



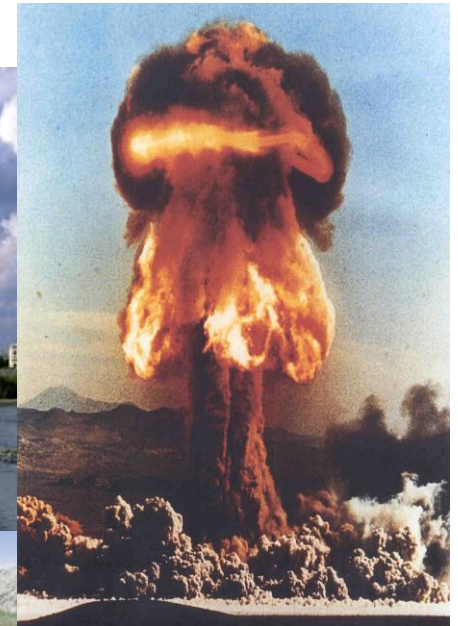
Population Monitoring in the Aftermath of a Radiation Incident

Jessi Snook

Kansas Radiation Control Program

Events

- ☢ Nuclear
 - WMD
 - Power plants
- ☢ Terrorism
 - RDD
 - RED
- ☢ Transportation
- ☢ Lost/stolen sources



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TMI

- April 1, 1979
- Maximum exposure: ~100mrem
- Average dose within 50 miles: 1.5mrem
- Most significant accident in US history involving nuclear power
- 35,946 people lived within 5 miles

Chernobyl

- April 26, 1986
- Worldwide detection of radiation
- Hundreds of thousands of people affected
- Thousands contaminated with little follow up
- Town was abandoned



Three Mile Island – 1979



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Goiânia



- ☢ Powdered ^{137}Cs
- ☢ 112,800 people monitored
 - ☢ approx. 10%
- ☢ 249 people contaminated
- ☢ 54 people hospitalized
- ☢ 28 suffered radiation burns
- ☢ 8 displayed ARS
- ☢ 4 people died



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Response

- ▶ NRF Nuclear Radiological Incident Annex
- ▶ Federal resources will take time to arrive
- ▶ Limited resources for monitoring and decontamination
- ▶ Local hospitals will become overwhelmed
- ▶ CRCs alleviate influx of concerned citizens



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Early Stages

- ❖ Pre-establish locations
- ❖ Plan and practice
- ❖ Activated after event by local EM
- ❖ First responders and volunteers dispatched
- ❖ Set up and prep for incoming public



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Special Considerations

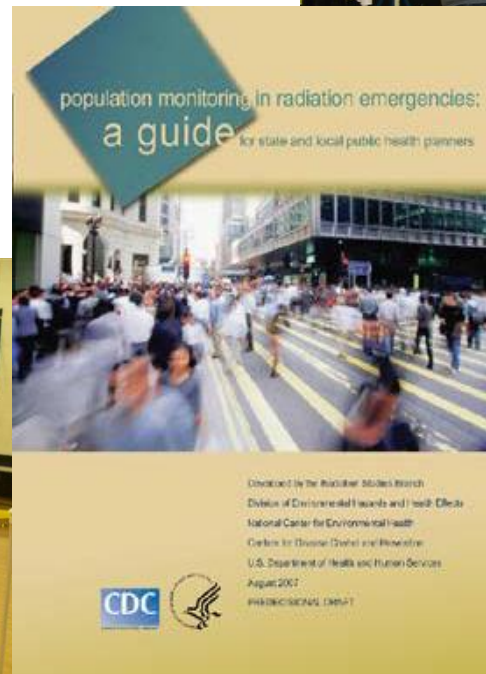
- ☠ Scope of event
- ☠ Staffing resources
- ☠ Facilities and resources for monitoring and decon
- ☠ Size of the population to be surveyed
- ☠ Radiation survey instrumentation utilized
- ☠ Management of people and information
- ☠ Psychosocial issues
- ☠ Special populations
- ☠ Communication with the public
- ☠ Vehicles/traffic control
- ☠ Companion & service Animals



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Needs and Resources

- ▶ Technical
- ▶ Equipment Needs
- ▶ Facilities
- ▶ Personnel



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The Biggest Problem:

I've got more people than
I can possibly handle
and I don't have enough help.



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Mission:

Radiation Professionals protecting the health of the citizens of Kansas by volunteering to assist with population monitoring during a radiation incident



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Radiation Response Volunteer Corps

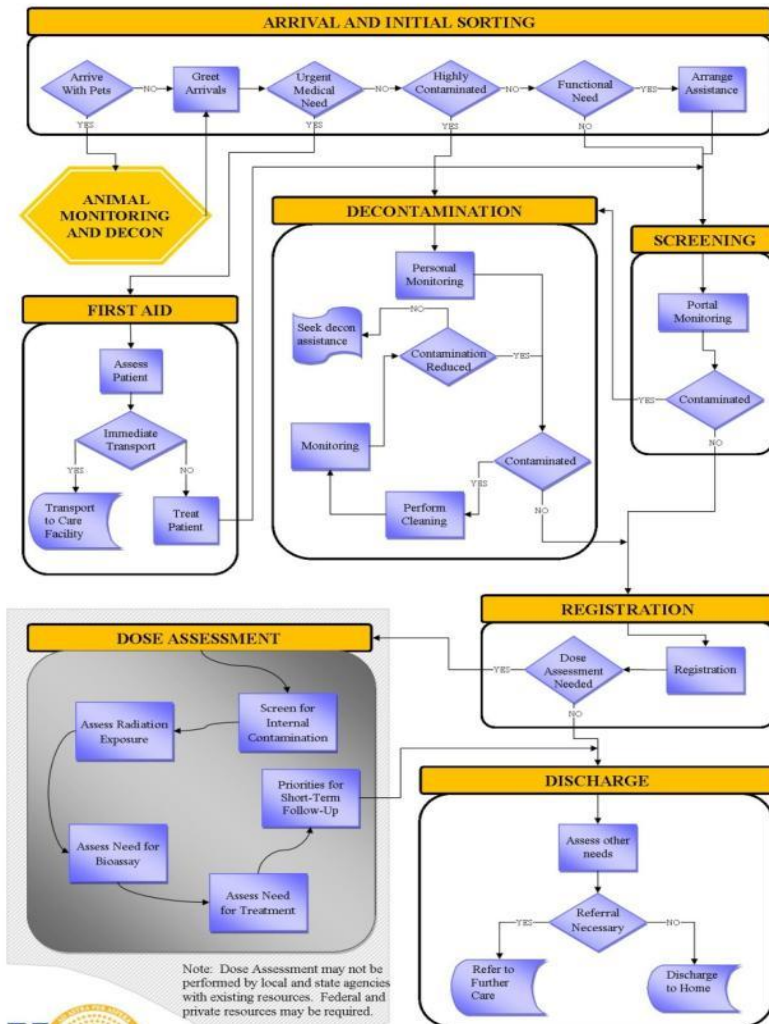


- Established in 2010
- Radiation professionals
- Perform monitoring and decontamination activities
- Initial training
- Advanced training
- Drills and exercises



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Kansas Community Reception Center Flow Diagram



Note: Dose Assessment may not be performed by local and state agencies with existing resources. Federal and private resources may be required.



<http://www.kdheks.gov/radiation/rvce.htm>
 rvce@kdheks.gov (785) 296-1560

Radiation Control Program
 1000 S.W. Jackson St., Suite 330
 Topeka, KS 66612



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Kansas Community Reception Center

Stations

- ❖ Initial Sorting
- ❖ First Aid
- ❖ Contamination Screening
- ❖ Decontamination
- ❖ Registration
- ❖ Dose Assessment
- ❖ Discharge



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Pets

- ❖ **Pets Evacuation and Transportation Standards (PETS) Act**
- ❖ **Animal monitoring and Decontamination**
- ❖ **Considerations**
 - ❖ Allergies
 - ❖ Fear
 - ❖ Aggressive animals
 - ❖ Sanitation
 - ❖ Supplies and temporary housing
 - ❖ Owner or handler concerns
 - ❖ Identification & health records





Objectives

- ▶ Monitor citizens, vehicles, pets for potential radiological contamination
- ▶ Perform decontamination on those citizens, vehicles, pets as needed.
- ▶ Registry of citizens

Lessons Learned

- Just-in-time training, especially for non-rad folks
- Accountability & record keeping
- Staffing
- Facility: ADA compliance & overflow capacity
- Animal decon & rad waste?



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Fukushima

- ▶ March 11, 2011
- ▶ Extensive population screening (200,000)
- ▶ Detailed studies
- ▶ Operation Tomodachi Registry
 - 75,000 DOD affiliated individuals who were on or near the mainland of Japan for next 2 months
 - Whole body and thyroid dose



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International Fund for Animal Welfare

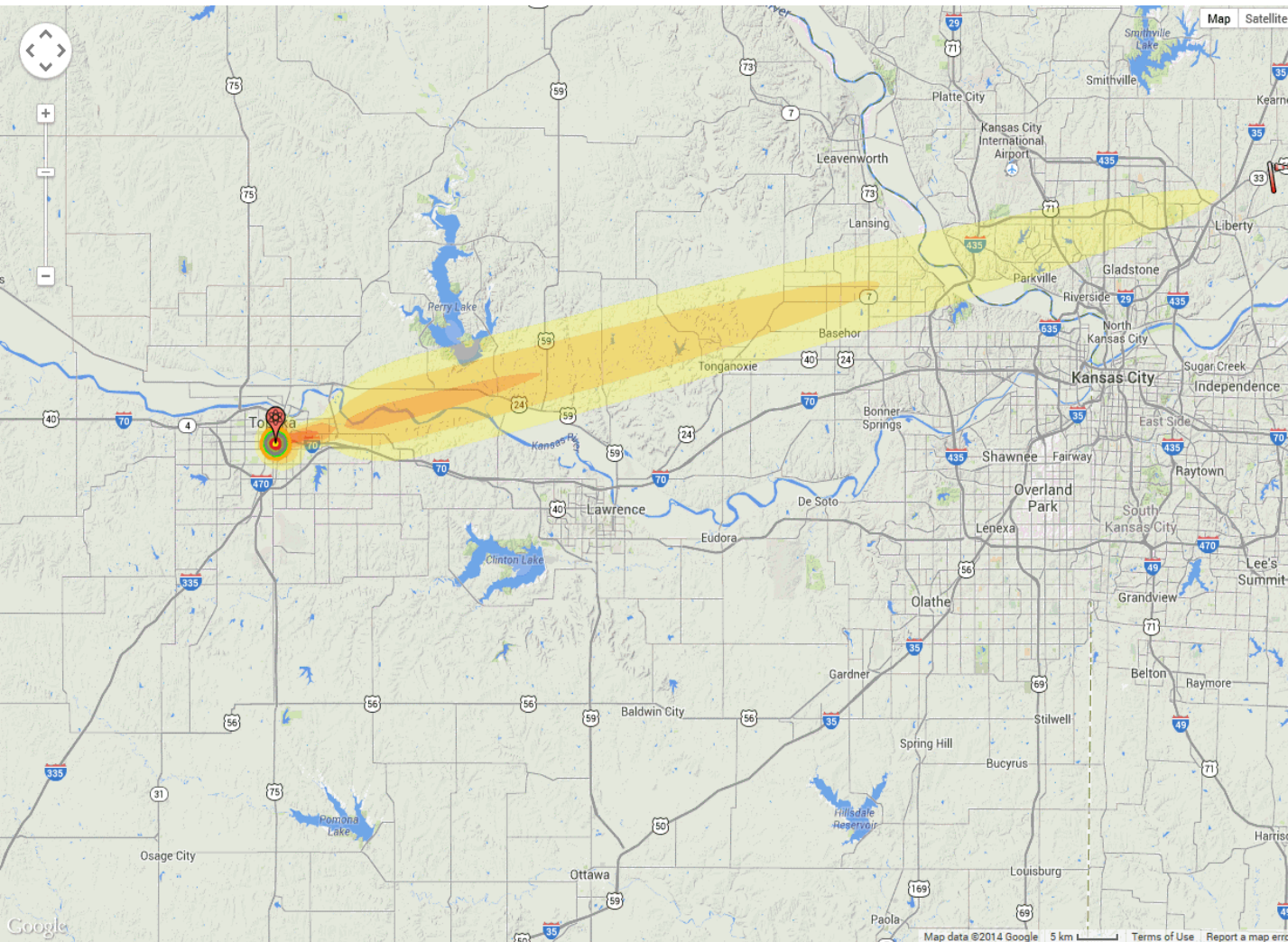


- ▶ Situation Report: Animals abandoned in the 20 km Exclusion Zone:
- ▶ 120 Farms:
 - 870 Dairy Cattle
 - 2,500 Beef Cattle
- ▶ 30,000 Swine
- ▶ 630,000 Chickens



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This is only a test.



NUKEMAP 2.42 : FAQ You might also try: NUKEMAP3D

Effects radii for 15 kiloton surface burst (smallest to largest):

- Fireball radius: 770 ft (0.07 mi²)**
Maximum size of the nuclear fireball; relevance to lived effects depends on height of detonation. If it touches the ground, the amount of radioactive fallout is significantly increased.
- Air blast radius (20 psi): 1,760 ft (0.35 mi²)**
At 20 psi overpressure, heavily built concrete buildings are severely damaged or demolished; fatalities approach 100%.
- Air blast radius (5 psi): 0.7 mi (1.55 mi²)**
At 5 psi overpressure, most residential buildings collapse, injuries are universal, fatalities are widespread.
- Radiation radius (500 rem): 0.83 mi (2.18 mi²)**
500 rem radiation dose; without medical treatment, there can be expected between 50% and 90% mortality from acute effects alone. Dying takes between several hours and several weeks.
- Thermal radiation radius (3rd degree burns): 1.05 mi (3.44 mi²)**
Third degree burns extend throughout the layers of skin, and are often painless because they destroy the pain nerves. They can cause severe scarring or disablement, and can require amputation. 100% probability for 3rd degree burns at this yield is 8.7 cal/cm².

Note: Rounding accounts for any inconsistencies in the above numbers.

Estimated total-dose fallout contours for a 15 kiloton surface burst with a 15 mph wind:

- Fallout contour for 1 rads per hour:**
 - Maximum downwind cloud distance: 69.7 mi
 - Maximum width: 6.68 mi
 - Approximate area affected: 480 mi²
- Fallout contour for 10 rads per hour:**
 - Maximum downwind cloud distance: 45 mi
 - Maximum width: 4.06 mi
 - Approximate area affected: 218 mi²
- Fallout contour for 100 rads per hour:**
 - Maximum downwind cloud distance: 20.2 mi
 - Maximum width: 1.43 mi
 - Approximate area affected: 57.3 mi²
- Fallout contour for 1,000 rads per hour:**
 - Maximum downwind cloud (stem only) distance: 3.19 mi
 - Maximum stem width: 0.66 mi
 - Approximate area affected: 3.53 mi²
 - The selected radiation level is too high for cloud fallout at this

This was not a test.



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Questions?



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