DOE Response to a Nuclear or Radiological Incident

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NA-42
Mission & Authorities

- Provide a versatile, capable, nuclear or radiological emergency response with the technical capability to respond to any radiological/nuclear incident worldwide

- Authorities
  - Atomic Energy Act of 1954 (as amended)
  - Executive Order 12656 of 1988
  - Homeland Security Act of 2002
  - Presidential Decision Directive 39 and 62
  - NSPD 17/HSPD 4, 5 and 8
  - National Response Framework (NRF)
    - Nuclear/Radiological Incident Annex
    - Catastrophic Incident Annex
NRF Roles & Responsibilities

- Coordinating or Cooperating Agency for:
  - Radiological terrorism incidents
  - Nuclear facilities incidents
  - Incidents involving transportation of radioactive materials
  - Nuclear weapon accident/incident
DOE/NNSA Emergency Response Assets

- Expert technical advice from the DOE complex in response to:
  - Nuclear weapon accidents and significant incidents
  - Radiological accidents
  - Lost or stolen radioactive materials
  - Acts of nuclear terrorism
  - Malevolent Threats or Acts

- Deployable capabilities, configured for a rapid response to any specific nuclear accident or incident
Atmospheric Release Advisory Capability (ARAC)

- Near real-time assessments of the consequences of accidental or potential radiation releases by modeling the movement of hazardous plumes
- Model calculations based on:
  - Real-time weather data
  - Terrain database
  - 3-D transport and diffusion model
- ARAC products:
  - Ground deposition plots
  - Instantaneous and time-integrated dose
  - Airborne concentrations
Aerial Measuring System (AMS)

**Fixed-Wing Aircraft**
- All-weather operation
- Rapid residual fallout pattern
- Cursory radiological data transmitted during flight (radiation surveys)
  - Peak exposure rates

**Helicopter**
- Visual flight operation
- Detailed aerial surveys
  - Exposure rate contour maps
  - Dominant isotope gamma spectra
  - May take several days

Provides aviation-based equipment to survey large areas in response to radiological emergencies.

August 2008
AMS Helicopter Survey

Aerial Survey Results
Map of Exposure Rate

- Release Point
- AMS Helicopter Survey
- Ba-133 Contamination
  - Background or baseline levels of concern, excluding agricultural contamination (0.5 - 15 uCi/l above background)
  - Exceeds Federal Guidelines for Emergency Action (15 - 30 uCi/l above background)
  - Greatly Exceeds Federal Guidelines (Exceeds 30 uCi/l above background. Ground-based measurements suggest localized patches of higher exposure rate up to 500 uCi/l)

- National Security Area

Map created on 7/04/2009 9:37:45 Pacific Standard Time
Check for revision is 12 hours
Radiological Assistance Program (RAP)

- Provide first-responder radiological assistance to protect the health and safety of the general public and the environment.
- Assist other Federal, State, Tribal and local agencies in the detection, identification and analysis, and response to events involving the use of radiological/nuclear material.
- Specific areas of expertise
  - Assessment
  - Area Monitoring
  - Air Sampling
  - Exposure & Contamination Control
Mission

- Provide 24/7 availability to deploy and provide emergency medical services at incidents involving radiation anywhere in the world
- Provide advice and consultation on radiation emergency medicine
- Post-incident dosimetry (Cytogenetic Dosimetry Lab)
- Stockpile of Radioprotective Drugs (DTPA, Prussian Blue)
Mission: Provide a Common Operating Picture of the environmental radiological conditions for the response

Multi-agency operational framework for coordinating on-scene monitoring and assessments during a radiological emergency

Phased Response
- Consequence Management Home Team (CMHT)
  - Provide technical support to IC before arrival of FRMAC
- Phase I
  - Validate protective action guidelines 30 People
  - Gross Field Monitoring & Data Assessment 2500 # Eq.
- Phase II
  - Define where population relocation is warranted 30 People
  - Extensive field monitoring & sampling 30,000 # Eq.
- Phase III
  - Ingestion Pathway Analysis
  - Detailed Sampling & Analysis
Initially staffed and equipped by DOE Consequence Management Response Teams (CMRT)

May absorb part or all of RAP Team(s) deployed to incident

Technical support from the Consequence Management Home Team (CMHT)

Leadership transitions to the Environmental Protection Agency for long-term recovery
Consequence Management Process

- ARAC - Plume modeling
  - Predictive plot
- Aerial Measurement System (AMS)
  - Initial model validation
  - Helps drive initial monitoring and sampling plan
- CMHT - Integrate State, Facility, & Radiological Assistance Program (RAP) data into initial monitoring and sampling strategy
- FRMAC
  - Comprehensive monitoring and sampling plan and activities
  - Recovery
Response Timeline

- Initial Dispersion Predictive Plots: 15 mins – 1 hr
- RAP Team: 2 hrs
- CM Home Team: 2 hrs
- CMRT Phase I: 4 hrs
- AMS: 4 hrs
- CMRT Phase II: 12 hrs
- CMRT Phase III: 24 hrs
- FRMAC: 24+ hrs

Approximate Activation Time
Other DOE/NNSA Assets

- **Nuclear/Radiological Advisory Team** - provide advice and limited technical assistance, including search, diagnostics, and effects prediction, as part of a Domestic Emergency Support Team

- **Search Response Teams** - provide search capability using local support for initial nuclear search activities

- **Joint Technical Operations Team** - provide technical operations advisory support and advanced technical assistance to the Federal primary or coordinating agency, provide extended technical support to other deployed operations through an emergency response home team during a nuclear or radiological WMD terrorist incident

- **Accident Response Group** – provide technical response to U.S. nuclear weapons accidents
Conclusion

DOE/NNSA serves as the Nation’s premier technical leader in responding to and successfully resolving nuclear and radiological threats and consequences worldwide

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Questions?