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THE RADIATION PROTECTION CODE ANALYSIS AND MAINTENANCE PROGRAM

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United States Nuclear Regulatory Commission

Office of Nuclear Research

2015 ISOE International ALARA Symposium

(Occupational Exposure Management at Nuclear Facilities)

Rio de Janeiro, Brasil

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AGENDA

- ✓ What is RAMP?
- ✓ Benefits to Member Countries
- ✓ Countries in RAMP
- ✓ Computer Codes in RAMP
- ✓ Next User Need Meeting and Training

WHAT IS RAMP?

- ✓ RAMP is a Computer Code Management Program -that will support development and maintenance of radiation/dose assessment codes
  - ✓ Streamline updates
  - ✓ Incorporating the latest accepted state of the art models
  - ✓ Prioritize technical updates
  - ✓ Achieve consistency in documentation
  - ✓ Implement a software QA program
  - ✓ Fiscally responsible by leveraging group dynamics
  - ✓ Implement centralized and consistent management and control structure
  - ✓ Responsive to the RAMP-user needs
  - ✓ Leverage the US NRC expertise in member country activities

Benefits to International Members

- Computer Codes will have:
  - Up to date ICRP Reports
  - Country Specific Reactor Types
  - International Units; Sv, Gy
  - Addressing other country specific needs

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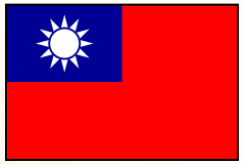
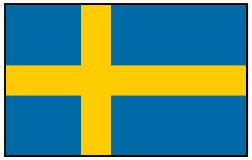
RAMP PARTNERS

- Canada
- South Africa
- South Korea
- American Institute of Taiwan
- United Arab Emirates (in discussions)
- Switzerland (in discussions)
- Sweden (in discussions)





INCORPORATING NATIONAL AND INTERNATIONAL ORGANIZATIONS

- ✓ Encouraging Organizations to join:
  - ✓ Regulators, licensees, vendor groups, etc
- ✓ Why?
  - ✓ Larger RP community exercises codes more thoroughly
  - ✓ User forums/groups benefit from multiple users
  - ✓ More efficient use of resources (larger resource pool)

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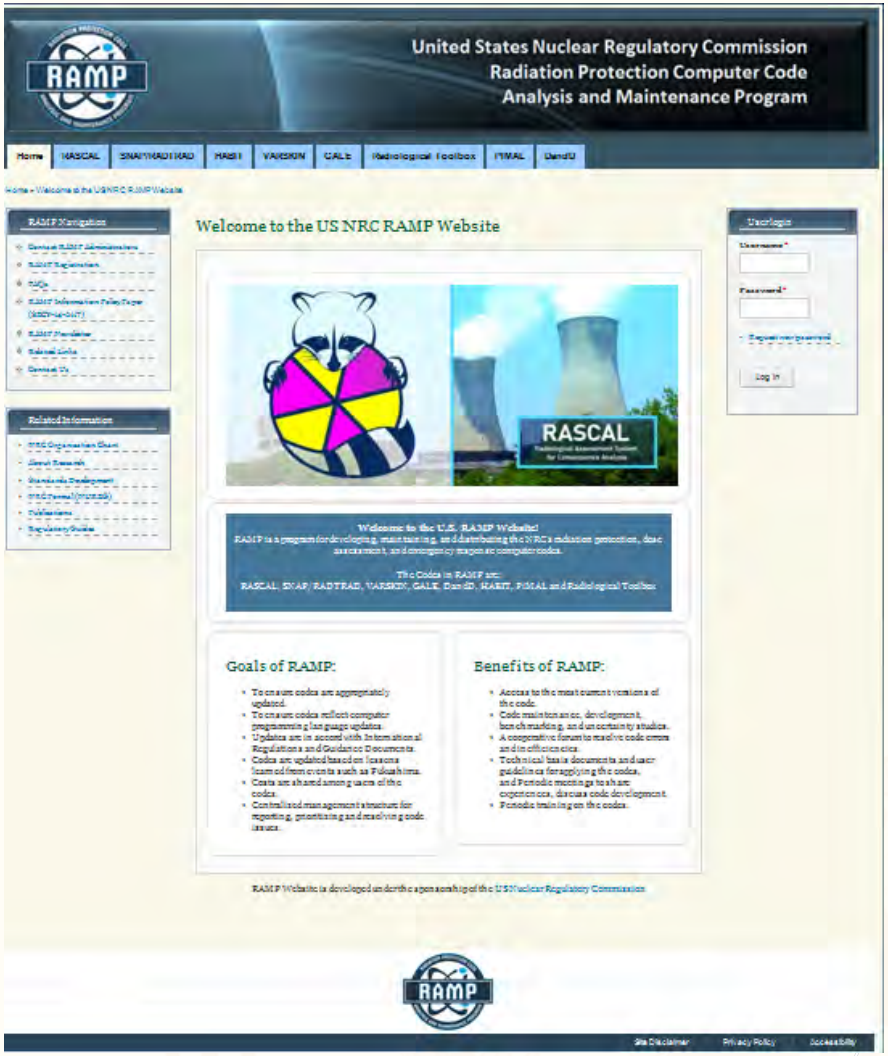
HTTPS://WWW.USNRC-RAMP.COM/



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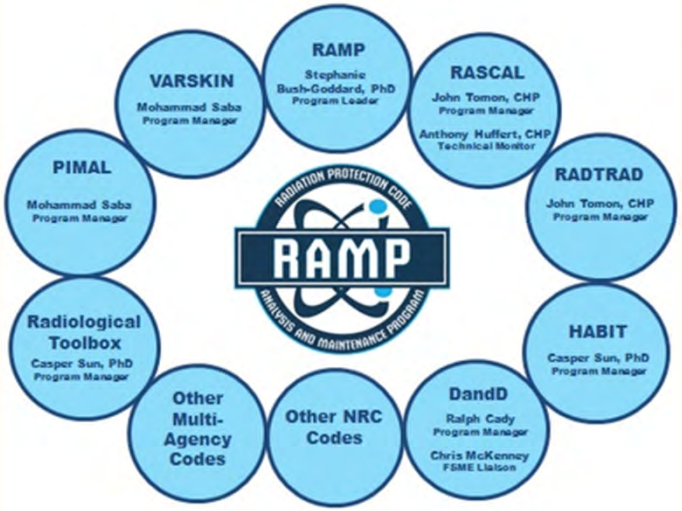
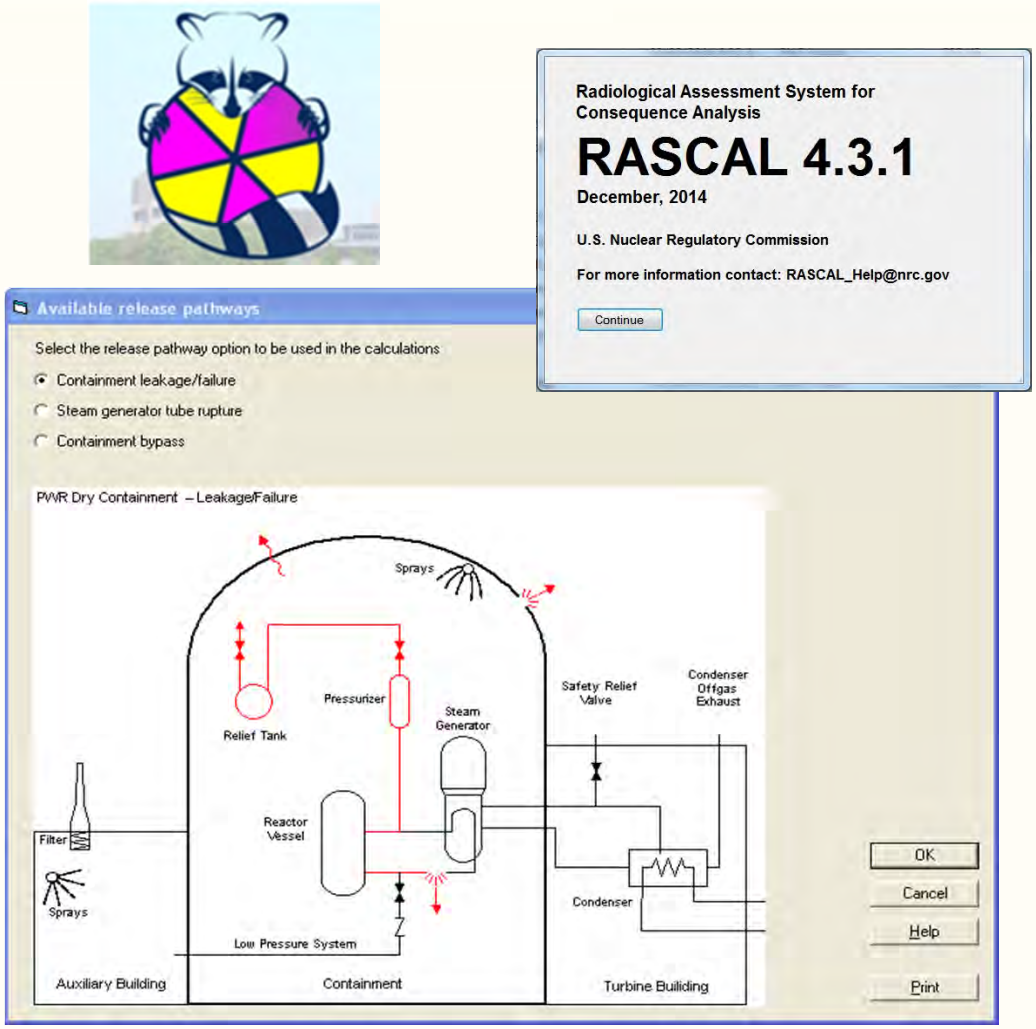
OBTAINING THE RAMP CODES

INTERNATIONAL

Who	Services	Cost	How
International Nuclear Regulatory Authorities	▫ All Codes in RAMP ▫ All Documentation ▫ All User Forums ▫ All Email Help Request ▫ All Training, when available ▫ Voting Member at RAMP User Meetings These services will be listed in the RAMP International Cooperative Research Agreement	20,000.00 USD/year	**Step 1:** Email Ramp@nrc.gov with the Regulatory International Officer contact information. **Step 2:** RAMPs International Program Team will send you a RAMP Agreement. **Step 3:** Upon US NRC and the Authority signing of the Agreements, access will be given for the services listed.
Non-Regulatory Authority, Companies, Universities, Hospitals	▫ All Codes in RAMP ▫ All Documentation ▫ All User Forums ▫ All Email Help Request ▫ All Training when available, but with limited seating per organization	20,000.00 USD/year	**Step 1:** Contact RAMP Administrators **Step 2:** Fill out, sign and email this non-disclosure agreement to ramp@nrc.gov or fax to 301-251-7423. **Step 3:** The RAMP contractor will present an invoice and contract to the entities. **Step 4:** Upon payment, you will be given access, by NRC, for the services listed.
All Others	Contact RAMP@nrc.gov		



CODES IN RAMP - RASCAL

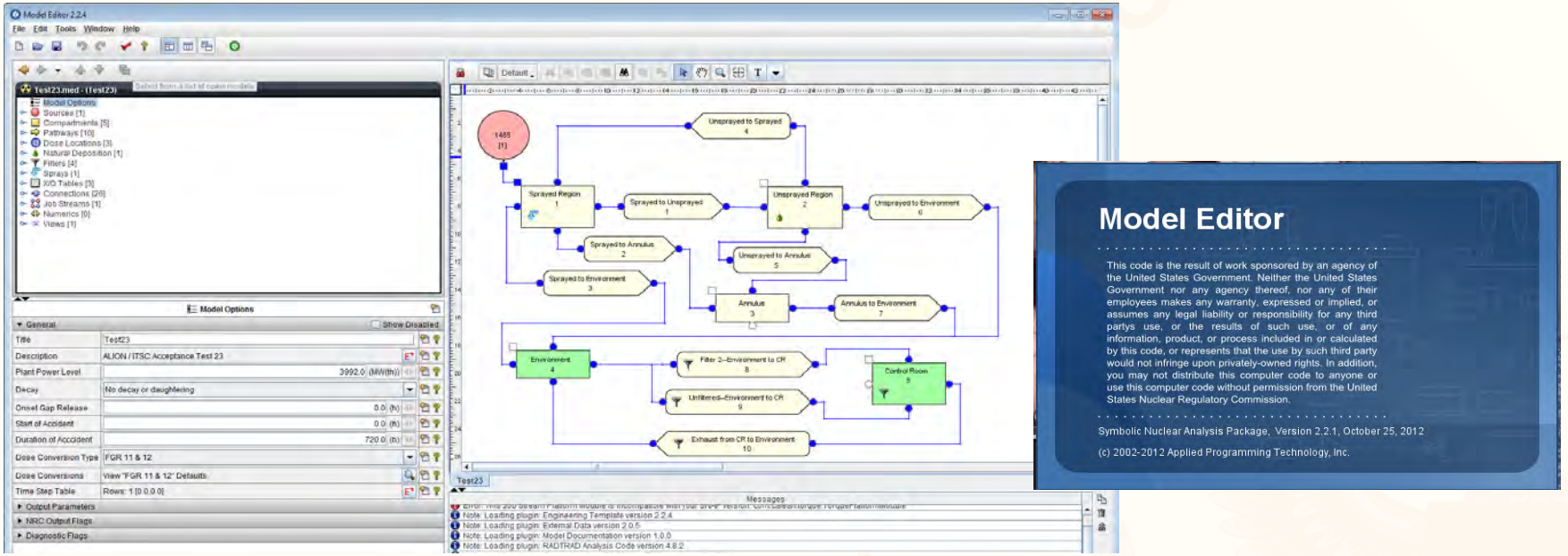


RASCAL

- Used for making dose projections during radiological emergencies
- premier code used by US NRC's emergency operations center
- Use during the Fukushima Accident
- InterRAS is the International Version of RASCAL

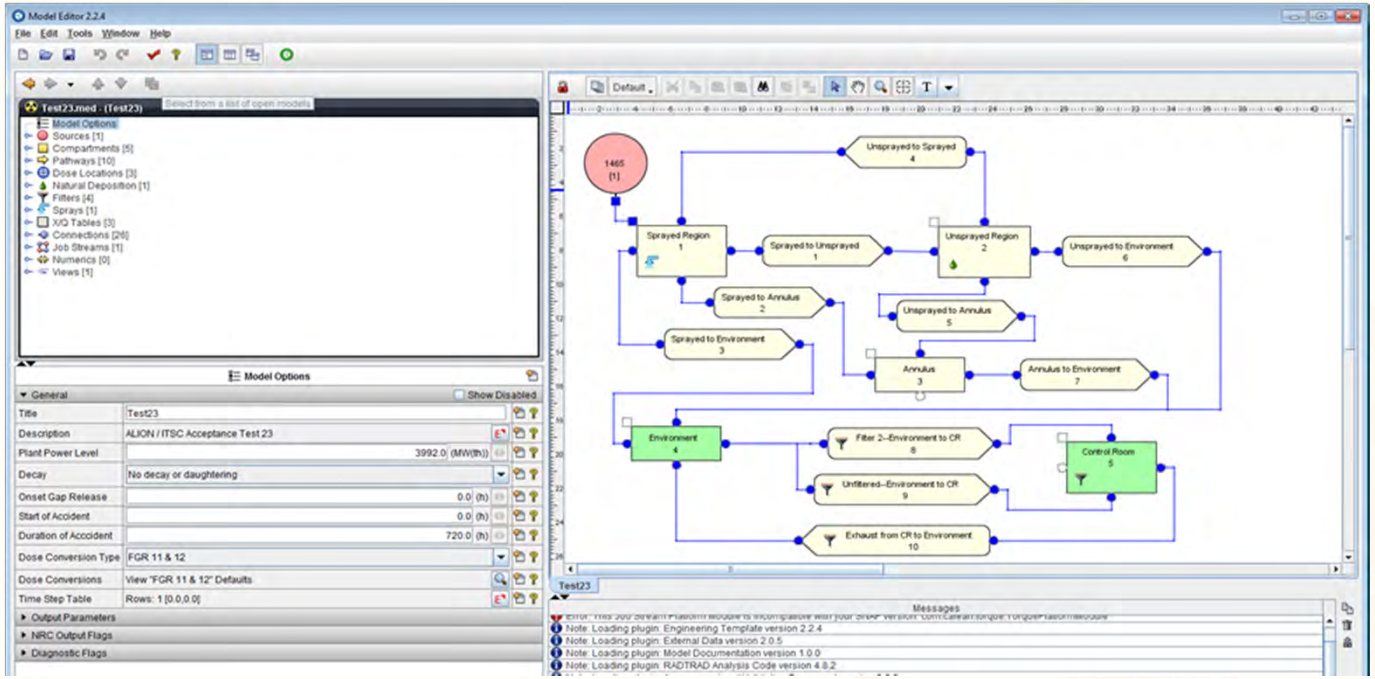
CODES IN RAMP – RADTRAD/SNAP

RADTRAD: RADionuclide Transport Removal And Dose Estimation code. The RADTRAD code uses a combination of tables and numerical models of source term reduction phenomena to determine the time-dependent occupational radiation exposures in the control room and to estimate site boundary doses at the exclusion area boundary (EAB) and low population zone (LPZ) for design basis accidents. Plugin to Symbolic Nuclear Analysis Package (SNAP).



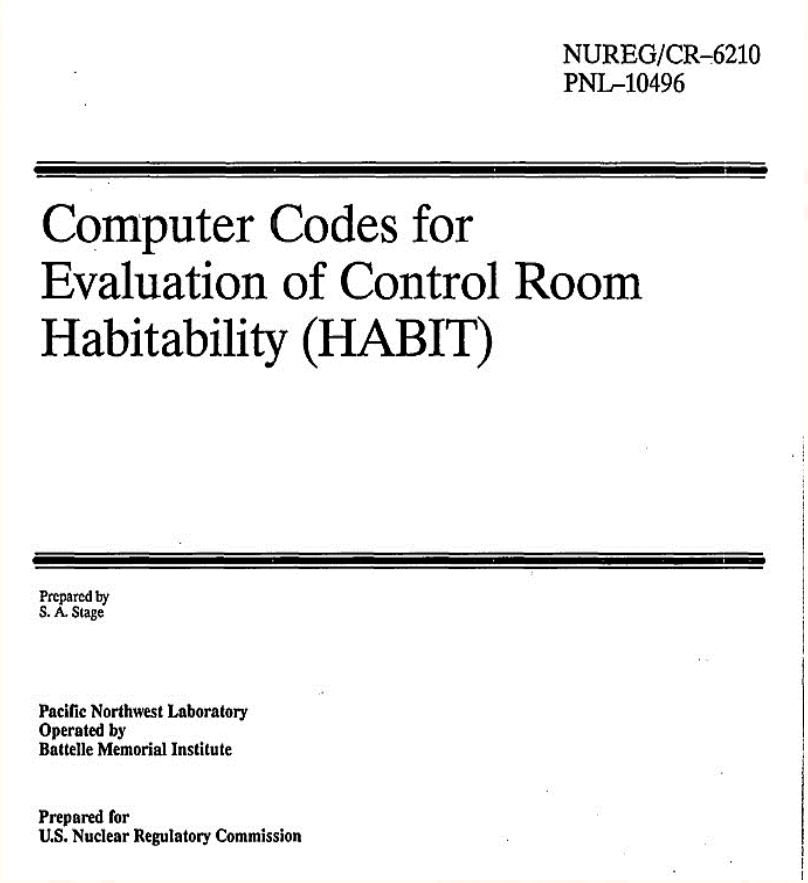
CORE SOFTWARE SNAP/RADTRAD

- **SNAP** (Symbolic Nuclear Analysis Package): is a graphical user interface which assists users in developing RADTRAD input decks and running the codes. The Symbolic Nuclear Analysis Package (SNAP) consists of a suite of integrated applications designed to simplify the process of performing engineering analysis. SNAP is built on the Common Application Framework for Engineering Analysis (CAFEAN) which provides a highly flexible framework for creating and editing input for engineering analysis codes as well as extensive functionality for submitting, monitoring, and interacting with the codes.



CODES IN RAMP - HABIT

HABIT: The computer code for evaluating control room HABITability. The HABIT code is an integrated set of computer programs used mainly to estimate chemical exposures that personnel in the control room of a nuclear facility would be exposed to in the event of an accidental release of toxic chemicals.



NUREG/CR-6210
PNL-10496

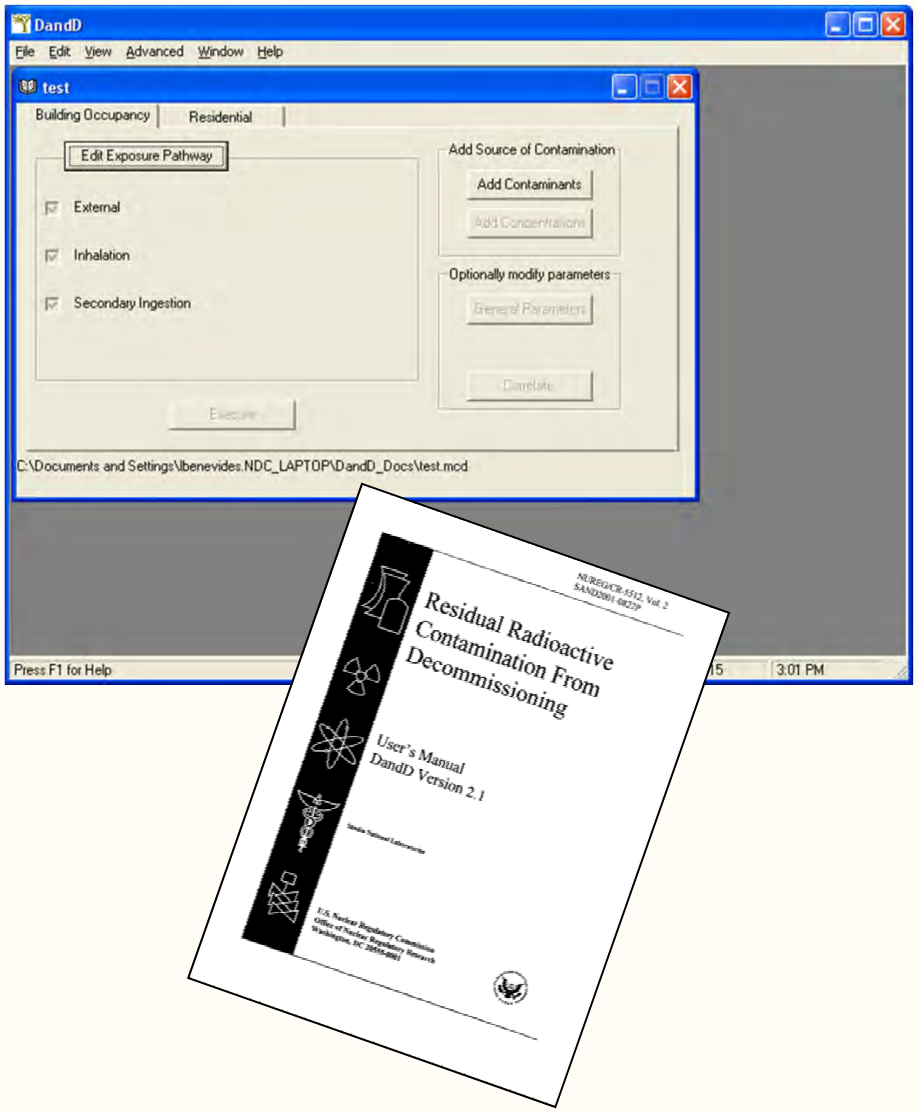
Computer Codes for Evaluation of Control Room Habitability (HABIT)

Prepared by
S. A. Stage

Pacific Northwest Laboratory
Operated by
Battelle Memorial Institute

Prepared for
U.S. Nuclear Regulatory Commission

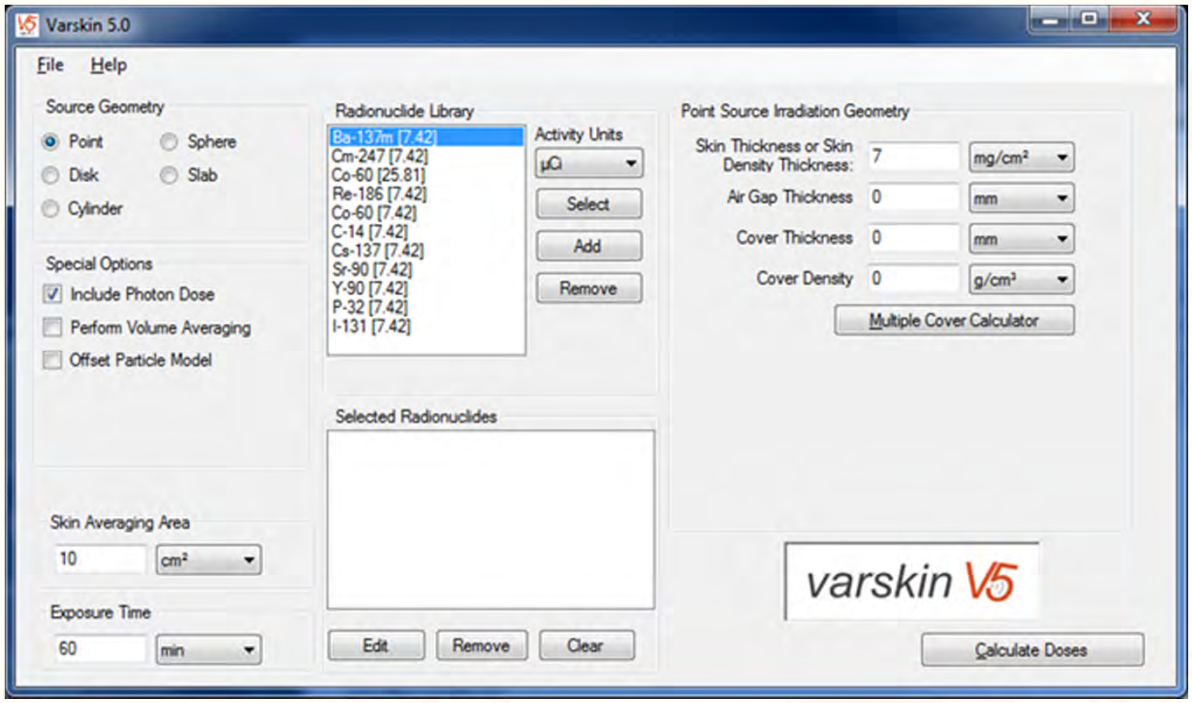
CODES IN RAMP – D AND D



DandD: The Decontamination and Decommissioning (DandD) software package, developed by NRC, assesses compliance with the dose criteria of 10 CFR Part 20, Subpart E. Specifically, DandD embodies NRC's guidance on screening dose assessments to allow licensees to perform simple estimates of the annual dose from residual radioactivity in soils and on building surfaces. For a screening assessment with DandD, NRC has predefined conceptual models for the scenarios along with default parameter distributions (based on NUREG/CR–5512, Volumes 1 and 3). DandD can also be used for site-specific analysis after verification that the site conceptual model is compatible with the conceptual model of the code.

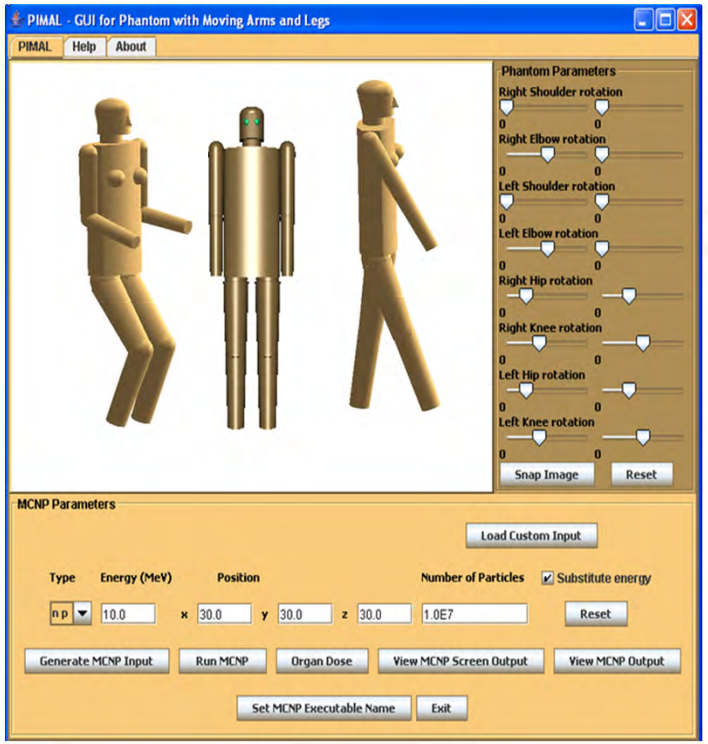
CODES IN RAMP - VARSKIN

VARSKIN: The code is used to perform confirmatory calculations of skin dose (from both beta and gamma sources) estimates at any skin depth or skin volume using different source to target geometries.

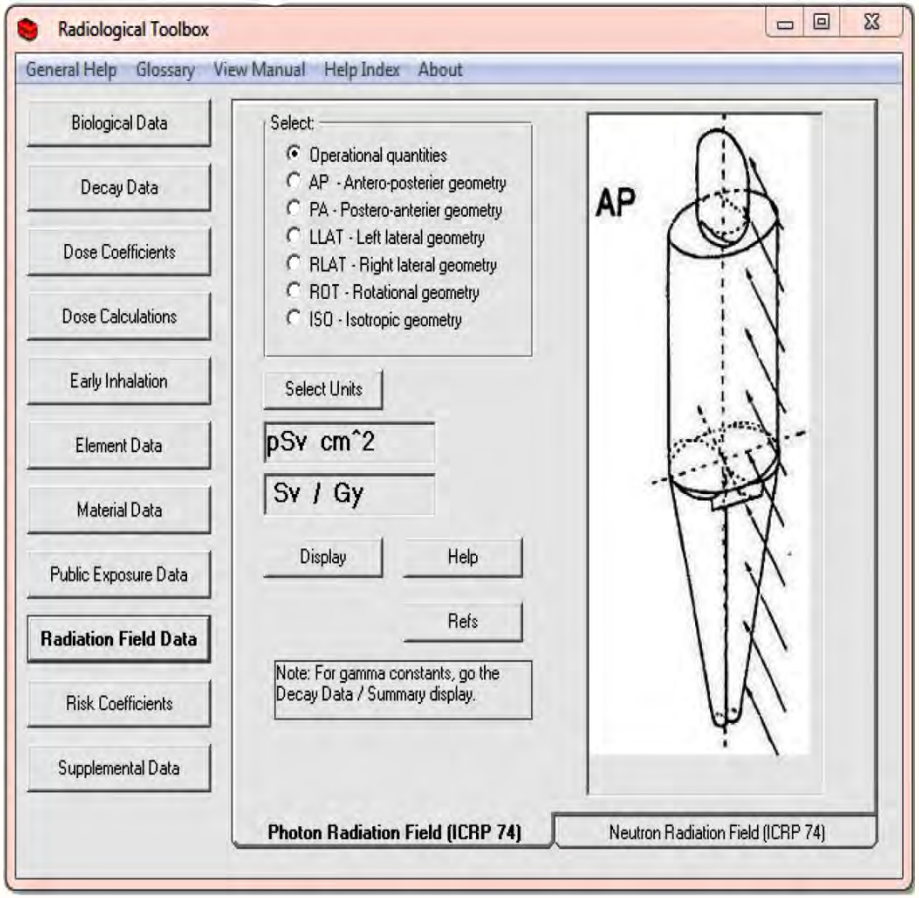


CODES IN RAMP - PIMAL

PIMAL: Phantom with Moving Arms and Legs is a graphical user interface with pre-processor and post-processor capabilities which assists users in developing Monte Carlo computer codes input decks (MCNP, EGS4 (Future), Penelope(Future)) and running the codes. It allows users to easily generate quantitative figures of merit regarding positioning arms and legs in difference geometries. PIMAL software is considered an efficient and accurate tool for performing dosimetry calculations for radiation workers and exposed members of the public.



CODES IN RAMP – RADIOLOGICAL TOOLBOX



Radiological Toolbox: The Radiological Toolbox provides ready access to data of interest in radiation protection of workers and members of the public. The data include dose coefficients for intakes of radionuclides, exposure to radionuclides distributed in the environment, and for exposures to photon and neutron radiation fields. Other supportive data include interaction coefficients for alpha, electron, photon and neutron radiations, nuclear decay data, biological and physiological data, and supplemental information on various topics.

CODES IN RAMP - GALE

- The GALE code estimates the Gaseous And Liquid Effluent from commercial light water nuclear power plants. This Fortran based code can provide estimates for gaseous and liquid effluent from either boiling or pressurized light water reactors for **pre-licensing** reviews. GALE is maintained at the Pacific Northwest National Laboratory under contract for the U.S. NRC Office of Research. The calculations are based on data generated from operating reactors, field tests, laboratory tests, and plant-specific design considerations incorporated to reduce the quantity of radioactive materials that may be released to the environment.

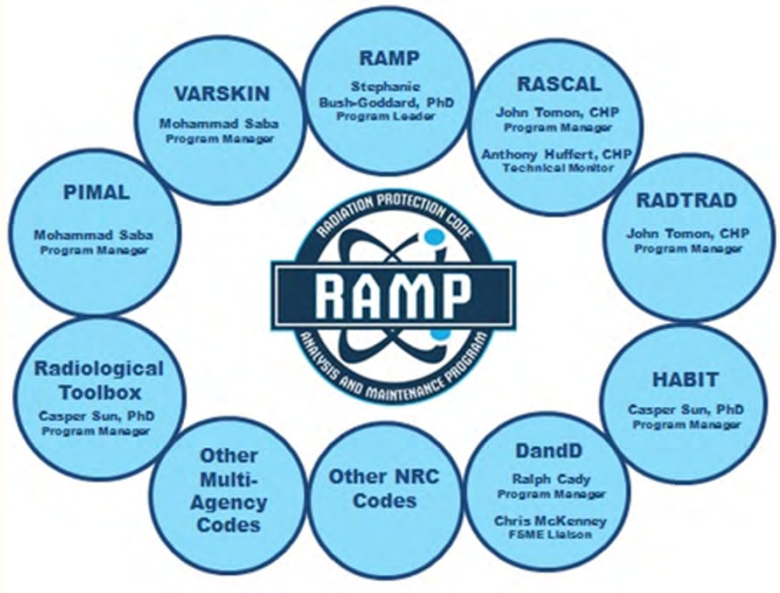
RAMP User Meetings

- September 2015 – Washington DC
- Spring 2016 – TBD (RAMP Country)
- Fall 2016 – Washington DC
- Spring 2017 – TBD (RAMP Country)
- Fall 2017 – Washington DC

1ST ANNUAL RAMP USER'S MEETING – WASH D.C.

October 5-9, 2015

United States Nuclear Regulatory Commission Rockville, MD



Topics to include:

RASCAL

VARSKIN

RADTRAD

D&D

GALE

Atmospheric Code Discussion

Advanced Dosimetry (PIMAL)

Registration Opens : May 30, 2015

Register at www.usnrc-ramp.com

Feel free to email ramp@nrc.gov for any questions/comments.

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QUESTIONS?

- United States Nuclear Regulatory Commission

  - Washington D.C.
  - Mailstop C0305
  - RAMP@nrc.gov
- 001-301-251-7528