A National Fallout Shelter Program for the 21st Century

Doctors for Disaster Preparedness
July 12, 2008
The Threat

• Terrorist groups (Al Qaeda, Hamas, Hezbollah, et. al.) and nations (e.g., Iran, Syria and North Korea) aggressively fund and direct world-wide violence.

• Their tools include: Explosives; Chemical & Biological agents; Radiological/Nuclear weapons and Hostage Taking/Murder.

• They often use multiple, simultaneous attacks:
  
  • Madrid bombings - 10 bombs on 4 trains, March 11, 2004
  • London bus/subway bombings of July 2005 - 4 bombings
  • Twin US Embassy bombings in Nairobi and Dar es Salaam, August 7, 1998
  • Twin Russian airliner attacks, August 2004
  • As many as 10 London-NYC airliner attacks thwarted, August 2006
  • WTC attacks in 1993 & on 9-11.

What if Osama bin Laden fulfills his promised “America’s Hiroshima?”
(nuke New York, Miami, Houston, Las Vegas, Los Angeles, Chicago & Washington, D.C.)
U.S. Unprepared for an Urban Nuclear Attack

THE WASHINGTON QUARTERLY—AUTUMN

U.S. officials talk all the time about the need to thwart terrorists, but the federal government has yet to adequately plan for a nuclear bomb exploding in a major city, say former Clinton administration officials Ashton Carter and William Perry and Stanford University’s Michael May.

The risk of terrorists detonating a nuclear bomb have grown over the past decade as the technology has spread. That possibility demands that the government discuss response plans. To plan for “the day after,” the government needs to be as forthright as it was about a possible attack during the 1950s, but rely on different plans from those tailored to a Cold-War-style onslaught of missiles. Assuming a terrorist group has only one or two bombs, the government has the chance to save the lives of thousands and increase the welfare of millions if it responds effectively.

According to the authors, the federal government has placed too much of the burden of nuclear-attack response in local hands. But mayors and governors won’t be able to deal with the legal, logistical and humanitarian challenges of a disaster of that scale. Instead, the federal government should be empowered to lead the response to any nuclear explosion, with city and state officials cooperating and providing local knowledge.

A major challenge will be ensuring that people from most areas of a stricken city stay put while those in places with the highest levels of radiation are evacuated as soon as possible. In most parts of a city, people’s best chances of surviving would lie in staying underground for roughly three days, and then leaving. For these purposes, the federal government should revive the Cold War fallout shelter program, identifying places where people could safely wait. Those just downwind of the explosion, however, would need to leave immediately. The government should plan how to quickly determine the different kinds of danger areas and the best routes to evacuate people and let emergency responders in.
National Planning Scenarios

1: Nuclear Detonation – 10-Kiloton Improvised Nuclear Device
2: Biological Attack – Aerosol Anthrax
3: Biological Disease Outbreak – Pandemic Influenza
4: Biological Attack – Plague
5: Chemical Attack – Blister Agent
6: Chemical Attack – Toxic Industrial Chemicals
7: Chemical Attack – Nerve Agent
8: Chemical Attack – Chlorine Tank Explosion
9: Natural Disaster – Major Earthquake
10: Natural Disaster – Major Hurricane
11: Radiological Attack – Radiological Dispersal Devices
12: Explosives Attack – Bombing Using Improvised Explosive Devices
13: Biological Attack – Food Contamination
14: Biological Attack – Foreign Animal Disease (Foot and Mouth Disease)
15: Cyber Attack
Before a Nuclear Blast

To prepare for a nuclear blast, you should do the following:

- Find out from officials if any public buildings in your community have been designated as fallout shelters. If none have been designated, make your own list of potential shelters near your home, workplace, and school. These places would include basements or the windowless center area of middle floors in high-rise buildings, as well as subways and tunnels.

- If you live in an apartment building or high-rise, talk to the manager about the safest place in the building for sheltering and about providing for building occupants until it is safe to go out.

- During periods of increased threat, increase your disaster supplies to be adequate for up to two weeks.

Taking shelter during a nuclear blast is absolutely necessary. There are two kinds of shelters - blast and fallout. The following describes the two kinds of shelters:

- **Blast shelters** are specifically constructed to offer some protection against blast pressure, initial radiation, heat, and fire. But even a blast shelter cannot withstand a direct hit from a nuclear explosion.

- **Fallout shelters** do not need to be specially constructed for protecting against fallout. They can be any protected space, provided that the walls and roof are thick and dense enough to absorb the radiation given off by fallout particles.

“Find out from officials if any public buildings in your community have been designated as fallout shelters. If none have been designated, make your own list . . .”
The DHS mission is to enhance the ability of State, local and tribal governments to prepare, prevent, respond to and recover from terrorist attacks and other disasters.

The Homeland Security Grant Program (HSGP) is a primary funding mechanism for building and sustaining national preparedness capabilities under four separate grant programs:

- **State Homeland Security Program (SHSP)** - builds capabilities at the State and local levels through planning organization, equipment, training and exercises.

- **Urban Areas Security Initiative (UASI)** - funds high-risk urban areas based on risk and effectiveness.

- **Metropolitan Medical Response System (MMRS)** - supports local preparedness efforts to respond to all-hazards mass casualty incidents, including epidemic disease outbreaks, natural disasters, large-scale hazardous materials incidents and chemical, biological, radiological, nuclear or explosive attacks.

- **Citizen Corps Program (CCP)** - brings together community & government leaders to coordinate community involvement in emergency preparedness, planning, mitigation, response & recovery.
Metropolitan Medical Response System (MMRS)

The 125 MMRS cities contain 70% of the US population.
Fallout Shelters in the 21st Century

We must adapt to the growing threat of global terrorism and the spread of nuclear weapons, not refight the “Cold War.”

DHS requires the 125 MMRS cities to respond to an attack with a small-yield (10 KT) weapon and/or a Radiological Dispersion Device. Huntsville, AL must prepare for:

- 7,500 immediate deaths
- 25,000 contaminated victims (10,000 acute & 15,000 moderate)
- 100,000 displaced persons

Having and using Fallout Shelters would minimize casualties.
Revitalizing A Fallout Shelter Program
Components of an effective (but barebones) shelter system

• Identify existing Fallout Shelters in your county/jurisdiction

• Revalidate the federal license for use in the 21st Century;

• Recruit, create and train effective Shelter Management Teams able to operate shelters with a high degree of confidence they will be survivors, not victims.

• Public education and training

• Radiological Monitoring.

Honorable Not Mentioned – water, food, sanitation/hygiene & first aid
Protective Options

Evacuation

- Feasible if completed before fallout/contamination arrives.
- Area would have to be small and time adequate.
- Detonation effects (blast/thermal/EMP) may impede evacuation.
- Evacuees may be exposed and/or contaminated.

Shelter In Place

- *Critical facilities that can not evacuate must continue to operate.*
- Necessary if fallout/contamination will arrive before evacuation complete.
- Fallout Shelters needed to protect against high level radiation/detonation.
- Shelter-in-place (not necessarily Fallout Shelter) near RDD/very low level.
- Shelter stay would range from a few days to 2 weeks.
- Authorities outside affected area can organize rescue/evacuation effort.
- Shelterees may be exposed and/or contaminated – medical care needed.
Protection Afforded

Fallout Shelters protect occupants from high levels of radiation so even in worst case most people receive non-lethal exposures.

To meet Federal standards, a public Fallout Shelter must:

- **Reduce radiation by a minimum 90%** (Protection Factor, PF, of 10 or more)
- Allow 10 sq ft/person floor space.
- Provide 3 cfm/person air flow (500 cf/person if unventilated)
- Not exceed 82° Effective Temperature (ET; heat + humidity + air flow)
- Have a capacity of 50 persons or more.

*Fallout Shelters are not Blast Shelters!*
Identified Fallout Shelter Space

A Fallout Shelter protects two ways:

**Distance.** The farther you are from a source, the less dose you receive.

**Shielding.** Dense (heavy, massive) materials absorb more radiation. Greater thickness of any given material absorbs more radiation.

- Also-

**Time.** Fallout radiation intensity decays rapidly; *90% in just the first 7 hours.* Distance and shielding protect occupants as radiation levels decay.
A High School as a Public Fallout Shelter
Hospital Fallout Shelter Spaces

Fallout Shelter space on 4th (of eight floors) in a Hospital

Both areas "Best" category, 98% to 99.5% reduction.
Madison Co., AL, Fallout Shelter Profile

• Goals 140 federally surveyed & approved Public Fallout Shelters with a total capacity of ~300,000 persons.

• 107 shelters with aggregate capacity of 210,000+ now active.
  • Owners, prior to 2006, not contacted since the 1980s. Most not aware their building was a shelter.
  • Work began in 2005 to revitalize shelter program

• MMRS facilities – surveyed in 2005-6 - reserved for medical operations and sheltering of staff, patients and families, not the public.

• A few Fallout Shelters for Direction and Control operations.

• 100’s of privately owned Tornado/Fallout shelters exist.

• Redstone Arsenal & Marshall Space Flight Center have ~80 usable Fallout Shelters for their use with an aggregate capacity of 90,000+ persons. These spaces not counted in the Madison Co. total.
Shelters in Madison County, AL
Who was asked?  Who accepted?

<table>
<thead>
<tr>
<th>Category (as of January, 2007)</th>
<th>Accepted</th>
<th>Declined</th>
<th>No reply</th>
</tr>
</thead>
<tbody>
<tr>
<td>State and local gov’t buildings</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private schools</td>
<td>10</td>
<td></td>
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</tr>
<tr>
<td>Shopping Malls</td>
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<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Churches &amp; YMCA</td>
<td>14</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>Industry</td>
<td>2</td>
<td>1</td>
<td></td>
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<tr>
<td>Business/professionals</td>
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<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Bank/Credit Union</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Residence/Apartments</td>
<td>1</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Caves</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>107</strong></td>
<td><strong>5</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>

Aggregate capacity: 210,000+ persons

30+ other shelters, covered by earlier agreements, to be contacted: capacity 75,000+. 
Steps to Build Your System

• Identify & select shelters
  • Search for existing shelter records
  • Secure Permission from owners
  • Determine Capacity & Protection Factor (FEMA calculated; in NFSS)

• Organize Shelter Managers into a System
  • Recruit & train Shelter Managers
  • Organize Shelters & Managers into self-support “Shelter Complex System”
  • Recruit & train Radiological Monitors
  • Produce a Shelter Guide which Shelter Managers can use to staff a shelter.
  • When would shelters be activated? Opened to public?

• Educate & inform the public – and public officials.

• Survival supplies needed:
  • Water
  • Sanitation
  • Hygiene
  • Food
  • First Aid
  • Radiation Monitoring instruments (KFM, NukAlert or Civil Defense kit)
Types of Shelter Records to Seek

• Federal License
  • Grants permission
  • “Heirs and Assigns” Clause commits all future owners – unless revoked.

• National Fallout Shelter Survey printout
  • Prepared for each County/Parish in a state
  • Lists each federally approved shelter with a unique identifier number
  • Lists shelter capacities qualitatively in “Protection Factor” Categories
  • Lists capacities of basements

• Building layout drawings
  • Shows all approved space, floor by floor or area by area.
  • “Protection Factor” (protective quality) shown on Good-Better-Best basis
  • Capacities shown may be inaccurate (criteria changed after surveys done)

• Sign Posting Sketch
  • Shows where signs were posted
  • Building layout may be incomplete – e.g., ground floor only
Sources of Shelter Records

- US Corps of Engineers District Offices
  - Phase 2 reports
  - NFSS Facility Booklets
  - Building layout drawings
  - Sign Posting Sketch

- FEMA Regional Offices and/or State EMAs
  - National Fallout Shelter Survey printout – last published 31 Dec 1992

- Local EMAs
  - Federal License
  - USCOE records
  - FEMA NFSS printout
  - Receipts for shelter supplies placed (and removed) from building.

- State archives, libraries, universities who sub-contracted work, etc.
Two Key Provisions of Federal Fallout Shelter License

Recognition of protection from fallout radiation

No termination date!
Local Fallout Shelter Permit

EMERGENCY MANAGEMENT AGENCY
(Address)

FALLOUT SHELTER PERMIT

TO WHOM IT MAY CONCERN

Authority is hereby granted to _______________ Emergency Management Agency the option to:

Utilize the Fallout Shelter spaces located in ________________ at ____________ with a shelter capacity of _______ persons.

To "utilize" means that preceding or during a nuclear attack emergency:
1) a Shelter Management Team will be allowed to prepare the Fallout Shelter for occupancy;
2) food, water and other survival supplies may be stocked; and
3) the general public will be allowed to occupy the shelter.

Publish the building name and address.

Mark the shelter with appropriate Fallout Shelter signs.

This shelter will be utilized only in the event of an impending or actual Weapons of Mass Destruction emergency, or upon the declaration of an emergency by the President of the United States.

The permit may be revoked by ninety (90) days written notice to the _______________ Emergency Management Agency.

This Fallout Shelter Permit is voluntarily granted without cost or compensation to the Grantor.

Emergency Management Representative  Grantor

______________________________  ________________________________
Title  Title

______________________________  ________________________________
Date  Date
The Legacy Federal Survey – The Treasure Trove

US Army Corps of Engineers managed surveys

Look for records in USCOE District Offices
- “Phase 2” reports
- NFSS Facility Booklets
- Building layout drawings
The Legacy Federal Survey – The Treasure Trove

Examples: Building layout drawings & Sign Marking Sketch
Past FEMA Shelter Survey Guidance
Fallout Shelter Management Course

- Trains key staff on how to Shelter In Place:
  1. Threats posed by high level radiation.
  2. What a Fallout Shelter is and how it protects people.
  3. How Fallout Shelters are organized/operate in County Fallout Shelter System.
  4. Organizing shelter occupants into specialized teams capable of group survival.
  5. How to provide and manage critical survival resources.


- Course intended for “Just In Time” use.
  - Just in Time version can be delivered in 6 hours.
  - In 2006/2007 Course delivered in 8 hrs but included Table Top Exercise

- Course could be adapted for CERT use – short sessions over 3 weeks.
Purposeful, directed leadership is as important as bricks & concrete!

Emergency Operations Center
Executive Group
Mayor/Chairman, Madison County Commission
EMA

SCH 1
17 Shelters

SCH 2
12 Shelters

SCH 3
25 Shelters

SCH 4
5 Shelters

SCH 5
6 Shelters

SCH 6
13 Shelters

SCH 7
13 Shelters

SCH 8
9 Shelters

SCH 9
7 Shelters

Critical Facilities
911 Center
D&C/EOC
Medical Law Enf.
Fire
Rescue
Engineering
Utilities

SCH = Shelter Complex Headquarters
Number of shelters grouped in each SCH
FALLOUT SHELTER MANAGER'S GUIDE

Information about this shelter:

Shelter Name: **Resource Ctr**
Address: **A&M University**
Shelter number: **316**
Capacity: **3,980** persons
Shelter Manager: ____________ Alternate: ____________
Telephone: home ____________ home ____________
P/C/work ____________ P/C/work ____________

Shelter Complex Headquarters:
Address: **Walkerwood Hall**
Telephone: ____________

Name, address and phone number of the 3 nearest shelters:

**PATTON HALL**
**Chambers Science Hall**
**Carter Science Hall**

If you need assistance and you are unable to contact the SCH or the 3 nearest shelters, contact the Shelter Officer at the Huntsville-Madison County Emergency Operations Center at 427-5130. The EOC is in the basement of the Public Services Building, 320 Fountain Circle.

Notes:
The Community Emergency Response Team (CERT) Program prepares people to help themselves, their families & neighbors in the event of disaster.

CERT instructs citizens about disaster preparedness and trains them in basic disaster response skills:
- Fire safety
- Utilities shut off
- Light search and rescue
- Disaster medical operations.
- Interface with the Incident Commander

CERT volunteers provide immediate assistance to victims before responders arrive.

CERT volunteers participate in community preparedness outreach activities and distribute disaster preparedness materials.

Citizens Corps/CERT could be the vehicle for attack preparedness education & training.
Fallout Pattern - Time/Wind effects

Sample Radioactive Fallout Pattern

Source: FEMA
Uniform deposition just does not happen in nature!
Fallout Follows the Wind
Plumbbob Boltzman shot, 12 KT, 500’ low airburst (tower), Feb 5 1957
Cloud tops: 33,000’ Dose rate at H+12 hours

Teapot Turk shot, 43 KT, 500’ low airburst (tower), Jul 3 1955
Cloud tops: 44,000’ Dose rate at H+12 hours
NOAA Fallout Winds Daily Forecast

http://www.srh.noaa.gov/data/WNO/FOFUS

Needed: Digitized forecast map similar to NOAA weather forecast maps.
Monitoring Capabilities

NukAlerts for shelters

Kearny Fallout Meter

Civil Defense Instruments

Aerial Monitoring
Radiological Preparedness Briefing to Members of Congress, September 11, 2007

- Rep. Charles Dent plus his Chief of Staff/Counsel/HS Advisor.
- Senator Arlen Specter plus his Chief of Staff & HS staffer.
- HS staffer of Rep. Rob Bishop from Utah.
- HS staffer of Senator Richard Shelby from Alabama.
- HS staffer for Senator Jeff Sessions from Alabama.

Briefing team:

Bob Kilbanks
Kimberly Kushel
Steve Jones
John “Rusty” Russell
Kirk Paradise
The IOM Committee on Medical Preparedness for a Terrorist Nuclear Attack is holding three workshops (April, June and Aug 7-8). Results to be published by Dec 2008.

Theme: Assessing Medical Preparedness for a Nuclear Event.

Aimed at 6 cities: New York City/Northern New Jersey; National Capital Region, Los Angeles/Long Beach, California Bay Area, Houston and Chicago.

Study areas:
1. Overall emergency response activities and available healthcare capacity (including shelter, evacuation, decontamination and medical infrastructure interdependencies) to treat the affected population;

2. Capacity and gaps of Federal, State and local authorities to deliver available medical countermeasures in a timely way;

3. Available treatments for radiation illnesses including the efficacy of medical countermeasures;

4. Appraise the expected benefit of medical countermeasures, including those currently under development.  
   www.iom.edu/nuclearpreparedness

Theme: Identify a strategy for response and preparedness across all levels of government and formulate what type of information the public needs to in the event of a nuclear detonation or RDD.

Project Background: The project is directed by the U.S. Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Act, (P.L. 110-28). Conferees expressed concern that cities have little guidance available to them to better prepare their populations to react in the critical moments shortly after a nuclear terrorism event such as an RDD or IND.

The DHS Office of Health Affairs (OHA) and FEMA tasked to assess public health plans for a nuclear terrorism event as well as identify a strategy for response and preparedness across all levels of government. May-June 2008, PIOs, first responders, and other officials interviewed in four cities to gather data on what type of information needs to be included in messages to the public. Workshop was to gather all data together; flesh out any gaps and formalize message templates for use in event of a nuclear detonation.

Follow up meeting will be July 16-17.
Attainable Priorities

1. Identify & secure use of existing Fallout Shelters. Survey new ones.

2. Educate public & leaders to orient them toward survival & recovery.

3. Ability for local & state governments to organize & operate a system of public Fallout Shelters to protect against radiation.

4. Ability to evacuate people, before fallout arrival, from projected fallout areas.

5. Rescue of people in areas covered by fallout when radiation rates drop to low levels.

6. Recovery after the attack.
Questions?

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