Radiological Operations Support Specialist (ROSS) and You - A Call to Arms for Health Physicists

Daniel Blumenthal, PhD, CHP
The Problem

During a radiological emergency,

Fear and lack of familiarity about radiation add complexity and uncertainty to decisions and operations
  – Responders may delay essential lifesaving activities
  – Responders may not adequately manage their own safety

Radiation protection experts do not routinely respond to emergencies and may lack skills to support an emergency

We need the radiation protection experts to assist with the emergency response.
ROSS as a Solution

Radiological Operations Support Specialist program is a means for *local health physicists and other personnel with radiological knowledge* to support radiological response operations in an emergency.

ROSS volunteers will support emergency operations by:

- Supporting the incident command system structure,
- Helping access specialized federal resources and tools,
- Interpreting and explaining health physics response data and predictive modeling results,
- Providing guidance to responders, incident commanders, elected officials, and decision-makers on appropriate protection actions for responders and the public, and
- Aiding public and responder communication efforts.
ROSS Integration

The ROSS is a State and Local asset, not a representative of federal agencies. Although they will often activate, use, and integrate federal capabilities into the response, they report to and work in the best interests of state and local agencies.

The ROSS can be used throughout the response structure, but will be most effective as a Technical Specialist to command staff.
Integration of ROSS Technical Specialist Within ICS

ROSS at ICP

ROSS at Branch
ROSS Tactical / Operational Roles

Health and Safety Decisions
• Support high level public health recommendations (i.e., large area shelter / evacuation)

Rapid Assessment of Field Data
• Support the integration of data and information for real time situational awareness

Interpret federal and local products, de-conflict contradictory measurements and models.

Support public messaging development and briefings

NOT a Firefighter
Or HAZMAT Technician
(though that experience can help)
ROSS: A NIMS Typed Capability

Type 1 is Highest Capability

Incident size/complexity will be driver of ROSS capability needs

Multiple ROSS may be at an incident, working together at all ICS levels insuring technical consistency
ROSS Education

**Type 3**: Advanced Training in Radiological Emergency Response.

**Type 2**: Undergraduate degree in radiation related field (e.g., Health Physics, Nuclear Engineering, and radiological science), certification from National Registry of Radiological Protection Technologists, or equivalent experience.

**Type 1**: Graduate degree in radiation related field, passing part 1 of the American Board of Health Physics certification exam, or equivalent experience.
ROSS Experience

Type 3 ROSS is a radiological subject matter expert with experience and training that goes beyond standard HAZMAT training. Practical experience working with, and making measurements of, radioactive material or radiation generating devices is required. Typical ROSS Type 3 candidates would be radiation control technicians or radiation safety officers with emergency response experience and training on the federal radiological response framework.

Typical ROSS Type 2 candidates would be operational health physicists or radiation safety officers with emergency response experience and awareness of the federal radiological response framework.

Typical ROSS Type 1 candidates would be operational health physicists who have extensive emergency preparedness / response experience and detailed knowledge of federal and state radiological response agencies and capabilities.
ROSS Skills

Understanding federal radiological response framework (assets, capabilities, deployment timelines, logistical needs, & contact information)

Understanding threat, sources, and impacts of radiological and nuclear terrorism devices

Protective Action Guidelines (PAG) and how protective action recommendations are generated

Decontamination techniques and priorities

Assist with appropriate recommendations for:

• Hot zone definition
• Population monitoring and decontamination levels
• Patient handling
• Release of vehicles and equipment from hot zone
• Responder PPE, dose and turn-back guidance
ROSS Tools

RadResponder
  • Collect monitoring data
  • Display, integrate, and share monitoring data and products

IMAAC (HSIN), FRMAC/NARAC (CMweb)
  • Generate products of potential impacts for planning
  • Access and share real event data and products

HotSpot, CAMEO/ALOHA, RASCAL, & HPAC dispersion models
  • Locally run dispersion models and impact assessments
  • Used for exercises, planning and “first cut” of potential impacts

REMM resource app and website for Radiological Emergency Medical Management

Familiarity with:
  • RESRAD-RDD Determines guidelines for release levels, stay times, and recovery planning for residual radiation from an RDD
  • TurboFRMAC
### Basic Health Physics Knowledge

**Note:** Passing Part 1 of the AHP Exam represents at least an “Intermediate” proficiency in all categories. CHP or PhD in Radiological Health Physics represents at least “Advanced” in all categories. NBRPT Certification represents at least a “Novice” proficiency in all categories.

#### ROSS Minimum Knowledge

<table>
<thead>
<tr>
<th>Category</th>
<th>Type 1 (Highest)</th>
<th>Type 2</th>
<th>Type 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Measurements and Instrumentation</td>
<td>Novice</td>
<td>Novice</td>
<td>Novice</td>
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<tr>
<td>2. Standards and Requirements</td>
<td>Novice</td>
<td>Novice</td>
<td>Novice</td>
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<tr>
<td>3. Hazards Analysis and Controls</td>
<td>Novice</td>
<td>Awareness</td>
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<tr>
<td>4. Operations and Procedures</td>
<td>Novice</td>
<td>Novice</td>
<td>Novice</td>
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<tr>
<td>5. Fundamentals and Education</td>
<td>Novice</td>
<td>Novice</td>
<td>Awareness</td>
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</tbody>
</table>

**Awareness** means you have a common knowledge or an understanding of basic techniques and concepts.

**Novice** means you understand and can discuss terminology, concepts, principles, and issues related to this competency.

**Intermediate** means you are able to successfully complete tasks in this competency as requested. Help from an expert may be required from time to time, but you can usually perform the skill independently.

**Advanced** means you can perform the actions associated with this skill without assistance. You are certainly recognized within your immediate organization as "a person to ask."
## Radiological Response Knowledge & Tools

<table>
<thead>
<tr>
<th>RR1. Models and Software Tools</th>
<th>Type 1 (Highest)</th>
<th>Type 2</th>
<th>Type 3</th>
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</thead>
<tbody>
<tr>
<td>RR1.1 Atmospheric Dispersion Modeling (e.g., Hot Spot, RASCAL, HPAC, NARAC)</td>
<td>Novice</td>
<td>Awareness</td>
<td>Awareness</td>
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<tr>
<td>RR1.2 Dose Assessment Modeling (e.g., RESRAD-RDD &amp; TurboFRMAC)</td>
<td>Awareness</td>
<td>Awareness</td>
<td>Awareness</td>
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<tr>
<td>RR1.3 Monitoring Planning (10 point strategy, MARSIM Methodology, &amp; Visual Sample Plan)</td>
<td>Intermediate</td>
<td>Intermediate</td>
<td>Intermediate</td>
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<tr>
<td>Emergency Monitoring Strategies (e.g., 10 point Strategy)</td>
<td>Intermediate</td>
<td>Intermediate</td>
<td>Intermediate</td>
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<tr>
<td>Software tool (e.g., Visual Sampling Plan (VSP) &amp; MARSIM)</td>
<td>Awareness</td>
<td>Awareness</td>
<td>Awareness</td>
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<tr>
<td>RR1.4 Information Management / Data Telemetry / Databases</td>
<td>Intermediate</td>
<td>Intermediate</td>
<td>Intermediate</td>
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<tr>
<td>RadResponder</td>
<td>Novice</td>
<td>Awareness</td>
<td>Awareness</td>
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<tr>
<td>CMWeb</td>
<td>Novice</td>
<td>Awareness</td>
<td>Awareness</td>
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<tr>
<td>HSIN</td>
<td>Novice</td>
<td>Awareness</td>
<td>Awareness</td>
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<tr>
<td>RR1.3 FRMAC/IMAAC Product Interpretation &amp; Customization</td>
<td>Intermediate</td>
<td>Intermediate</td>
<td>Novice</td>
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## RR2. Radiological Emergency Response Standards and Guidance (e.g., NCRP, ICRP, ANSI, & IAEA - see references)

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<td>Awareness</td>
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## RR3.0 Response Doctrine and Framework

<table>
<thead>
<tr>
<th>RR3.1 Federal, State, and Local Radiological Response Doctrine (Federal, State, and Local Plans manuals frameworks, &amp; playbooks - see reference list)</th>
<th>Type 1 (Highest)</th>
<th>Type 2</th>
<th>Type 3</th>
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<tbody>
<tr>
<td>Intermediate</td>
<td>Novice</td>
<td>Awareness</td>
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<tr>
<td>RR3.2 Federal Radiological Response Assets &amp; Capabilities</td>
<td>Awareness</td>
<td>Know it exists and what it does</td>
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<tr>
<td>Novice</td>
<td>Know how to activate and use asset</td>
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<tr>
<td>Intermediate</td>
<td>Know activation, expected timelines, and response integration</td>
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<tr>
<td>Novice</td>
<td>Awareness</td>
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<tr>
<td>RR3.3 State Radiological Response (e.g. implication of a NRC agreement vs. non-agreement State &amp; Impact on Home Rule vs Dillon Rule governance)</td>
<td>Intermediate</td>
<td>Novice</td>
<td>Awareness</td>
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<td>Awareness</td>
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## RR4. Radiological Threats

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<tr>
<th>Type 1 (Highest)</th>
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Understanding Radiological Terrorism, sources of concern, and potential impacts
Understanding Nuclear Terrorism and potential impacts
Ideal ROSS volunteer

• Able to rapidly deploy
• Leadership, especially technical teams
• Communicate radiological issues to a non-technical audience (from the responder in the field to the Governor)
• Provide concise, actionable guidance and recommendations
• Integrate into multi-discipline team under ICS & EOC systems
• Work long hours in difficult, often austere, environments without good communication or computational capabilities.
ROSS Operational Challenges

Not all Health Physicists are suited for emergency response

Most Responders and Emergency Managers do not know what a ROSS is or what to do with them
ROSS is a Collaborative Effort

• Federal agencies are:
  – Developing the requirements, training, tools
  – Making training available
  – Integrating the ROSS into ICS and various reserve corps systems

• State and local agencies will:
  – Recruit and register experts
  – Send candidates to required training
  – Activate registered ROSS as needed during emergencies

• Radiation protection experts will:
  – Sign up through the HHS Medical Reserve Corps (MRC) or Emergency System for Advance Registration of Volunteer Health Professionals (ESAR-VHP)
  – Take specialized training to supplement their basic radiation protection knowledge
  – Sign up for access to specialized Federal tools and resources
  – Participate in exercises
  – Respond when requested and available
Addressing Shortfalls in Radiological or Nuclear Emergency Response

Local response organizations need radiation protection expertise beyond normal HAZMAT skills, but radiological emergencies are rare

- Reserve Corps concept is sustainable

Federal radiological response resources are available, but are scarce, not always well known, and may take significant time to integrate at the local level

- Federal assistance benefits from the existence of knowledgeable local radiation protection experts who can be on-scene quickly

We need your help to make the ROSS program a success!

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202-287-5269
Back Up Slides
Type 3 ROSS (Lowest Capability) Duties

1. Provides incident radiological assessment and resources information through:
   a. Interpreting Model and Measurement results and products
   b. Proficient use of RadResponder to collect and share data
   c. Awareness of key federal radiological response assets, state radiation control, and emergency management programs
   d. Exchange of technical information with other ROSS members and advisory organizations

2. Guides radiological aspects of response during the event by their:
   a. Working knowledge of radiological protection guidance and best practices
   b. Ability to obtain advice and recommendations from appropriate advisory organizations.

3. Communicates radiological issues to a non-technical audience

4. Provides just in time training for first responders for Rad responder, monitoring devices, and safety protocols.

5. Integrates into the ICS structure.
Type 2 ROSS (Median Capability)

In addition to Type 3 ROSS Activities, the Type 2 will also:

1. Perform exposure estimates for a variety of internal and external exposure scenarios

2. Understand key state and federal radiological response capabilities / assets, reporting structures, and how to integrate them into a response.

3. Communicate complex radiological issues to large groups, senior executives, & supports public message development.

4. Balance complex radiological safety concerns with mission priorities

5. Work closely with command staff
Type 1 ROSS (Highest Capability)

In addition to Type 2 ROSS Activities, the Type 1 will also:

1. Synthesize available radiological and situational information to make recommendations required by the executive levels of government making decisions for the broadest populations.

2. Help activate and integrate federal radiological response assets and capabilities from across the USG into the response.

3. Coordinate the radiological activities and technical data with other ROSS team members and federal response assets across the entire incident.

4. Integrate into a state’s emergency operations and coordinates with radiological control authority.

5. Support radiological response preparedness activities and exercises at the state and local level.