

# IAEA Activities on Minimizing HEU and Stabilizing Supply in Mo-99 Production

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Mo-99 Topical Meeting

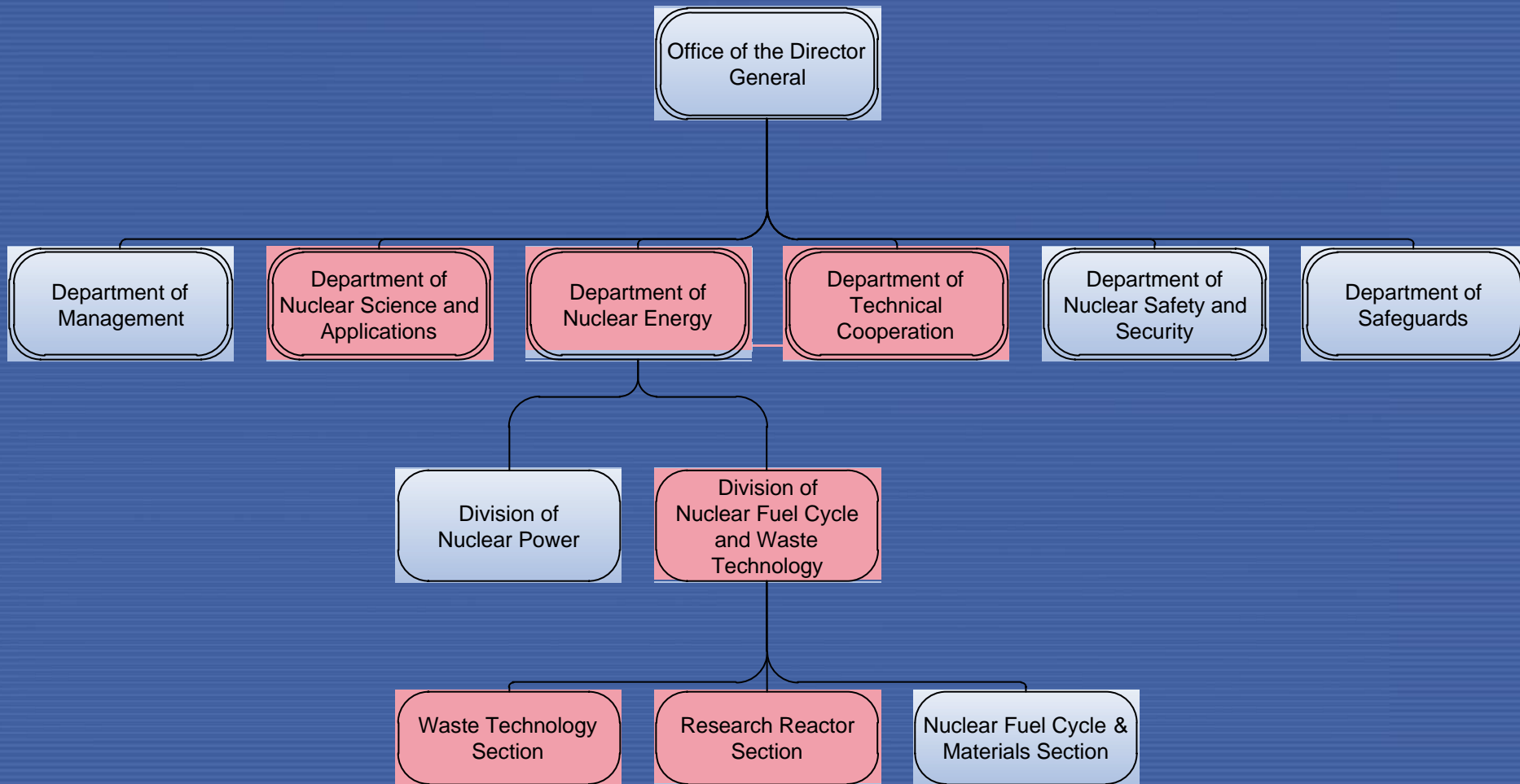
Santa Fe, NM 4-7 December 2011



**IAEA**

International Atomic Energy Agency

# IAEA Organization for Mo-99 Work



# RRS Priorities for Mo-99

- **From 2005 → HEU Minimization**
  - Several projects aimed at producing Mo-99 without using HEU
- **From 2008 → Stability of Supply**
  - Various supply issues led to immediate emphasis on finding ways to ensure the global supply of Mo-99
- **Currently → Both: Non-HEU Production Capabilities and Ensuring Supply**

# Mo-99 Research Reactor Projects

Working with other Agency departments and key external partners, the RRS leverages numerous types of activities to assist Member States in their Mo-99 work. These include:

- Coordinated Research Projects
- Technical Cooperation Projects
- Regular Program activities
  - Networks and Coalitions
  - Participation in complimentary, international activities
  - Meetings
  - Missions
  - Publications
  - General Conference Side-events

# RRS Mo-99 Projects

## Assisting Conversion of Major Mo-99 Producers to LEU:

- Supported by US DOE/NNSA and the Government of Norway
- Series of working group meetings for key stakeholders to review progress, exchange information and explore opportunities for mutually beneficial collaboration
- Website developed to share information related to:
  - High density target development: U-foil, U-silicide, Relevant experience from RR fuel development
  - Front-end adaptive processing
  - Back-end waste management



# RRS Mo-99 Projects

## Assisting small-scale, non-HEU production:

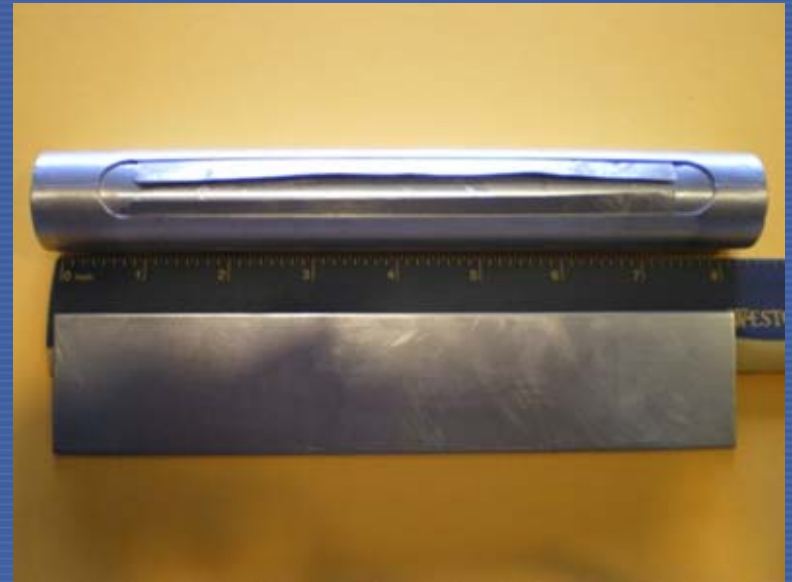
- CRP on Small-Scale Production using LEU Fission or Neutron Activation
  - 2005-2011 – Final closing meeting coming up next week
  - 7 Contract holders, 8 Agreement holders
  - Assist with the adoption of LEU-modified Cintichem (foil targets), other LEU technology, or neutron activation (gel moly) technology for producing Mo-99,
  - Foster capacity building for local/regional self-sufficiency to meet Mo-99 needs,
  - Advance international non-proliferation and nuclear security objectives, while promoting sustainable development and the sustainability of nuclear research institutes.

This CRP helped states look at the feasibility of producing a national supply of non-HEU Mo-99 in case of future supply crises, or as demand rises.

# RRS Mo-99 Projects

## Assisting small-scale production, continued:

- Interregional TC project – to deploy demonstrated, non-HEU production technologies in Member States seeking small-scale, or back-up production capability.
- Project is planned and ready to commence in 2012.



*Annular foil target from Argonne National Laboratory, USA*

# RRS Mo-99 Projects

## Assisting small-scale production, continued:

- Expert Missions
  - Mo-99 production project progress review Mission to Egypt (2010)
  - Missions to Malaysia to assess Mo-99 production infrastructure readiness (2011)
  - IAEA and project counterpart Missions to US facilities and laboratories (ANL, Y-12, MURR)





# RRS Mo-99 Projects

## Assisting small-scale production, continued:

- EURASIA Coalition work
  - Reactors in Eastern Europe and former Soviet states cooperating to produce low specific activity, Mo-99 via neutron capture of Mo-98 (launched in 2008)
  - Working to address availability of enriched Mo-98 and low activity generator technology – Kazakhstan is a part of this project and also worked on the CRP on small-scale production to gain the capability to produce gel generators
- Regional TC project (ARCAL) in Latin America assessing feasibility of production for regional facilities
  - Current project commenced in 2009

# RRS Mo-99 Projects

## Report on Non-HEU-Based Production Technologies for Mo-99

- Examines status of numerous non-HEU Mo-99 production technologies
- Due in 2012
- Small to large scale
  - Reactor-based production
  - Accelerator-based production
  - Neutron Activation and Photo-neutron processes
  - Various target types, processing technologies
- Basic concepts to fully deployed technologies
- To be used as an input for the Interregional TC Project

# RRS Mo-99 Projects

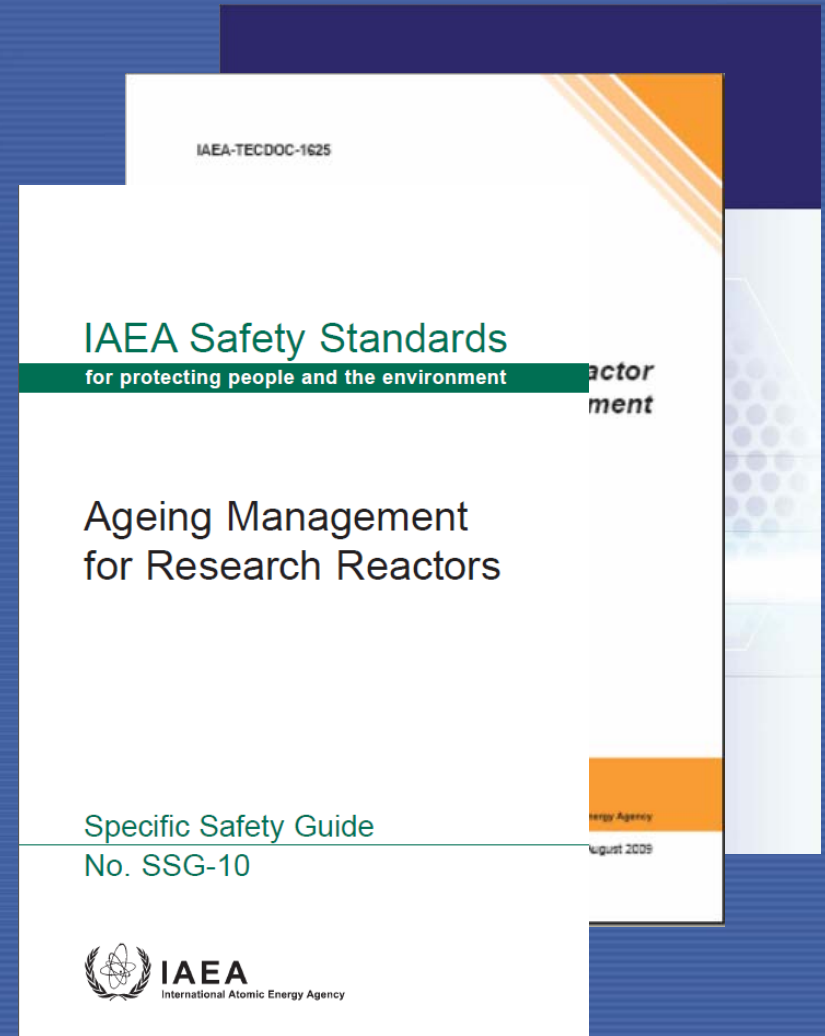
## International cooperation

- Oslo, Norway Symposium on the Minimisation of HEU in the Civilian Nuclear Sector, June, 2006
- Sydney, Australia Global Initiative to Combat Nuclear Terrorism, December 2007
- Contributed to preparation and review of US National Academy of Science study, Medical Isotope Production without HEU, 2009
- WOSMIP – 2009, 2011 and 2012
- Second Symposium on the Minimization of HEU in the Civilian Nuclear Section, 23-25 January 2012
- Cooperation with the OECD HLG-MR since 2008

# RRS Mo-99 Projects

## Closely related projects

- RR Availability & Reliability (2008)
- RR Modernisation and Refurbishment (2009)
- RR Ageing Management (2010)
- Recurring bi-annual TM
- Joint activity NS/NE



# RRS Points of Contact

- P.Adelfang@iaea.org** Section Head & research reactor cross-cutting coordinator
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- E.Bradley@iaea.org** non-HEU technology report, interregional TC project, HLG-MR, WOSMIP
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