

U N E N E

University Network of  
Excellence in Nuclear  
Engineering

# UNENE Perspective

**Presented at the  
Thorium Workshop  
McMaster University  
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# UNENE Mandate

- UNENE (University Network of Excellence in Nuclear Engineering) is an industry-university partnership which:
  - Upgrades the education of staff working in the nuclear industry
  - Supplies highly-qualified graduates
  - Supports nuclear research
  - Creates respected university-based experts
- Uniquely placed to contribute to Human Resource Development (HRD) needs



# Members



McMaster  
Nuclear  
Reactor

- Atomic Energy of Canada Limited
- Bruce Power
- Ontario Power Generation
- Canadian Nuclear Safety Commission
- CANDU Owners Group
- Nuclear Safety Solutions
- CAMECO
- McMaster University
- Queen's University
- University of Ontario Institute of Technology
- University of Saskatchewan
- University of Toronto
- University of Waterloo
- University of Western Ontario
- Ecole Polytechnique
- University of New Brunswick
- Royal Military College
- University of Guelph
- University of Windsor

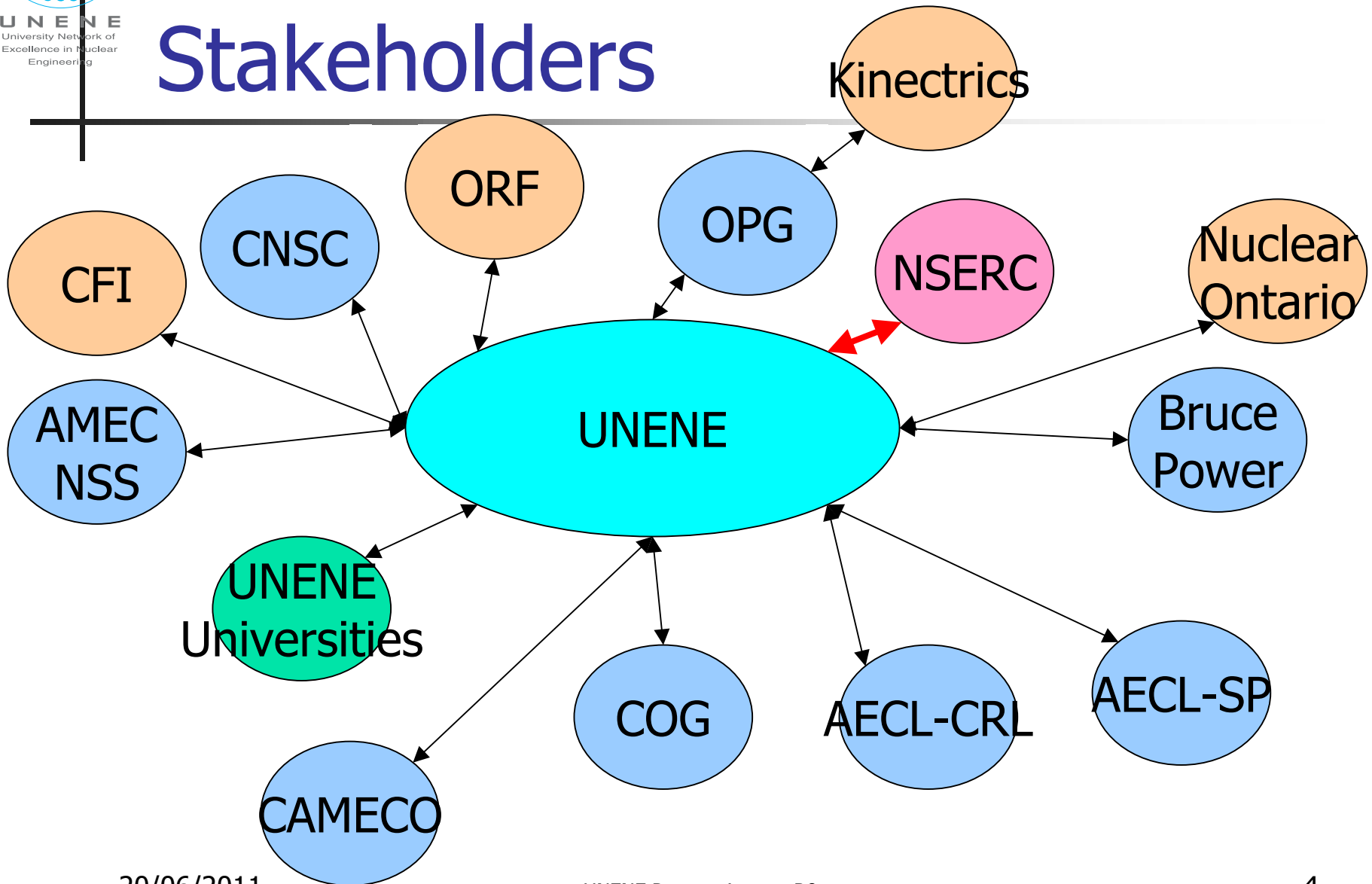
Queen's U.



AECL



# Stakeholders



# 1. UNENE Activities: IRCs

- Funds Industrial Research Chairs (IRCs) in nuclear subjects at 7 universities
  - Industry funds leverage government funds: M\$43 to date
  - > 100 Highly Qualified Personnel (HQP) – Ph.D., Post-Doctoral Fellow, M.Sc.
  - R&D focussed on industry needs



# 1. IRCs – cont'd

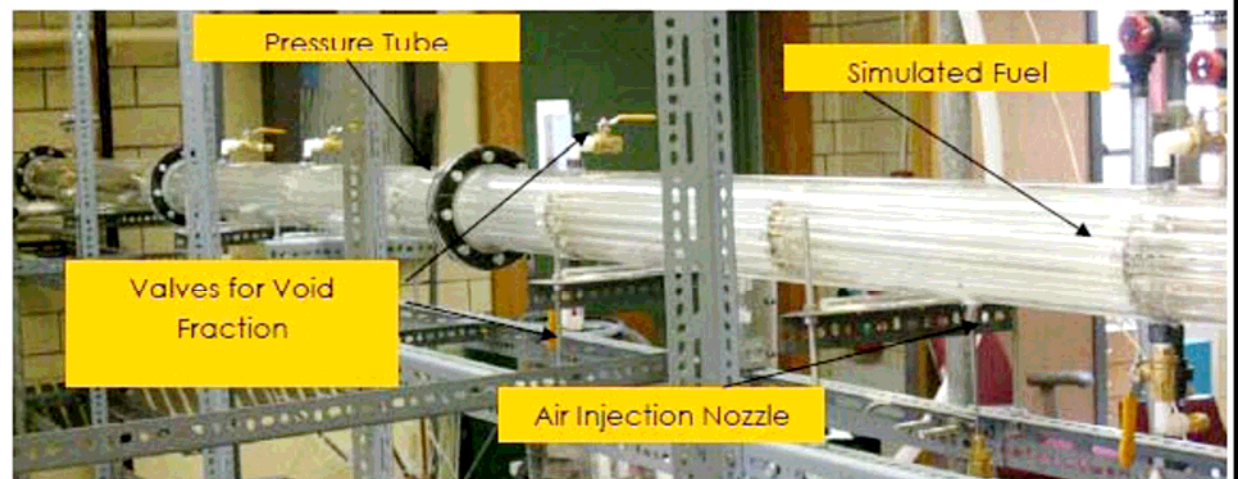
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- McMaster University: Safety and Thermalhydraulics (Luxat / Novog)
- Queen's University: Material Sciences (Holt / Daymond)
- University of Toronto: Corrosion Control and Materials Performance (Newman)
- University of Waterloo: Risk and Reliability (Pandey)
- University of Western Ontario (UWO): Instrumentation, Control, and Electrical (Jiang)
- Royal Military College (RMC): Fuel Technology (Lewis)
- University of Ontario Institute of Technology (UOIT): Health Physics and Environmental Safety (Waker / Waller)

Typically k\$200/year, matched by NSERC

## 2. Collaborative Research and Development Grants (CRDs)

- Smaller projects have been funded at Universities by UNENE / Natural Resources Canada
  - Topics closely tied to the IRC programs



## 2. CRDs – cont'd

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- Waterloo (Xie) – Seismic Risk Analysis
- McMaster (Lightstone) – Subchannel Mixing
- Guelph (Tremaine) – D<sub>2</sub>O Chemistry
- Western (Lau) – SCC in Alloy 800
- UOIT (Shahbazpanahi ) – NDT Sensors (Feeders)
- Ottawa (Tavoularis) – Thermalhydraulics
- Queens (Daymond) – DHC

Small projects ~\$30,000/year for 3 years



# 3. UNENE M.Eng.

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- Course based:
  - 10 courses OR
  - 8 courses plus a project
  - 3 of the 10 courses can be Business Courses from Advanced Design and Manufacturing Institute (ADMI)
- Accredited by Ontario Council on Graduate Studies
- Offered by McMaster, Waterloo, UOIT, Western and Queen's
- Geared to the working professional
  - Topics are relevant to industry work
  - Scheduling recognizes full-time employees

# Opportunities for Increased Collaboration on Thorium

1. With existing UNENE students:
  - Industrial research project
    - Instead of 2 courses
  - Work with professor and industry co-supervisor on project of interest to industry
  - Must be in addition to the day-job
  - Can limit distribution of the results
  - No further direct cost to industry
  - Usually done in ~4 months
  - Good successes in past
    - Criticality analyses of new fuel type in spent fuel bay

# Opportunities ... cont'd

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2. Through new CRDs:
  - No additional ones this year
  - Number set by funding level
  - Industry member could take a funding initiative to create more
  - High productivity for small outlay, especially if no equipment is required

# Opportunities ... cont'd

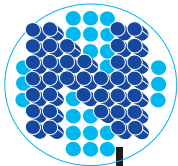
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3. Through further interaction with IRCs
  - IRCs supervise many students and try to choose areas of interest to nuclear industry
  - Thorium cycle has not been on the radar
  - This workshop is a good first step

# Summary

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- UNENE's mandate includes development of HQP and supporting industry via research
- Three methods of achieving increased collaboration on thorium development via UNENE projects, CRDs and IRCs



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# Discussion

