



# Welcome to the RAMP Users Meeting

*Enhancing Radiation Protection Worldwide through  
Collaborative Code Development and Maintenance*



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**Office of Nuclear Regulatory Research**

*2018 RAMP Meeting*  
*Abu Dhabi, UAE*  
*March 25 -29, 2018*

# *Welcome ! HOUSE KEEPING????*

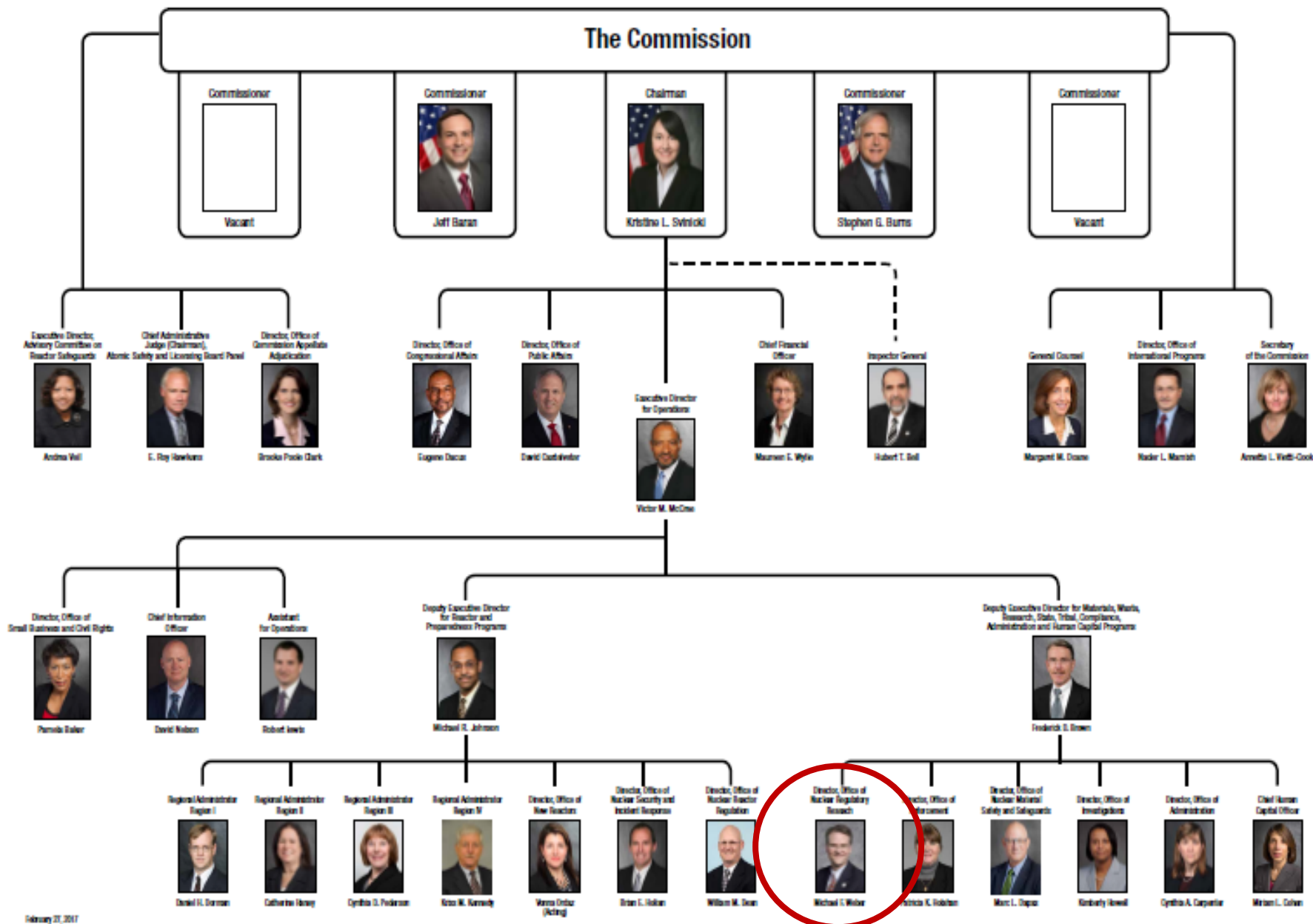
- Welcome to the 2018 RAMP Meeting
- Over 1000 registered RAMP Users
- Over 30 participants at this RAMP Meeting
  - Representatives from 4 Countries
    - UAE, South Africa, United Kingdom and United States

# AGENDA

- Who we are at the US NRC
- What is RAMP/Need for RAMP
- Computer Codes in RAMP
- Benefits of RAMP
- RAMP Website
- RAMP Partners
- What is New and Future Activities
- How to become a RAMP Member



# U.S. Nuclear Regulatory Commission



# Nuclear Regulatory Research

- Mandated by Congress
- Three technical divisions and a support organization:
  - Division of Engineering
  - Division of Risk Analysis
  - Division of Systems Analysis
  - Program Management, Policy Development & Analysis Staff
- About 200 engineers, scientists, analysts, and support staff.
  - ~ 30% M.S. and 30% Ph.D.
- About \$90M funding



# Research Mission

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- Develop technical bases to support regulatory decisions
- Conduct confirmatory and anticipatory research
- Provide specialized technical expertise and tools
- Partner with national labs, commercial contractors, universities, other government agencies, industry organizations, and international organizations
- Issue Commission and congressionally mandated reports
- Manage the Generic Issues Program

# Key Research Areas

- Thermal-Hydraulics Research
- Fuel and Core Research
- Severe Accident and Accident Consequences Research
- **Radiation and Environmental Protection Research**
- Risk Analysis Research
- Human Reliability and Human Factors Research
- Fire Safety Research
- External Events Research
- Materials Performance Research
- Structural Performance Research
- Digital Instrumentation & Control and Electrical Research
- Robust International Program



<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1925/>



# Research Roles

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- Licensees and applicants have the primary responsibility for nuclear safety and security
- NRC determines if a safety or security issue exists
- NRC conducts confirmatory and anticipatory research to confirm safety and security
- NRC develops tools, codes, and information to confirm safety and security
- NRC does not conduct developmental research



# International Research Collaboration

- Strong international cooperation
- 100+ bilateral or multilateral agreements with over 20 countries
  - Cooperative Research Programs
- Shared insights and resources
- Wide range of technical activities, including
  - Fukushima Activities
  - Halden Reactor Project
  - Zirconium Fire during Loss-of-coolant Accident Study
  - Fire Research



Halden Lab

# Cooperative Research Programs

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- **RAMP:** Radiation Protection Code Analysis and Maintenance Program to exchange information on radiation protection and dose assessment codes.
- **CSARP:** Cooperative Severe Accident Research Program to exchange information on severe accident safety issues related to reactor, spent fuel pool, and plant systems.
- **CAMP:** Code Applications and Maintenance Program to exchange information on thermal-hydraulic safety issues related to reactor and plant systems.
- **SGTIP:** Steam Generator Tube Integrity Program provides data and analysis for predicting the ability of degraded steam generator tubes to withstand normal operating and accident conditions.

# What Is RAMP?/Need for RAMP.

RAMP is a Computer Code Management Program for development, maintenance and distribution of radiation/dose assessment codes:

- Streamline updates/ recognized code issues
- Incorporating the latest accepted state of the art models
- Prioritize technical updates
- Achieve consistency in documentation
- Fiscally responsible by leveraging group dynamics
- Implement centralized and consistent management and control structure
- Leverage the US NRC expertise in member country activities
- Customer relationship management
- Obtain user-endorsed roadmap for codes



# Importance of RAMP

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- Collaborate on radiation protection, dose assessment, and emergency response computer codes
- Share knowledge about radiation safety through training, code discussions, and “in-kind” contributions
- Refine codes and models based on strengths and deficiencies from the user community
- Enhance nuclear and radiological safety
- Protect people and the environment

# Benefits to US Agencies and Countries

- For UAE
  - RASCAL: Input Atmospheric Information
- US DOE, EPA, NIST and States
  - Training, email help, forums
- For South Africa
  - RASCAL: Input Atmospheric Tower Information
  - ARCON96: Helping with confirmatory analysis
- For Canada
  - RASCAL: Candu Source Term
  - MILDOS: Specialized training to meet Uranium Mills and Mining needs
- For Taiwan
  - RASCAL: Inputting Reactor Source Term Information
  - GENII: Decommissioning Examples

# RAMP International Agreements and Activities

**Member contributions have saved NRC and Country resources and improved the codes. The larger user community and range of applications help to identify code problems and improved modeling approaches. Examples include:**

- Identifying code errors
- Plant modeling for new applications
- Improvement to code models

# What is New in RAMP?

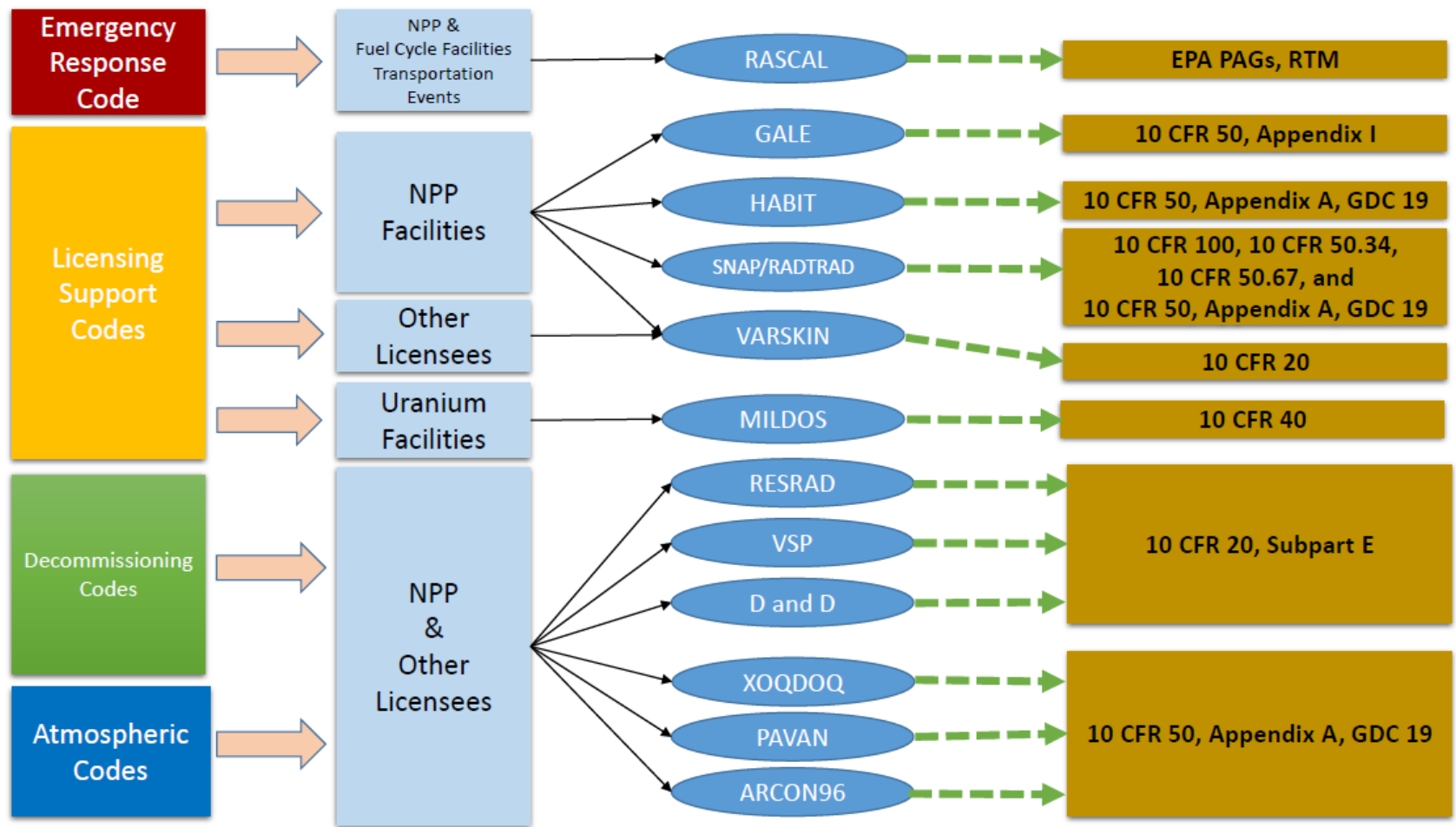
- Code Updates
  - RASCAL –
    - Online Training Modules
    - Forum – use the forum!!!!
  - RADTRAD –
    - Test Reports, User Manuals
  - HABIT – GUI
    - Added new Dense Gas model
- New to RAMP in 2016
  - GENII - chronic and acute exposure from the environment
  - MILDOS - 80-km radius of an operating uranium recovery facility
  - Atmospheric Codes - PAVAN, ARCON, XOQDOQ



# Future Activities in RAMP

- Include Additional Codes:
  - In talks with DOE for RESRAD, TurboFRMAC
- Updated Software Quality Assurance Program
- Combine Codes for Greater Efficiencies
- Maintain Code Development
  - Ensure Compatible platform
  - Consistent Documentation
- Develop online training and information modules
  - More RASCAL Modules, VARSKIN, RADTRAD
  - Health Physics and Radiation Safety Training
- Meeting regulatory requirements
  - Security and Safeguards

# RPB Code Development and Regulatory Applications



# Dose Assessment Codes in RAMP

## Environmental



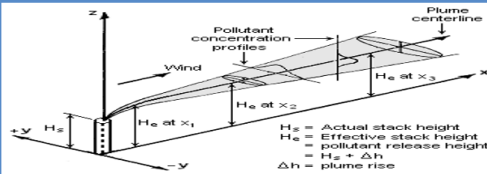
### MILDOS 4

Radiological Dose from Uranium Milling



**DandD**  
Decontamination and Decommissioning

## Atmospheric Codes

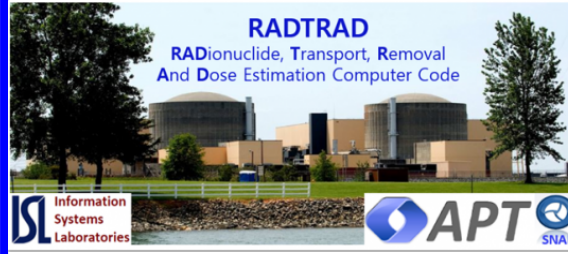


PAVAN

ARCON96

XOQ/DOQ

## NPP Licensing



**V5**  
varskin

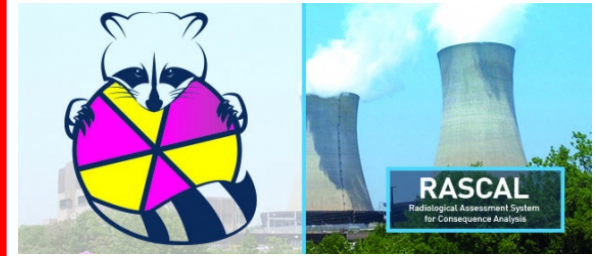
**VARSKIN**  
Computer Code for Skin  
Contamination Dosimetry

## Gaseous And Liquid Effluent



**H**  
Habit 2.0

## Emergency Response Code



## Other Dose Assessment Codes



**PIMAL**  
Phantom with Moving Arms and Legs

# Current RAMP International Agreements



# RAMP WEBSITE

<https://www.usnrc-ramp.com/>

# Your Role

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- Thank you for coming!
- Participate actively
- Share your insights
- Work together for safety
- Build networks
- Strengthen collaboration
- Enjoy Abu Dhabi