DOE/NNSA Response to a Nuclear/Radiological Incident

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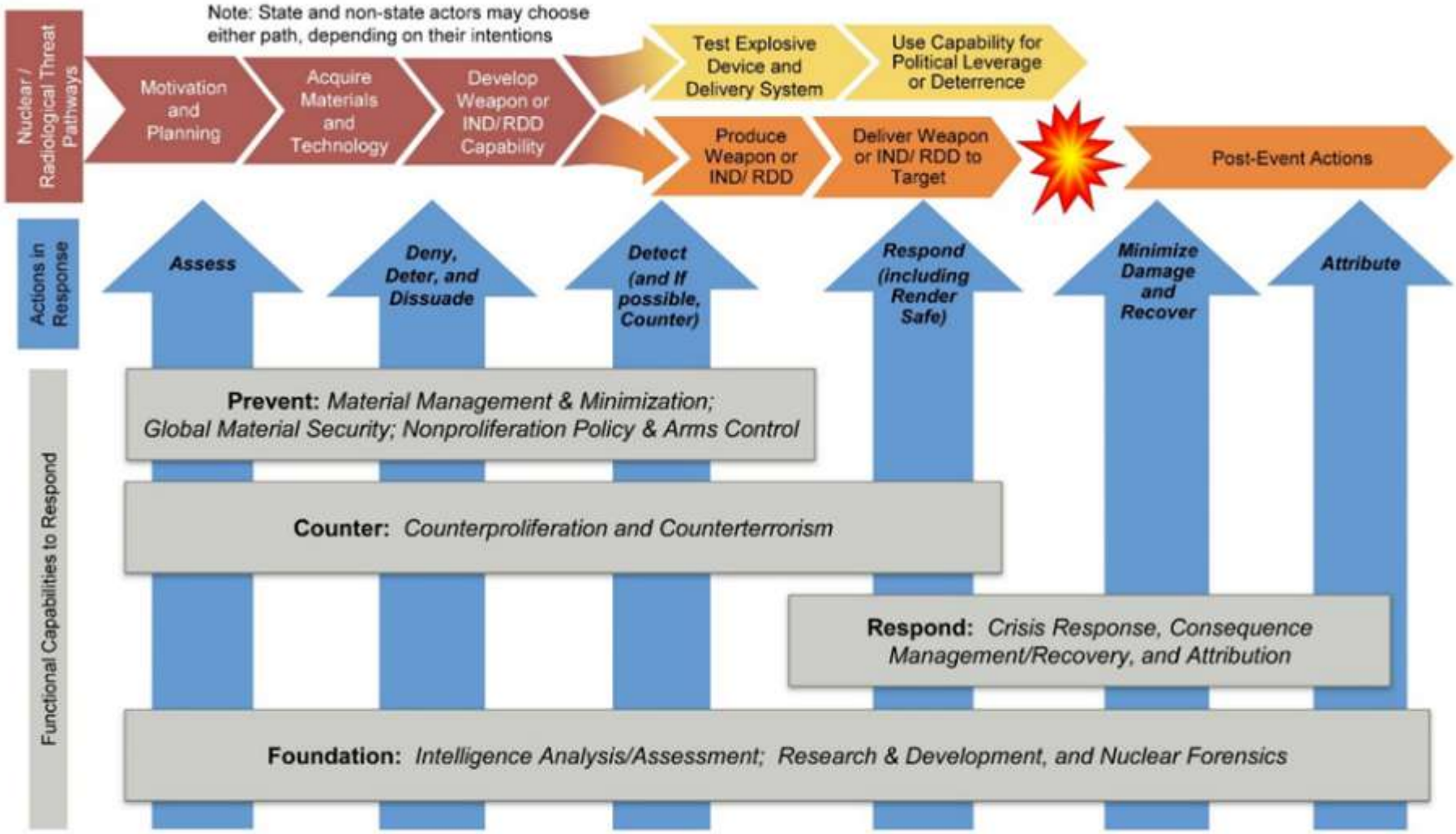
Organizational Overview

- The mission of the Energy Department is to ensure America's security and prosperity by addressing its energy, environmental and nuclear challenges through transformative science and technology solutions
- Established by Congress in 2000, NNSA is a semi-autonomous agency within the U.S. Department of Energy responsible for enhancing national security through the military application of nuclear science.
  NNSA

DOE/NNSA - Applying Technical Capabilities to National Security Challenges

Strategic Approach to Nuclear Threat Reduction Mission



Preventing Nuclear/Radiological Proliferation & Terrorism

- **Purpose** - prevent non-state actors and additional countries from developing nuclear weapons or acquiring weapons-usable nuclear materials, equipment, technology, and expertise; and prevent non-state actors from acquiring radiological materials for a radiological threat device.
- **Approach**
  - Material Management & Minimization
  - Global Material Security
  - Nonproliferation & Arms Control
  - Defense Nuclear Nonproliferation Research & Development
  - Nonproliferation Construction Program

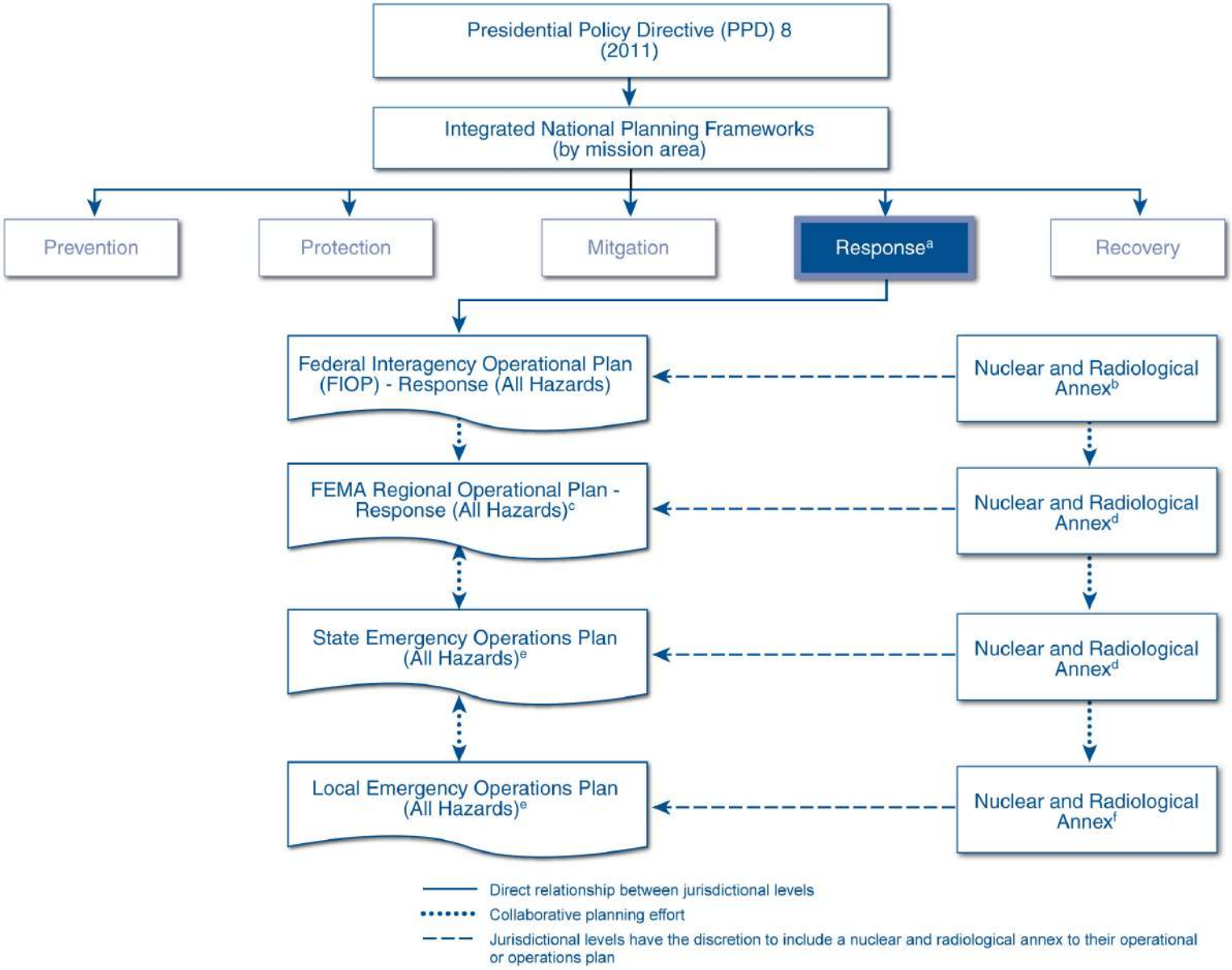
Countering Nuclear/Radiological Proliferation & Terrorism

- **Purpose**
  - Counter the attempts of both proliferant states and non-state actors to steal, acquire, develop, disseminate, transport, or deliver the materials, expertise, or components necessary for a nuclear weapon, IND, or RDD
- **Approach**
  - Develop/maintain a robust technical understanding of how to characterize, detect, and defeat the range of nuclear threat devices that a non-state actor could potentially construct
  - Use specialized knowledge of nuclear threat devices to inform U.S. and international policy relating to nuclear counterterrorism and counterproliferation
  - Strengthen WMD counterterrorism and nuclear/radiological incident response capabilities and preparedness at home and beyond

Responding to Nuclear/Radiological Threats and Terrorism

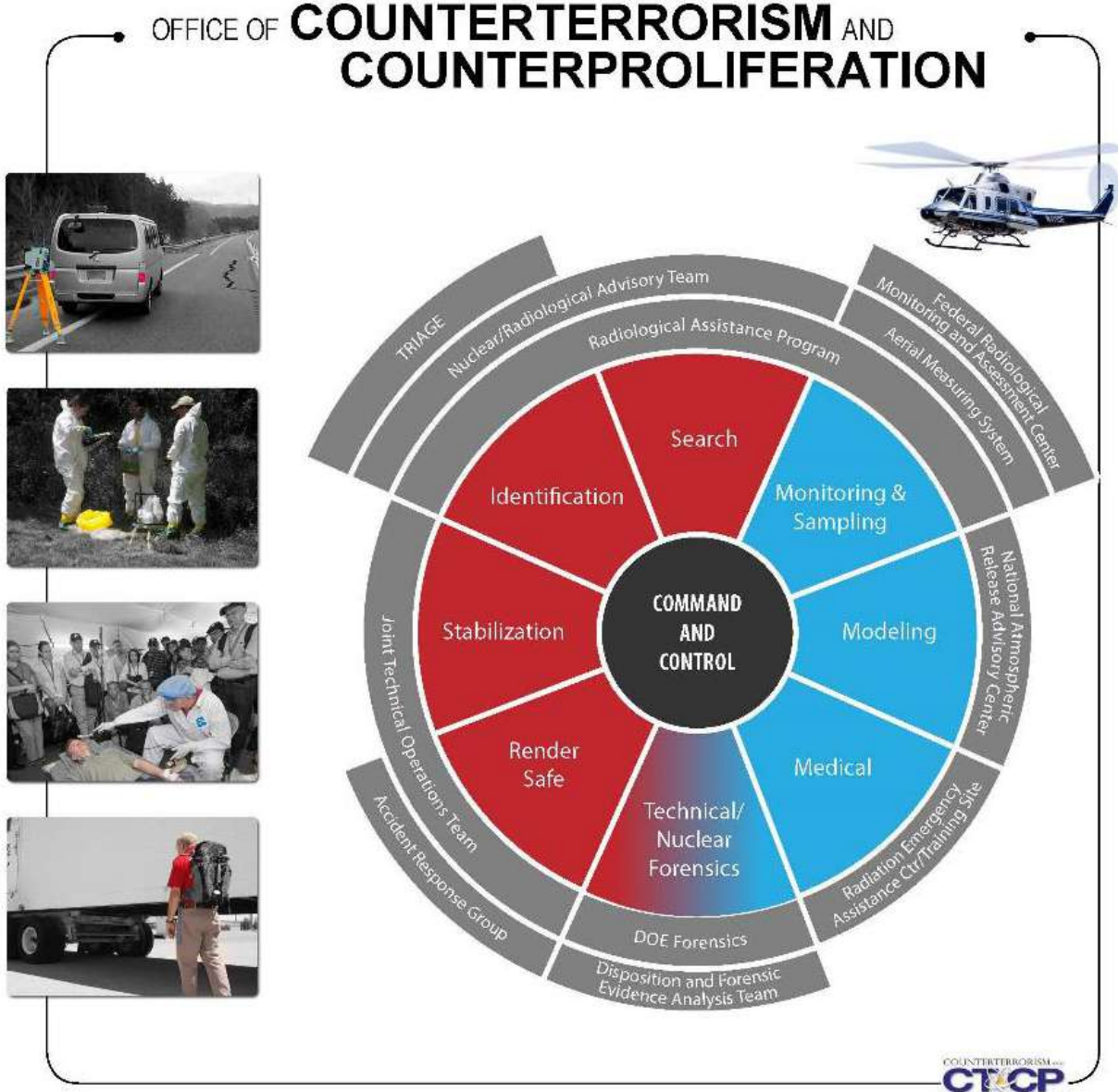
- **Purpose**
  - develop and communicate **timely, technically-defensible,** and **actionable** decision support to key leaders tasked with protection public health and safety, restoration of essential government services, and providing emergency relief to governments, businesses, and individuals affected by the consequences of a radiological or nuclear incident
- **Approach**
  - Model
  - Measure
  - Assess
  - Interpret

Planning for the Response



Source: GAO.

DOE/NNSA Nuclear/Radiological Threats & Terrorism Response Capabilities



National Atmospheric Release Advisory Center(NARAC)

- Transport and diffusion models simulate the release and predict the extent of the hazard.
- 3-D modeling system with continuous representation of terrain.
- Combines the model with data collected from the field and real-time meteorological conditions.

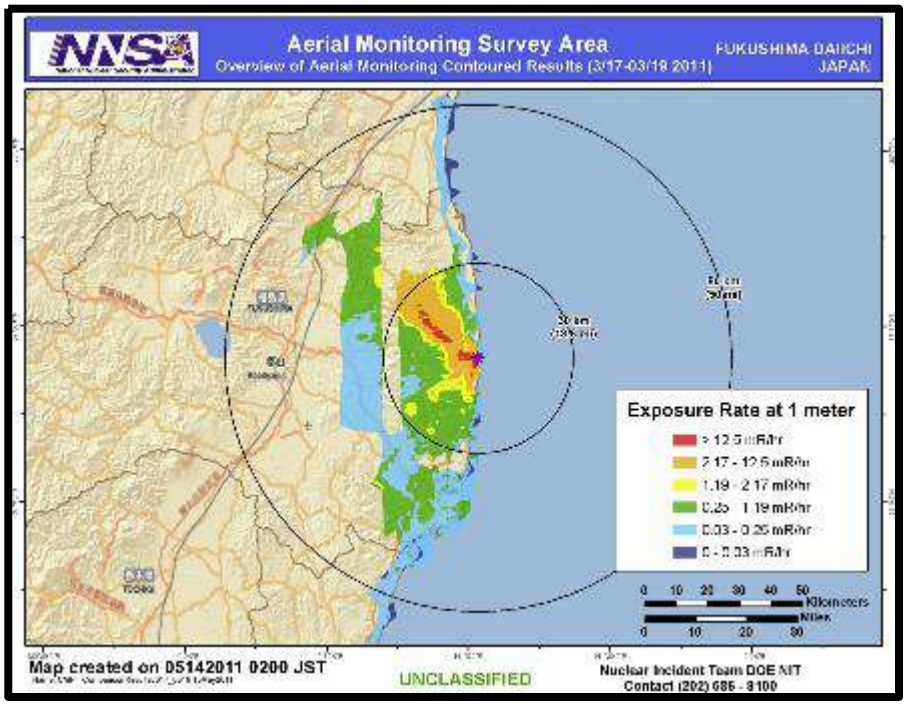
The Interagency Modeling and Atmospheric Assessment Center (IMAAC) is responsible for the production, coordination, and dissemination of consequence predictions for atmospheric hazardous material releases during actual or potential incidents requiring Federal coordination. The IMAAC generates the single Federal prediction of atmospheric dispersions and their consequences utilizing the best available resources from the Federal Government. NARAC is the primary provider of radiological/nuclear plume modeling for the IMAAC

Radiological Assistance Program (RAP)

- Regionally-based asset located at 9 DOE and NNSA sites throughout the country
- Provides advice and radiological assistance for incidents involving radioactive materials that pose a threat to the public or the environment.
- Provides field deployable teams of health physics professionals equipped to conduct radiological search, monitoring, and assessment activities.

Aerial Measuring System (AMS)

- The fixed-wing aircraft are deployed with the radiation detection system to collect information and determine the location of ground contamination.
- The helicopters are used to perform detailed surveys of ground contamination.
- Scientists are then able to rapidly develop maps of the radiological materials deposited on the ground and the potential radiation exposure to personnel in the affected areas.



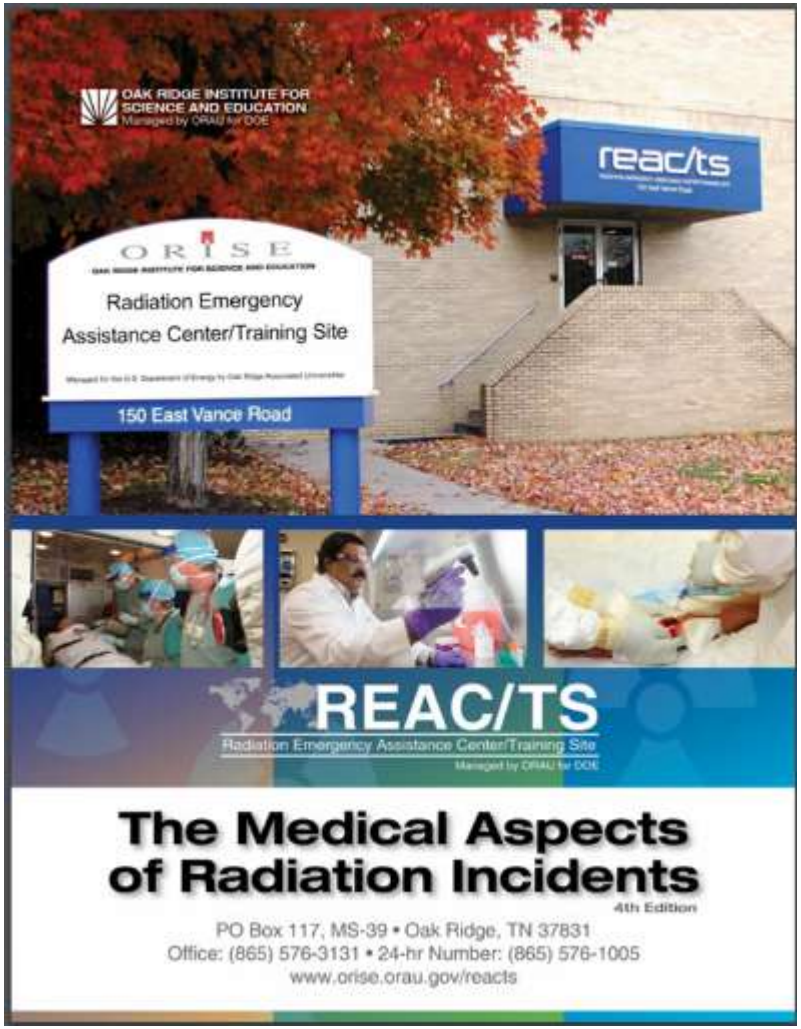
Consequence Management Response Team (CMRT)

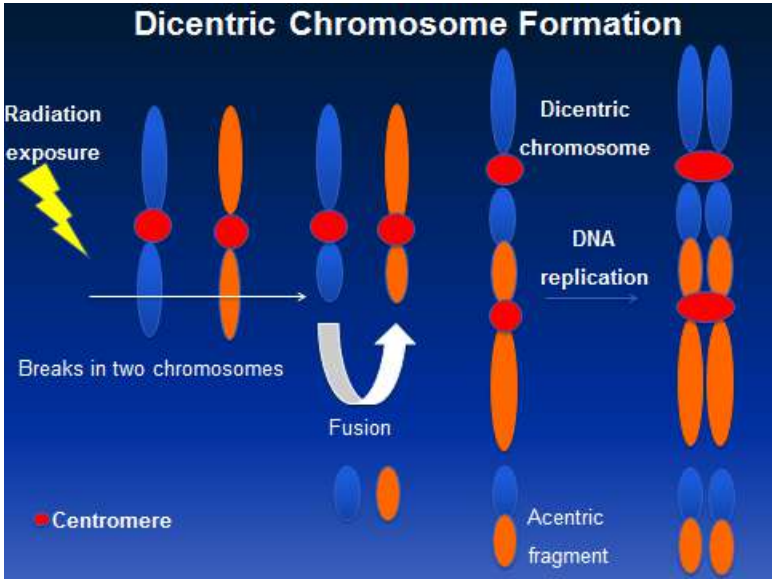
COUNTERTERRORISM AND COUNTERPROLIFERATION
National Nuclear Security Administration

Consequence Management Home Team (CMHT)

- Scientific Support
  - Atmospheric Modeling
  - Assessment Scientists
  - Health & Safety
  - Aerial Measurements
  - Laboratory Methods
- Communications Support
  - Bridge Lines & Coordinators
  - Data Management
- Product Support
  - GIS Specialists
  - Product development and interpretation
- Logistics Support
  - Personnel
  - Field Samples & Off-Site Laboratory support

Medical Management





Cytogenetic Biodosimetry Laboratory (CBL)

COUNTERTERRORISM AND COUNTERPROLIFERATION
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Support & Coordination Elements

- Federal Radiological Monitoring & Assessment Center (FRMAC)
- Interagency Modeling and Atmospheric Assessment Center (IMAAC)
- Advisory Team for Environment, Food & Health (A-Team)
- Nuclear/Radiological Incident Task Force (NRITF)

Asset Response Timeline

CMHT
NARAC
Remote A-Team
REAC/TS

0-6
State/Local
RAP
CST

6-12
AMS
CMAC
REAC/TS
CERFP

12 – 24
CMRT
EPA
HRF

24 – 48
Advisory Team

FRMAC
Established

CMHT -	**Consequence Management Home Team**
NARAC -	**National Atmospheric Release Advisory Center**
REAC/TS -	**Radiation Emergency Assistance Center/Training Site**
RAP -	**Radiological Assistance Program**
CST -	**Civil Support Team**
AMS -	**Aerial Measuring System**
CMAC -	**Consequence Management Advance Command**
CMRT -	**Consequence Management Response Team**
CERFP -	**CBRNE Enhanced Response Force Package**
HRF -	**Homeland Response Force**

DATA AND TECHNICAL PRODUCTS

GOALS

Model
- Predictions
- Early decision making

Measure
- Ground truth
- Refined decision making

Map
- Scale and scope

Situational awareness of the radiological environment

Model

- Standard plots sets
  - Plume hazard areas
  - Affected population numbers
  - Expected health effects
  - Protective action guide levels
  - Geographical info
- Form
  - One page summaries
  - Detailed consequence reports
  - Briefing products

Ground Truth

Data Collection

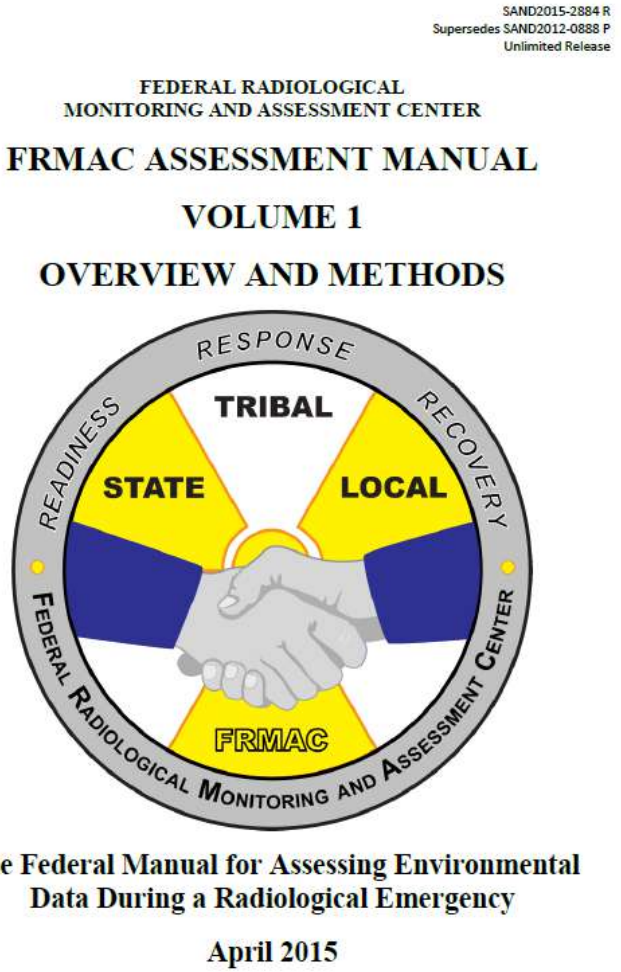
- State, regional, local responders
  - PRND for CM
  - REPP states
- Fixed radiation monitors (i.e., facility monitoring, RADNET)
- Volunteers (i.e., SAFECAST)
- Inter-agency responders (DOE, EPA, DoD, etc.)

Data Flow

- RadResponder Network
  - https://www.radresponder.net/
  - Mobile app
- Email to: cmht@nnsa.doe.gov
- Fax to CMHT at 702-794-1039
- Call in data on CMHT bridge line
- Radiological Response Data Portal
  - FRMAC Radiological Assessment & Monitoring System (RAMS)
  - AMS Reachback

Assessment

- Methodologies developed by interagency
  - DOE/NNSA
  - US NRC
  - US EPA
  - USDA
  - US FDA
  - CDC
- Documented in peer-reviewed manuals
- Codified in TurboFRMAC



SAND2015-2884 R
Supersedes SAND2012-0888 P
Unlimited Release

FEDERAL RADIOLOGICAL
MONITORING AND ASSESSMENT CENTER

FRMAC ASSESSMENT MANUAL

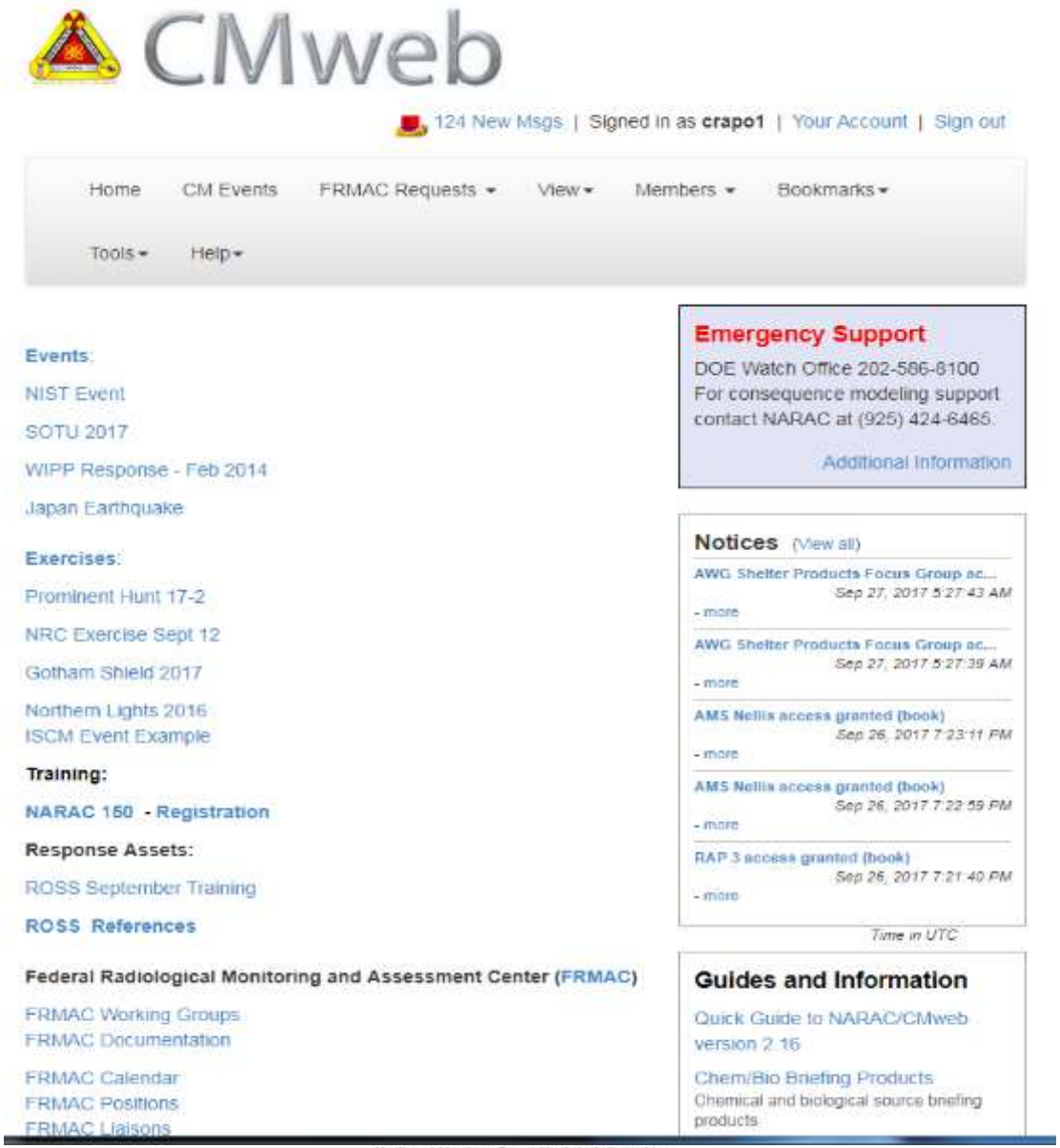
VOLUME 1

OVERVIEW AND METHODS

The Federal Manual for Assessing Environmental Data During a Radiological Emergency

April 2015

Distribution of Products



How to Request Assistance

- DOE Watch Office: 202-586-8100 (Primary)

- Radiological Assistance Program Regional Offices:
  - Region 0 (Washington, DC): 1-800-405-1140
  - Region 1 (Brookhaven, NY): 1-631-344-2200
  - Region 2 (Oak Ridge, TN): 1-865-576-1005
  - Region 3 (Savannah River, GA): 1-803-725-3333
  - Region 4 (Albuquerque, NM): 1-505-845-4667
  - Region 5 (Chicago, IL): 1-630-252-4800
  - Region 6 (Idaho Falls, ID): 1-208-526-1515
  - Region 7 (Livermore, CA): 1-925-422-7595
  - Region 8 (Richland, WA): 1-509-373-3800

- NARAC Operations: 1-925-424-6465

Additional Questions

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QUESTIONS?