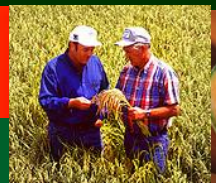
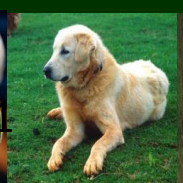
Human and Other Animal Health Issues Following a Radiation Release

Eleventh One Medicine Symposium

Gordon Cleveland
Radiological Program Analyst
USDA APHIS VS STAS OSIC
Advisory team for Environment, Food, and Health





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Today's Topics

- What is radiation
- What is a radiological emergency
- Advisory Team for Environment, Food and Health
  - Participating Agencies
  - Participating Agency responsibilities
- Protective Action Recommendations
  Public and Worker Safety

More Today's Topics

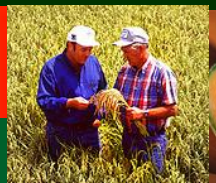
- USDA & Other Agency's Radiological Emergency Response: NRIA
- USDA's Role in the Advisory Team for Environment Food and Health
- Multi-agency efforts to resolve Pets and Service Animal issues in Radiological Emergencies
  - Evacuation
  - Decontamination
  - Radiotherapeutic Interventions

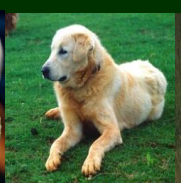
Still More Today's Topics

- Livestock Issues in Radiological Emergencies
  - Evacuation/Decontamination
  - Rehabilitation VS Disposal
- Perception VS Science: the major impact on agricultural recovery from a radiation release
  - Mitigation efforts: consumer confidence
- And no current presentation would be complete without:

Today's Topics

THE GREAT TOHOKU EARTHQUAKE AND THE FUKUSHIMA DAIICHI NUCLEAR POWER PLANT DISASTER





Today's Topics

THE GREAT TOHOKU EARTHQUAKE AND THE FUKUSHIMA DAIICHI NUCLEAR POWER PLANT DISASTER

What is Radiation?

- Background radiation
  - Natural: radioisotopes in the soil, granite in your building or kitchen counter top, cosmic rays from the sun and outer space
  - Manmade: medical or dental x-rays, medical lab procedures, radiotherapies, microwaves from communications technologies and radar
  - Background radiation is the standard against which dose rates from unusual radiation sources are measured

What is Radiation?

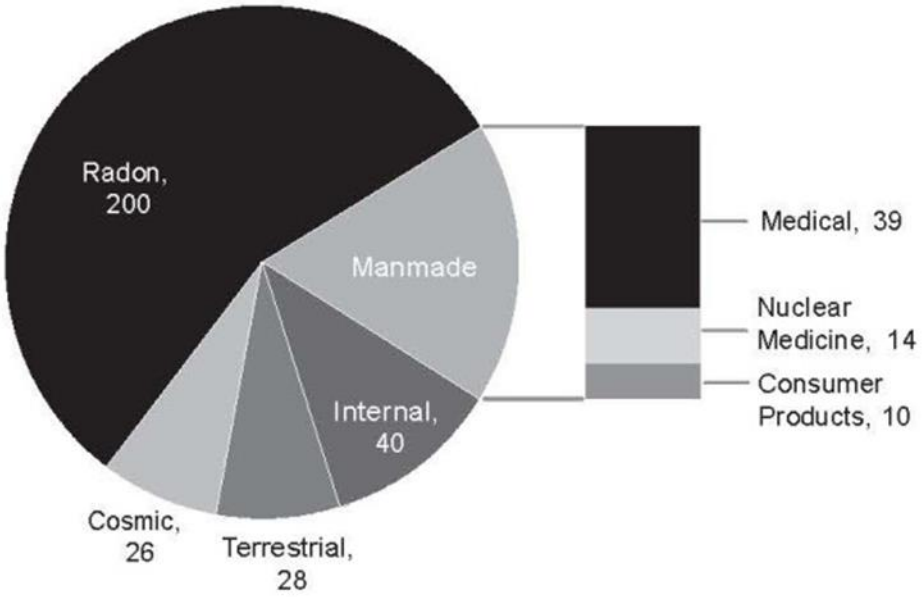


figure B-1. typical annual radiation doses from natural and Man-Made Sources (mrem). *Source: NCRP Report No. 93 (NCRP 1987)*

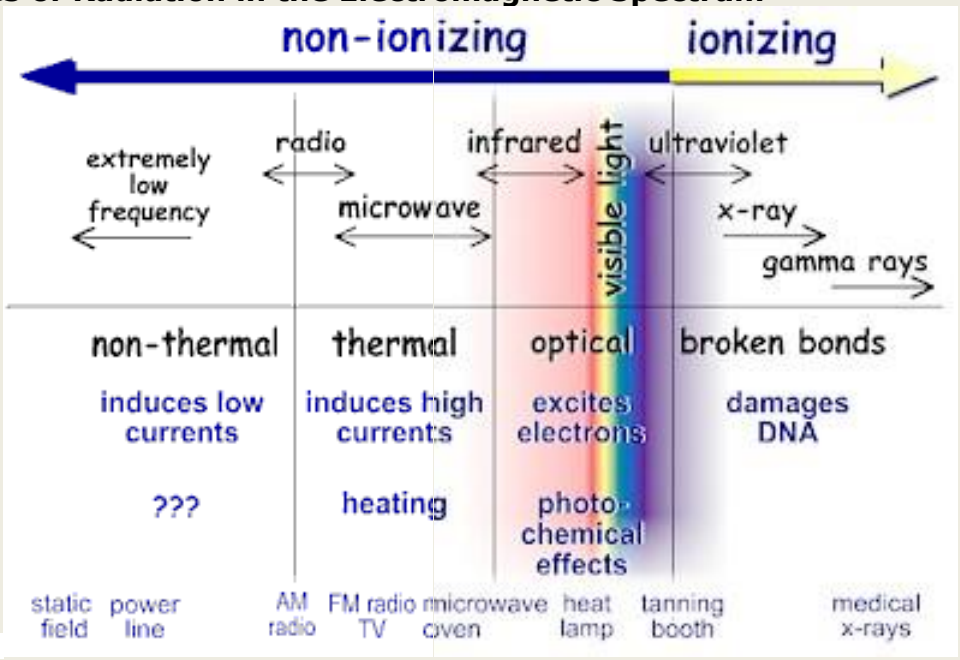
A rem (10 milliSieverts) is a measure of radiation dose. The average American is exposed to approx. 620 millirems, or 0.62 rem, or 6.2 mSv, of radiation each year from natural and manmade sources: US Nuclear Regulatory Commission

What is Radiation?

- Energy in waves or high speed particles
  - Manmade: X-ray, radio waves
  - Natural: Cosmic radiation, radon
- Types of radiation of concern (ionizing radiation):
  - Alpha α, Beta β, Gamma γ
- Ionizing Radiation:
  - Destabilizes molecules creating free radicals
  - Causes oxidative damage to body cells such as DNA
  - Body can repair damage if not overwhelmed
  - If irreparable damage occurs, mutated cells can become cancerous or promote organ failure

What is Radiation?

Types of Radiation in the Electromagnetic Spectrum



What is Radiation?

Irradiation:

- Close enough to source to receive a dose
- Recipient may be harmed but does not become radioactive

Contamination: (radionuclides where you don't want 'em)

- radioactive materials being deposited on, coming in contact with, or being ingested by a recipient
- Beta β, Gamma γ, pose a threat whether internally or ingested or externally deposited
- Alpha α particles cannot penetrate the skin, paper, or water and are extremely difficult to detect and particularly harmful when ingested as they accumulate in, and seriously damage, organs

What is Radiation?

- There is a radiotherapy for every class of radionuclides:

Isotope Name & Symbol	Ionizing Radiation Type	Radiological Half-life	Biologic Half- life (days)	Exposure Type	Mode of Contamination	Focal Accumulation in Body	Treatment
Americium (Am-241)	α	458 years	73,000	Internal	Inhalation, skin wounds	Lungs, liver, bones, bone marrow	Chelation with DTPA‡
Californium (Cf-252)	α, γ	2.6 years	N/A	Internal	Lungs, GI tract	Bones, liver	Chelation with DTPA†
Cesium (Cs-137)	β, γ	30 years	70	External, Internal	Lungs, GI tract, wounds, follows potassium	Renal excretion	Ion exchange with Prussian blue‡
Cobalt (Co-60)	β, γ	5.26 years	9.5	External, Internal	Lungs	Liver	Gastric lavage; Limited animal data suggest that DTPA, EDTA, L-cysteine, NAC (N-Acetyl-Cysteine), and glutathione may be effective in increasing urinary excretion. §
Curium (Cm-244)	α, γ, neutron	18 years	7,300 (liver) 18,250 (bones)	Internal	Inhalation, GI tract	Liver, bones (soluble Cm compounds)	Chelation with DTPA‡
Iodine (I-131)	β, γ	8.1 days	138	Internal	Inhalation, GI tract, wounds	Thyroid	Potassium iodide‡, propylthiouracil†, methimazole†, sodium iodide†
Iridium (Ir-192)	β, γ	74 days	50	External, Internal	Not available	Spleen	Not available

See handout for additional information

What is Radiation?

- **There is a radiotherapy for every class of radionuclides:**

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Iridium (Ir-192)	β, γ	74 days	50	External, Internal	Not available	Spleen	Not available

See handout for additional information

Radiation Emergencies

Accidental or purposeful dispersal or deposition of Radioactive Materials:

- RDD Radiological Dispersion Device
- Lost or purposely planted source
- Nuclear Weapons Accident
- Improvised Nuclear Device
- Nuclear Power Plant release
- For our purposes radiocesium is the benchmark (can or will occur in all events listed above)
- Nuclear Power Plant release will be our focus (last two radiation emergencies)

USDA Responsibilities: Nuke-RAD Incident Annex to the NRF:

- **Assists** in the planning and collection of agricultural samples
- **Assesses** damage to crops, soil, livestock, poultry, and processing facilities
- Provides **support and advice** on screening and decontamination of contaminated animals

USDA Responsibilities: Nuke-RAD Incident Annex to the NRF:

- **Inspects and assists** in the disposition of agricultural animals and monitors the production, processing and storage of their products

- **Assists,** in conjunction with HHS, in monitoring the production, processing, storage, and distribution of food through the wholesale level

USDA Responsibilities: Nuke-RAD Incident Annex to the NRF:

- **Assists** in the planning and operational aspects of animal carcasses disposal
- Inspects and **assists** in the collection of samples of crops, meat and meat products, poultry and poultry products, and egg products to ensure that they are safe for human consumption.

USDA's Preparedness Challenges

- **Radiological surveillance** for contaminated or irradiated animals/crops/feeds
- **Radiological decontamination** for livestock/poultry/pets/zoo animals/wildlife
- **Therapeutic countermeasures** to mitigate the effects of radionuclide contaminants ingested by animals/euthanasia strategies if necessitated
- **Remediation strategies** for soils and crops contaminated by radionuclides

USDA's Preparedness Challenges

The return to sustainable marketability of livestock, poultry, foods, crops, and feeds which have been determined by sampling, monitoring, and geographic location, not to have been contaminated by a radiological release

- **Regionalize the event to reduce impact on trade and assure consumer confidence**

Radiological Program Analyst

Who am I, and why are you listening to me?

POSITION DESCRIPTION: To develop robust and practicable *strategies* for maintaining agricultural production and a safe food supply following a purposeful or accidental nuclear or radiological release.

Radiological Program Analyst Challenges

- **Radiological surveillance** for contaminated or irradiated animals/crops/feeds
- **Radiological decontamination** for livestock/poultry/pets/zoo animals/wildlife
- **Therapeutic countermeasures** to mitigate the effects of radionuclide contaminants ingested by animals/euthanasia strategies if necessitated
- **Remediation strategies** for soils and crops contaminated by radionuclides

Radiological Program Analyst

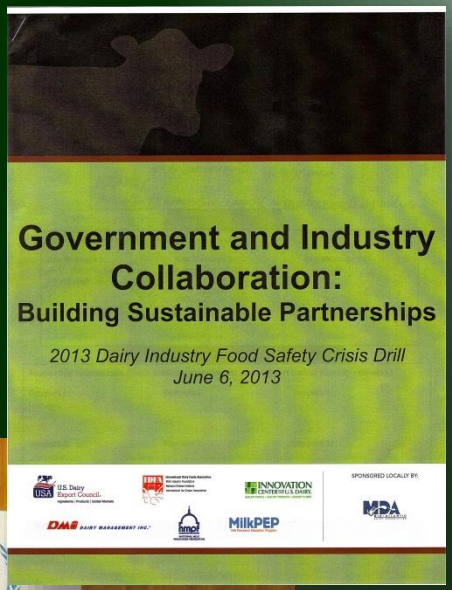
- Provides Subject Matter Expertise, support, and Protective Action Recommendations to federal, state, local, and tribal emergency responders during radiological response exercises and real events

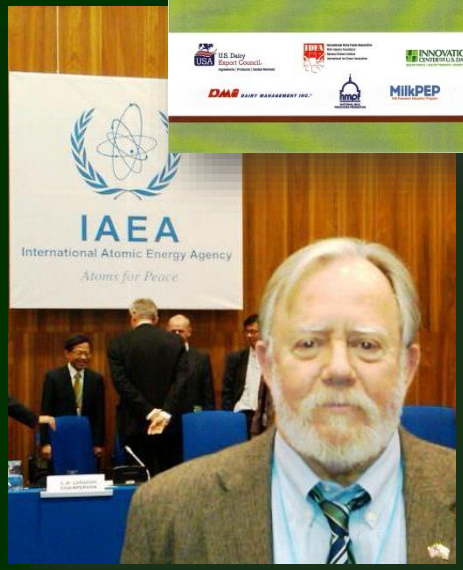
- Maintains membership and participation in national level multi-agency radiological emergency preparedness programs. Example:
  - Lead in development of DHS Science and Technology Branch Subcommittee, animal decontamination R & D for Federal Radiological Preparedness Coordinating Committee.

Radiological Program Analyst

- Participates in and provide guidance for the development of radiological exercises to enhance radiological emergency preparedness in the agricultural sector (Dairy Crisis COMMS Drills 2013 – 2014)

- Maintains communication, liaison with, and membership in, national and international radiological organizations





Radiological Program Analyst

Maintains membership in the Radiological Advisory Team for Environment Food and Health

The Advisory Team for Environment, Food, and Health

The goal of the Advisory Team is to provide coordinated advice and recommendations to the State, Coordinating Agency, and DHS concerning environmental, food, and health matters.

Membership is comprised principally of :

and other Federal agencies as needed

Advisory Team

Made up primarily of radiation health physics Subject Matter Experts from the Signatory Agencies, to provide Protective Action Recommendations to decision makers:

- **Based on coordinated technical and scientific advice, and best practices, through the Coordinating Agency/Incident Command**
- **Regarding shelter in place, evacuation, responder/worker stay times**
- **In accordance with EPA Protective Action Guides**

Advisory Team

Advisory Team provides *recommendations* concerning:

- **Environmental assessments**
- **Protective Action Guides and their application to the emergency;**
- **Use of radioprotective substances (e.g., thyroid blocking agents)**

Advisory Team

Advisory Team provides *recommendations* concerning:

- Exposure through the ingestion pathway
- Disposition of contaminated livestock, pets, poultry, wildlife and foods
- Relocation, reentry, and other radiation protection measures prior to recovery
- Recovery, return, and cleanup issues

Advisory Team

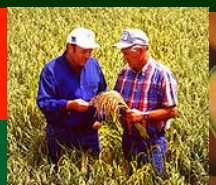
Advisory Team provides *recommendations* concerning:

- Health and safety advice or information for the public and for emergency workers;
- Estimated effects of radioactive releases on human health and the environment; and
- Provide guidance on availability of clean food, animal feed, and water supply inspection programs to assure wholesomeness;

Example: Advisory Team activities

MARS Launch:

- Worked with Federal, State, and Extension agriculture experts in Florida to perform an exhaustive assessment of animal and plant agriculture, aquaculture, and the natural ecosystem which could be potentially impacted by a plutonium release should there be an accident at liftoff.
- Had Advisory Team on site (NASA) at liftoff.
- Remote Advisory team on ready standby.





Example: Advisory Team activities

Example: Advisory Team activities

Advisory Team activated for the duration of the Fukushima Dai-ichi nuclear power plant emergency

- Worked with Customs and Border Protection to determine worker protection and acceptable levels of contamination for ships and cargo arriving from Japan.
- DOE in Sandia requested ingestion pathway information from the Advisory Team
- Advisory Team provided recommendations to increase the frequency of milk and drinking water sampling

Example: Advisory Team activities

Advisory Team activated for the duration of the Fukushima Dai-ichi nuclear power plant emergency

- Worked with National Center for Import, Export to determine the risk of importing 390 products of plant and animal origin from Japanese providers.
- Continuous monitoring of the situation in country including modification of Derived Intervention Levels for foods, and acceptable contamination levels for animals to slaughter
- Two Advisory Team members on the ground

Advisory Team Functions

- Does not make policy decisions.
- Does not make protective action decisions for States and locals, only Protective Action Recommendations.
- Provides coordinated technical and scientific advice through the Coordinating Agency or Unified Command.
- Bases its recommendations on science and best practices.

Advisory Team Activation

To request Advisory Team participation/activation in emergencies, exercises, etc., by contacting the Advisory Team Chairman:

CAPT Mike Noska (FDA)

Phone: (301) 796-8313

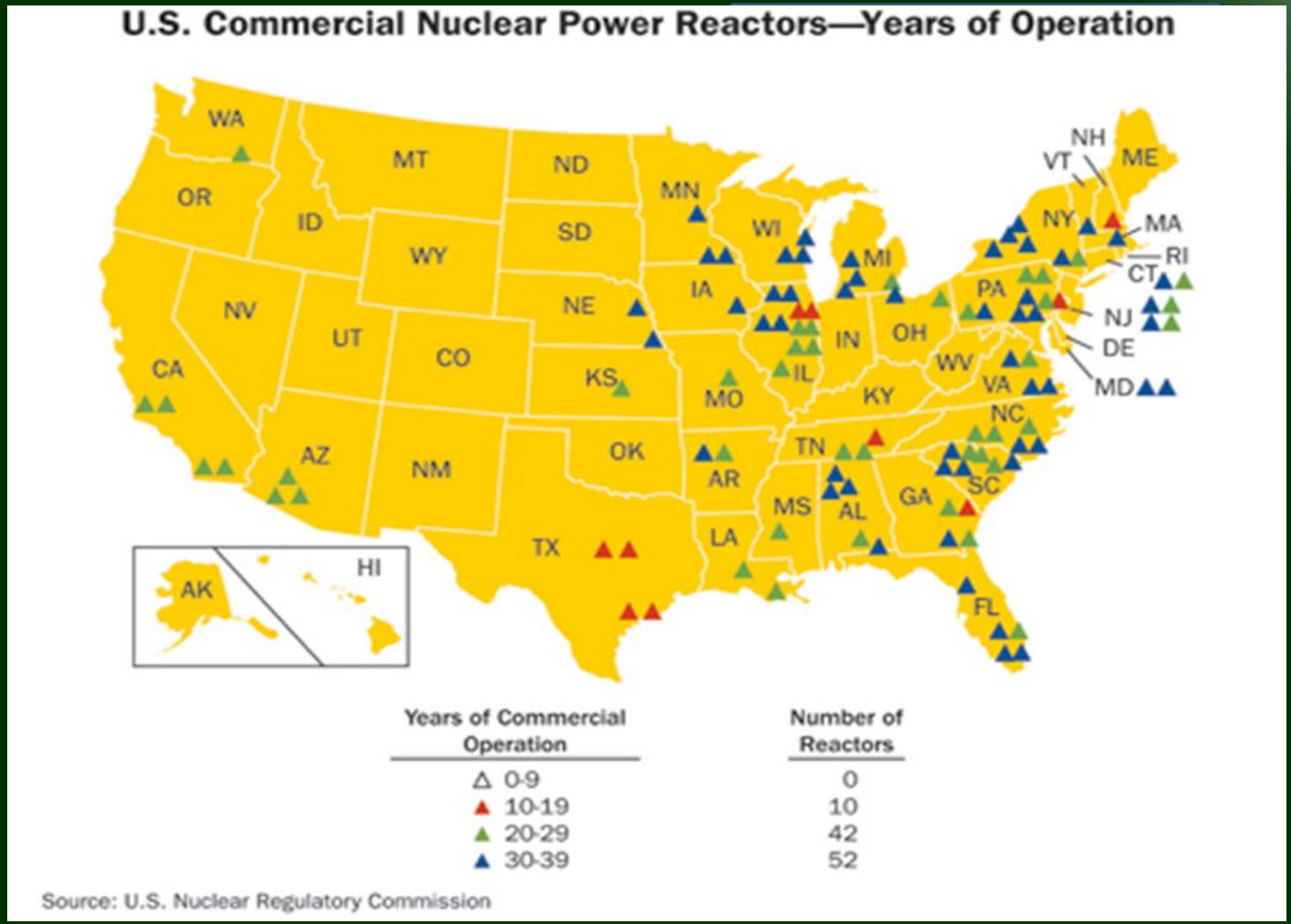
Email: michael.noska@fda.hhs.gov

For more information, go to the Conference of Radiation Control Program Directors (CRCPD) website:

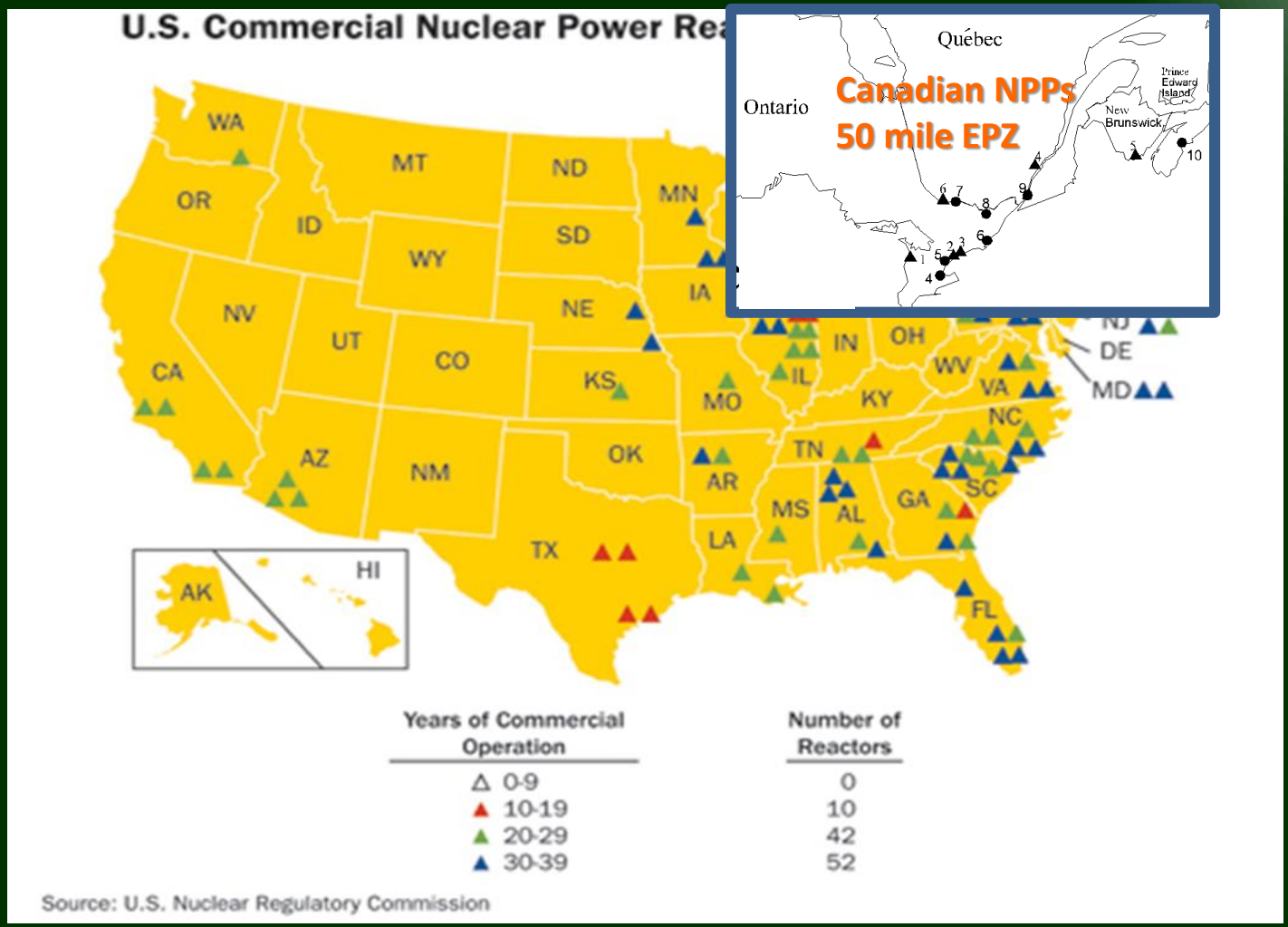
http://www.crcpd.org/ATeam/Ateam.htm

Nuclear Power Plant Release

Nuclear Power Plant Release



Nuclear Power Plant Release



Radiation Emergencies: Release

- Advisory Team PARs for Agriculture:
  - To prevent or minimize contamination of milk, food and water
  - To minimize loses of agricultural resources from radiation effects
  - Regarding availability of food, animal feed, and water supply inspection programs to ensure wholesomeness
  - Regarding relocation, reentry, and other radiation protection measures

Radiation Emergencies: Release

- Protective Measures/Communication
  - Move livestock under cover
  - Provide clean feed and water (See AVMA Maintenance Ration Calculator)
  - Modify ventilation if necessary, until plume passes
  - Tune into your local Emergency Alert System radio/TV station
  - Respond to Protective Action Recommendations
  - Extension Disaster Education Network website

Radiation Emergencies: Release

AVMA MAINTENANCE RATION CALCULATOR

ANIMAL SPECIES	WATER/DAY	FEED/DAY
Cattle		
In Production	9 Gallons Summer 7 Gallons Winter	20 Pounds Hay
Dry Cows	9 Gallons Summer 7 Gallons Winter	20 Pounds Hay
Weaned Calves	6 Gallons summer 3 Gallons Winter	8-12 Pounds Hay
Cow (Pregnant)	7 Gallons summer 6 Gallons Winter	10-15 Pounds Hay
Cow With Calf	9 Gallons summer 8 Gallons Winter	12-18 Pounds Hay
Calf (400 Pounds)	6 Gallons summer 4 Gallons Winter	8-12 Pounds Hay
Swine		
Brood Sow With Litter	3-7 Gallons	8 Pounds Grain
Brood Sow (Pregnant)	3-6 Gallons	2 Pounds Grain
150 LB Gilt or Boar	3-5 Gallons	3 Pounds Grain
Sheep		
Ewe with Lamb	4 Quarts	Pounds Hay
Ewe, Dry	3 Quarts	Pounds Hay
Weaned Lamb	2 Quarts	Pounds Hay
Poultry		
Layers	5 Gallons/100 Birds	7Lbs./100 Birds
Broilers	5 Gallons/100 Birds	7Lbs./100 Birds
Turkeys	12 Gallons/100 Birds	7Lbs./100 Birds
Horses		
All Breeds	5 Gallons/1000Lbs.	20 Lbs. Hay/1000 Lbs.
Dogs and Cats		
	1 Quart Water/Day/Animal	Leave Dry Food Free Choice

Radiation Emergencies: Release

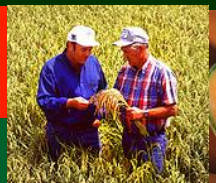
- Evacuation of Livestock
  - Follow instructions from Joint Information Center (Via EAS, police, or Extension Agent, from Incident Command informed by Advisory Team and other SMEs)
  - Consider feed and water and medication needs
  - **Bring farm records** (ident/indemnification)
  - Follow prescribed routes
  - Do not sell or deliver animals to slaughter
  - Respond to Protective Action Recommendations

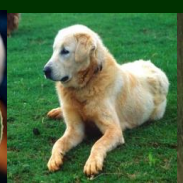
Radiation Emergencies: Release

- Evacuation of Pets
  - Follow instructions from Joint Information Center (Via EAS, police, or Extension Agent, from Incident Command)
  - Follow prescribed routes
  - Bring photographs of you and your pets
  - Bring sufficient food, water for at least 1 week
  - Bring all medications, records, contact info for veterinarian, pet friendly shelters
  - Cages, muzzles, leashes and other restraints as necessary

Radiation Emergencies: Release

- What is a Pet (FEMA)
  - Domesticated animals such as dog, cat, bird, rabbit, rodent, or turtle kept for companionship/pleasure not commercial purposes, that can travel in commercial carriers, and be housed in temporary facilities
  - Does not include reptiles (except turtles), amphibians, fish, insects/arachnids, farm animals, horses, and animals kept for racing purposes, or avian athletes





Radiation Emergencies: Release

- What is a Pet (FEMA)

Radiation Emergencies: Release

- Decontamination: Dependent on characteristics of the plume
  - Follow instructions from Joint Information Center (Via EAS, police, or Extension Agent, from Incident Command informed by Advisory Team and other SMEs)
  - Be creative and effect procedures that minimize contact with contaminated animals

Radiation Emergencies: Release

- On Farm Decontamination: Dependent on characteristics of the plume/available resources
  - Observe mandated ‘stay times’
  - Wear protective equipment (gloves, coveralls,
  - boots) that can be removed before entering ‘clean’ facilities
  - Control effluent and prevent animals and workers standing in it

Radiation Emergencies: Release

- **Decontamination methodology:** Dependent on characteristics of the deposition
  - How clean is clean enough?
  - In the past Advisory Team PAR would likely be:

2 times background is recommended per (EPA) Protective Action Guidelines (PAG). But higher values are permissible in emergency if resources are not sufficient to clean so low. The Conference of Radiation Control Program Directors (CRCPD), the National Council on Radiation Protection & Measurements (NCRP), and the International Atomic Energy Agency (IAEA) have higher values that can be used in emergency. But the goal and ideal is to reduce to below 2 times background. --- Armin Ansari

Radiation Emergencies: Release

One Medicine Concept, repatriation: How clean is clean enough?

- **Establish standards for release/reunification of humans, pets, service animals, working animals**
- **10 CFR 20.1301 : Reunification if the dose in any unrestricted area from sources does not exceed 0.02 mSv (0.002 rem) in any one hour**
- **Instructions to human or other animal caretaker: keep doses to others ALARA**

Radiation Emergencies: Release

- Decontamination: Exercises

Amber Waves

Florida SART

Radiation Emergencies: Release

- Decontamination: Exercises

MN RAD DECON X

USDA Office of Science and Interagency Coordination: Meeting the Challenges

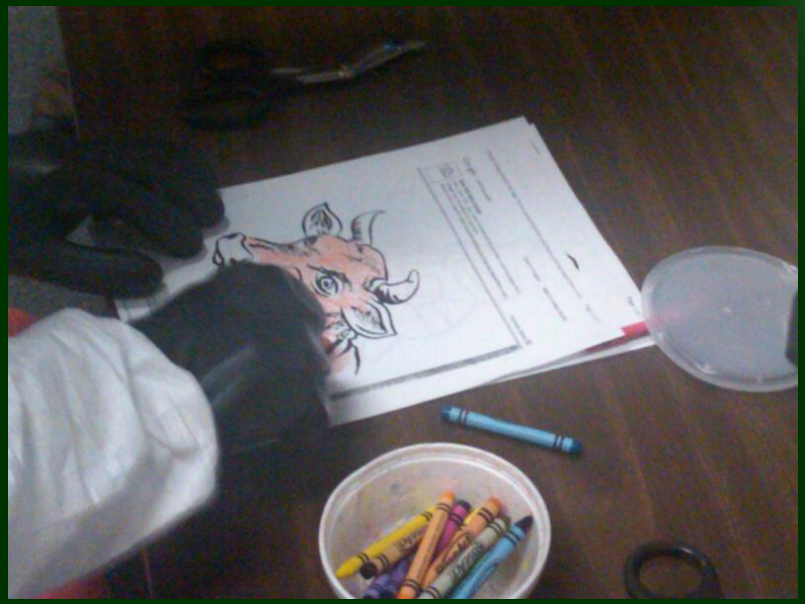
Radiological surveillance for contaminated or irradiated animals/crops/feeds

- 9 SHEWB Safety Officers, Veterinarians and Animal Health Technicians, 4 sets of radiological surveillance gear, 1 VMO trained
- Can merge with the Federal Radiological Monitoring and Assessment Center teams to provide veterinary presence.

OSIC: Meeting the Challenge

Radiological Monitoring for Contaminated Animals

Office of Inspector General HAZWOPER TEAM AgERT trained and 4 members DOE RAD surveillance trained



OSIC: Meeting the Challenge

Radiologica itoring fo aminated animals/

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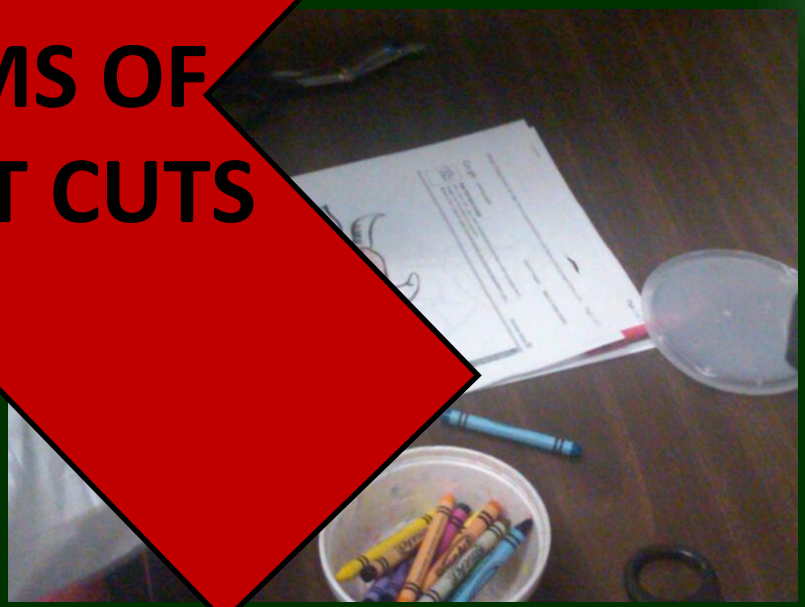
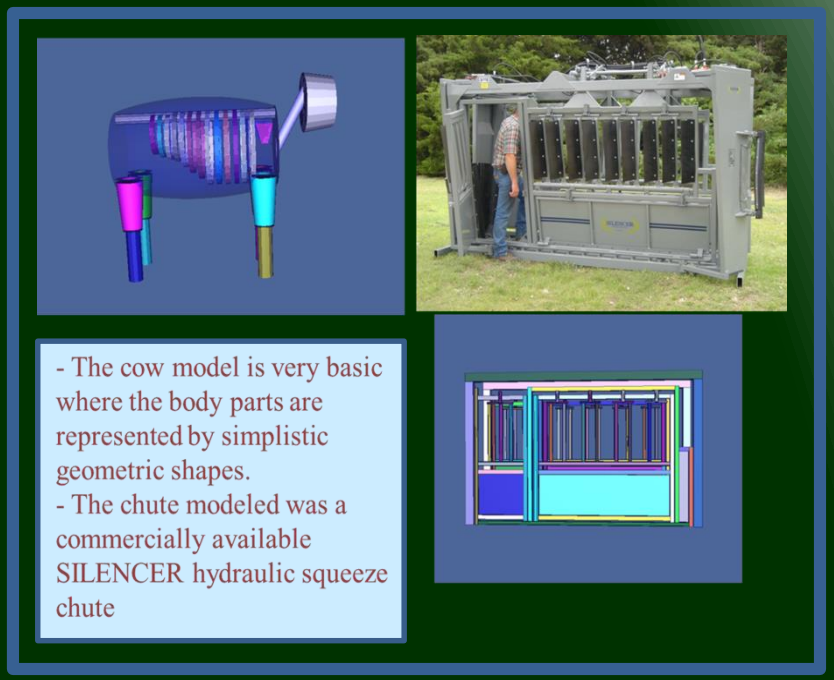
VICTIMS OF BUDGET CUTS



OSIC: Meeting the Challenge

Radiological Monitoring for Contaminated Animals

- $170,000 from National Institute for Food and Agriculture, to Texas A&M to develop portable, scale-able, large animal
- provide emergency evacuation triage and ante-mortem surveillance at slaughter facilities



OSIC: Meeting the Challenge

Radiological Decontamination for Pets

- PETS Act of 2006: pets must be evacuated with their owners.
- AVMA has requested pet, service and working animals be included in the FEMA REP Program Manual
- AVMA, DHS, FEMA, USDA, HHS NDMS, sponsor R & D program for decontamination of these animals
- (PHEMCE) Public Health Emergency Medical Countermeasure Enterprise Implementation Plan 2012

OSIC: Meeting the Challenge

Therapeutic Countermeasures:

- Food and Drug Administration (FDA) regulates veterinary medicines through their Center for Veterinary medicines (CVM)
  - FDA CVM, will not authorize the use of radiotherapeutic interventions (such as Prussian Blue) for animals
  - public perception that livestock might be treated and returned to service

OSIC: Meeting the Challenge

Therapeutic Countermeasures:

- CVM allows veterinarians to prescribe human pharmaceuticals for animals: expensive, and compatibility and dose rates are unknown
- CVM can ‘wave a wand’ and authorize the use of radioprotective products for animals but compatibility and dose rates are unknown

OSIC: Meeting the Challenge

Therapeutic Countermeasures:

- CBRN Nonclinical Studies/BARDA Animal Models Program are all irradiation studies except one: pediatric Radiogardase
  - Minipigs, ingestion, but still farm animals: multitude of IAEA/FAO post-Chernobyl studies
  - 1 (one) rat ingestion study

OSIC: Meeting the Challenge

External Decontamination:

- National Alliance of State Animal Agricultural Emergency Programs DECON BPWG
- Zoo Animal Health Network (ZAHN), Decontamination Best Practices Working Group
- National Institute for Food and Agriculture grant to CSU for R & D of scientifically validated RAD DECON procedures
- FEMA IND Best Practices Working Group

OSIC: Meeting the Challenge

Remediation of Crops and Soils:

- Alternative crops with low radionuclide uptake
- Phyto remediation to remove radionudides from soils (*Conysa canadensis*)
- Soil mitigation by surface removal, deep plowing, flocculation & sequestration.
- Alternative processing of crops

OSIC: Meeting the Challenge

Remediation of Crops and Soils

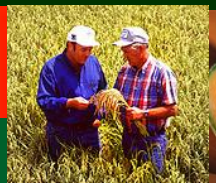
- The International Symposium on Combating Radionuclide in Agro Soil Environments 3/11/2012

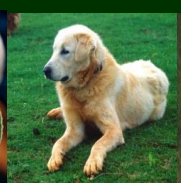
Preeminent Eastern European and Japanese Researchers in radioecology and agro-soil mitigation technology

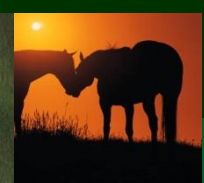
OSIC: Meeting the Challenge

Euthanasia and Carcass Disposal

- For injured, abandoned, or excessively contaminated only until planned
- Collaboration with Aussies, Wildlife services on humane, practicable euthanasia for swine NaO2
- Use of ferrocyanates (Prussian blue) for Cs
  - Reduce cost of disposal: high RAD cow $8,000
  - Low RAD cow: Landfill
  - Cost? $1.70 ($4,500 M/T) to $40: Ferrezen







Perception VS Science

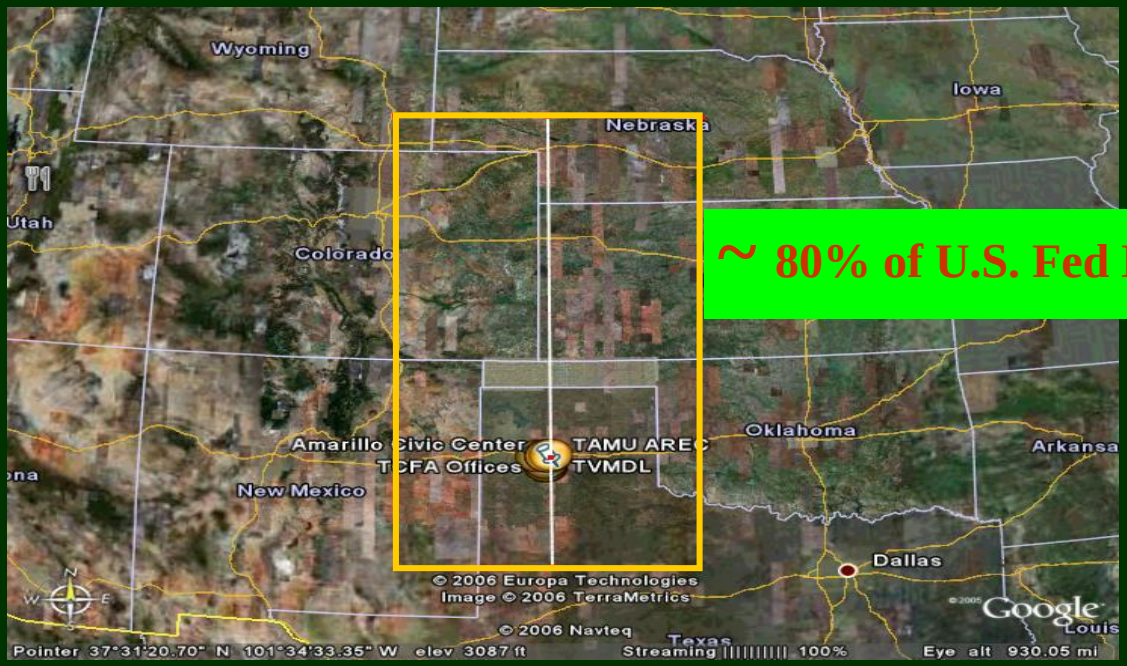
Greatest Impact on Agricultural Recovery

PERCEPTION:

- Dispose any AG product even vaguely associated with radioactivity
- FEDS are trying to cover up
- Milk 12,000 times more contaminated than reported
- Take boron to protect from radioactivity
- KI is protection from all radionuclides

Fukushima Dai-ichi Nuclear Power Plant Disaster

Depopulation and Disposal: Perception VS Decon and Return to Service: Science



Depopulation and Disposal: Perception VS Decon and Return to Service: Science

Depopulation and Disposal

- 100,000 head
- It would take 10 hrs/day, 7 days/week, for 28 days to move 50,000 tons of biomass
- 21 days to dig the trench
- 100,000 head x 8 ft = 800,000 ft = 151 miles
- Area = 151 miles x (4+3) ft = 128 acres
- Volume = 151 mi x 4 ft x 3 ft = 207,407 cubic yd
- 4000 gal/day of leachate (assuming 100M lbs biomass with 60% rapidly degradable = 60M lbs per 5years

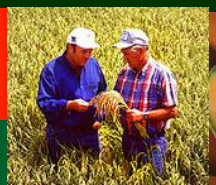
--- Dr. Lori Miller, PhD

Perception VS Science

Greatest Impact on Agricultural Recovery

SCIENCE:

- Eastern Europe survived Chernobyl by cleaning up hundreds of thousands of animals
- EPA RADNET 24/7 near real-time
- Spokane sample was 5,000 times lower than FDAs Derived Intervention Level (DIL)
- Boron taken as suggested = cardiac arrest
- KI only during or in advance I-131 release

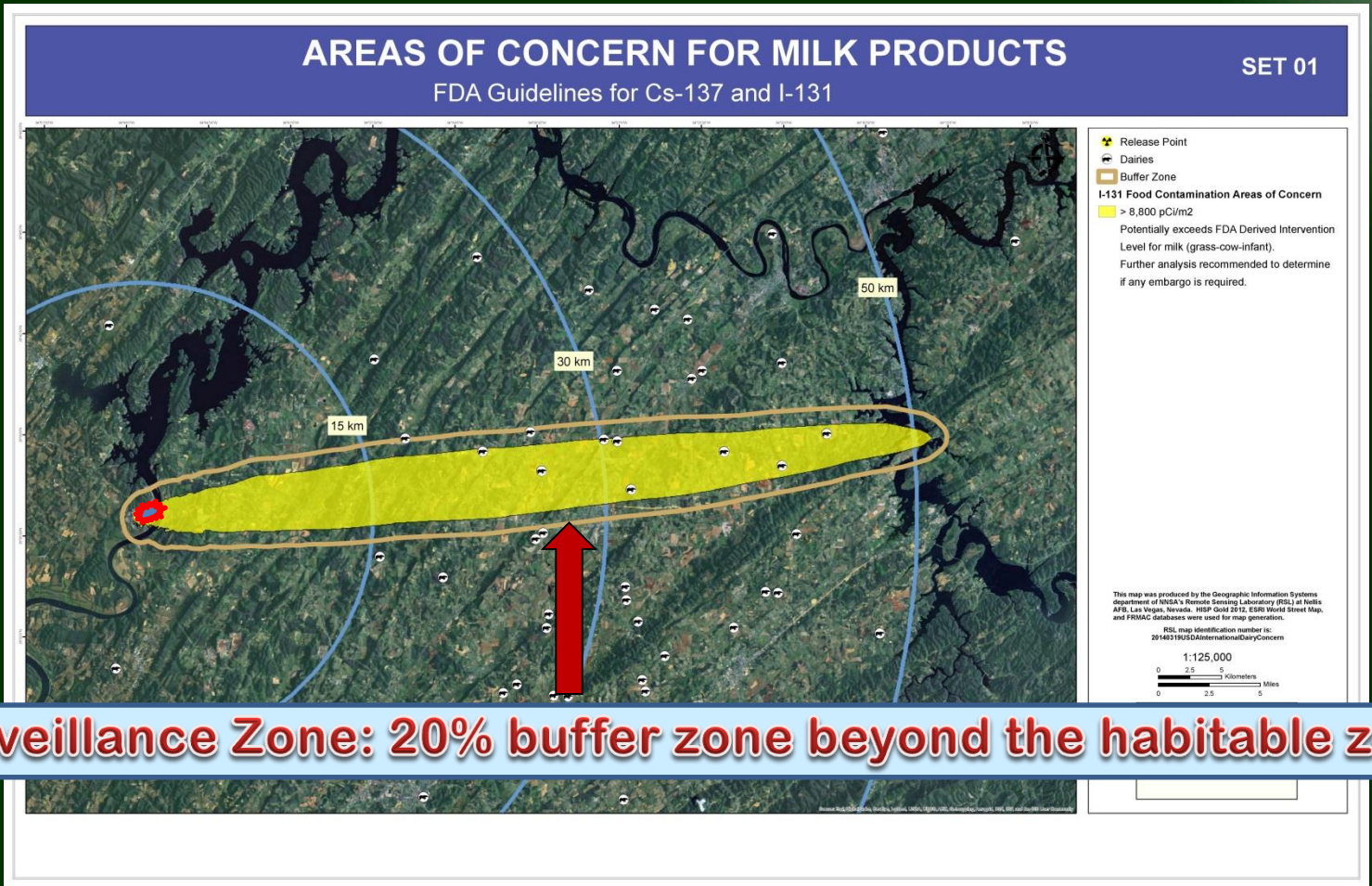




International Oversight

- Propose the formation of an internationally respected and nonaligned consortium including World Organization for Animal Health (OIE), International Atomic Energy Agency (IAEA), and Codex Alimentarius to:
  - Monitor radiological incidents
  - Provide oversight and guidance for the regionalization of those events
  - Establish standards for lifting of trade restrictions
  - Support reinstatement of international agricultural trade from the affected nation(s)
  - Promote domestic consumer confidence

Nuclear Power Plant Release



Surveillance Zone: 20% buffer zone beyond the habitable zone

The Great Tohoku Earthquake and Fukushima Dai-ichi Nuclear Power Plant Disaster

Fukushima Dai-ichi Nuclear Power Plant Disaster

文部科学省 MINISTRY OF EDUCATION, CULTURE, SPORTS, SCIENCE AND TECHNOLOGY-JAPAN

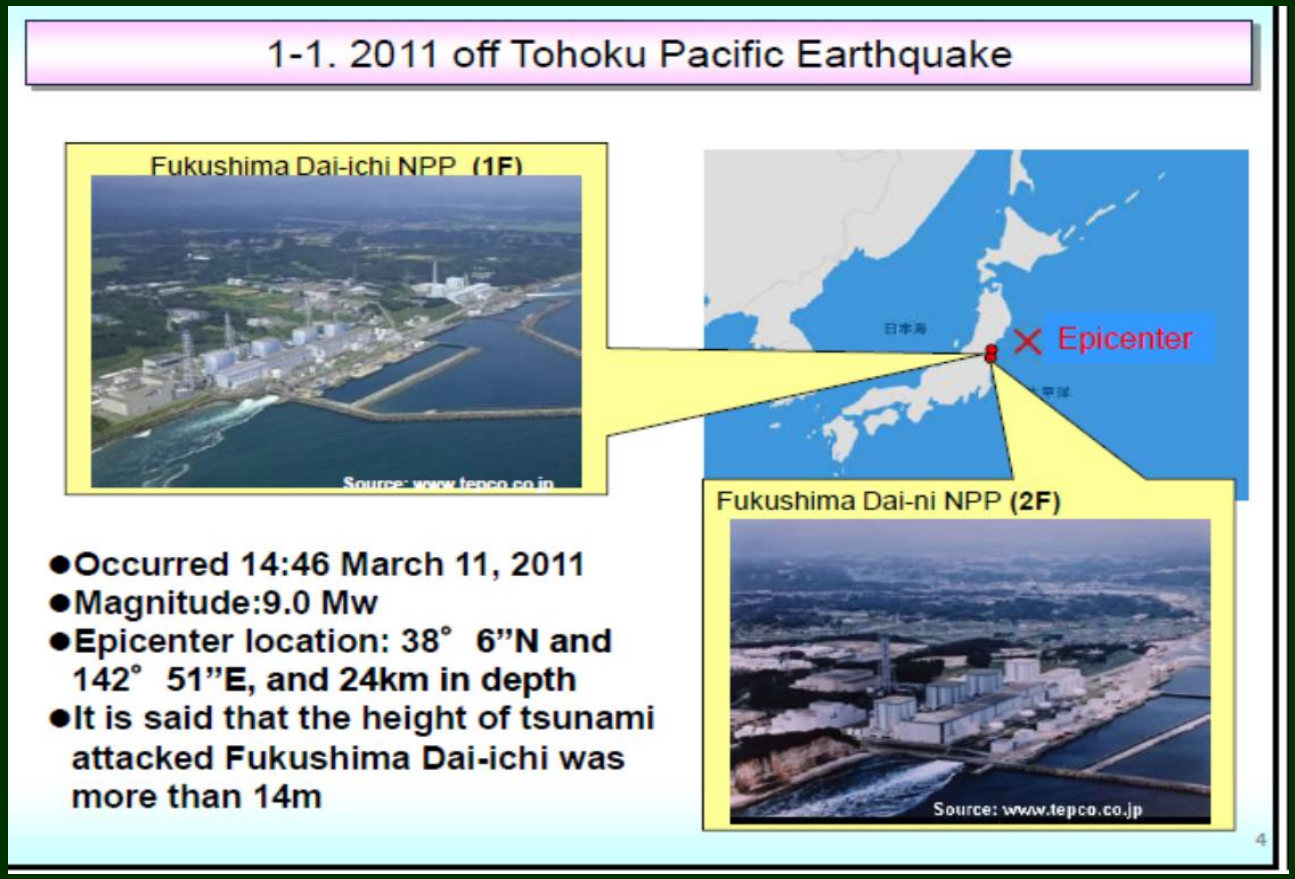
The 2011 off the Pacific coast of Tohoku Earthquake and the seismic damage to the NPPs

Kazuo SAKAI (National Institute of Radiological Sciences)
And

Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan

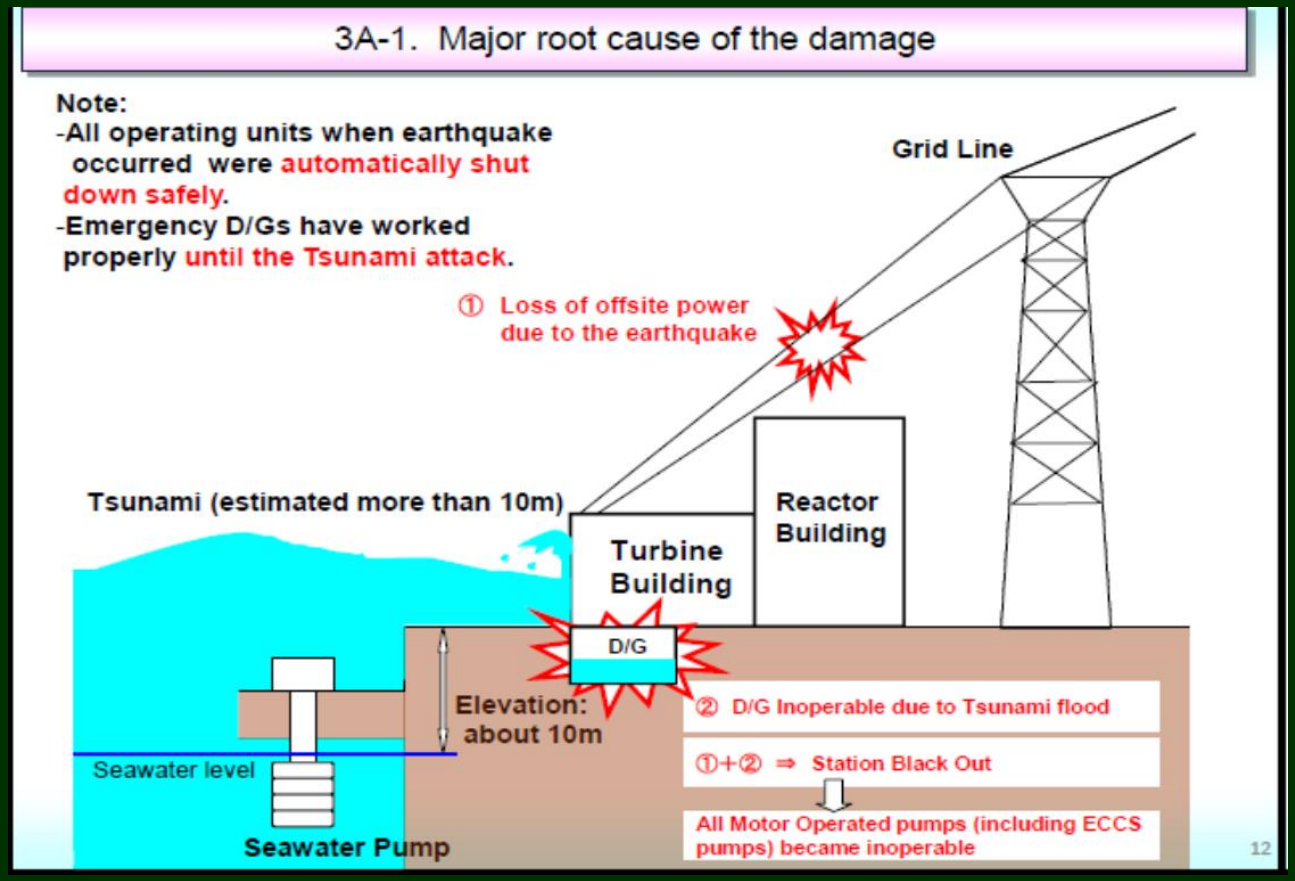
CRPPH-69 (17th – 19th May, 2011)

Fukushima Dai-ichi Nuclear Power Plant Disaster




MIYAKO

Fukushima Dai-ichi Nuclear Power Plant Disaster



Fukushima Dai-ichi Nuclear Power Plant Disaster

- 47 foot tsunami overwhelms the protective barrier
- Emergency Diesel Generators flooded
- Reactors and spent fuel pools now have inadequate coolant (water supply)
- Cores begin to heat.
- Zirconium fuel cladding overheats giving off hydrogen

$$Zr + 2\ H_20 + 1700\ F \rightarrow ZrO_2 + 2\ H_2 \rightarrow$$

Fukushima Dai-ichi Nuclear Power Plant Disaster

Situation Report: Animals abandoned in the 20 Kilometer Exclusion Zone:

120 Farms:

- 870 Dairy Cattle
- 2,500 (which later became 10,000) Beef Cattle (¥1,000,000 @) : Iitate-gyu and Fukushima-gyu
- 30,000 Swine
- 630,000 Chickens
- 5,600 registered dogs and (?) cats

Fukushima Dai-ichi Nuclear Power Plant Disaster

Situation Report: Animals abandoned in the 20 Kilometer Exclusion Zone:

- Tethered cattle starved to death.
- Pastured and loose cattle doing fairly well.
- Pigs in captivity starved, cannibalism, predation.
- All poultry starved or killed by predators.
- Pets on the loose, surviving but malnourished and other medical issues.

Fukushima Dai-ichi Nuclear Power Plant Disaster

International Fund for Animal Welfare Mission

- Ministry of Environment
- Wildlife Rehabilitation
- Academia
- Agriculture
- Animal Welfare
- Toxicology
- Radiology
- Civil Defense

Government of Japan launches animal evacuation operation in Fukushima

SHARE

13 May 2011

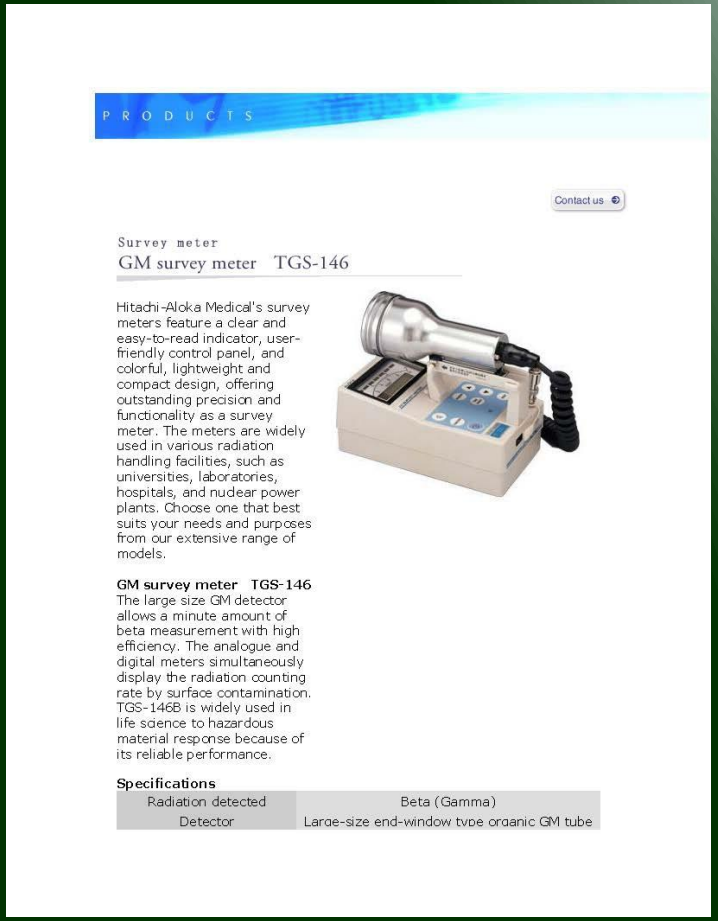
(Yarmouth Port, MA) - A day after receiving a detailed report that included protocols to safely monitor, evacuate and treat animals contaminated by radiation, the Government of Japan launched an operation to remove abandoned animals from inside the 20km evacuation zone in Fukushima Prefecture. The report was the result of an International Fund for Animal Welfare (IFAW- http://www.ifaw.org/) led summit that convened subject matter experts in Tokyo earlier this month to find ways to rescue the animals that were left behind. The Japanese Ministry of Environment and Ministry of Agriculture, Forestry and Fisheries (MAFF) participated in the summit as observers.

I.F.A.W. Mission

I.F.A.W. Mission

I.F.A.W. Mission

- Cattle permitted evacuation and/or slaughter if below 100,000 CPM
- Pets required 10 times further reduction: 10,000 CPM
- Hitachi Aloka TGS – 146 beta/gamma



PRODUCTS

Contact us

Survey meter

GM survey meter TGS-146

Hitachi-Aloka Medical's survey meters feature a clear and easy-to-read indicator, user-friendly control panel, and colorful, lightweight and compact design, offering outstanding precision and functionality as a survey meter. The meters are widely used in various radiation handling facilities, such as universities, laboratories, hospitals, and nuclear power plants. Choose one that best suits your needs and purposes from our extensive range of models.

GM survey meter TGS-146
The large size GM detector allows a minute amount of beta measurement with high efficiency. The analogue and digital meters simultaneously display the radiation counting rate by surface contamination. TGS-146B is widely used in life science to hazardous material response because of its reliable performance.

Specifications

Radiation detected	Beta (Gamma)
Detector	Large-size end-window type organic GM tube

Pet Decontamination: the Problem

Pet Decontamination: the Problem

Fukushima Dai-ichi Nuclear Power Plant Disaster

National Diet of Japan, Report of the Fukushima Nuclear Accident Independent Investigation Commission (NAIIC) 7/5/2012:

- Government had no response measures for a severe accident in place
- Power company did not have emergency response plan and had no manual or training regimens

Fukushima Dai-ichi Nuclear Power Plant Disaster

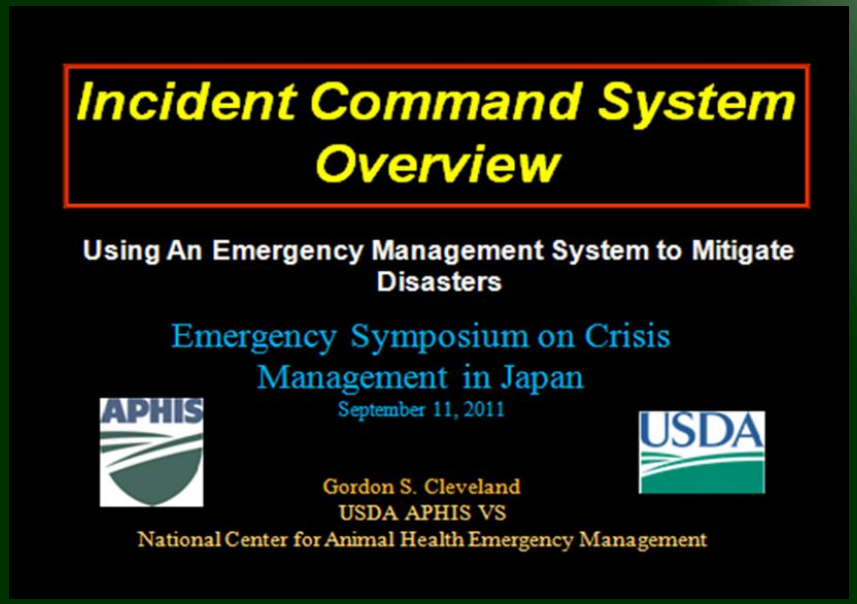
National Diet of Japan, Report of the Fukushima Nuclear Accident Independent Investigation Commission (NAIIC) 7/5/2012:

- Industry was committed to idea that NPPs were safe
- Nuclear & Industrial Safety Agency was part of the Ministry of Economy Trade and Industry, promoters of NPPs (like AEC)

Japan Moves Forward

Emergency Symposium on Crisis Management in Japan: Adopting Incident Command System

- Panel of ICS advocates and experts organized by Rhisso University in cooperation with members of the Government of Japan, House of Representatives



In Contrast: United States' Robust Radiological Emergency Response Preparedness

National Response Framework

- Establishes a comprehensive, national, all-hazards approach to domestic incident response

National Incident Management System

- A comprehensive, national approach to incident management at all jurisdictional levels across all functional disciplines.

Incident Command System

- Single standardized emergency management tool
- Mandated for all emergency response disciplines
- Disaster response Command & Management structure
- Cost effective operations & logistical support

In Contrast: United States' Robust Radiological Emergency Response Preparedness

- **NRC/FEMA:** Provides strict training regimen for plants and local and state responders.
  - Evaluated Exercises every year for all responders.
- **Department of Energy:** Regional Radiological Assistance Program teams.
- **Department of Energy:** Center for Radiological/Nuclear Training provides technical and operational training for state and local responders.

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In Contrast: United States' Robust Radiological Emergency Response Preparedness

- All states have Radiological Response Plans
- All states have Radiological Emergency Preparedness Program teams
  - Membership in the Conference of Radiation Control Program Directors
- States provide brochures to the community within the 50 mile EPZ
- HHS sponsored all inclusive National Alliance for Radiation Readiness
- CDC, FDA, EPA, USDA, provide radiological and other subject matter expertise to the Advisory Team for Environment, Food, and Health

FUKUSHIMA: Not the first time animals have been left behind in in a disaster!


Oh, crap!
Was that
TODAY?
REGAN

QUESTIONS?

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Office: **(301) 851-3597**