only 15 %, in 1992 the share of economic and market information increased to 50 %.

Thus ICSTI cooperation with the Agency of Economic News of the Russian commodity exchange allows to create a data base on good offered for sale, their prices and terms of delivery and provide this data base on-line. At the next stage ICSTI and its partner plan to publish regular economic and market outlooks.

A broker office of ExNet, a universal electronic exchange, has been organized in ICSTI. ExNet has know-how for organization of electronic bidding. The network of ExNet broker offices is equipped with PCs, the exchange operates 24 hours a day and uses satellite channels for communications.

ICSTI also signs contracts with organizations (R&D institutes, enterprises, cooperatives), specializing in production of factographic data bases. Long term prospects in developing ICSTI information potentialities include the following:

within the Commonwealth of Independent States (CIS)

- cooperation with organizations generating data bases on industrial technologies, materials and substances and joint exploitation within the CIS in on-lin-mode
- cooperation with information bodies and other data base generating centers in coordination of price policies regarding information products and services and development of a mutually acceptable system of account balancing considering the current economic situation.

with organizations of ICSTI member stages

- arranging information exchange from data bases produced in the countries, assistance in supporting the information network of interested organization
- joint production of data bases and their distribution in the Western information market.

with Western information services and data bases generating centers

- joint running through Western information networks of data bases, produced by ICSTI independently or in conjunction with other organization from its member states
- joint staging of conferences and seminars with participation of information services from the East and the West, aimed at phased out creation of a unitied information area.

ICSTI information resources also include established and long term contacts with scientific and industrial circles within the CIS Joint work with them on information servicing as well as preparation of analytical materials enable ICSTI to increase the range of products and services offered.

ICSTI information services can be divided into three groups:

Services, rendered through use of data bases and the library of primary sources

Independent of the equipment used for supporting data bases (host-center, CD-ROM data bases and PCs), ICSTI renders the following services:

- services in the mode of selective dissemination of information according to industrial or standard profiles
- retrospect information services including on-line access to data bases
- computerized preparation and issue of production in specific fields of science, technology, economy and ecology;
- statistical analysis of data bases
- supply copies of documents, available from ICSTI or other funds.

Preparation of analytical materials and publications

Preparation of analytical materials and publications is bases on:

- orders for publications from organizations interested in specific subject fields
- orders for analytical materials according to an agreed plan
- assessment, carried out by ICSTI and confirming the economic viability of a prospect analytical material or a publication in view of its future commercial distribution

Mediatory Services in business

ICSTI mediatory services in business contacts include the following commitments depending on requirements of the client:

- distribution of information and promotional materials and offers of the client among potential partners
- follow-up correspondence to specify preliminary terms of a prospect partnership

- organization of business talks in ICSTI
- assistance to the client in carrying out expert analysis of economic and legal aspect of the partners offer
- participation in preparing the contact.

Diversification of the services regarding preparation of analytical materials and support to business activities, has naturally led to inevitable changes in the structure of employed labour. Currently ICSTI employs not only specialist in information, experts in economy, law, marketing and advertising.

In general ICSTI services are determined by their economic efficiency and demand in the market of ICSTI member states.

An important role in ensuring economic viability of information services is played by the price policy carried out in the country of ICSTI location and ICSTI member states. Prices for data base information services are quoted with account of:

- ICSTI cost for their preparation
- prices for similar services, rendered by other information organizations
- information market outlook
- expected rate of inflation, changes of prices for input materials, etc.

Payments in roubles are effected within the CIS; a switch to dollar payments in relations with ICSTI member states could become an insuperable obstacle to mutual trade in information products and services. In this regard in settling accounts ICSTI is promoting use of national currencies of its member states.

Two recent years have seen the following practice develop. After comparing prices in roubles for ICSTI services with prices for similar services in the national market of the client, as well as commercial exchange rates of national currencies to the US dollar, ICSTI and its client fix the price for a service in a national currency. The money due to ICSTI for rendered services is retained by the client in its account and is utilized according to purchasing of materials and equipment in this country and etc. If ICSTI acts as the client ordering information, the money due to the supplier of information is retained in a special ICSTI account.

ICSTI - Internationales Zentrum für wissenschaftliche und technische Information

Status:	**Zwischenstaatliche Organisation mit entsprechenden Privilegien**
Mitglieder:	**Bulgarien** **Rumänien** **Ungarn** **Polen** **Tschechoslowakai** **UdSSR** **VR Korea** **Mongolei** **Kuba** **Vietnam** **(Anwärter: Estland, Lettland, Litauen)**
Assoziierte Mitglieder:	**FAXON (USA),** **SIBIR (USA),** **SIGMATRONICS (Belgien),** **NAUTILUS (Hongkong),** **INFOEXPERT (BRD),** **KINITI (Korea),** **Informationsinstitut des Auswärtigen Amtes der Ukraine** **(Anwärter: Organisationen aus Polen, Holland, China und Vietnam)**
Mitarbeiter:	**300 (davon 30 Ausländer)**
Budget:	**Selbstfinanzierung** **Ausgaben: 3,2 Mio Rubel** **Einnahmen: 4 Mio Rubel**

Struktur des staatlichen Informationssystems der UdSSR

Informationsquellen-orientiert

VINITI	All-Unions-Institut für wissenschaftliche und technische Information (UdSSR- und Welt-Publikationen und Zeitschriften)
VNTIZ	Wissenschaftlich-technisches All-Unions-Informationszentrum (Graue Literatur, Reports)
POISK	Unionszentrum für Patente
INION	Institut für Sozialwissenschaft, soziale Information
GPNTB	Staatliche Bibliothek für Wissenschaft und Technik Zentrum für wissenschaftlich-technische Erfindungen (Wolgograd)

Fachlich orientiert

VIMI	All-Unions-Institut für inter-industrielle Information innerhalb der Rüstungsministerium Institut für medizinische Information Institute für technisch-ökonomische Studien (bei jedem Ministerium)

Territorial orientiert

Informationszentren der Republiken
Regionale Informationszentren
Städtische Informationszentren

IASNET Resources

Databanks - Electronic mail systems - Mainframes
Soviet databases connected to IASNET

Databank producer	Number of databases	Subject	Database type	NUA
ICSTI	18	Science and technology	R	02502 120701 02502 120702
VINITI	61	Science and technology	R	o2502 120601 02502 120602 02502 120603
VNTICentre	4	Science and technology (reports, dissertations, software)	R, N	
VNIPI Sport	1	Sport	R	
GBL	5	Culture	R	
INION	14	Sociology, history, humanities	R	02502 160400
GPNTB	8	Science and technology (books, serials, prospects and booklets, software programs, grey literature)	R	02502 130402
VNIIPI (NPO POISK)	6	Science and technology	R	
IVTAN	1	Thermodynamic characteristics of materials and substances	N	
JV DIALOGUE	3	Politics, economics	T	02502 160100
*)	R - reference (bibliographic) database N - numeric database T - full text			

PRICES FOR DATA BASE SERVICES						
Organization	On-line search rub./h		SDI ind.prof. rub./year	SDI stand.prof. rub./year	Print doc. rub./rec.	
	1991	1992	1991	1992	1991	1992
VINITI	30-40	60	15	35	0.3	0.6
POISK	180	295	10	100	0.3	0.65
GPNTB	50	80	-	-	0.1	0.7
VNIIKI	49	360	20	100	included in the price for SDI and retrosearch	
VNIITEMR	55	550	45	45	included in the price for SDI and retrosearch	
ICSTI	150	375	180	450	0.4	0.8

PRODUCERS OF DATA BASES ON ECONOMY AND BUSINESS		
Subject coverage	**Number of data bases**	**Number of data base generating centres**
Address data on enterprises, organizations, foreign companies	87	41
Market and financial information	49	35
Ecology, natural and production resources	102	67
Scientific and experiments data	69	38
Products for industry, industrial equipment, products for the building industry	132	111
Consumer goods	12	10
Materials and substances	124	102
Technical and economic data, accounting	106	76
Material and resources supplies, sale of products, export/import	49	42

Distribution of Data Bases by types and availability of on-line access			
Type of Data base	On-line		Total
	Yes	No	
Documentary	75	258	333
Factographic	665	3893	4548
Lexicographic	27	189	216
Full text	10	79	89
Others	7	39	46
Total:	774	4458	5232

World stream of information and its part, coming in and processing in the USSR		
Type of publications	Approximate number of publications in world (in millions)	Part of world stream accessible in the USSR
Scientific and Technical articles	2,0	1,0
Patent publication	1,5	1,47
Information of industrial production	2,4	0,20
Conjunctural information	1,3	0,35
Reports of R&D, dissertations	0,70	0,250
Information about scientific and technical achievements	0,50	0,20
Technical documentation	0,050	0,050
Total:	8,450	3,520

PRODUCTION OF DOCUMENTARY AND FACTOGRAPHIC DATA BASES		
Host	1988 Retrofund volume (mln. rec.)	1991 Retrofund volume (mln. rec.)
VINITY (published documents)	2725,0	10767,0
POISK (patents)	8453,6	21150,0
GPNTB (register of periodicals and books)	44,0	475,0
INION (social sciences)	270,0	1160,0
VNTICentre (reports and dissertations)	-	2090,0
VNIIPM (industrial catalogues)	-	836,0
TOTAL:	11492,6	36478,2

KN F32.061N

BZ Informatsionnye resursy po Prikaspiyskoy nauchnoy geologicheskoy partii (Kazakhskaya chast')
Wissenschaftliche geologische Gesellschaft der Region Kaspisches Meer (Kasachischer Teil): Informationsquellen

HS KOME GKGU Kazakhstana

HH Kazakhskoe otdelenie .. (?)

AH Alma-Ata, Kasachstan

ON Offline

TY Faktendatenbank

IN Die Datenbank enthält Informationen über erdöl- und erdgashaltige Schichten, Tiefbohrlöcher, 3000 Strukturuntersuchungen, 116 Lagerstätten, 300 zur Bohrung vorbereiteten Strukturen sowie 2000 Bohrlöcher, die wasserhaltige Schichten durchschneiden

SG Erdöl und Erdgas (Gewinnung und Verarbeitung)
Bergbau/Bergtechnik

DE Lagerstätten
Tiefbohrlöcher
Bohrlöcher
Erdölgewinnung
Erdöllagerstättenbau

BS 5 500

LA Kasachstan

SP Russisch

ST Ja

Tabelle 16

ICSTI Data Base Service Price List (in am. dollars)							
Data base	Subject	Coverage	Number of doc. 1000's	On line hour	On line print full doc.	On line print without abst.	SDI one year
VINITI-informatics	Informatics	1987	35	35	0,20	0,10	56
VINITY-economics	Industry economics	1990	33	-	-	-	-
VINITY-Biotechnology	Biotechnology	1990	26	-	-	-	-
VINITI-OOS	Enrivonment Protection	1987	60	-	-	-	-
VINITI-VTSP	High temperature Super-Conductivity	1989	18	-	-	-	-
INIS	Nuclear Science and Engineering	1989	210	40	0.25	0.15	72
BIOTEC	Biotechnological Firms & Organizations	1990	6	25	0.20	0,20	-

KN F32.056N

NA NGP, NGO

HS GlavNIVTS

HH Glavnyy nauchno-issledovatel'skiy vychislitel'nyy tsentr -
Zentrale wissenschaftliche Informationsstelle

AH Moskau, Rußland

ON Offline

TY Faktendatenbank

IN Die Datenbank enthält Angaben für die Analyse der Beschaffenheit und die Bewertung der Rohstofflager bei zielgerichteter und langfristiger Vorbereitung der erschlossenen Vorräte an Kohlenwasserstoffen der Kategorien A+B+C1

SG Geowissenschaften

DE Gesteinskunde
Lagerstätten
Kohlengesteine

LA Rußland

SP Russisch

ST ja

Information Dissemination using the Information and Documentation Department of an Industrial Company as an Example

M. Hintze
Henkel KGaA, Düsseldorf

At Henkel, information procurement and dissemination has a long tradition. There are two main reasons for this:

1. The Henkel family recognized the benefits and value of information early on and established the so called information center in 1913.

2. Chemistry with its structural formulae and nomenclature is particularly suitable for documentation. Three examples of secondary literature which acted as precursors of modern online data bases are: Firstly, literature registration and evaluation in BEILSTEIN, which dates back to 1830, secondly, the World Patent Index from Derwent and last but not least the Chemical Abstracts which started 1907.

In the twenties and thirties the information center at Henkel was already issuing a short daily economic report. At the same time Henkel-relevant literature and patents were analyzed by a clerk of the patent department and then entered into a card index. In the Fifties Henkel began a retrospective broad evaluation of Henkel-specific literature and patents. For this purpose, apart from punch-code cards, machine punched cards were used for the storage of terms in the form of code numbers. This future oriented approach led to the development of the first internal online data base as early as 1970. In addition, lists of the equivalent patents, which were printed with tabulating machines were already available. The compilation of the material required great effort because the patents did not have priority numbers. Only the priority date and country could be used as unambiguous criteria for the search equivalents. In the meantime several specialist departments had been established which compiled, viewed and evaluated documents, created internal data bases and provided information from external and internal data bases. Information procurement is expensive but indispensable. This becomes clear if one considers that in the field of natural sciences alone, more than 5000 reports and patents which must be documented are published every day. In order to render this massive amount of information accessible, data base manufacturers require thousands of specialists. But as you all know, information is an industrial

production factor just as important as capital and labour. This belief was 20 years ago by no means commonly appreciated. Even today few people concern themselves with the problem of how to master the flood of information. How to direct and store information, and most importantly, how to retrieve data. Which filters should be integrated and how information can be condensed and analyzed.

The Importance of an Information Department to a Company

Even for specialists working in a narrow field, the often quoted flood of information makes it impossible to remain up to date. It is therefore at the start of a new research project particulary important to check whether the new ideas which one would like to realize have already been covered by others. Bearing in mind that to run one chemistry laboratory, with one chemist, two labortory technicians and may be one further assistant, on average costs DM 75000 per month, you can imagine how much money is possibly wasted if one does not carry out a comprehensive retrospective search before starting a new project and during routine research work through SDIs (selective dissemination of information).

Ten to fiftien years ago a monograph, i.e. a specialized book which summarizes certain fields of activity, was probably the best aid for information evaluation. A good monograph can often reduce the effort required for literature evaluation. However, since, every year the publications in the area of chemistry increase by 9 %, it is a stroke of luck if a current monograph is available. The so called review articles in scientific journals are just as important, but these articles are usually not directly accessible in a library and can only be retrieved by online search. Nevertheless, there is usually a gap between the monograph or the review article and the present day state of the art or knowledge. This gap must be filled by additional patent and literature searches.

Now and then the high expenditure for searches is criticized. The Rules of good businesmanagement expect costs to justify quantifiable benefits. This also applies to research when experiments do not always lead to concrete or marketable results. It is very difficult to calculate savings made when a research project is abandoned after a search has revealed that the particular topic has already been investigated. However, the successful oppositions of a competitors patent application allows a rough estimate to be made.

We know the average development costs that our company encounters until a new development reaches the patent department. We can therefore estimate the damage done to a competitor who has not searched his development work thoroughly.

When Should One Use Online Data Bases?

Although today there are more than 5000 online data bases in the world, this does not mean that every search has to be carried out in a online data base. There are many examples and reasons where this is not the case. I would like to emphasize that data bases will never render the printed word and/or libraries superfluous; on the contrary, online search possibilities and libraries complement one another. Furthermore, it should be emphazized that the retrospective online search, with the exception of BEILSTEIN and a few online data bases, usually only covers the last 25 to 30 years. Older literature and patents may still be relevant but cannot be searched online.

At Henkel we carry out online searches whenever complete coverage of information is required. Patent information, whether it is general or referring to our own applications, always has to be searched online, because here the most up to date information is provided. In those cases where the information need not be comprehensive, i.e. if a single literature reference concerning a specific query suffices and if the literature reference can easily be found in a reference book, for example in a publication by a specific author, we usually recommend that our colleagues from the research department look for the relevant publication in the library. However, when our colleagues require all publications by a specific author, we recommend online searching because it is more efficient and saves time and money.

Another type of query where we would not necessarily carry out an online search is the determination of physical data of a generally known chemical. For inorganic substances we recommend GMELIN and for organic substances BEILSTEIN. We do not carry out all online searches that are requested, since apart from the necessary searches which have to be done, we also receive inquiries that clearly reveal a certain laziness to use the library. But let us return to the original question: When should one use online data bases? The answer is almost always!

It is then unimportant whether one searches online in internal or external data bases. CD-ROMs or combination systems with optical disks or hypermedia etc. One of the

main reasons for the permanent use of the online data bases, is that in future more and more information will no longer be available in the printed form. One example that points us in this direction is the intention of the Japanese patent office to provide Japanese patents on electronic media only, i.e. on floppy disks and CD-Rom's or other.

What Are The Advantages of Online Searching as Compared to a Manual Literature Search in Bibliographies?

- it saves a great deal of time
- it achieves a higher yield
- it has a much higher precision

Savings with respect to time are mainly due to the faster access by the computer. Improved yield and higher precision result from the fact that bibliographies usually only contain a few registers, in most cases a list of authors and a code word register. The online data bases have several other registers as well as additional indices. Apart from theses, one can search in the abstracts and, in the case of fulltext data bases, also in the fulltext. Many pessimists who used online data bases shortly after their introduction onto the market received a bad impression of this medium. One must admit that the quality of the early online data bases was considerably worse than that of the data bases built later.

The reason for this is that in the first few years of the online data bases were practically electronic copies of printed bibliographies. Basically, they were magnetic tapes which had been converted into online data bases. The original aim was the control of the Digiset plants which produced the printed works. Once the importance and the potential of this instrument had been recognized, data bases were altered and improved for storage on the computer.

What Are The Advantages of Online Data Bases?

- the gigantic storage capacity
- the speed of access
- the simultaneous search in several data bases
- the high selectivity of searching with the aid of Boolean operators and further auxiliary operators (proximity operators)

- worldwide availability
- the speed og updating

There are several data bases in which publications are already available online before the respective printed work is published. However, in spite of all the advantages that have been mentioned so far, we should not forget the disadvantages of online searches.

Worldwide, only an estimated 20 % - if that - of current human knowledge is available online. In the field of economics the situation is possibly different. Here information is normally valid for only a short period of time, and after a few years it often has merely an historical value. Here the "short life" of the information is disadvantageous because it reduces the quality of the data base. The producers of economic data bases must recover their production expenses within a relatively short period of time. Thus large amounts of information from a large variety of different sources are integrated uncritically, and the validity of the information is hardly ever checked by the data base producer. Thus it is quite possible that an economic data base contains an entry which states that in 1990 91 t of coal were produced in the Federal Republic of Germany, while in reality the figure was 91 million t. Of course, in this field there are also data bases with a high standard of quality, and specialists in this sector know how to distinguish between the data bases.

This leads us to another disadvantage of online searching. At present, searches in most data bases require expert knowledge of searching, data base content and the retrieval languages. However, this is likely to change in the course of time , in many fields there will be a trend away from the data base expert (information manager) towards the end user.

As I have already mentioned at the beginning of my lecture, Henkel introduced the STAIRS search system in 1981.The aim was to provide internal data bases which allow clerks, researchers, engineers and marketing manager to carry out their own searches, at least simple searches. We regularly train and support our end users. At the moment there are more than 2000 terminals and PCs at Henkel with direct access to our mainframe computer. More than 800 STAIRS passwords have been allocated. Our aim is to provide as much information as possible on electronic media and to make it accessible to all Henkel employees. We have also installed CD-ROMs as an in-

formation medium, and some of the files are used quite intensively. Unfortunately there is no standard for CD-ROMs and many CD-ROMs require their own PC since the corresponding software is often incompatible with other PC or driver software. In our opinion another disadvantage is the fact that the storage space of a single CD-ROM is often insufficient for one data base. However, this problem can be solved by means of jukeboxes which can hold up to 50 or more CD-ROMs.

Where Are The Limits of Online Searching Today?

I have already said that only a certain percentage of human knowledge is so far available online. In addition, most data bases only allow searches in the bibliography with additional index words or key words and abstracts. For example, a six page article is summarized in an abstract with a maximum of 300 words, in exceptional cases 500 words. Such an abstract reflects the main points of the original report but does not provide the whole correctly and completely report. Even with thorough indexing and abstracting, essential statements can be overlooked, since an abstracter or an indexer cannot be expected to be an expert in all fields. Fine nuances which only have a meaning to the specialists can be overlooked and thus cannot be searched online. At present data base producers show a trend towards the so called full text data bases. Full text data bases are very desirable for information professionals, but require more experienced searchers etc.

As many of you know for searching online data bases the Boolean Algebra is used for linking and grouping individual search terms.

The online search is the only practical application of Boolean Algebra (set theory) that I know of. In addition, so called "proximity operators", i.e. logical auxiliary operators are used to define the proximity or the releationship between search terms. Thus one can for example specify that two or more search terms must occur in a sentence. One can also demand that two or more search terms must occur together or that they must stand together in any sequence. In principle this is also possible for full text data bases, but the length of the texts and the missing field codes in the original and/or the full text complicate the retrieval of relevant documents. I am sure that the problem which I have just illustrated will be solved satisfactorily within a short period of time. I would like to refer back to the problem of searches in abstracts and to the risk of missing index terms or important pieces of information in the abstracts. An online collea-

gue once said "One data base is not enough!" Thus the experienced information specialist will never be satisfied with the results from one single data base if he requires comprehensive information. In the case of searches on the same topic in several data bases it is very probable that one will find duplicates, i.e. abstracts of the same work are found in different data bases. For example a medical data base summarizes the contents of the original report mainly from a medical point of view. If the original report also deals with biological and chemical aspects, another data base producer will analyze the same report placing particular emphasis on the biological and/or chemical aspects. This basically means that by searching more than one data base the risk of leaving out important information can be reduced considerably. Another reason why errors, in particular typographical errors, are made is the large quantity of texts which the data base producers have to process.

In the afore-mentioned case duplicates are useful. However, in many cases they are an expensive and negative side-effect of searching more than one data base. Although today there are identification programs for duplicates, the fact remains that one has to pay for the duplicates, which leads to an unnecessary increase in search costs. In order to solve this problem, it is necessary in future to assign serial numbers to the individual articles in addition to the ISSN and the ISBN numbers.

Are We on The Way to The Information Society?

I believe the answer is: We are no longer on the way, we are already there. Ever increasing amounts of information are invading all areas of our daily life, and in most cases more time is required for sorting and filing than for the actual reading. According to the Swiss federal archives, in one decade as much information will be stored as in all previous centuries put together.

In some areas the technological development can already be predicted. The development time for a new storage medium is approx. 10 years. The magnetic storage media for large quantities of data appeared towards the end of the fifties, in the seventies came the floppy disks, and the 80ies saw the rise of optical memories. Consequently, one can assume that the next new medium, whatever it may be, will soon be introduced. Probably, multimedia integrated workplaces will soon be just as common as PCs are today. Multimedia will integrate information channels that are presently still separate at the workplace. Although we have only just got used to the graphic user interfa-

ce on the PC, PC users will soon have to face the next revolution; the multimedia aims are very high. It is not just a question of retrieving a few sentences from a PC or letting it control a video recorder - no - it must be a real multimedia PC. For the generation, storage, processing and output of graphics in motion, real-time images, sound etc. it must in principle offer the same possibilities that are available today for processing texts, graphics, individual images etc..

As you can see, we are moving towards our final goal, the "paperless office", although I personally think that at least my generation will not live to see this. I rather have the impression that ever increasing quantities of paper are produced due to the modern technologies of information dissemination.

Finally, please allow me to state my personal opinion on online searching. Finding nothing by an online search does not nessarily mean that no information is available on the search topic, it just means you should go to the library.

Information Products from the East

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Economy

The former communist countries face a tough transition. Those which wish to succeed in turning their economies towards the market must asset the starting conditions. In the economic point of view the main indicators at the end of communism era are:

Indicators 1988	Population million	GDP per capita k$	GDP 86-88 % growth	Exports as % of GDP
Bulgaria	9.0	5.63	1.9	23.0
Czechoslovakia	15.6	7.60	1.6	19.7
Hungary	10.6	6.49	1.5	14.7
Poland	38.0	5.45	1.0	6.4
Romania	23.0	4.12	0.1	11.2
OECD	824.8	14.64	3.5	14.4

Sources: PlanEcon, OECD

Up-to-date figures are in each former communist country evil. In the interim, national and hot war doubts (mainly former Soviet Union, Yugoslavia) or hidden domestic business war (Czecho-Slovakia) have grown about the ability of former Comecon countries to hold together as a political entity, while in each country is sharp internal disagreement over economic reform mess. Market principles are being forced hopping to reach West conditions of social level; but more urgently the social unbalance appears. Inside such common business and social environment is very hard work to disclosure the local engines of visible surface movements in all sectors.

Signals

They exist many different signals describing the reality, but its meaning is not understandable to the West analyst correctly. The meaning key seems to be a construction of goals to which the signal response, the history of meaning and the input facts. A significant example is visible national moving, which in majority means the wish of national community to participate on tax revenue only.

Signals arise in each relevant area - politics, economy, social, life environment, personal relation and ethic. For selection of relevant sources we have to set up the metrics which give us countable value of received signals. The simplest way is to count signals carrying the unexpected information only. For such method we need to determinate the term "unexpected". Supposing conceptual model the unexpected signal is signal correcting our model of clipped reality. For the west analyst there is a main problem to throw away their experience regarding former gaps among official announcements and its reality. Example: in former communist era all economic figures were out of shape by exchange rate depending of branch. Today East information bring no trouble with exchange rate to the West currency, but the same indicators has different meaning. Another example is environmental law, which is very strong, but in fact not valid or valid for selected persons only. Example: in city Prague acts "air pollution announcement" rejecting car traffic if more then half of installed measure equipments are over fixed threshold. But in fact majority of equipments were switched off due to its failure or missing money covering telecommunication lines connecting this measure equipments. Resulting this, no times the ignition of traffic rejection has been generated during the last 2 years despite the air pollution level had been at minimum 10 times higher as doubled threshold level.

Business information

In this situation practical difficulties in gathering business information have been significant. In the inverted world of eastern European economies, the indices normally considered those of failures are a perverse sign of success.

For example, balance of payments statistics mix up the current and capital accounts, because they account on a cash basis. Loans or support to state enterprises are counted as revenues, and figures are based on incorrect prices. The annual report and balance sheet of each enterprise is "secret" and in fact contains no part about stockholder equity and many non-true amounts. Typically term of products realization for calculation revenue is equal to the date when products are delivered into internal stock. Incomings are calculate in the amount of issued invoices neglecting outstanding payments. The reason for this is very simple - within planned economy each product must be taken over and paid. The turnover is calculated from invoices only and a part of delivery were no invoiced - the trade with insolvent enterprises is based as a barter. High profitability of a firm at present can, in fact, mean any of the following:

1. true high profitability

2. the firm is still producing in excess of what it can sell and is building up its stocks

3. the firm is selling its output and does not worry about whether it is likely to be paid for what it has sold.

4. the firm rejected list and consequencely the payment of received invoices using simple tricks (the mail is said not delivery supplier invoices, the list for bank settlement contains an erroneous supplier identification and bank response time is usually about 1 month etc.)

In many firms seems to be not stupid question, how many month they assume in 1992 due they started to invoice before regular delivery. We have a special term "a secondary insolvency" which means that the customer is not paying its debts (or amount delayed more then 6 month) because another customer is not paying to him. The business court is not deciding, because the validity of "bankruptcy law" had been postponed. The total amount of the "secondary insolvent" is estimated to 250 bn. Czech. crowns (about U.S. $ 9.6 bn). Comparing it with table above is not "unexpected" signal that 70 % of enterprises before privatization interfere in secondary insolvency. Stopping this is unpossible due to social disturbance and we continue to build the giant constructions like the Gabcik dam, the nuclear power station Temelin etc. In this situation the Czech and Slovak government search the solution in separating Czech and Slovak Republic in conjunction with increased taxes believing that tax revenue cover the local debts if the federal budget would not transfer the money from one republic to the second one in both direction. Of course, the rest of tax revenue should cover the new governmental post too.

Those signals are hidden in media sources. If we want to clip it, we need to monitor a large volume information and of course to deal with many rubbishes and duplicities.

Information products

Information products from the East seems to be schizophrenic. The list of "existing" sources is large. But the contents of information products is only a mirror of confused state. If we want to eliminate the duplicities, the best way is to clip informations sour-

ces covering all relevant fields. One of effective solution is to clip the agency service because it is produced in English and partial in German. Combining it with databases from host specialized to the East information (GENIOS, GBI) bring most of existing "unexpected" information. Why the agency services are better then monitor of newspapers? According my research in set of 10 most important Czech newspapers appears 5 % of messages provided by Czechoslovak Press Agency.

Services CSTK

Czechoslovak News Agency produce a full scale services covering all relevant areas.

THE CSTK NEWSWIRE - daily news coverage of events in Czechoslovakia available in English or German. Since November 1992 is spread via satellite EUTELSAT too.

DAILY NEWS AND PRESS SURVEY - a printed daily digest of CSTK newswire reports, with summaries of articles and editorials from the Czech and Slovak press.

ECOSERVICE - a daily English-language bulletin of Czechoslovak business and financial news, including coverage of legislative changes, geared to the needs of foreign investors and trading houses.

CSTK DATABANK - a complete file of recent events in Czechoslovakia. Part of this file is loaded in REUTER:FILE and Mead Data Centrals too.

Czech Newspapers

English speaking newspapers are:

- The Prague Post (weekly)
- Prague Business Week (weekly)
- Prognosis (biweekly).

German speaking newspapers are:

- Prager Zeitung (many changes in periodicity and form)
- Prager Wochenblatt (weekly).

Electronic databases for transboarder flow

Most of databases are not useable, because their providers use specific codes and rabies sources in good will to fulfil a plan, not to serve to users. The coding of Czech characters bring troubles, because there exists at minimum 4 different norms and each user should clear the conversion by themselves.

If the database reach the west quality it is always loaded in west host too. The leading host in Prague runs National Information Centre (NIS). Its orientation is to load the west databases and serve Czechoslovak users, but it contains the directory of Czechoslovak enterprises too.

Another new possibilities offer rapidly growing up Czechoslovak BBS (Bulletin Board Services). Up-to-date exists more then 10 BBS, but in fact it is one PC plugged with 2-4 dial-up input lines only. But INFIMA BBS contains the full text of Czechoslovak leading newspaper "Mlada Fronta" and BBS TRINET many statistical data from Statistical Office.

A special meaning bring a "negative database" produced by DATR Ltd., which collect the economic and ethics events differ from common sense of law and west economic and rules.

Conclusion

An acute and terrible paradox faces the providers of east informations products. State support and control disappeared. Domestic users are mostly broken and not solvent. Technology is not on the west level. Many little private enterprises wish to succeed in cooperation with west support. The political and economic changes in Eastern Europe are creating a wealth of new business opportunities, especially for subsidiaries of west information producer. Next year we will see who bridges the gap between up-to-date confused state and future market economy producing valuable and reliable information. In the business area one good effort provides the German Chamber of Commerce, which established inside Czech republic the locally distributed network of information nodes.

Information Support of the Process of Elimination of the Chernobyl Accident Effects

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No other catastrophe or natural calamity of the 20th century has such a disastrous effect on the ecology of a huge region, as well as the life and the health of dozens of millions of people as the Chernobyl NPS accident which took place on April 26, 1986. Moreover, the effects of this global catastrophe have told not only on Ukraine, Russia and Byelorussia but also on many other countries.

Therefore, the soonest possible elimination of the Chernobyl catastrophe effects is a most sophisticated scientific-and-technological, social, ecological, biomedical, and economic problem. However, the elimination of the accident effects is impossible without the necessary information and the creation of a comprehensive information support system.

The major components of the information support of the elimination of the Chernobyl disaster effects include the following:

- collection of information from the territory of the region which was exposed to direct radioactive contamination (information monitoring), its analysis, processing and working out of forecasts of the development of the processes in the given region;
- search of domestic and foreign information which can contribute to the elimination of the accident effects;
- working out of the section dealing with the information support for the National Program of the elimination of the Chernobyl accident effects;
- analysis of the available information resources, their synthetic processing and working out, on its basis, of forecasts of the elimination of the accident effects;
- transfer of information products and services to the customers: the state authority and administration bodies, the regional bodies of authority and administration, research institute (for conducting researches) and enterprises (for products manufacturing), which are engaged in the accident effects elimination.

Special attention was attached to the information support of such problems as the radiological situation and the environmental pathways of radionuclides; technological processes and equipment providing the removal of radioactive contamination from the soil and water; methods of monitoring of the radionuclides content in the environment; reduction of their content in foodstuffs and human organism.

Now we are in the process of creation of the national documentographic retrospective database on the ecological problems of nuclear power engineering. Today, this database includes 1.5 million original documents.

The above types of work have been carried out by the Ukrainian Institute of Scientific-and-Technical and Economic Information (UkrINTEI). This is a major generator of information, the nuclear power engineering problems included. Since 1984, it has been the Ukraine's center at INFOTERRA, the International environmental information system (with its headquarters in Nairobi, Kenya).

It was in the initial period of the elimination of the Chernobyl catastrophe effects that, assisted by INFOTERRA, the national centers of Germany, Great Britain, India provided the most needed information materials on the elimination of radioactive contamination of the territory of Ukraine.

At present, the required information concerning the elimination of the Chernobyl accident effects is much scattered not only in Ukraine but also in other countries of the world, and is contained in thousands of different sources. That is why the search of such information is a complicated and costly problem. Taking into consideration the global nature of the Chernobyl catastrophe, it is expedient to create, within INFOTERRA, a unified database on the problems of elimination of such effects. This database must be integrated, i.e. it must include all kinds of information (scientific-and-technical, ecological, social, biological medical, economic) required for the elimination of the Chernobyl catastrophe effects.

User Services in the Central Library of Juelich Research Center

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1 Jülich Research Center and its Central Library

Jülich Research Center (KFA) is one of 16 German national research centers. The center is financed by the Federal Republic of Germany (90%) and the state of North-Rhine Westfalia (10%). KFA has 4.700 employees, 1.000 of whom are scientists. The research and development activities are concentrated on basic research and technical development in the following fields:

* materials science, solid state research
* basic research in information technology
* environmental sciences, biotechnology, medical sciences
* energy research, energy technology
* nuclear fusion
* basic research in nuclear science
* interdisciplinary research in systems and methods

Interdisciplinary cooperation is a basic concept of the KFA research program. The KFA research facilities are used by universities and research centers from all over the world. Many KFA scientists teach at universities or polytechnics, which promotes the scientific discourse with academic research. (In this context I should mention the Jülich model: directors of KFA research institutes are appointed institute director and university professor). Also, KFA has several industrial partners.

The central library is a sci/tech special library providing information for the KFA researchers and staff.
The library has a large collection of sci/tech materials to meet the information demands of the KFA employees and over 3.000 external users. Among the outside users are students from the universities and polytechnics of the region Aachen, Cologne, Düsseldorf, and industry. The library acquires about 8.000 volumes per year and subsribes to 2000 journals. Apart from the

classical library tasks the library has some special functions: it does a customized press service, it manages and distributes the KFA publications, and it creates an electronic bibliography of the KFA scientists' publications.

2 Information technologies

The central library extensively uses information technology. The library has an integrated online library and information system, which organizes the following processes:

* document ordering from book dealers and information suppliers
* bibliographic description and subject description
* Online Public Access Catalog (OPAC)
* library holdings and reference services
* circulation
* administration of transactions with exchange partners
* interlibrary loan

The center of the system is DOMESTIC, a commercial software package from KTS Information Systems. DOMESTIC is a mainframe system which predominantly operates on IBM mainframes under MVS and the transaction system CICS (these are also IBM developments).
In the Jülich research center DOMESTIC operates on one of the large IBM ES9000-620 mainframes. Presently access to the database is possible from 45 terminals (IBM 3179/3179 G; 3192/3192 G) and PCs (PS2/IBM-Emulation 3270) in the library.
In November 1992 access will be possible from the research institutes as well. Access from outside the KFA is possible through different networks (DFN, Internet).

The outline of the technical situation should have made obvious that the library has gone beyond the automation of internal library operations. The library offers its complete catalog in electronic form. The catalog records contain extensive subject descriptions.
The retrieval software offers the following search options:

* search mode: command mode
* search for keywords and descriptors with Boolean operators
* indirect search through linear browsing of subject headings, descriptors and indexed keywords
* search for conference dates

* different show formats; search request/show and browse/view
* possibility to save and print search results
* possibility to sort search results
* display of search history
* error messages
* help functions

The OPAC does not, however, allow truncation; the help function is limited.
The library staff and customers use DOMESTIC extensively, none the less it is not yet an efficient self service information system for the occasional user.

Beyond the catalog the library offers access to a spectrum of electronic information sources:
* access to articles in sci/tech journals and periodicals through *Current Contents on diskette* with abstracts (Institute for Scientific Information)
* CD-ROMs (among others *Science Citation Index* and *INSPEC*)
* bibliography of KFA publications
* online access to several national research centers' library catalogs
* commercial online databases

Access to information is more important than possessing the materials. This is crucial because the library must react flexibly to demands of project groups and shifts of emphasis in research fields. Interlibrary loan and document supply from commercial vendors are part of the concept.

The central library uses the catalog data of the regional library network in COM-format. An online access and the purchase of the CD-ROM are being discussed.

3 User-oriented information services

The library offers highly user-oriented services.
The library is part of the research center's infrastructure and can react flexibly to local changes. Mass user service is the exception, and we are aware that this is a privilege. Students from the regional universities and polytechnics, as well as graduate and doctoral students who work in the research center for a longer period of time, use the library extensively. The library's services benefit the library's users; this means a high responsiveness to the users' information needs and a willingness to customize the information products and services to meet these needs.

On the other hand, products and services which are no longer useful need to be eliminated. The central library has taken several steps to manage the information flood through professional service. The researchers are being assisted in navigating the OPAC and the other electronic information sources.
This is crucial, since we do not have an integrated user interface, and the different information sources must be searched with different retrieval languages. We are using the following approach for user training and information:

* The reference librarians give instruction on the use of the online catalog and the other electronic sources in an informal way.

* The librarians help the users to identify search problems, to interpret search results and to reformulate search questions.

* The librarians hold formal online training sessions in German and for foreign guest researchers in English.
  These sessions concentrate on teaching knowledge of the DOMESTIC system as well as the general ability to formulate information search strategies in databases.

* The researchers are being assisted in choosing relevant information sources and in finding useful information from the vast amount of available information.

The reference librarians are continually improving their knowledge of information sources and technologies. Also, the workflow is being investigated as to whether it allows an optimal use of these technologies. In this context it has become obvious that the information desk is not always the ideal place for reference services. The users do not always have the time to formulate their information needs; the librarians do not always have the time to fully analyse questions on the spot. The library has begun to change the information services structure, i.e. the organization of information services. We offer to treat more complex questions in the office and to present the result later.

The reference team receives support from the subject specialists, who are scientists; they answer subject-related questions and they perform online searches in commercial databases.

The development of interactive communication systems with microcomputers created new possibilities and new challenges for information services. The traditional reference desk loses its importance. Instead, the demands on reference librarians in the area of electronic information services increase. The reference librarians increasingly become information

specialists who assist the scientists in finding relevant information from the vast reservoir of available information.
In the near future it will become increasingly necessary to process and present information according to the scientists' needs. Increasingly this will be done with the help of software.

The goal of all efforts to optimize the library and information services is not more library automation but a redesigning of the scientific communication process. Electronic communication is the scientists' workstyle, they use PCs for a large part of their routine jobs.

The integration of new technologies takes place not only to rationalize internal procedures but to improve user services. The goal of library automation cannot be improved efficiency alone (to do the same things faster); it must go beyond technical questions.
Library automation offers the chance to rethink traditional services, to identify new services and new responsibilities for libraries and librarians.

The first step towards integrated library automation was the online catalog. With the success of the online catalog came great user expectations. These expectations concerned improved access to the OPAC: users want to search abstracts and tables of contents in addition to bibliographic descriptions and subject descriptions. They also demand electronic access to articles in journals and periodicals. Once the scientists can search the online catalog from their desks, they demand more services from the library:

* online ordering of library materials from their desk or lab;

* the possibility to download search results on the PC;

* the possibility to create personal bibliographies with annotations;

* the possibility to communicate with the library through e-mail and to receive and transmit information electronically.

Further, users demand access to commercial online databases. The library catalog cannot meet all user needs. Also, bibliographic information alone does not satisfy the users.
Our users want the information itself, possibly as full text. The desire for better access to full text databases is being increased by the possibility to locate materials in bibliographic databases. Efforts to meet the user needs for full texts will be very important in the years to come.

An adequate response to these desires includes a reexamination of library concepts as well as an extension of the classical spectrum of library tasks.

4 Summary

I would like to summarize the most important aspects of an information system (technology and services) in a research institution:

* There must be an integrated library system with powerful administrative functions.

* The online public access catalog must have extensive retrieval functions and desirably two search modi: a lay mode for beginners and occasional users (with a menu) and an expert mode (command mode).
  Subject searching must be possible.

* Access to remote library catalogs and regional networks must be possible.

* Access to articles in journals and periodicals in electronic format must be possible (locally mounted commercial databases, CD-ROM databases, external online databases). It is desirable that all of these are offered under an integrated user interface.

* Full text storage and retrieval including graphics and images must be possible (external full text databases, full text databases on CD-ROM, internal full text databases).

* Electronic communication between the library and its customers (document ordering and transmission of full texts) must be possible.

* All investments in technology must be accompanied by adequate information services. These services include the selection of relevant databases, navigation in databases, downloading, processing, and presentation of information; this will increasingly be done with the help of software.

* With the growing importance of library networks a large part of traditional library functions will be acquired as outside services. A shift from traditional services to electronic information services is taking place.

Activities of the EC in the Information Services Market

P. Müller
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I welcome this opportunity to address you on behalf of Directorate-General XIII/E of the Commission of the European Communities and to provide some details of the main EC initiatives which have an impact on the information services market. After some general comments I shall explain the role of the CEC in this area. I shall then outline the objectives and scope of the main phase of the IMPACT programme. Activities described within the framework of the programme's action lines will help to indicate how the European Community is addressing the present situation. Some indication will be given of the future direction which the programme will take in efforts to overcome the barriers confronting the European information services industry.

Introduction

In today's business world companies and individuals generate and collect every day a most valuable resource - information. This vital asset, if properly managed, can be used effectively to increase staff skills, make better decisions, open up new areas of business and gain a strategic advantage over the competition. Intelligent enterprises will succeed - enterprises that are prepared to invest in keeping themselves informed. In a global context EC companies must strengthen their position in the world market by remaining competitive. This means having access to comprehensive, relevant, up-to-date and readily accessible sources of information on the various areas which affect decision-making. Information systems have assumed a much greater corporate importance in many organisations in recent years, yet many executives still need to be persuaded of the benefits to be derived from the use of information systems and services. A very definite need continues to exist for an increased awareness of the information services available and of the means by which they can be accessed.

For the success of the Single European Market as a unified economic and social area, it is essential for Europeans to increase their efforts to communicate effectively and quickly. Furthermore, not only is the effective use of information vital for the economic success and competitiveness of the European Community, but the EC information industry, as both a net exporter and a major employer, is potentially a major economic sector in its own right.

The Role of the CEC

Against such a background the Commission of the European Communities (CEC) has an active role to play in encouraging and stimulating the transition currently taking place in the information industry - a transition reflected in the shift from a service-oriented to an information-oriented society and from a market dominated by technology to one driven by applications, where the role of the user dominates that of the supplier.

Within the CEC, DG XIII - the Directorate-General for telecommunications, information industries and innovation - is in an appropriate position to perform the role of catalyst, as its programmes, co-ordinated in Brussels and Luxembourg, cover the key elements of the transition process: information, communications and new information technologies. Not only does the Commission stimulate the development of the technologies involved, it also endeavours to promote the use of the modern information services to which they are intrinsic.

Projects undertaken under programmes such as ESPRIT and RACE have made it possible to strengthen the technological basis of the EC information and communication technology industry. Within the framework of the DRIVE, DELTA and AIM programmes the European Commission has catalysed the development of applications based on results of Community technological research.

The IMPACT (Information Market Policy Actions) Programme

Whereas the programmes I have been referring to in discussing the role of the European Commission may be classed as technology driven, the IMPACT programme - which comes under the direct responsibility of DG XIII/E in Luxembourg - aims at developing the market for information services in Europe, and at improving the competitiveness of EC business by promoting the use of advanced information services. Let me at this point provide some background. On 26 July 1988 the Council of Ministers approved an action plan for the years 1989-1990 to promote the development of the European Community information services market. In this introductory phase, known as IMPACT 1, two complementary approaches were adopted: on the one hand, a continuous effort to improve the market conditions and to promote the use of modern information services, and on the other hand the launching of large-scale pilot and demonstration projects capable of exerting a multiplier effect on the development of the market.

In view of the initial success of IMPACT 1 and the need to continue to encourage the development of the Community's information services market, the Council of Ministers adopted IMPACT 2 on 12 December 1991. This main phase of the programme will run from 1991-1995 with a budget of ECU 64 million. Its objectives may be expressed as follows:

1 To establish an internal market for information services;

2 to identify the strengths and weaknesses of information services available in the European Community and to stimulate and reinforce the competitiveness of EC suppliers of information services;

3 to promote the use of advanced information services;

4 to reinforce joint efforts to achieve a unified Community policy with regard to information services, giving particular attention to small and medium-sized enterprises (SMEs), to the disparities between different regions and the less advanced state of development of the less favoured regions (LFRs);

5 to exploit the results provided by other national and Community programmes with the aim of strengthening the EC information services market.

IMPACT 2 will build on and extend the work of IMPACT 1. To identify appropriate concrete actions for implementation in this main phase, all major EC information-related organisations were consulted. In response to industry's request, the programme's scope has been widened in terms of its four action lines, which may be summed up as:

1 Improving the understanding of the market

2 Overcoming legal and administrative barriers

3 Increasing user-friendliness and improving information literacy

4 Supporting strategic information initiatives.

Throughout the range of activities undertaken, an effort will be made to give increased attention to the needs of information users, provide easier access to information services, and improve awareness of the availability and scope of such services. Accessibility to services on a European-wide basis will be encouraged.

IMPACT 2 aims to respond flexibly to the emerging needs of the changing market, and will work at a strategic level to ensure that the market for information services is nurtured and developed in the best interest of the entire Community. In doing so, special attention will be devoted, as stated in the objectives, to the requirements of less favoured regions and small and medium-sized enterprises.

As a user-driven programme, IMPACT 2 will not devote its efforts or funds to research and development, though existing and developing technologies will obviously play an important role. In its aim to develop the market and to create interfaces for interaction with market actors, it will try to build on the expertise and achievements of other Community programmes.

Certain problems are encountered in addressing the development of the European information services market. Its diversity is an inescapable fact - not only the diversity that exists in terms of the level of information literacy in the various Member States, but diversity of administrative and billing practices, diversity of languages, diversity of standards, and disparities in the level of technology and quality of services available. Differing technical, legal and administrative requirements often create barriers to trouble-free transfer of and access to information on a European scale. A theme central to IMPACT 2 will therefore be the improvement of accessibility of information at the European level for all concerned.

The role assumed by the European Community in channelling the programme in this direction will be of the nature of stimulator rather than actor. It should be feasible to effect stimulation of the market on a shared-cost basis by cooperating closely with industry and with national governments. Where appropriate, partnerships will be formed which make it possible to capitalise on existing expertise. An important element will be the "networking" of relevant organisations and individuals in an effort to help the industry and the user to help themselves. The Community can undoubtedly go some way towards catalysing and coordinating activities aimed at developing the EC information services market in terms of information services provided as well as awareness of and access to these services. It can provide a platform for discussion aimed at accelerating the development of an information culture. However, strong market involvement and support will be a prerequisite for success. Maintaining a continuous dialogue with the principal actors in the information market is crucial. In addition, cooperation with all Member States will be essential to the successful achievement of the programme's objectives.

IMPACT 2 Action Lines in Greater Detail

Action Line 1 - Improving the understanding of the market - will help to identify the areas where there is a potential demand for information services, and the types of services that could be made available. It will also assist in pinpointing areas where accessibility of information can be improved. Four themes will characterise the activities of the Commission's Information Market Observatory (IMO), namely improving the knowledge of the market by collecting and analysing market data; analysing the competitive strengths and weaknesses of the EC information industry; analysing the social and economic impact of information; and ensuring wide dissemination of IMO results.

By way of example, I shall mention some of the work that will be carried out. Monitoring activities, initiated during IMPACT 1, will be continued. Only by comparison of data over a period of time can longer-term trends and developments be identified and the

collection of statistics become meaningful. Emphasis will be given to analysing the user/demand side by means of user surveys. These will help to identify the means by which users access the professional information they need and to highlight the gaps requiring Community initiatives. Analysis will also be undertaken of the supply side. In addition, the IMO will endeavour to increase its knowledge base concerning the world market by comparing EC, Japanese and American initiatives relating to production and distribution of information services.

In today's society electronic information and its use are becoming an integral part of economic, social and political life. It is intended, therefore, to study the role of information in the economy and in society through work in the field of information science. This will begin with a preparatory study on priority subject areas and, it is hoped, an early study on organisational efficiency and the use of information.

Improved knowledge of the market and likely trends, when transferred to the industry, should help to stimulate investment by private market actors. In this context, wider dissemination of IMO findings in general, through trade associations and commercial channels where possible, will be encouraged. Strategic studies will be undertaken, for example one on new opportunities for publishers in the EC information services market. Sectoral analysis surveys will aim to assess Europe's performance in specific information market sectors which will be identified.

Action Line 2 - Overcoming legal and administrative barriers - will focus on creating a comprehensive legal framework for information services, crucial for the development of the market at EC level. The contribution of the Legal Advisory Board (LAB), set up in 1986, should go some way towards making the situation easier for information services to be made available to the user and to be accessed by the user, with the minimum of legal and administrative barriers encountered by both supplier and user in the process. Many of the legal issues affecting the development of the information services market (such as intellectual property, data privacy, liability, authentication of electronic signatures) have been found to have implications extending beyond the scope of the IMPACT programme. The expertise of the LAB, as a key advisory group, will continue to be called upon where appropriate in horizontal legal issues within the framework of other Community programmes. It is planned to strengthen the expertise and documentation resources of the LAB secretariat in order to provide Member States and Community institutions with easier access to current information in this area. More stable two-way links are being developed between market actors and the LAB, with efforts made to exploit synergies outside DG XIII.

Present initiatives are concentrating on the following main areas among others: personal data protection; legal protection of databases; synergy between the public and private sectors in the information market. A few examples may be of interest. Regarding personal data protection, the application of data privacy principles in relation to the provision of electronic information services will be monitored and the drawing up of European codes of conduct encouraged. Elsewhere efforts will be made to establish Community guidelines to harmonise the conditions for opening up electronic information services to the public. The Commission is, for instance, supporting the drafting of guidelines by the audiotex industry, while, at the request of certain national telecommunications organisations, the LAB will discuss the legal problems impeding the establishment of pan-European videotex services. In an attempt to overcome administrative barriers, it is hoped that useful discussions can be conducted with the relevant bodies in efforts to reduce the problems associated with inconsistent administration and billing procedures.

The setting up of a database on information and informatics law is envisaged. Finally, of extreme importance in all areas of activity is the wide dissemination of the results of the LAB's work.

Action Line 3 - Increasing user-friendliness and improving information literacy - is best explained by considering its two related aspects in turn. First, increasing user-friendliness (or **Info Euro Access from the user side**). The objective of the Info Euro Access concept, which, if proven feasible, would involve coordination of activities by a number of Community programmes, is to enable European-wide access to electronic information services from one central access point with one piece of equipment, based on the principle of "one-stop shopping, one-stop billing". Efforts to increase the user-friendliness of information systems will involve the promotion of open technical standards and the improvement of access and presentation so that information can be delivered on time and in a readily usable form. IMPACT 2 addresses this aspect of the European market with two action areas: Open Information Interchange (OII) and interaction with market actors.

The advent of higher bandwidth telecommunication networks and the introduction of inexpensive mass storage optical media will stimulate the development of multimedia information products in the near future. The OII initiative can be seen as a framework for the application of the basic existing standards for coding text, pictures, sound, video and document structure, which will increase in importance for the development of multimedia systems. As the application of norms and standards will gain in significance with the imminent higher volume of transborder activity after 1992, the Commission aims to stimulate the standardisation

process, instigate cooperative efforts towards standardisation, as well as increase awareness of and encourage the application of existing standards.

The main participants in information interchange are information providers, software developers, standards makers and, of course, end users. Successful interchange is possible only if all of these groups are aware of the problems and agree to apply the solutions that are available. The CEC's role of catalyst in this domain will include the creation of discussion platforms and regular interaction with market actors to facilitate the examination of common problems and needs in given sectors. Coordination actions will be supported by the development of a reference model for information coding standards. Priority will be given to establishing guidelines for the use of image standards, developing a model for document layout objects and discussing progress in work being undertaken on hypermedia/multimedia standards.

Let me now deal with the second part of this action line. This has the objective of improving information awareness and hence increasing the use of electronic information services for professional purposes, which in Europe continues to be rather low. The Commission is therefore initiating a schedule of appropriate activities. In this context European Commission experts are involved in four key areas, namely the creation and management of an "information awareness network", support for users and providers of information services using ECHO as an instrument, information exchange with the market-place, and training of intermediaries and information brokers especially in less favoured regions (LFRs).

I shall outline some of the activities that will be undertaken. These include awareness campaigns based on a network of national partners, and the preparation of appropriate material in all Community languages for distribution and use by these partners. Starting with the existing national focal points (NFPs), a network of national multipliers is being created. This will enable the responsibility for awareness training to shift to Member States, with central support provided by the Commission. Such an approach is geared towards avoiding the increasing disparities between Member States.

In terms of user support, Commission experts are involved in the production and maintenance of electronic and printed directories available in the nine Community languages. For example, the I'M-Guide is an inventory of European electronic information services (online, CD-ROM, CD-I, gateways, etc), while the Experts Guide contains a listing of persons and organisations with specific knowledge of the electronic information services market.

Support for users and providers of information services also encompasses tests of databases in a neutral environment, provision of an online service with menu interfaces to support new users and the availability of the CCL-TRAIN database as a training tool for

familiarisation with the Common Command Language (CCL). A EC-wide free phone help desk service is also operated, with answers to enquiries available in all Community languages.

It is hoped in early 1993 to start implementing training courses of 2-3 weeks' duration for intermediaries and information brokers in less favoured regions. These will be designed to cater for the specific needs of the participants and should lead to an increased consultation of private sector information services through the intermediaries, both for their own purposes and for the benefit of the end-users from small and medium-sized enterprises with whom they are in contact.

Action Line 4 - Supporting strategic information initiatives (or **Info Euro Access from the industry side**) - addresses the situation whereby the European information industry needs to confront new market challenges in order to establish a capability for information supply in the face of growing external competition. In support of this, Community action is required to stimulate cooperative ventures across national boundaries to share resources, expertise and development effort. As high-risk investment is involved, this is particularly critical for small and medium-sized enterprises.

User access in Europe continues to be characterised by fragmentation of information supply through different hosts, languages, regulations and administrations. Action is needed, therefore, to improve European-wide access. Moreover, it is vital to ensure the increased involvement of the less favoured regions in the EC information market.

The first phase of the IMPACT programme featured a small number of large-scale pilot and demonstration projects to stimulate growth in specific areas. By contrast, IMPACT 2 projects will focus mainly on coordination and interaction with industry actors to catalyse developments in improving user access to information, wider application of standards and extension of the information industry to the LFRs. Improved cooperation between European suppliers will be necessary and services will be developed that build on the results of earlier research in expert systems, man-machine interfacing, the treatment of natural language, and universal access facilities at European level.

Cooperation with market actors will extend to a number of areas where challenges and opportunities for new developments are emerging from economic and technological changes such as the Single Market, advances in multimedia technology and geographical information systems (GIS). If the European Community neglects to take the initiative in stimulating a coordinated approach to such questions, fragmentation of activities will leave the EC market vulnerable to penetration by external actors.

The limited budgetary resources of IMPACT 2 dictate a focusing on areas which contribute towards stimulating the improvement of European-wide access to information (Info

Euro Access) from the industry or supplier side. As preliminary investigation has shown that there are considerable legal, technical and commercial difficulties involved, 1992 activities will concentrate on assessing the feasibility of specific actions and establishing adequate specification of requirements.

Attention will also focus on the areas of interactive multimedia information, a networked multimedia laboratory, scientific and technical information (STI), improving access to non-EC information sources such as Japanese databases, and geographical information systems. Preparatory activity during 1992 is expected to be followed up in 1993 with support for concrete projects to demonstrate practical solutions to the problems revealed and to catalyse further developments.

Support actions for less favoured regions will aim to guarantee the participation of organisations located in these regions in information services market development. First steps have been taken by supporting the setting up of national focal points and by implementing a partnership database. This will be supplemented by specific initiatives to stimulate international cooperation in information projects, the organisation of IMPACT Information Days, ongoing coordination with related Community Structural Fund (CSF) programmes and the training activities mentioned under Action Line 3.

Efforts to Overcome Barriers

With regard to ensuring that accessibility to information and information services on a European scale is as user-friendly as possible, the question of the legal, administrative and technical barriers to be overcome has been touched on in earlier parts of my presentation. In the European Community context, however, another significant barrier exists - the language barrier, a problem posed by the multilingualism of Europe. With nine different languages involved in the present Community of 12 Member States and an inevitable increase as additional countries are accepted for membership in future years, the need to facilitate communication in order to carry out efficient business and, indeed, social interactions is a very real one. Consider, for example, that, in the current scenario, translation *from* all Community languages *into* all the other Community languages involves a total of 72 language pairs!

It is relevant at this point to outline briefly what we have been doing in this area to date. The Commission of the European Communities has been active in the field of machine translation since 1976 with the Systran project. Since 1982, it has engaged with Eurotra in a more ambitious research and development project in computational linguistics. In 1991, these activities were complemented by a new research and development programme in Linguistic Research and Engineering (LRE). Under the ESPRIT programme, a number of projects

tackled the problems raised by the treatment of natural language, analysis and voice synthesis, some of the results being used in projects carried out within the framework of the IMPACT programme. Such relations between programmes are highly important.

It is clear that fragmented efforts, however useful, are no longer adequate. The introduction of a coherent Community strategy aimed at strengthening Europe's position in this sector is essential. With regard to overcoming language barriers in relation to the communication of transborder information, the Commission is in the process of revising its strategy. In 1992 a coherent plan will be proposed in the field of multilingualism and natural language processing. DG XIII will play a key role in the development and implementation of the strategy adopted.

Among major considerations are the economic benefits in terms of productivity increase which could be achieved in all economy sectors as pan-European communications are facilitated by means of European-wide accessibility of information. However, the other crucially important factor to be borne in mind is the need to preserve the cultural diversity which is a truly valuable asset of the European Community and, indeed, the European continent.

Conclusion

A certain threat to the unity of the European Community is implicit in the different rate of development of electronic information services. For Europe to remain competitive in the world market, as I stated at the outset, it is essential for Europeans to increase their efforts to communicate effectively and quickly. Continually developing information services can provide the key to economic competitiveness by facilitating easy, fast communication, providing the ability to exchange all kinds of data and have rapid access to pan-European information services. The turnover of information services in Europe is growing by 25% annually; the number of direct participants is increasing. Yet the level of activity remains at only half that of the US level. This is partly attributable to the problems of our fragmented market, in which technical, legal, language and tariff barriers tend to obstruct the free movement of information.

In addressing these problems, the IMPACT programme has as its goal the creation of a truly integrated European information services market. The 1990s will witness the emergence of new applications and of innovative information services whose developments we can scarcely predict. The Commission aims to assist in promoting the uptake and use of the technologies and services involved. With the cooperation of the various Member States and by means of open and continuous dialogue with all actors in the information market, it is

convinced that Europe will be ready to meet the challenges that lie ahead, and to enjoy a healthy share of the world market of 100 billion ECU forecast for the overall electronic information services industry for the year 2000.

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The Bulgarian Central Institute for Scientific and Technical Information and its Services

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Allow me to represent the biggest Bulgarian institution for specialized information, namely the Central Institute for Scientific and Technical Information (abbreviated CINTI in Bulgarian) in Sofia, established in 1959.

Its main task is to support the technological development and the governmental promotion of the Bulgarian industry with actual and relevant informations about state, experiences and achievements of the leading industrialized countries in the following fields:

- Restructuring of the indsutry according to the economic, social and ecological conditions, requirements and trends;
- Financial and economic governmental regulation of the industrial development;
- Technological innovations in the industrial production;
- Environmental protection including problems of nuclear power stations safety;
- International markets of industrial products;
- Organization and achievements of R&D.

At the same time CINTI collects and disseminates jointly with other organizations information about Bulgarian industrial production, restructuring and investment projects and technological aspects (existing production capacities and needs) regarding Bulgarian industrial enterprises.

Main functions

To comply with the above-stated tasks CINTI performs the following functions:

1. Collection and cataloguing of unique for Bulgaria foreign literature and other sources of scientific, technological and industrial information, which are open to the public.

2. Elaboration of analytical reviewing and prognostic informations for the international top achievements, state of industry and trends in its development.

3. Set-up and maintenance of own databases and telecommunication access to leading foreign hosts, providing industrial, economic and scientific databases.

CINTI is producer of the following databases:

- "HORIZON": provides bibliographical information and abstracts of publications about scientific, technologic and economic developments of the leading industrialized countries to support the strategic management of Bulgarian industry;
- "SIRENA" (meaning as well "Mermaid" in Bulgarian): contains information about (completed as well as continuing) R&D projects in Bulgaria for new technologies and equipment. Goal of this database is to promote the wider practical application of the achieved results in R&D.
- "KATALOG": with online available bibliographical data about CINTI information resources - scientific literature, specialized periodicals, dissertations, company publications, translations and others.

The telecommunication access from and to the CINTI host can be realized in several ways:

- per direct leased line connected to the host´s communication controller IBM 3705. The possible data transfer rate ranges from 300 to 4800 bps.
- via dial-up phone lines - the recommended data transfer rates are 300 to 2400 bps.
- by the use of the data network DATEX-P and further per Bulgarian packet-switched public data network BULPAK according to CCITT Recommendations.

Further functions of CINTI are:

4. Providing of information services by branch offices covering the whole country and research on users´ demands and wishes.

5. Participation in international organizations, conferences and projects concerned with the development of specialized information services.

Organizational structure

The above-stated functions are performed by the following organizational units of CINTI:

1. Automated Information Centre (to be enlarged in future to National Centre for Automated Information Exchange). The centre is responsible for: maintenance of computer hardware and software for operation of databases, offered by CINTI (the self-produced as well as some exterior such as BIOSIS, INIS, INSPEC, COMPENDEX, BIOBUSINESS and others, received on magnetic tapes); providing of telecommunication access to foreign hosts (DIALOG, STN, DATASTAR, QUESTEL, PERGAMON INFOLINE, SDC ORBIT, DERWENT, CISI WHARTON, VINITI, ICSTI, ECHO); providing of telecommunication services such as E-mail, bulletin-boards and others; development and delivery of modern technology and software for automated information systems; providing of automated information services (retrospective searches, selective information dissemination). The centre exists since 1974, is equipped with a mainframe computer IBM 4381 (Model P14) and has very experienced staff.

2. Central Scientific and Technical Library: possesses and makes available to numerous users rich and in many cases unique for Bulgaria stock of scientific and technical literature: patent specifications (more than 15 millions), dissertations, conference proceedings, specialized books and periodicals, translations in Bulgarian, reference books, company publications and others.

3. Unit for Information Services (comprising actually three divisions - for analytical information and reviews, for specialized industrial information and for complex services): elaborates (mainly on request) by analytical processing of the relevant sources various information products such as state-of-the-art reports, translations, comparative data tables, bibliographical references and others. This unit is preparing also abstracts for CINTI´s own databases and bulletins.

CINTI has moreover own printing office.

Major problems

Nowadays the biggest problem of CINTI is the financing of its activities. Since its founding the institute was always fully subsidized by the government, although since the introduction in 1983 of paid information services a part of expenditures (at most 15-20%) was covered by revenues from information products and services (these revenues were entirely returned to the public treasury). Since April 1991 CINTI is however no more fully subsidized by the government and has to make living by its own income, receiving subventions to the amount of no more than 50% of its budget. In consequence of the strong diminution of information demand in Bulgaria resulting from the actual economic crisis our revenues from information services decreased vastly (especially considering the inflation) and are not at all sufficient for the normal function of the institute in this difficult transition time. Moreover the procurement costs for foreign literature and databases increased several times with the introduction of unfavourable floating exchange rate for the Bulgarian currency (lev). For that reasons the CINTI management has proposed to the superior institution (that is the Ministry for Industry) the renewal of the institute financing entirely by the government as the only possible way for its survival. At the same time is foreseen an considerable staff reduction (by more than 50%) considering the actual decreased information demand and the difficulties of the public treasure.

Another major problem of CINTI is the insufficient modern information equipment: the personal computers are scarce and CD-ROM players are still not available.

Future development

For the near future the implementation of the following projects is foreseen:

1. Development and implementation of national online catalogue, covering all big Bulgarian libraries.

2. Set-up of GEONET network´s telecommunication node in Bulgaria by joint-venture.

3. Introduction of consulting services about:

   - opportunities for selling of Bulgarian products on international markets
   - utilization of information resources and application of modern information technology in restructuring and technological development of Bulgarian industry.

4. Set-up and operation of databases about Bulgarian industrial enterprises to be privatized as well as about companies, looking for partnership with foreign enterprises.

The CINTI´s management is looking for co-operation with interested foreign organizations to implement the above-stated projects.

Information products and services on environmental protection and nuclear safety

In these fields CINTI offers automated information services:

retrospective searches on request and selective information dissemination by various databases - mainly INIS, BIOSIS and the Bulgarian database "Horizon".

CINTI is producing the bulletin "Environmental protection", containing abstracts in Bulgarian of important foreign publications. On users´request are provided alo state-of-the-art reviews, bibliographical references, translations and another information products.

Moreover CINTI is participating in the international system NUKENET. The institute is collecting (by contributors in the nuclear power station "Kozloduy" and from another sources) information on development and problems of the Bulgarian nuclear power industry (including problems of safety, radiation and environmental protection). This information is disseminated amongst the NUKENET subscribers per Fax.

Information Management in Nuclear Safety, Radiation Protection and Environmental Protection
The Nuclear Energy Agency of OECD (NEA)

D. Menke
OECD, Bonn, on behalf of NEA, Paris

PART ONE

OUTLINE OF THE NEA INFORMATION PROGRAMME

BACKGROUND

In spite of the fact that today some 450 nuclear power plants meet 17 % of the electricity requirements worldwide (23 % in the OECD area), there is still a general problem of confidence in the general public and political circles regarding nuclear power, notably the safety of nuclear plants, the economic viability of the nuclear power programmes, and the ability of the scientific and technical community to manage radioactive waste.

Public understanding and acceptance problems continue to affect to varying degrees national nuclear power plans and programmes in many countries, sometimes with serious potential consequences for the overall energy situation of those countries.

Because nuclear energy has largely become a societal issue, the need for the nuclear community to bridge the communication gap and offer transparency in its activities so as to be more readily understood and accepted both by the public and by decision-makers is more and more widely acknowledged.

THE ROLE OF THE NEA IN THE FIELD OF INFORMATION

The role of the NEA in the field of information on nuclear power has traditionally had to reconcile different factors such as:

1) the provisions of its statute ("to further the development of the production and uses of nuclear energy for peaceful purposes ...");

2) the diversity of attitudes about nuclear power held by its Member governments;

3) and the evolution of the nuclear debate itself (in particular, in the light of the perceived threats and benefits to man and the environment of various forms of energy production).

Given these different factors, the role of NEA in this field is to serve as an authoritative and objective source of information in major areas of interest, such as nuclear power safety and regulation, technology and economic assessments, scientific matters, legal aspects, through which nuclear power issues can be accurately evaluated and overcome using international co-operation.

The audience to which the NEA's information activities are addressed includes, in addition to Member governments, the press, industry, labour and other professional groups and parliamentary circles where the role of nuclear energy is being evaluated or debated, and where public opinion is being formed. The NEA's role is not to communicate directly with the general public in its Member countries and should not appear to come between the national government and its public. Within its membership, there is an increasing sensitivity to any "promotional" attitude, particularly where communication with the public is concerned. Taking this sensitivity into account is an important requirement in shaping up NEA activities in the public information field.

THE STRUCTURE OF THE PROGRAMME

The current NEA programme in the field of information and communication can be categorised under four main headings:

I. GIVING VISIBILITY TO THE NUCLEAR ENERGY AGENCY

This involves the publication and dissemination of brochures introducing the NEA programmes and R&D projects, the annual Activity Report, the semi-annual Newsletter and various other information booklets. These publications are distributed free of charge by means of the NEA mailing list, which includes representative selections of those who form public opinion or have a particular interest in nuclear energy.

II. PUBLICISING THE AGENCY'S RESULTS

The Nuclear Energy Agency runs an important programme of publications which are based on the numerous specialised programmes carried out by its technical committees. Effort is being made to ensure that these reports, even those written primarily for experts, are attractively presented and contain clear and concise executive summaries intended for non-specialists.

More recently, the NEA is placing emphasis on the preparation of reports of general interest, intended to distill the results of the Agency's programme in a suitably simple language, for the decision-makers and opinion-formers. A first such report was published in 1990 under the title "Nuclear Energy in Perspective". Two others will be published by the end of 1992, respectively "Achieving Nuclear Safety: Improvements in Reactor Safety Design and Operation" and "Economics and Technology of Nuclear Energy". A further report on "Radioactive Waste Management in Perspective" will be prepared for publication in 1993.

A series of Issue Briefs has also been introduced giving non-technical readers a four-page summary of essential information on a specific nuclear power topic. Issue Briefs have been prepared thus far on Nuclear Plant Decommissioning, the Role of the Human Factor, Dispo-

sal of High-Level Waste, Disposal of Low- and Intermediate-Level Waste, Nuclear Third-Party Liability, Advanced Light-Water Reactors, and Small and Medium Reactors. The last Issue Brief dealt with Probabilistic Studies.

The publication of international consensus statements, developed by the Agency on key technical or policy issues, also forms an important component of the information programme. Statements published so far include such topics as reactor siting and an appraisal of the technical status of radioactive waste management. A collective view of the NEA Radioactive Waste Management Committee on the progress achieved in safety assessment methods for long-term disposal of high-level waste was published in 1991.

III. EXCHANGING EXPERIENCE ON PUBLIC INFORMATION AND COMMUNICATION ISSUES

In the last few years, the NEA has developed a series of restricted meetings where information specialists, particularly from those countries with operating nuclear power programmes, can review nuclear energy information and communication needs and experience and evaluate future challenges, in an informal atmosphere. Specific areas discussed so far during specialised workshops include public information needs and programmes in relation to radioactive waste management, public information measures recommended during a nuclear emergency, improvements in explaining radiation protection concepts to a non-technical audience and communicating "routine" reactor operating experience to the public and the media.

In 1991, the NEA organised a seminar on Communicating with Non-technical Publics on nuclear issues, in co-operation with the Japanese authorities. The purpose was to explore the issue of communicating about nuclear power to a lay audience, notably groups of the public which are less familiar with scientific or technical concepts. Certain basic communication principles and practices which are currently applied in a number of countries were discussed, including the importance of understanding the audience, of the language, of effective communicators, and of the form under which the information is conveyed. The Seminar paid special attention to communication with women about nuclear energy in OECD countries.

Another international workshop was held jointly with the Office of Civilian Radioactive Waste of the US Department of Energy, in co-operation with the Swiss Co-operative for the Storage of Radioactive Waste. The meeting was devoted to the subject of Education in the Field of Radioactive Waste Management. It contributed to building an information base for education sytems on global aspects of waste management, and helped identify tools and methods necessary for this purpose. Education specialists from countries with radioactive waste management programmes evaluated actual examples of educational materials in this field and discussed their teaching experience in raising awareness of scientific/environmental subjects in younger generations. This meeting was conducted with the assistance of information experts of national radioactive waste management organisations in OECD countries.

In March 1992, a seminar was organised in co-operation with the International Atomic Energy Agency on Public Participation in Nuclear Energy Decision-making. The meeting was attended by some 70 participants from 13 OECD countries as well as from several non-Member countries, including CIS. On the basis of national replies to a questionnaire, this seminar took stock of the nature and trends of legal provisions and institutional procedures, both at the local and national levels, governing public participation in decisions regarding siting and operation of nuclear facilities. Case studies illustrated the diversity of approaches

in different countries and identified the differences, if any, in public participation to decision-making for nuclear and non-nuclear industrial facilities. The meeting also reflected on the conditions for improving the efficiency and relevance of public participation procedures in the nuclear field.

Another international seminar on Information of the Medical Profession in the Field of Ionizing Radiation, held in Grenoble (France) in September 1992, was attended by some 60 participants from 12 countries plus IAEA, CEC, WHO, IRPA, ICRP. The seminar assessed the role of the medical profession in transmitting to the public objective information on ionizing radiation. On the basis of the comparison of current methods used in OECD countries for training and informing the medical profession in this field, the meeting identified means of improving these methods and outlined new improved training and information techniques.

Finally, a specialist meeting will be held to take stock of the experience acquired with the setting-up and operation of Visitor Centres for the Public at nuclear facilities' sites. On the basis of this experience in OECD countries, this Seminar will measure the impact of the centres on the public and assess the educational and information methods used in these centres. It will also help to define better the visitor's expectations and to improve the design of existing or planned centres. It may be of interest to indicate that the NEA, in the context of its 1993 programme, plans to organise another international seminar to discuss the trends, results and future needs of information and communication policies of national nuclear regulatory organisations in OECD countries.

IV OTHER ACTIVITIES IN SUPPORT OF NATIONAL PUBLIC INFORMATION PROGRAMMES ON NUCLEAR ENERGY

The NEA started in 1991 the setting-up of a central file on published results of opinion polls carried out on nuclear energy in Member and non-Member countries, and on supporting material such as articles, commentaries, lectures etc. on the subject. Already seventeen countries have designated correspondents in relevant national institutions, who regularly provide material from their country. The central file is open for consultation by participating countries.

Under the aegis of the NEA, a set of brochures was produced in the field of radioactive waste management, each describing a national radioactive waste management programme. These brochures, which have been widely distributed both by NEA and the countries concerned, are intended to provide the public with a co-ordinated view of waste management programmes in OECD countries.

Along the same lines, it is now planned to develop an International Public Information File on National Nuclear Power Programmes in OECD Countries. The NEA will coordinate the production of this file made up of fact sheets describing the respective nuclear power programmes of Member countries.

SOURCES OF FUNDING

The sources of funding for the information programme come from the NEA general budget. In addition, the Japanese authorities have granted a voluntary contribution to the NEA to help carry out additional projects in the field of information.

The personnel establishment of the entire NEA is 83 (including 41 professional staff). The total appropriation for the Agency for 1991, including the Data Bank, was 68 million francs.

PART TWO

PROGRAMMES IN THE FIELD OF NUCLEAR ENERGY CO-OPERATION WITH THE CENTRAL AND EAST EUROPEAN COUNTRIES (CEECs) AND THE NEW INDEPENDENT STATES OF THE EX-SOVIET UNION (NIS)

The following brief remarks may be interesting for participants of this Third Workshop on Information Management since they touch upon core areas of the NEA activities devoted to CEECs and NIS in most recent years.

I. NUCLEAR SAFETY AND REGULATION

1. Transfer of safety knowledge

Central and Eastern European Countries (CEECs) and the New Independent States of the ex-Soviet Union (NIS) are invited, on an ad hoc basis, and in consultation with relevant committees, to specialist meetings, symposia, seminars/workshops and to special meetings of the competent NEA bodies. They are also invited to participate in International Standard Problem Exercises (ISPs) and NEA joint undertakings.

During the course of the year, experts from the CEECs and the NIS have participated in the specialist meetings on Instrumentation for Severe Accident Management, on Molten Core/Concrete Interaction, on Transient Two-Phase Flow, Plant Analysers and in the symposium on Nuclear Power Plant Instrumentation & Control, as well as in the CNRA Special Issue Meeting on Regulatory Requirements and Experience Related to PWR Steam Generators. They are also invited to participate in the workshops on Inspection Practices & Inspector Qualification & Training, and on Reactor Coolant System Leakage and Failure Probabilities, which will take place later this year. Several of these countries have also participated in the International Standard Problem Exercises (ISP) with simulations of different accidents.

2. Safety of VVER-1000 reactors

In this field, the NEA will support the IAEA programme by providing assistance in areas of specific expertise closely related to the Agency's programme. These activities will begin as soon as the general programme has been agreed by the IAEA. Topics that have been suggested by the Russian authorities concern, in general, the enhancement of plants to cope with

severe accidents, as well as the reliability of safety systems, the quality of steam generators and the reliability of on-line maintenance of scram systems.

3. Strengthening of safety authorities

Assistance will be provided by the NEA Committee on Nuclear Regulatory Activities (CNRA) through contacts with experts and officials in the CEECs and NIS, provision of direct help on specific regulatory issues, invitations to participate in regulatory meetings, participation in CNRA workshops and seminars, and organisation of workshops and specialist meetings to address specific needs.

4. Decommissioning of Chernobyl nuclear power plants 1, 2 and 3

The NEA Co-operative Programme for the Exchange of Scientific and Technical Information Concerning Nuclear Installation Decommissioning Projects provides information and practical assistance in the decommissioning of nuclear power plants and fuel cycle facilities. The Ukrainian State Committee on Nuclear and Radiation Safety has indicated interest in joining this project.

5. Enhancement of nuclear safety research

This project is designed to assist the Russian and Ukrainian State Committees on Nuclear and Radiation Safety in planning and executing safety research programmes with the view to building up capabilities in safety technology pertaining to VVER nuclear power plants. Thermal-hydraulic behaviour of reactor coolant systems and the performance of bubble condenser containments have been chosen as first issues.

6. Long-term isolation of the radioactive substances of the Chernobyl 1-4 nuclear power plant

This project is aimed at exploring ways to isolate in the short- and long-term, the radioactive substances of the Chernobyl 1-4 nuclear power plant and to examine how both steps could be made compatible.

II. NUCLEAR LAW AND NUCLEAR LIABILITY

In relation to nuclear law, NEA has been working on establishing programmes of co-operation between it and various central and eastern European countries. These programmes include, for example, provision by the NEA of information concerning both nuclear legislation of NEA Member countries and international standards, and provision of assistance to CEECs and NIS authorities in drawing up new national laws.

Preparations are under way to hold, in the second half of 1993, a four or five-day training seminar on nuclear law and insurance for CEECs and NIS, to which it is intended to invite participants from CSFR, Hungary, Poland, Romania, Russia, Ukraine, Belarus, Bulgaria and the Baltic Republics.

III. INFORMATION

Following participation of experts from CSFR, Hungary, Poland, Romania and Russia in the International Seminar on Public Participation in the Decision-Making Process in the Nuclear Field, held in Paris in March, which was mentioned earlier, a member of the Secretariat was invited to present the conclusions of this meeting at an International Seminar on Nuclear Power and Public Opinion, which was organised in St. Petersburg by the Russian Nuclear Society in May.

Experts from Russia and the CSFR have been invited to take part in the International Seminar on the Role of Visitor Centres at Nuclear Facility Sites, which will be held in November in Madrid.

PART THREE

THE NEW PUBLICATIONS PROGRAMME

I. General Interest Brochures and General Distribution Documents (Free on request)

- NEA Activities in 1991, Twentieth Annual Report of the OECD Nuclear Energy Agency, Paris 1992, 59 pages
- NEA Newsletter, Volume 10 No. 1, Spring 1992 (two issues per year), 41 pages
- NEA Issue Brief, January 1992, No. 8. Probabilistic Safety Assessment: An Analytical Tool for Assessing Nuclear Safety, 4 pages
- Data Bank NNDEB/45 - Neutron Nuclear Data-Evaluation Newsletter
- Disposal of High-Level Radioactive Waste. Radiation Protection and Safety Criteria. Proceedings of an NEA Workshop, Paris 5-7 November 1991
- Catalogue of NEA Publications, July 1992

II. Monographs 1992

- Living Probabilistic Safety Assessment for Nuclear Power Plant Management, January 1992, 81 pages, 50 DM
- Systemic Approaches to Scenario Development, January 1992, 76 pages, 62 DM
- International Co-operation in Decommissioning. Achievements of the NEA Co-opertive Programme 1985-1990, April 1992, 183 pages, 92 DM
- Nuclear Energy Data 1992, June 1992, 45 pages, 23 DM

- In-core Instrumentation and Reactor Core Assessment, June 1992, 398 pages, 133 DM

- Decommissiong Policies for Nuclear Facilities. Proceedings of an International Seminar, Paris 2-4 October 1991, September 1992, 398 pages, 130 DM

- Gas Generation and Release from Radioactive Waste Repositories, Proceedings of a Workshop Organised by NEA in Co-operation with ANDRA, Aix-en-Provence, 23-26 September 1991, September 1992, 437 pages, 122 DM.

III. Periodical

Nuclear Law Bulletin (bi-annual), Nos. 49 and 50, 1992
approx. 100 pages each. Annual subscription: 67 DM

The Bulletin is the only international legal publication of its kind. It contains information on national legislative and regulatory work, jurisprudence and international agreements, and also reports on the regulatory work of the competent international organisations in the nuclear sector. It contains articles or studies prepared by acknowledged legal specialists and includes bibliographies of recent publications. It also provides in the form of free supplements the full texts of many important laws, regulations and agreements. In addition, an analytical index is sent to subscribers after every five issues.

Further information on NEA activities and publications is available from:

OECD Nuclear Energy Agency, Attn. Mr. Jacques de la Ferté or Mme Florence de Galzain, Le Seine-Saint Germain, 12 boulevard des Iles, F-92130 Issy les Moulineaux, Tel. 0033 1 4524 1010

OECD Publications and Information Centre Bonn, Attn. Dr. Dieter Menke, Schedestraße 7, 5300 Bonn 1, Tel. 0228-216045

TASKS AND MAIN AREAS OF WORK OF THE GRS INFORMATION AND DOCUMENTATION SERVICE (IuD)

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1 THE TASKS OF GRS IuD

GRS decided as early as in 1980 to build up an information and documentation service (IuD).

Its tasks were defined as follows:

- access to external data bases,
- establishment of internal information systems to give the scientists of the company quick and comprehensive access to the literature available within GRS, and
- documentation of scientific knowledge gained from work within GRS and published there.

In the course of the last few years the technological progress has made it easier to tackle these tasks in an efficient way.

Today we have at our disposal an informational infrastructure that allows online access to approximately twenty national and international information suppliers. With the help of GRS computers we use the internally developed information systems and make our own systems available to all GRS staff who may want to use it.

2 MAIN AREAS OF WORK

There are now three main areas of work for GRS-IuD (Illustration 1) that have been singled out over the years from information needs of GRS staff and GRS customers:

- information service
- documentation
- information management

2.1 Information service

This area mainly comprises the supply of information to GRS staff to give them quick and efficient support in their work. Here, it is mainly online data bases that are employed, but other conventional sources are also in use. Illustration 2 shows that this GRS service has been accepted and is used more and more frequently.

We subdivide the information services into Quick References, Deeper Investigations and Profile Services.

2.1.1 Quick References

- urgent queries requiring less than an hour's work

2.1.2 Deeper Investigations

- Information services which require more time

Here, the amount of time calculated includes preparation (interview), the investigation as such with the help of online data bases, and an extensive review (pre-selection) of the results gathered.

2.1.3 Profile Services

GRS-IuD offers the subscription to periodic profile services, a subscription to information concerning one particular topic area. If for instance a GRS staff member wishes to be informed on a constant basis about the latest developments of a specialist area, then he/she can receive - usually on a weekly basis - the current information that was fed into the relevant online data bases.

At present, four different kinds of profile services may be used:

- Literature information: newly published literature in a certain topic area
- Events information: information on conferences, meetings and trade fairs on selected topic areas

- Press review: a daily compilation of reports from various international newspapers and news agencies, giving the full text of the article (published at 10.00 am every morning)

- Reuters weekly review another press review, but tailored according to the needs of the subscriber; published weekly and covers more than 2000 international journals and newspapers, giving the full text of the article.

2.1.4 Information Consultation

At present, there are more than 5000 data bases worldwide offering their services commercially. A considerable part of our work is formed by the constant survey and selection of the information available on the market. The knowledge of the existence of new online data bases and the know-how of where exactly which information is available is the basis for an efficient use of external information sources and for the consultation given to GRS-IuD customers during the process of information acquisition.

2.2 Dokumentation

The area of work of documentation includes the constant development and re-evaluation of the internally used information systems. It has the following particular tasks:

2.2.1 Description

The GRS library data base (BISS), devised by the literature supply and GRS-IuD, presently has data of over 50 000 documents available. This data base comprises all the literature available in the libraries of Cologne and Garching. Content information of newly-received literature is extricated by GRS-IuD with the help of the so-called GRS keyword list and can thus be found in the library system under criteria of its content.

2.2.2 Update of the GRS Keyword List

The keyword list "Sicherheit, Strahlen- und Umweltschutz (Reactor Safety, Radiation and Environmental Protection)", developed and used by GRS, is now available in its fifth edition (June 1992) and contains about 1200 officially defined keywords that enable the user to make full use of the potential of the literature available within GRS. Since in the fields of work of GRS the scientific terminology undergoes constant change, a thorough review of the vocabulary is necessary. For this purpose we have developed programmes which can perform most of the formal work automatically.

2.2.3 Illustration processing

With the help of a video scanner pictures are read in and inserted into different databases.

2.3 Information management

Approximately three years ago we set ourselves another main area of work by taking over the task of information management (IM). Within this field, we offer various services.

2.3.1 IM Systems

We develop and install IM systems for external customers and internal users. This is to be understood in the first place as documentation systems for project controlling and also as fast information supply systems, e.g. for the documentation of incidents or data from nuclear installations.

The role of the above-mentioned illustrated information also becomes more important with these systems. Illustrations of whole plants or components of a plant can submit valuable information for the user and thus are already integrated during the development of such information systems.

2.3.2 Know-How Transfer

We keep in permanent contact with national and international information suppliers. Such personal contacts mainly serve the transfer of knowledge and form valuable help in the exploitation of new sources of information.

SUMMARY AND FURTHER OUTLOOK

The acceptance and frequent use of the GRS-IuD services indicates that the need for this service surely is bound to grow continually through the widening use of electronic data processing in offices and because of the mounting need for information from the users´ side.

In future, GRS-IuD will face new challenges like:

1. Value Added Services
   The improvement of the current quality of investigation through an intensive re-appraisal of the investigation results as well as quicker access to the original sources are tasks that GRS-IuD is committed to resolve.

2. Network
   One of our main aims is the establishment of further information systems and an improved access for all GRS staff through more efficient exploitation of the existing electronic data processing infrastructure.

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