

## Project 1.4.2.01 - Enhancement of RR utilization and applications (12 activities)

Responsible Officers: Danas Ridikas/NAPC & Ira Goldman/NEFW

Outcome:

RR Networks for enhanced, efficient & sustainable utilization

Performance indicators:

- Number of RR forming networks/coalitions
- Number of RR users forming networks (without RR)
- Number of RR with new/updated strategic plans

## Project 1.4.2.01 - Enhancement of RR utilization and applications

	2010	2011
<b><u>Activity 1:</u></b> RR coalitions & centres of excellence (2008-2012)	CS – RR networks & coalitions	CS – RR networks & coalitions
<b><u>Activity 2:</u></b> RR User's Networks - RRUN (2008-2012)	CS – RR Users' networks	TM – Use of RR by non-host Member States

- RR coalitions:

- Eastern European RR Initiative (EERRI)
- Eurasian RR Coalition (EARRC)
- Caribbean RR Coalition (CRRC)

*North-South America RR Coalition (NSARRC)*

- RR Users' Networks:

- Mediterranean RR Users' Network (M-RRUN)
- Network on Residual Stress & Texture Analysis (STRAINET)

*Baltic RR User's Network (B-RRUN)*

*Pacific RR User's Network (P-RRUN)*



→ See presentations on Tuesday: I. Goldman, D. Ridikas

## Project 1.4.2.01 - Enhancement of RR utilization and applications

	2010	2011
<b>Activity 3:</b> CRP on Development, characterization and testing of materials in energy sector using neutrons (2009-2012)	RC/RA	RCM2

- Background:

- Finished CRP (2003-2006) on neutron imaging

- Ongoing CRP (2006-2009) on residual stress measurements

- Recommendation of TWGRR in 2008

- TM held in Nov. 2008: RR Application for Materials under high neutron fluence

- CS held in Nov. 2008: Non destructive testing using neutron beams

- Preparation of CRP in progress:

- Development, characterization & testing of materials in energy sector using neutrons

- irradiated materials by neutrons & ions (implantation)

- variable temperature & pressure environment

- materials in magnetic fields

## Project 1.4.2.01 - Enhancement of RR utilization and applications

	2010	2011
<b>Activity 4:</b> CRP on Effective adaptation of increased neutron fluence for enhanced utilization of RRs(2011-2013)	Preparatory CS meeting	RCM1

- Background for increased fluence
  - RRs with upgraded power
  - RRs with enhanced utilization
  - RRs with innovations and/or design modifications
  - RRs with new strategic plans

## Project 1.4.2.01 - Enhancement of RR utilization and applications

	2010	2011
<b>Activity 5:</b> Report on RR applications for materials in energy sector	TM	Report
<b>Activity 6:</b> Catalogue on Products and Services of RRs	CS, Contents	TM, report

<b>Activity 7:</b> International Conference on RR	CS, preparation	CN, proceedings
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- Organization as a cross-cutting activity (NE, NS and NA)
- 2005 in Chile (NEFW) , 2007 in Australia (NSNI)

### 2011 RR Conference (NAPC) in Africa:

Candidate countries are Egypt, Morocco, South Africa

Host selection spring 2009

1<sup>st</sup> CS meeting autumn 2009

## Project 1.4.2.01 - Enhancement of RR utilization and applications

	2010	2011
<b>Activity 8:</b> IAEA/ICTP workshops	Advanced school on “Neutrons for Science and Technology: from fundamental research to applications with neutron beams” in collaboration with Helmholtz-Zentrum Berlin (HZB)	IAEA/ICTP workshop on “Effective use of intense neutron fluxes”

### Contents of 2010 school (IAEA/ICTP & HZB)

- Introduction to neutron sources
- Introduction to fundamentals of neutron beam techniques
- Neutron beam applications in biology, chemistry, physics, material sciences, engineering
- Neutrons for science through a toolkit for virtual planning and design of experiments including virtual data taking and analysis
- Experimental training (hands on experiment in small groups) in Triple-Axis Spectroscopy, Powder Diffraction, Spin-Echo-Spectroscopy, Small Angle Neutron Scattering, Time-of-Flight Spectroscopy, Reflectometry, Tomography

## Project 1.4.2.01 - Enhancement of RR utilization and applications

	2010	2011
<b>Activity 9:</b> Technical support for <u>National TC</u> projects involving RR utilisation & applications	Technical inputs to planning and implementation of TC projects	

- Algeria, China, Egypt, Morocco, South Africa, ...

	2010	2011
<b>Activity 10:</b> Technical support for <u>Regional TC</u> projects involving RR utilisation & applications	Technical inputs to planning and implementation of TC projects	

- RER4032 (Europe), RAF4022 (Africa), RAS4030 (Gulf region), ...

## Project 1.4.2.01 - Enhancement of RR utilization and applications

	2010	2011
<b>Activity 11:</b> Extend the cooperation, support & participation in the meetings & conferences pertinent to RRs & their utilisation	<ul style="list-style-type: none"> <li>• Neutron Radiography Conference, South Africa</li> <li>• IGORR Workshop</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• RR Conference in Africa &amp; satellite meetings</li> <li>• IGORR Workshop</li> <li>• ...</li> </ul>

	2010	2011
<b>Activity 12:</b> Report on utilization & specific applications of RR to support <ul style="list-style-type: none"> <li>• RR management</li> <li>• Emerging interest in NP</li> </ul>	CS meeting, report	CS meeting, report

## Project 1.4.2.02 – RR infrastructure, planning and innovation

Responsible Officers: Edward Bradley/NEFW & Danas Ridikas/NAPC

Outcome:

Use of Agency guidance

for the refurbishment and modernization of old RRs

for the construction of new national/regional RRs

Performance indicators:

- Number of Member States requesting the above assistance

## Project 1.4.2.02 – RR infrastructure, planning and innovation

	2010	2011
<b>Activity 3:</b> Manage RR Data Base, Incorporate recommended improvements & user identified modifications/changes Bradley/Ridikas	<ul style="list-style-type: none"> <li>• CS Meeting</li> <li>• Contracts for external services</li> </ul>	<ul style="list-style-type: none"> <li>• CS Meeting</li> <li>• Contracts for external services</li> </ul>

- Organized as a cross-cutting activity (NEFW & NAPC), potentially in the future also NSNI
- By now it is fully merged into a single RRDB + SFDB = RRSFDB
- Contains detailed data on ~675 RRs
  - operational ~250
  - shutdown ~240
  - decommissioned ~170
  - under construction ~10
  - planned ~5

Beta testing on Nucleus

RRDB Search - Microsoft Internet Explorer provided by IAEA

http://rrsf-dev.iaea.org/RR/ReactorSearch.aspx

File Edit View Favorites Tools Help

RRDB Search

## Research Reactors

IAEA International Atomic Energy Agency

Home Reports Administrator **Nucleus**

OPERATIONAL  
 TEMPORARY SHUTDOWN  
 UNDER CONSTRUCTION  
 PLANNED  
 PLANNED SHUTDOWN  
 SHUT DOWN  
 UNVERIFIED INFORMATION  
 DECOMMISSIONED

Country: Austria  Reactor:

### 3 Reactors Found

IAEA Code	Country	Facility Name	Type	Status
AT0002	Austria	TRIGA II VIENNA	TRIGA MARK II	OPERATIONAL
AT0002	Austria	ASTRA	POOL	SHUT DOWN
AT0003	Austria	SAR-GRAZ	ARGONAUT	SHUT DOWN

Choose any reactor listed to view/change its details.

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Beta testing on Nucleus

Header Information - RRDB - IAEA - Microsoft Internet Explorer provided by IAEA

http://rrsf-dev.iaea.org/RR/HeaderInfo.aspx?RIId=8

File Edit View Favorites Tools Help

Header Information - RRDB - IAEA

### Research Reactors

IAEA International Atomic Energy Agency

Home Reports Administrator Nucleus

Reactor Fuel Cycle Data Providers

Reactor: **TRIGA II VIENNA** IAEA Code: **AT0002** Workflow Status: **FDP Update needed** Current | Updated [Search Reactors](#)

Header Information General Information Technical Data Experimental Facilities Utilization Decommissioning

Country Name \*  
Austria

Facility Name \* / Number \*  
TRIGA II VIENNA / 0002

Status  
Status \* :  
OPERATIONAL

Status Comment:  
status comment

Category  
RESEARCH

URL  
www.atl.ac.at [View](#)

Info Date \*  
2006-03-25 (YYYY-MM-DD)

Geographical Location  
Latitude: ° ' "  
Longitude: ° ' "

[Cancel](#) [Save](#) [Submit](#)



• Beta testing on Nucleus



Reactor Data - RRDB - IAEA - Microsoft Internet Explorer provided by IAEA

http://rrsf-dev.iaea.org/SF/ReactorData.aspx?RID=8

File Edit View Favorites Tools Help

Reactor Data - RRDB - IAEA

### Research Reactors

Home Reports Administrator **Nucleus**

Reactor Fuel Cycle Data Providers

Reactor **TRIGA II VIENNA** IAEA Code **AT0002** Workflow Status **Data Up to Date** Start Data Update Search Reactors

Reactor data Fuel Data Fuel & Inventory Storage Concerns Management Contacts

Country: Austria Information provided on: 2006-03-25 (yyyy-mm-dd)

Storage site away from reactor: Power level (KW): 250.0000

Status: OPERATIONAL

Status Comments: status comment

General Comments:

Comments:

GTRI:  Do you agree to share information with GTRI?

Save

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## Dynamic IAEA RRDB: future actions

### RRDB

- final format/structure/testing: March 2009
- printable reports per RR: May 2009
- Production → public access from Nucleus: September 2009

### Data updates

- ~50 operational RR updates via e-mail since August 2008
- Official nomination requests sent to all permanent missions
- Nominated managers will be able to provide updates on-line
- In addition to web, hard copy & e-mail requests, some dedicated actions  
e.g. participation in RR managers meeting in Russia (May 2009)

### Development of static RRDB for operational RRs

- ...

# Static IAEA RRDB: future actions

## RRDB for operational RRs

- Preparation of CD/USB version for distribution (no internet connection needed)

**Physics Section Database**

- Foreword (Home)
- Accelerators
- Reactors
- Spallation Sources
- Synchrotron Light Sources
- Editorial Note

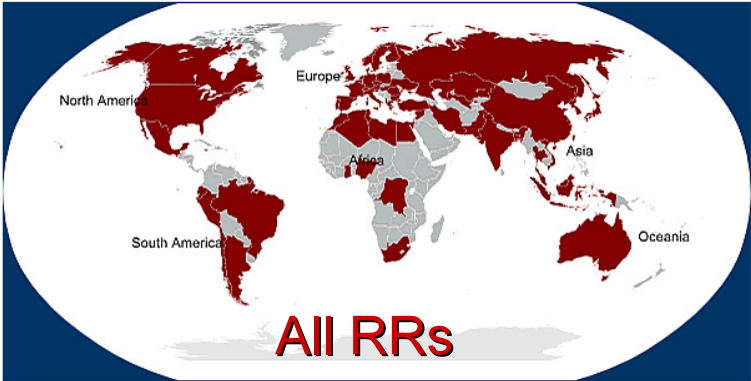
**Research Reactors**

- All Reactors
- Low Flux Reactors
- Medium Flux Reactors
- High Flux Reactors

**Facility Listing**

All Reactors Here ▾

Home
Accelerators
Reactors
Spallation Sources
Synchrotron Light Sources




All RRs

This database contains 259 research reactors distributed over 60 Member States.

The analytical and research capabilities of a research reactor are determined primarily by the available thermal neutron flux. This database categorises research reactors as a low flux, medium flux, or high flux reactor according to the following levels of thermal neutron flux:

- low flux reactor ( $\leq 1 \times 10^{12}$  n/cm<sup>2</sup>/s)
- medium flux reactor ( $> 1 \times 10^{12}$  n/cm<sup>2</sup>/s and  $< 1 \times 10^{14}$  n/cm<sup>2</sup>/s)
- high flux reactor ( $\geq 1 \times 10^{14}$  n/cm<sup>2</sup>/s)

Home
Accelerators
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Synchrotron Light Sources



HF RRs

This database contains 49 high flux research reactors distributed over 30 Member States.

Similar filters/maps application based:  
 Isotope production, radiography, Si doping,  
 neutron scattering, training & education, etc.

High-Flux Research Reactors

No.	Country	Name	Reactor Type	Thermal Power, kW	Thermal Flux, n/cm <sup>2</sup> /s	Fast Flux, n/cm <sup>2</sup> /s	Criticality Date
1	Algeria	ES-SALAM	HEAVY WATER	15000	2.1E14	4.2E12	17/02/1992
2	Australia	OPAL	POOL	20000	4E14		12/08/2006
3	Belgium	BR-2	TANK	100000	1.0E15	7.0E14	29/06/1961
4	Brazil				1.17E14		16/09/1957
5	Canada				1.0E14		03/11/1957
6	China	HWR-2	HEAVY WATER	15000	2.4E14	5.2E12	01/09/1958
7	China	HFETR	TANK	125000	5.2E14	1.7E15	27/12/1979
8	Czech Republic						24/09/1957
9	Dem. P.R. of Korea	IRT-DPRK	POOL, IRT	8000	1.2E14	1.4E13	15/08/1965
10	Egypt	ETR-2	POOL	22000	2.8E14	2.2E14	27/11/1997
11	France						08/09/1966
12	France						31/08/1972
13	France	DRPHIE	POOL	18000	1.1E14		19/12/1980
14	France	PHENIX	POOL	40000	2.8E14	5E13	09/08/1978
15	France	CADRI	POOL	25000	1.9E14	1.5E17	01/01/1963
16	France	HFR	HEAVY WATER	58300	1.3E15		01/07/1971
17	Germany	BER-II	POOL	10000	2.0E14	1.4E13	09/12/1973
18	Hungary	NUCL BUDAPEST RES. REACTOR	TANK WWR	10000	2.5E14	1.0E14	25/03/1959
19	India	DHRUVA	HEAVY WATER	100000	1.8E14	4.5E13	08/08/1985

Detailed List:  
 \*per continent  
 \*per country

Individual reports



1<sup>st</sup> release: September 2009