



RADIATION PROTECTION COMPUTER CODE
ANALYSIS AND MAINTENANCE PROGRAM

2021 FALL USERS VIRTUAL MEETING

UNITED STATES NUCLEAR REGULATORY COMMISSION
OCTOBER 25 – NOVEMBER 4, 2021



WELCOME!

Audio – All participants will be muted.

Video – All participants video will be disabled.

Questions –

- Questions will be addressed at the end of the presentations.
- Please use chat feature to submit any questions.
- Please type your name, country, the question, and the person the question is directed to in the chat.
- If you have questions after the meeting, please email the questions to RAMP.ADMIN@pnnl.gov

Electronic Certificates –

- Available per request only. Please email RAMP.ADMIN@pnnl.gov.

Technical Issues –

- Please email RAMP@nrc.gov.

Meet the NRC RAMP Team

U.S. Nuclear Regulatory Commission (NRC) RAMP Team



Vered Shaffer, Ph.D.
RAMP Program Manager



Stephanie
Bush-Goddard, Ph.D.
RAMP Program Manager



Ed Harvey
RAMP Program Team



Erin Kennedy
RAMP Program Team

Pacific Northwest National Laboratory (PNNL) RAMP Team



Bruce McDowell
PNNL RAMP Program
Manager



Caitlin Condon
PNNL Health Physicist



Luba Hamilton
PNNL RAMP Program
Coordinator



Tanya Korotkov
PNNL RAMP Program
Coordinator

Leidos RAMP Team



Daniel Pomykala
Leidos RAMP Program
Manager



Wendy Chinchilla
Leidos RAMP Website
Technical Lead

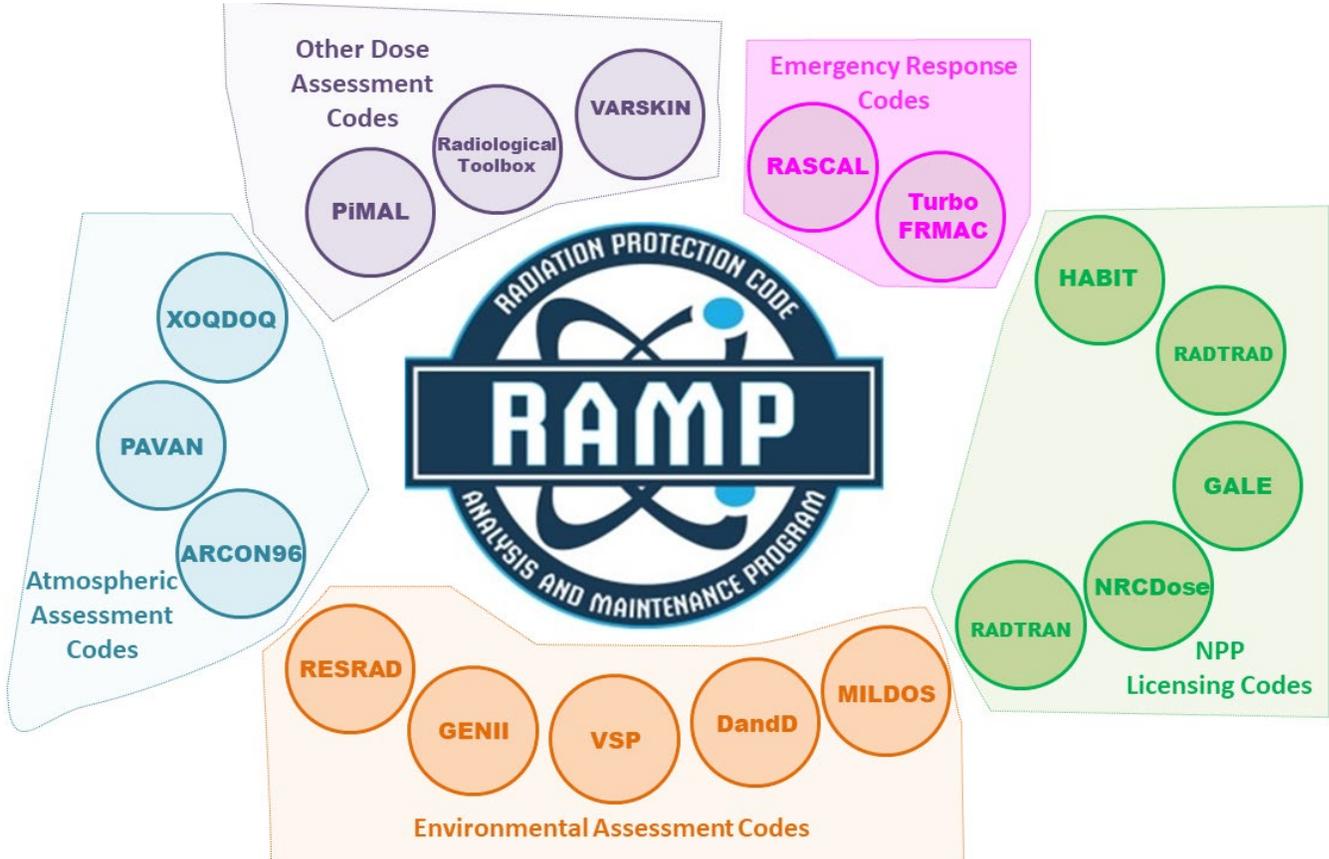


Jason Luttrell
Leidos RAMP Website
Developer



Frederic Gooding
Leidos RAMP Operations
Support

Radiation Protection Computer Code Analysis and Maintenance Program (RAMP) Codes



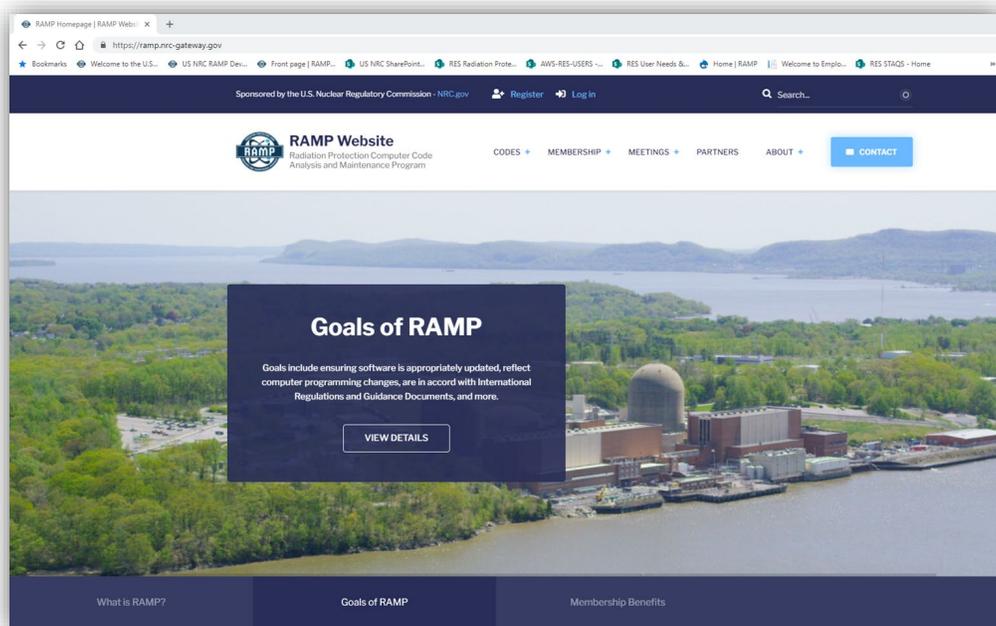
RAMP International Agreements



Opening Agenda

2021 Fall RAMP Users Meeting — Opening Session

8:30 – 8:35 AM	Opening and Housekeeping	Bruce McDowell PNNL RAMP Program Manager
8:35 – 8:40 AM	Welcome Remarks	Ray Furstenau, Director Office of Nuclear Regulatory Research
8:40 – 8:50 AM	Welcome from the RAMP Team	John Tomon, CHP, Chief Radiation Protection Branch
8:50 – 9:15 AM	Feature Presentation: DOE Deputy Assistant Secretary for Reactor Fleet and Advanced Reactor Deployment	Alice Caponiti, Deputy Assistant Secretary Office of Nuclear Energy
9:15 – 9:35 AM	RAMP Back to Basics	Vered Shaffer, Ph.D. & Edward Harvey NRC RAMP Program Managers
9:35 – 9:45 AM	RAMP User Meeting Information & Roll Call	Erin Kennedy, NRC RAMP Team



RAMP

Radiation Protection Computer Code
Analysis and Maintenance Program

FALL 2021 USERS GROUP VIRTUAL MEETING

OCTOBER 25, 2021 | 10:00 AM TO 12:00 PM

Virtually hosted on Microsoft Teams

All times U.S. Eastern Daylight Time (EDT)



STUDENT SYMPOSIUM

Moderator: Jessica Strongin

10:00 AM – 10:15 AM

RAMP Data Management and User Analytics

Jessica Strongin | University of Maryland/NRC

10:15 AM – 10:30 AM

Assessment of the Vehicle Transport Accident Involving Naturally Occurring Radioactive Materials Using RADTRAN

Hilali Hussein Ramadhan | KEPCO International Nuclear
Graduate School, Republic of Korea

10:30 AM – 10:40 AM

Key elements of a field study for the comparison of human and UAV radiological surveys for decommissioning radiological facilities

Kelly O'Malley | Oregon Institute of Technology/PNNL

10:40 AM – 10:55 AM

Interrogation methods for existing computer models

Adam Stein | Carnegie Mellon University

11:00 AM – 11:10 AM Break

11:10 AM – 11:25 AM

Design of a Novel Decision-Making Tool for the Analysis of Protective Actions during a Radiological Release

Emily Downing | Purdue University

11:25 AM – 11:40 AM

Exacting the Science of Sheltering-in-Place

Todd Smith | Oregon State University/NRC

11:40 AM – 11:55 AM

PIMAL Overview and Example Application in Dosimetry Assessment of a Fission-Based Weapon"

Ethan Asano | Georgia Institute of Technology

RAMP

Radiation Protection Computer Code
Analysis and Maintenance Program

FALL 2021 USERS GROUP VIRTUAL MEETING

OCTOBER 25, 2021 | 1:00 PM TO 4:00 PM

Virtually hosted on Microsoft Teams

All times U.S. Eastern Daylight Time (EDT)



DOSIMETRY ANALYSIS SYMPOSIUM

1:00 PM – 1:20 PM

The Taurus Internal Dosimetry Software

Anthony E Riddell, Ph.D. | Internal Dosimetry Group
Leader, Interim Head of Radiation Hazards and
Emergencies Department, United Kingdom Health
Security Agency

1:20 PM – 1:40 PM

Modeling Extravasation Dosimetry

William Thomson, Ph.D. | Head of Physics and Nuclear
Medicine (Ret.), City Hospital, Birmingham, UK

1:40 – 1:50 PM BREAK

1:50 PM – 2:10 PM

Breastfeeding Dosimetry Analysis for Regulatory Guide 8.39 “Release of Patients Administered Radioactive Material”

Roland Benke, Ph.D. | CHP, Partner/Advisory Engineer,
Renaissance Code Development LLC

2:10 PM – 2:30 PM

“Can I Pet My Pets????” A Dosimetry Risk Analysis for Veterinarian Use of Radiopharmaceuticals

Rigel Flora, M.S. | Associate Scientist, Renaissance
Code Development LLC

2:30 PM – 2:50 PM

Dosimetry of Hot Particle in the Gastrointestinal Track

Shlomi Halfon, Ph.D. | Soreq Nuclear Research Center,
Israel

2:50 – 3:00 PM BREAK

3:00 PM – 3:20 PM

Deep Dose Equivalent Analysis Using VARSKIN+

Colby Mangini, Ph.D. | CHP, Advisory Scientist,
Renaissance Code Development LLC

3:20 PM – 3:40 PM

Is Wearing a Mask During a Radiological Emergency Helpful or Harmful? Skin and Inhalation Dose Assessment

Adam Stricker | U.S. NRC Summer Intern

3:40 PM – 4:00 PM

Internal Radiation Dose Evaluation for an Unruptured Post Release Tristructural Isotropic Fuel Particle for Advanced and Micro-reactor Applications

Caitlin Condon, Ph.D. | Pacific Northwest National
Laboratory

VARSKIN Training

Instructors:



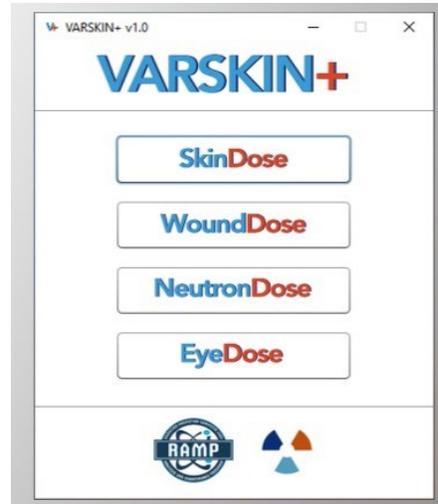
David Hamby, Ph.D.

Renaissance Code
Development, LLC
(RCD)



Colby Mangini, Ph.D.

Renaissance Code
Development, LLC
(RCD)



VARSKIN+ is used to calculate occupational dose to the skin resulting from exposure to radiation emitted from hot particles or other contamination on or near the skin. These assessments are required by Title 10 of the Code of Federal Regulations (10 CFR) 20.1201(c), which states that the assigned shallow dose equivalent is to the part of the body receiving the highest exposure over a contiguous 10 cm² of skin at a tissue depth of 0.007 centimeters (7 mg/cm²).

With the release of VARSKIN+ three new physics modules are introduced: (1) wound dosimetry; (2) neutron dosimetry; and (3) eye dosimetry. Skin and wound dosimetry implement a new alpha dosimetry model for shallow skin assessments. VARSKIN+ can be used to perform wound dose assessments if the metabolic modeling and dosimetry methods are consistent with NRC regulations (e.g., use of 10 cm² averaging area for skin dose assessments and tissue or organ weighting factors as defined in 10 CFR 20.1003).

Course Requirements:

- Attendees must provide their own laptop computer with the current version of VARSKIN+ installed prior to the start of the meeting.
- Before taking the course, all attendees should complete the online course "Introduction to VARSKIN."



RAMP – User Group Meeting

Non-LWR HP Technical Meeting Challenges and Approaches for Code Development

U.S. Nuclear Regulatory Commission

October 28, 2021



AGENDA

TIME	TOPIC	PRESENTER
8:30-8:35	Introductory Remarks	Bruce McDowell (PNNL)
8:35-8:45	Welcome	John Tomon (NRC)
NRC Initiatives		
8:45-9:00	Update: NRC Strategic Non-LWR Vision	Steven Lynch (NRC)
9:00-9:15	Advanced Reactors Generic EIS	Ken Erwin (NRC)
9:15-9:30	Emergency Planning Zone	Todd Smith (NRC)
9:30-9:45	Non-LWR Accident Tolerant Fuel Transportation	Bernie White (NRC)
9:45-10:00	Office of Research Radiation Protection Updates	Stephanie Bush-Goddard (NRC)
10:00-10:15	Break	
Advanced Non-LWR Initiatives		
10:15-10:30	Gateway for Accelerated Innovation in Nuclear	Christine King (DOE)
10:30-10:45	National Reactor Innovation Center	Ashley Finan (INL)
10:45-11:00	Mobile Nuclear Power Plant	Jama D. VanHorne-Sealy (Army)
11:00-11:15	Nuclear Power in Alaska	Gwen Holdmann (ACEP)
11:15-11:30	Nuclear Alternative Project – Puerto Rico	Jesus Nunez (NAP)
11:30-11:45	Non-LWR Updates in Canada	Aurelian Tanase (Canada-CNCS)
11:45-12:00	Morning Wrap-up	Stephanie Bush-Goddard (NRC)
12:00-1:00	Lunch	
Industry HP Code Approaches		
1:00-1:10	Introduction	Michelle Hart (NRC)
1:10-1:30	RADTRAD and HP Challenges with Non-LWR Designs	Emma Redfoot (OKLO)
1:30-1:50	The Use of RAMP Codes for Source Term Analysis of the Kairos Power Fluoride Salt-Cooled High Temperature Reactor	Matthew Denman (Kairos Power)
1:50-2:10	X-Energy Mechanistic Source Term	Milan Hanus (X-energy)
2:10-2:30	RADTRAD Source Term (Non-LWR)	Nolan Bartlow (ISL)
2:30-2:45	Break	
NRC Code Consolidation Update		
2:45-3:00	Consolidated Code Approach Overview	Jeremy Rishel (PNNL)
3:00-3:15	Consolidated Code Source Term Module	Nicole LaHaye (PNNL)
3:15-3:45	Consolidated Code Atmospheric Module	Saikat Ghosh (PNNL)
3:45-4:00	Wrap-up & Closing Remarks	John Tomon (NRC)

RAMP – User Group Meeting

Non-LWR HP Technical Meeting

Challenges and Approaches for Code Development

U.S. Nuclear Regulatory Commission

October 28, 2021



Christine King

Christine King is the new director of DOE's Gateway for Accelerated Innovation in Nuclear (GAIN) initiative. She most recently served as the operations director for an emerging venture capital firm focused on bringing private capital into the developing advanced nuclear sector to help speed these disruptive technologies to market. Her knowledge and experience include leading a nuclear division for a consulting firm, working in long term R&D with EPRI, and working nuclear plant outages focused on steam generator reliability. Her unique experience is a valuable asset as we assist advanced nuclear entrepreneurs in being able to compete within the broader energy and capital markets. The GAIN initiative is a well-known, respected cornerstone of the advance reactor community; Christine's passion for tackling obstacles fits perfectly with their prior success.



Ashley Finan

Ashley Finan is the Director of the National Reactor Innovation Center at the Idaho National Laboratory. In this role, she is responsible for overseeing initiatives to provide resources to reactor innovators to test, demonstrate, and conduct performance assessments to accelerate the deployment of advanced nuclear technology concepts. Dr. Finan most recently served as Executive Director for the Nuclear Innovation Alliance, where she was responsible for managing the organization's strategy, operations, policy and technical development, stakeholder outreach, and fundraising. She provided expert guidance to policymakers, academic teams, industry stakeholders, and NGOs. Dr. Finan previously served as a Director of Nuclear Innovation at Clean Air Task Force.



RAMP – User Group Meeting

Non-LWR HP Technical Meeting Challenges and Approaches for Code Development

U.S. Nuclear Regulatory Commission

October 28, 2021



Jama D. VanHorne-Sealy

Lieutenant Colonel Jama D. VanHorne-Sealy is the manager of the Army Reactor Program in Bethesda, Maryland. She has served in numerous roles in the Army throughout her career, including as an assistant professor of preventive medicine and biometrics and director of radiation safety for the Uniformed Services University of the Health Sciences, as the primary advisor on nuclear and radiation issues for the Office of Health Affairs and the chief medical officer of the Department of Homeland Security, and as the lead for the Department of Defense Medical Radiobiology Advisory Team and instructor for the Armed Forces Radiobiology Research Institute Medical Effects of Ionizing Radiation course.



Gwen Holdmann

Gwen Holdmann is the Director of the Alaska Center for Energy and Power (ACEP), which is an applied energy research program based at the University of Alaska Fairbanks focusing on both fossil and renewable/alternative energy technologies. Gwen is a co-author of a report that provides Alaskans with a snapshot of the current status of SMR and MNR technologies, relevant state and national policies and regulations, and economics related to potential deployment in Alaska. It updates portions of a 2011 study completed by the Alaska Center for Energy and Power (ACEP, University of Alaska Fairbanks) in partnership with the Institute of Social and Economic Research (ISER, University of Alaska Anchorage) titled "Small Scale Modular Nuclear Power: An Option for Alaska?" It also complements a 2020 market survey prepared by the Center for Economic Development at the University of Alaska Anchorage titled "Microreactors in Alaska: Use Case Analysis" for the U.S. Department of Energy.



RAMP – User Group Meeting
Non-LWR HP Technical Meeting
Challenges and Approaches for Code Development
U.S. Nuclear Regulatory Commission
October 28, 2021



Jesus M. Nunez

Jesus M. Núñez is co-founder and Chief Executive Officer of the non-profit organization The Nuclear Alternative Project. This organization educates communities about the technological advances of small modular nuclear reactors or better known as SMRs or microreactors. He is also a senior structural engineer at Bechtel with over thirteen years of experience in the design of nuclear power plants, transmission and distribution lines, chemical weapons processing plants, and Department of Energy projects. His experience in these projects involves structural design and structural technical support during construction. He holds a master of science degree in civil engineering with a specialty in structures of the University of Puerto Rico Mayaguez Campus. In addition, he holds professional licenses in Puerto Rico and in the state of Maryland. Currently, he works as a resident structural engineer in the construction of the new DOE facilities at the Y12 National Laboratory.



VSP Boot Camp and Drones Agenda

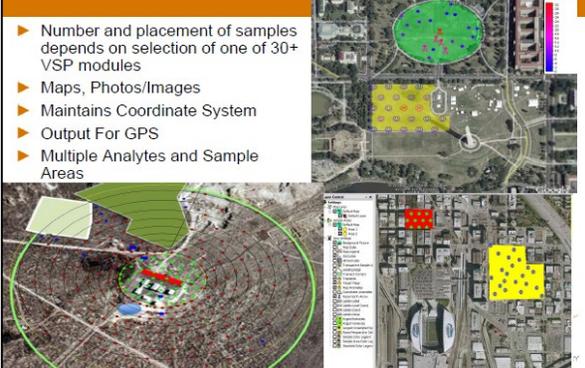
October 29, 2021

9:00 AM – 9:05 AM	Welcome	Kerstun Norman (NRC)
9:05 AM – 9:15 AM	Introduction and VSP Overview	Lisa Newburn (PNNL)
9:15 AM – 9:45 AM	Quick Tour of VSP (Hands On)	Lisa Newburn (PNNL)
9:45 AM – 10:20 AM	Systematic Planning, DQO Process and MARSSIM	Deb Fagan (PNNL)
	10-minute break	
10:30 AM – 10:50 AM	Statistical Concepts Review	Deb Fagan (PNNL)
10:50 AM – 11:30 AM	VSP Maneuvering and Procedures	Lisa Newburn (PNNL)
11:45 AM – 12:00 PM	Exercise 1: Creating a Map and Survey Unit	Lisa Newburn / Deb Fagan
	Lunch Break	
1:30 PM – 1:45 PM	Review Exercise 1	Lisa Newburn / Deb Fagan
1:45 PM – 2:15 PM	Exercise 2: Setting up a MARSSIM Sampling Plan	Lisa Newburn / Deb Fagan
2:15 PM – 3:00 PM	Exercise 3: Importing and Analyzing Data	Lisa Newburn / Deb Fagan
3:00 PM – 4:00 PM	Drones	Amoret Bunn (PNNL)

Outdoor Sampling and Analysis

- ▶ Number and placement of samples depends on selection of one of 30+ VSP modules
- ▶ Maps, Photos/Images
- ▶ Maintains Coordinate System
- ▶ Output For GPS
- ▶ Multiple Analytes and Sample Areas



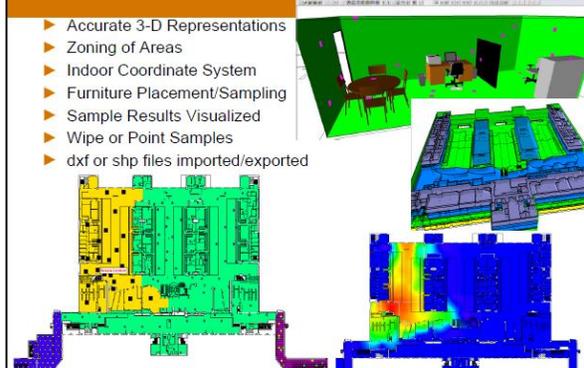


The collage shows various outdoor sampling scenarios: a large stadium with a green circular sampling area, a city street map with yellow and red sampling points, and a 3D visualization of a sampling area over a terrain.

Indoor Surface Sampling and Analysis

- ▶ Accurate 3-D Representations
- ▶ Zoning of Areas
- ▶ Indoor Coordinate System
- ▶ Furniture Placement/Sampling
- ▶ Sample Results Visualized
- ▶ Wipe or Point Samples
- ▶ dxf or shp files imported/exported





The collage shows indoor sampling visualizations: a 3D room model with furniture and sampling points, a 2D floor plan with colored zones, and a 3D visualization of a sampling area over a building structure.

RASCAL Training

Instructors:



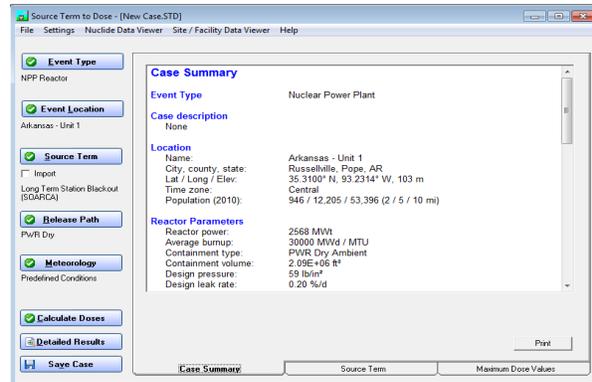
George Athey

Athey Consulting



Jeff Kowalczyk, CHP

NRC



The Radiological Assessment System for Consequence AnaLysis (RASCAL) computer code is an emergency response software used to assess off-site consequences from a radiological release incident at a nuclear power plant or materials facility. This training course is a hands-on computer class for new and experienced RASCAL users using the current version of the code (RASCAL v4.3.3). It guides users through simulated release scenarios to develop an understanding of the RASCAL models, inputting data, and interpreting results.

Course Requirements:

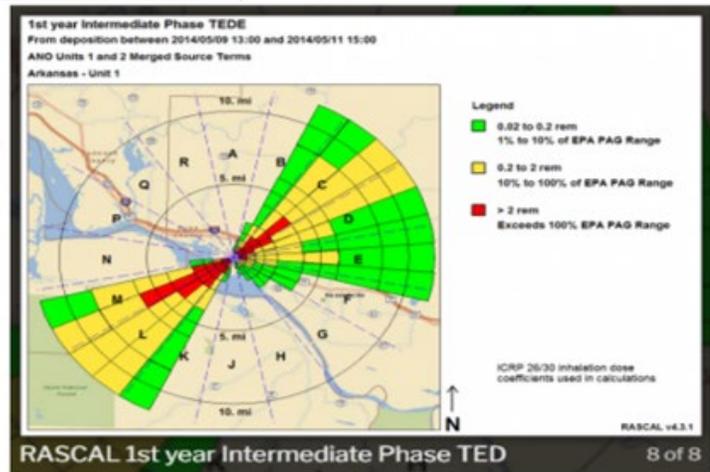
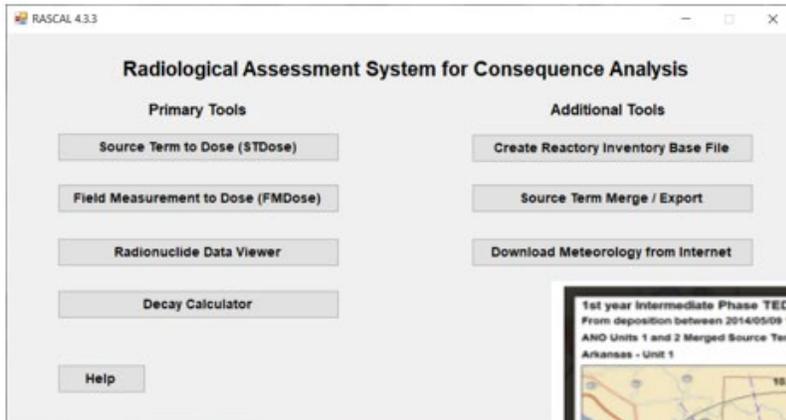
- Attendees must provide their own laptop computer with RASCAL 4.3.3 installed prior to the start of the meeting.
- Installation issues? Contact rascal_help@nrc.gov.



RASCAL Agenda

November 1-4, 2021

Monday, November 1, 2021	
8:30 AM – 11:30 AM	RASCAL for Beginners
11:30 AM – 12:00 PM	Q&A for Beginners
Tuesday, November 2, 2021	
8:30 AM – 11:30 AM	RASCAL Models Overview
11:30 AM – 12:00 PM	Q&A (optional)
Wednesday, November 3, 2021	
8:30 AM – 11:30 AM	RASCAL Scenario Problems
11:30 AM – 12:00 PM	Q&A (optional)
Thursday, November 4, 2021	
8:30 AM – 11:30 AM	RASCAL Advanced Discussion
11:30 AM – 12:00 PM	Q&A (optional)



THANK YOU FOR ATTENDING
STAY TUNED
2022 Spring International Users Group Virtual Meeting



For additional information:

Email:

RAMP@nrc.gov

RAMP.Admin@pnnl.gov

RAMP Website:

<https://ramp.nrc-gateway.gov>