

radiological emergency preparedness program usa

Richard Emch, AdSTM

Introduction

Objectives

- Get a basic understanding of the US's National emergency preparedness program
- Review the roles and responsibilities of the main Federal agencies involved in radiological emergency preparedness in the US
- Consider what your country can gain from studying US system

Introduction

- 1979 – Three Mile Island accident
- President Carter gave Federal Emergency Management Agency responsibility for offsite radiological emergency
- FEMA established Radiological Emergency Preparedness Program (REPP) and Federal Radiological Emergency Response Plan (FRERP)
- 2011 – attacks on World Trade Center and Pentagon
- Homeland Security Act of 2002
- National Response Plan established in 2005
- Currently - National Planning Frameworks - 2nd edition - 2013

Introduction

- National Planning Frameworks (5):
 - Prevention
 - Protection
 - Mitigation
 - Response
 - Recovery
- Nuclear/Radiological Incident Annex to the National Response Framework addresses accidents at nuclear facilities such as nuclear power plants

Nuclear/Radiological Incident Annex

Describes the policies, situations, concepts of operations, and responsibilities of the Federal departments and agencies governing the immediate response and short-term recovery activities for incidents involving release of radioactive materials to address the consequences of the event

Nuclear/Radiological Incident Annex

Purposes

- Define the roles and responsibilities of Federal agencies in responding to different categories of nuclear/radiological incidents
- Discuss the specific authorities, capabilities, and assets the Federal Government has for responding to nuclear/radiological incidents
- Discuss the integration of the concept of operations
- Provide guidelines for notification, coordination, and leadership of Federal activities.

Nuclear/Radiological Incident Annex

- Coordinating Agency:
 - Department of Defense
 - Department of Energy
 - Department of Homeland Security
 - Environmental Protection Agency
 - National Aeronautics and Space Administration
 - Nuclear Regulatory Commission
- NRC is the coordinating agency for incidents involving materials or facilities licensed by the NRC or Agreement States

Nuclear/Radiological Incident Annex

Cooperating Agencies:

- Department of Agriculture
- Department of Commerce
- Department of Defense
- Department of Energy
- Department of Health and Human Services
- Department of Homeland Security
- Department of the Interior

Nuclear/Radiological Incident Annex

Cooperating Agencies:

- Department of Justice
- Department of Labor
- Department of State
- Department of Transportation
- Department of Veterans Affairs
- Environmental Protection Agency
- Nuclear Regulatory Commission

Nuclear/Radiological Incident Annex

- Department of Homeland Security (DHS) is operational incident manager of “Incidents of National Significance”
- High impact events & anything that looks like terrorism
- A reactor accident declared as a “General Emergency”
- Unless the accident involves an element of terrorism, NRC will most likely remain coordinating agency
- Let’s discuss the major participants and resources for power reactor accident

- FEMA established the Radiological Emergency Preparedness Program
 - Ensure protection of citizens living around commercial nuclear power plants in the event of an accident
 - Inform and educate the public about radiological emergency preparedness

Federal Radiological Emergency Response Plan (FRERP)

- Establish organized and integrated capability for timely, coordinated response by Federal agencies to peacetime radiological emergencies
- Provides the Federal Government's concept of operations for responding to radiological emergencies
- Outlines Federal policies and planning considerations
- Specifies authorities and responsibilities of each Federal agency

- Federal Radiological Preparedness Coordinating Committee
- Representatives from Federal agencies that have responsibilities under the national program
- Discuss and coordinate programs and ongoing initiatives
- For example, use of thyroid block - Potassium Iodide (KI) was hot topic several years ago
- Quarterly meetings

FEMA Programs

- Regional Assistance Committees (RAC) coordinate and assist State and local governments
- Certification of offsite plans at nuclear power plants
- Training programs such “First Responder Training”
- Evaluation of nuclear power plant exercises (offsite)
- Nuclear power plant exercises are designed to involve all elements and participants in the plant’s emergency plan
- Graded exercises every two years at nuclear plants
- Not all aspects of plan are exercised every time, but all aspects have to covered within five-year cycle

Requirements & Guidance

- NUREG-0654/FEMA-REP-1
- Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants
- Joint guidance from FEMA and NRC
- Numerous supplements and revisions of NUREG-0654/FEMA-REP-1
- Revision 1 published in 1980
- Revision 2 will be issued for public comment this year

NUREG-0654/FEMA-REP-1

Planning Standards

- A – Assignment of Responsibility (Organization Control)
- B – Onsite Emergency Organization
- C – Emergency Response Support and Resources
- D – Emergency Classification System
- E – Notification Methods and Procedures
- F – Emergency Communications
- G – Public Education and Information
- H – Emergency Facilities and Equipment
- I – Accident Assessment

NUREG-0654/FEMA-REP-1

- J – Protective Response
- K – Radiological Exposure Control
- L – Medical and Public Health Support
- M – Recovery and Reentry Planning and Post-Accident Operations
- N – Exercises and Drills
- O – Radiological Emergency Response Training
- P – Responsibility for the Planning Effort: Development, Periodic Review, and Distribution of Emergency Plans

Nuclear Regulatory Commission

NRC is responsible for regulation of onsite emergency preparedness plans at commercial nuclear facilities

- Nuclear power plants
- Research and test reactors
- Fuel cycle facilities – fuel enrichment and fabrication
- Waste repositories
- Medical facilities
- Transportation accidents

Department of Energy (DOE)

DOE Emergency Response Resources

- Radiological Assistance Program (RAP)
- National Atmospheric Release Advisory Center (NARAC)
- Aerial Measuring System (AMS)
- Radiation Emergency Assistance Center/Training Site (REAC/TS)
- Federal Radiological Monitoring and Assessment Center (FRMAC)

Radiological Assistance Program

- RAP teams are stationed in nine regions in the US
- Quick first response assistance by National government
- Highly trained radiological survey teams
- Most advanced radiation detection and protection equipment available including portable field radiation monitoring instrumentation for alpha, beta, gamma, and neutron detection
- Generators, mobile laboratories, air samplers, decontamination equipment, communications, and personnel protective equipment

National Atmospheric Release Advisory Center

- Provides capability to map the probable spread of radiological releases into the atmosphere
- Higher level of capability than the RASCAL code
- Team of research and operational staff with expertise in atmospheric research, operational meteorology, numerical modeling, computer science, software engineering, geographical information systems, computer graphics, hazardous material (radiological, chemical, biological) properties and effects

Aerial Measuring System

- AMS provides specialized airborne radiation detection systems to provide real-time measurements of low levels of air and ground contamination
- Helicopters and fixed wing aircraft equipped with sophisticated radiation detection systems
- Information is used to produce maps of radiation exposure rates and contamination
- Two teams located at Nellis Air Force Base in Las Vegas, Nevada, and Andrews Air Force Base in Washington, D.C.

Aerial Measuring System



Radiation Emergency Assistance Center/Training Site

- REAC/TS mission is to strengthen medical response to radiation emergencies
- Available to deploy and provide emergency medical consultation for incidents involving radiation anywhere in the world
- Provides training to medical personnel, health physicists, first responders, and occupational health professionals about radiation emergency medical response

Federal Radiological Monitoring and Assessment Center

- FRMAC mission is to coordinate and manage all Federal radiological environmental monitoring and assessment activities during a nuclear or radiological incident
- Deployed to safe area near the accident
- List of potential FRMAC facilities is maintained
- Advance team onsite in 6-10 hours; FRMAC operational within 24-36 hours
- Depending on the type and severity of the accident, may consist of as few as 60 or as many as 500 professionals from Federal, state, and local emergency response teams

Federal Radiological Monitoring and Assessment Center



Federal Radiological Monitoring and Assessment Center

- Emergency response is chaotic with many organizations and people involved
- FRMAC is intended to bring as much order as possible
- Even though it was expensive, FRMAC has been setup and used during Federal Field Exercises (FFE)
- FRMAC provides:
 - Atmospheric transport modeling
 - Radiation monitoring
 - Radiological analysis and data assessments
 - Medical advice for radiation injuries

Federal Field Exercises

- FFE - 1 was conducted at St. Lucie plant in 1984
- FFE - 2 was conducted at the Zion plant in 1987
- FFE - 2 lasted 3 days
- 12 Federal agencies and 1000 people involved in overall exercise; 200 people at the FRMAC at nearby fairground facilities
- FRMAC-93 was conducted at Fort Calhoun plant in 1993
- First use of Geographic Information System (GIS) in exercise
- Next FFE may be conducted in 2015

FRMAC at FFE-2



Environmental Protection Agency

- EPA is responsible for setting radiation dose standards
- Those standards are often implemented by other agencies, such as NRC
- Protective Actions Guides (PAGs)
- Radiological Emergency Response Team (RERT)
- RADNET – National radiological environmental monitoring system

PAG Manual

- EPA 400-R-92-001, “Manual for Protective Action Guides and protective Actions for Nuclear Incidents”
- Addresses public and emergency workers
- Addresses early, intermediate, and late phases of accident
- Addresses wide range of protective measures – evacuation, sheltering, interdiction of drinking water and foods, milk
- Extensive discussion of bases for PAGs

PAG Manual

- PAGs for early phase
 - Evacuation and sheltering – 1-5 rem
 - Emphasis on lower end of scale – 1 rem
 - 5 rem more applicable to thyroid dose
- PAGs for intermediate phase
 - Relocation – 2 rem

PAGs for emergency workers

- All workers – 5 rem
- Protecting valuable property – 10 rem
- Life saving or protection of large populations – 25 rem
- Only on a voluntary basis to persons fully aware of the risks involved – >25 rem

Radiological Emergency Response Team (RERT)

National Analytical Radiation Environmental Laboratory (NAREL)

- Assistance to response efforts at all levels – national, state, local
- Technical advice
- Analysis and monitoring teams
- RADNET – national radiological monitoring system
 - Air, drinking water, precipitation, and pasteurized milk
 - Fixed monitoring stations or sample collection points
 - Mobile monitoring stations

Department of Health and Human Services (DHH)

- Responsible for coordination of population monitoring and decontamination
- Responsible for coordinating availability of potassium iodide (KI) out to 20 miles around nuclear power plants
 - Bioterrorism Act of 2007
- Member of Advisory Team for Environment, Food and Health
 - Provides technical guidance and assistance to DHS and NRC

Other Groups

- We have been talking about Federal government agencies involved in radiological emergency planning and response
- Many State and local government agencies involved
- Many non-government groups involved
- Especially at the local level
- Volunteers (one of the reasons that exercises are often conducted outside of “normal business hours”)

Summary

- Your country has one or more agencies responsible for emergency preparedness for many hazards
- Nuclear emergency planning and response has to be integrated
- US has extensive system of plans and resources at the national level for nuclear power plant emergencies
- Everyone has to understand role and responsibility
- Coordination is extremely important; ongoing challenge
- In US, NRC is responsible for onsite emergency preparedness and overall nuclear safety
- FEMA is responsible for offsite emergency preparedness