Consequence Management

Asset Overview

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National Nuclear Security Administration

Overview

- What is a CM Event?
- CM Program Misson
- Assets and Capabilities
- Deployment Timeline
- Recent CM Deployments


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WEDNESDAY, MARCH 28, 1979

A-PLANT MISHAP LEAKS RADIATION

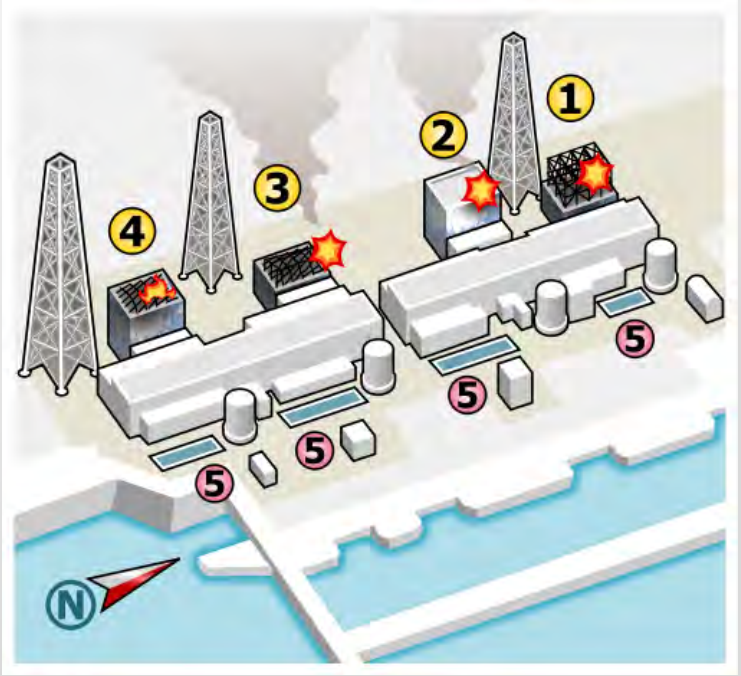
Contaminated steam escapes in Pa.

What is a Consequence Management Event?

- **The "Bad Thing"™ has happened**
  - Or could happen soon (Prep CM)
- The Public is At-Risk
  - States are considering protective actions
    - Shelter-in-Place Orders
    - Evacuation Orders
    - Exclusion Zones
    - Food/Water Embargoes
  - Or – Public perception of risk
    - "Is it safe to stay here?"
    - "Why didn't we evacuate?"

What is a “radiological incident”?

- Release of radioactive material where it’s not wanted
- Nuclear power plant accident
- Radiological dispersal device
- Nuclear detonation
- Wildfire encroaching on a cleanup site
- Radiopharmaceutical delivery truck accident
- …?



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Radiological Support to the States

- FRMAC = “All of Government” Support Center
  - Integrates all radiological monitoring & assessment support to the State, Local, Territorial, and Tribal (SLTT) Governments
  - Created after Three Mile Island to provide a “single voice” for all of the federal assets responding to support an incident
  - Activated by FEMA
- Provides radiological monitoring and assessment support to SLTT response
  - Intended to ensure the federal assets speak with “one voice” and all provide same assessment
- FRMAC Structure
  - **DOE (Initial Leadership of FRMAC)**
  - EPA (Leads FRMAC for recovery)

Federal Radiological Monitoring *and* Assessment Center

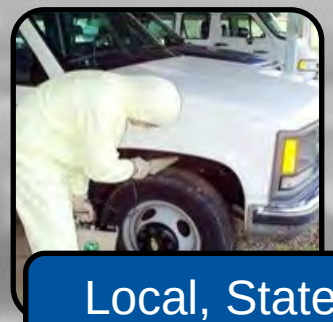
CM Program Mission

Provide timely, scientifically defensible, operationally relevant and actionable decision support to authorities responsible for protection of the public, responders, and the environment affected by a nuclear or radiological incident

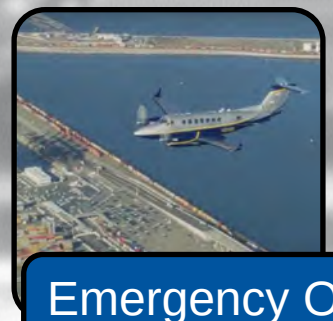
- Provide radiological support to SLTT partners in an emergency
  - Radiological monitoring
  - Assessment of data
- Lead the FRMAC in the emergency phase of a response
  - Deployable team to provide assistance to SLTT partner
  - Deployable equipment to support establishment of the FRMAC

Asset Timeline Overview

Immediate Reach-Back Support



Local, State, Regional First Response



Emergency On-Call National Response

Follow-On National Response

Transition to Recovery

Minutes | Hours | Days | Weeks | Months

CM Assets

CM Home Team (CMHT)

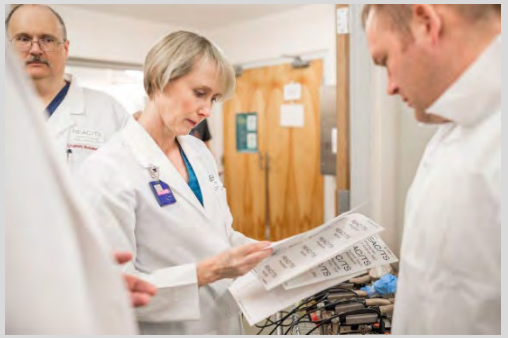
- Scalable technical reach back support
- Near immediate response

National Atmospheric Release Advisory Center (NARAC)

- Performs atmospheric dispersion modeling to simulate the release and predict the extent and effects of the hazard

Radiation Emergency Assistance Center / Training Site (REAC/TS)

- Emergency response, advice and consultation in cases of human radiation exposure



CM Assets

CM Advance Command (CMAC)

- First DOE CM elements to deploy
- 6-7 person deployed team
- Early planning, leadership, and logistics

Aerial Measuring System (AMS)

- DOE's aerial-based radiation detection platform used to verify and update plume predictions

CM Response Team (CMRT)

- Full field support (50-100 people)
- Provides technical support in the field with analysis and field measurement/sampling expertise to local authorities

From Question to Answer

INNOVATE. COLLABORATE. DELIVER.

Receive Request for Information (RFI)

Determine needed data to answer RFI

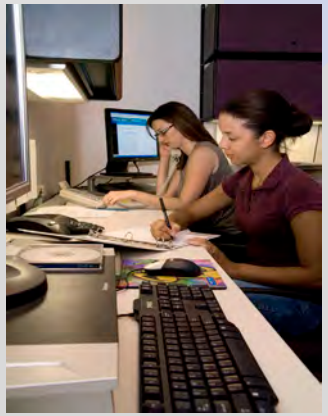
Collect radiological measurements and samples

Perform laboratory analysis

Incorporate data into models

Assess results

Create product to aid decision maker understanding



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What questions will be asked?

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Do you have the information you need to answer these questions?

- Do people need to evacuate?
- Is the water safe to drink?
- Can we open the roads? Airports?
- Should we distribute potassium iodide?
- Do we need to cancel the Independence Day fireworks?
- Is it safe to drive to work?
- What do we do with contaminated livestock?
- …?

CM Capabilities

Monitoring and Sampling

- Coordination and planning of radiological monitoring and sampling
- Field collection of various radiological measurements and samples

Laboratory Analysis

- Coordination of analysis by Federal, state, local, and commercial labs
- Sample control and tracking throughout chain of custody
- Data quality assurance
- Operation of the Fly Away Laboratory

Assessment

- Atmospheric dispersion modeling and dose projection for protection of the public and emergency workers
- Data management
- Interpretation of models and data in terms of protective action guidance
- Creation of decision support products

Health and Safety

- Establishment of emergency worker dose guidance and worker dose tracking
- Provision of dosimetry and PPE
- Hotline contamination control

Support

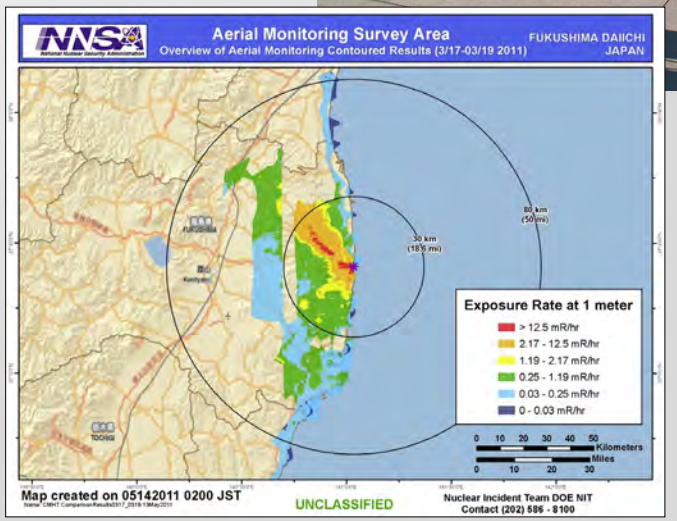
- Management of logistical operations and staffing
- Provides reliable communications, mechanical, and electrical support
- Ensures complete, accurate, and timely documentation of all assessments

What is Radiological Monitoring?

- Field measurements of radiation
  - Calibrated health physics equipment
    - Gamma dose rate
    - Alpha & Beta contamination
  - Advanced radiation identification systems
    - High Resolution Gamma (HPGe) Spectroscopy
      - Isotope Identification
    - Vehicle-mounted gamma detectors
      - Rapid area quantification
- Sample collection
  - Air monitoring
  - Ground deposition & soil contamination
  - Agricultural products
  - Water sampling

Recent Real World Responses

- 2011 Fukushima Daiichi Nuclear Power Plant disaster
- 2014 Waste Isolation Pilot Plant release
- 2017 Ruthenium release in Eurasia
- 2017 NIST Contamination
- 2017 Hanford tunnel collapse
- 2018 Santa Susana Field Laboratory wildfire
- 2018 Special Request**
- 2018 INL drum "explosion"
- 2019 Cesium release in Seattle
- 2019 Portsmouth contamination response
- 2020 Chernobyl Exclusion Zone wildfire
- 2020 Mars Perseverance Rover launch support
- 2020 DOE shipment support
- 2021 Cherrywood Fire (NNSS)
- 2021 NIST Reactor dose assessment support
- 2022 RAP 6 / Bureau of Indian Affairs survey
- 2022- Ukraine



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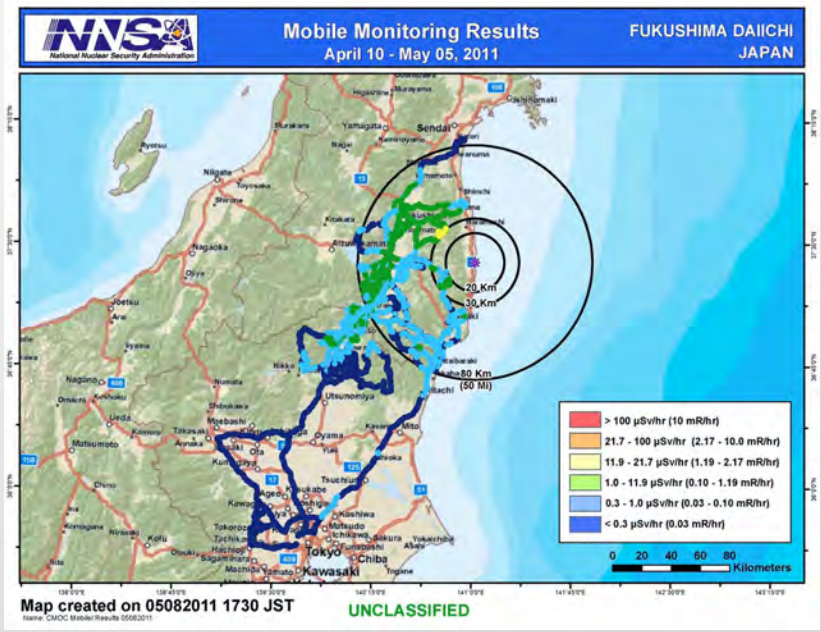
Fukushima Daiichi (2011)

- Large scale nuclear power plant accident
- CMHT activated
- CMRT & AMS deployed (Yokota AFB, Japan)
- Initial mission
  - Support Defense & State assessments of risk for US personnel in the impacted areas
- CM tasks included
  - Radiological monitoring
  - Aerial mapping to determine impacted areas
  - Modeling of the releases from the plant
  - Data analysis
  - Developing situational awareness products for USG
  - Developing decision support products
    - multiple agencies (Air Force, Navy, State Dept., etc.)
  - Data exchange with Government of Japan (MEXT)
    - Ministry of Education, Culture, Sports, Science, & Technology



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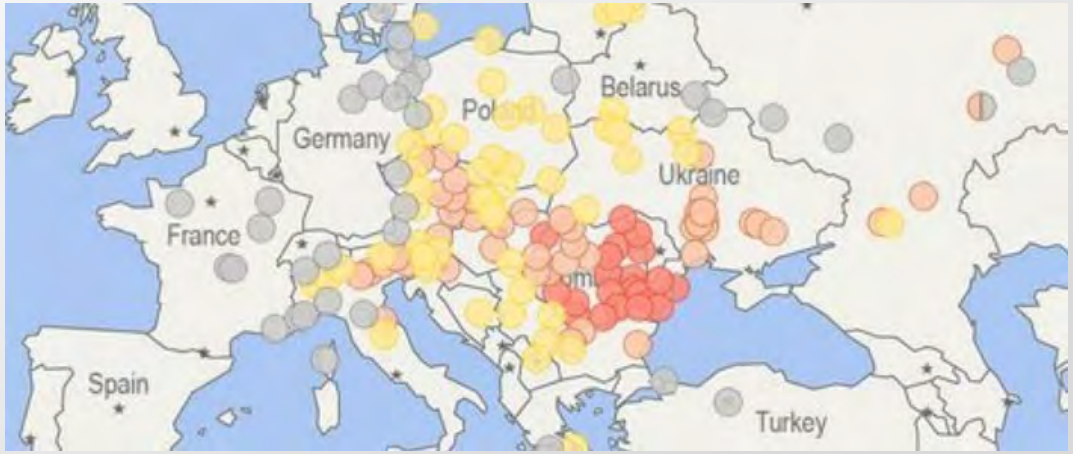
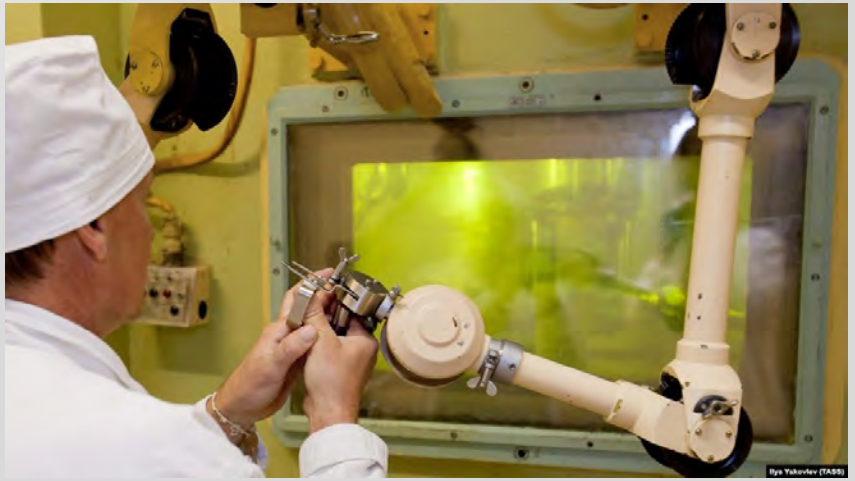
Eurasian Ruthenium Release (2017)

- Ruthenium release detected in Europe
  - Multiple monitoring sites in Western Europe detected elevated radiation levels
  - Analysis confirmed short-lived Ruthenium isotopes (typical fission products)
  - No officially reported releases or accidents in the region at the time
- CMHT activated
- Initial Mission
  - Provide analysis and situational awareness
- CM Tasks included
  - Analyze and integrate data from the available sensor networks and international reports
  - Model potential release scenarios to identify potential locations where release may have originated
  - Review open sources to identify potential facilities where the release may have originated



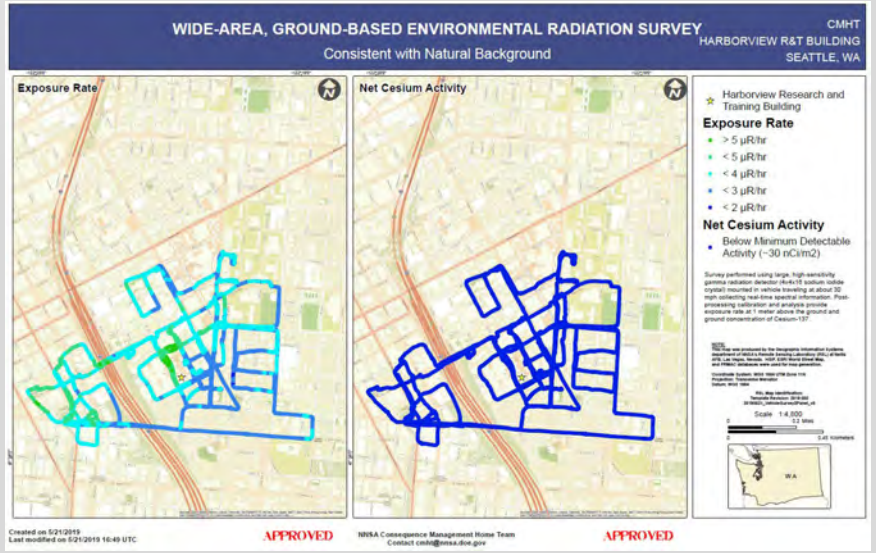


Santa Susanna Field Laboratory (2018)

- Wildfire impacting former DOE lab
  - Potential Radiological Dispersion Event
- CMHT activated
- Initial Mission
  - Support for RAP deployment
- CM Tasks included
  - Management of laboratory samples
  - Statistical analysis of analytical results to confirm no detectable release
  - Development of situation awareness products
  - Assessment support for state partners

Seattle Hospital Contamination Incident (2019)

- Radiological contamination event
  - Potential radiological dispersion event
- CMHT activated
- CMAC deployed to Seattle, WA
- Initial Mission
  - (CMHT) Assessment support for RAP deployment
  - (CMAC) SME support for RAP deployment. Sample control, radiological shipper, and fly away laboratory also deployed to manage sample collection
- CM Tasks included
  - Data quality review & assessment of data
  - Evaluation of data to confirm no ground-level release
  - Development of situation awareness products
  - Assessment support for field activities & HQ RFI's



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Portsmouth Contamination Incident (2019)

- Potentially Contaminated Site
  - Off-site from the Portsmouth Gaseous Diffusion Plant (decommissioned) DOE EM site
- CMHT activated
- Initial Mission
  - Reach back support for RAP 5 deployment to collect samples at the middle school
- CM Tasks included
  - Development of statistical sampling plan
  - Coordination of sample collection and assignment to laboratories for analysis
  - Data quality review & assessment of data
  - Scientific evaluation of laboratory analysis results to evaluate if contamination could be present

Any