

CURRENT STATUS OF THE WORLD'S RESEARCH REACTORS

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Abstract

Data from the IAEA's Research Reactor Database (RRDB) provides information with respect to the status of the world's research reactors. Some summary data are given. Recent initiatives by the IAEA regarding communications and information flow with respect to research reactors are discussed. Future plans and perspectives are also introduced.

1. RESEARCH REACTOR DATABASE

Each year the IAEA sends out questionnaires to the owners and operators of research reactors requesting an update on information relating to each facility. This information is fed into the IAEA's database and comprises the Research Reactor Database (RRDB). When reviewing information from the database it should always be remembered that while every attempt is made to correct obvious errors, the information is only as good as that submitted to the IAEA. Conversely, perhaps a plea can be made for owners and operators to review information carefully and to be as accurate as possible when submitting data in response to the questionnaire. Tabulated summary database information is published each year in Reference Data Series No. 3 "Nuclear Research Reactors in the World". Complete information is published every few years in the "Directory of Nuclear Research Reactors". Each of these was last published at the very end of 1998.

At the time of writing, the database shows 291 operational research reactors (including critical assemblies), 246 shut down reactors, 107 decommissioned reactors, 16 under construction and 15 new research reactors planned. These reactors are distributed among 58 countries. There is a fairly even regional distribution of the operational reactors with 64 of them in North America, 65 in Western Europe, 76 in Eastern Europe, 57 in Asia, 18 in Latin America and 14 in Africa and the Middle East. Eighty-seven of the operational reactors are in 40 developing countries.

A review of the utilization data submitted to the IAEA shows that about 110 reactors are engaged in neutron activation analysis, 60 in isotope production, and 35 in neutron scattering work. In addition, some 20 are performing silicon doping and 15 are actively working in or towards neutron capture therapy. However, these data should be interpreted as being representative only, since the database needs some improvement with respect to its utilization information.

One of the important pieces of data is to note from the RRDB is that about 66% of the reactors are over 30 years old, and over 80% are over 20 years old. On the other hand there

appear to be more new research reactors now under construction or planned than in recent years.

2. INFORMATION COMMUNICATIONS

2.1. RRDB on the Internet

Member States should be aware of some new initiatives that the IAEA has already implemented and will be implementing in the near future. The first is that the RRDB is now freely accessible on the Internet (<http://www.iaea.or.at/worldatom/rrdb>). The Internet version allows multiple types of searches and filters to find the information needed. It has been on line since the end of July 1999 and is currently receiving between 100 and 150 hits per week. Facility operators are requested to check the information with respect to their reactors and let the author know if any corrections are needed.

In the near future, the questionnaire will request more explicit research reactor utilization data. This will help the IAEA and Member States in two ways. First, it will be possible to better evaluate the effectiveness of the programmes designed to increase utilization, and second it will facilitate RRDB searches to find out which facilities are performing each type of work. This will help customers to better find appropriate facilities to perform their experiments or irradiations, as well as to help place IAEA fellows and scientific visitors. Further improvements planned to the RRDB include enabling the annual questionnaires to be completed on-line.

2.2. Research Reactor Calendar

It should be noted that the research reactor web site also contains a calendar of research reactor meetings and activities. If you are planning a meeting, please check this calendar first to see if there are likely to be any problems with dates being considered. Then, let the author know about your meeting as soon as possible and it will get added to the calendar. It is planned to update the calendar on about a monthly basis.

The IAEA's research reactor web site will also be expanded to include more information such as that related to IAEA research reactor publications, including safety standards.

2.3. Listservers

Listservers have now been made available by the IAEA for use by the world's research reactor community. There is a listserver for each region of the world as well as a world wide one. The addresses are as follows:

afresrx@listserv.iaea.org	African countries
laresrx@listserv.iaea.org	Latin American countries - Central and South America
apresrx@listserv.iaea.org	Asian and Pacific countries
euresrx@listserv.iaea.org	European countries
waresrx@listserv.iaea.org	West Asian countries, such as Iran, Iraq, Israel, Jordan, Kazakhstan, Syria, Uzbekistan
naresrx@listserv.iaea.org	North American countries

worldresrx@listserv.iaea.org World wide - the total of all those subscribed to the above listservers.

The main purpose of the listservers is to facilitate communication between the managers, operators, and users of research reactors. The objective is to share useful information throughout the community so that research reactor facilities may be operated and utilized as safely and efficiently as possible. Appropriate messages sent via the listservers could include:

1. Requests for help with respect to advice on a particular problem.
2. Announcements of research reactor related meetings.
3. News items which may be of interest to the research reactor community, such as initial reactor criticality, accomplishment of major renovation, or a reactor being shut down.
4. Reactor related job vacancies that may be available to qualified people from other countries.
5. Offers to donate equipment or spare parts, which are no longer needed, to other facilities.

Messages that are deemed to be inappropriate by the moderator will not be approved for forwarding to subscribers. The author moderates the listservers. (Institutionally, it is the person in the position of Research Reactor Specialist in the Physics Section of the IAEA's Division of Physical and Chemical Sciences in the Department of Nuclear Sciences and Applications).

Meeting participants are asked to publicize the availability of the listservers to colleagues in the research reactor community. Ideally, at least one person from each operating research reactor facility in the world should be subscribed. All those with email who are participating in the current meeting will be subscribed automatically within a few weeks.

For those unfamiliar with listserver operation, the following summary instructions are included:

To subscribe

You should subscribe to the listserver applicable to the region of the world you are in. You will then also be automatically subscribed to the world wide listserver.

For example, if you are in Africa, send the message:

subscribe afresrx

to majordomo@listserv.iaea.org. You will receive a message indicating that you are subscribed and also receive basic instructions about the list functions. Once subscribed, you will automatically receive any approved messages addressed to the afresrx or the worldresrx listservers.

To send a message

To send an email message, just use the appropriate email address above. The message will first go to the moderator for approval, and then will be forwarded to all members of

that particular list. For example, a message sent to afresrx@listserv.iaea.org will go to all subscribers in Africa, and a message sent to worldresrx@listserv.iaea.org will go to those subscribed to any of the lists.

To unsubscribe

If you do not wish to be on the listserver, send a message to the listserver for the region of the world you are in. For example, if you are in Africa, send the message

unsubscribe afresrx

to majordomo@listserv.iaea.org. You will receive a message indicating that you have been unsubscribed.

At various times Member States have requested a research reactor newsletter. Routinely publishing a newsletter can be a large task. However, it is hoped that the listserver will be able to fulfil some of the functions of a newsletter. If you have some information or announcements to pass on, then please send them to worldresrx@listserv.iaea.org. It is hoped to feature specific facilities on a routine basis.

3. STRATEGIC PLANNING FOCUS

One of the outcomes from the recent Programme Performance Assessment System (PPAS) review of the IAEA's research reactor programmes was a recommendation with respect to strategic planning. There were two aspects to this recommendation. One emphasized the need for the IAEA to develop an internal strategic plan covering four of the Departments involved with research reactors. This would enable the IAEA to be consistent in its interactions with each facility. For example, it would help ensure that efforts towards assurance of safe operation of a facility take precedence over efforts to increase its utilization.

The second aspect of the recommendation results in a focus of IAEA efforts to encourage each individual facility to develop an economic or strategic plan to ensure its sustainability. Each facility needs to have carefully thought through its reason for existence and developed the necessary justification and mission. The term 'business plan' is probably not the best one to use with respect to most facilities; however, there are some aspects of a good business plan that each reactor facility needs to have analyzed.

4. RESEARCH REACTOR COMMUNITY

The concept of a research reactor community is not a new one, but it is worth emphasizing again. The number of research reactors is relatively few. Generally speaking, facilities have similar problems and can do best when they learn from, and help each other. A mindset of mutual support and assistance regionally, but also throughout the world, is to be encouraged. Hopefully, some of the mechanisms that the IAEA has recently instigated, such as the web site, the common calendar and the listservers can assist the further development of just such a research reactor community. Each reactor manager can help the IAEA and help each other by being involved, by coming to meetings, by hosting fellows and scientific visitors from other countries, and by serving as experts.