

Introduction of MODARIA II Working Group 1

Ming Zhu, Ph.D., PE, PMP

U.S. Department of Energy, Office of Environmental Management

Presented to ERAD Webinar

August 16, 2017

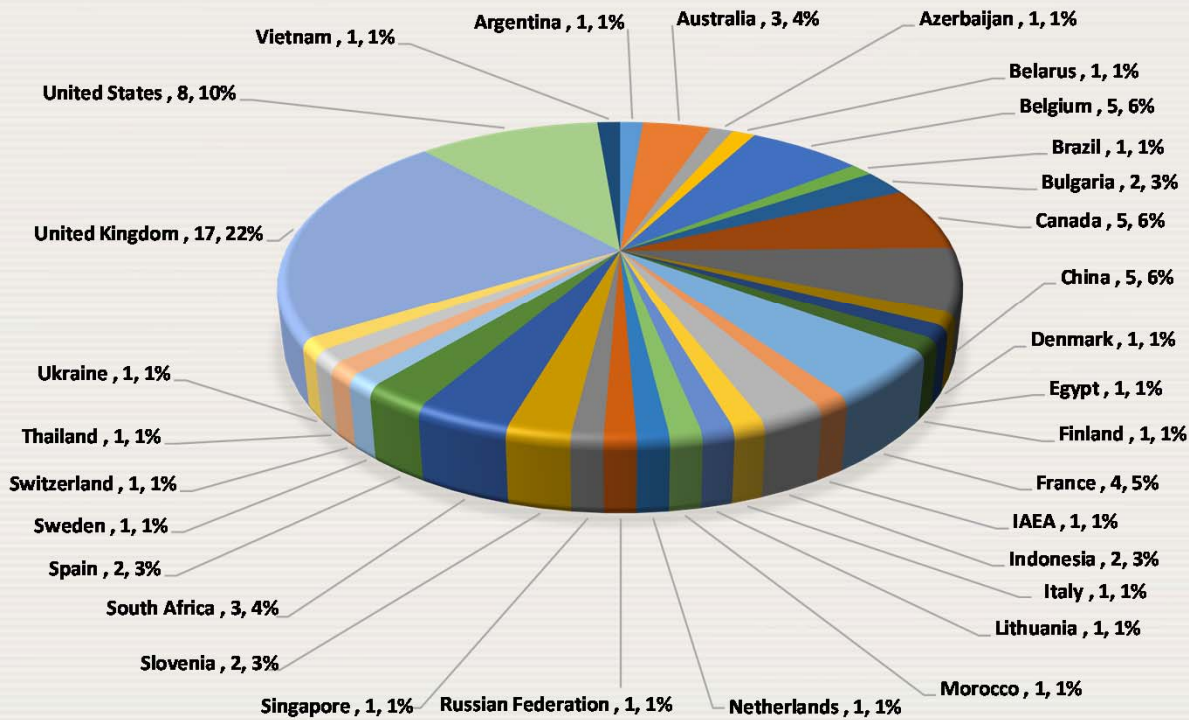


IAEA

International Atomic Energy Agency

MODARIA II Working Group 1

77 MEMBERS FROM 31 MEMBER STATES & IAEA



Country	Number of Participants'
Argentina	1
Australia	3
Azerbaijan	1
Belarus	1
Belgium	5
Brazil	1
Bulgaria	2
Canada	5
Denmark	1
Egypt	1
Finland	1
France	4
IAEA	1
Indonesia	2
Italy	1
Lithuania	1
Morocco	1
Netherlands	1
Russian Federation	1
Singapore	1
Slovenia	2
South Africa	3
Spain	2
Sweden	1
Switzerland	1
Thailand	1
Ukraine	1
United Kingdom	17
United States	8
Vietnam	1
Grand Total	77



Work Scope

WG 1: Assessment and Decision Making of Existing Exposure Situations for NORM and Nuclear Legacy Sites

- WG Leader: Ming Zhu (USA)
- IAEA Scientific Secretary : Tamara Yankovich
- Methods and **tools for radiological impact assessments** and application to specific situations
- Methodologies for **decision analyses for remediation and closure** of NORM and legacy sites
- **Communication** and engagement with relevant interested parties
- **Training** for end users for the use of the relevant software

History and Focus of MODARIA II WG1

MODARIA II WG1 is a combination of 2 MODARIA I Working Groups:

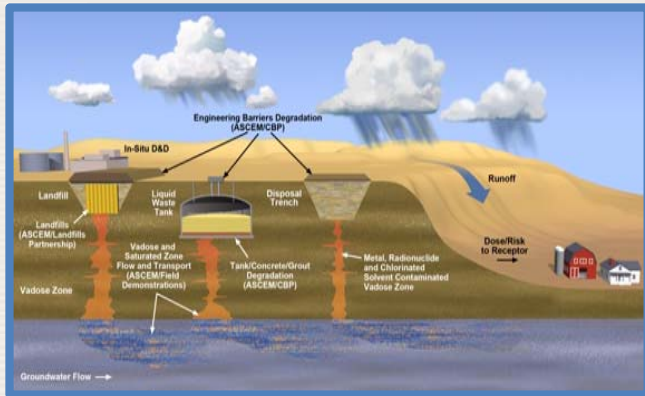
- one focused on application of decision-aiding tools in remediation, and
- another focused on risk assessment for NORM and radioactively contaminated legacy sites.

MODARIA II WG1 focuses on:

- on developing methods and toolsets for risk-informed decision-making for NORM and nuclear legacy sites, including
- demonstration of decision-making processes and tools through case studies.

Work Scope Illustration

Assessment and Decision Making for Existing Exposure Scenarios of NORM and Legacy Waste Sites



Hanford Site environmental remediation, in-situ D&D, and tank waste management



Typical NORM site remediation



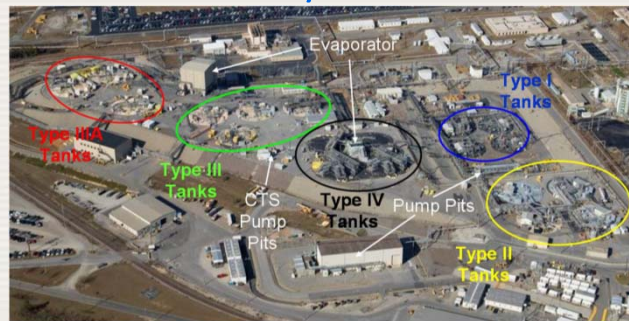
- Environmental Remediation



Hanford Site Excavation of Cr-contaminated Soil

- Site characterization
- Remedy selection
- Remedial action
- Post-remediation mgt.

- In-Situ D&D/Site Closure



Savannah River Site H Tank Farm

- Risk Assessment
- Decision Analysis



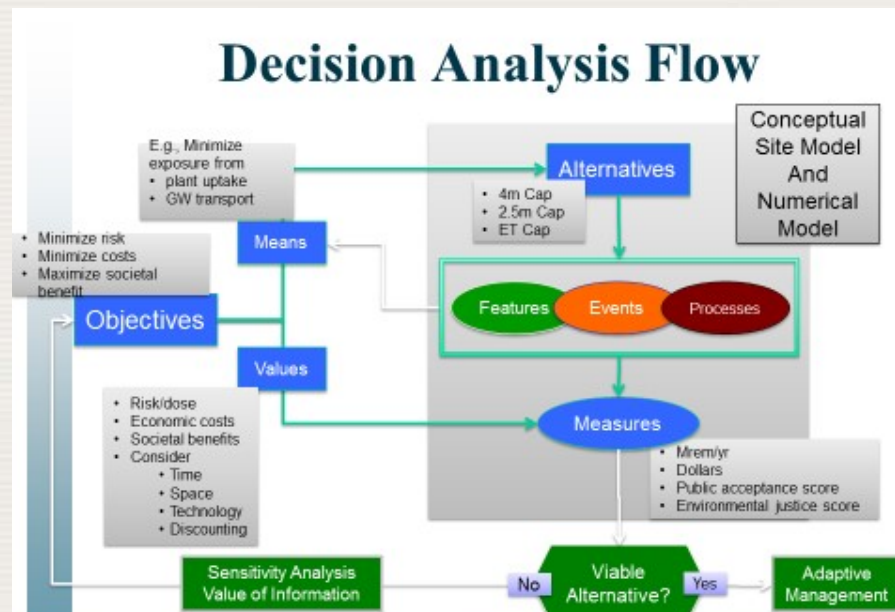
Risk Assessment Tasks

- Develop improved methodologies for radiological impact assessments
- Improve assessment models
- Conduct model–model and model–data comparisons
- Apply methodologies to existing sites and facilities
- Train end users (regulators, operators, other stakeholders) on use of NORMALYSA, RESRAD, and other codes



Decision Analyses Tasks

- Document decision making process for best practices and lessons learned
- Develop lists of “prevailing circumstances” and site specific situations
- Develop methodologies and toolsets for formalized decision analysis



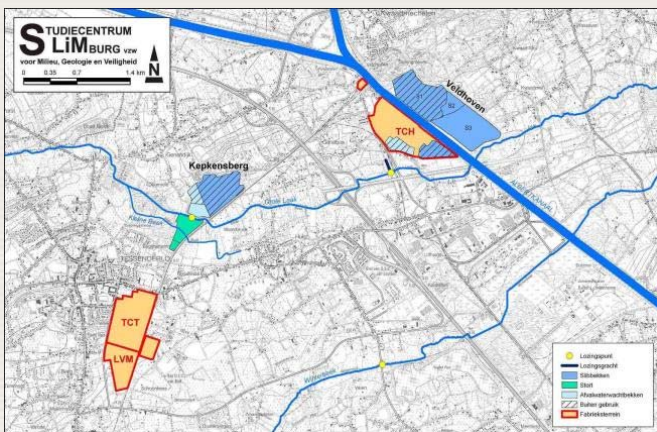
Recent Activities and Accomplishments

- First Technical Meeting of MODARIA II, Vienna, Austria, October 31-November 4, 2016.
- WG1 First Interim Meeting, Brussels, Belgium, June 26-30, 2017, including field trip to the Tessenderlo Chemie (TCH) phosphate processing Site.
- 2 sites were selected for Case Studies; An additional site will be evaluated in late 2017
- 2 additional sites selected as examples for sharing good practices and lessons learned
- A Work Plan has been developed for 2017-2019
- An Interim Report is being prepared

MODARIA II WG1 Activities



Sites Selected for Case Studies

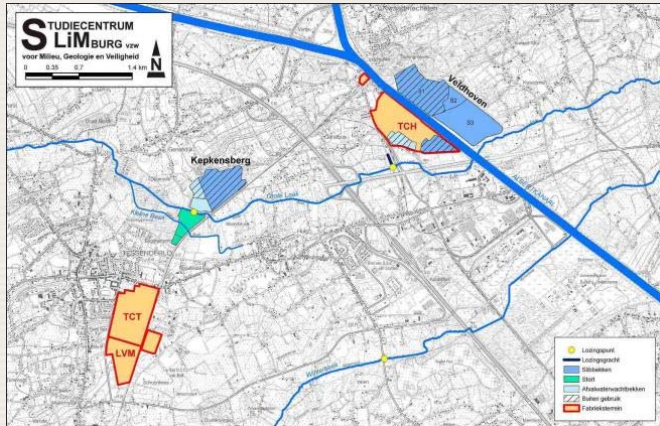


Tessengerlo (TCH) Phosphate Processing Site
Belgium

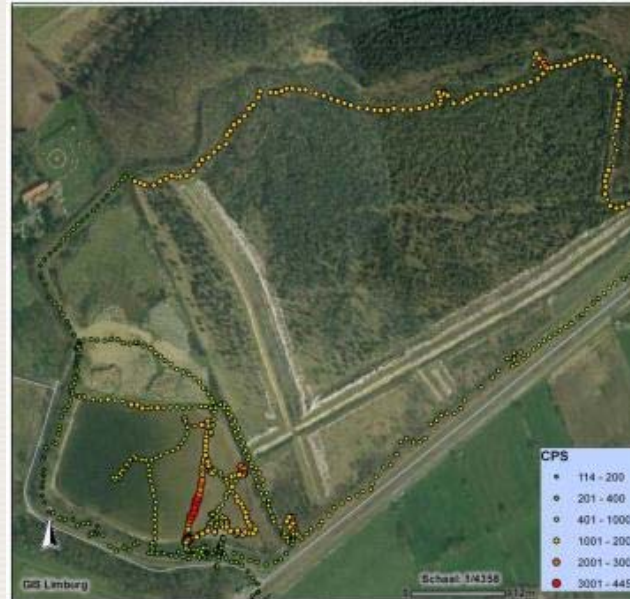


Pridneprovsky Uranium Legacy Site
Ukraine

Tessenderlo (TCH) Phosphate Processing Site, Belgium



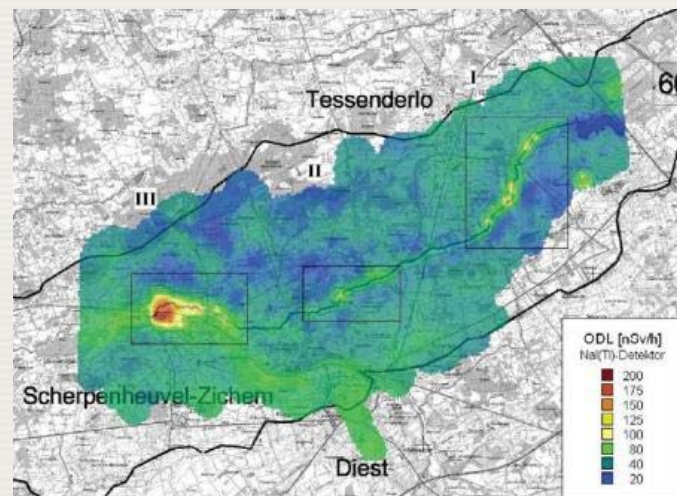
Site locations: The facilities (orange); sludge basin (dark blue); waste water buffer basin (light blue); landfill (green); out of operation (dashed); discharge points to the rivers (yellow)



Sludge pond at the Kepkensberg site



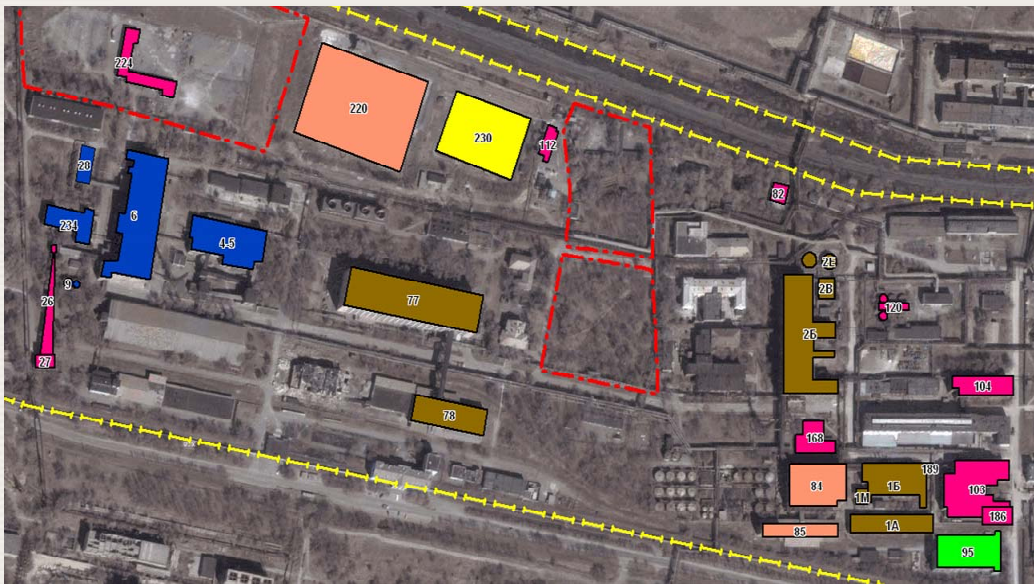
TCH Phosphate Processing Facility



Ra-226 contamination of the Winterbeek River



Pridneprovsky Uranium Legacy Site, Ukraine



Location of Zapadnoe tailings



Distribution of Rn-222 flux (mBq/m²/s) from the surface of Zapadnoe tailings in September 2009

Sites Selected as Examples for Good Practices and Lessons Learned



**Material Disposal Area B
Los Alamos National Laboratory
USA**

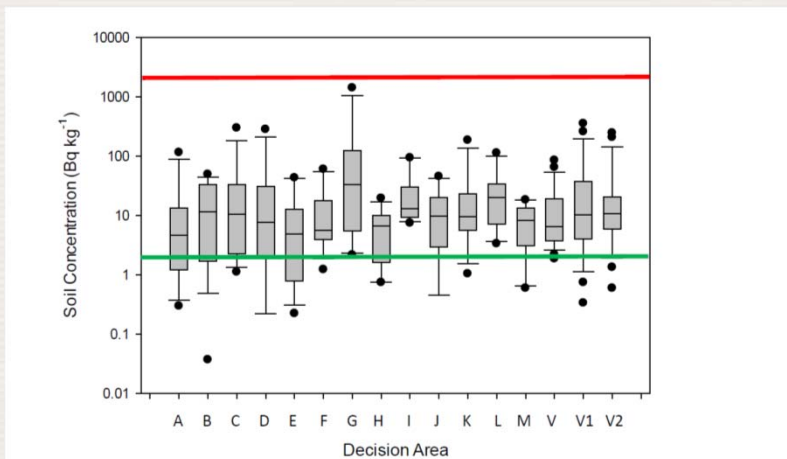


**Beaverlodge Mine/Mill Site
Canada**

Material Disposal Area B - Los Alamos National Laboratory, USA



Site layout



Distribution of Pu concentrations from samples

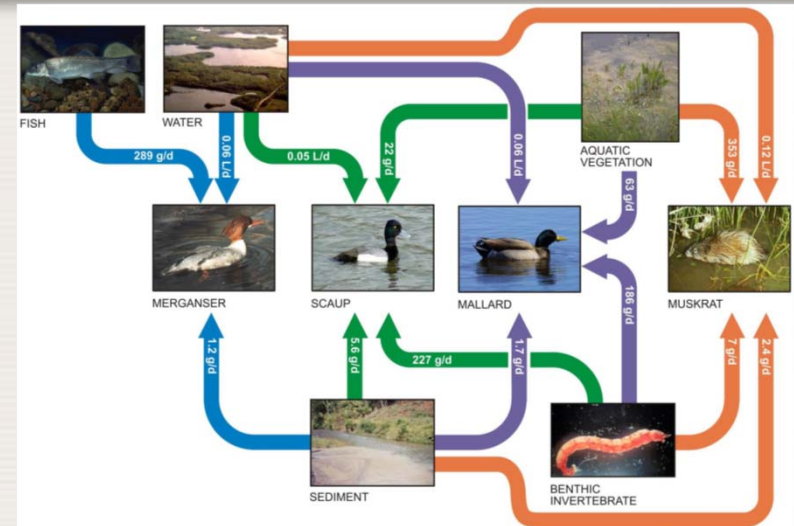


A clean-up area at LANL MDA B

Beaverlodge Mine/Mill Site Closure



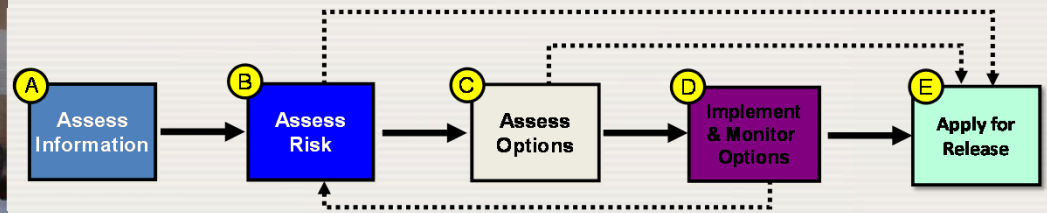
Beaverlodge Mine/Mill in 1983



Modeling Non-Human Biota



2012 Remediation Options Workshop



Management Framework



Work Plan

- A Work Plan has been developed, including
 - Literature review, data analysis, model-model/data comparisons, and documentation activities for 2017-2019
 - Demonstration of use of Guided Interactive Statistical Decision Tools (GiSdT) for stakeholder-engaged structured decision making at the MODARIA II 2nd Technical Meeting, October 30-November 3, 2017
 - Presentations at international conferences (e.g., NRPA International Workshop; WM2018)
 - Preparation of an Interim Report due to IAEA by October 2018; Final Report due October 2019.

Collaborations/Leveraging

- Within MODARIA II
 - WG 5: Joint session in June 2017; biota modeling
 - WG 3: Human-biota modeling
 - WG 2: Urban scenarios; joint meeting at 2nd TM
 - WG 6: FEPs list
- Within the IAEA
 - RICOMET, CIDER
 - ICRP Task Groups 98 and 105
- External
 - P&RA CoP
 - ICEMM
 - ASCEM
 - ERAD

