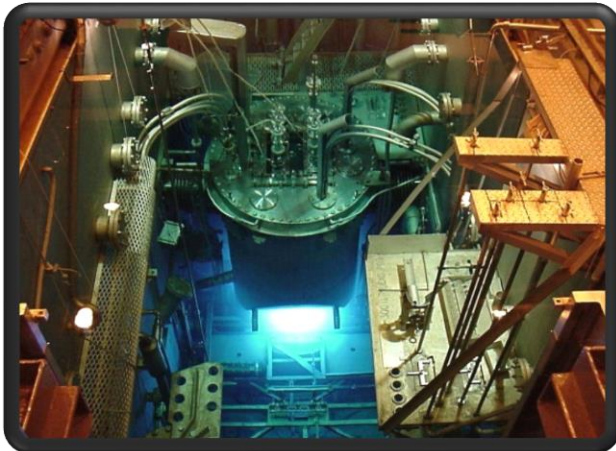
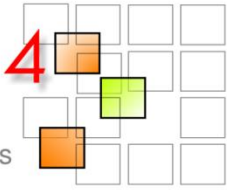


Radiation and Reactor Theory Section



Presented by
RRT Section Head: Djordje Tomasevic



Overview

Major Activities

International Collaborations

Challenges and Opportunities

University interaction

Major Activities

Structure of the RRT group

- Radiation and Reactor Analysis (RRA) and Method and Code Development (MACD)

List of current major projects

- SAFARI-1 calculational support
- NTP production expansion
- Shielding, Activation and Criticality Calculations
- OSCAR-4 code system development (deterministic nodal diffusion code)
- Full core transport, semi-heterogeneous approach, spatial kinetics and thermal-hydraulics
- Next generation code and method development

Linkages with Necsa Strategy

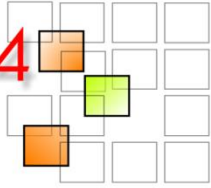
- Contribute to usage of SAFARI-1 through calculational and modeling support
- Participate in MTR / LWR code and method development
- Contribute to Necsa skills development and SA nuclear education programs
- Contribute to Nuclear Fuel Cycle Activities

General

- IAEA CRPs
- OECD / NEA benchmarks
- High Performance Computing
- Number of international collaborators / consultants

OSCAR related

- Usage collaboration with NRG (Netherlands), TU-Delft (Netherlands)
- Prospective clients: MNR Reactor, McMaster University (Canada) & OPAL, ANSTO (Australia)
- OSCAR-4 / COBRA-TF link with Penn State University
- OSCAR-4 / CONDOR link with INVAP, Argentina
- OSCAR-4 / SERPENT link with VTT, Finland



University interaction

Agreements

- Memoranda of understanding (UNW, UP, UJ)
- Grant agreements (Penn. State University)
- Code usage collaboration (TU-Delft, McMasters)

RRT staff participation in lecturing at graduate and under-graduate level

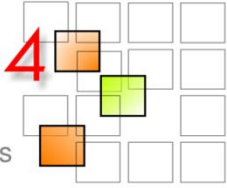
- Reactor physics and Radiation shielding at UNW (Marst program)
- Computational methods at UNW (Physics department)
- Nuclear Engineering at UP (Mechanical Engineering department)
- Radiation shielding at University of Namibia and UWC

MSc and PhD thesis supervision and examination

- **NWU (Physics and Mechanical Engineering departments)**
- **Penn. State University**
- UWC
- UJ (Physics department)
- **SUN (Applied mathematics department)**

Hosting of student

- Graduate and undergraduate students projects hosted at RRT
- UNW, UJ, WITS, SUN



Challenges and Opportunities

Primary Challenges

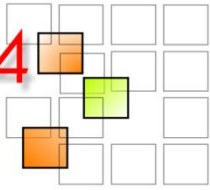
- Provide competent calculational service to SA nuclear industry
- Develop a world-class MTR calculational system
- Establish expertise in LWR methods and code development

Future Developments

- Development of original reactor analysis methods
- Improve capability in Safety Analysis
- Expand toward large scale computations

OSCAR

4



system for
reactor calculations

RRT introduction

Thank you