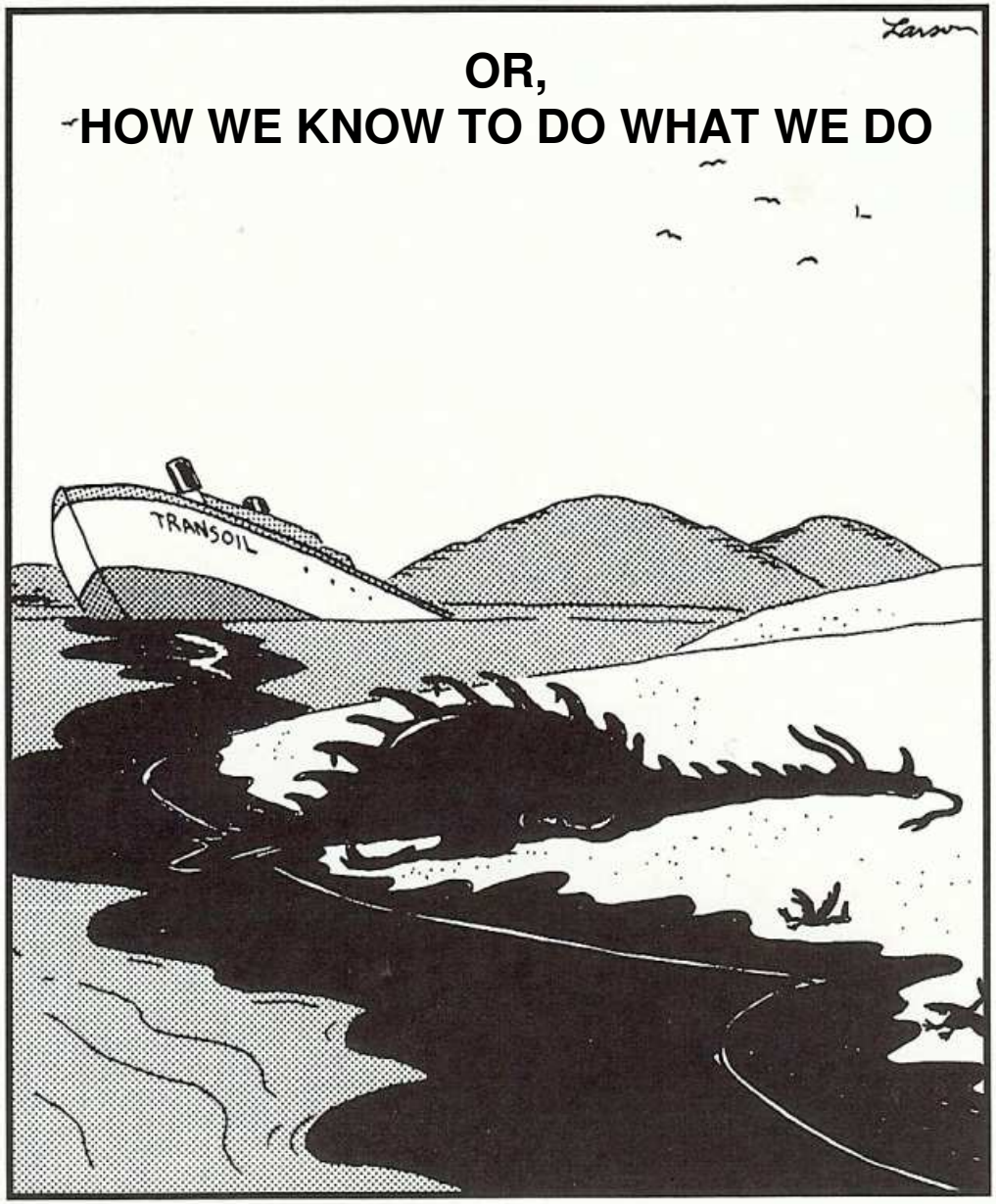
THE FACTORS THAT DETERMINE EFFECTS TO WILDLIFE FROM OIL SPILLS AND OTHER CHEMICAL RELEASES

WILDLIFE RESPONSE

Craig Giggleman
USFWS - REGION 5



OR,
HOW WE KNOW TO DO WHAT WE DO

A tragedy occurs off the coast
of a land called Honah-Lee.

THE FACTORS

- **WHAT**
  - WHAT PRODUCT HAS BEEN RELEASED?
  - HOW WILL IT BEHAVE IN A GIVEN ENVIRONMENT UNDER VARIOUS CONDITIONS?
  - HOW WILL WILDLIFE REACT FROM EXPOSURE TO THE PRODUCT?

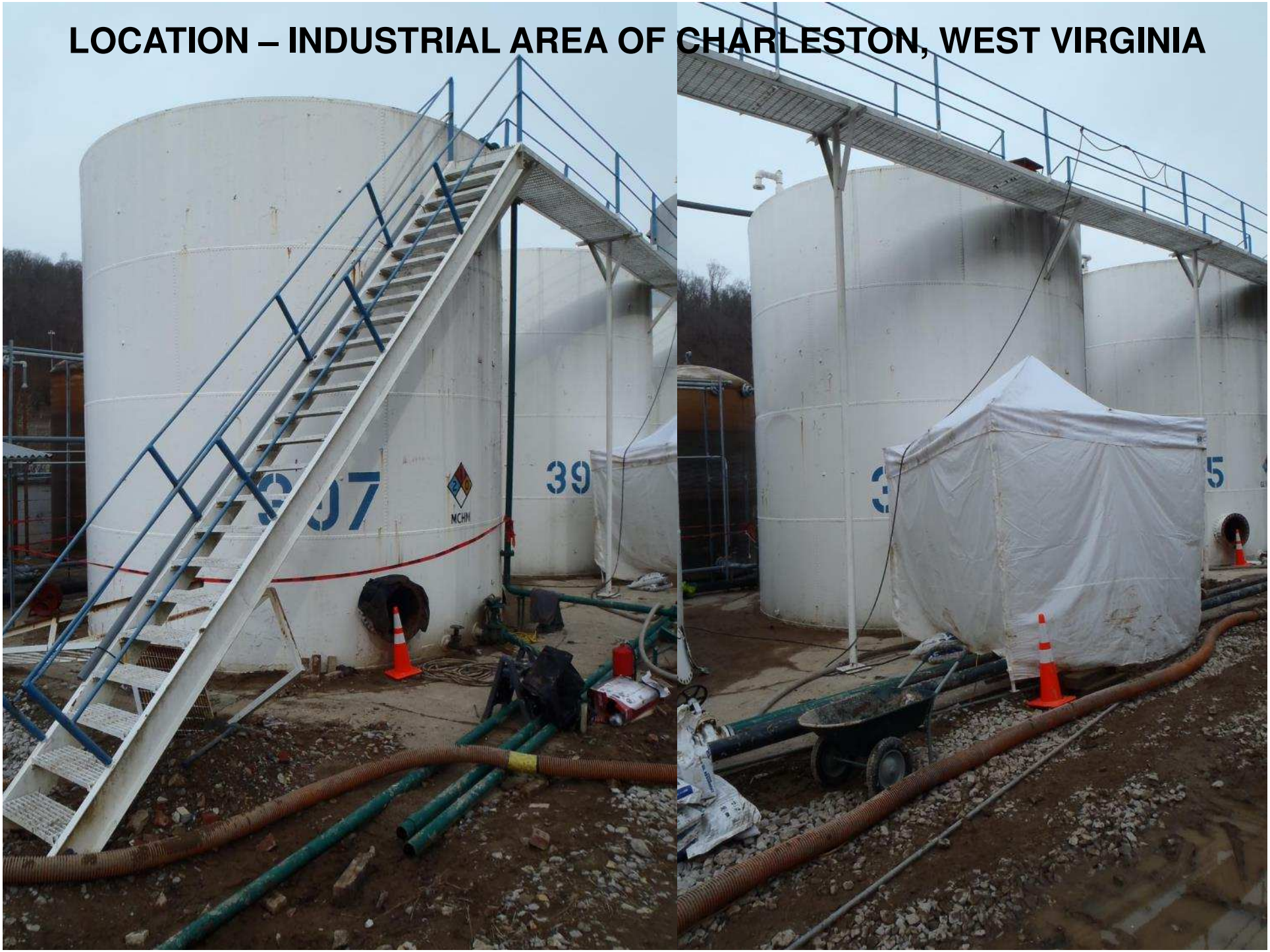
- **WHERE**
  - WHATS THE LOCATION WHERE THE RELASE HAS OCCURRED?
  - IS IT IN AN ECOLOGICALLY SENSITIVE ENVIRONMENT?
  - ARE LISTED SPECIES PRESENT?
  - IS A ROOKERY NEAR BY?
  - ETC.

- **WHEN**
  - WHAT TIME OF THE YEAR DID THE RELEASE OCCUR?
  - IS IT DURING MIGRATORY SEASON?
  - IS IT DURING THE SPAWNING SEASON?
  - IS IT DURING THE NESTING SEASON?
  - HAVE JUVENILES FLEDGED?
  - ETC.

CASE 1: ELK RIVER METHANOL SPILL

PRODUCT – METHYLCYCLOHEXANEMETHANOL (MCHM)

LOCATION – INDUSTRIAL AREA OF CHARLESTON, WEST VIRGINIA

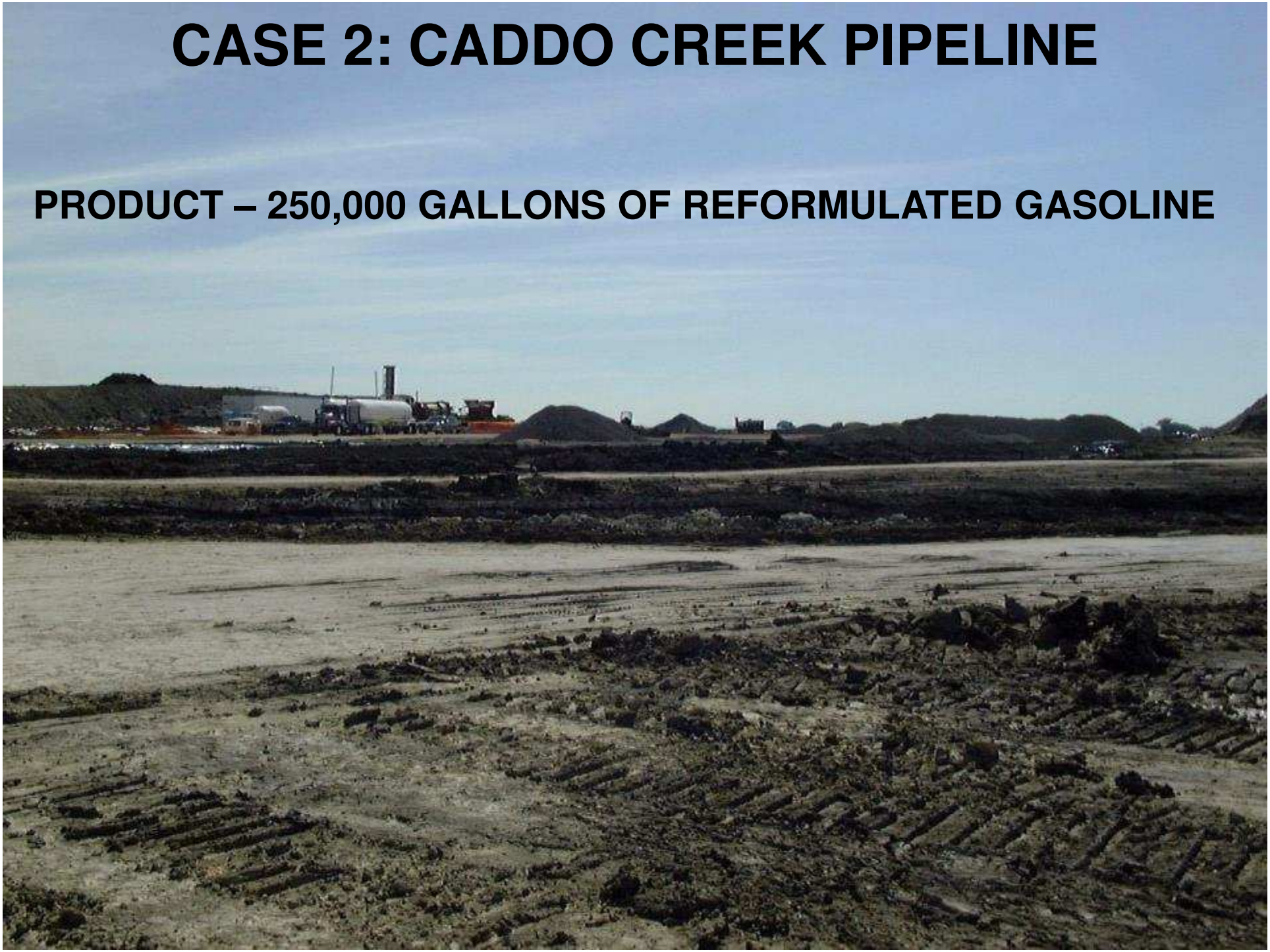


SEASON - WINTER

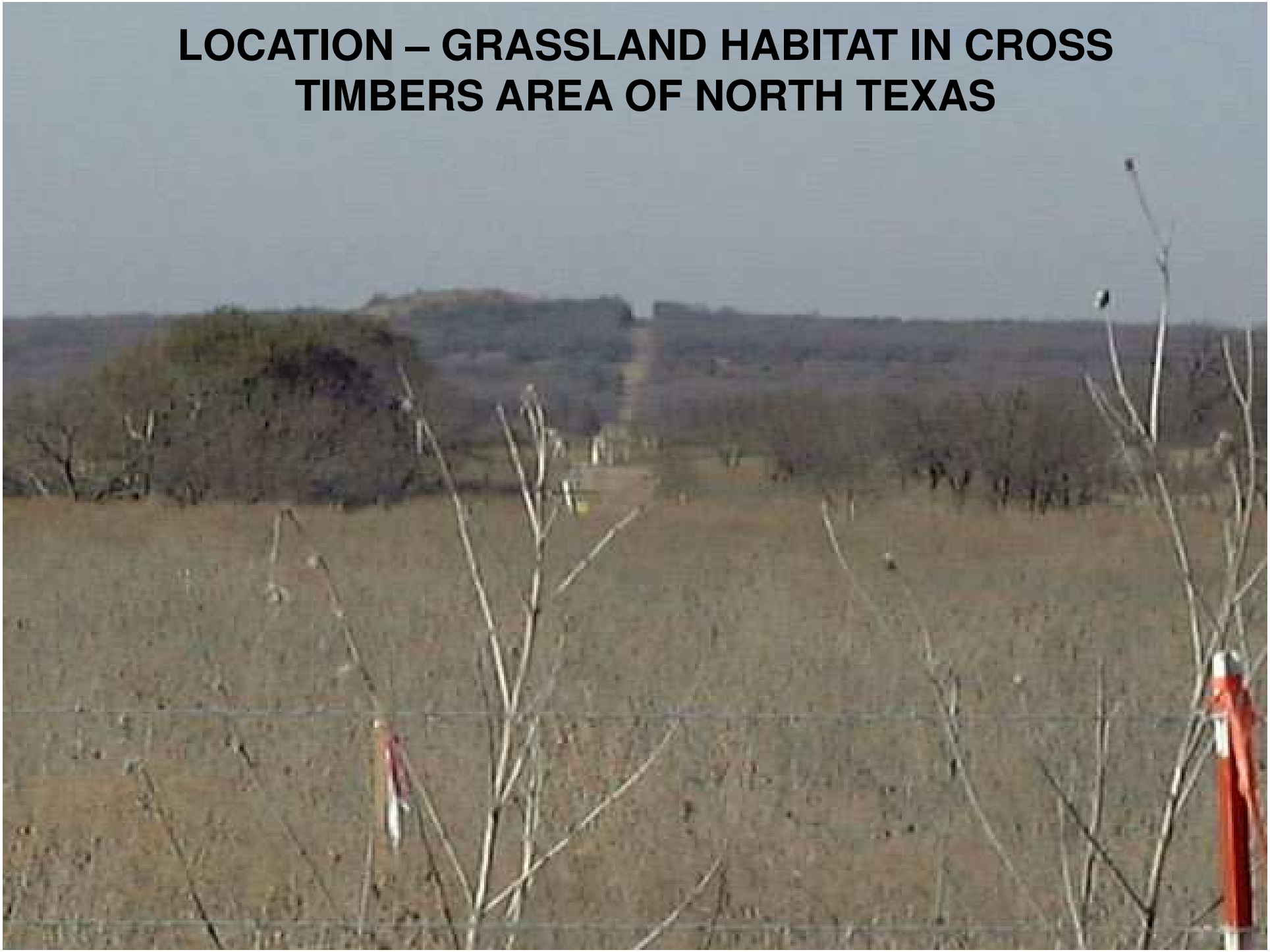
EFFECTS TO WILDLIFE – NO MORTALITIES OBSERVED

CASE 2: CADDO CREEK PIPELINE

PRODUCT – 250,000 GALLONS OF REFORMULATED GASOLINE



LOCATION – GRASSLAND HABITAT IN CROSS TIMBERS AREA OF NORTH TEXAS



SEASON – LATE SUMMER

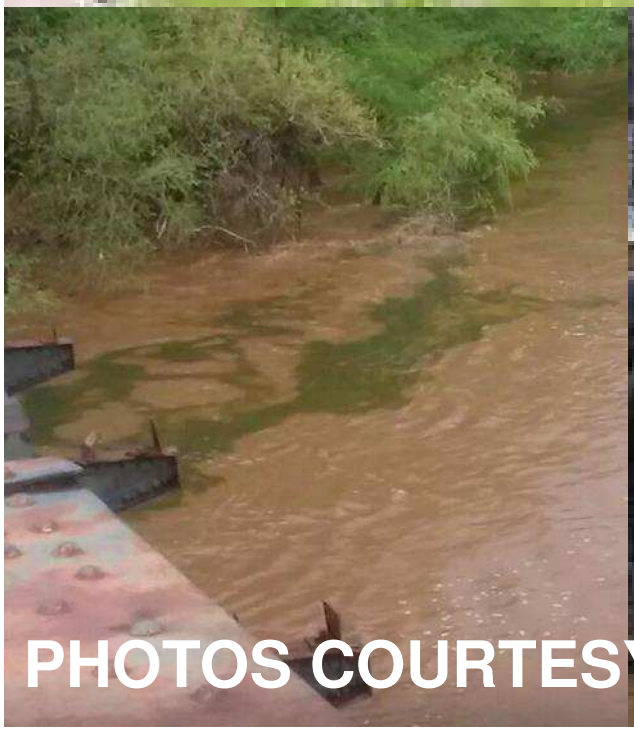
EFFECTS TO WILDLIFE – NO OBSERVED MORTALITIES

WHY?

CASE 3: LYNCHBURG TRAIN DERAILMENT

PHOTO COURTESY VADEQ

PRODUCT – 30,000 GALLONS OF BAKKEN CRUDE OIL



PHOTOS COURTESY VADEQ

LOCATION – JAMES RIVER IN LYNCHBURG, VIRGINIA

MAP – COURTESY VADEQ

SEASON - SPRING

EFFECTS TO WILDLIFE – NO OBSERVED MORTALITIES

CASE 4: SMITH COUNTY PIPELINE

PRODUCT – 200 BARRELS OF LIGHT CRUDE OIL

LOCATION – BOTTOMLAND HABITAT IN PINEY WOODS OF EAST TEXAS

SEASON – WINTER

EFFECTS TO WILDLIFE – NO OBSERVED MORTALITIES

CASE 5: SMITH COUNTY TANK BATTERY


PRODUCT – 5 BARRELS OF LIGHT CRUDE OIL

LOCATION – WETLAND IN CLEARED PINE LANDS IN EAST TEXAS

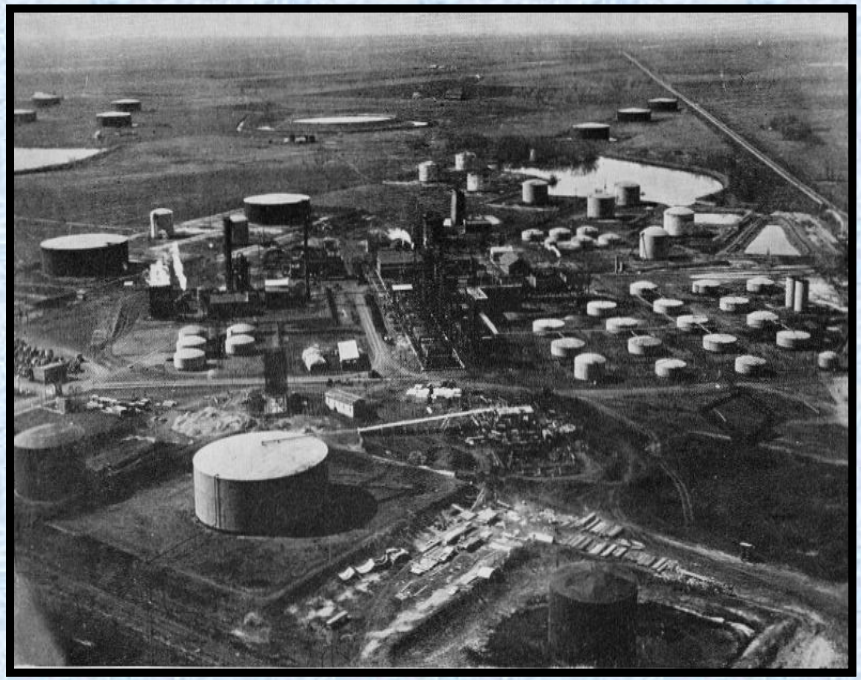

SEASON - SPRING

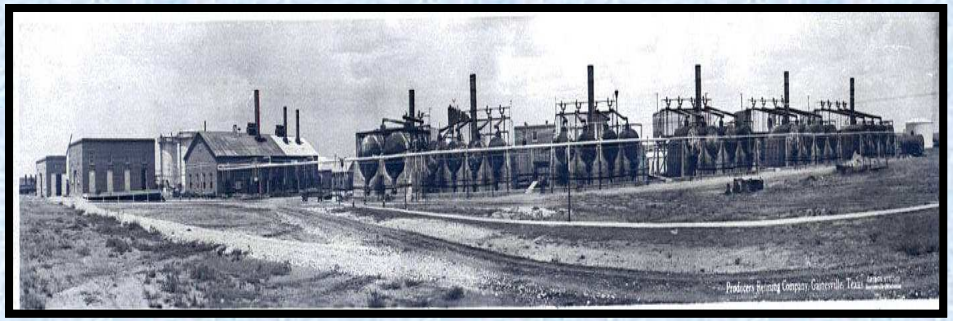
EFFECTS TO WILDLIFE – DIRECT MORTALITY TO MULTIPLE SPECIES, ENFORCEMENT ACTION PURSUED

WHY?

CASE 6: LEGACY SITE - FORMER PRODUCTION FACILITY

PRODUCT – WEATHERED CRUDE OIL





LOCATION – BLACKLAND PRAIRIE IN NORTH TEXAS

SEASON – SITE DISCOVERED AT BEGINNING OF MIGRATORY SEASON IN EARLY FALL

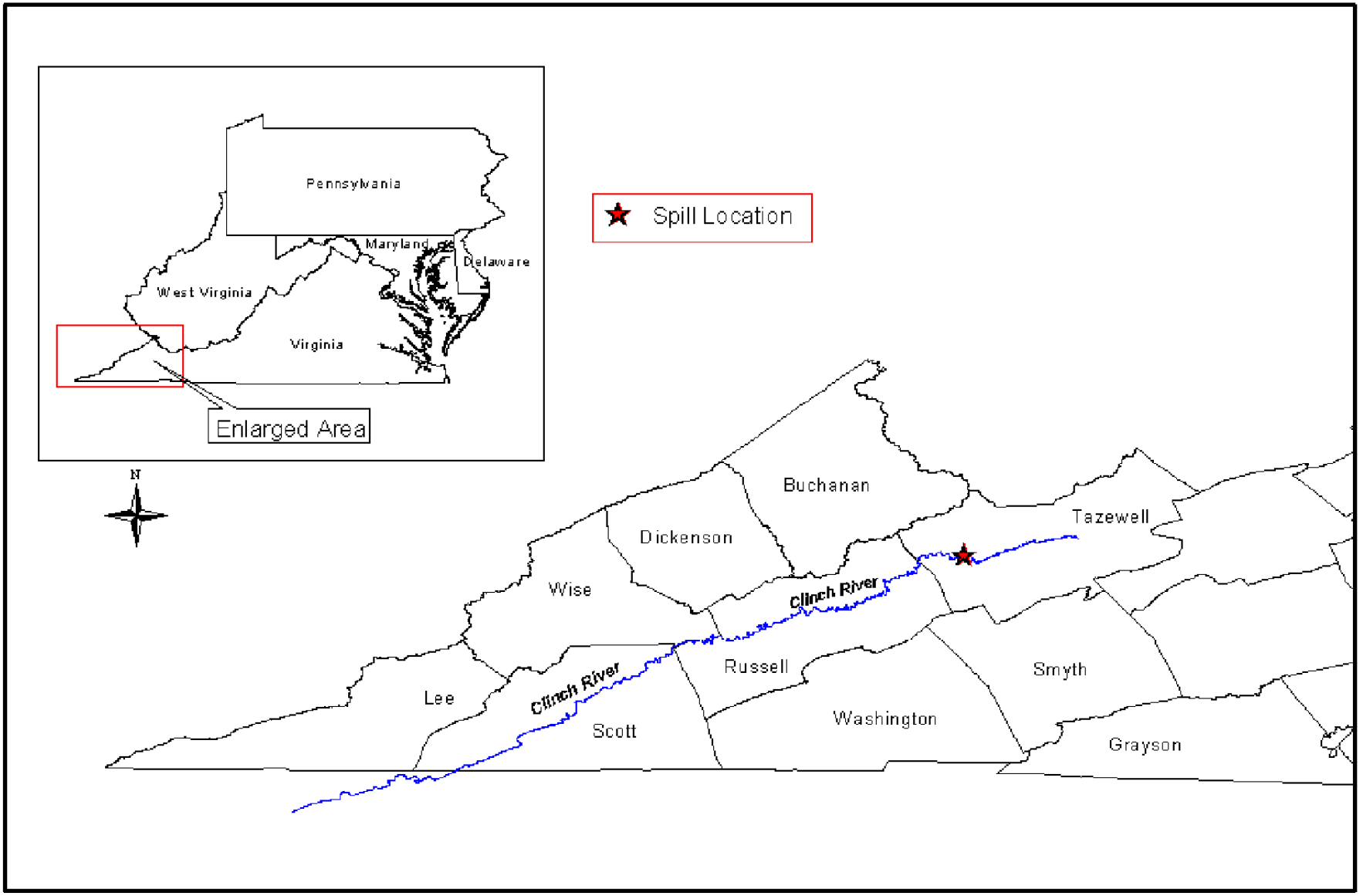
EFFECTS TO WILDLIFE – DIRECT MORTALITY TO MULTIPLE SPECIES, NRDA CLAIM PURSUED


WHY?

CASE 7: CERTUS CHEMICAL SPILL

PRODUCT – 1,350 GALLONS OF OCTOCURE FROM TANKER TRUCK

LOCATION – TRIBUTARY OF CLINCH RIVER, VIRGINIA

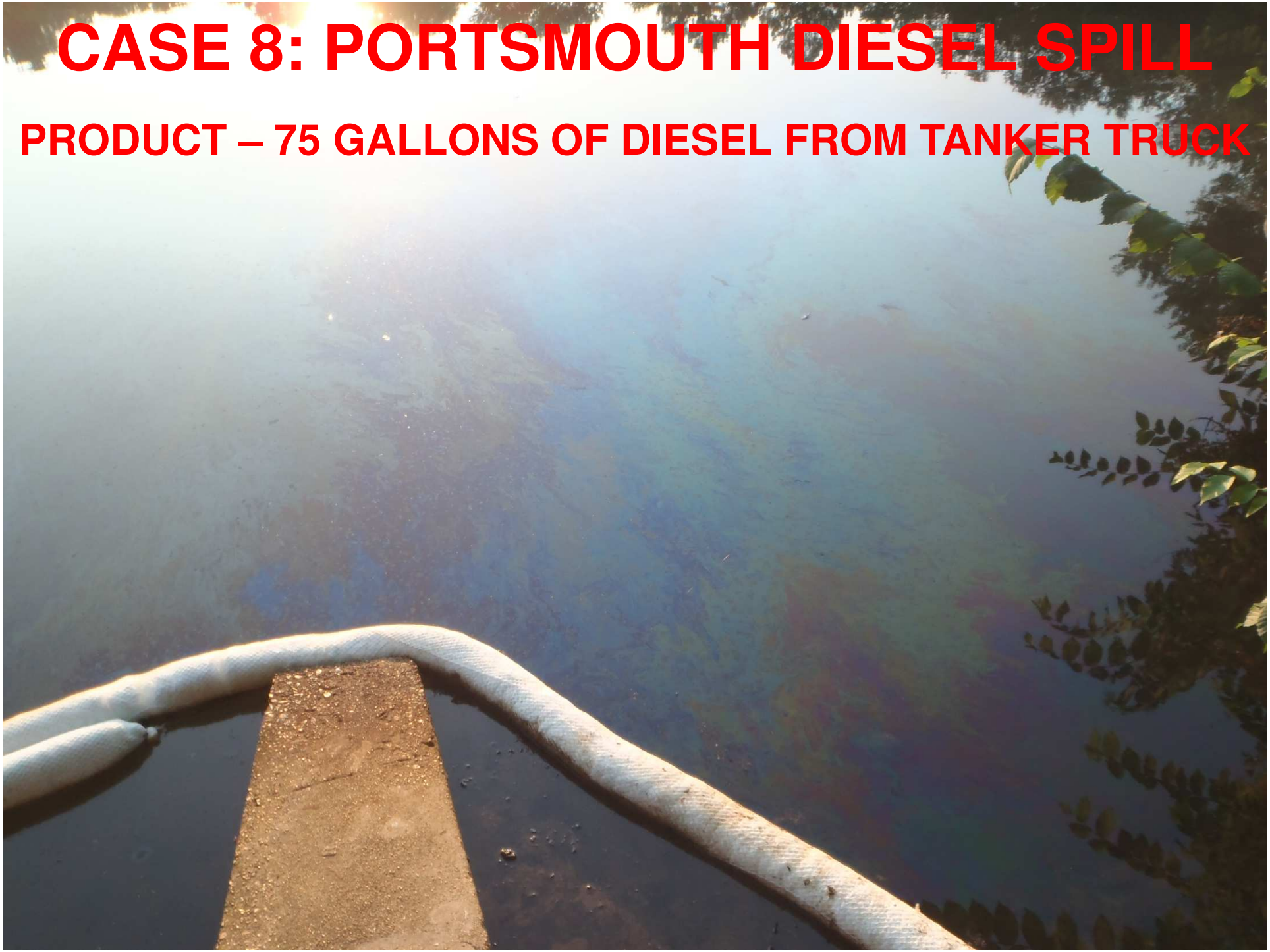


SEASON - SUMMER


EFFECTS TO WILDLIFE – FISH AND MUSSELS IMPACTED FOR 7 MILES, NRDA CLAIM PURSUED
WHY?

CASE 8: PORTSMOUTH DIESEL SPILL

PRODUCT – 75 GALLONS OF DIESEL FROM TANKER TRUCK




LOCATION – STORM DRAIN TO URBAN DETENTION POND
SEASON - SUMMER


EFFECTS TO WILDLIFE – RESIDENT WATERFOWL IMPACTED, OVER 75 BIRDS RECOVERED/REHABILITATED/RELEASED
WHY?

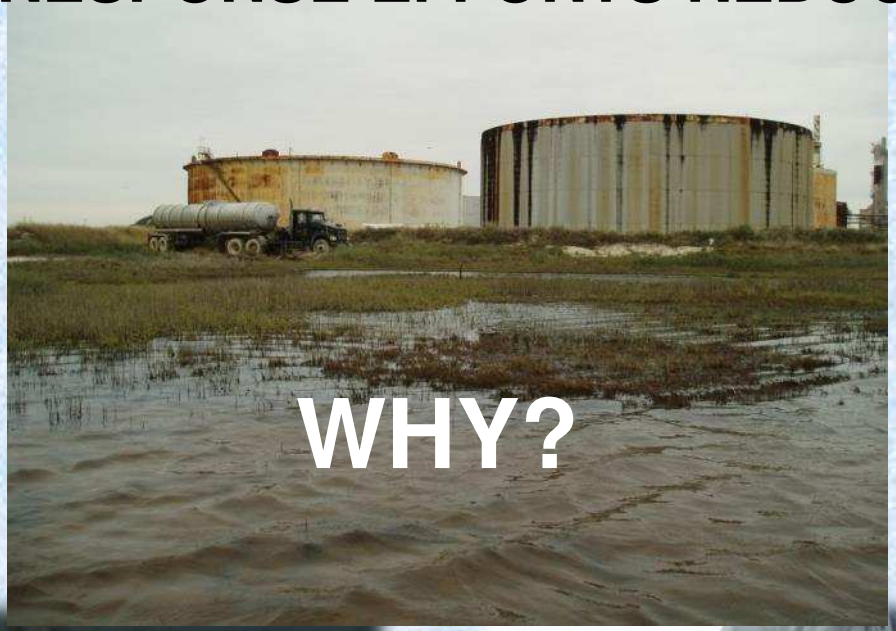
CASE 9: FALCON OIL

PRODUCT – LIGHT CRUDE OIL FROM STORAGE TANK

LOCATION – LOWER GULF COAST IN SOUTH TEXAS

SEASON - WINTER

EFFECTS TO WILDLIFE – MINOR FISH KILL, 6 OILED BIRDS RECOVERED, RESPONSE EFFORTS REDUCED IMPACTS



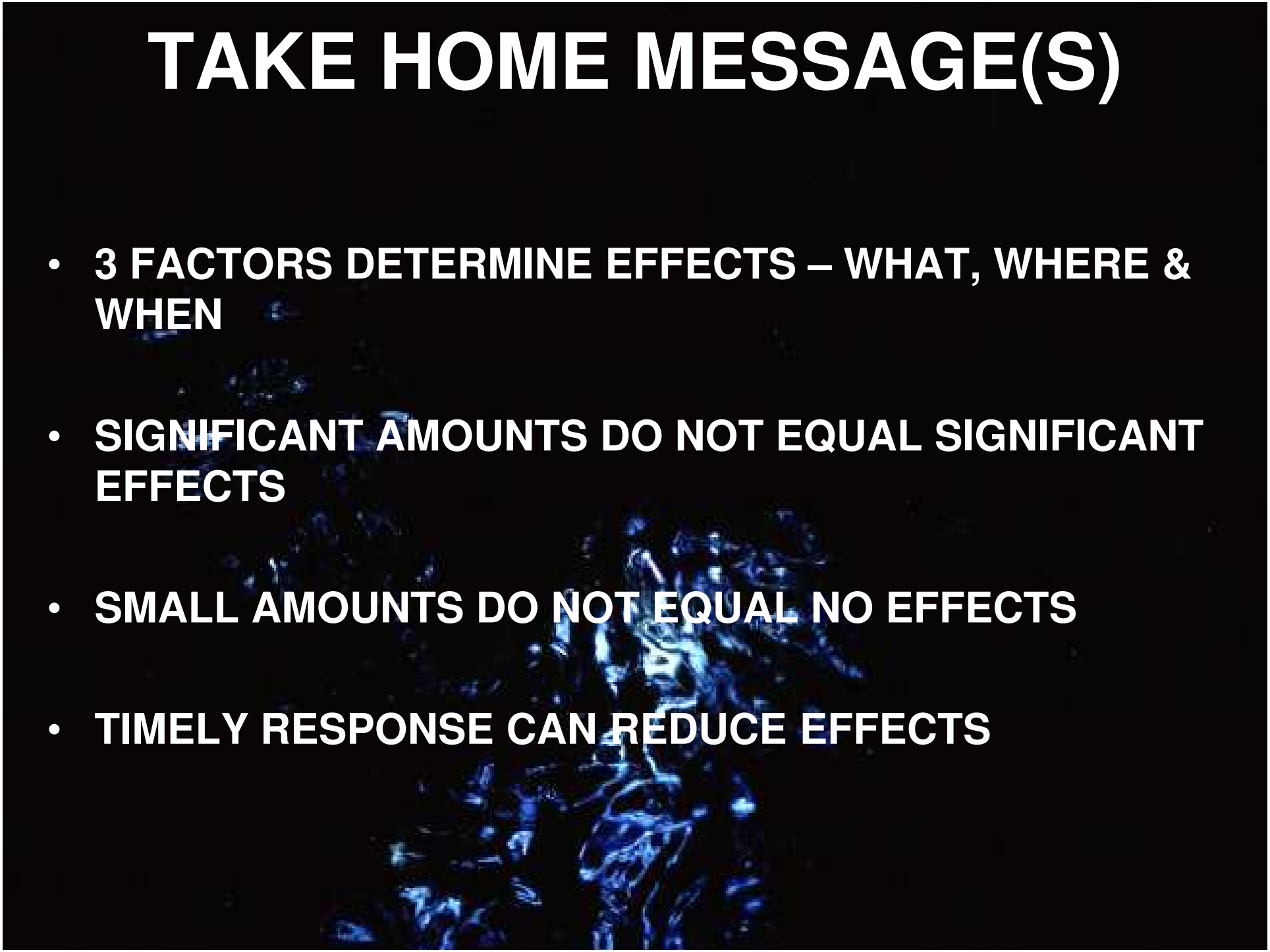
AGGRESSIVE TIMELY RESPONSE ACTIONS

AMOUNT???

RESPONSE???

TAKE HOME MESSAGE(S)

- 3 FACTORS DETERMINE EFFECTS – WHAT, WHERE & WHEN
- SIGNIFICANT AMOUNTS DO NOT EQUAL SIGNIFICANT EFFECTS
- SMALL AMOUNTS DO NOT EQUAL NO EFFECTS
- TIMELY RESPONSE CAN REDUCE EFFECTS



ANY QUESTIONS?

SECTOR DELAWARE BAY

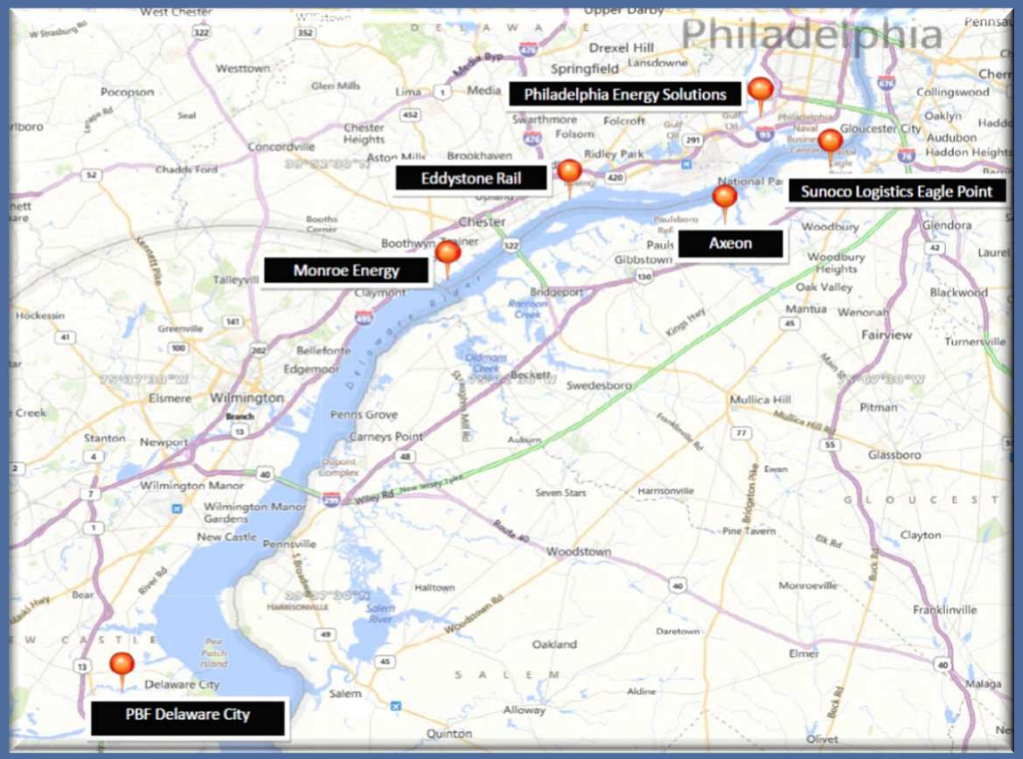
Update on Domestic Crude transportation

Captain Moore

November 6, 2014

Energy Production Growth

- Increase in domestic petrochemical industries
- Increase in domestic crude transported by rail
- Bakken, bitumen & dilbit



Energy Production Growth

- 6 Refineries
- 3 Rail companies
- Est. 588,000 BBLs Bakken refined daily
- Est. 102,500 BBLs bitumen/dilbit refined daily

Facility	Product	Transport Method
PBF- Del City	Bakken, Bitumen, Dilbit	Norfolk Southern
PES	Bakken	CSX
Eddystone Rail	Bakken	CSX/Norfolk Southern
Axeon	Bitumen/Dilbit	Ships & Norfolk Southern RR
Monroe Energy	Bakken	No RR -Barges
Sunoco Logistics	Bakken	CSX to Conrail

Real World Events

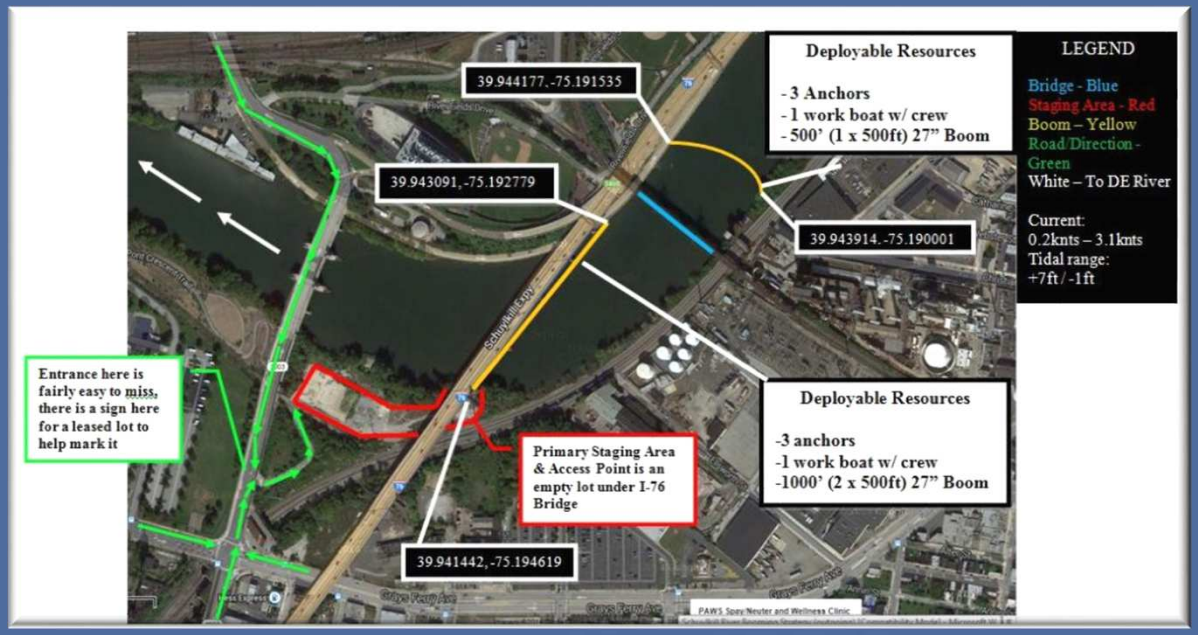
- East Jefferson St Bridge Train Derailment Paulsboro, NJ (30 Nov 2012)
- Schuylkill Arsenal St Bridge Train Derailment Philadelphia, PA (20 Jan 2014)

Rail Risk Planning

- Oil/HAZMAT Response to Rail Risks Planning
- Info Gathering
- Area Committee/Industry Engagement
- Ecological Risk Assessment (ERA)-potential

Rail Risk Planning

- Incorporate rail incident planning in ACP/GRP
- Prioritized booming strategies
- 32 critical rail/water nexus areas
- Update Oil & HAZMAT ACP Annexes & QRCs



Industry Engagement

- Industry (ies) Outreach
- LEPC Outreach
- Increase Rail Specific Exercises/Training

1) Exercises

Date	Sponsor	Type
19-Nov-13	Camden County-Conrail	TTX
23-Nov-13	Burlington County -Conrail	TTX
11-Aug-14	Gloucester County	TTX
2-Aug-14	Norfolk Southern -New Castle County LEPC	TTX
23-Aug-14	Norfolk Southern -New Castle County LEPC	FSE
17-Oct-14	Philadelphia - CSX	TTX
TBD	Delaware County LEPC	TTX

2) Training/Meetings

Date	Meeting
16-Apr-13	Delaware Valley Regional Planning Committee - Rail Meeting
Spring 2014	Philly OEM
3-Apr-14	Railroad Workgroup Meeting -SDB
18-Aug-14	Delaware County - Brief to LEPC sub-committee
9-Sep-14	Bensalem Police Academy- Rail Risks Presentation

Ecological Risk Assessment

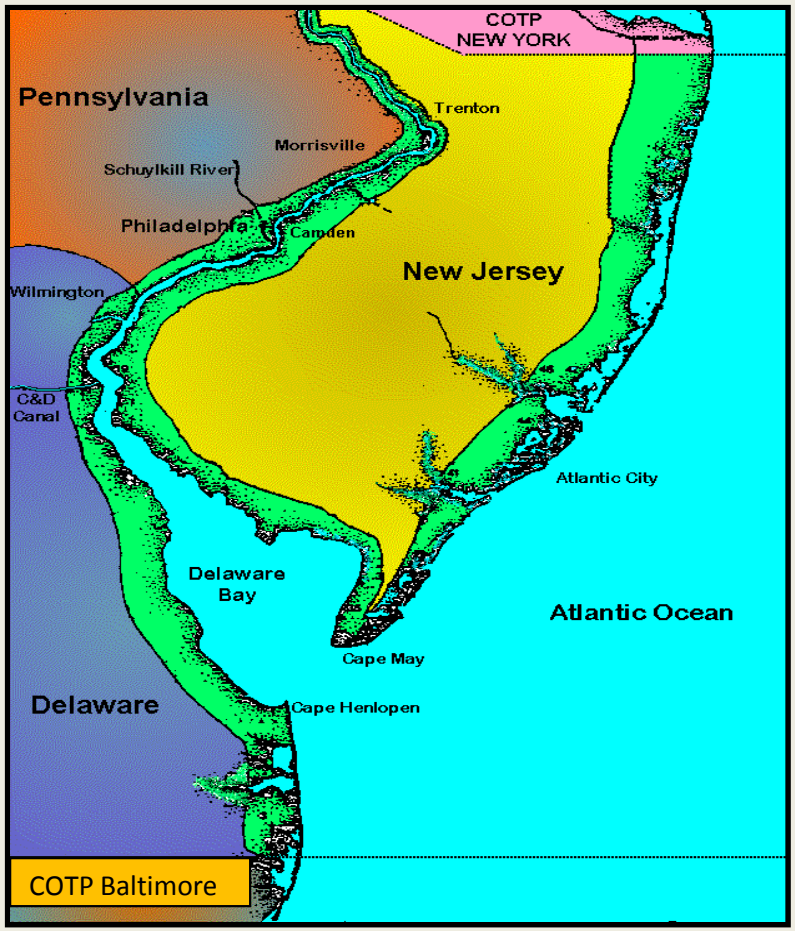
- Potential Focused ERA
- Release between major Philadelphia Bridges
- Dilbit/Bakken as subject product
- Water Column ?
- Response Strategies?
- 3-state input

QUESTIONS?

Sector Delaware Bay

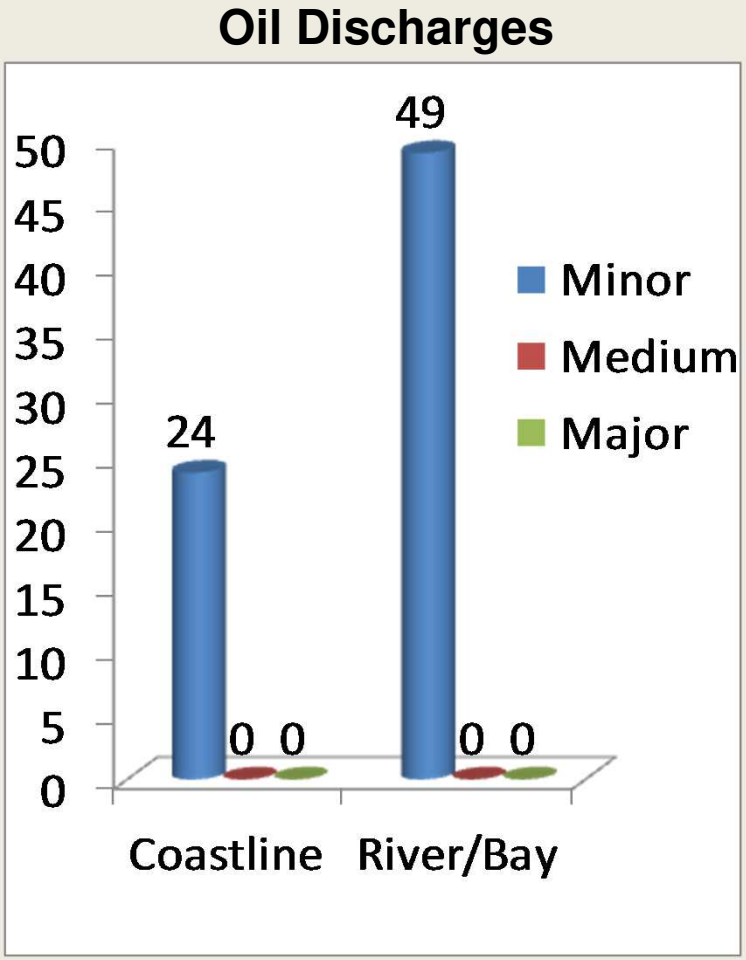
Captain Kathy Moore

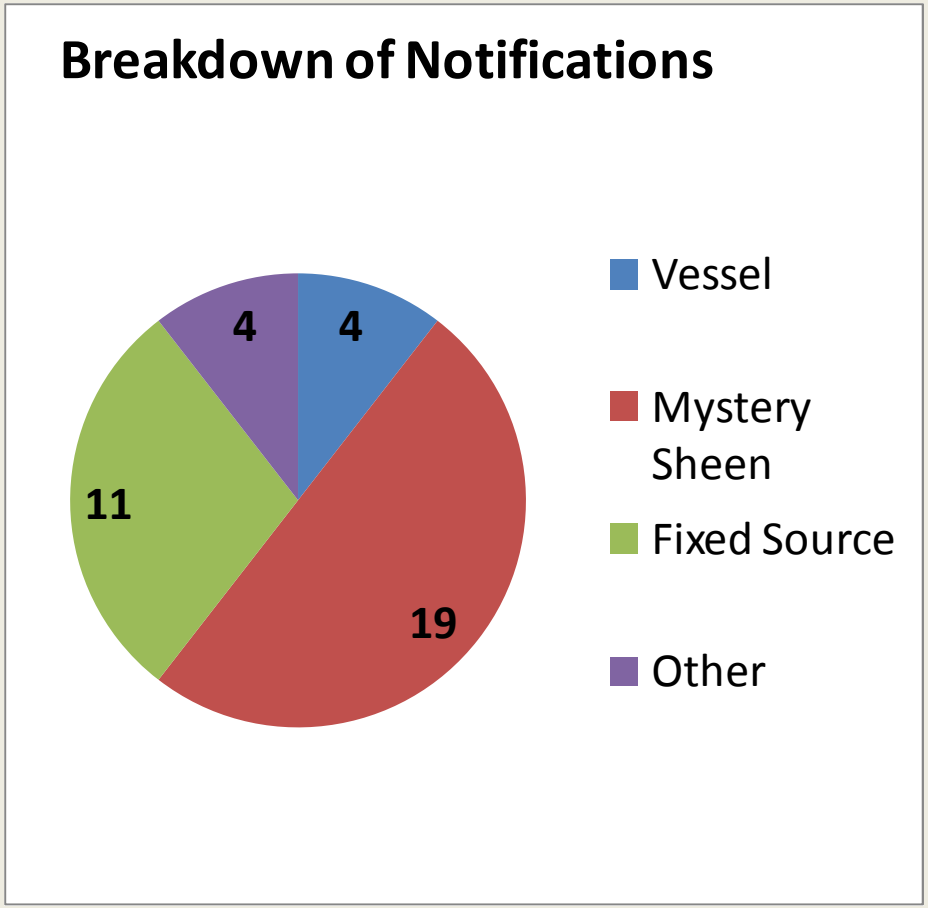
Sector Commander



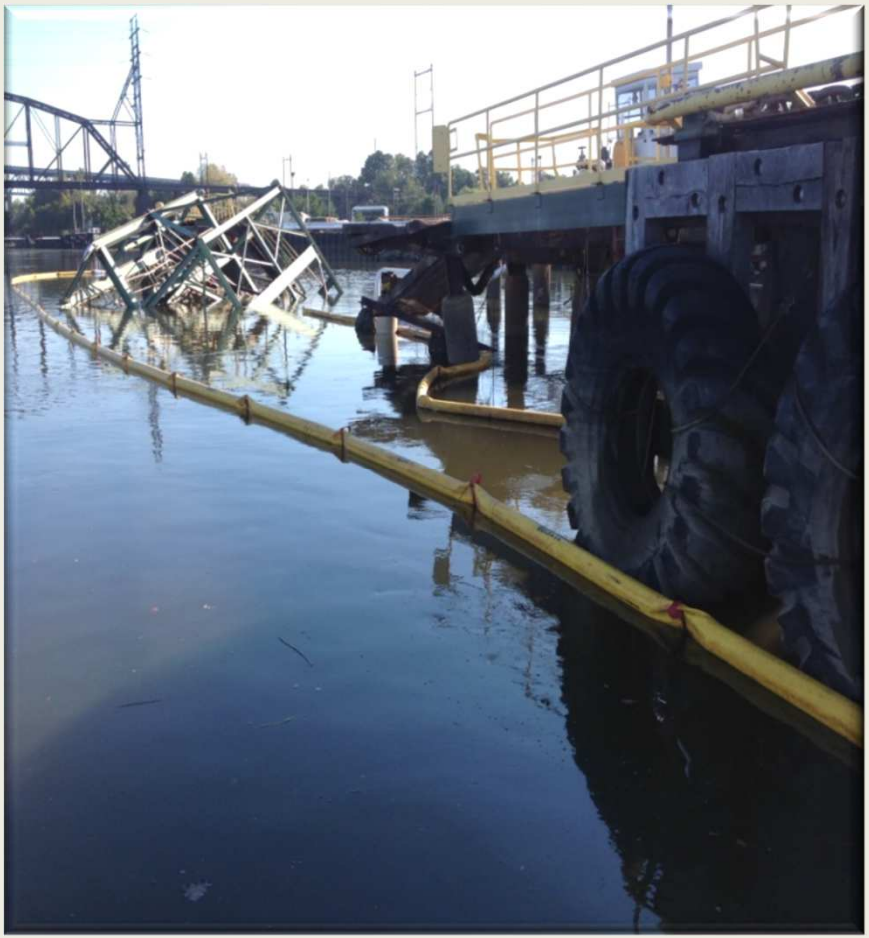
COTP Report to RRT III 13 MAY 2014 – 06 NOV 2014		
NRC Notifications	**Oil Spill Reports**	**HAZMAT Release Reports**
73	72	1
RRT Activations	**OSLTF Projects**	**CERCLA Projects**
0	1	0

SDB Responses

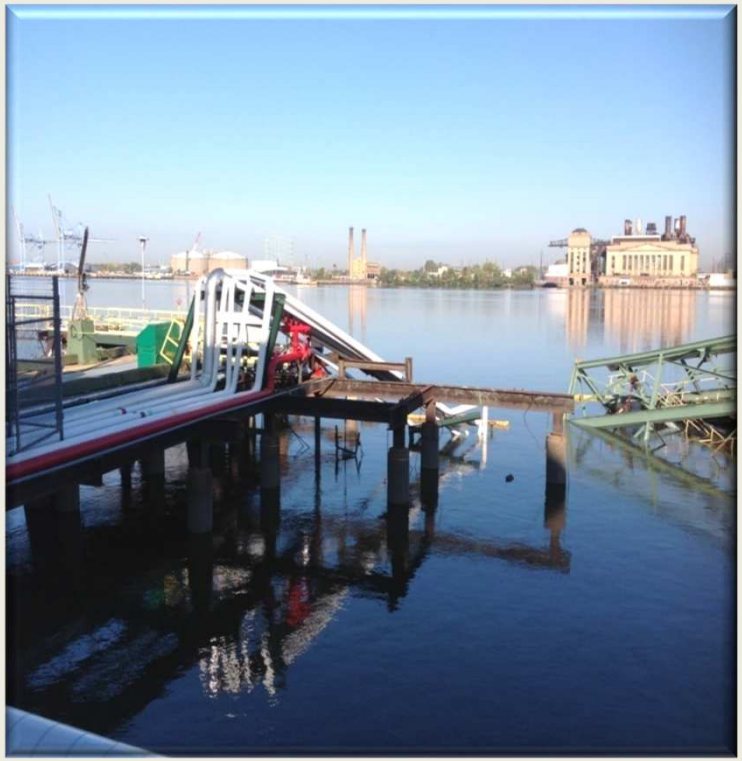




Marine Terminal Discharge Pennsauken, NJ

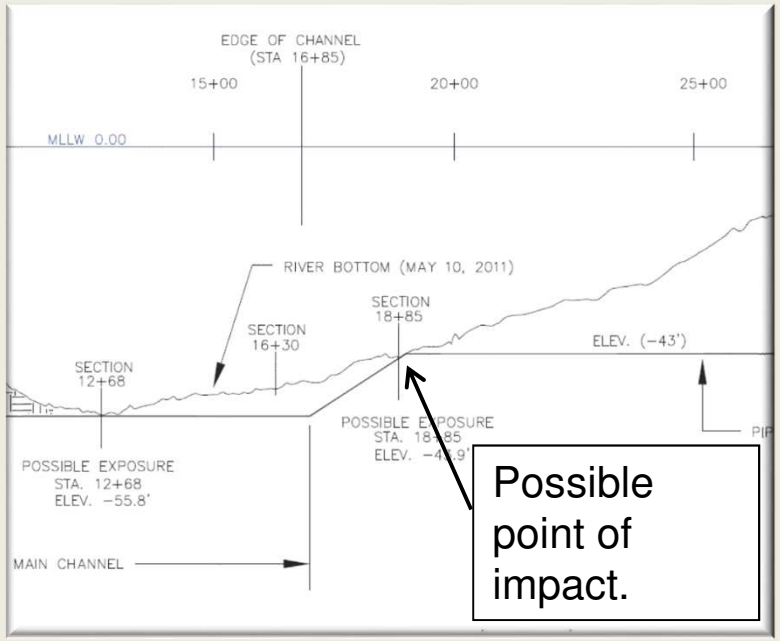


- Tug/Barge allision with facility pier.
- Transfer manifold collapsed into Delaware River – remained intact.
- Minimal sheening.
- Recovered 924 gallons from intact transfer lines.



Liquid Natural Gas Pipeline Release Paulsboro, NJ

- **Dredge struck a submerged LNG pipeline.**
- **Pipeline supplies high pressure LNG to local refinery.**
- **$8^{5/8}$ ” diameter pipeline; 600 PSI.**
- **No LELs observed during 52 minute release.**
- **Investigation on-going.**



Contingency Preparedness Initiatives

- **Domestic Crude Workgroup:** Sector Area Committee Sub-group formed to review ACP and develop plans to respond to spilled cargoes from 32 RR bridges into waterways. Booming strategies will be completed by 15 March 2015.

- **ACP GIS:** The Sector is currently working with D5 to update the electronically linked ACP and develop a GIS based Geographic Response Plan supplement for Oil by Rail. Anticipated project completion date: 31 July 2015.

Endangered Species Act Section 7 Consultation Overview

NOAA FISHERIES

RRT III Meeting

Frank Csulak
NOAA SSC

November 4 2014

Section 7 Training

Endangered Species Act

What is a Section 7 Consultation?

- Section 7(a)(2) of the ESA states that each Federal agency shall, in consultation with the Secretary, insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat

- Section 7 consultation must be on a proposed action and cannot (except in emergency situations) occur "after the fact." As such, consultation must be completed before final agency actions are taken

Purposes of the Endangered Species Act

- "The purposes... are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in subsection (a) of this section...

- Section 2(b) of the Endangered Species Act"

ESA: Definitions

Endangered	any species which is in danger of extinction throughout all or a significant portion of its range (other than a member of Class Insecta which are determined to be a pest species)
Threatened	any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range
Species	includes any species of fish or wildlife or plants and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature

ESA: Definitions

Critical Habitat

specific areas within the geographic area occupied by species at the time it is listed... on which are found those physical or biological features (1) essential to the conservation of the species and (2) which may require special management considerations or protection.

specific areas outside the geographical area occupied the species if determined to be essential for the species' conservation

Sec. 9: Prohibited Acts

"...it is unlawful for any person subject to the jurisdiction of the United States to

- take any such species within the United States or the territorial seas of the United States
- violate any regulation pertaining to such species or to any threatened species or fish or wildlife [cross-reference section 4(d)]"

ESA: Definitions

Take	to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct
Harass	an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering
Harm	an act which actually kills or injures wildlife. Such act may include significant modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding or sheltering

Section 7 Training

Interagency Cooperation (Section 7 Consultation)

Sec. 7: (a)(2) Insure No Jeopardy...

- Section 7 requires Federal agencies to
  - consult with the Services
  - insure that
  - any action they authorize, fund, or carry out
  - is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat
  - use the best scientific and commercial data available

Our Objectives in Section 7 Consultation

- **Help** Federal agencies **insure** that any action they authorize, fund, or carry out is
  - not likely to expose endangered or threatened species to activities that are likely to cause those species to get closer to extinction
  - not likely to reduce the value of designated critical habitat for the recovery of endangered or threatened species
- Produce consultations that are **legally-defensible** because they are
  - transparent
  - "objective: (=replicable)
  - evidence-based
  - have conclusions that are logical outcomes of well-reasoned arguments using the best scientific and commercial data available

When Does Consultation Occur?

As soon as the action agency has enough information on the proposed action and the details of the activity are refined enough to allow analysis and minimize uncertainty about alternatives

- Identify the proposed action
- Define Action Area
- Are ESA-listed species or critical habitat present in the action area?
  - If no, end consultation process
  - If yes, determine if action “may affect” those species

ESA Species in Northeast Region

http://www.nero.noaa.gov/protected/section7/guidance/maps/index.html

WHALES

- North Atlantic right whale
- Humpback whale
- Fin whale
- Sei whale
- Sperm whale

SEA TURTLES

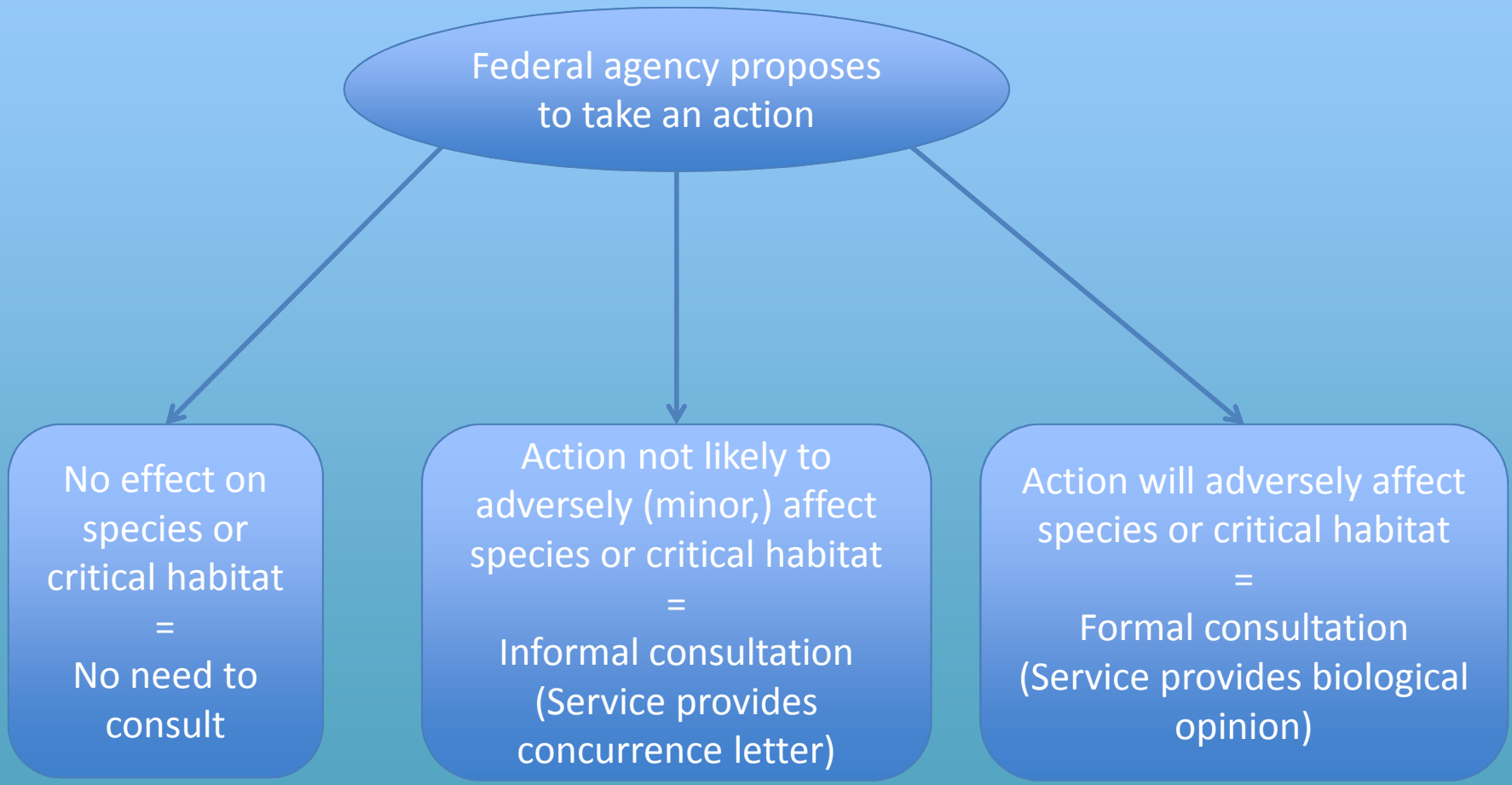
- Loggerhead (NWA DPS)*
- Leatherback
- Kemp's ridley
- Green

FISH

- Atlantic salmon (GOM DPS)
- Shortnose sturgeon
- Atlantic sturgeon (5 DPSs)
  - Gulf of Maine*
  - NY Bight
  - Chesapeake Bay
  - Carolina
  - South Atlantic

* Threatened species

Types of ESA consultations



Determining the Effects

- Think about what impacts the activity has on the environment and how might the species may respond
- Identify “stressors” (e.g., on-water and on-shore response activities)
- Determine if listed species are likely to be exposed to those stressors, and if so, what is the likely response
- Action Area – All areas to be affected or indirectly by the proposed action and not the immediate area

Determining the Effects

- No effect = No need to consult
- Informal Consultation = Effects are wholly beneficial, insignificant (very minor), or discountable (extremely unlikely to occur)
- Formal Consultation = Adverse effects may occur

Initiate Consultation

The **Action Agency** prepares a memo or letter that includes:

- Complete description of activity
  - Who, what, when, where and under what authorities
  - Identify ALL Federal actions and action agencies
- Any measures being implemented as part of the proposed action to minimize or monitor impacts of activity
- Identification of species and critical habitat present and which ones likely to be exposed to effects
- Description of action area
  - Geographic location and description of habitat
- Assessment of Effects to listed species or critical habitat
- Your Conclusion….
  - A request for concurrence with your "NLAA" determination; **OR**
  - Request for concurrence that reinitiation of an existing consultation is not necessary; **OR**
  - Request for Formal Consultation
- Literature Cited

What Does NMFS/FWS Do?

- Reviews Initiation Package to determine if all information necessary to conduct consultation has been provided
- Determines if the activity falls within the scope of an existing consultation and if so, if reinitiation of consultation is necessary
- Determines if effects will be wholly beneficial, insignificant or discountable
  - If so, provide a memo concurring with the "NLAA" determination and providing justification
- If action will have adverse effects, prepares a Biological Opinion
- Keeps track of all completed consultations and the status of all species to determine if consultations need to be reinitiated

Biological Opinion

Assessment to determine if the proposed action is likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of Critical Habitat

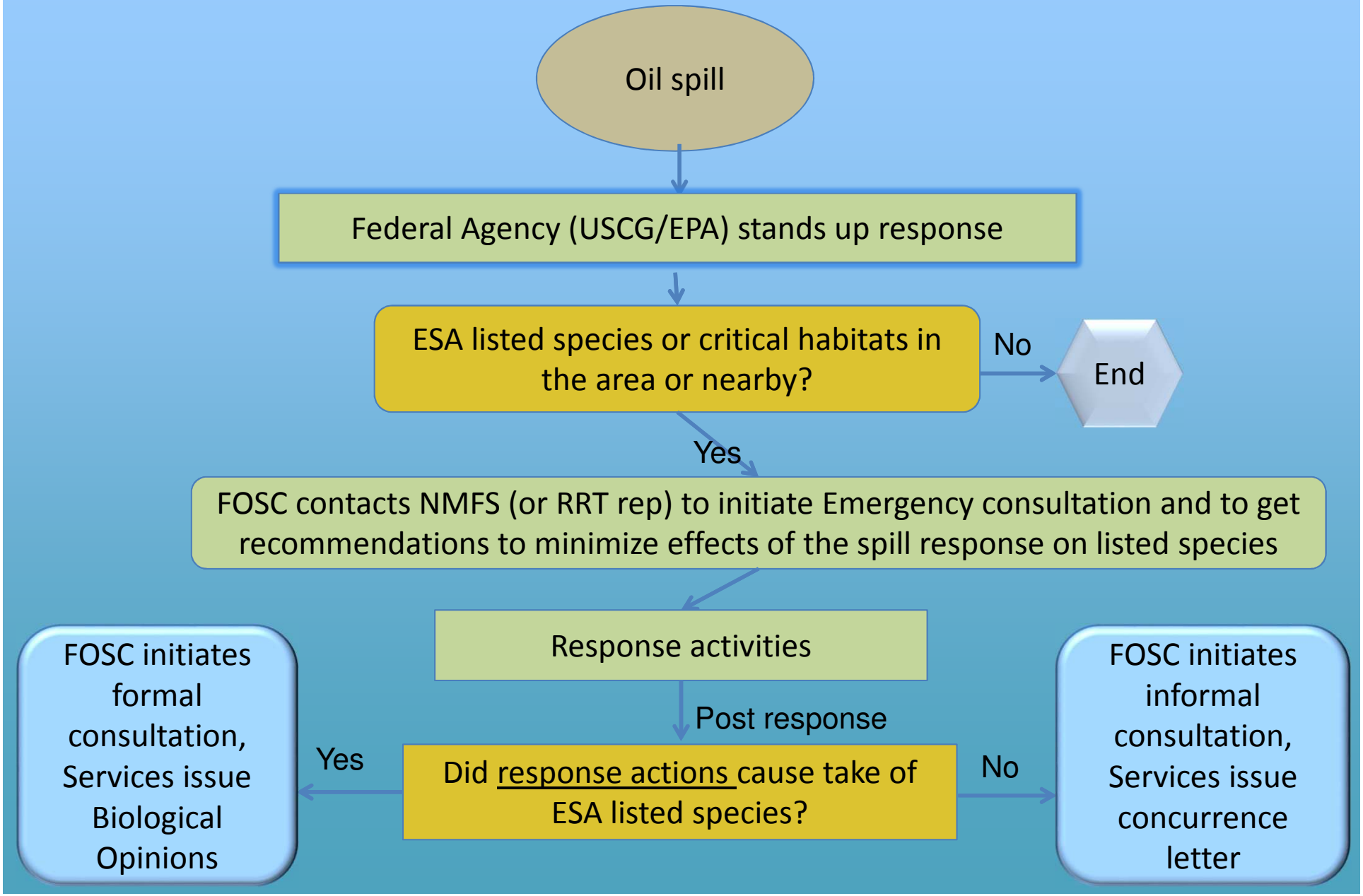
- NMFS/FWS consults with the action agency and produces Biological Opinion (target: **135 days or longer**)
- If no jeopardy, Service issues Incidental Take Statement (ITS), Reasonable and Prudent Measures (RPM), Terms and Conditions (T&C), Conservation Recommendations (CR) to reduce impact of takes
- If jeopardy, Service issues a Reasonable and Prudent Alternative (RPA), ITS, RPMs, T&Cs and CRs (Best Management Practices (BMPs)

ESA consultation - Emergency

- Some circumstances require immediate response by Federal governments - acts of God, disasters, casualties, national defense, security emergencies, etc.

- These emergency responses cannot wait for a normal consultation.

Emergency consultation process



For more information visit our website

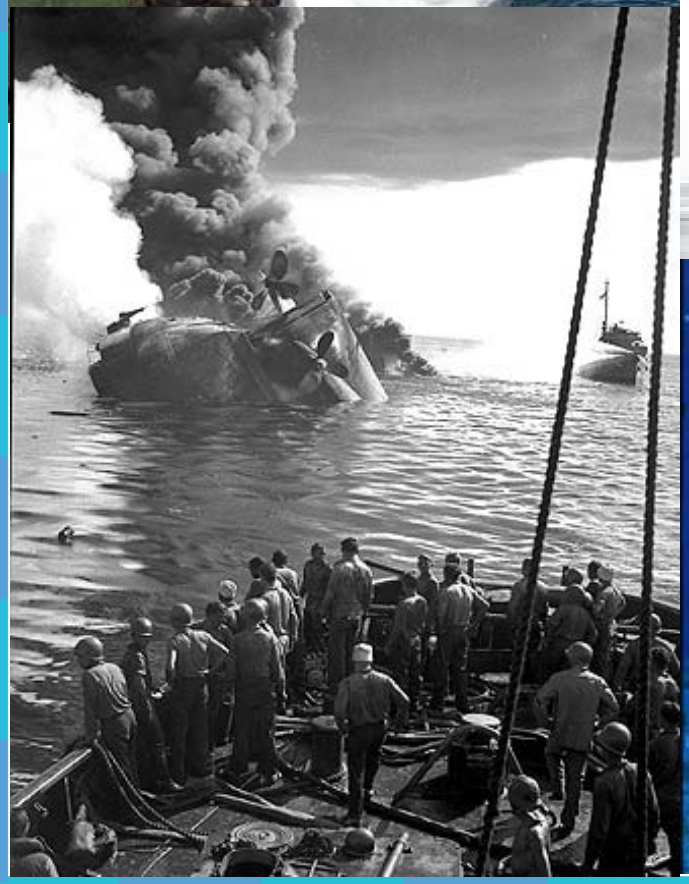
http://www.nero.noaa.gov/protected/section7/

Thank you!

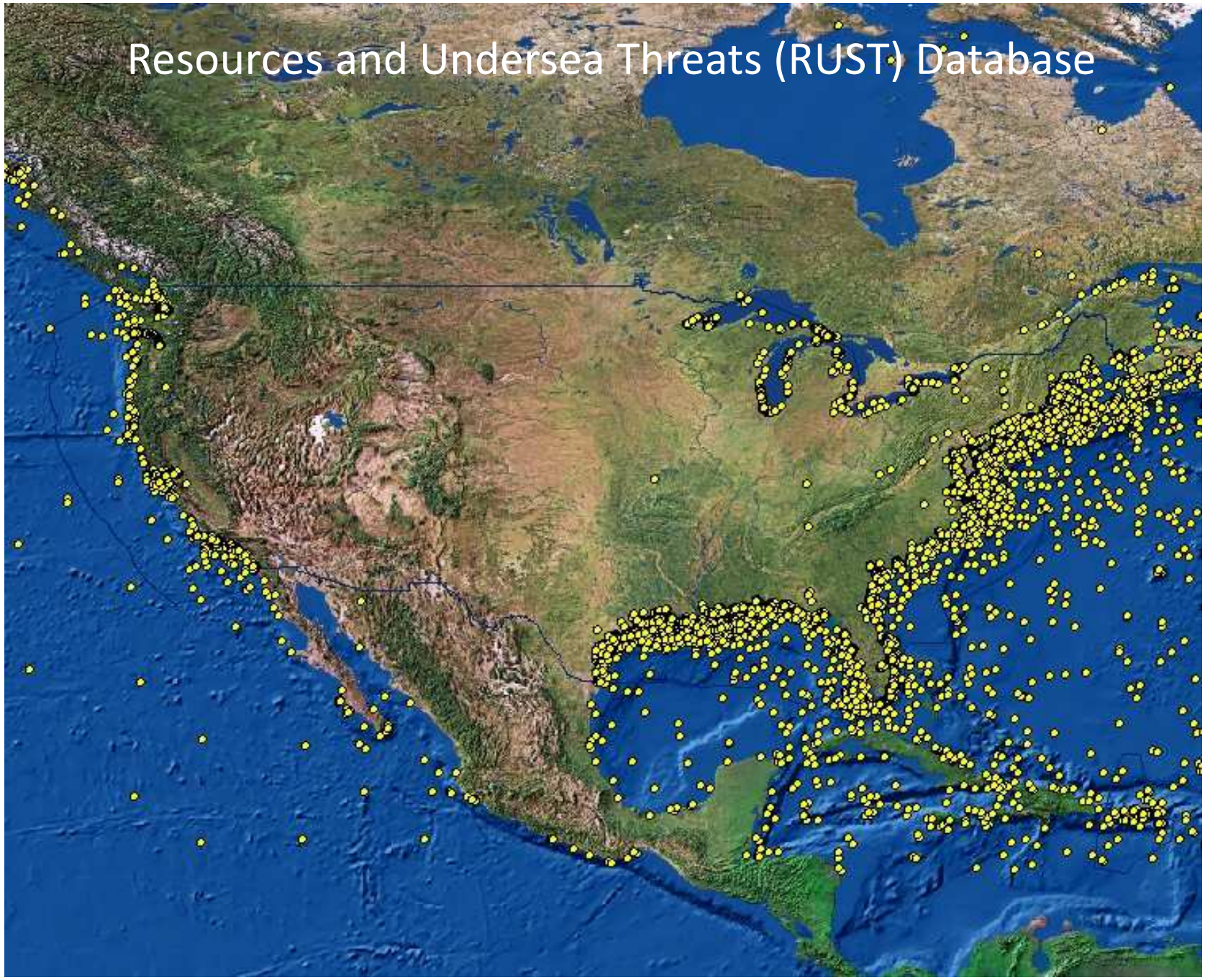
Office of National Marine Sanctuaries
Office of Response and Restoration

NOAA's Remediation of Underwater Legacy Environmental Threats (RULET) Database
AND
W.E. Hutton Response

NOAA Office of Response and Restoration
Frank Csulak and Lisa Symons
USCG Sector North Carolina
LCDR Miguel Torrez



Resources and Undersea Threats (RUST) Database



Prioritizing wrecks

Resources and Undersea Threats Database (20,000 vessels)

Initial Screening based on age, size, hull material, type and location (573 vessels)

Secondary screening based on historical information on vessel, engineering analysis and archaeological site formation (107 vessels)

Third screening based on Pollution fate & consequence analysis

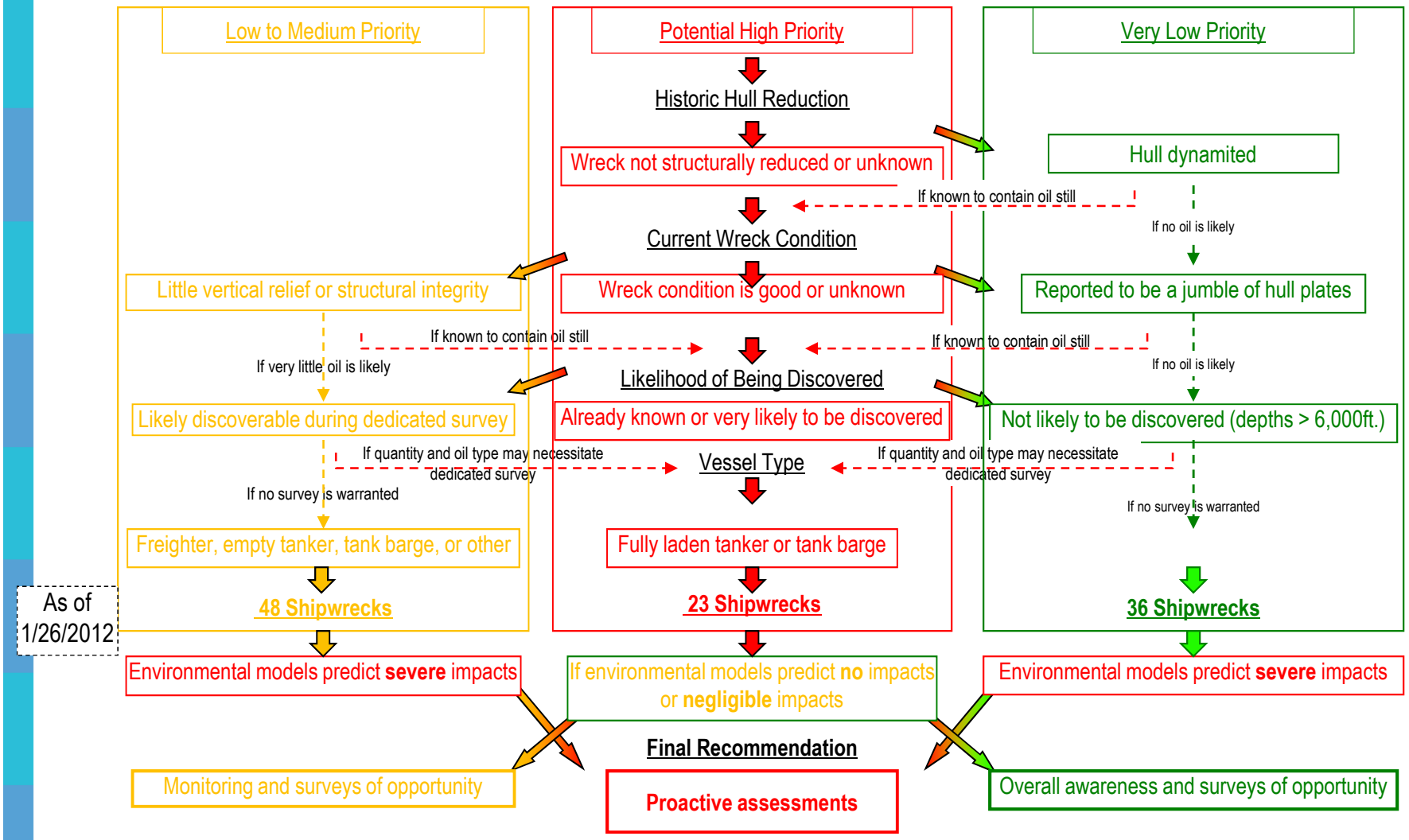
National Summary 87 wreck reports

USCG/RRTs → ACPs
Surveys of Opportunity
NOAA support thru SSC's

RULET Initial Screening: (≈580 Shipwrecks)

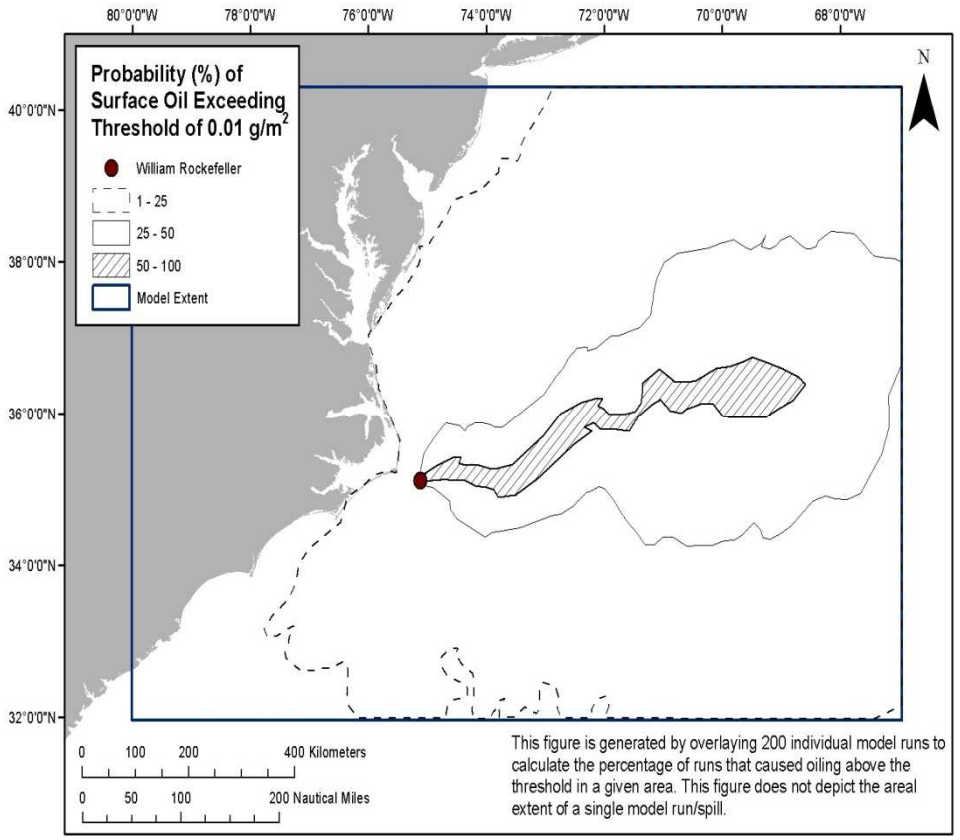
Over 1,000 gross tons or any tank vessel; Built post 1891; Steel, iron, or concrete hull

Removal of coal burning vessels, sailing vessels, or nonhazardous barges; Wrecks outside US EEZ; Vessels that were raised and scrapped; Ships that did not actually sink; Wrecks that NOAA has verified as demolished. (228 Shipwrecks (Aug 2011))



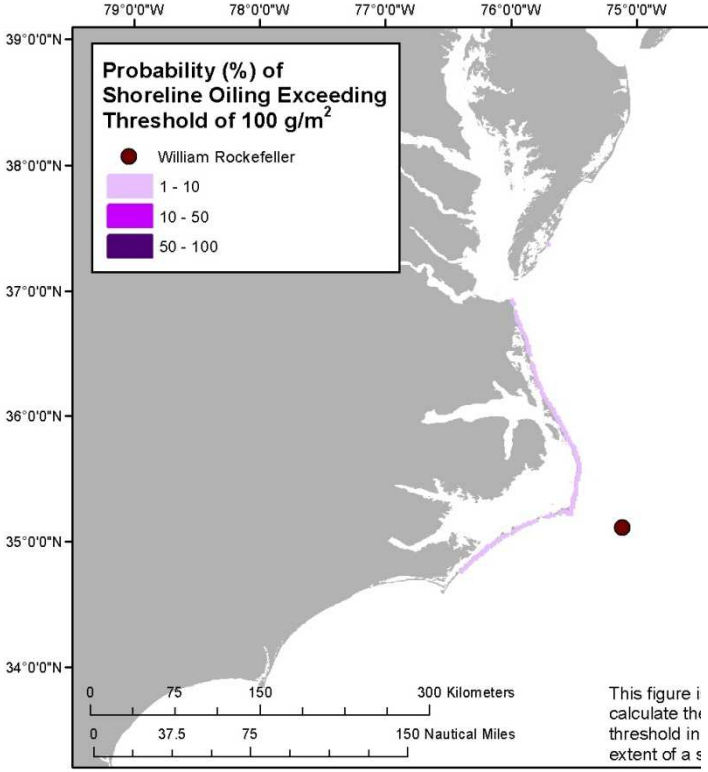
Release Scenarios

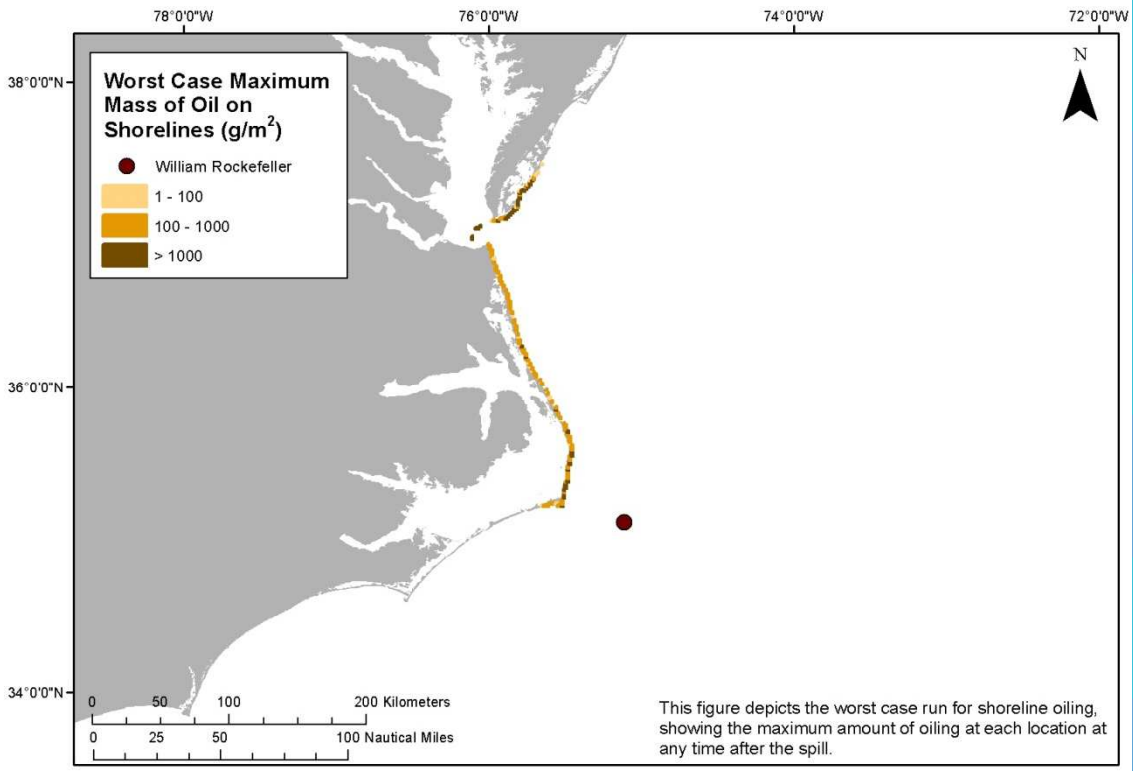
- Release duration of 12 hours
- Model simulations run for a 30 days. 200 runs/site, 4 different spill volumes
- Releases assumed to be from a depth between 2 and 3 meters above the sea floor.
- Simplified oil types: e.g., South Louisiana light crude (representing crude) and Medium aromatic Fuel Oil No. 2 (representing light fuels).

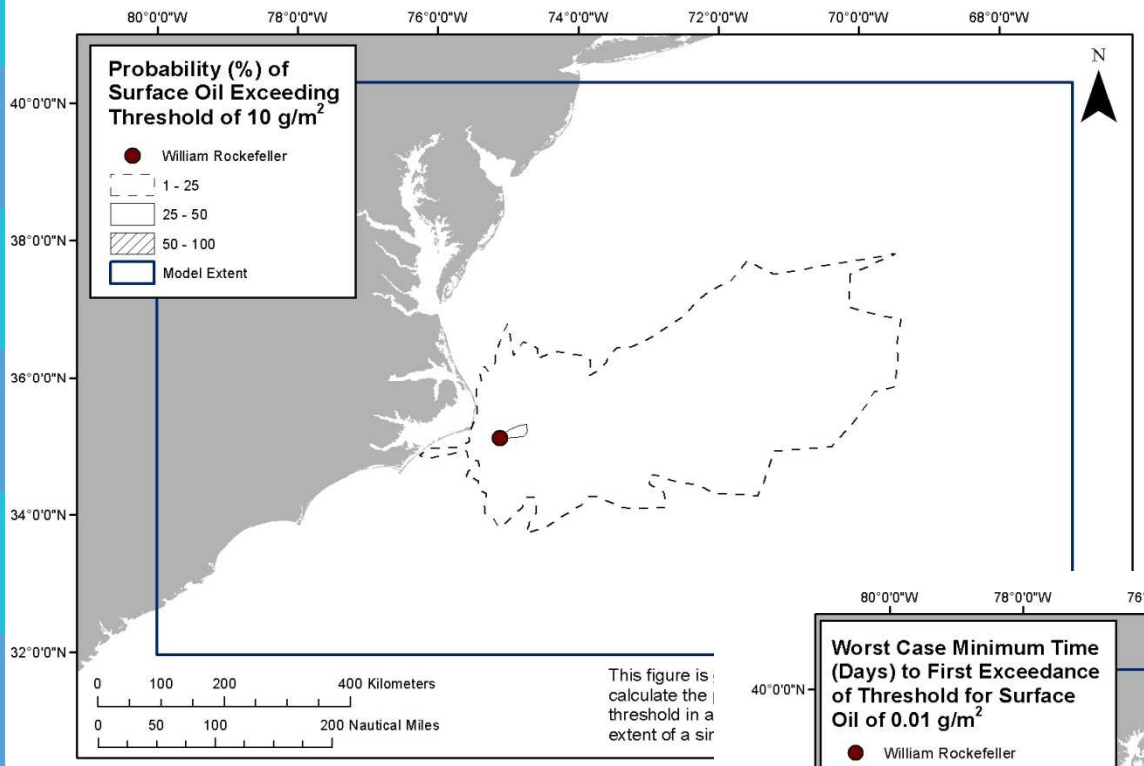


William Rockefeller: 14,054 gross tons

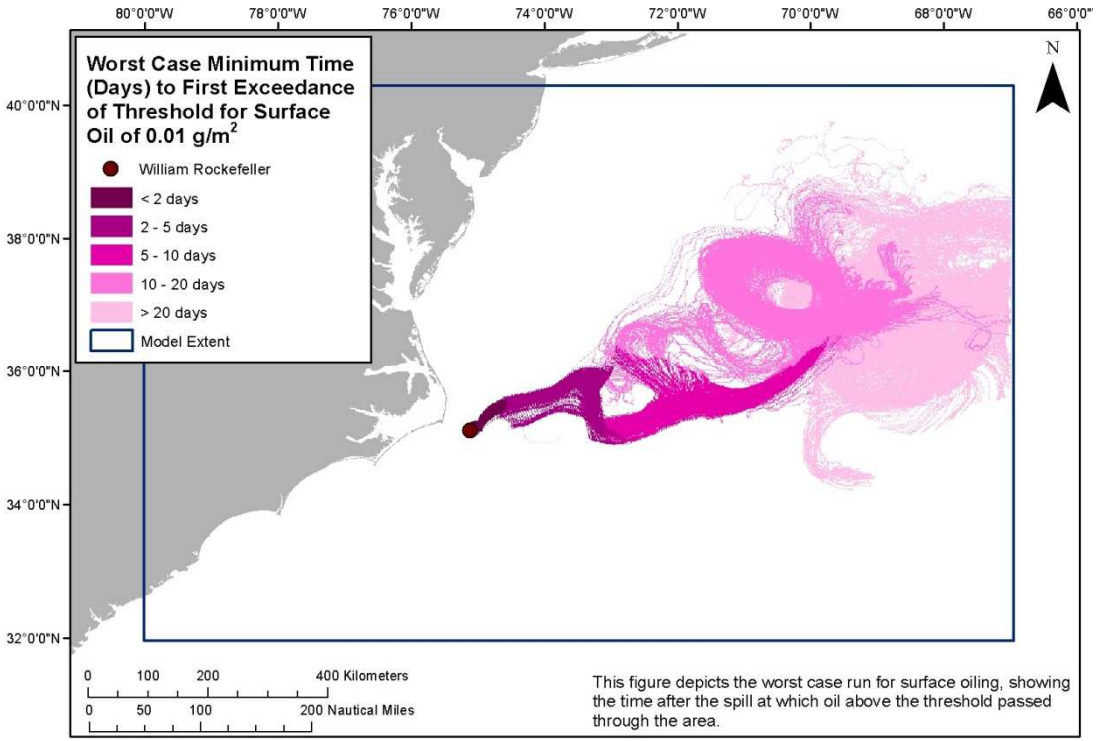
Pollution Potential: in theory 150,000 barrels of Bunker C







This figure is
calculate the
threshold in a
extent of a sir



This figure depicts the worst case run for surface oiling, showing the time after the spill at which oil above the threshold passed through the area.

RUST ➡ **R**emediation of **U**nderwater **L**egacy **E**nvironmental **T**hreats (**RULET**)

Initial Narrowing Criteria: 30,000 to 573

- ~~Post 1910~~ ~~Post 1902~~ Post 1891 (UK uses 1873)
- Steel Hull (as well as iron or concrete)
- Tanker/Tank Barge
- >200' or 1000GT

RULET: ~~233~~ ~~228~~ ~~162~~ ~~115~~ ~~107~~ **87**

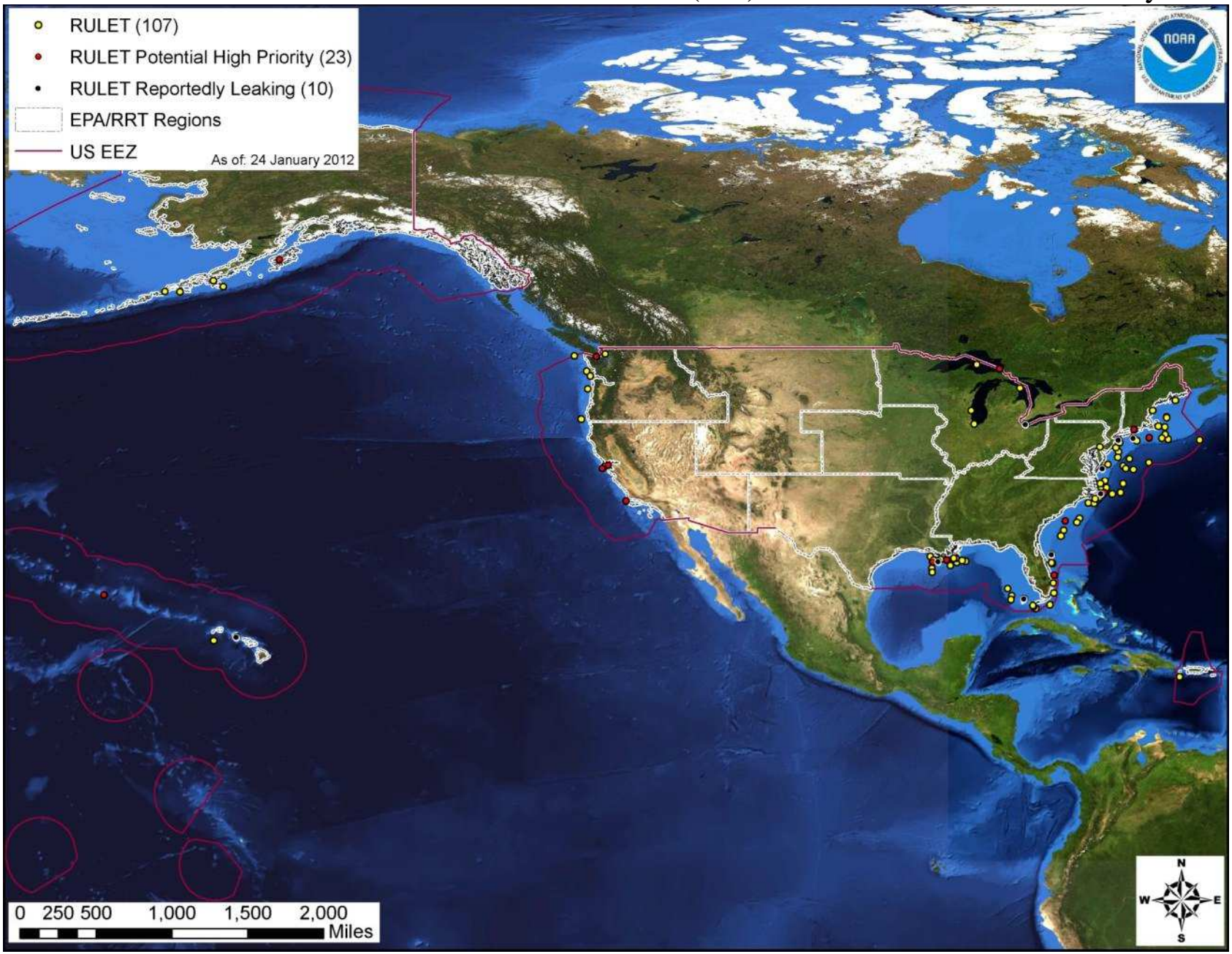
Reported to be leaking: 10

High Priority

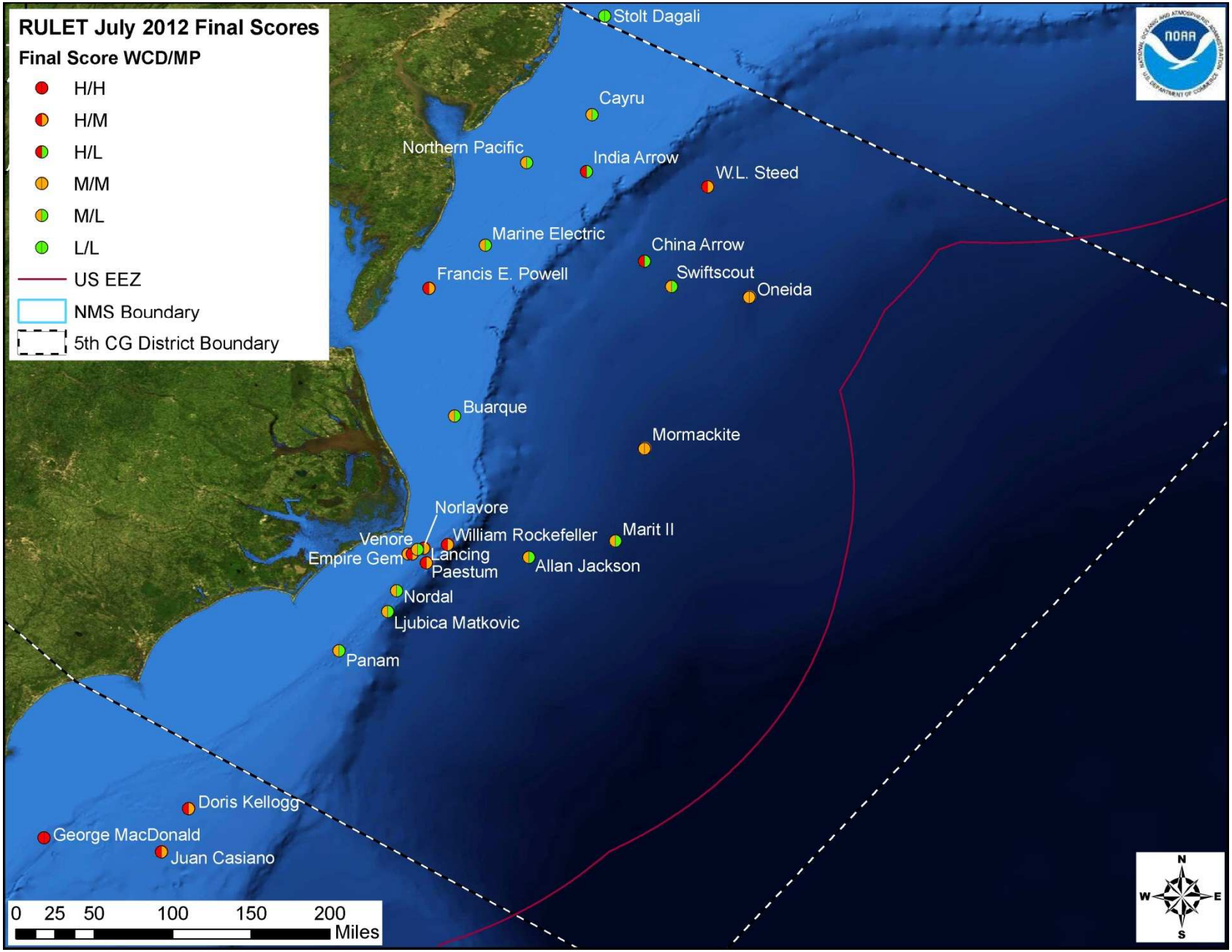
Worst Case Discharge: 36

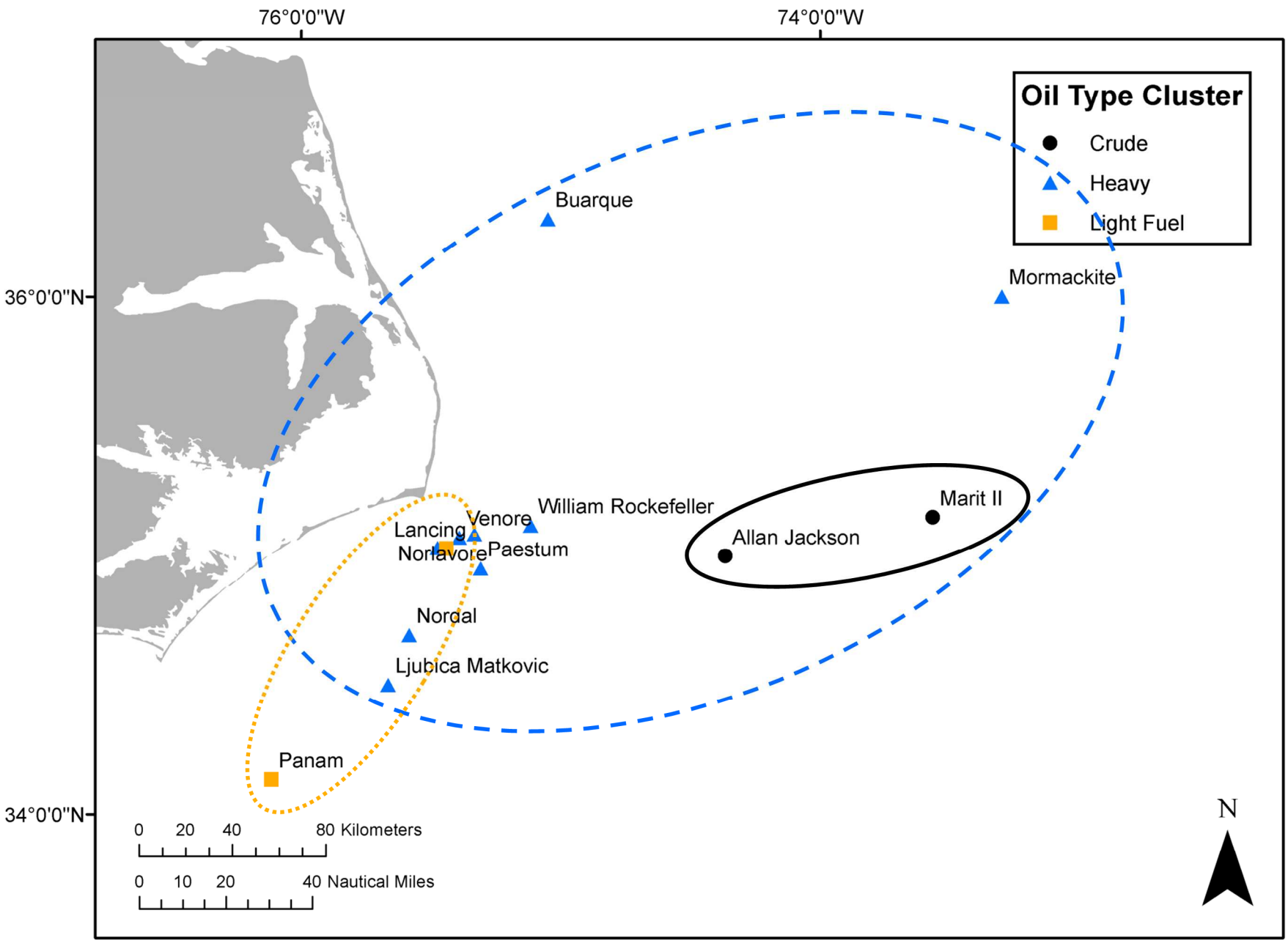
Most Probable: 6

NOAA RULET All US Waters (107) 24 January 2012

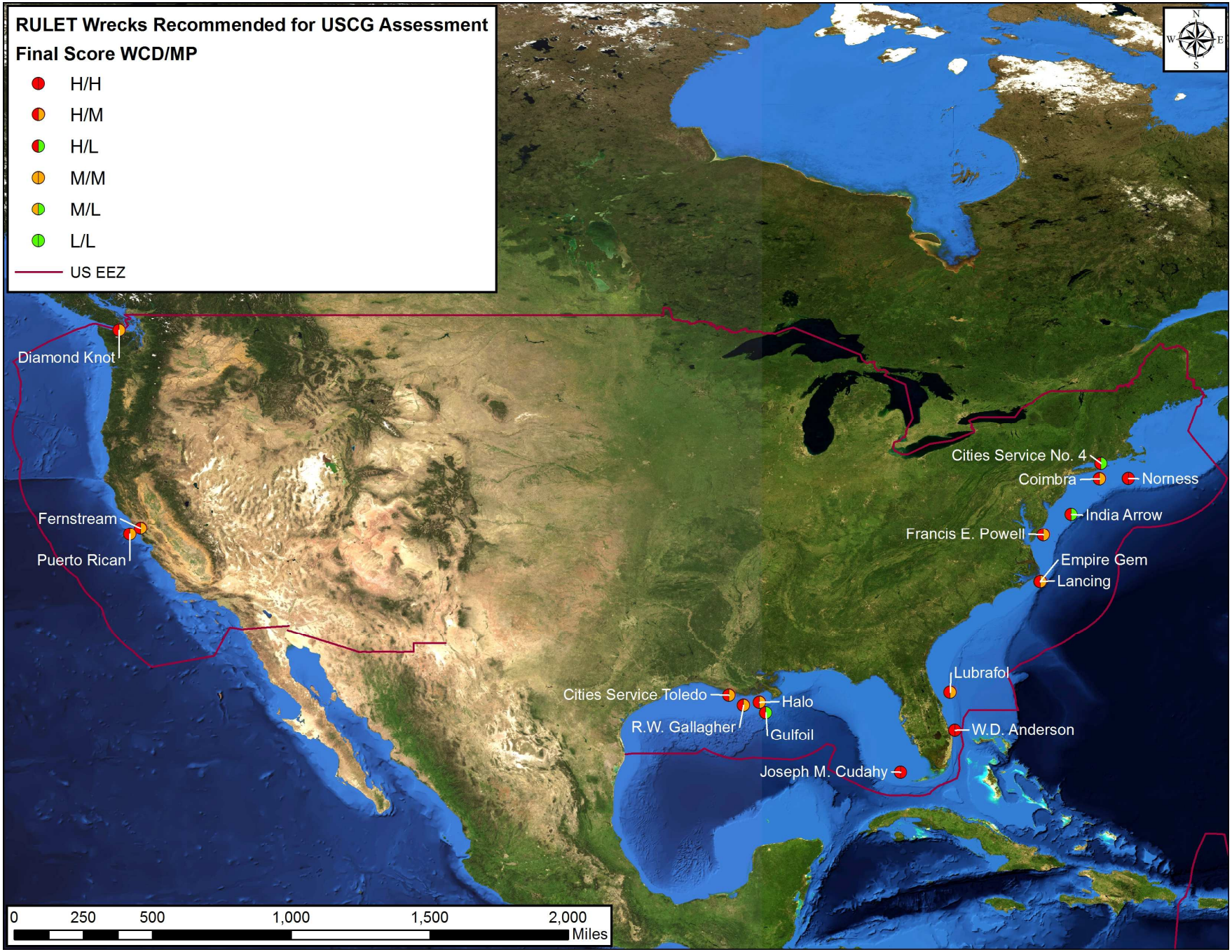


Vessel Name (Year of Sinking)	Project Year	Location	Action	Quantity Removed (gal)	Cargo/Bunker Type	Water Depth (ft.)
Tenyo Maru, 1991	1991	Washington	Partial Removal	26,000	Diesel	540
Cleveco, 1942	1995	Ohio	Removal	340,000	HFO	72
Union Faith, 1969	1999	Louisiana	Partial Removal	16,800	HFO	125
Ehime Maru, 2001	2001	Hawaii	Potential Removal	0	Diesel	2000
Jacob Luckenbach, 1953	2002	California	Partial Removal	100,000	HFO	178
Mississinewa, 1944	2003	Yap	Removal	1.8 million	Navy Special Oil	130
Roy A. Rodrey, 1974	2003	New York	Partial Removal	6,000	HFO	200
Bow Mariner, 2004	2004	Virginia	Potential Removal	0	HFO and Diesel	265
Palo Alto, 2004	2006	California	Removal	505	HFO	Surface
Catala, 1965	2007	Washington	Removal	34,500	HFO	Surface
William Beaumont, 1971	2009	Texas	Removal	16,000	HFO	40
Chehalis, 1949	2010	Am. Samoa	Removal	60,000	Gasoline	160
Princess Kathleen, 1952	2010	Alaska	Removal	110,000	HFO	134
William McAllister, 1963	2011	New York	Removal	200	Diesel	160
Montebello, 1941	2011	California	Potential Removal	0	Crude and HFO	900
Davy Crockett, 2011	2011	Washington	Removal	38,400	HFO	Surface


RULET July 2012 Final Scores
Final Score WCD/MP
H/H
H/M
H/L
M/M
M/L
L/L
US EEZ
NMS Boundary
5th CG District Boundary
Stolt Dagali
Cayru
Northern Pacific
India Arrow
W.L. Steed
Marine Electric
China Arrow
Francis E. Powell
Swiftscout
Oneida
Buarque
Mormackite
Norlavore
Venore
William Rockefeller
Marit II
Empire Gem
Lancing
Allan Jackson
Paestum
Nordal
Ljubica Matkovic
Panam
Doris Kellogg
George MacDonald
Juan Casiano
0 25 50 100 150 200
Miles
N
W
E
S


76°0'0"W
74°0'0"W
36°0'0"N
34°0'0"N
Oil Type Cluster
Crude
Heavy
Light Fuel
Buarque
Mormackite
William Rockefeller
Marit II
Allan Jackson
Venore
Lancing
Norfavore
Paestum
Nordal
Ljubica Matkovic
Panam
0 20 40 80 Kilometers
0 10 20 40 Nautical Miles
N

Vessel Scores	Possible NOAA Recommendations	Number of Vessels Receiving Recommendation
High (+1 Med)	Wreck should be considered for further assessment to determine the vessel condition, amount of oil onboard, and feasibility of oil removal action	17
High & Med. (Unk Loc.)	Use surveys of opportunity to attempt to locate this vessel and gather information on the vessel condition	46
High & Med.	Conduct active monitoring to look for releases or changes in rates of releases	22
All	Be noted in the Area Contingency Plans	87
All	Conduct outreach efforts to regional users.	87


RULET Wrecks Recommended for USCG Assessment
Final Score WCD/MP
H/H
H/M
H/L
M/M
M/L
L/L
US EEZ
N
W
E
S
Diamond Knot
Fernstream
Puerto Rican
Cities Service No. 4
Coimbra
Norness
India Arrow
Francis E. Powell
Empire Gem
Lancing
Lubrafol
Cities Service Toledo
Halo
R.W. Gallagher
Gulfoil
W.D. Anderson
Joseph M. Cudahy
0
250
500
1,000
1,500
2,000
Miles

http://sanctuaries.noaa.gov/protect/ppw

Questions?

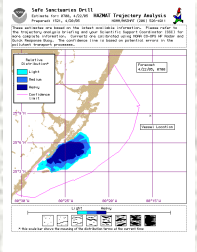
Frank Csulak 732-371-1005
Frank.Csulak@noaa.gov

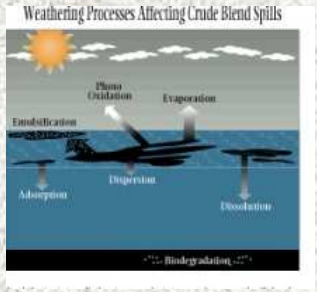

NOAA's National Ocean Service / Office of Response & Restoration
OR&R
National Consultation
Training Workshop
Hosted by the USCG Headquarters Office of
Marine Environmental Response
Washington, DC
04-08 August 2014
NOAA
OFFICE OF RESPONSE AND RESTORATION • NOAA's NATIONAL OCEAN SERVICE

What is the NOAA Scientific Support Coordinator & Team?

Under the National Contingency Plan, the Federal On-Scene Coordinator may call on a Scientific Support Coordinator, provided by NOAA, to assist with scientific aspects of the incident response. NOAA developed its SSC program as a full team approach with skills in physical oceanography, biology, chemistry, resources at risk, shoreline assessment, information mgt., and health & safety. Individual SSCs are assigned to US Coast Guard Districts to support Federal On Scene Coordinators (FOSCs), with the Scientific Support Home Team in Seattle.

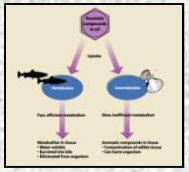
What Got Spilled?





Where Does it Go?

Who Does it Hit?



How Does it Hurt?

What Can I Do?

Our Other Hat

Typically, the SSC also Serves as the **NOAA Natural Resource Trustee** representative for the Regional Response Teams for the region(s) to which they are assigned.

TRUSTEES, TRUSTEE REPS, & RESOURCE MANAGERS

- *Natural Resource Trustees are Secretary of Interior & Secretary of Commerce*
- *Delegated to NOAA for DOC & Office of Environmental Policy for DOI*
- *Resource Managers (USFWS, NMFS, NMS, etc.) operate under separate authorities, regulations, and policy than trustees. They include ESA, EFH, NHPA, MMPA, MSA*
- *From the NCP perspective, it is worth noting if you are a trustee or a resource manager*

Federal Consultation Mandates

- *Endangered Species Act (ESA)*
- *Magnuson Stevens Fisheries Conservation Act or Essential Fish Habitat (EFH)*
- *National Historic Preservation Act (NHPA)*
- *Tribal Interest (THPO – addressed under NHPA and a separate executive order-13175)*
- *Possible future National Marine Sanctuaries consultation mandate*

Federal Consultation Mandates: 3 Modes

1. ***Planning and Pre-approvals***:
   (ACPs, dispersants, in-situ burning, other sub part J chemical countermeasures or approved sub-plans)

2. ***Emergency Consultation*** ***(during active response)***

3. ***Post Incident Formal Consultation*** ***(when takes occurred)***

USCG's NEW Incident Management Handbook Excerpts

- *For SSC responsibilities: Facilitate in the Endangered Species Act consultation process and develop a prioritized list of resources at risk, including threatened and endangered species, in conjunction with Natural Resource Trustee Representatives and the FOSC's Historical/Cultural Resources THSP*
- *For SCAT Coordinator: Develop STRs and obtain necessary permits, consultations, and other authorizations required by the Endangered Species Act, National Historic Preservation Act and Magnuson-Stevens Act.*
- *Note: SSC is tagged to "facilitate" ESA only - not EFH, NHPA, Tribal. Facilitation is helping coordinate and connect the dots. The action agency has the responsibility to perform the consultation through either in-house resources or possibly contracted assistance.*

Consultation Status Summary

from regions SSCs

Region	Response Plans	Mandated Consultations (Y – Yes N – No; C – Current O – Outdated)			Needs	Plans & Activities	History	Emergency Consultation Procedures	Questions	Comments / Recommendations
		ESA	EFH	SHPO/THPO						
1	ACP - LIS	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O	• Need to address ESA, EFH, SHPO/THPO Consultations for ALL ACPs. • Disp and ISB Consults are only for ESA consults with both NMFS and FWS and do not include all current ESA species. Zones and managed areas need updating.	- Awaiting potential area-wide consultation.	• ESA consultation for disp and ISB completed in 1990's. EFH and SHPO/THPO never addressed.			
	ISB	■ Yes ☐ No ■ C ☐ O	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O						
	DISP	■ Yes ☐ No ■ C ☐ O	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O						
	SOLID	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O						
	SWA	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O						
	VSL DECON	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O						
	SCC all RP	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O						
	Other									
2	ACP - NY	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O	• Need to address ESA, EFH, SHPO/THPO Consultations for ALL ACPs. • Disp and ISB Consults are only for ESA consults with both NMFS and FWS and do not include all current ESA species. Zones and managed areas need updating.	- Awaiting potential area-wide consultation.	• ESA consultation for disp and ISB completed in 1990's. EFH and SHPO/THPO never addressed. • All preauth plans and response guidance developed by the RRT is on the RRT website and in the selection guide vol 2.			
	ISB	■ Yes ☐ No ■ C ☐ O	■ Yes ☐ No ■ C ☐ O	☐ Yes ■ No ☐ C ☐ O						
	DISP	■ Yes ☐ No ■ C ☐ O	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O						
	SOLID	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O						
	SWA	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O						
	VSL DECON	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O						
	SCC all RP	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O	☐ Yes ■ No ☐ C ☐ O						
	Other									

Consultation Status Summary for Response Plans

Region 3???

Plans	Y – Yes N – No C – Current O – Outdated		
	ESA	EFH	SHPO/THPO
ACP	☐ Yes ☒ No ☐ C ☐ O	☐ Yes ☒ No ☐ C ☐ O	☐ Yes ☒ No ☐ C ☐ O
ISB	☒ Yes ☐ No ☐ C ☒ O	☐ Yes ☒ No ☐ C ☐ O	☐ Yes ☒ No ☐ C ☐ O
DISP	☒ Yes ☐ No ☐ C ☒ O	☐ Yes ☒ No ☐ C ☐ O	☐ Yes ☒ No ☐ C ☐ O
SOLID	☒ Yes ☐ No ☐ C ☒ O	☒ Yes ☐ No ☐ C ☒ O	☐ Yes ☒ No ☐ C ☐ O
SWA	☐ Yes ☒ No ☐ C ☐ O	☐ Yes ☒ No ☐ C ☐ O	☐ Yes ☒ No ☐ C ☐ O
VSL DECON	☒ Yes ☐ No ☒ C ☐ O	☒ Yes ☐ No ☒ C ☐ O	☐ Yes ☒ No ☐ C ☐ O
SCC all RP	☐ Yes ☒ No ☐ C ☐ O	☐ Yes ☒ No ☐ C ☐ O	☐ Yes ☒ No ☐ C ☐ O

Compilation of ESA Consultation Status for ACPs

Source : draft document from CG legal hdqrts

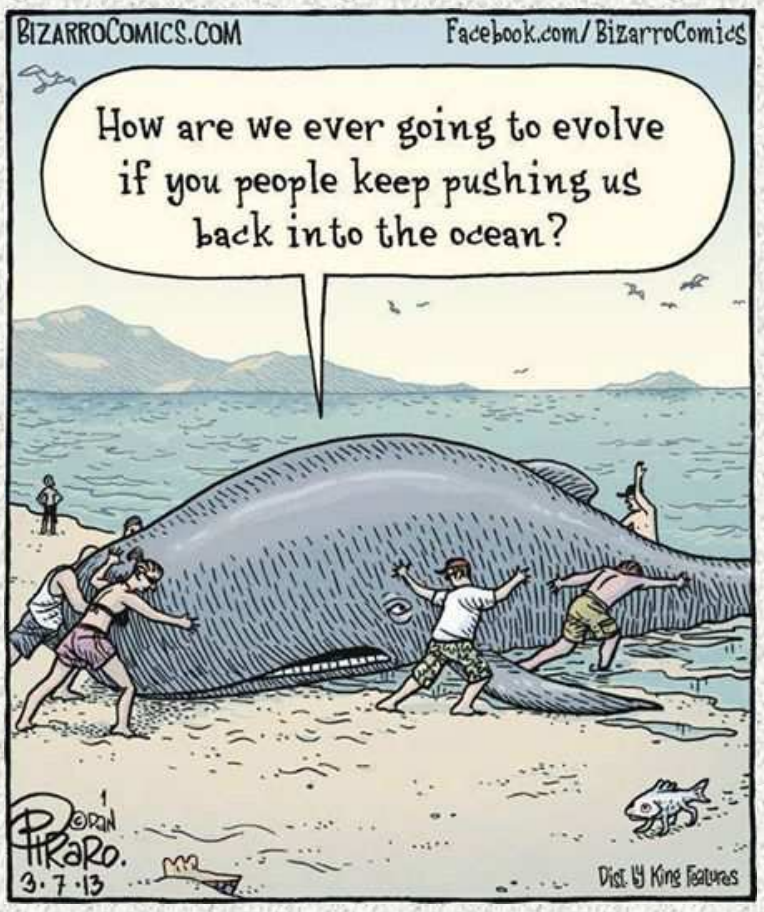
RRT	Does ACP include pre-authorizations?	National Marine Fisheries Service (NMFS)		U.S. Fish and Wildlife Service (USFWS)	
		Has ESA consultation been initiated (cite letter date, to/from) with NMFS?	Has ESA consultation been completed (cite date of concurrence letter or Biological Opinion) with NMFS?	Has ESA consultation been initiated (cite letter date, to/from) with USFWS?	Has ESA consultation been completed (cite date of concurrence letter or Biological Opinion) with USFWS?
I – New England					
ME/NH Area Contingency Plan (SNNE)	Dispersant: Y ISB: Y Other: Y	Yes	Yes- 09Mar1998	Yes	Yes- 06May1996
Massachusetts Area Contingency Plan (SBOS)	Dispersant: Y ISB: Y Other: Y	Yes	Yes- 18Nov1997, 02Aug1996	Yes	Yes- 02Jan1998
S. MA/ RI Area Contingency Plan (SSENE)	Dispersant: Y ISB: Y Other: Y	Yes	Yes- 18Nov1997, 02Aug1996	Yes	Yes- 02Jan1998
LI Sound Area Contingency Plan (SLIS)	Dispersant: N ISB: N Other: Y	Yes- 27Mar2000	Yes- 06Jul2000	Yes- 17Mar2000	Yes- however concurrence is for testing only
II – New York and New Jersey	Dispersant: Y ISB: Y Other: N	Yes	Yes- 10Sep1996	Yes	Yes- 05Apr1996
III – Mid-Atlantic					

Questions & Needs

- *Clarity on consultation requirements for Area Contingency Plans, National Contingency Plans, Regional Contingency Plans, Response and other guidance documents vs.Pre-approvals for use of dispersants, in-situ burning, solidifiers, surface washing agents, etc. and response "actions." Could a general approach with Best Management Practices for various common response actions be the best approach for nationally or regional programmatic plan consultations?*
- *Thresholds for consultation requirements and levels of effort. Possibly a tiered approach ranging from routine everyday incidents to the big one.*

Questions & Needs (cont.)

- *Consistency in guidance, processes, application from region to region and for all federal agencies and emergency response actions. Avoids confusion uncertainty and the "Bring me a different rock" game. Important for USCG to plan, prepare, train and implement in a consistent manner around the country with regular personnel changes.*
- *Need an operationally focused consultation manual to address processes with standard forms and documentation for all three modes (planning, emergency, post incident).*


BIZARROCOMICS.COM
Facebook.com/BizarroComics
How are we ever going to evolve if you people keep pushing us back into the ocean?
DAN PIRARO
3·7·13
Dist. by King Features

Contacts

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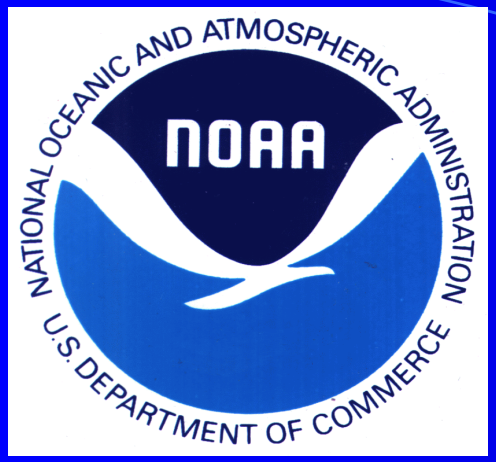
Ed.levine@noaa.gov

Or

OR&R Web Site

http://response.restoration.noaa.gov



Essential Fish Habitat

Frank Csulak
NOAA SSC

NOAA Fisheries Service

Our Mission: Stewardship of living marine resources through science-based conservation and management and the promotion of healthy ecosystems

Habitat Conservation Division ⇒ Protect, restore, and promote stewardship of marine, estuarine, and riverine habitat to support our nation's fisheries for future generations. This includes the conservation and enhancement of Essential Fish Habitat (EFH)

Protected Resources Division ⇒ Conservation and protection of Marine Mammals and Endangered Species

Habitat Conservation Division

What do we do?

- Habitat Conservation Division (HCD) staff review federal and state actions (public notices, EA/EIS, etc.), perform field inspections, attend meetings and public hearings, and provide conservation recommendations under our authorities (e.g.,Magnuson-Stevens Act, FWCA, Section 404 CWA, NEPA,etc.)

- HCD's recommendations are intended to sequentially *avoid, minimize, and offset adverse impacts* to NOAA-trust resources.

Habitat Conservation Division

- Although HCD is identified with EFH consultations, we are responsible for the conservation and protection of all living marine resources, including anadromous fish, shellfish, crustaceans. Many of these species are also prey for federally-managed species, and are therefore considered a component of EFH.

- In addition to EFH, consultation requirements must also be met for other authorities such as the Fish and Wildlife Coordination Act, National Environmental Policy Act, and Federal Power Act (e.g., river herring, Atlantic menhaden, rainbow smelt, American eel, lobster, soft-shell clams, blue mussels).

Essential Fish Habitat (EFH)

Key Points:

- **Laws and Regulations ⇒ What is required?**
- **Define EFH ⇒ What the is it?**
- **EFH Consultation ⇒ How do we do this?**
- **Streamlining ⇒ Tools to get the job done <u>better</u>**
- **Tools ⇒ Website and resources**

MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT (MSA)

amended 1996 Sustainable Fisheries Act

- Describe and identify EFH for each federally-managed fishery (through Fishery Management Councils)
- Consultation requirements for Federal agencies (USACOE, BOEM, FHWA, USCG etc.), including other NOAA agencies
- Encourage conservation and enhancement of EFH

MSA EFH Provisions

Agency Consultation

Federal agencies are required to consult with NOAA Fisheries regarding any activities that ***may adversely affect*** EFH

State agencies are not required to consult, but NOAA Fisheries can provided EFH conservation recommendations on state actions through existing or new coordination procedures

EFH Final Rules (2002)

NMFS Consultation Guidance
50 CFR Part 600

"adverse affect"*

"…any impact which reduces quality and/or quantity of EFH."

1. Indirect (e.g. loss of prey, reduction in fecundity)
2. Direct (e.g. contamination or physical disruption)
3. Individual, cumulative, or synergistic

MSA EFH Provisions [Section 305(b)]

- Consultation required for activities proposed to be ***authorized, funded, or undertaken*** by Federal agencies (includes state and federal waters)

- NOAA (and in some cases, the Fishery Management Councils) must provide conservation recommendations (CRs) to federal and state agencies on actions that may adversely affect EFH

MSA EFH Provisions [Section 305(b)]

- Conservation recommendations must include measures to ***avoid, minimize, mitigate, or otherwise offset adverse effects on EFH***

- Federal agencies must respond in writing to NOAA Fisheries within ***30 days*** after receiving an EFH conservation recommendation

Types of EFH Consultations

- **General Concurrence:** Specific types of federal actions that will likely result in ***no more than minimal adverse effects on EFH***, and for which no further consultation is required (e.g. RP's, LOP's).
- **Abbreviated Consultation:** Actions that do not qualify for a General Concurrence but ***do not have the potential to cause substantial adverse effects on EFH***.
- **Expanded Consultation:** Additional coordination required, used for actions that ***would result in substantial adverse effects on EFH***.
- **Consultation may be completed at either a *programmatic or project-specific level*, as appropriate.**

WHAT IS EFH ???

EFH DEFINED

MSA PL 104-297
Sec. 3. Definitions

"essential fish habitat" means those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity.

EFH Final Rules (2002)

NMFS Consultation Guidance
50 CFR Part 600

- "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and ***aquatic areas historically used by fish***, where appropriate (e.g. potential utilization areas).

- "Substrate" includes sediment, hard bottom, structures underlying waters and associated biological communities.

EFH Final Rules (2002)

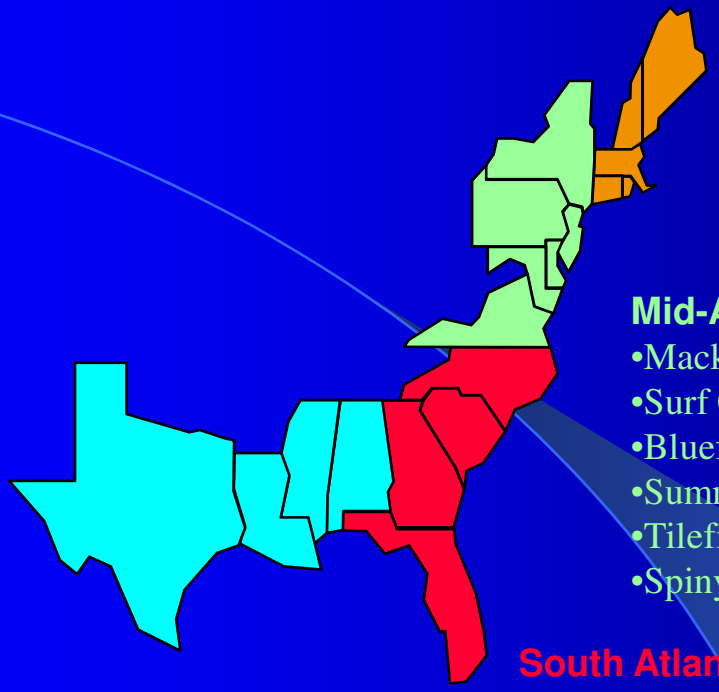
In addition to EFH, the Fishery Management Plans may also identify ***Habitat Areas of Particular Concern*** (**HAPC**).

HAPC's may be established for areas and/or habitat types that:

1. provide important ecological functions;
2. are sensitive to human-induced environmental degradation;
3. are rare; and,
4. development activities must represent a current or potential stress for the habitat.

Examples: summer flounder and sandbar shark

Fishery Management Plans



New England
- Monkfish
- Multispecies
- Sea Scallops
- Atlantic Salmon
- Atlantic Herring
- Skates

Secretarial
- Atlantic HMS (Tunas, Swordfish & Sharks)
- Atlantic Billfish

Mid-Atlantic
- Mackerel, Squid, Butterfish
- Surf Clam & Ocean Quahog
- Bluefish
- Summer Flounder, Scup & Black Sea Bass
- Tilefish
- Spiny Dogfish

South Atlantic
- Spiny Lobster*
- Coastal Migratory Pelagics*
- Snapper-Grouper
- Red Drum
- Coral, Live/Hard Bottom
- Shrimp
- Golden Crab

Gulf of Mexico
- Spiny Lobster*
- Coastal Migratory Pelagics*
- Coral & Coral Reefs
- Stone Crab
- Shrimp
- Reef Fish Resources
- Red Drum

Caribbean
- Queen Conch
- Corals, Plants and Invertebrates
- Spiny Lobster
- Caribbean Reef Fish

* Joint Plans

EFH Designations for Northeast Region Managed Species

New England Fishery Management Council

- American plaice
- Atlantic cod
- Atlantic halibut
- Atlantic herring
- Atlantic salmon
- Atlantic sea scallop
- Haddock
- Monkfish (goosefish)
- Ocean pout
- Offshore hake
- Pollock
- Red hake
- Redfish
- Windowpane
- Winter flounder
- Witch flounder
- Yellowtail flounder
- Skates – 7 species (little, winter and clearnose)

Mid-Atlantic Fishery Management Council

- Atlantic mackerel
- Black sea bass
- Bluefish
- Butterfish
- Illex squid (short finned squid)
- Loligo squid (long finned squid)
- Ocean quahog
- Scup
- Spiny dogfish
- Summer flounder
- Surf clams
- Tilefish

South Atlantic Fishery Management Council

- Spanish mackerel
- King mackerel
- Cobia

EFH Designations for Northeast Region Managed Species

NOAA Fisheries Atlantic Highly Migratory Species

- Swordfish
- Bluefin tuna
- Albacore
- Yellowfin tuna
- Skipjack tuna

Sharks

- Scalloped hammerhead
- Sand tiger
- Basking
- White
- Atlantic sharpnose
- Atlantic angel
- Longfin mako
- Shortfin mako
- Porbeagle
- Thresher
- Blue
- Sandbar
- Dusky
- Tiger

How do Federal agencies consult with NOAA Fisheries?

(50 CFR 600.920)

Can be consolidated with existing environmental review procedures if:

1. The existing process provides NOAA Fisheries with ***timely notification*** of actions that may adversely affect EFH;
2. Notification includes an assessment of impacts that meets the requirements for an ***EFH assessment***;
3. NOAA Fisheries must have made a ***finding*** that the existing process satisfies the EFH consultation process

Existing findings:
Philadelphia District (Regulatory) dated Nov 5, 1999
NAD Civil Works dated January 18, 2000

EFH Assessment

(50 CFR 600.920(e))

Federal agencies must prepare a written assessment of any action that requires consultation. The ***EFH assessment*** must include:

1. A description of the proposed action;
2. An analysis of the effects of the action on EFH and associated species;
3. The federal agency's views regarding the effects of the action on EFH; and
4. A discussion of proposed mitigation, if applicable.

EFH Assessment (continued)

(50 CFR 600.920(e))

If appropriate, the EFH assessment should also include:

- A review of pertinent literature and related information;
- An analysis of alternatives to the proposed action, including options that could avoid or minimize adverse effects on EFH.
- The views of recognized experts on the habitats or species that may be affected;
- The results of a site inspection to evaluate the habitat and the site-specific effects of the project;

Federal Agency Response to EFH Conservation Recommendations

(50 CFR 600.920(k)(1))

- Within ***30 days*** after receiving an EFH conservation recommendation from NOAA Fisheries the federal agency must respond in writing and describe measures proposed by the agency to avoid, minimize, or offset the impacts of the action on EFH.
- If the response is inconsistent with the EFH conservation recommendations, the Federal agency must explain its reasons for not following NOAA Fisheries' recommendations.

EFH Consultations

Dispute Resolution: If a decision is inconsistent with NOAA Fisheries' EFH conservation recommendations, the NOAA Assistant Administrator for Fisheries may request a meeting with the head of the action agency to discuss the proposed action and opportunities for resolving any disagreements. (50 CFR 600.920(j)(2)

NOAA Fisheries will endeavor to resolve any such issues at the field level whenever possible, typically in a meeting between the NOAA Fisheries Regional Administrator and the action agency regional administrator.

Options for Streamlining EFH Consultations

Are there options to further "streamline" the EFH Consultation process? YES.

- Involve NOAA Fisheries in consultation as *early as possible* (e.g., project design or "scoping" meetings, survey results);
- Provide all required and necessary *EFH assessment information;*
- Possible development of a *General Concurrence* or *Programmatic Consultation* with NOAA Fisheries

General Concurrence

(50 CFR 600.920(g))

General Concurrences should meet the following criteria:

- Actions should be similar in nature (e.g., size, features, and functions of boat docks);
- Actions would cause "minimal adverse effects on EFH when implemented individually";
- Actions do not "cause greater than minimal cumulative adverse effects on EFH"; and
- Actions must be tracked and reviewed periodically to ensure that their cumulative effects are no more than minimal.

Programmatic Consultation (50 CFR 600.920(j)(1))

A ***Programmatic Consultation*** can be developed that takes a comprehensive approach to a program's potential adverse effect on EFH.

- A Programmatic Consultation may include all or some activities of a program and incorporate multiple individual actions that may adversely effect EFH into one consultation;
- The federal agency is not required to consult with NOAA Fisheries on each individual action, as long as those actions have been included in the Programmatic Consultation.

Programmatic Consultation

(50 CFR 600.920(j)(1))

Development of a *Programmatic Consultation* requires the following steps:

- Federal agency prepares an *EFH assessment* for all activities that it proposes to be included in the consultation;
- The assessment should estimate the number of actions, describe the range and types of impacts on EFH (direct, indirect, and cumulative) and any proposed mitigation measures;
- NOAA Fisheries determines activities that may adversely effect EFH and provides *EFH conservation recommendations*;
- Actions must be *tracked and reviewed* periodically to ensure that their cumulative effects are no more than minimal.

Additional Tools and Resources for EFH

GARFO EFH website: provides important information regarding EFH (e.g., managed species, locations and descriptions of EFH, and consultation requirements and processes);

www.greateratlantic.fisheries.noaa.gov/habitat

Use EFH tab to access:

- EFH tables (Designations by Location)
- Text descriptions of EFH for each species (Descriptions)
- Life history information (Source Documents)
- Consultation Guidance documents (Consultations)
- The EFH mapper * (Species Maps)

Use the Consultation tab to access:

- EFH – This will have examples of assessments, the EFH worksheet, copies of the Findings letters, and a link to our EFH regulations.

Additional Tools and Resources for EFH

* NOAA Fisheries Office of Habitat Conservation EFH Mapper

  www.habitat.noaa.gov/protection/efh/efhmapper/index.html

- **Do not use** this mapper except for highly migratory species (e.g. sharks, tuna).
- Before using, **read** the EFH mapper help section and the information under the data quality tab.
- The mapper does not yet include all data for Mid-Atlantic Fishery Management Council species (bluefish, summer flounder, scup, black sea bass, etc.) so it will produce false negatives.
- The inshore extent of other species (winter flounder, windowpane, etc.) is incorrect.

GARFO EFH Contacts

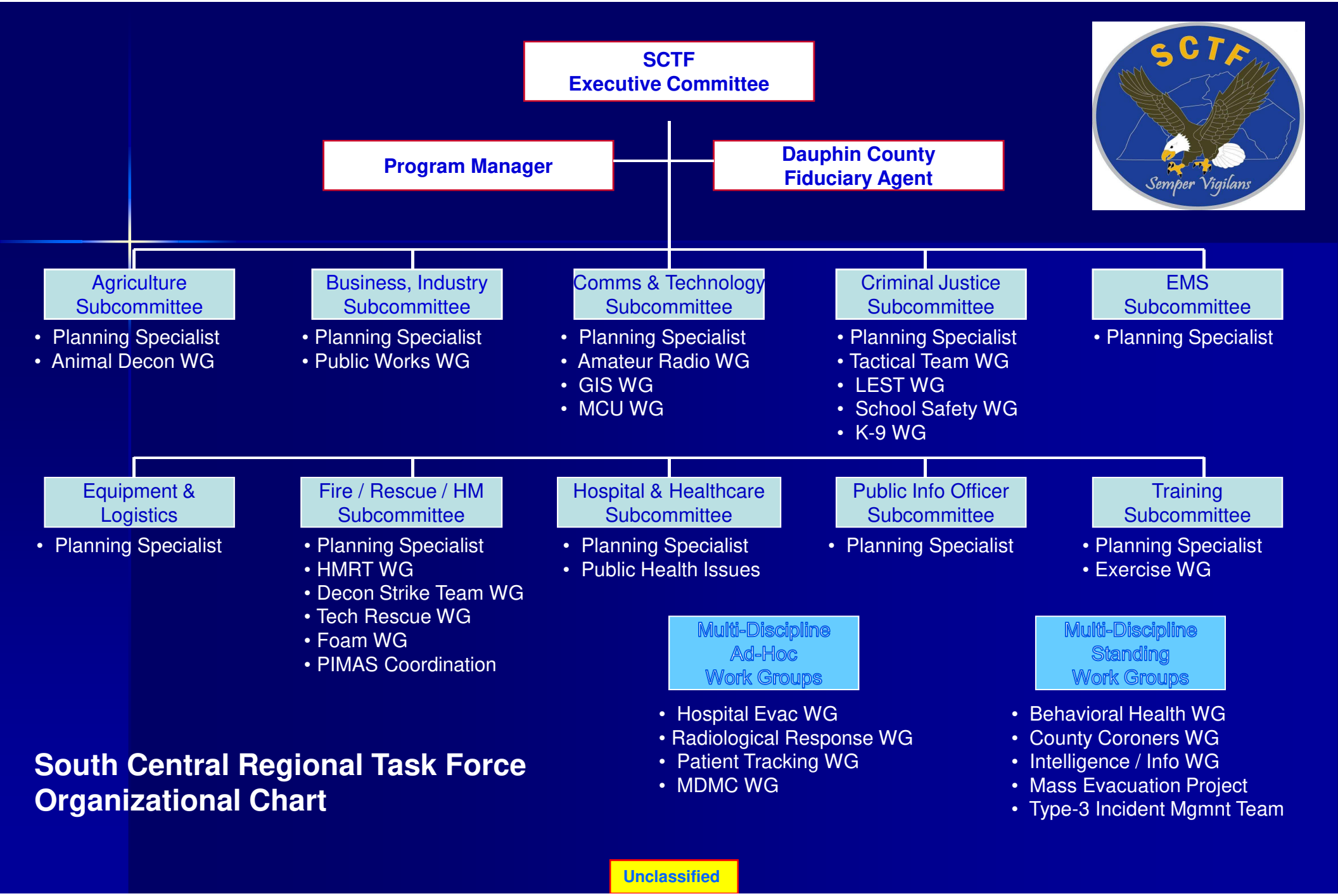
Assist. Regional Admin.	Lou Chiarella lou.chiarella@noaa.gov	978-281-9277
Field Office Supervisor	Chris Boelke christopher.boelke@noaa.gov	978-281-9131
Regional EFH Coordinator/ Sandy Hook NJ Field Office – NJ	Karen Greene karen.greene@noaa.gov	732-872-3023
Sandy Hook NJ Field Office NY	Melissa Alvarez melissa.alvarez@noaa.gov	732-872-3116
Annapolis Field Office PA, DE and MD Eastern Shore	Michelle Magliocca michelle.magliocca@noaa.gov	410-573-4559
Annapolis Field Office MD and Susquehanna Basin	Kristy Beard kristy.beard@noaa.gov	410-573-4542
Gloucester Point, VA Field Office VA	David O'Brien david.l.o'brien@noaa.gov	804-684-7828

EPA Region 3 Inland Area Committee Meeting

South Central Task Force

Gregory G. Noll, CSP, CEM
SCTF Program Manager

PA Regional Task Forces


SCTF
Executive Committee
Program Manager
Dauphin County
Fiduciary Agent
Agriculture Subcommittee
• Planning Specialist
• Animal Decon WG
Business, Industry Subcommittee
• Planning Specialist
• Public Works WG
Comms & Technology Subcommittee
• Planning Specialist
• Amateur Radio WG
• GIS WG
• MCU WG
Criminal Justice Subcommittee
• Planning Specialist
• Tactical Team WG
• LEST WG
• School Safety WG
• K-9 WG
EMS Subcommittee
• Planning Specialist
Equipment & Logistics
• Planning Specialist
Fire / Rescue / HM Subcommittee
• Planning Specialist
• HMRT WG
• Decon Strike Team WG
• Tech Rescue WG
• Foam WG
• PIMAS Coordination
Hospital & Healthcare Subcommittee
• Planning Specialist
• Public Health Issues
Public Info Officer Subcommittee
• Planning Specialist
Training Subcommittee
• Planning Specialist
• Exercise WG
Multi-Discipline Ad-Hoc Work Groups
• Hospital Evac WG
• Radiological Response WG
• Patient Tracking WG
• MDMC WG
Multi-Discipline Standing Work Groups
• Behavioral Health WG
• County Coroners WG
• Intelligence / Info WG
• Mass Evacuation Project
• Type-3 Incident Mgmnt Team
South Central Regional Task Force
Organizational Chart
Unclassified

SCTF Strategic Planning Assumptions

- Any regional response must build upon the elements of mutual aid used on a daily basis
- Where possible, all equipment purchased through SCTF will have a "dual use" capability
- Local response agencies will be "on their own" for the initial 24 hours before state resources and up to 96 hours before federal resources will arrive
- SCTF decisions are based upon "regional" needs and perspectives vs. "local" perspective

Unclassified

SCTF Concept of Operations

Incident Occurs	24 Hours	48 Hours	72 Hours	96 Hours

Local — South Central Task Force

Commonwealth of PA

Federal Govt.

DPC ENTERPRISES, FESTUS
(August 14, 2002)

Unclassified

SCTF Flammable Liquid Risks

- Flammable liquid distribution facilities
- Petroleum liquid pipelines
- High Hazard Flammable Trains (HHFT)
  - Crude Oil
  - Ethanol

Unclassified

SCTF Foam Resources

- County-Based Foam Task Forces
  - Lancaster County
  - Cumberland County
  - Lebanon County
- Industrial-based mutual aid from Petroleum Products Corporation (PPC)
- High Hazard Firefighting Contractors and Foam Suppliers facilitated by the Responsible Party

Unclassified

SCTF Spill Resources

- County-Based HMRT's - Cumberland, Dauphin, Lancaster, Lebanon, York
  - Certified in accordance with PA Act 165
  - Either EMA-affiliated or volunteer-based organizations
  - Region-based Type-1 capability, with majority at a Type-2 capability
  - Standardized SOG's facilitated through SCTF HMRT WG
  - Minimal marine-based spill capabilities; future training focus

Unclassified

SCTF Planning & Training

- Regional planning template being developed by Lancaster County EMA
- Fast-water booming course for PA Central Region
- Develop Awareness-level training module to be presented at local / department level
- TRANSCAER exercises
- Support regional deliveries of PSFA Foam Course
- Evaluate 1-2 day workshop on Energy Infrastructure and ER Issues

Unclassified

SCTF Lessons Learned

Random Thoughts

- *Remember*: Almost everyone you will meet is having a bad day….
  - Be nice
  - Be helpful
  - Solve problems
  - Go home safe

IMBIBITIVE TECHNOLOGIES CORPORATION

"Re-Defining Environmental Solutions"

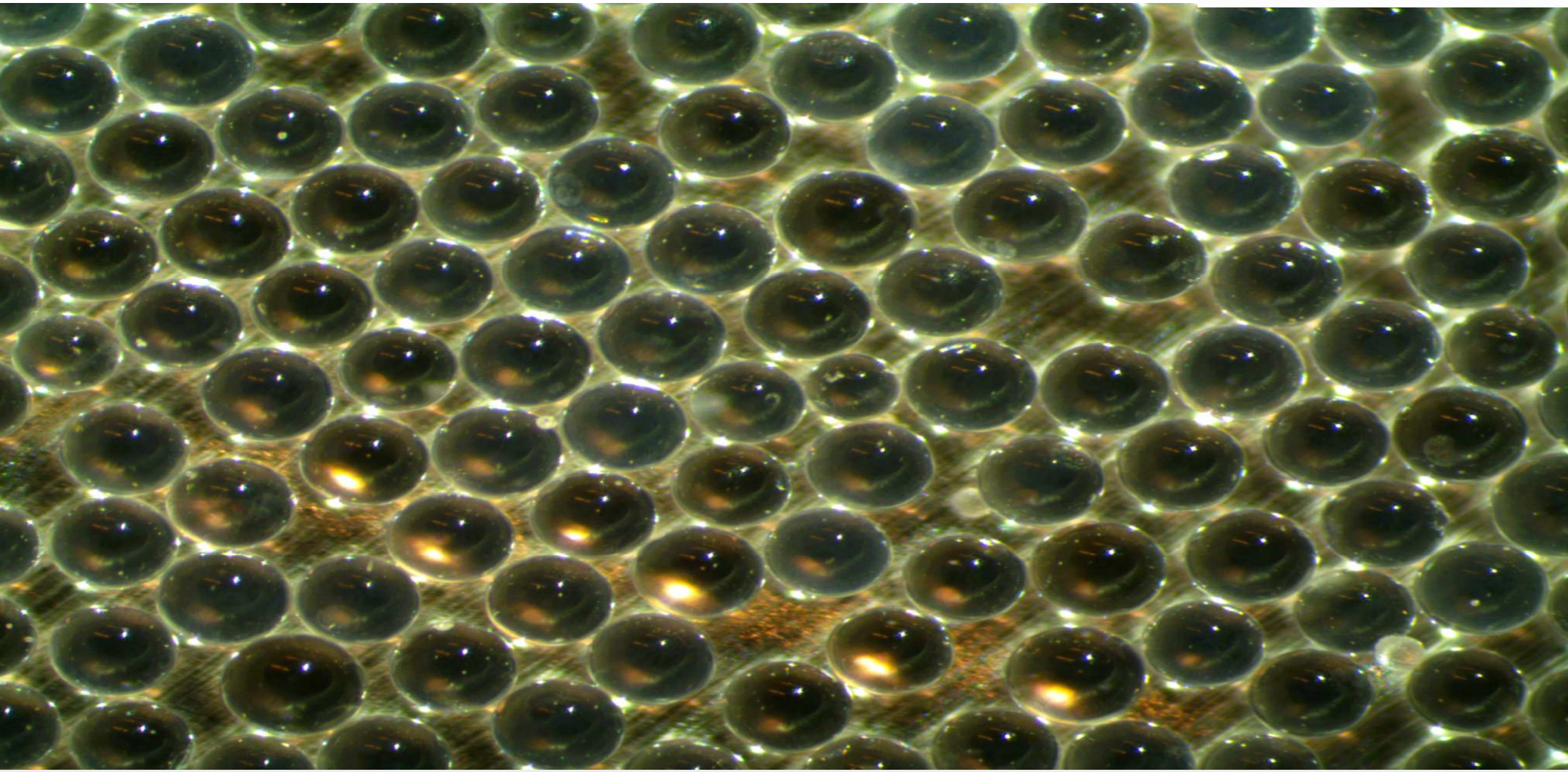
Fast Attack Spill Response For Diluted Bitumen & Bakken Shale Oil

www.ImbiberBeads.com

Imbiber Beads®

Who We Are

Imbiber Beads®



Spill Response **Prevention** **Filtration** **Custom**

Specialty aBsorbent manufacturer who globally advances
Environmental Protection, Recovery & Sustainability
through development of Innovative Products & Technologies.

Imbibitive Manufacturing (IMBICOR) - Maumelle, AR

Imbibitive Research - Midland, MI

One-Pot Mix

US DEA Container Program

Battle Jacket®

UK Highways Agency
Transport Research Laboratory

MOTORWAY MAINTENANCE
3 YEAR – IMBIBER BEADS® #1

HIGHWAYS AGENCY

Safe roads, reliable journeys, informed travellers

QEW & HWY 406 Accident

May 9th, 2013 – 4am to 12midnight (22 hrs.)

- ★Diesel Fuel Road Repairs = $1.25 million/mile
- ★OECD Commercial Cost (Toronto) = $3.3 B/year.
- ★Spill Clean-up – 14 hrs to 6 hrs = $3 M Savings.

Absorbent or Adsorbent?

★It is the vapors that we inhale that are toxic.

★It is the vapors that support combustion.

★Dermal & Respiratory exposure.

★Incidents of Alzheimer's & Dementia increasing.

HOW **ADSORBENTS** WORK

Liquids coat surfaces and fill interstitial spaces.

Can **only** hold up to 1x their own volume.

Like a sponge, gravitational pull and compression lead to secondary contamination of personnel and the environment.

ASTM International Performance Standards

Sorbent

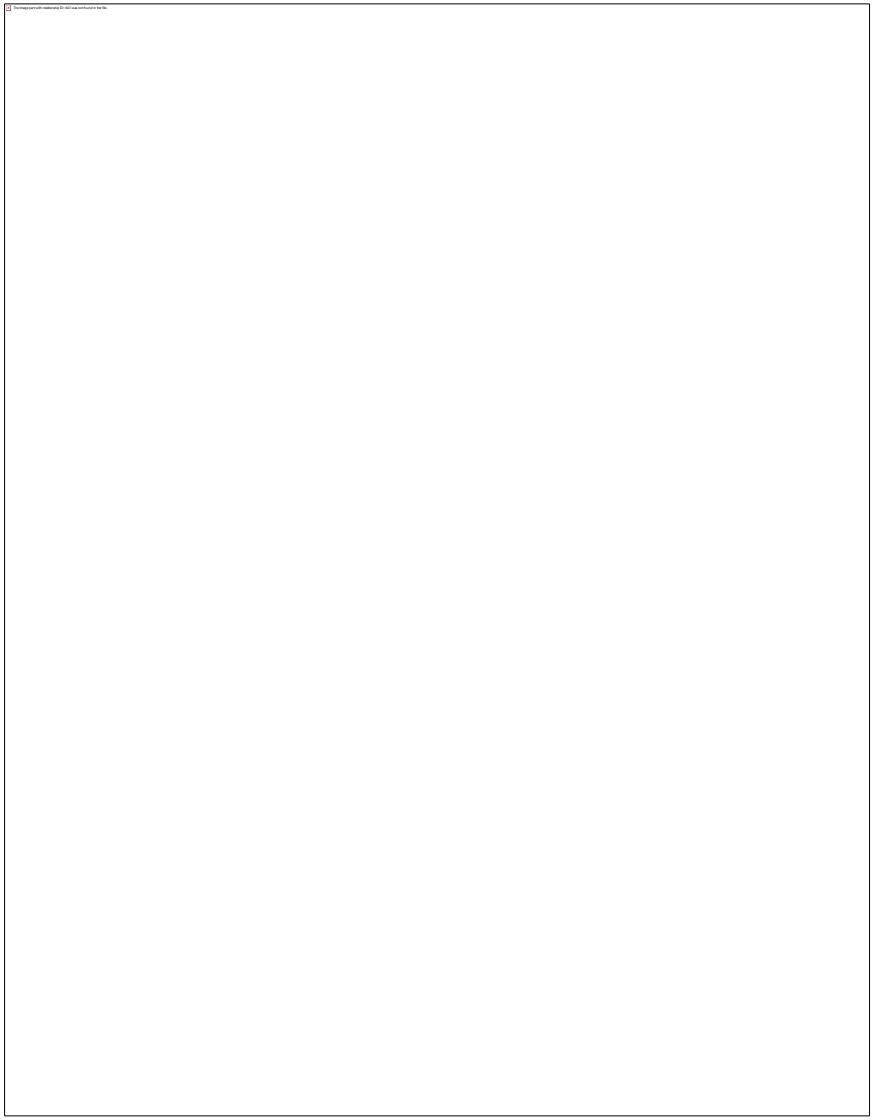
"An insoluble material or mixture of materials used to recover liquids through the mechanisms of aBsorption or aDsorption or both."

aDsorbent

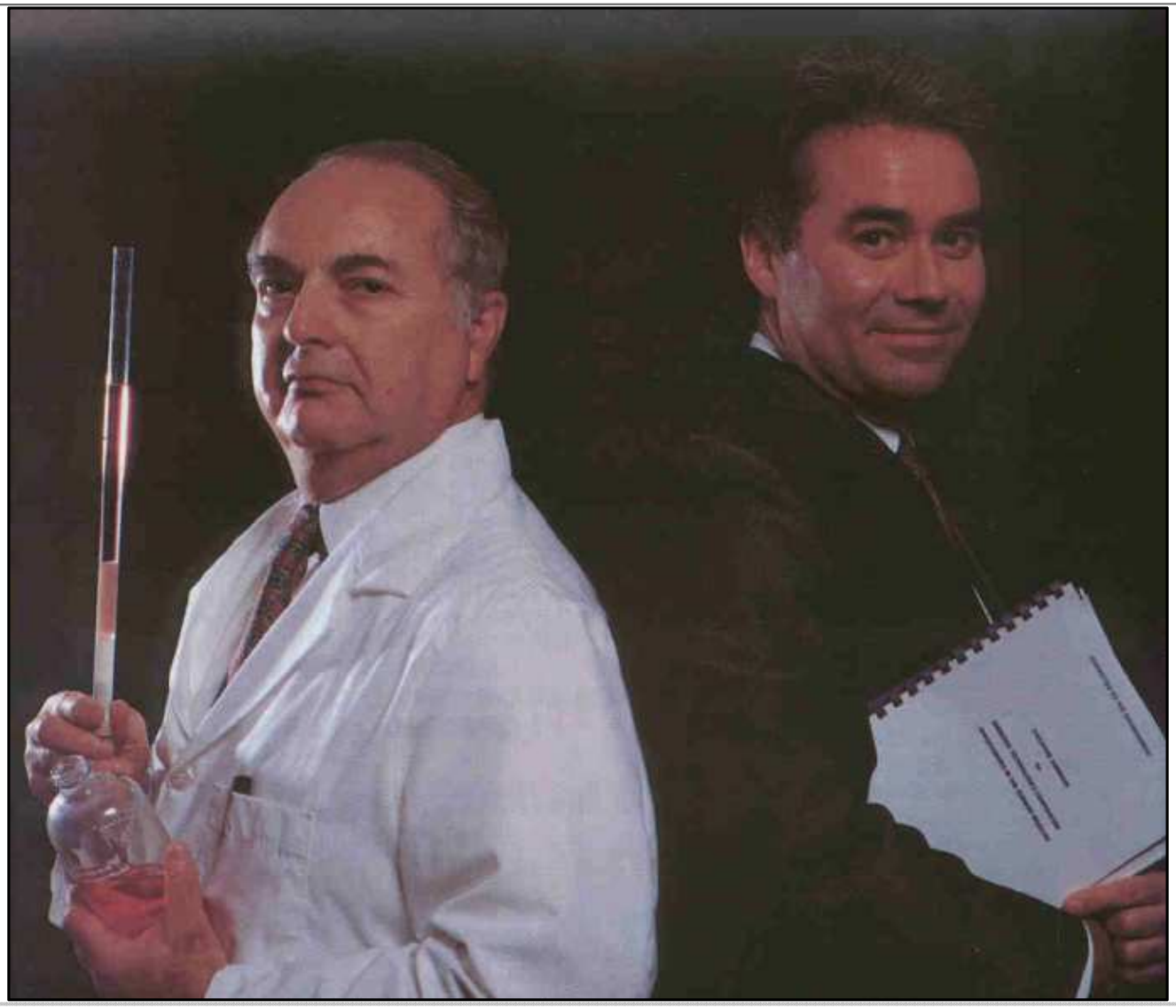
"An insoluble material that is coated by a liquid on it's surface including pores and capillaries without the solid swelling more than 50% in excess liquid."

aBsorbent

"A material that picks up and retains a liquid distributed throughout it's molecular structure causing the solid to swell (50% or more). The aBsorbent is at least 70% insoluble in excess fluid."



“Separating Things From Stuff”



Expansive Imbibition for Practical Pollution Particulation
1970-2014

WHAT ARE **IMBIBER BEADS®**?

The world's ***only*** **S**uper **A**bsorbent **P**olymer engineered for organic compounds. **IMBIBER BEADS®** bridge the gap between ineffective/outdated spill response products, increasing environmental regulations and booming energy production.

Basic Properties

- **Liquids diffuse into IMBIBER BEADS®**
- **Elimination of liquid phase**
- **Swelling = volume capacity vs. weight**
- Swelling = integration of 2 materials
- Elimination of secondary contamination personnel & environment
- Wicking Agent blended into value-add products = enhanced migration and even distribution without agitation or stirring

Representative List of Compatible Organic Liquids

Crude Oil - Louisiana Sweet, West Texas, Alyeska North Slope, Diluted Bitumen, Bakken Shale Oil

Transportation Fluids - Gasoline, JP4, JP5, JP8, Jet-A, Jet A-!, No 1, 2, 3 Fuel Oil

Chlorinated Solvents - Trichloroethylene, PCBs, Perchloroethane, Carbon Tetrachloride, Trichlorobenzene

Aromatic Solvents - Benzene, Toluene, Ethylbenzene, Xylene, Styrene, Cumene, Methylnaphthalene

Polar Compounds - Vinyl Acetate, Methylisobutylketone, Tetrahydrofuran, Methylmethacrylate, Ethyl Acrylate

Exxon Valdez

- March 1989 - Exxon Valdez Oil Spill
- Oil Spill Recovery (approx 10%)
- Exxon Valdez - 6% of 11 Million Gallons
- March 1990 - US OTA Report
- Oil Spill - 6 square miles in 12 hours
- Oil Pollution Act of 1990

ITOPF Report (IOSC - 2003)

"An active response is therefore often adopted even when technical opinion is agreed that it **is unlikely to have a significant benefit**. *This is usually due to the fact that oil spilled on the surface of the sea spreads rapidly, thereby extending over an area that is* **too great to be countered effectively by available techniques**. *Added to this are the limitations on containment and collection systems imposed by winds, waves and currents and the severely reduced effectiveness of chemical dispersants on high viscosity oils and water-in-oil emulsions (mousse).* **Responding in such circumstances can lead to high cleanup costs for little or no benefit in terms of mitigating the oil's impact on coastlines and sensitive resources".**

BP Macondo Well (DWH) - April 2010

- January 2011 - Oil Spill Commission Report
- 44,000 Personnel - 6,000 Skimmers
- 2 Million Gallons of Dispersant
- DWH - 3% of 200 Million Gallons
- 650 Miles of Coastline Oiled

Historical Outcomes

- **Response Transformed To Clean-Up Operation**
- **Local Economy Impacted**
- **Local Environment Impacted**
- **Industry - Social/Political Implications**

Oil, Fuels & Solvent Spills - The Problem

- Spreads Quickly
- Explosive/Toxic Vapors?
- SOP - evaporate, evacuate or dissipate?
- Colorless? Odors?
- Foams? Clean-up?
- Other considerations - Fuels & Solvents Near Urban Centers?

Lac-Megantic Train Derailment - July 6th, 2013

- Crude Oil Spilled From Ruptured Tanker Cars
- Crude Oil & Diluent Vapors Locate Ignition Source
- 47 Killed - 30 Buildings Destroyed

Relative Cost of Oil Spills

March 1989
Exxon Valdez
11 Million Gallons
@ 6% Recovery = 660k Gallons

Clean-up Operation @ $2.5 Billion/ 660k = $3,780 Per Gallon

Total Damages Estimated at $7 Billion

April 2010
Deep Water Horizon
200 Million Gallons
@ 3% Recovery = 6M Gallons

Clean-up Operation @ $7 Billion/ 6M = $3,500 Per Gallon

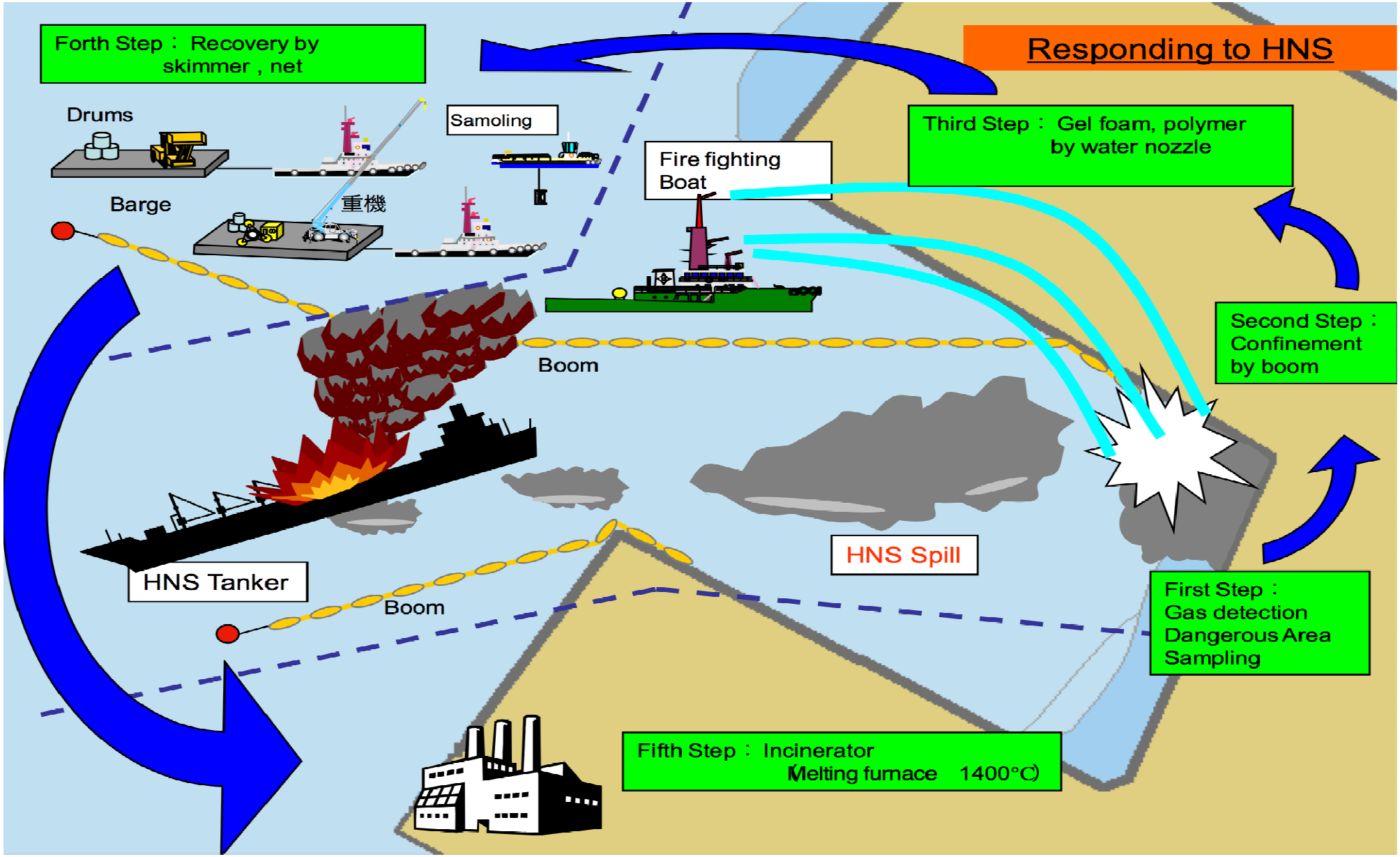
Total Damages Estimated at $26+ Billion

The Need For Innovative Thinking

In 25+ years why hasn't spill recovery improved?

OPA '90 performance criteria?

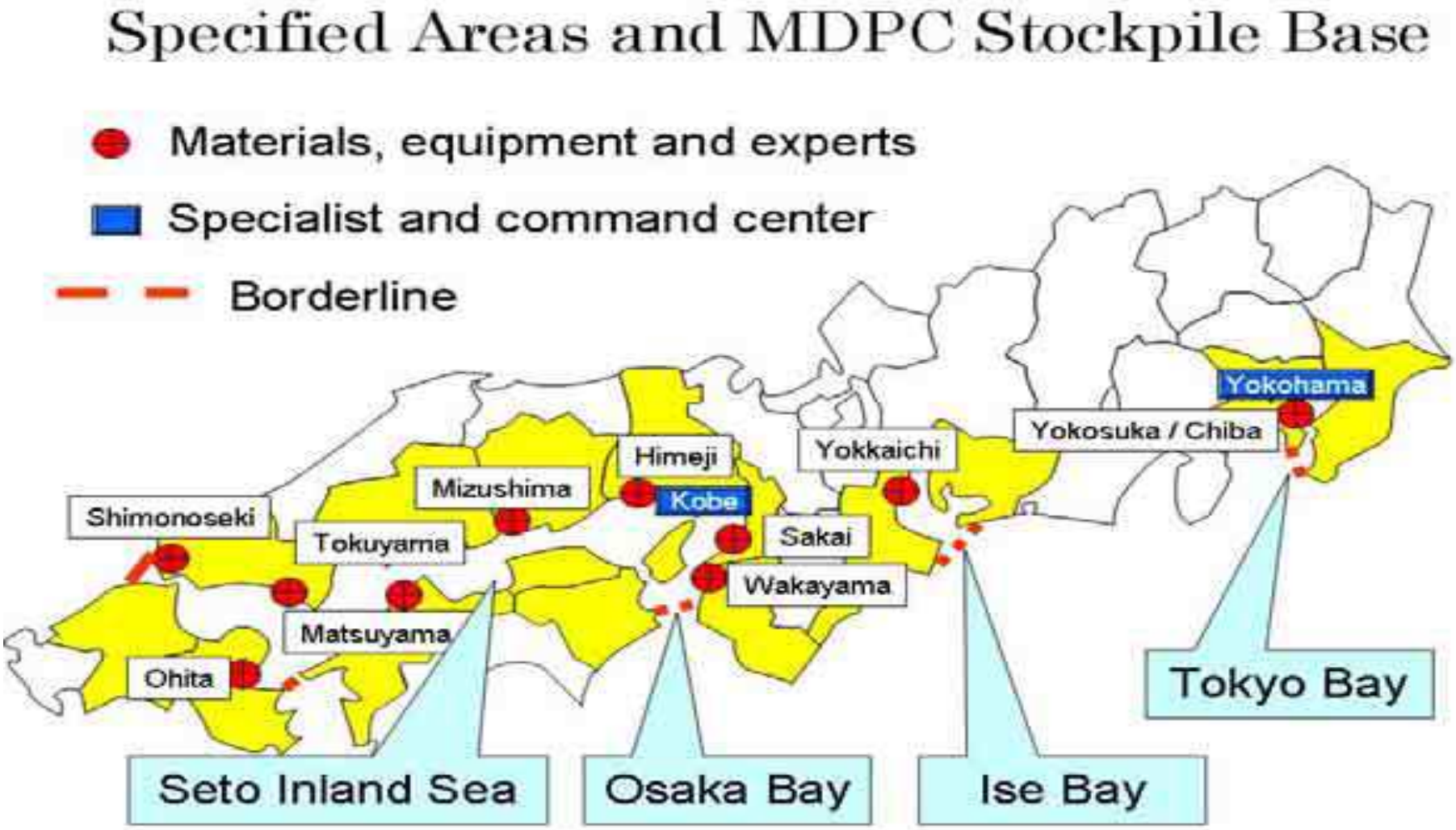
The Model - MDPC Japan 2001-2007



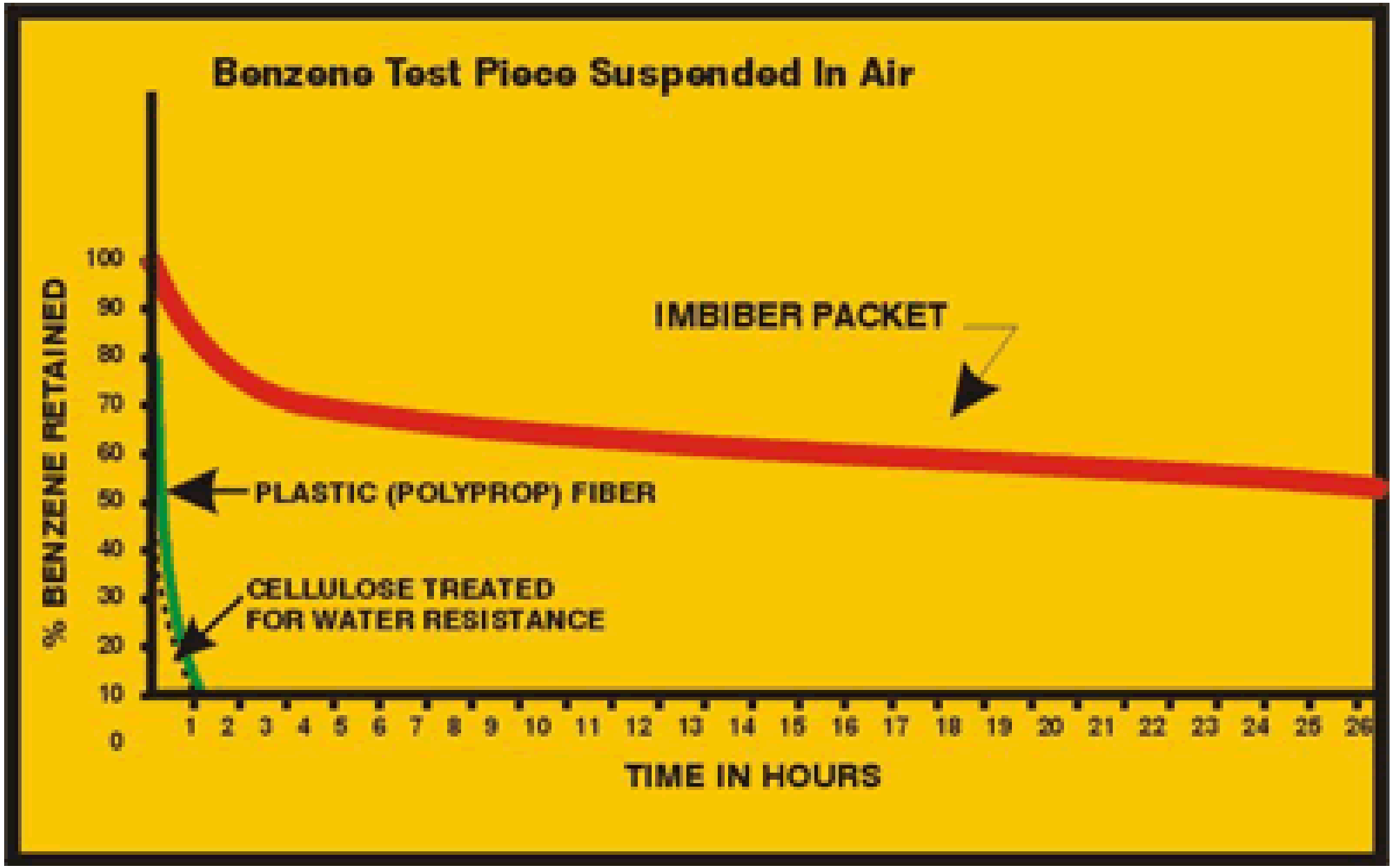
IMBIBER BEADS® - Vapor Reduction

Rank #	Chemical Name	Initial Concentration PPM	Time Immediate PPM	Time 5 min PPM	Time 10 min PPM	Time 20 min PPM	Time 30 min PPM	Initial % Change	Final % Change
1	Xylene	700	50	50	50	<50	<50	93%	>93%
2	Benzene	12,000	1300	960	780	600	540	89%	96%
3	Styrene monomer	550	55	<55	<55	<55	<55	90%	>90%
5	Toluene	4100	480	360	360	300	300	88%	93%
6	Cyclohexane	13,000	590	260	220	200	200	95%	98%
12	Methyl methacrylate	3700	600	400	400	340	340	84%	91%
15	Vinyl acetate mon.	18,000	1700	910	780	520	390	91%	98%
16	Propyl benzene	LEL % - 2.0	LEL % - < 0.5	LEL % - < 0.5	LEL % - < 0.5	LEL % - < 0.5	LEL % - < 0.5		
21	Butyl acrylate	390	<65	<65	<65	<65	<65	83%	>83%
22	Ethyl acetate	20,000	1100	770	440	330	<110	95%	>99%
23	Normal hexane	11,000	1200	660	500	390	330	89%	97%
24	1-Octane	LEL % - 24.0	LEL % - 2.5	LEL % - 2.0	LEL % - 2.0	LEL % - 2.0	LEL % - 2.0		
25	Decane	LEL % - < 0.5	LEL % - < 0.5	LEL % - < 0.5	LEL % - < 0.5	LEL % - < 0.5	LEL % - < 0.5		
26	Alkyl benzene	LEL % - 1.5	LEL % - < 0.5	LEL % - < 0.5	LEL % - < 0.5	LEL % - < 0.5	LEL % - < 0.5		
34	Diisopropyl benzene	LEL % - 1.0	LEL % - < 0.5	LEL % - < 0.5	LEL % - < 0.5	LEL % - < 0.5	LEL % - < 0.5		
35	2 Ethylhexyl acetate	LEL % - < 0.5	LEL % - < 0.5	LEL % - < 0.5	LEL % - < 0.5	LEL % - < 0.5	LEL % - < 0.5		

MDPC HNS Action Plan
2007 – 2009.



Vapor Release (Safety Personnel)



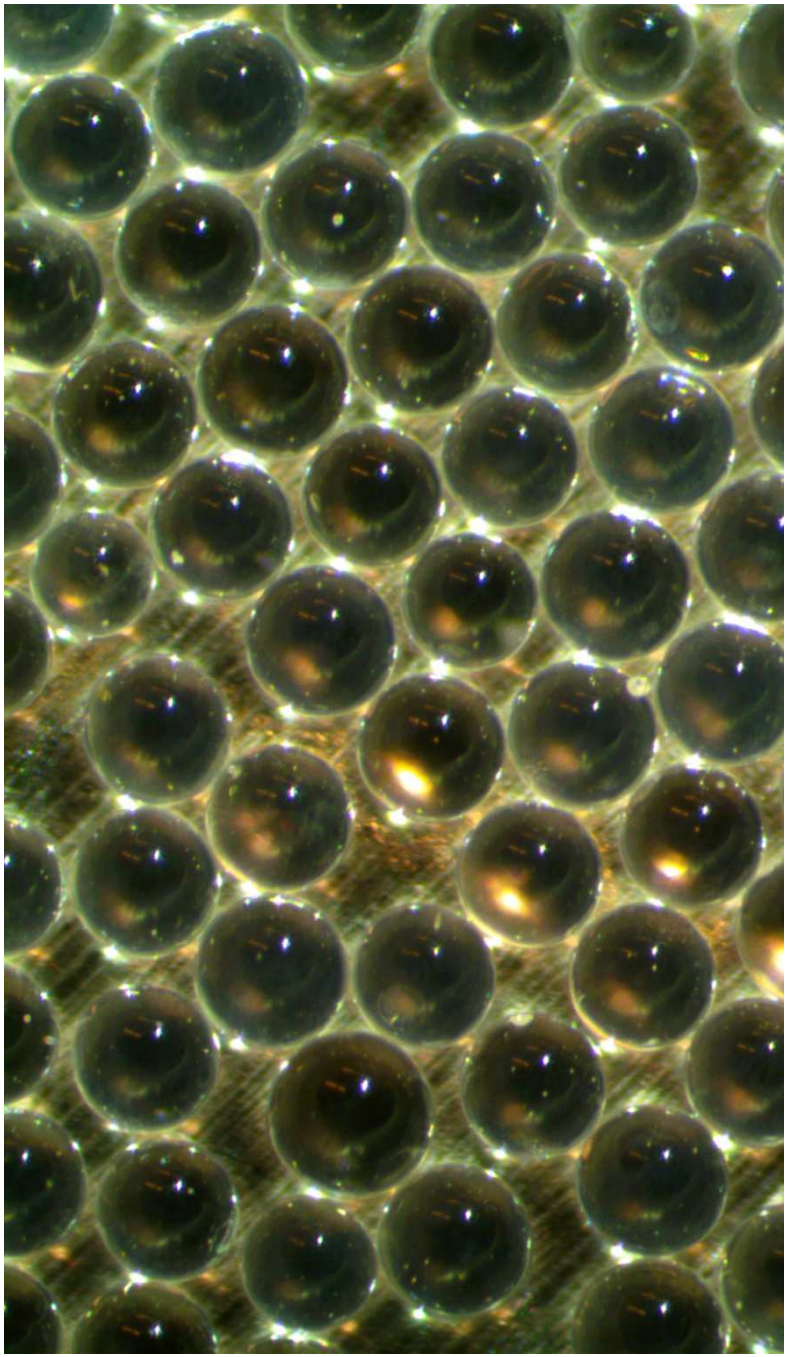
Fast Attack System

High Extension Rapid Oil Spill System (HEROS™)

A multi-component, state of the art, spill recovery system allowing for response operations to mobilize and commence spill cleanup within hours, not days. System features:

- Elimination of liquid phase, transformed into a semi-solid
- Imbibed liquids can no longer coat shorelines, marine life or wildlife
- Drastic reduction of toxic and explosive vapors

HEROS™ IMBIBER BEADS®



- **Super aBsorbent Polymer (oil-sensitive)**
- **Capture & Containment of Organic Liquids**
- **Elimination of Liquid Phase**
- **Imbibed Liquids Will NOT Coat Shorelines, Marine Life or Wildlife**
- **Imbibed Liquids Can Be Retrieved Using Existing Recovery Equipment**
- **Tremendous Thirst - 10 to 15 volume of Oil For Each Volume of IMBIBER BEADS®**

HEROS™ Treat & Skim System

Foam Monitor Delivery System

- Venturi System
- Standard Foam System
- Coloured IMBIBER BEADS® Used For Spray Identification
- IMBICATOR® Discs For Colourless HNS
- Spill Immobilization

HEROS™ Treat & Skim System

HEROS™ Wrap

- Rapid deployment barrier
- 10” x 1000 ft. rolls deployed in minutes
- 1000 ft. rolls = 100 gallons oil adsorption
- 2-ply laminar film with thousands of tiny oleophilic pockets
- Excellent adhesion to water’s surface
- No special equipment

HEROS™ Treat & Skim System

SEA MAT™ Helicopter Delivery

- Empty Wt. - 80 Kg
- Volume Capacity - 800Kg
- Operation - Electro Pneumatic Valve & Air Cylinder
- Material - Aluminum & Teflon Sliding Parts
- Spray Mode Area - 10mm Gap = 15M x 600M at 150’

HEROS™ Treat & Skim System - Recovery

HEROS™ System - UK Trial (Heptane)

Activation Awareness Technology™ AAT™

Industry First • Visual Spill Identifier • Color Changing Technology • Unaffected By Water • Eliminates The Guess Work

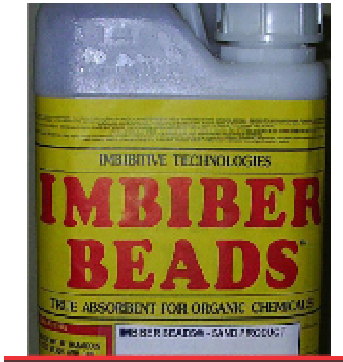
Imbiber Beads® Color Change Response Technology

Packets

Pillows

Blankets

Boom



Sand/Bead

Available - Spill Kits For 26, 52, 131 Gallon Spills


"You must be the change you want to see in the world"
(Mahatma Ghandi,1869 – 1948)
One Company - One Product - Endless Applications
Imbiber Beads®

Modeling Improvised Nuclear Device (IND) Impacts to Tier I UASI Cities: National Capitol Region

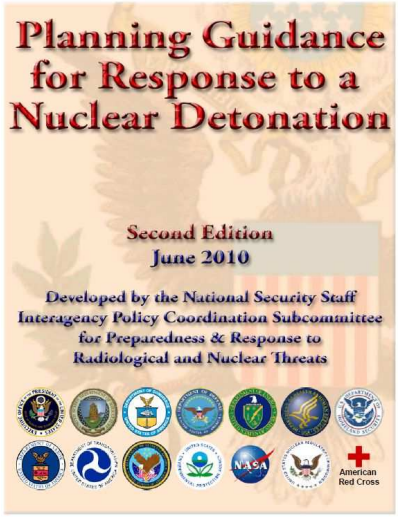
Dick Polley
FEMA Region III
Please send suggestions and corrections to
richard,polley@fema.dhs.gov

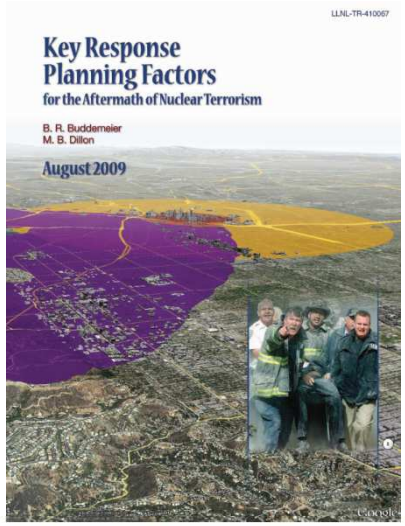
FEMA

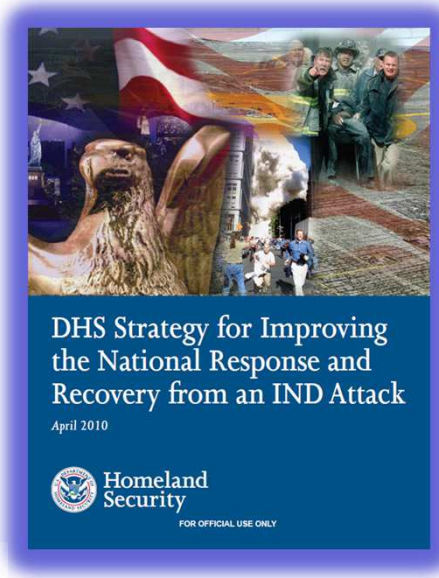
LLNL-PRES-489337

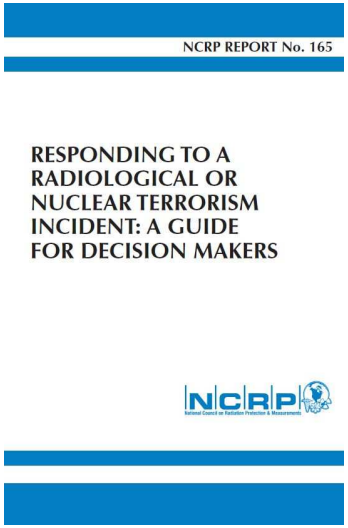
National Nuclear Security Administration

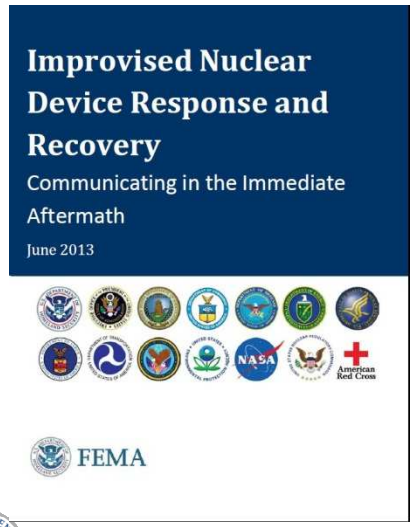
Important References

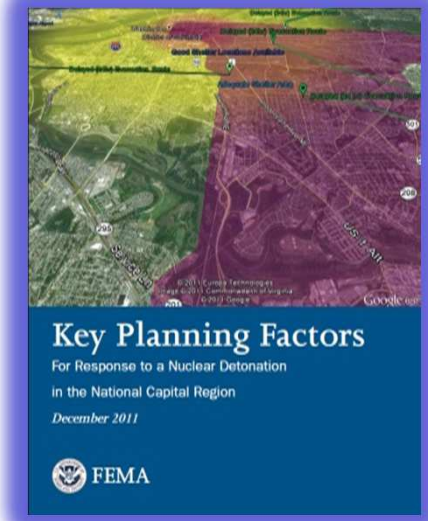


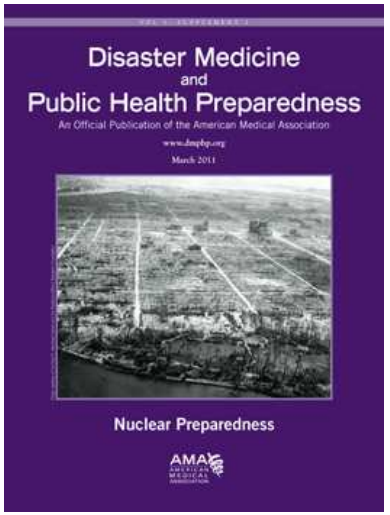








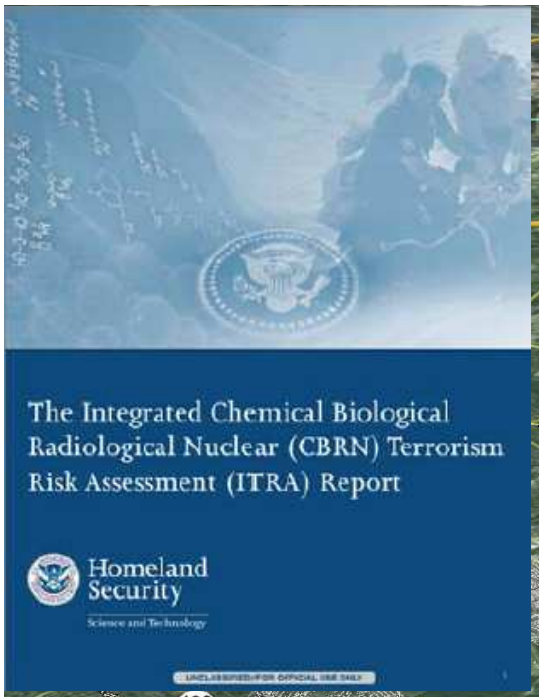




Modeling and Analysis Coordination Working Group (MACWG)

And many more…

Detailed IND Effects Analysis from DHS S&T



Block by Block Assessment of Effects:

- Daytime Population
- Overpressure (psi)
- Thermal Effect (cal/cm^2)
- Prompt Radiation
- Fallout dose and dose rate

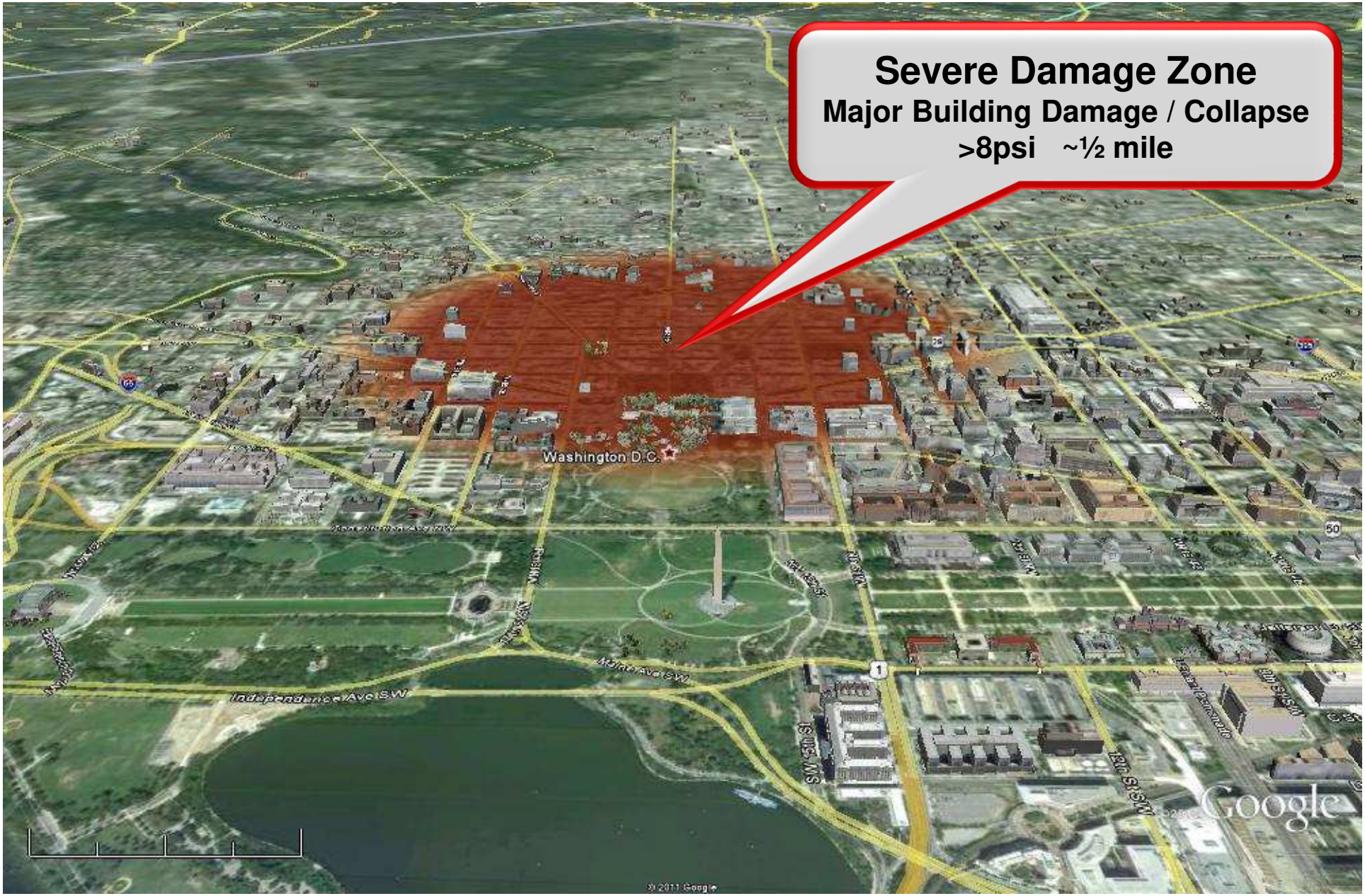
The Light of a Thousand Suns

seen at 1 mile for those with line of sight

- Scenario Presumptions:
  - 10kT Yield (equivalent to 5,000 Oklahoma City Truck Bombs)
  - Ground Level Detonation at 1600 K St. NW
  - Fallout Predicted using Weather from noon on Feb 14, 2009
  - Casualty Numbers Using Daytime Population Estimates

*The follow slides contain **modeling and analysis** and some of our newly developed "first person point of view" **visualization products** requested by State and Locals to help them understand how an IND event unfolds, what key decisions need to be made, and where new plans and policies should to be considered.*

Accidents and Congestion Caused by Flashblindness



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Pipeline and Tunnel Damage with Ground Shock

Lifeline damage/disruption based on scaling surface explosion results:

10 kt: up to 120m

1 kt: up to 55m

Extrapolation Nevada Test Site experience suggests significant subway damage to ranges of:

10 kt: 200-250m

1kt: 90-120 m

T. N Dey and R. J. Bos, Underground Infrastructure Damage for a Chicago Scenario, LA-UR-11-00566

Image From : Hiroyuki KAMEDA, "ENGINEERING MANAGEMENT OF LIFELINE SYSTEMS UNDER EARTHQUAKE RISK," Proceedings of The 12th World Conference Earthquake Engineering, 2000

Los Alamos NATIONAL LABORATORY EST. 1943

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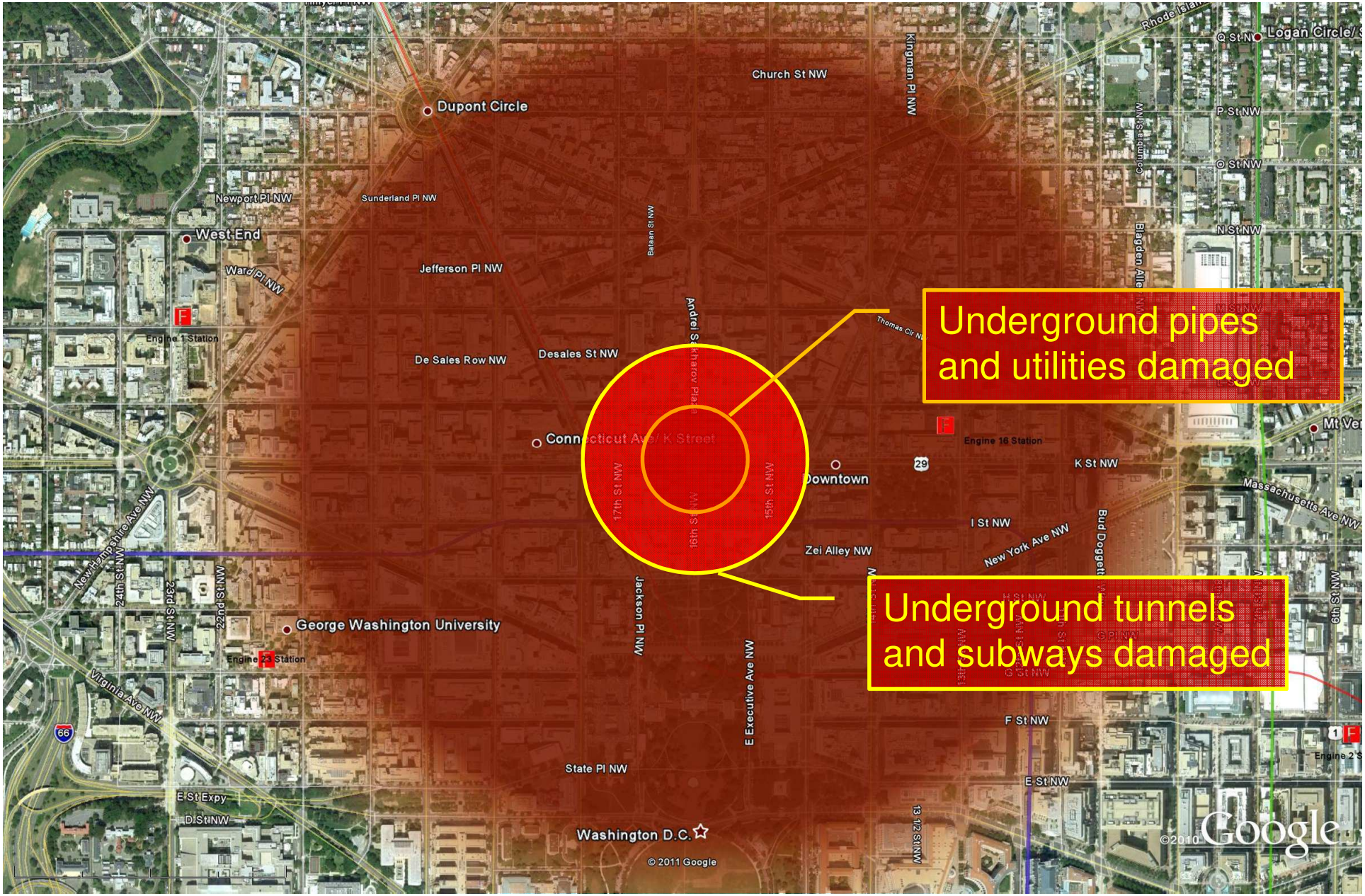

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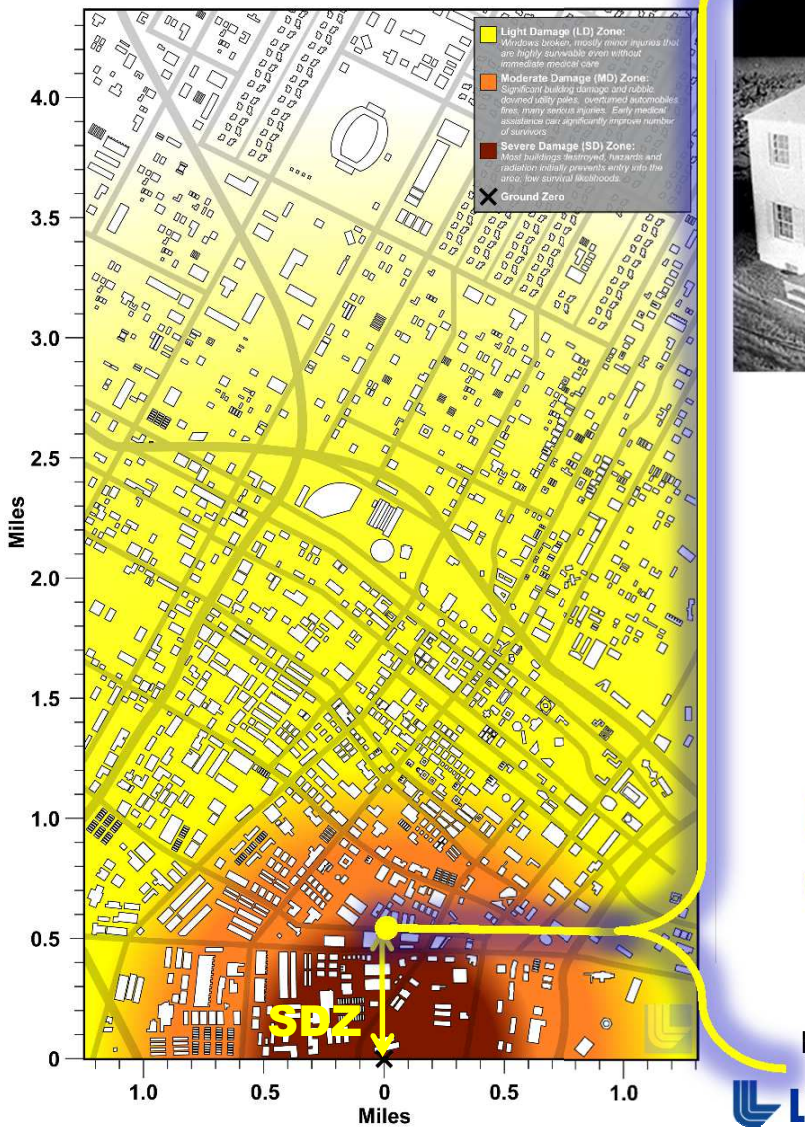
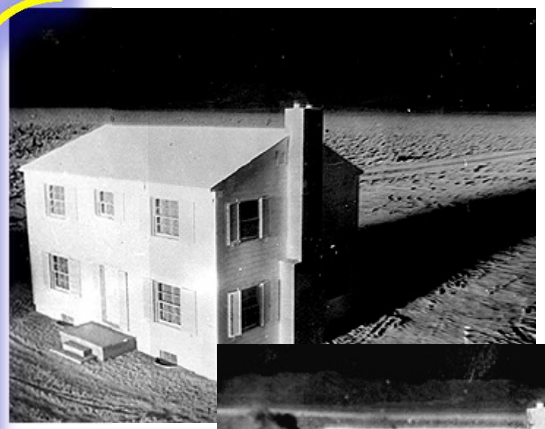
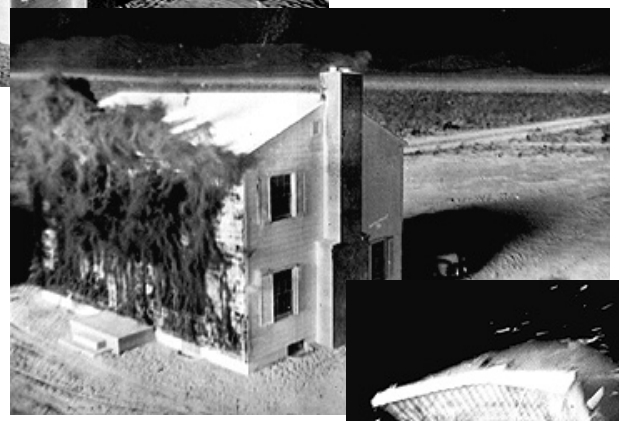
Outer Edge of Severe Damage Zone (SDZ)

~ ½ Mile from 10KT





Nighttime shot, the only light is from the blast



Thermal pulse ignites paint and wood

Pressure wave destroys house

Film and images at 1km (0.6 mile) from ~16kT yields (~ 6 psi)

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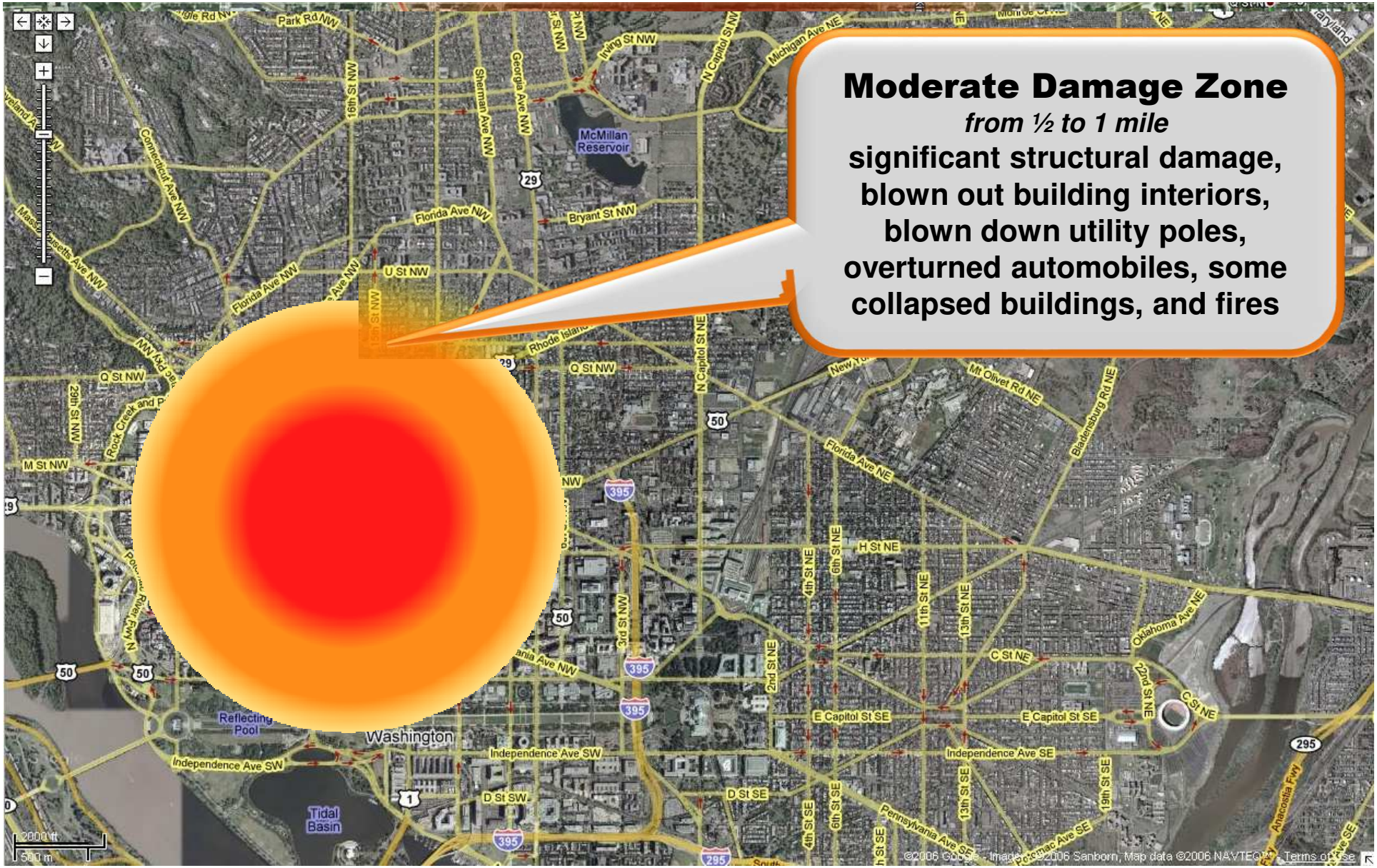
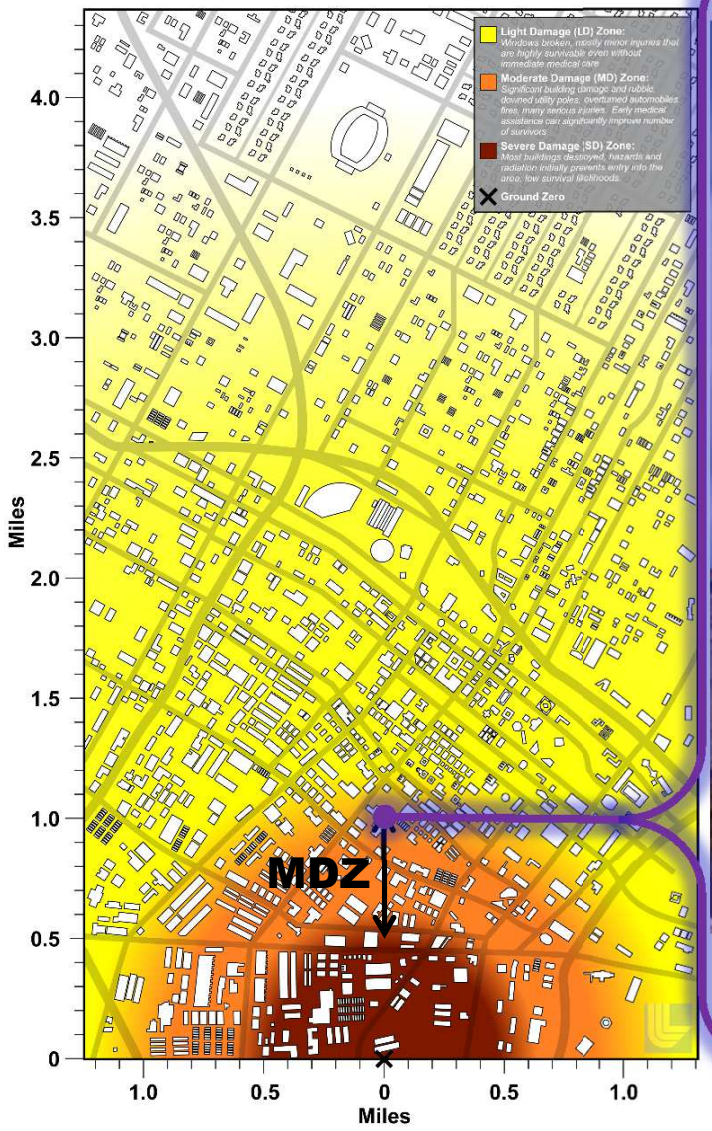
National Nuclear Security Administration

Moderate Damage Zone



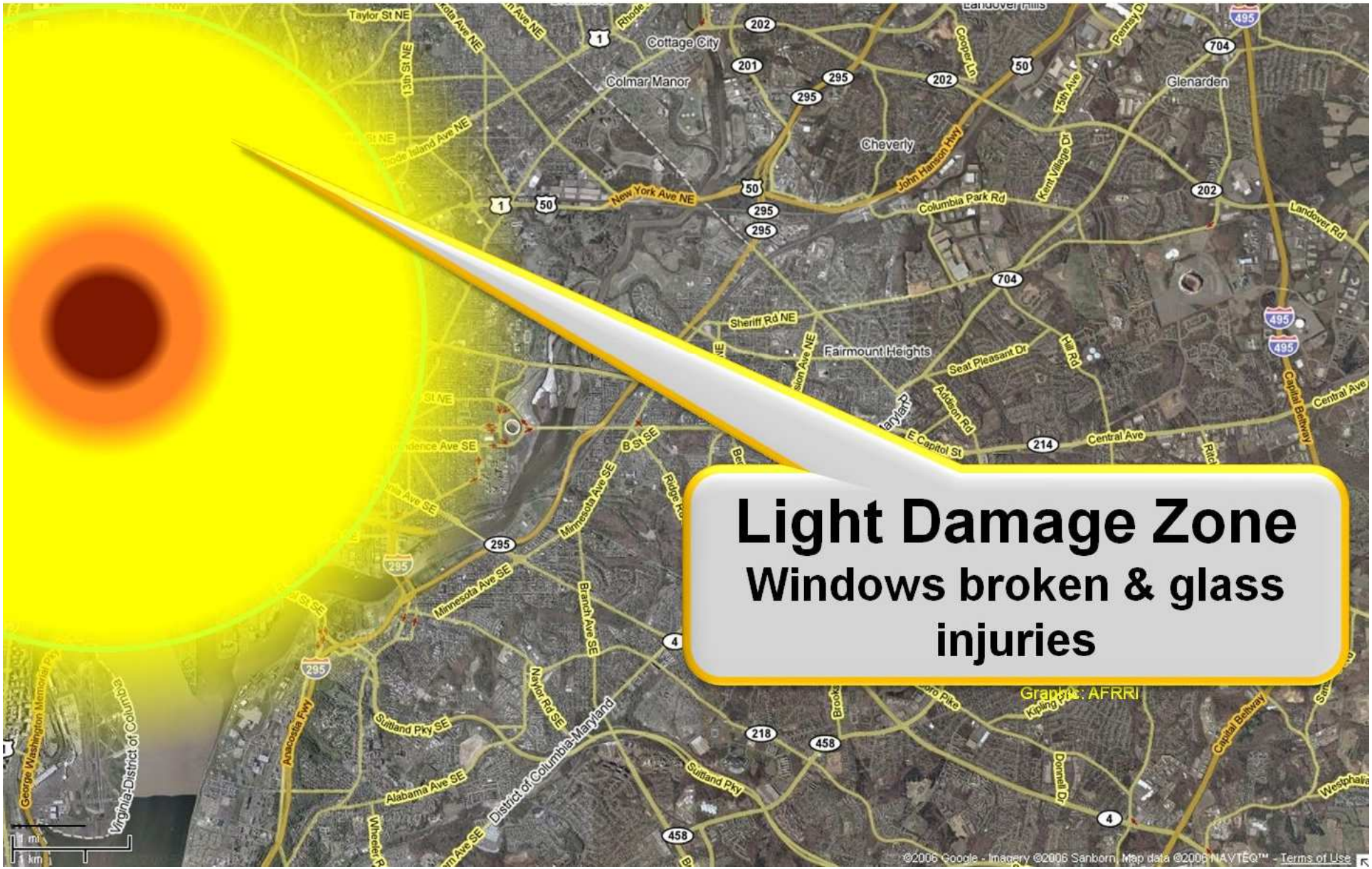
Outer Edge of Moderate Damage Zone

~ 1 Mile from 10KT



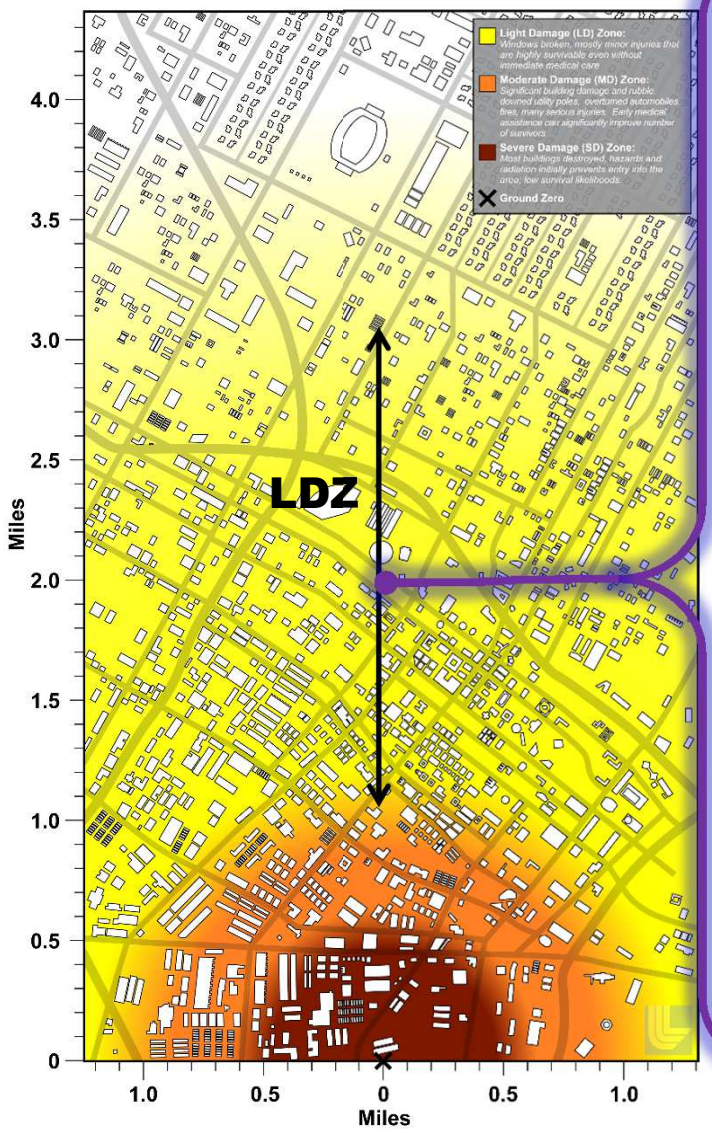
Animation depicts timing and damage from the outer edge (1 mile for 10KT) of MDZ

Light Damage Zone

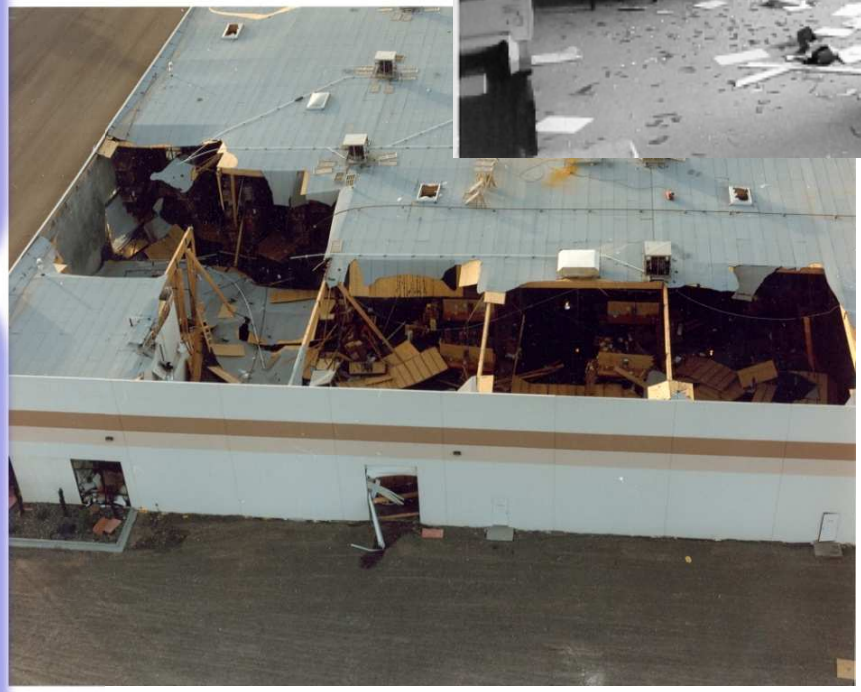


Light Damage Zone (1 to 3 miles)

~ 2 Miles from 10KT



Damage caused by "shockwave" of peak free field overpressure



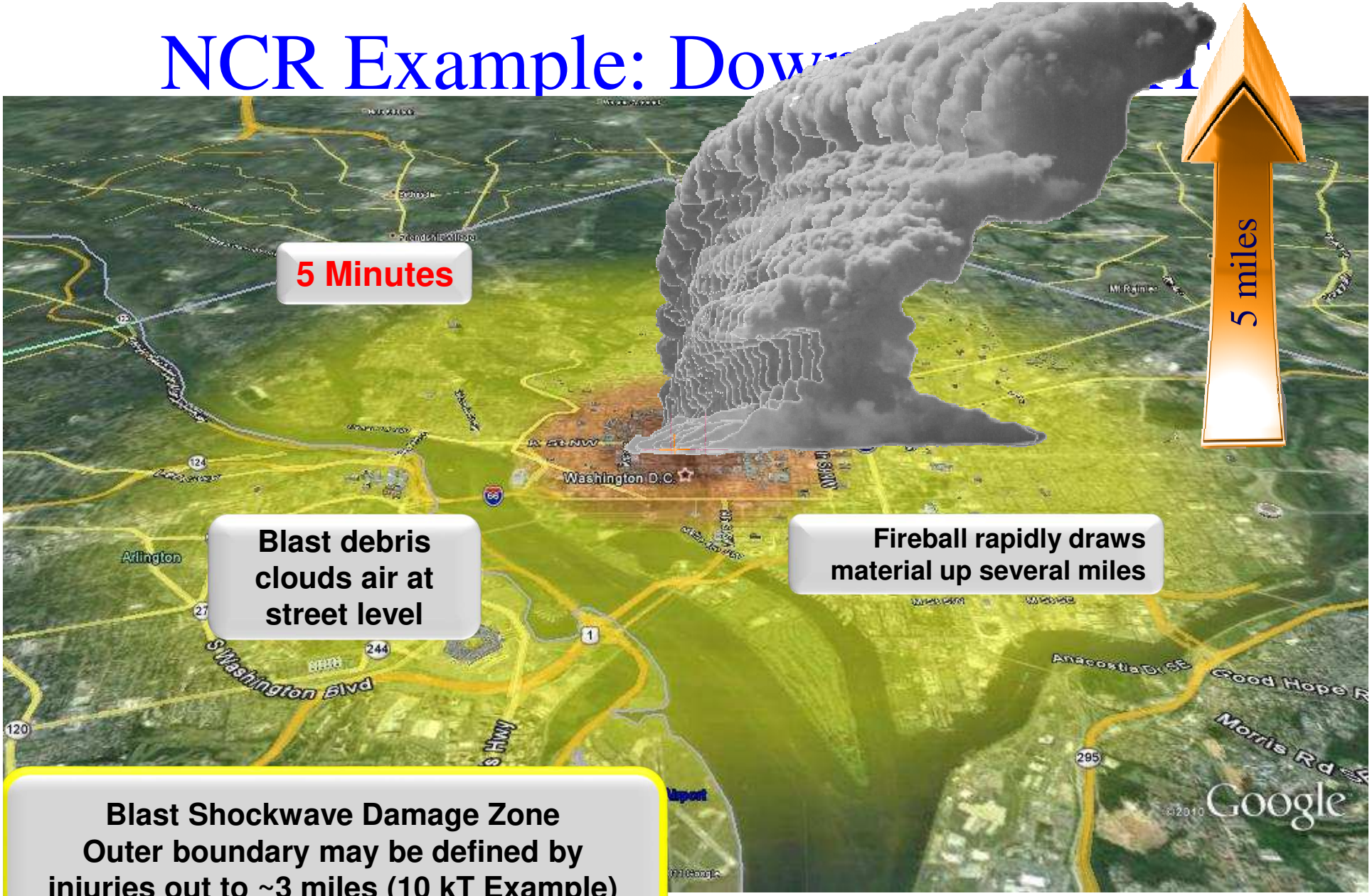
Damage to windows and other large area, weak building features

Images taken at 2.6km (1.5 miles) away from PEPCON (conventional accidental explosion estimated to be equivalent to a 1KT free air burst), estimated overpressure shock was ~ 0.9 psi

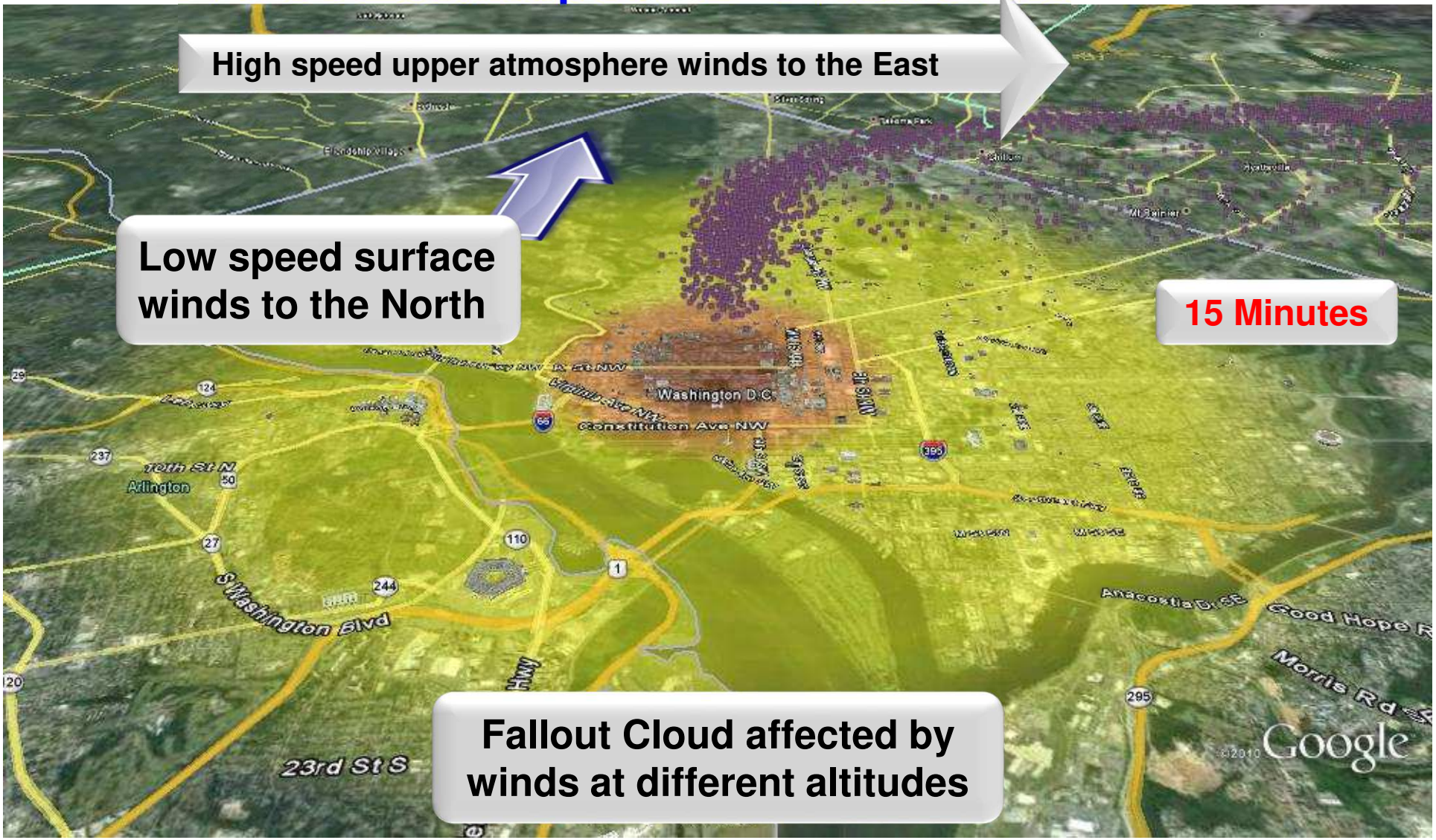
FALLOUT

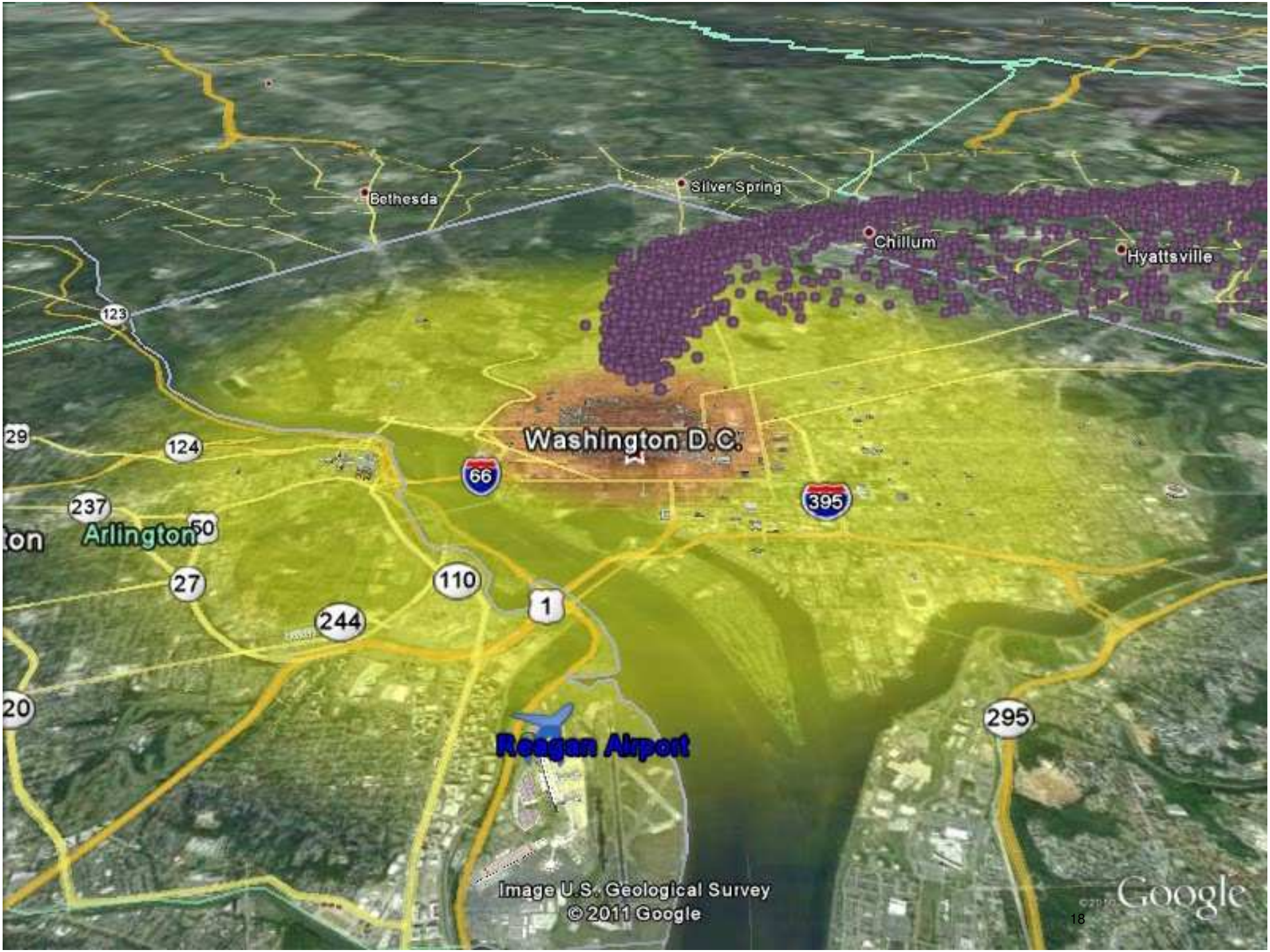
- Fallout is generated when thousands of tons of excavated by the explosion is combined with radioactive fission products and drawn upward by the heat of the event.
- This cloud rapidly climbs through the atmosphere, up to **five miles high for a 10kt**, and highly radioactive particles coalesce and drop back down to earth as they cool.
- Within 10 – 20 miles of the detonation, particles will be the size of table salt or sand as they **fall back to earth contaminating horizontal surfaces**
- These particles give off **penetrating radiation** that can injure people (even inside cars or inadequate shelter)
- **Fallout decays rapidly away with time**, and is most dangerous in the first few hours after the detonation

NCR Example: Dow



NCR Example: Downtown 10kT




Bethesda
Silver Spring
Chillum
Hyattsville
123
Washington D.C.
29
124
66
395
237
Arlington
50
27
110
1
244
20
295
Reagan Airport
Image U.S. Geological Survey
© 2011 Google
Google

Fallout Clouds Drop Contamination

6:00
Hours : Minutes

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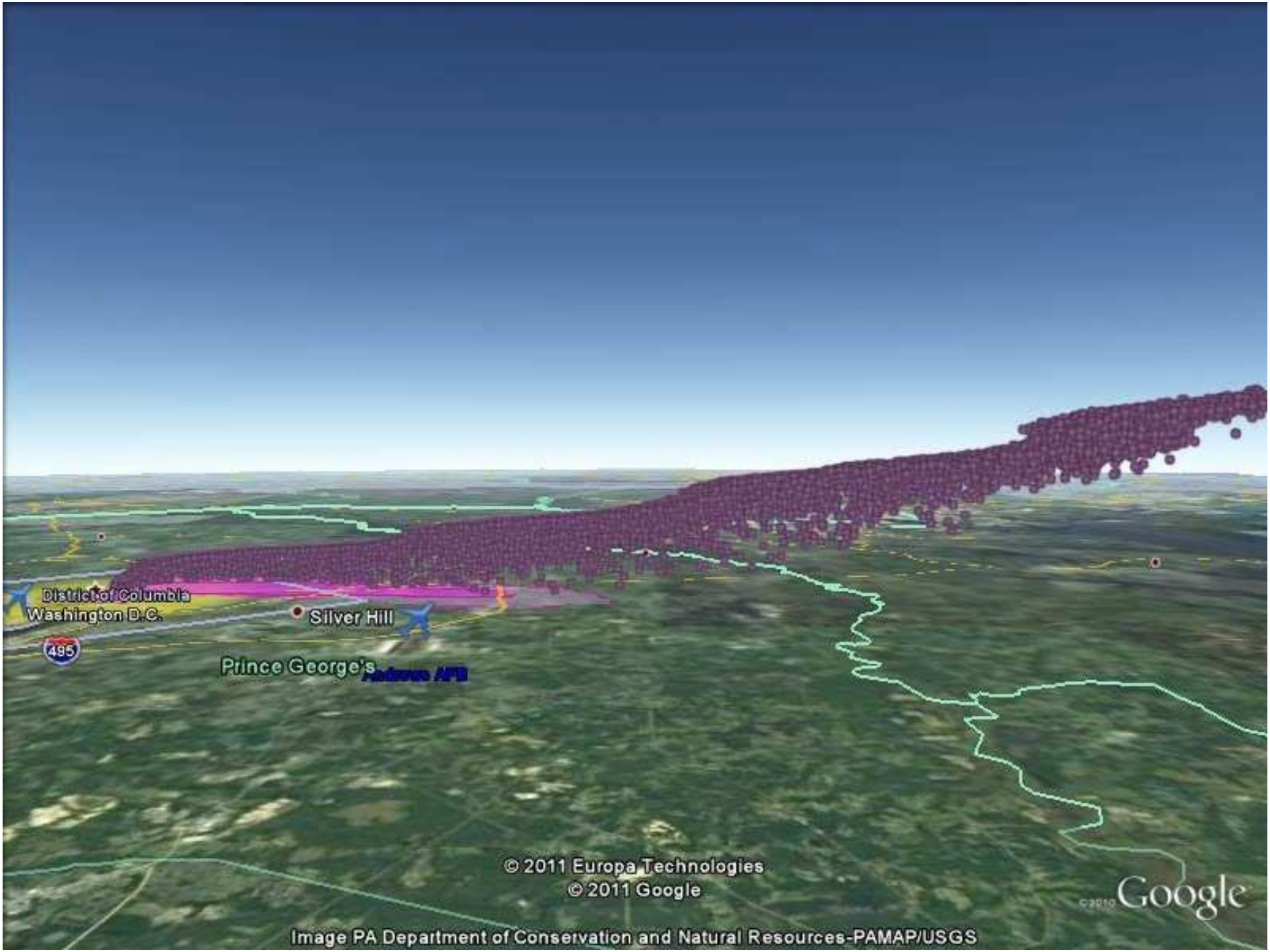
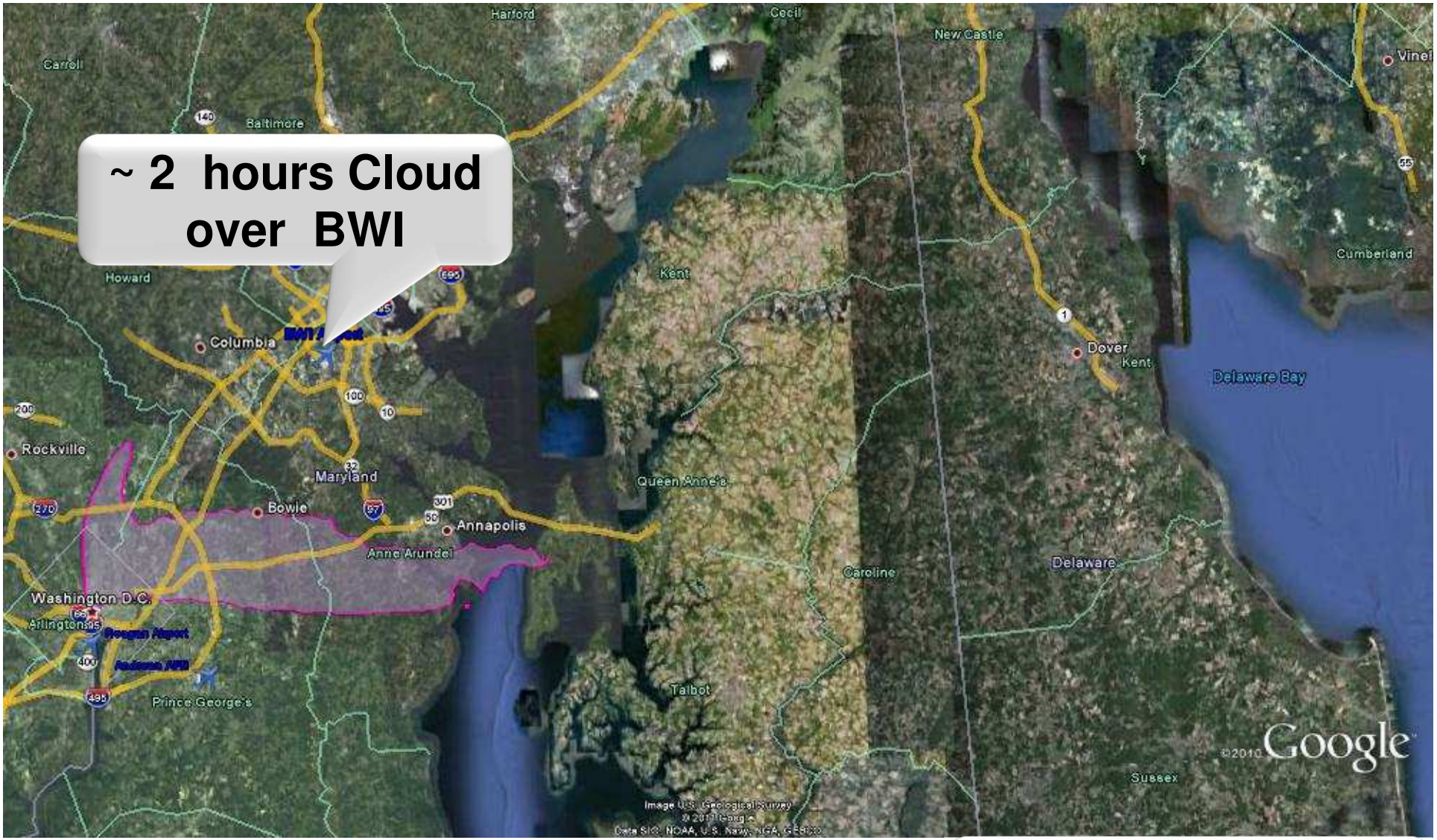

District of Columbia
Washington D.C.
Silver Hill
495
Prince George's
© 2011 Europa Technologies
© 2011 Google
Google
Image PA Department of Conservation and Natural Resources-PAMAP/USGS

Fallout Zone Changes with Time

Day 7



~ 1 hour Cloud Reaches Atlantic

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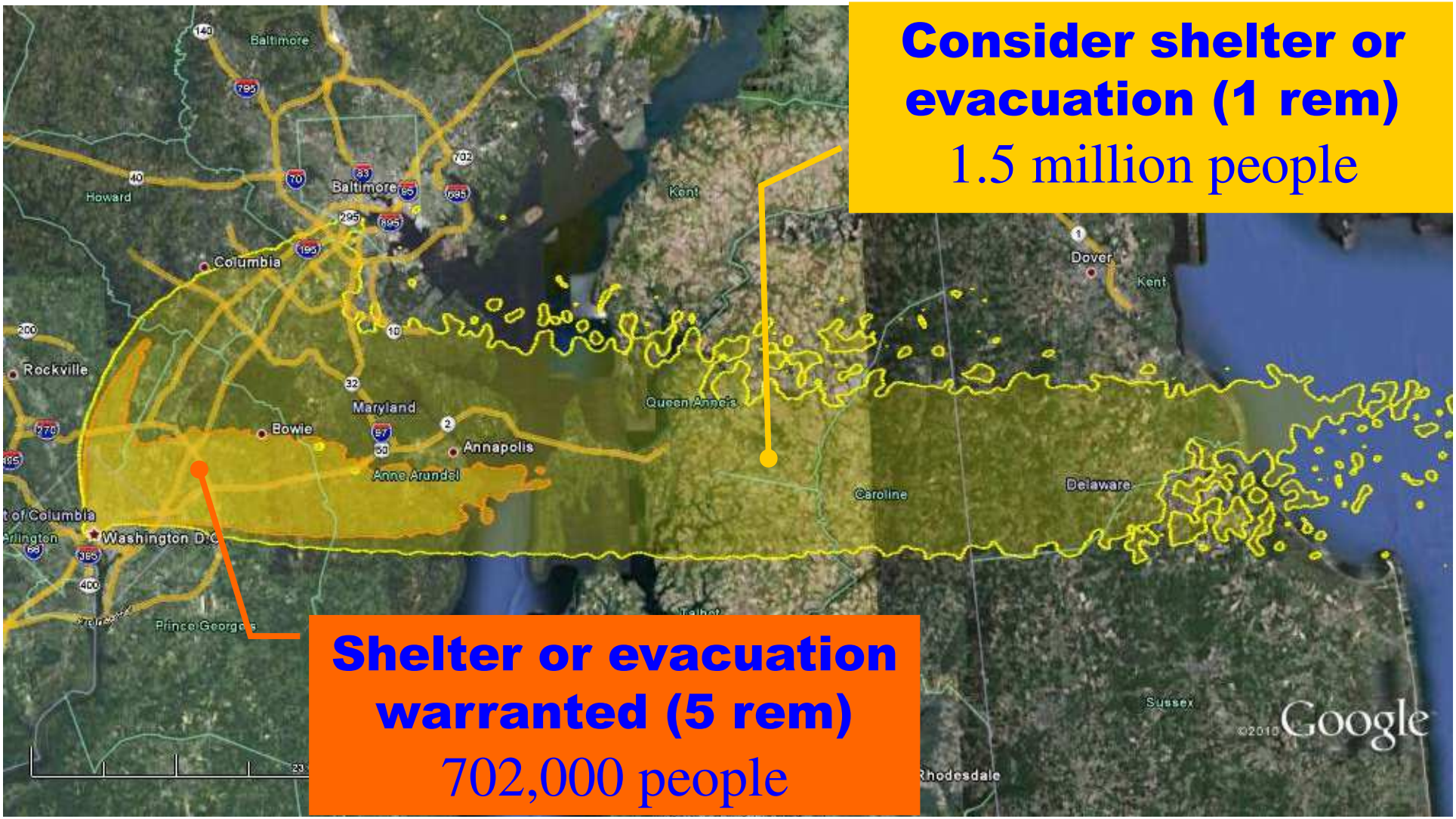
Current DHS & EPA Guidance Focus on Low Level Exposures for Cancer Avoidance

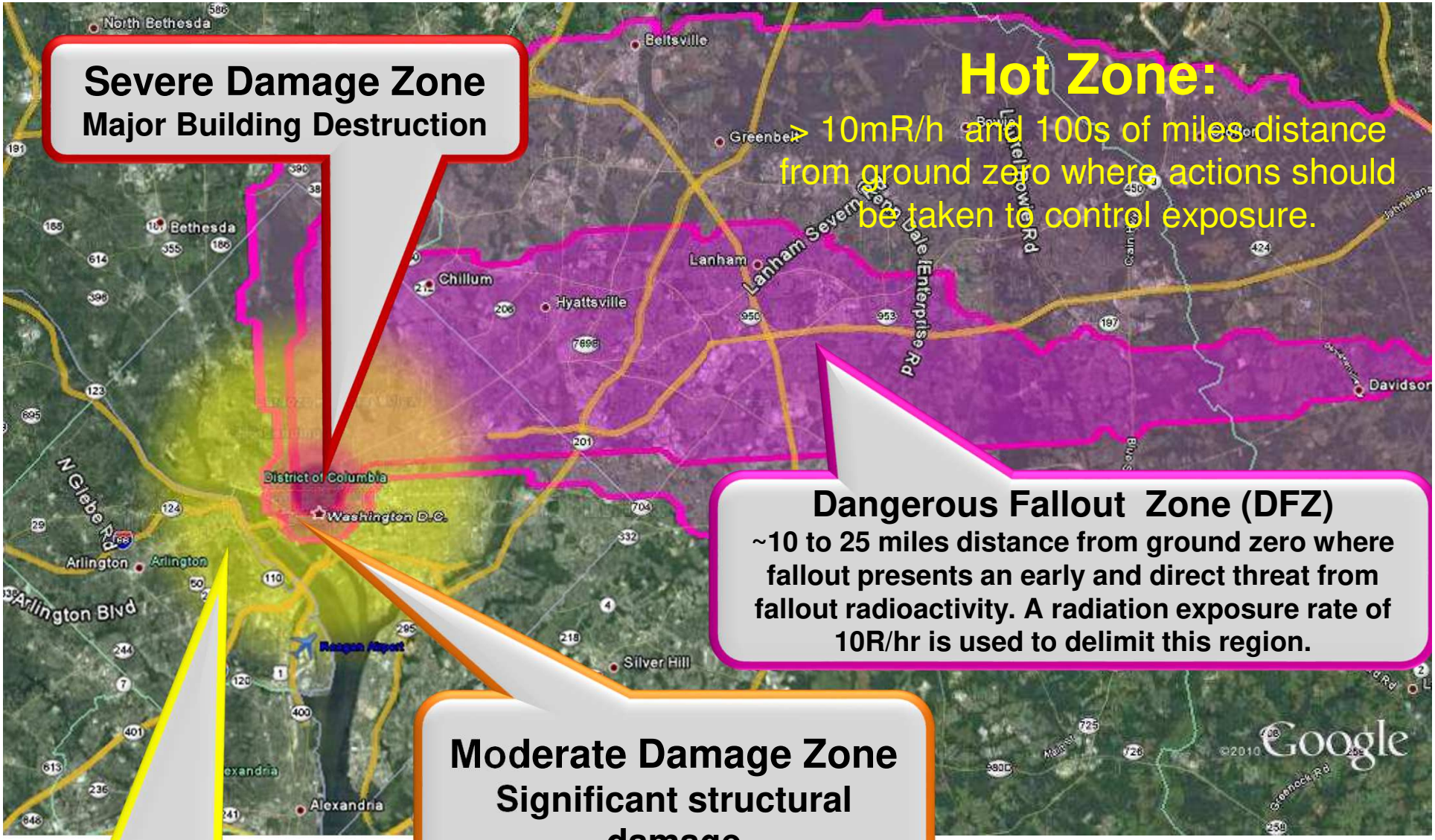


Zoned Approach to Response

- Defining zones can be a useful approach to planning:
  - Identify priority zones
  - Prioritize actions within each zone
  - Identify responder protection in each zone
  - Determining where to locate staging areas

"The goal of a zoned approach to nuclear detonation response is to save lives, while managing risks to emergency response worker life and health."

~Planning Guidance for Response to a Nuclear Detonation



Severe Damage Zone
Major Building Destruction

Hot Zone:
> 10mR/h and 100s of miles distance from ground zero where actions should be taken to control exposure.

Dangerous Fallout Zone (DFZ)
~10 to 25 miles distance from ground zero where fallout presents an early and direct threat from fallout radioactivity. A radiation exposure rate of 10R/hr is used to delimit this region.

Moderate Damage Zone
Significant structural damage

Light Damage Zone
Defined by the prevalence of glass injuries and minor damage to structures.

Example:
Radiation Levels at
1 hour from Fallout
Contamination

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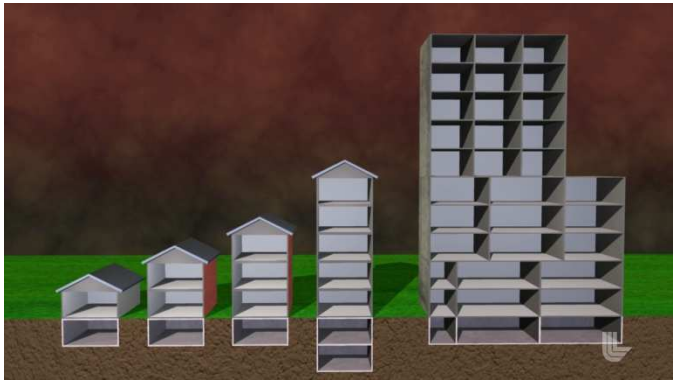
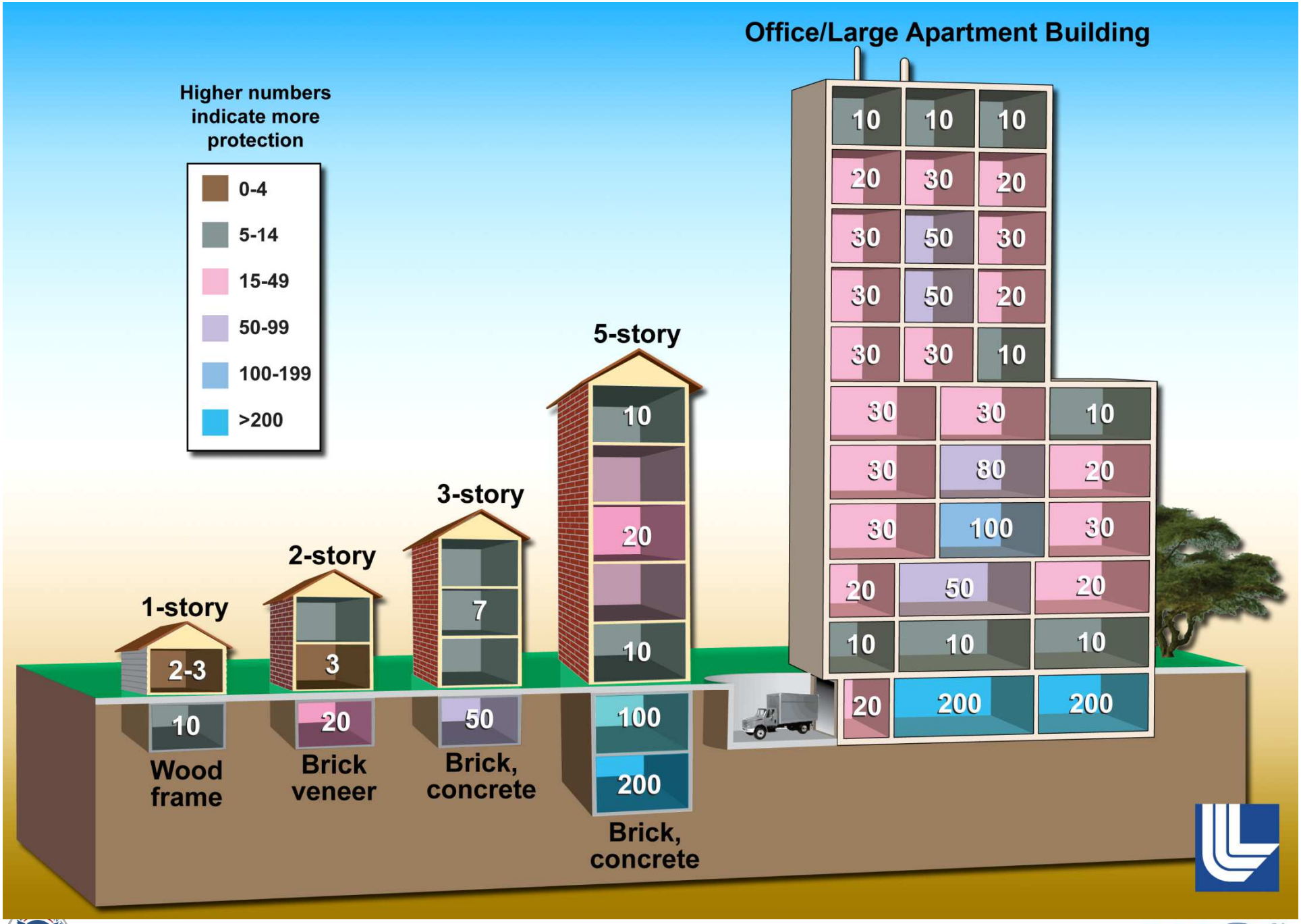
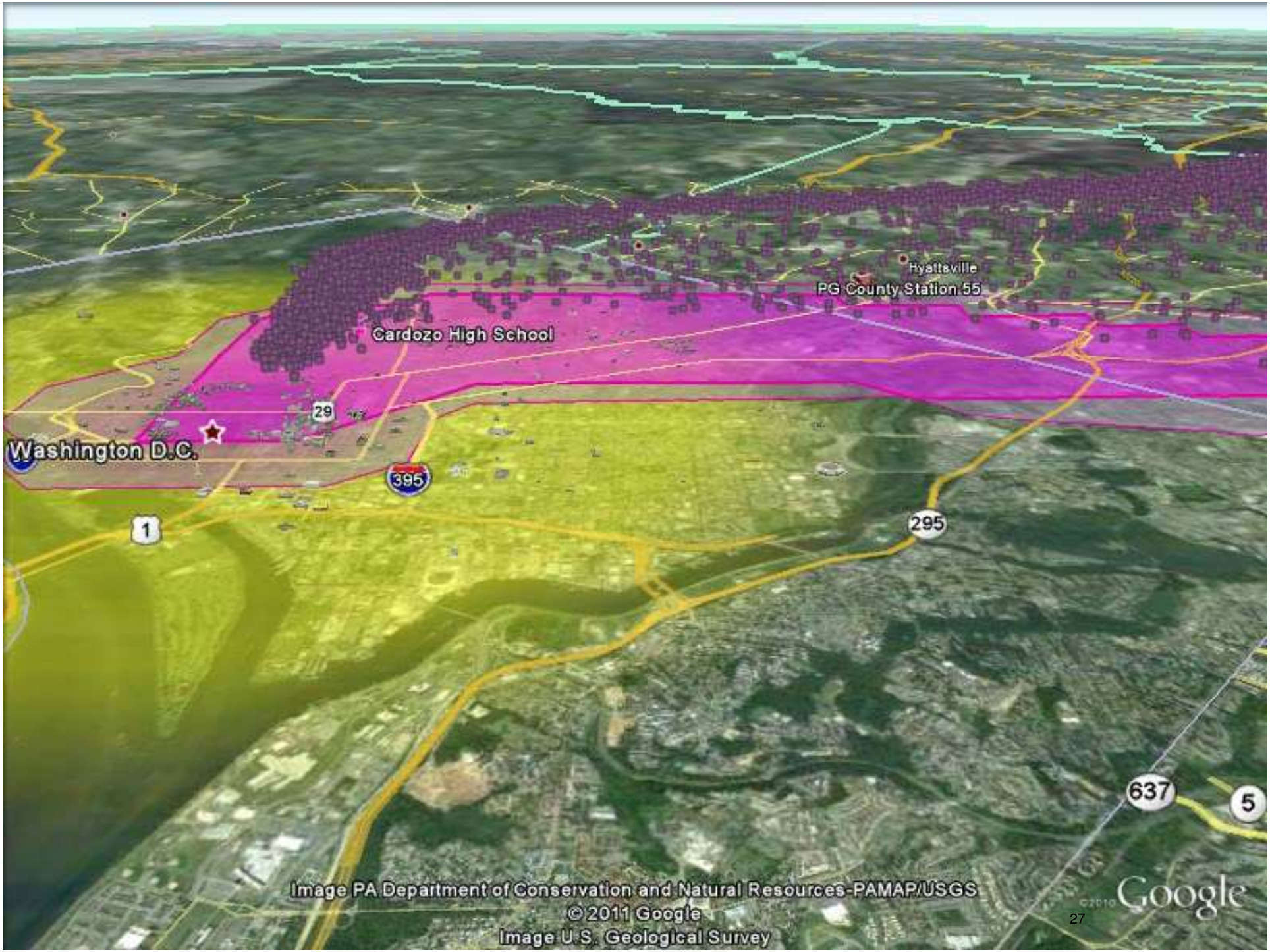
NNSA
National Nuclear Security Administration

Key Fallout Considerations

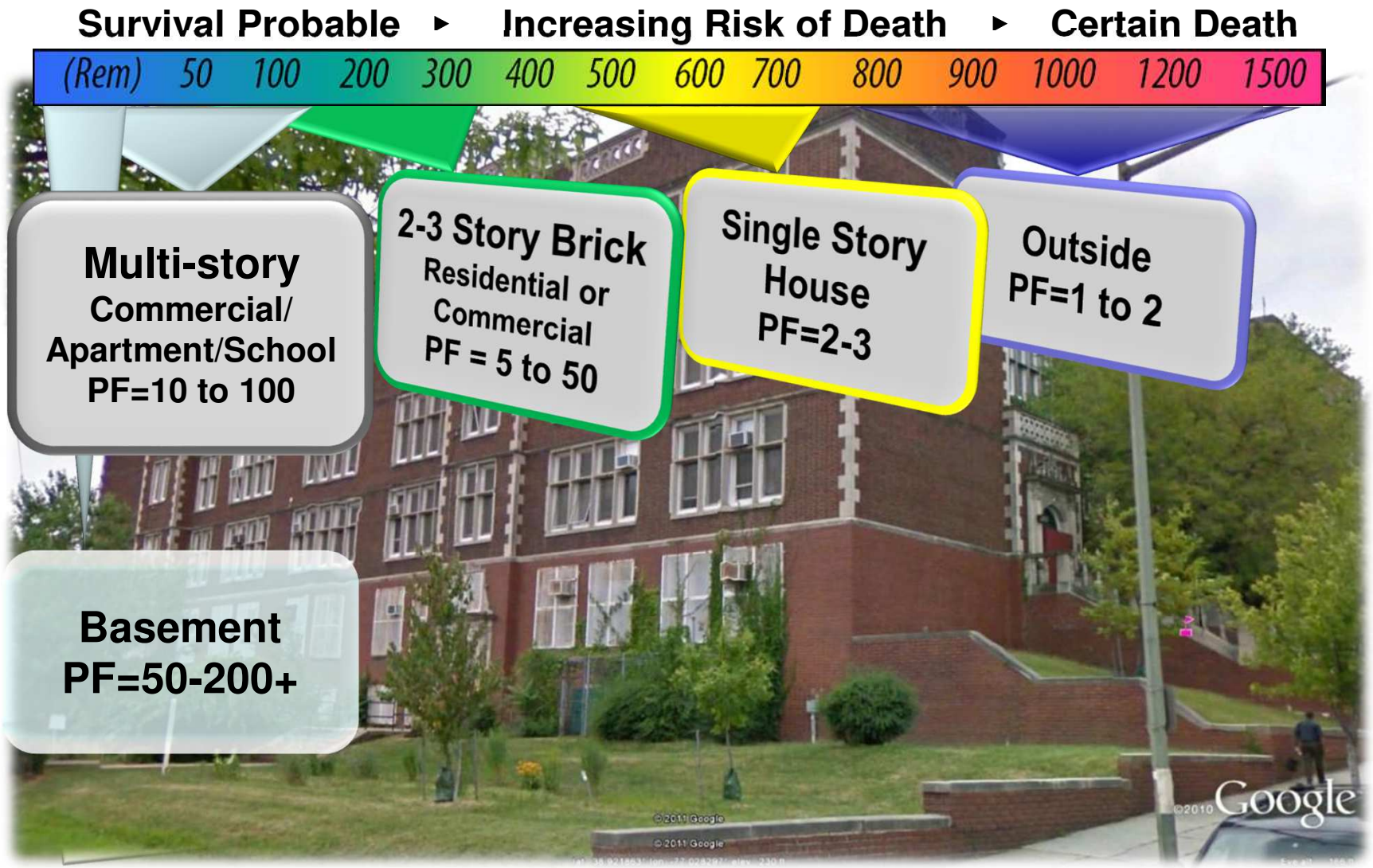
- ***Fallout Decays Rapidly*** (releasing more than half of its energy in the first hour)
- Primary hazard from fallout is exposure to penetrating radiation from the particles
- Dangerous levels of fallout is readily visible as it falls
- Fallout is not a significant inhalation hazard
- The radiation penetrates through windows and walls, but exposure decreases with distance and intervening materials.



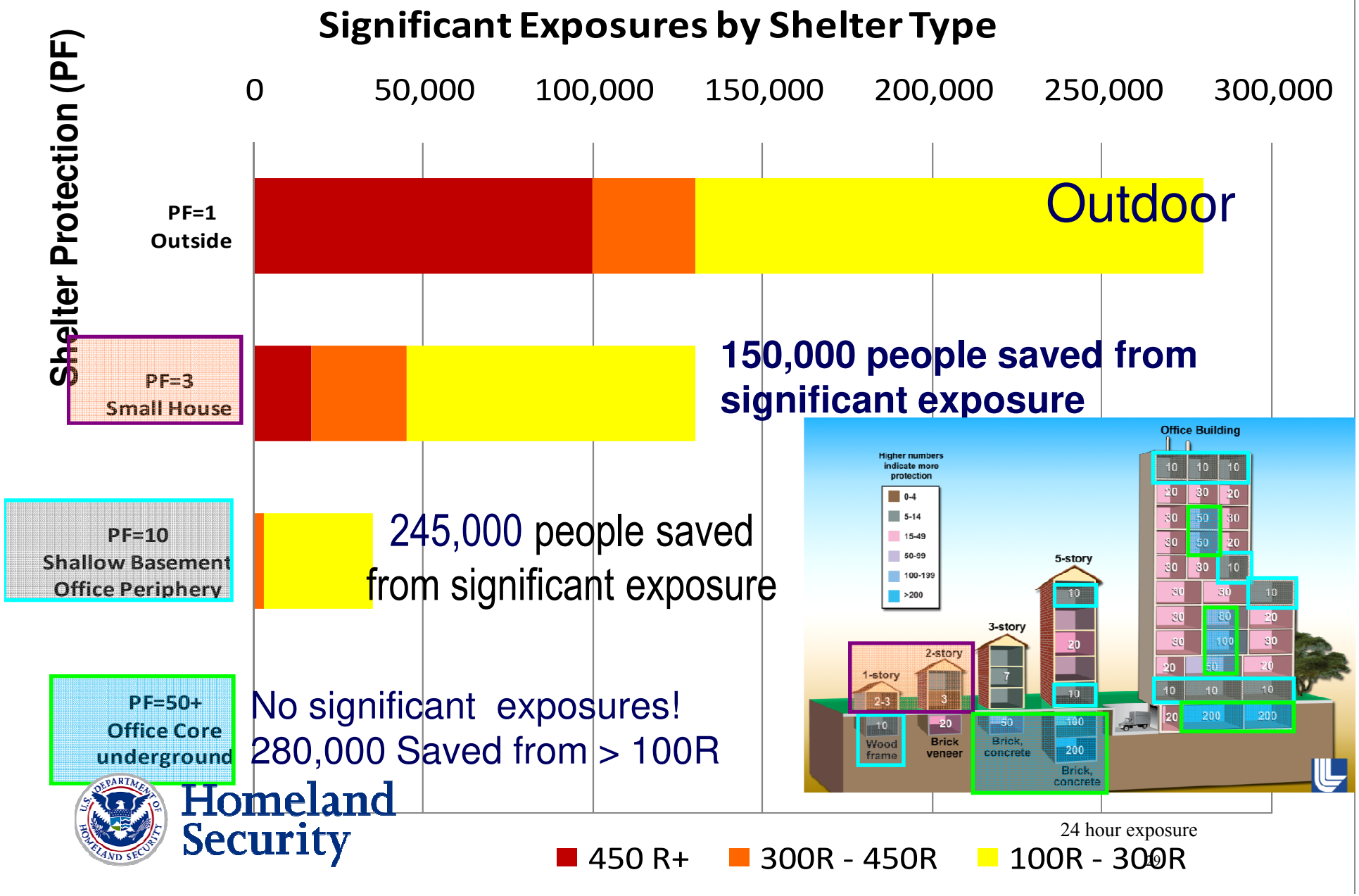

Higher numbers indicate more protection
0-4
5-14
15-49
50-99
100-199
>200
1-story
2-3
10
Wood frame
2-story
3
20
Brick veneer
3-story
7
50
Brick, concrete
5-story
10
20
10
100
200
Brick, concrete
Office/Large Apartment Building
10 10 10
20 30 20
30 50 30
30 50 20
30 30 10
30 30 10
30 80 20
30 100 30
20 50 20
10 10 10
20 200 200


Hyattsville
PG County Station 55
Cardozo High School
29
Washington D.C.
395
1
295
637
5
Image PA Department of Conservation and Natural Resources-PAMAP/USGS
©2011 Google
Image U.S. Geological Survey
©2010 Google

Fallout Exposure Reductions

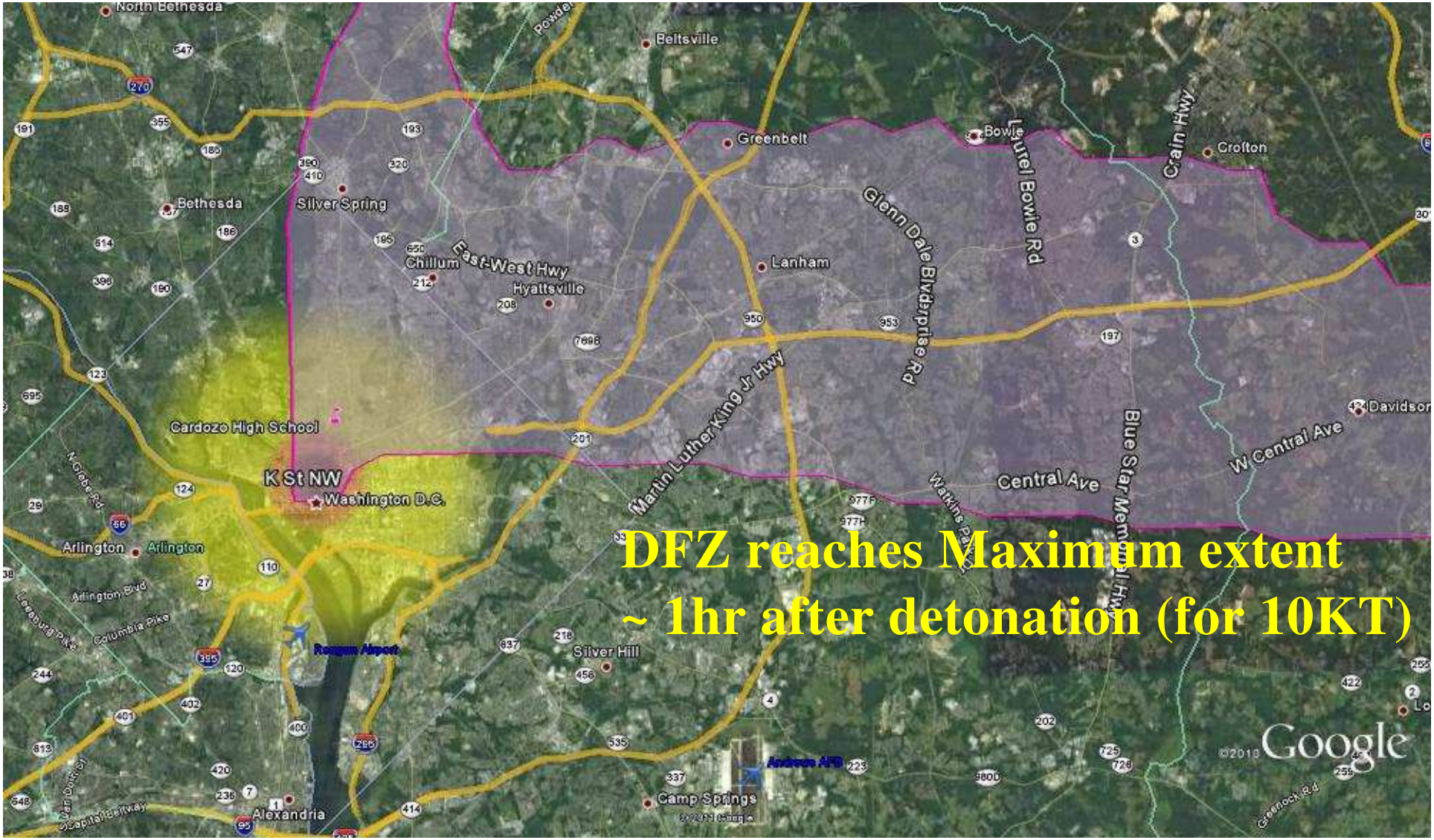


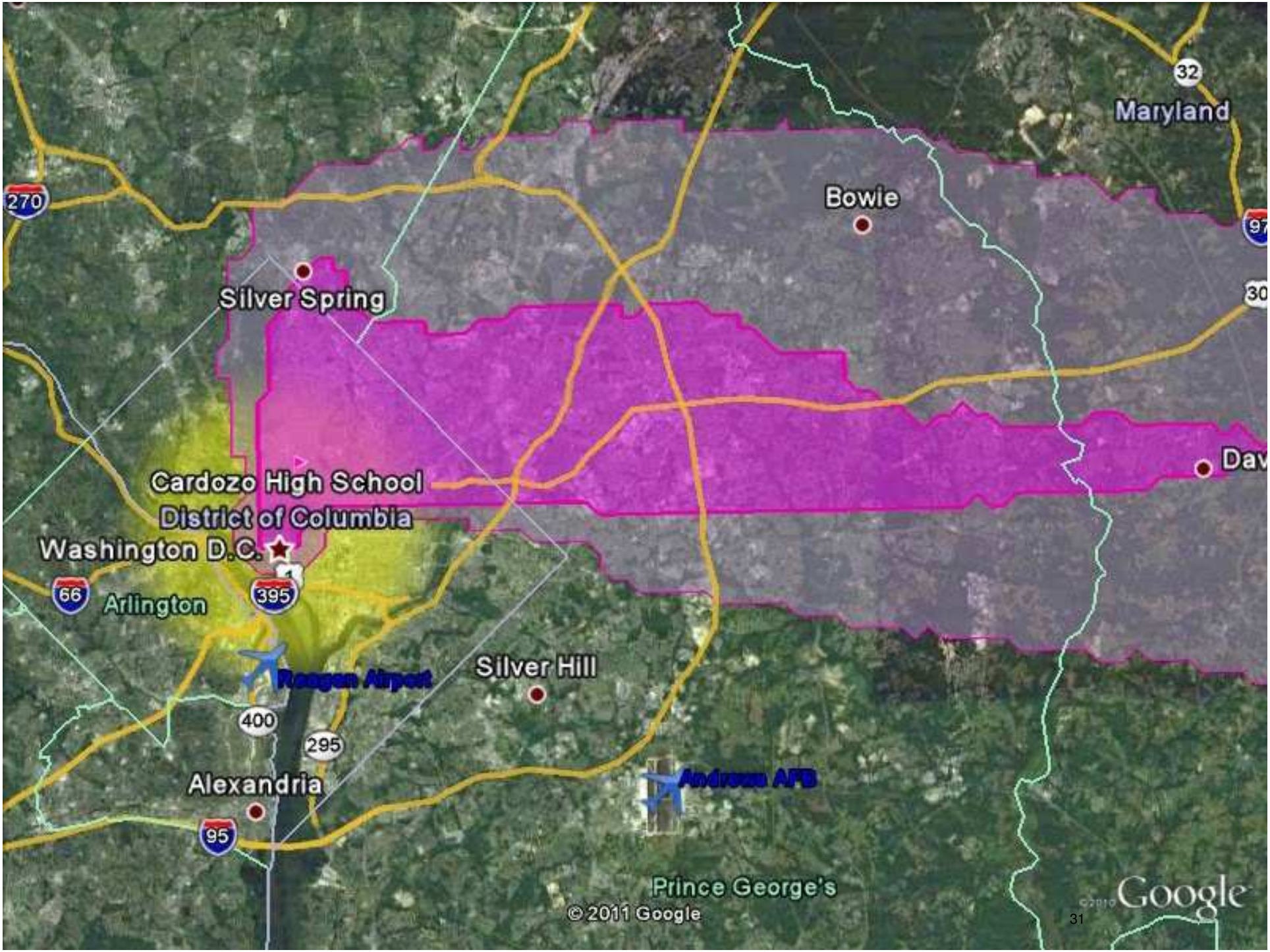
How Many Lives can Sheltering Save?



Homeland Security

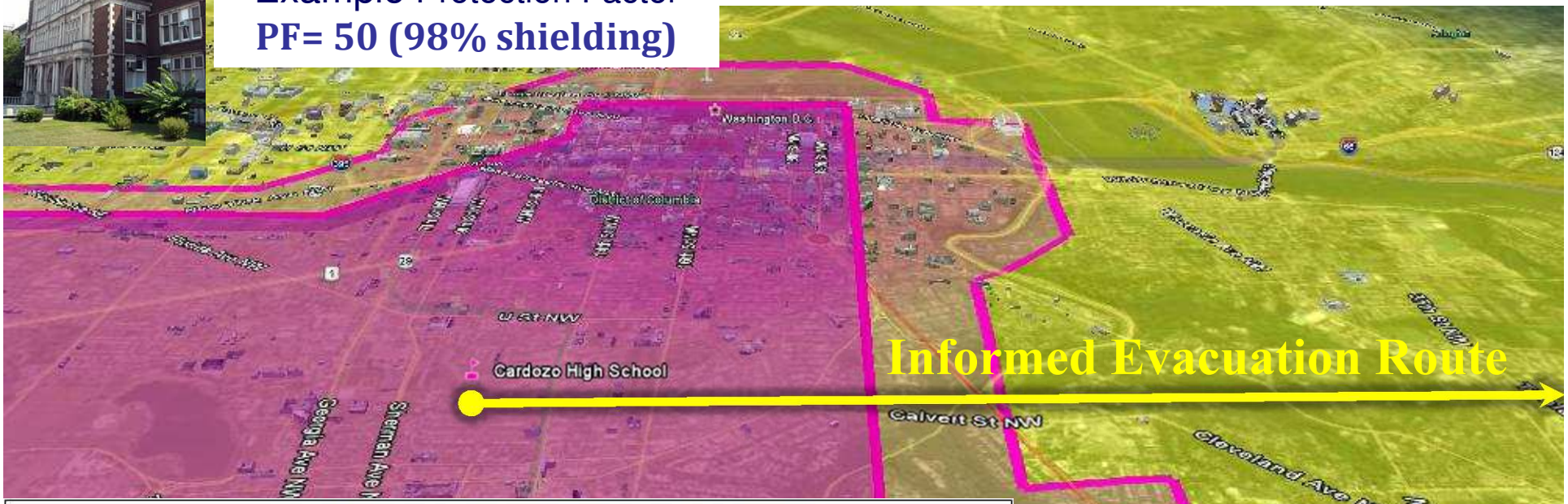
Dangerous Fallout Zone Changes with Time **Day 7**

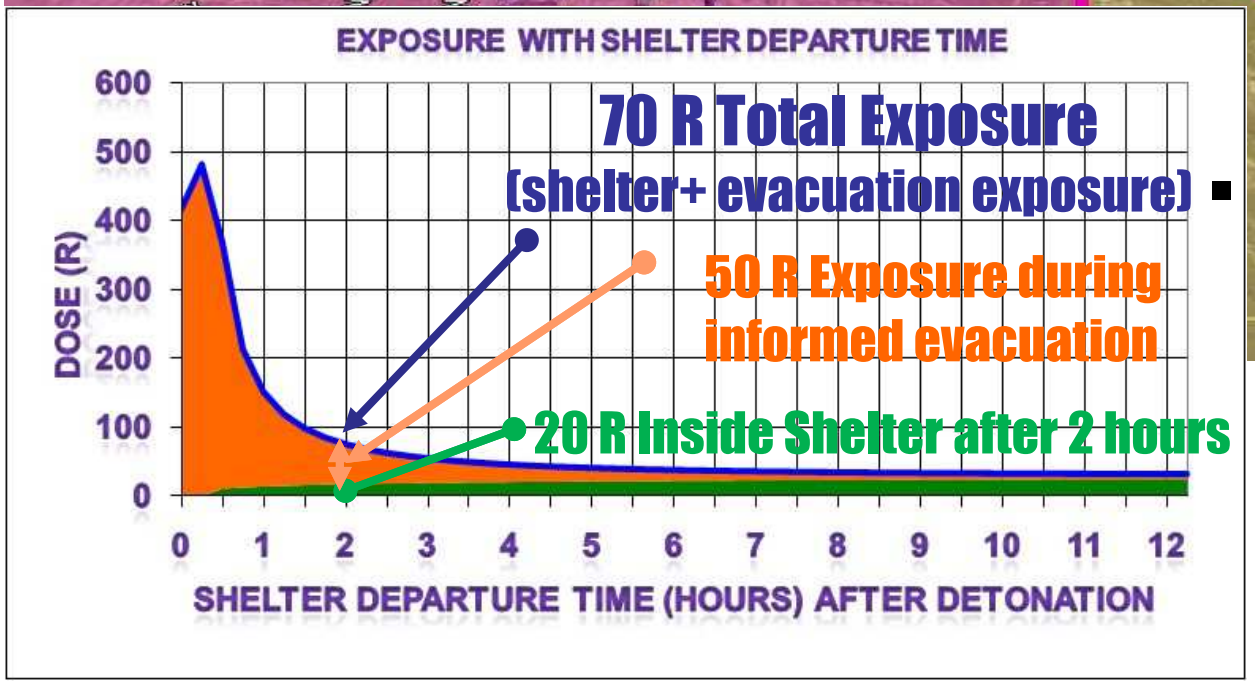



Maryland
Bowie
Silver Spring
Cardozo High School
District of Columbia
Washington D.C.
Arlington
Reagan Airport
Silver Hill
Alexandria
Andrews AFB
Prince George's
© 2011 Google
Google
270
32
66
395
400
295
95

Example Protection Factor
PF= 50 (98% shielding)

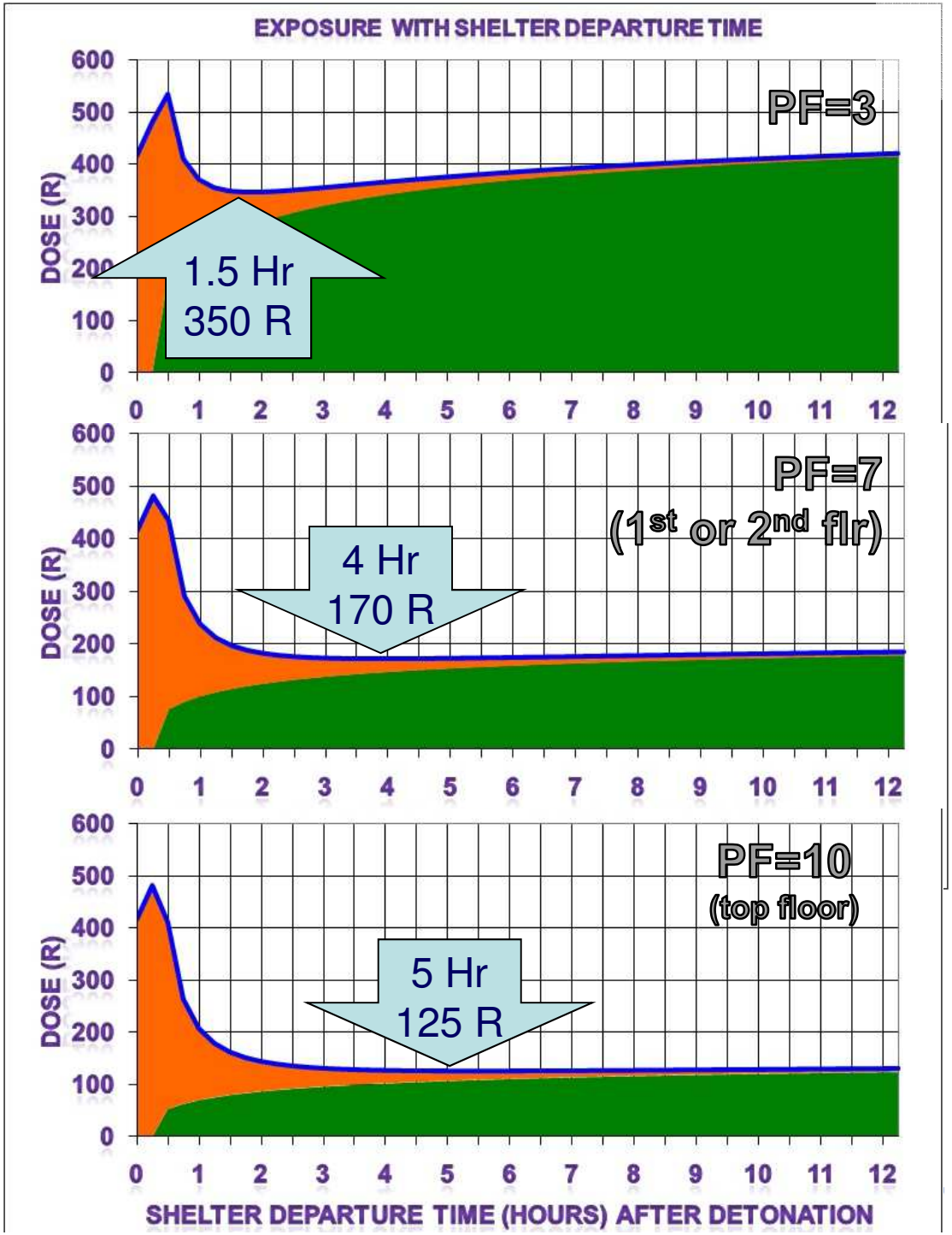
(Note: Most of the shelter locations within school would exceed PF 50)





- Analysis for this Shelter and Evacuation Path:

Shelter in School <u>25 hours</u> followed by ***informed evacuation***



Effect of Shelter Types on Departure Time and Dose

Poor Shelter:
Small House
(PF=2-3)

Inadequate Shelter
2-3 story
Stand Alone
Residential
t incl basement)

Adequate Shelter

Adjacent
Brownstones,
2-4 story office
or apartments
buildings

PF = 5 - 50
(not incl basement)

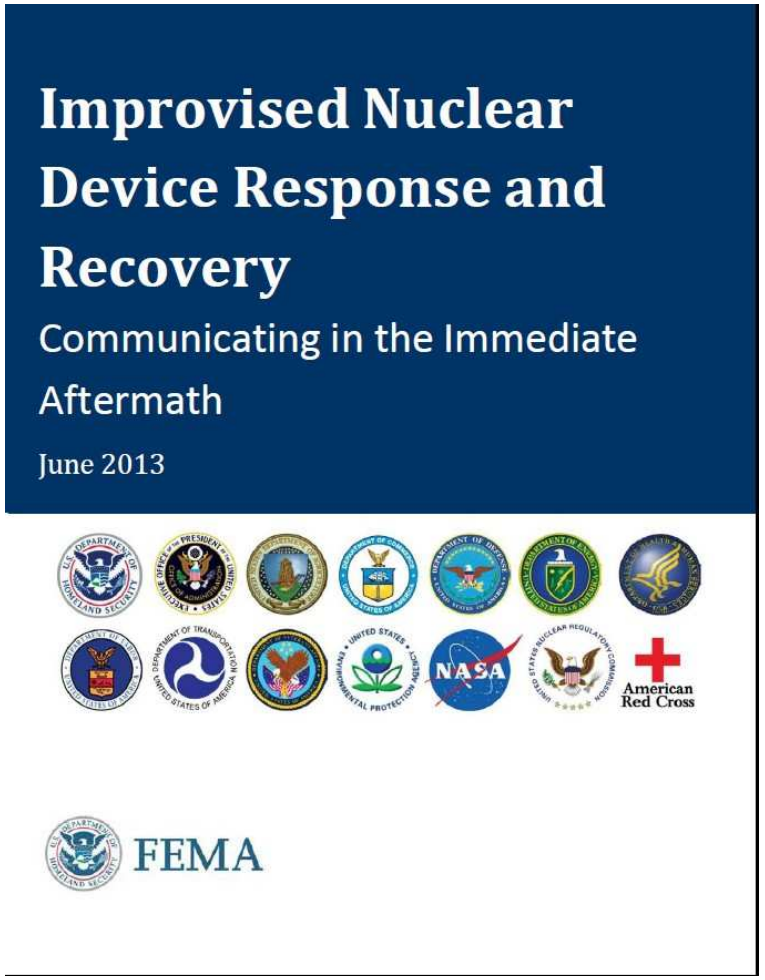
33

Public Strategy Conclusions

- Public Protection Strategy: **Early, adequate shelter followed by delayed, deliberate evacuation.**
  - Adequate Shelter is houses with basements, large multi-story structures, and underground spaces (e.g., parking garages and tunnels)
  - Sheltering for at least the first hour in an adequate shelter can keep exposures non-lethal
  - Be prepared to shelter for 12-24 hours
- **Knowing what to do and being prepared (at home AND work) before the event is critical.**
- **A prepared Emergency Response Capability to support Delayed, Deliberate Evacuation**

Immediate Emergency Broadcast Messages

- An early priority for federal, state and local officials is to broadcast "shelter in place" messaging to the public through whatever means is available.
  - Communication infrastructure may be damaged, plan for multiple communication methods.
  - Planners should select individuals with the highest public trust and confidence to deliver messages and should be prepared to deliver key information to the public in the affected areas about protection almost immediately in order to maximize lives saved.



Sample Message from the Planning Guidance for Response to a Nuclear Detonation

Response Considerations

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344

FEMA

LLNL-PRES-489337

National Nuclear Security Administration

Zone Priorities From Planning Guidance for Response to a Nuclear Detonation

- Most of the injuries incurred within the LDZ are not expected to be life threatening and would be associated with flying glass and debris from the blast wave and traffic accidents.
- If injured survivors are able to move on their own, they should be directed to medical care or assembly shelters.
- The MDZ should be the focus of early life-saving operations. Focus on medical triage with constant consideration of radiation dose minimization.
- Response within the SDZ should not be attempted until radiation dose rates have dropped and the MDZ response is significantly advanced.
- All response missions must be justified to minimize responder risks based on risk/benefit considerations built into worker safety plans.

Priorities for Immediate Life Safety

- **Public Protection Strategy:**

  Early, adequate shelter followed by delayed, deliberate evacuation

- **Response Strategy:**

  1. *Protect response personnel*
  2. *Support regional situational assessment*
  3. *Support public safety*

From Key Response Planning Factors for the Aftermath of Nuclear Terrorism

Protect Response Personnel

- Responders without radiation detection instruments: Follow the general public protection strategy.
- Responders with radiation instruments: Shelter using radiation detection equipment to monitor shelter conditions.
  - Do not exit shelter or enter areas if radiation levels exceed 10R/hr unless there is a time critical life safety issue (e.g., avoiding fire or building collapse).
  - Provided outdoor radiation levels are below 10R/hr, perform scene assessment of the immediate area for hazards.

Radiation safety and measurement training should be required of any workers that would be deployed to a radiation area. Response teams should not enter affected areas without first confirming the level of radioactivity in the area they are entering.

~Planning Guidance for Response to a Nuclear Detonation

Personal Protective Equipment (PPE)

- **SCBAs, Respirators, Firefighter "turnouts", Level A, B, or C HAZMAT suits do not protect against the primary hazard - the penetrating gamma radiation given off by fallout.**

- **Radiation / dose monitoring primary protection**
- **Inhalation & ingestion is a secondary concern compared to the external exposure.**
- **Turnouts and anti-contamination clothing can help ease decontamination after entries, but not required for time-critical, life saving activities.**

"Reducing the time spent in high dose-rate areas is the greatest protective measure. Bulky isolation suits and elaborate respiratory protection methods may actually increase exposure as they reduce the speed, the ability to communicate, and worker efficiency."

~Key Response Planning Factors for the Aftermath of Nuclear Terrorism

Decontamination Issues

Fallout Decon

Entering Shelter

Actual Fallout Decon

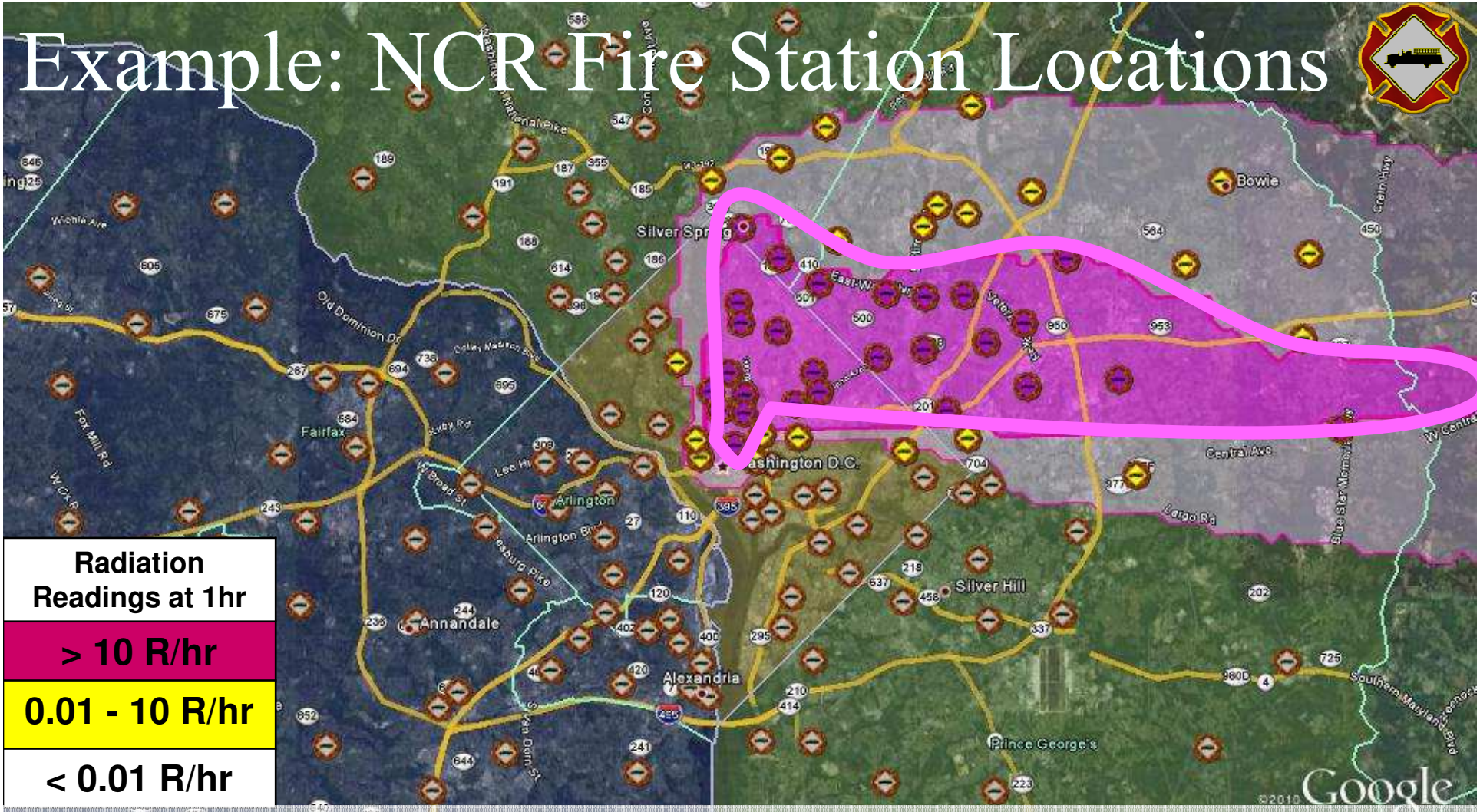
- Simple self-decontamination techniques (such as removing outer clothing, showering, and brushing away fallout material) are effective.
- Techniques should be used as the impacted population leaves the high-hazard zone or enters a shelter

Support Regional Situational Assessment

- Designate a regional situational assessment center
- Establish communication with responders in the affected area.
- Obtain approximate radiation levels in the area.
  - Identification of high hazard zones (reading greater than 10R/hr) is a priority, but
  - reporting safe areas (reading less than 10mR/hr) is also important for safe evacuation routes and response staging areas.
- Establish communication with Interagency Modeling and Atmospheric Assessment Center (IMAAC)

Photo: *Los Angeles County's Emergency Operations Center was activated for Operation Golden Phoenix. Photo by Paul Williams.*

Example: NCR Fire Station Locations



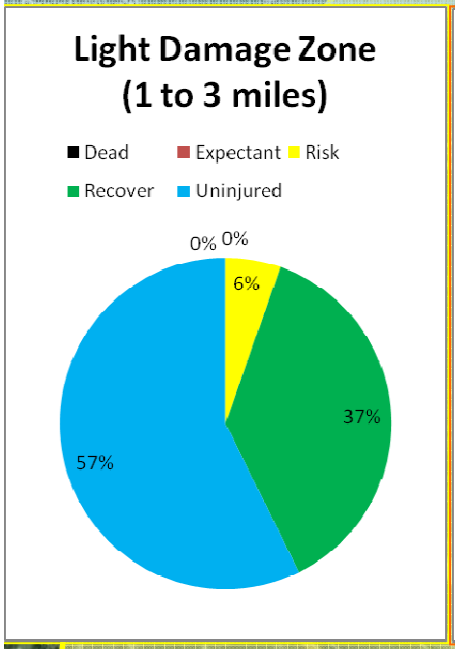
Early Priority: Obtain approximate radiation levels in the area.

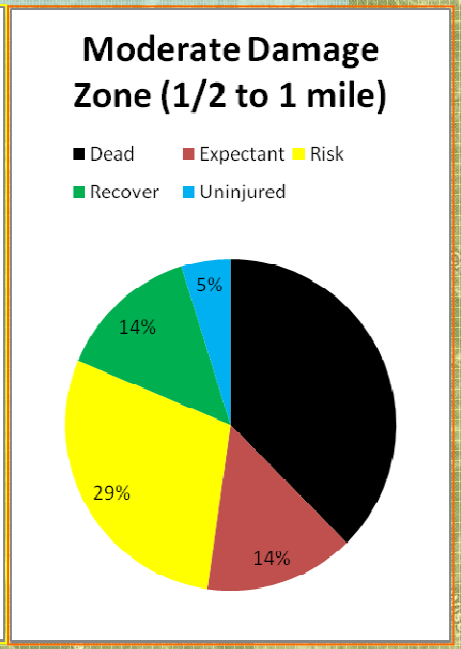
- **Identification of high hazard zones (reading greater than 10R/hr) is a priority, but**
- **Reporting safe areas (reading less than 0.01 R/hr) is also important for safe evacuation routes and response staging areas.**
- **Share / Coordinate information across the region to inform Shelter & Evacuations**

Support Public Safety

- Use emergency broadcast systems to shelter populations
- Once the DFZ has been determined, the following activities can occur ***outside*** of the DFZ:
  - Establish receptions centers and triage sites
  - Direct response resources to the moderate Damage Zone to support injured extraction
  - Fight fires and control hazards

Where are the Injured we can help the most?





3 mile

Total Population
500,000

1 mile

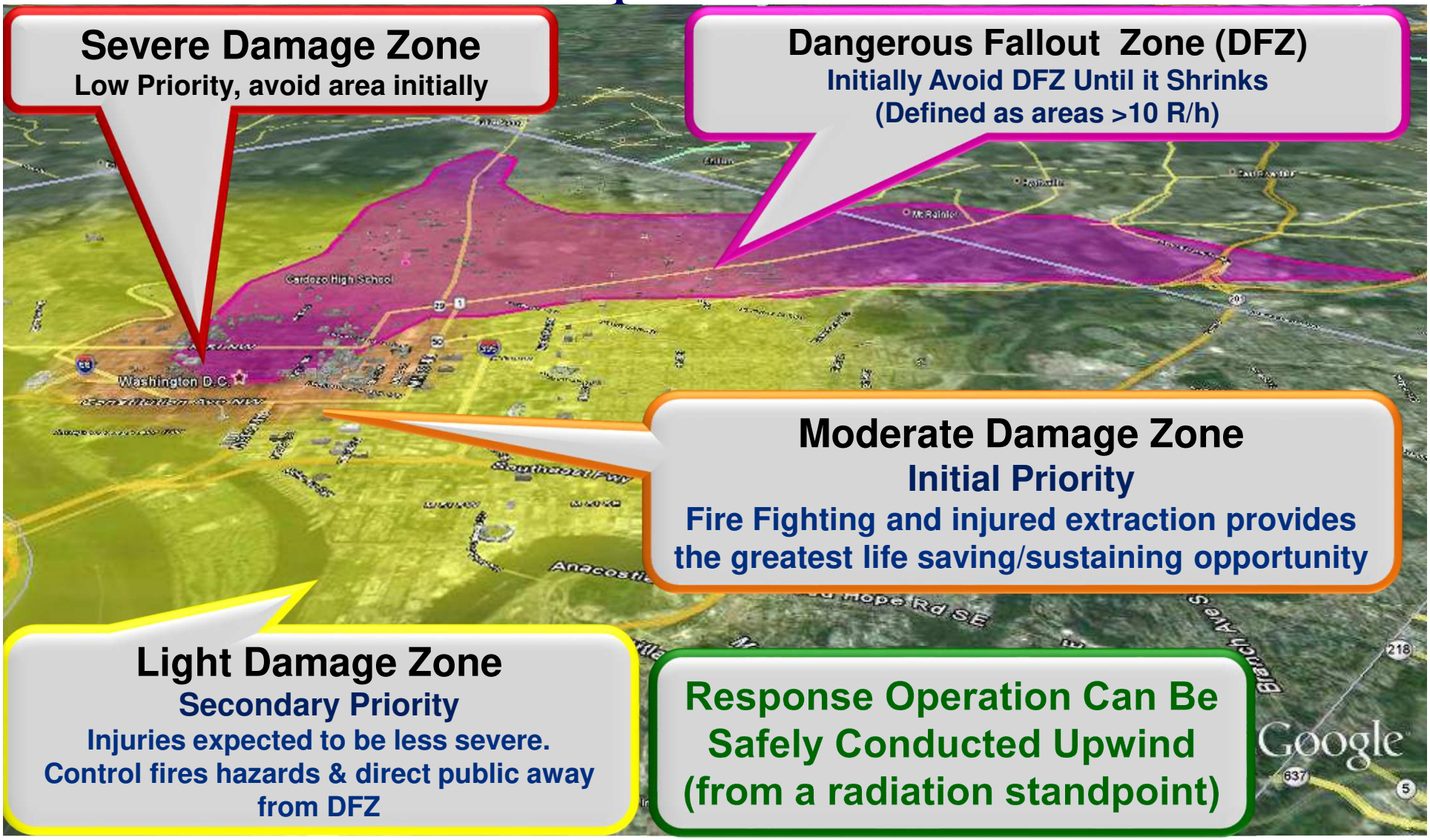
Total Population
200,000

½ mile

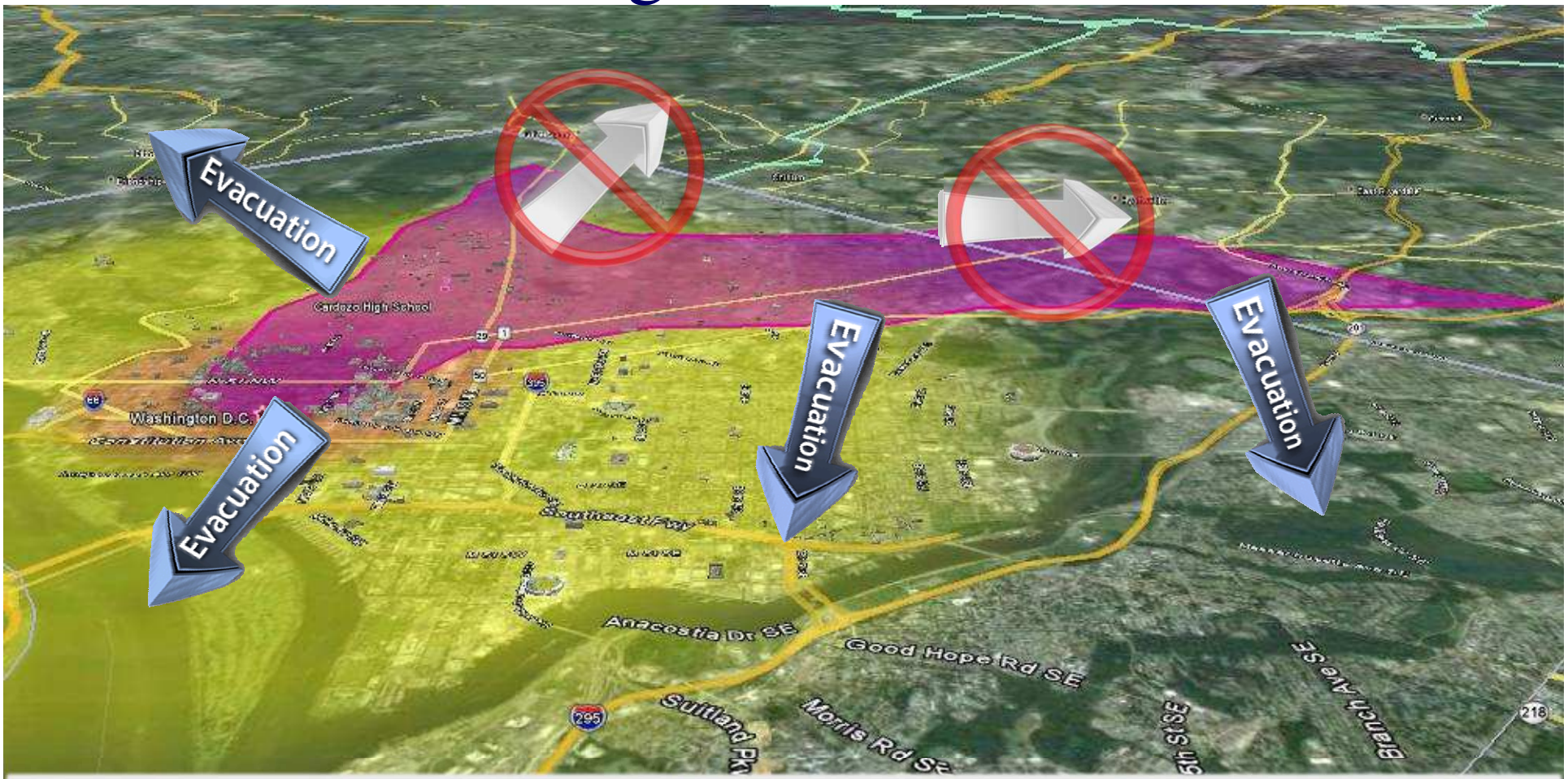
Total Population
150,000

we can save 26,000 people with medical assistance

Recommended Response Priorities



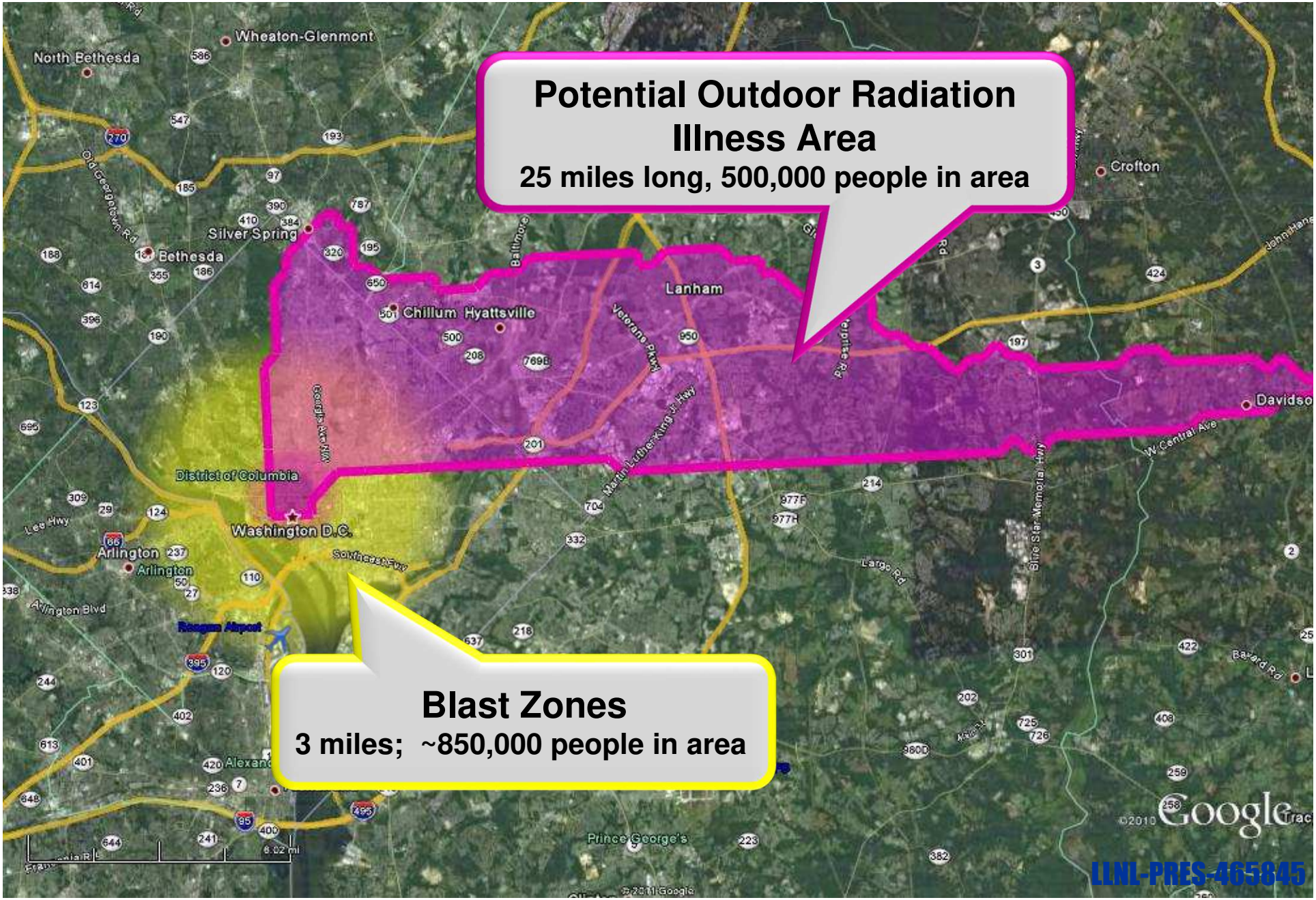
Evacuation Planning (After Initial Shelter Period)



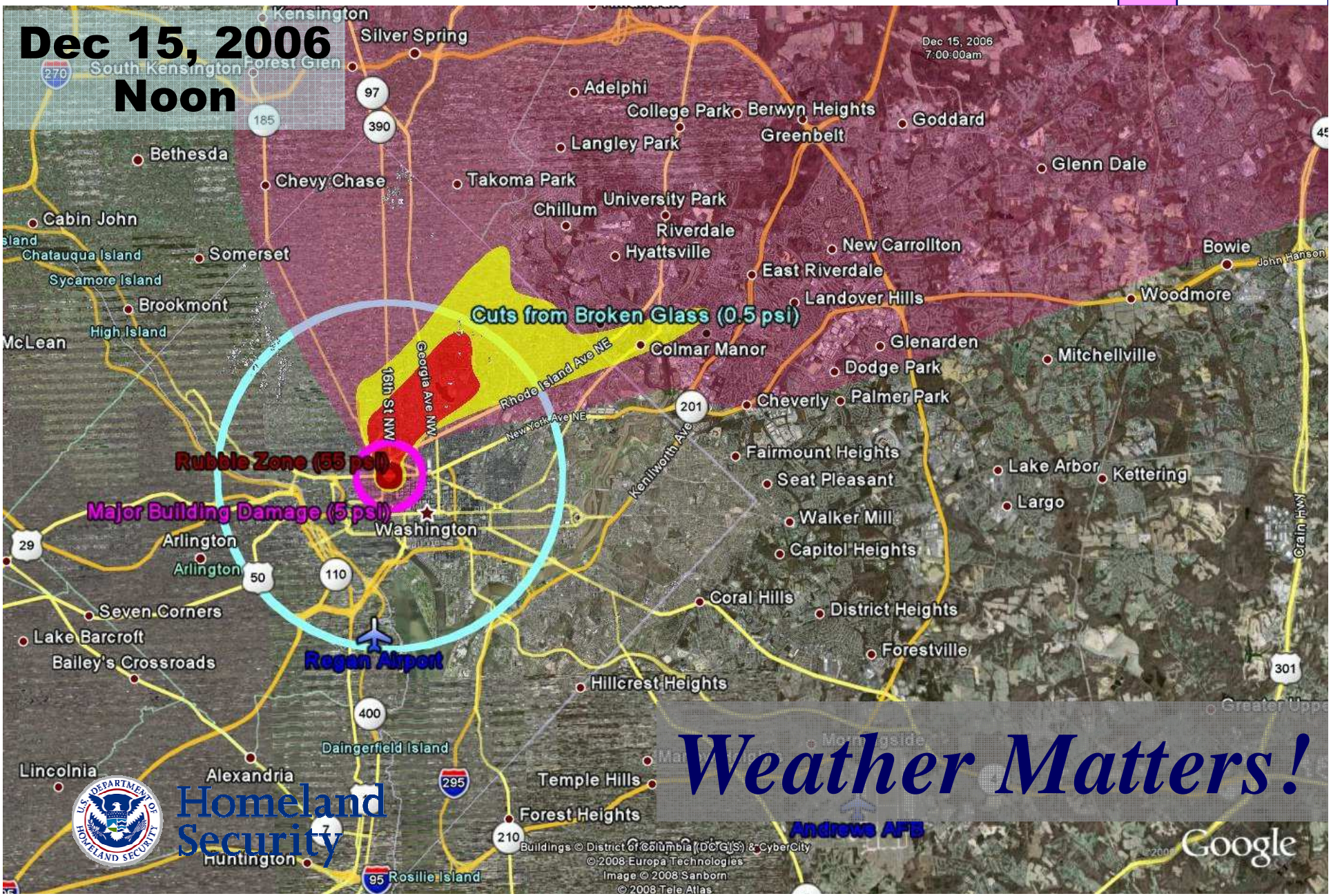
When evacuations are executed, travel should be at right angles to the fallout path (to the extent possible) and away from the plume centerline, sometimes referred to as "lateral evacuation."

~Planning Guidance 2nd Ed

Putting It Into Perspective



Illustrative Weather Variations



Conclusions

- 100,000s of people can be saved through proper action (both individual action and leadership)
- First hour most critical, a prepared response community is needed (a prepared public would also be helpful)
- Public Protection Strategy: Early, adequate shelter followed by delayed, deliberate evacuation
- Response Strategy:
  - Protect Response Force
  - Rapid identification of hazard areas and safe evacuation routes
  - Establish communication (Responder and Public)
- The IND scenario offers a community preparedness tool for key all hazards issues; whole community, no notice communication, mass care/casualty, deliberate evacuation.

Questions?

Acknowledgements

Integrated Department of Homeland Security Effort

- **Science and Technology** providing Supporting Science
- Initial Vision of **Office of Health Affairs**
- Leadership and Support from the **Planning Division of FEMA's Response Directorate**

FEMA / Response / CBRNE
Harvard School of Public Health, Boston, MA

Dwayne A Myal MPH, CAAMA
FEMA CBRNE/ IND (HQ) Office
July 29, 2014

CBRNE

- **Mission:** Plan, prepare and assess the execution of specialized CBRNE programs and provide technical support to National and Regional planning efforts
- Relatively small group but large mission(s)
  - CBRNE and all hazards response/ incident support
  - Integration into many communities (EM, Defense, Intelligence, Scientific, etc)
  - Primarily a coordination, technical advisor/ support role

CBRNE Office Programs

- Chemical-Biological Program
- The Domestic Emergency Support Team (DEST)
- Nuclear Incident Response Team (NIRT)
- IND Response and Recovery Program

FEMA IND Analysis Support

- The CBRNE Office of FEMA Response supports Regional efforts by providing technical supporting information to interagency, regional, state, and local response planners.
  - Providing the technical support to response planning efforts in Regions 1, 2, 3 (2 UASI Cities), and 6; Regions 4 and 9 pending
  - Stakeholders critical to identify analysis priorities and technical gaps to be assessed
  - Detailed effects analysis, evaluation of community specific attributes, and courses of actions.
  - Deliverables include a detailed presentation of the potential effects (and trade-offs of response actions) and technical report.

NIRT Operational Resources/Assets

*DHS/FEMA Nuclear Incident Response Team (**NIRT**) Teams are comprised of:*

- DOE Aerial Measuring System (**AMS**)
- DOE Accident Response Group (**ARG**)
- DOE National Atmospheric Release Advisory Center (**NARAC**)
- DOE Radiation Emergency Assistance Center/Training Site (**REAC/TS**)
- DOE Radiological Assistance Program (**RAP**) Team
- Interagency Modeling and Atmospheric Assessment Center (**IMAAC**)
- EPA Radiological Emergency Response Team (**RERT**)
- EPA RadNet

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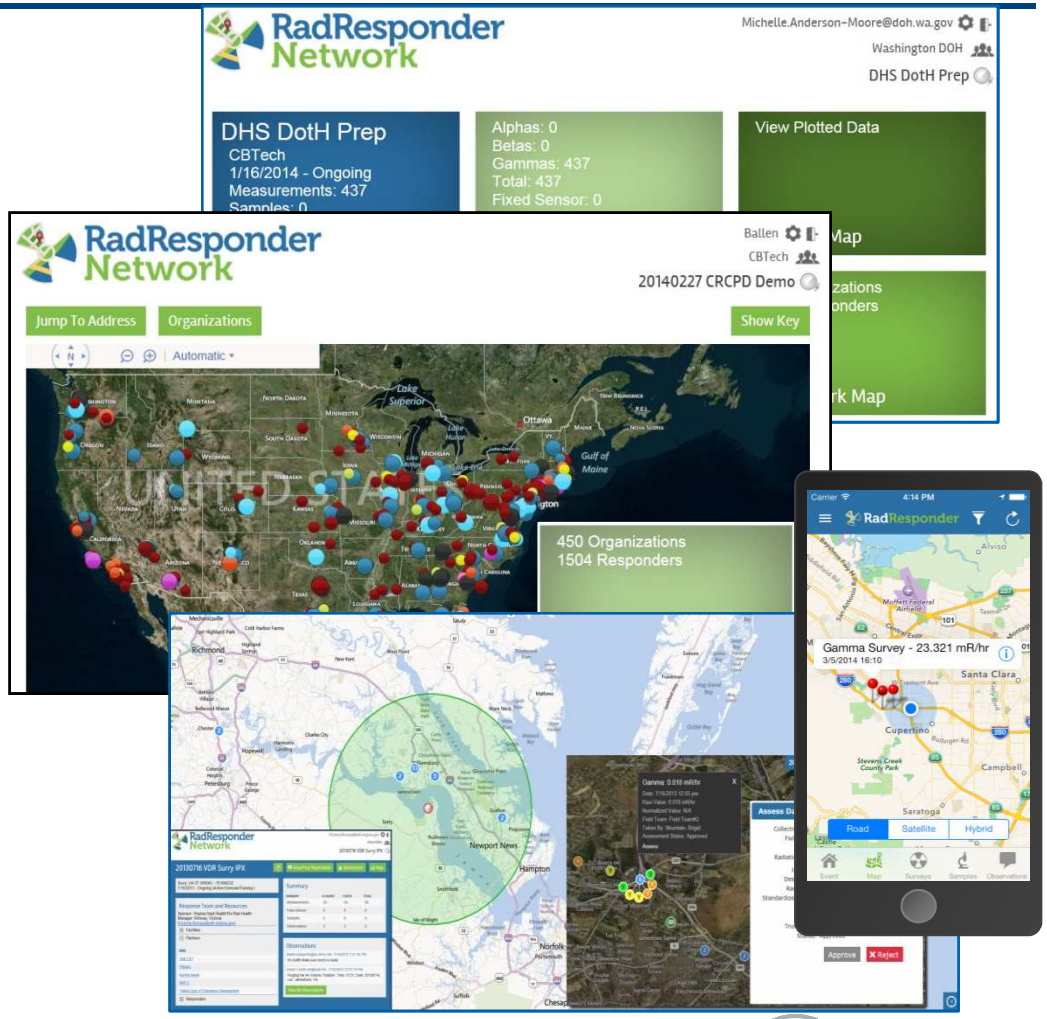
RadResponder Network

- Launched February 2013
  - Sponsored by FEMA, DOE/NNSA and EPA
- Cloud database
  - Responders and Teams
  - Equipment
  - Field Surveys
  - Samples and Analysis
- Web Portal
  - Data sharing
  - Mapping tools
- Mobile application
  - Windows, iPhone, and Droid
- Integration
  - Mapping tools
  - Your Network
  - EPA/DOE
  - API
- Substantial input from CRCPD, CDP, CTOS
- FREE to use and manage



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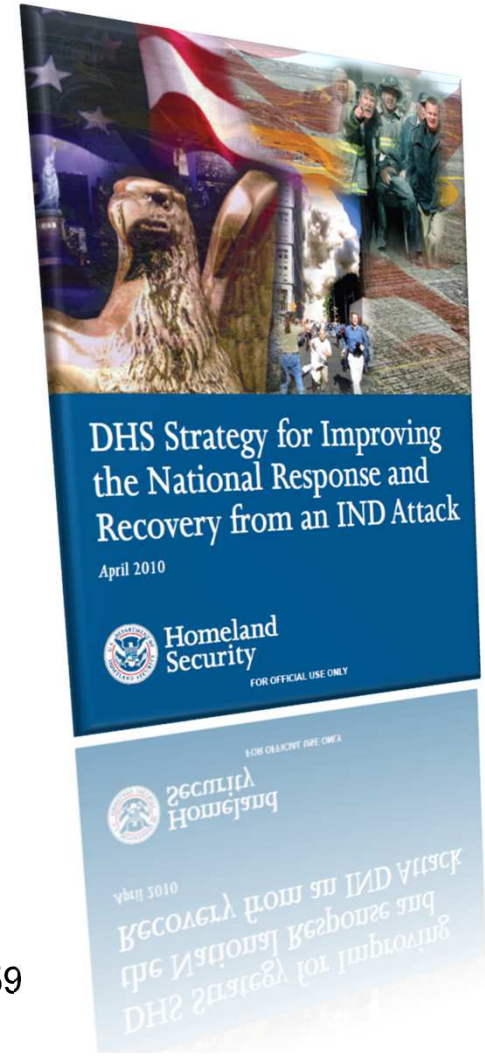
DHS Strategy for Improving the National Response and Recovery from an IND Attack



- **Capability 1** – Manage the Response
- **Capability 2** – Characterize the Incident
- **Capability 3** – Mass Evacuation and In-Place protection
- **Capability 4** – Medical Triage
- **Capability 5** – Provide Casualty/Evacuee Care
- **Capability 6** – Stabilize and Control the Impacted Area
- **Capability 7** – Perform Site Cleanup and Recovery and Restore Essential Functions

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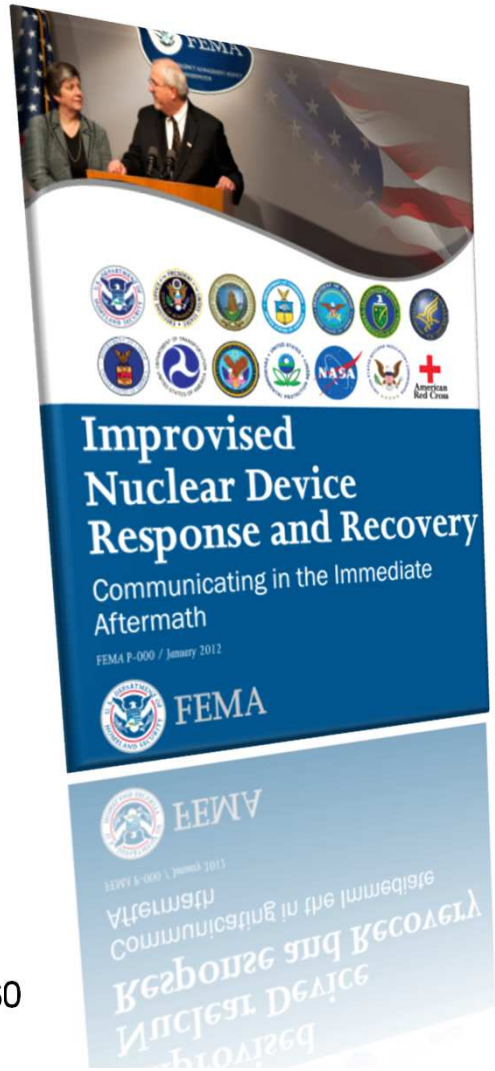
IND Response and Recovery: Communicating in the Immediate Aftermath



- Developed as a tool for public affairs officials to better prepare for and respond to risk communications following a nuclear terrorism attack
- Contains pre-scripted public messages to anticipated questions
- Developed by National experts in radiation risk communications, health physics, science, and public health
- Tested with focus groups through HHS/CDC

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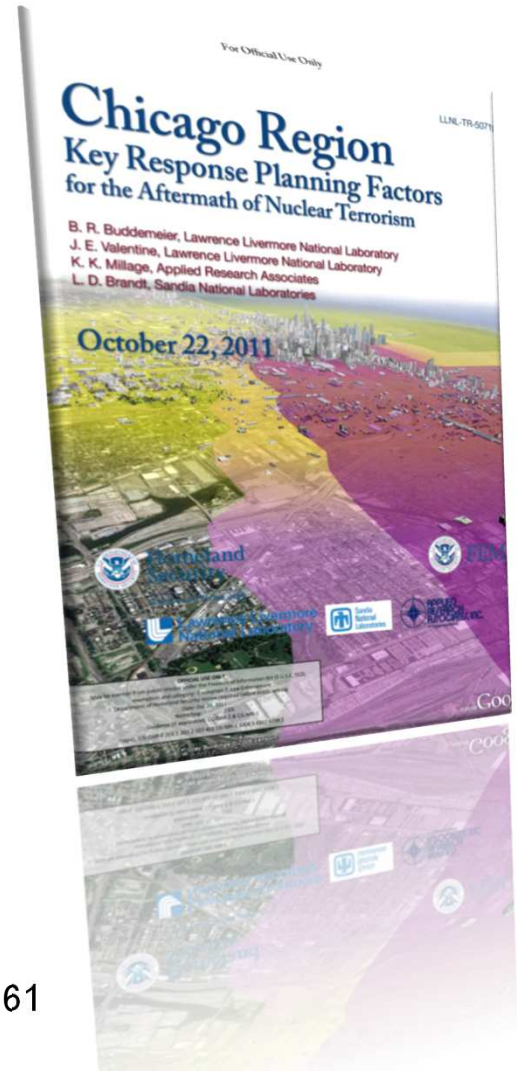
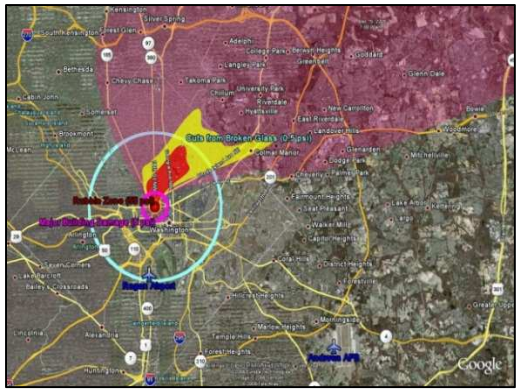
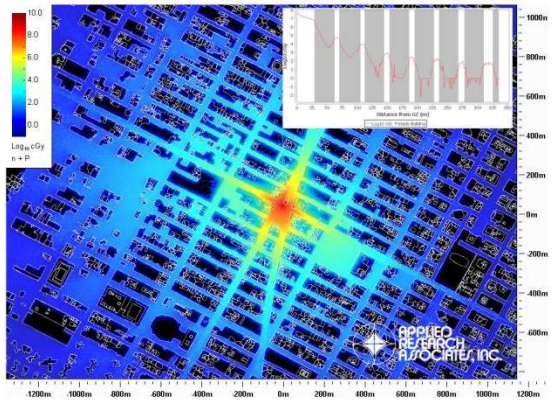
Regional Key Response Planning Factors to an IND (and related products)



- FEMA CBRNE leveraging the most advanced scientific analysis and models to inform plan development
- Enables planners to develop better planning assumptions specific to the region's characteristics and improves the overall quality of the plan
- Primarily focused on Information Analysis portion of the process, but supports the entire process
  - COA Development
  - COA Evaluation
  - Exercising the Plan
- Facilitates development of National and Regional IND Annexes (i.e. Region V)





Useful Resources/ Tools

- Rad Resilient City (UPMC)
- Institute of Medicine Reports (IND, Catastrophic Planning, Crisis Decision Making Toolkit, etc)
- Radiation Emergency Medical Management (REMM)/ REMM App
- CDC Radiation Emergency Toolkit
- CRCPD, NARR, RITN, NCRP, etc
- And more…

FEMA Supports Interagency Coordination of IND Response Planning

- Interagency working groups
  - Public Health and Medical (HHS, FEMA, etc..)
  - Communication (EPA, CDC, FEMA, DOE etc..)
  - Response (State &Local responders, FEMA, DoD, DOE, etc..)
  - Recovery (EPA, FEMA, HUD, etc..)
  - Scientific Support (FEMA, S&T, DoD, CDC, DOE, etc..)
- Supporting Analysis and resource development
- Doctrine Development and Updates
  - Nuc/Rad Annex (update) to the NRF
  - Others

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Questions?

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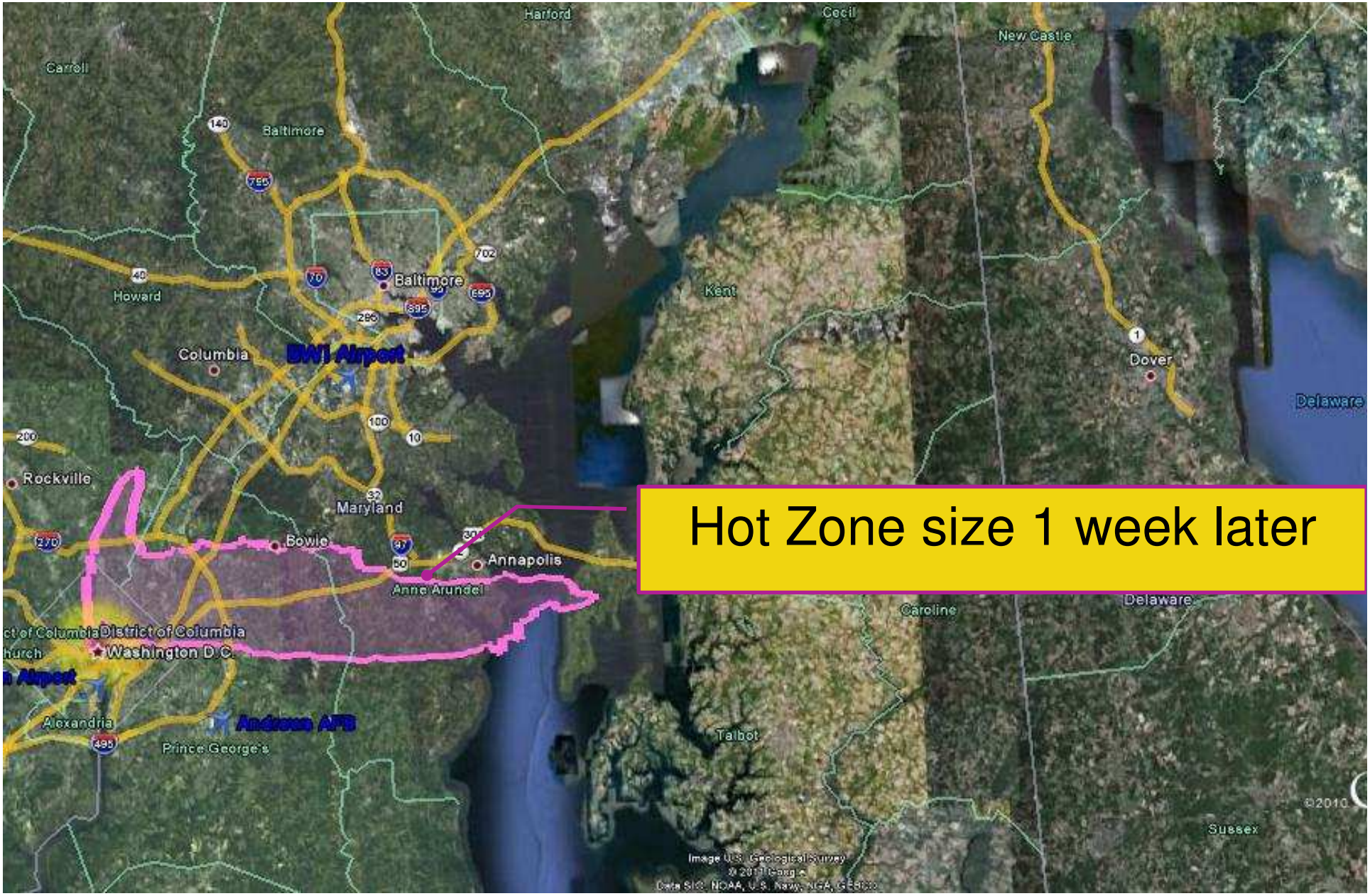
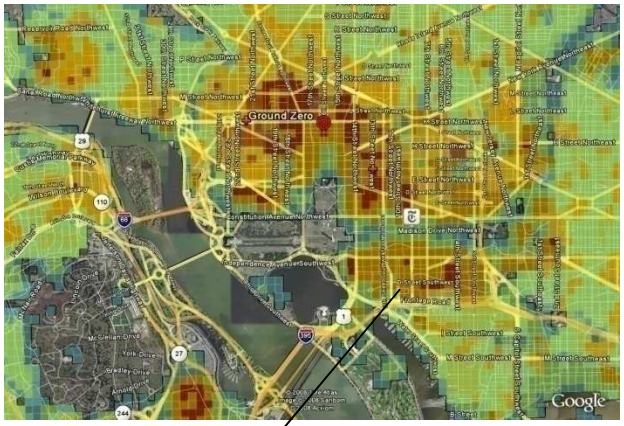
Supplemental Slides

- Long term contamination
- Types and distribution of injuries
- Zone Recognition


Hot Zone size 1 week later
Harford
Cecil
New Castle
Carroll
Baltimore
Howard
Columbia
BWI Airport
Kent
Dover
Delaware
Rockville
Maryland
Bowie
Annapolis
Anne Arundel
District of Columbia
Washington D.C.
Alexandria
Andrews AFB
Prince George's
Caroline
Talbot
Sussex
©2010

Advanced Casualty Determination



Injury profile determined for each building type

Σ **Population @ location X,Y**

MSSF-C
MSSF-ER-C
MSSF-ER-P
MSSF-P
MSWB
Outside
SSLSF
WF

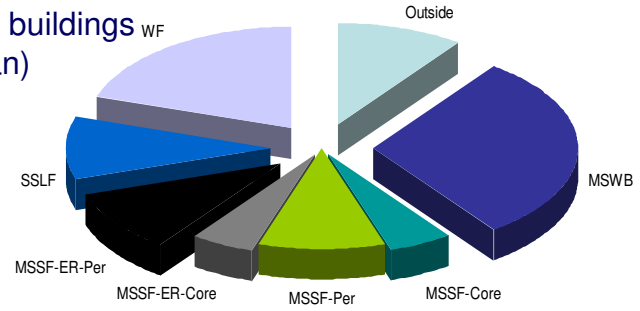
Blast Injury Distribution: Operable, Non- Operable, Uninjured

Thermal Injury Distribution: Severe, Moderate, Mild, Uninjured

Radiation Exposure: 0.5-0.7, 0.7-1.25, 1.25-3.0, 3.0-5.3, 5.3-8.3, 8.3-15, 15-20 Gy

20 Gy → Prompt Fatalities

Population Distributed into buildings (example: Suburban)



Summed for all buildings and all locations in venue

Dose (Gy)	Burn	Trauma
< 0.5	None, Mild, Moderate, or Severe	None, Non-operable, or Operable
0.5 to 0.7	None, Mild, Moderate, or Severe	None, Non-operable, or Operable
0.7 to 1.25	None, Mild, Moderate, or Severe	None, Non-operable, or Operable
1.25 to 3.0	None, Mild, Moderate, or Severe	None, Non-operable, or Operable
3.0 to 5.3	None, Mild, Moderate, or Severe	None, Non-operable, or Operable
5.3 to 8.3	None, Mild, Moderate, or Severe	None, Non-operable, or Operable
8.3 to 15	None, Mild, Moderate, or Severe	None, Non-operable, or Operable
15 to 20	None, Mild, Moderate, or Severe	None, Non-operable, or Operable
Immediate Fatality		

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Lessons from Non-Nuclear Explosions

For unwarned (more importantly, unprepared) populations, window breakage injuries (especially eye injuries) were the most common injury mechanism outside of the Oklahoma City building and in the town near the Halifax explosion. Ophthalmology *Volume 107, Number 5, May 2000*

Table 2. Locations of all Injured Persons and 55 Persons with Ocular Injuries—Oklahoma City Bombing

Location	Total Persons Injured (n = 684)	Ocular Injuries (n = 55)	Corneal Abrasions (n = 18)	Lid/Brow Lacerations (n = 20)	Open Globe Injuries (n = 12)
Murrah	168	31	9	14	10
YMCA	78	4		2	
Water Resources	41	1		1	
Journal Record	128	6	2	2	2
Regency Tower	26	1			
Other buildings	150	6	4		
Outdoors	60	4	2	1	
Unknown	33	2	1		

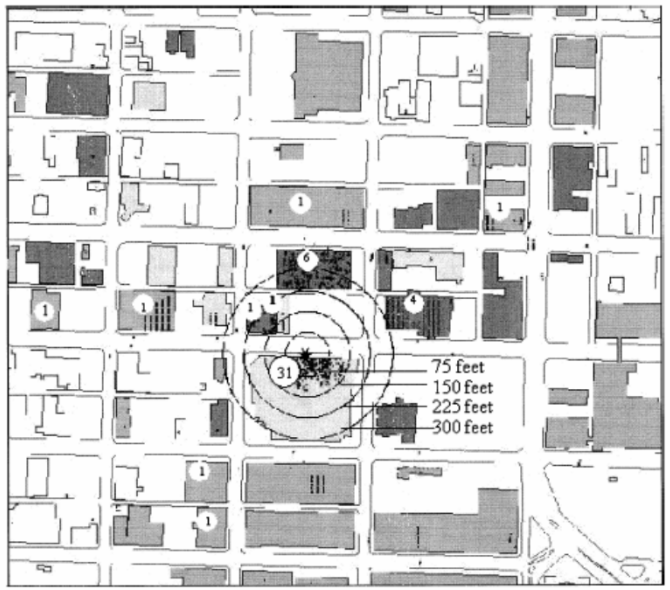


Figure 5. Ocular injuries by location and distance from the blast. (Exact location determined for 49 of the 55 patients with an ocular injury.)

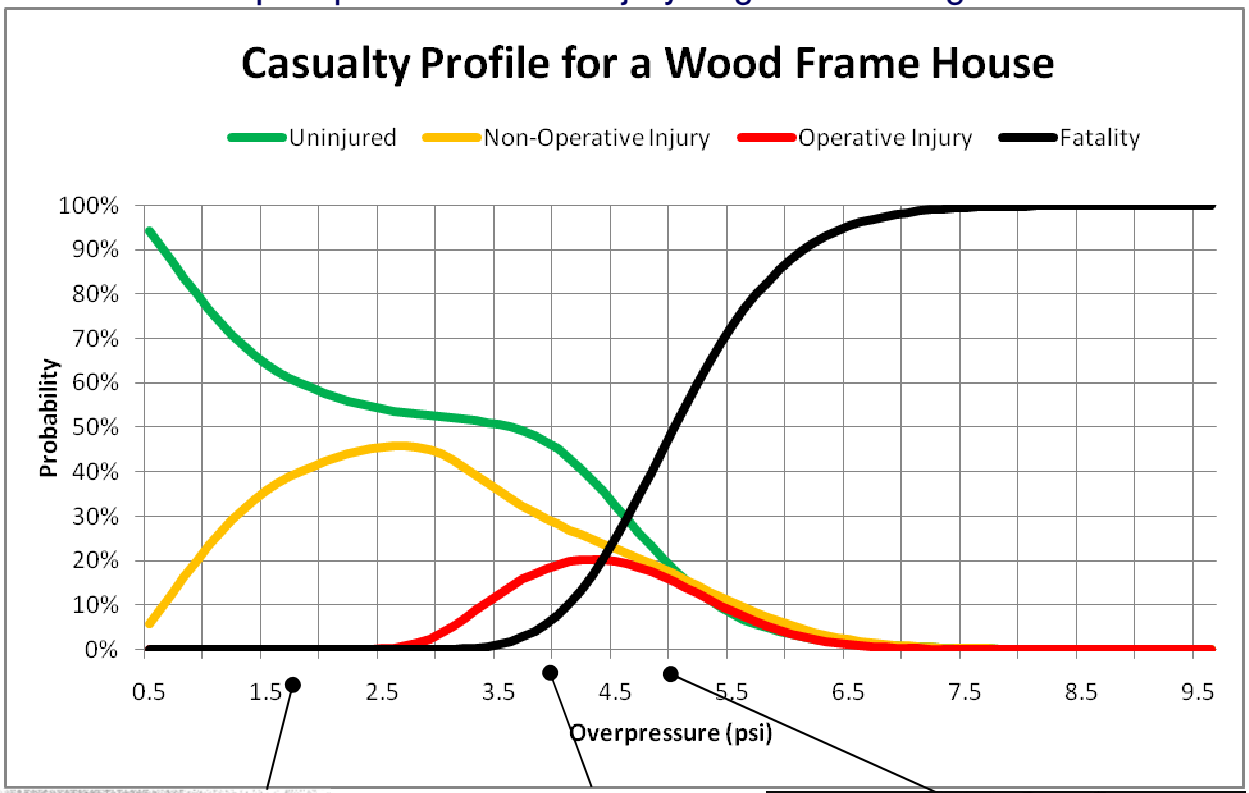
*Exact locations known for 49 persons.
Map shows the detonation point and the locations of people exposed to the blast.

"Most injuries among survivors of bombings have been shown to result from secondary effects of the blast by flying and falling glass, building material, and other debris.[5] Despite the relative small surface area exposed, ocular injury is a frequent cause of morbidity in terrorist blast victims.[6–25]" (Ocular Injuries Sustained by Survivors of the Oklahoma City Bombing, American Academy of Ophthalmology ISSN 0161-6420)

Accounting for Glass and Blast Injuries

Typical Overpressure Damage	
Psi	**Damage**
50	LD_{50} from Lung Damage
15	**Lung Damage**
5	**Eardrum Rupture** Brick houses destroyed; trucks overturned; telephone poles collapsed
3	Wall of 12-inch concrete shattered; parked aircraft destroyed
2	Aluminum panels ripped off
0.5	**Windows shattered**

Graphic presumes 50% injury to glass breakage ratio



Burn Injury (Secondary)

- Burns from ***secondary fires*** likely to be a primary thermal injury mechanism
- Based on burns caused by building collapse during earthquakes, this event could result in 1,700 burn patients.
  - 200 have mild burns,
  - 650 have moderate burns
  - 900 have severe burns.

  {information from Gryphon Scientific}

Radiation Injury

TABLE 4.1—*Approximate acute death, acute symptoms, and lifetime fatal cancer risk estimates as a function of whole-body absorbed doses (for adults), for use in decision making after short-term*[a] *radiation exposure (adapted from AFRRI, 2003; Goans and Wasalenko, 2005; IAEA, 1998; ICRP, 1991; Mettler and Upton, 1995).*

Short-Term Whole-Body Dose [rad (Gy)]	Acute Death[b] from Radiation Without Medical Treatment (%)	Acute Death from Radiation with Medical Treatment (%)	Acute Symptoms (nausea and vomiting within 4 h) (%)	Lifetime Risk of Fatal Cancer Without Radiation Exposure (%)	Excess Lifetime Risk of Fatal Cancer Due to Short-Term Radiation Exposure[c] (%)
1 (0.01)	0	0	0	24	0.08
10 (0.1)	0	0	0	24	0.8
50 (0.5)	0	0	0	24	4
100 (1)	<5	0	5 – 30	24	8
150 (1.5)	<5	<5	40	24	12
200 (2)	5	<5	60	24	16
300 (3)	30 – 50	15 – 30	75	24	24[d]
600 (6)	95 – 100	50	100	24	>40[d]
1,000 (10)	100	>90	100	24	>50[d]

[a]Short-term refers to the radiation exposure during the initial response to the incident. The acute effects listed are likely to be reduced by about one-half if radiation exposure occurs over weeks.

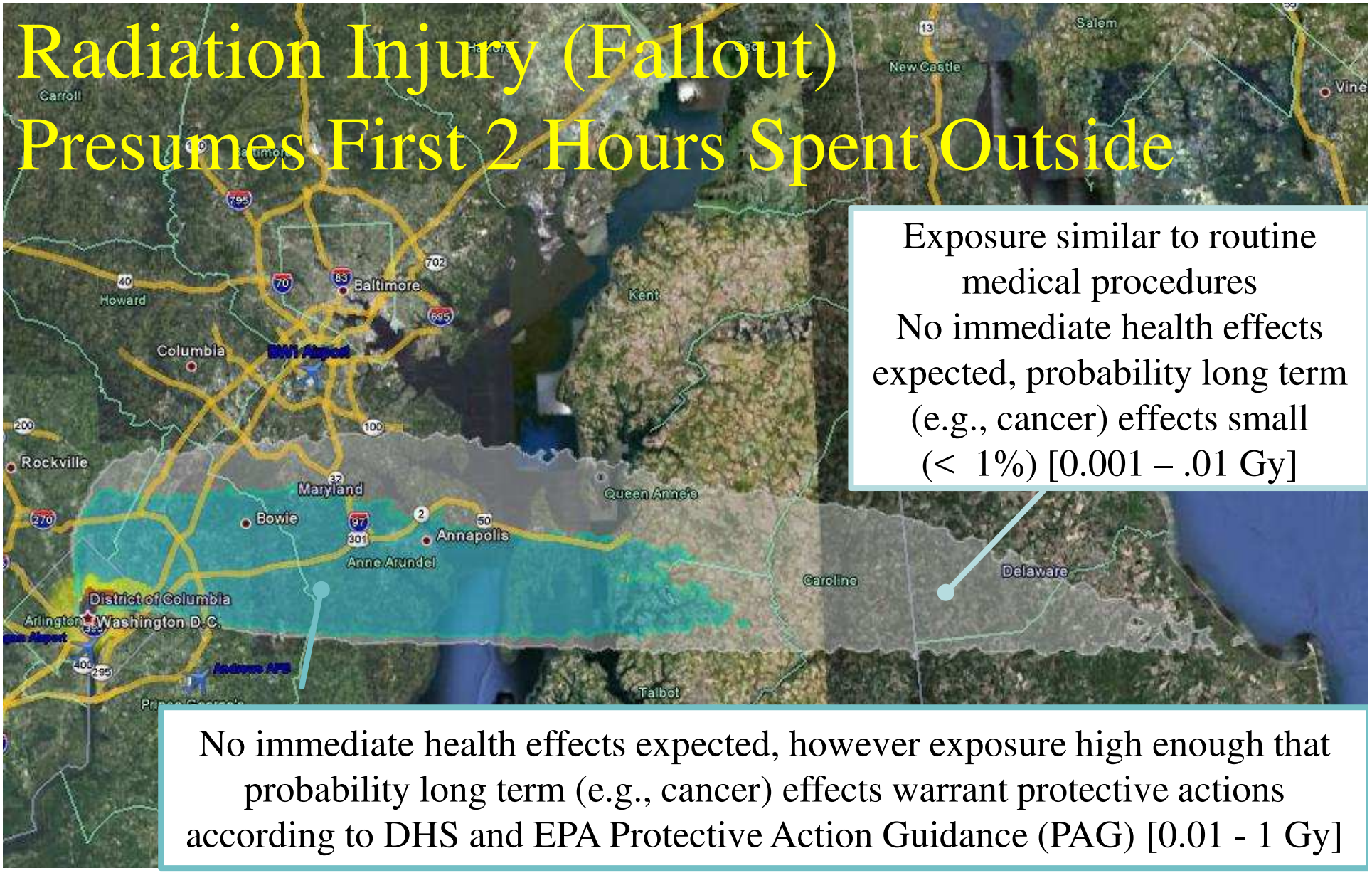
[b]Acute deaths are likely to occur from 30 to 180 d after exposure and few if any after that time. Estimates are for healthy adults. Individuals with other injuries, and children, will be at greater risk.

[c]Most cancers are not likely to occur until several decades after exposure; although leukemia has a shorter latency period (<5 y).

[d]Applies to those individuals that survive ARS.

Table from NCRP Commentary No. 19 - Key Elements of Preparing Emergency Responders for Nuclear and Radiological Terrorism (2005)

Radiation Injury (Fallout)
Presumes First 2 Hours Spent Outside



Exposure similar to routine medical procedures
No immediate health effects expected, probability long term (e.g., cancer) effects small (< 1%) [0.001 – .01 Gy]

No immediate health effects expected, however exposure high enough that probability long term (e.g., cancer) effects warrant protective actions according to DHS and EPA Protective Action Guidance (PAG) [0.01 - 1 Gy]

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Integrated Exposure (0 – 2 Hours)

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Radiation Injury (Fallout)
Presumes First 2 Hours Spent Outside

Integrated Exposure (0 – 2 Hours)

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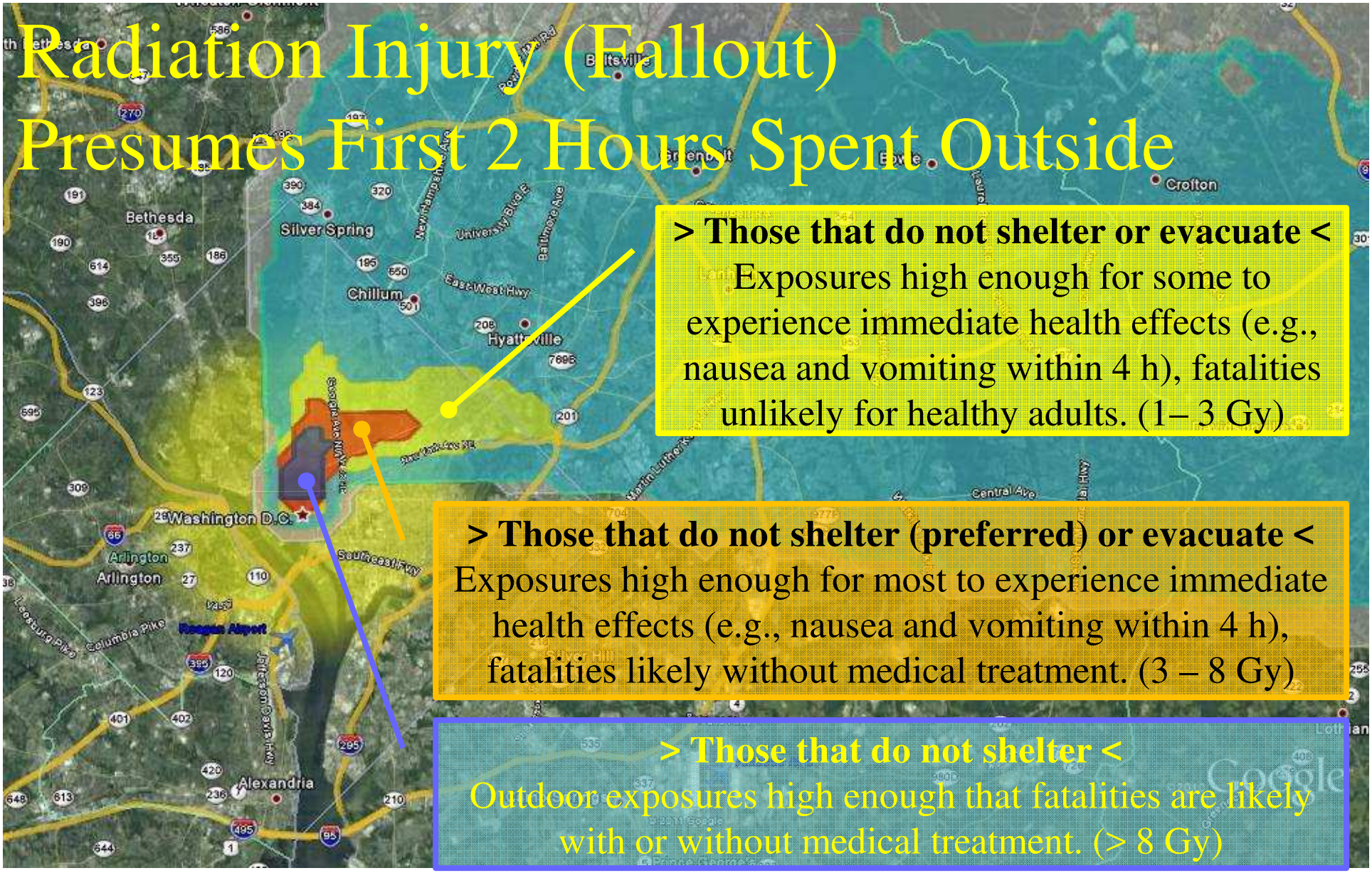
National Nuclear Security Administration

Radiation Injury (Fallout)
Presumes First 2 Hours Spent Outside



> Those that do not shelter or evacuate <
Exposures high enough for some to experience immediate health effects (e.g., nausea and vomiting within 4 h), fatalities unlikely for healthy adults. (1– 3 Gy)

> Those that do not shelter (preferred) or evacuate <
Exposures high enough for most to experience immediate health effects (e.g., nausea and vomiting within 4 h), fatalities likely without medical treatment. (3 – 8 Gy)

> Those that do not shelter <
Outdoor exposures high enough that fatalities are likely with or without medical treatment. (> 8 Gy)

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Integrated Outdoor Exposure (0 – 2 Hours)

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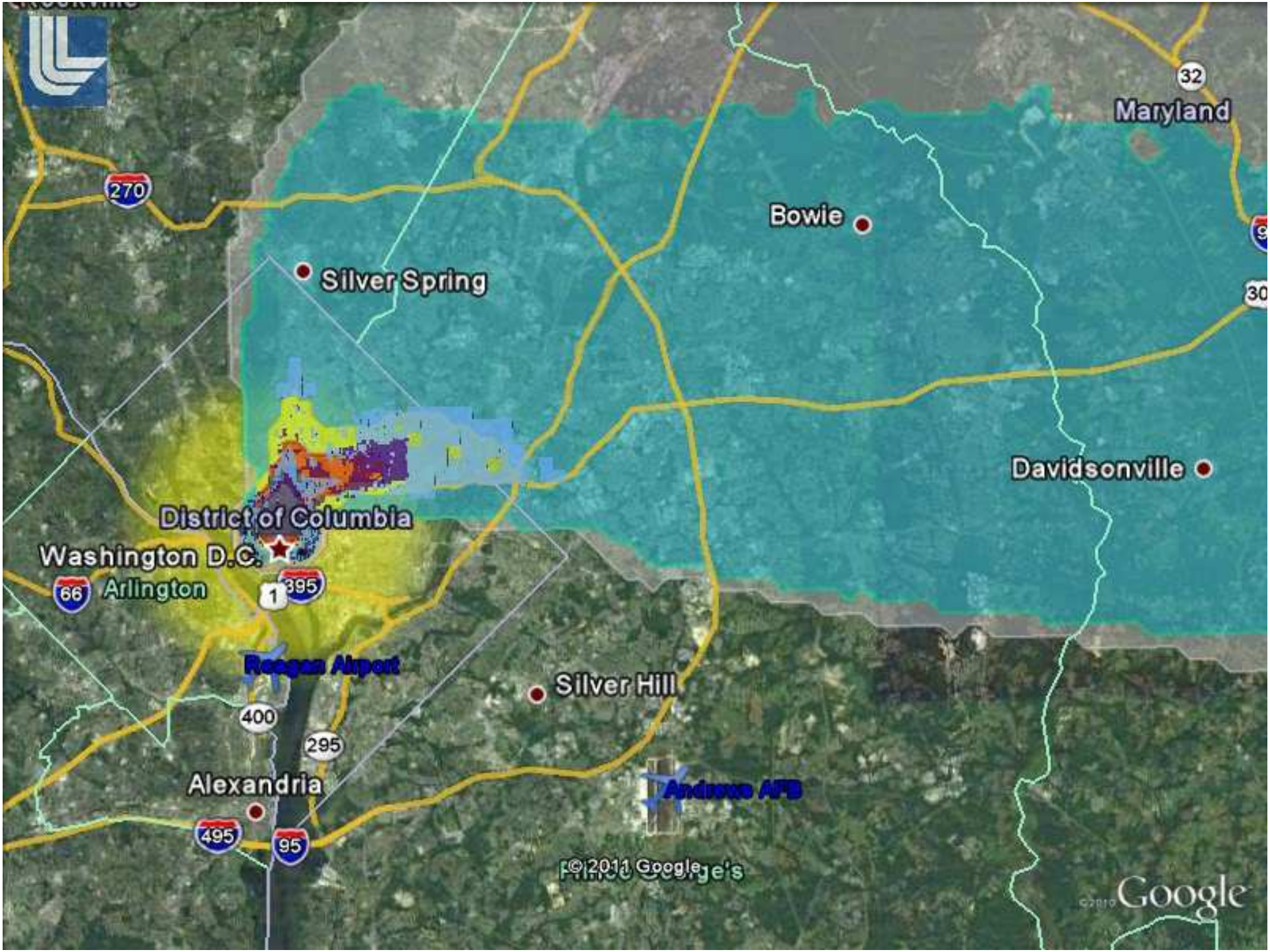
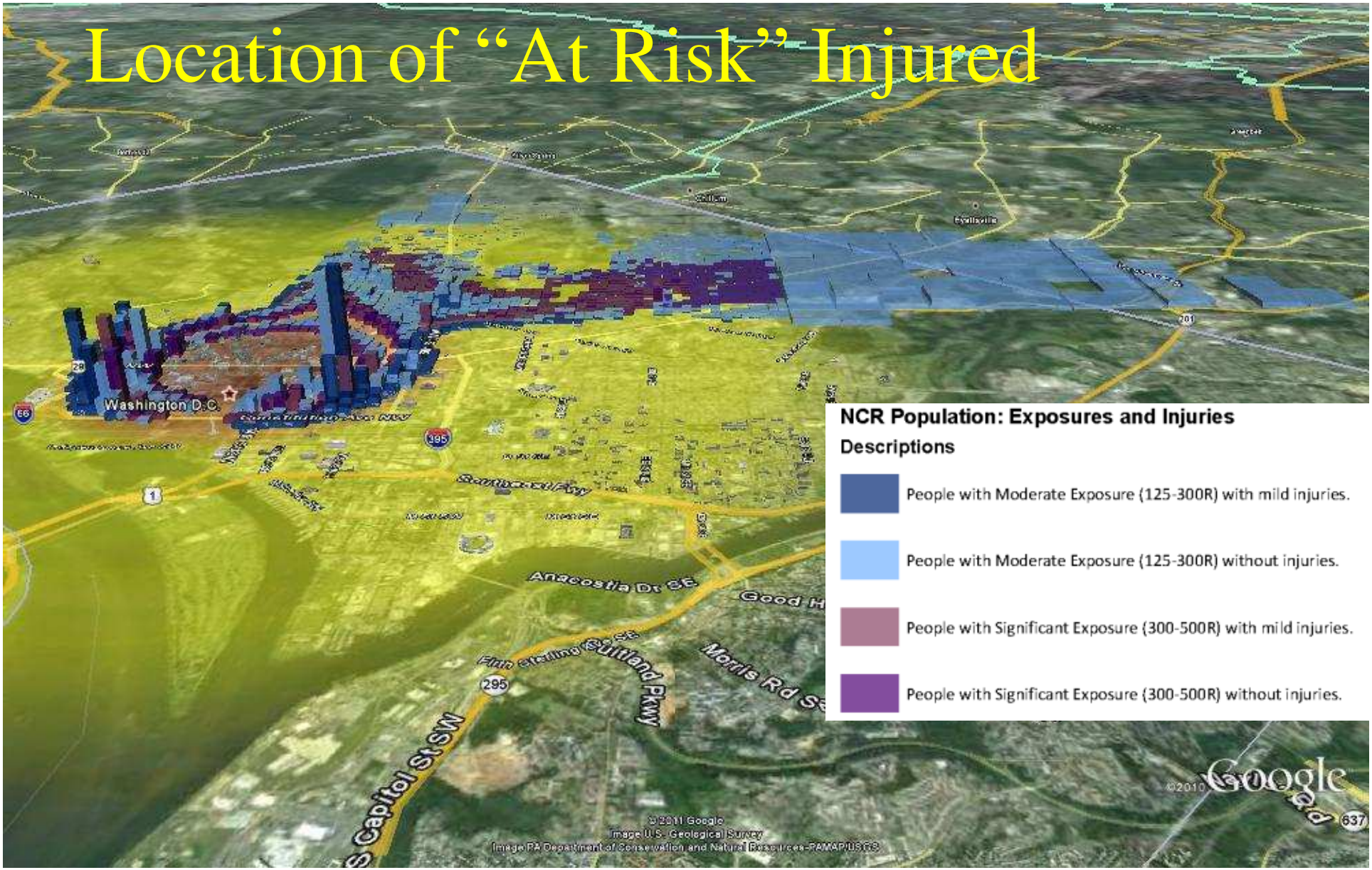

Maryland
Bowie
Silver Spring
Davidsonville
District of Columbia
Washington D.C.
Arlington
Reagan Airport
Silver Hill
Alexandria
Andrews AFB
270
32
66
1
395
400
295
495
95
© 2011 Google
Google

Location of "At Risk" Injured



Primary "At Risk" Injury Categories

Low exposure (< 1.25 Gy), mild trauma: 175,000 people

~4,000 of the ~5,000 potential fatalities can be saved with medical care

These will generally be populations that are upwind of the fallout but in the light on moderate damage zones (LDZ & MDZ). In the case of our Feb 14 scenario, this means South and West DC and Virginia.

Injury of concern is trauma and prompt medical support (<12 hours) will be most effective. As the number of potential mortalities is only 3% of the overall population in this category, separating and saving the ones on a mortality trajectory may be difficult.

Moderate Exposure (1.25 – 3 Gy), with and without mild trauma: 60,000 people

~10,000 of the ~15,000 potential fatalities can be saved with medical care

This represents the greatest life saving potential. Exposure complicates recovery, but not so high as to be acutely life threatening.

Since the primary mortality mechanism is complications (i.e. immune-suppression) from ARS, medical care can be applied throughout the acute radiation syndrome (ARS) stages to improve prognosis (even as late as weeks later), however early intervention, especially with anti-Neutropenics, can greatly improve outcomes. These survivors will come from downwind areas in dangerous fallout zone (DFZ), also often in the light damage zone (LDZ).

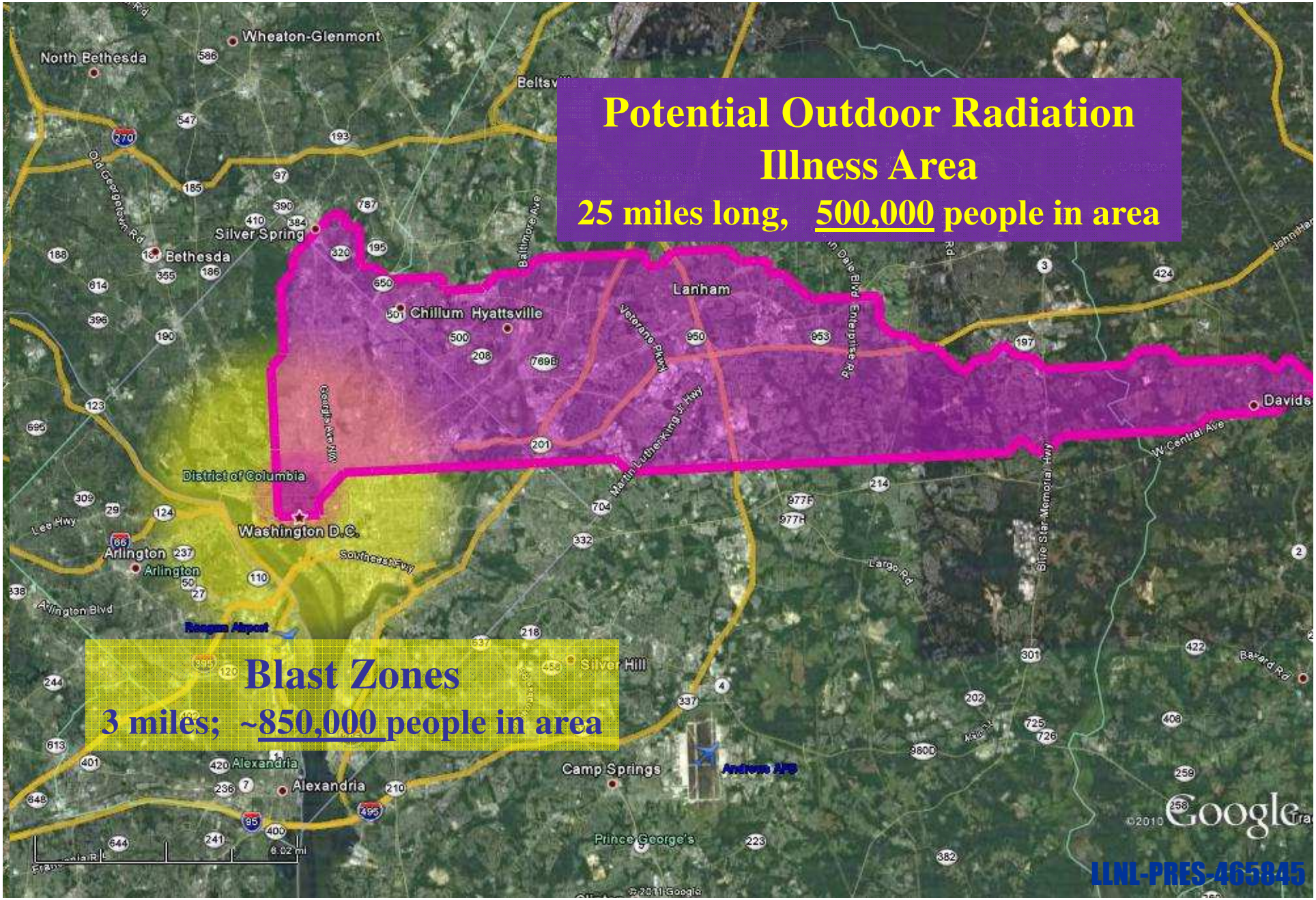
Significant Exposure (3– 5.3 Gy), with and without mild trauma: 33,000 people

~10,000 of the ~25,000 potential fatalities can be saved with medical care

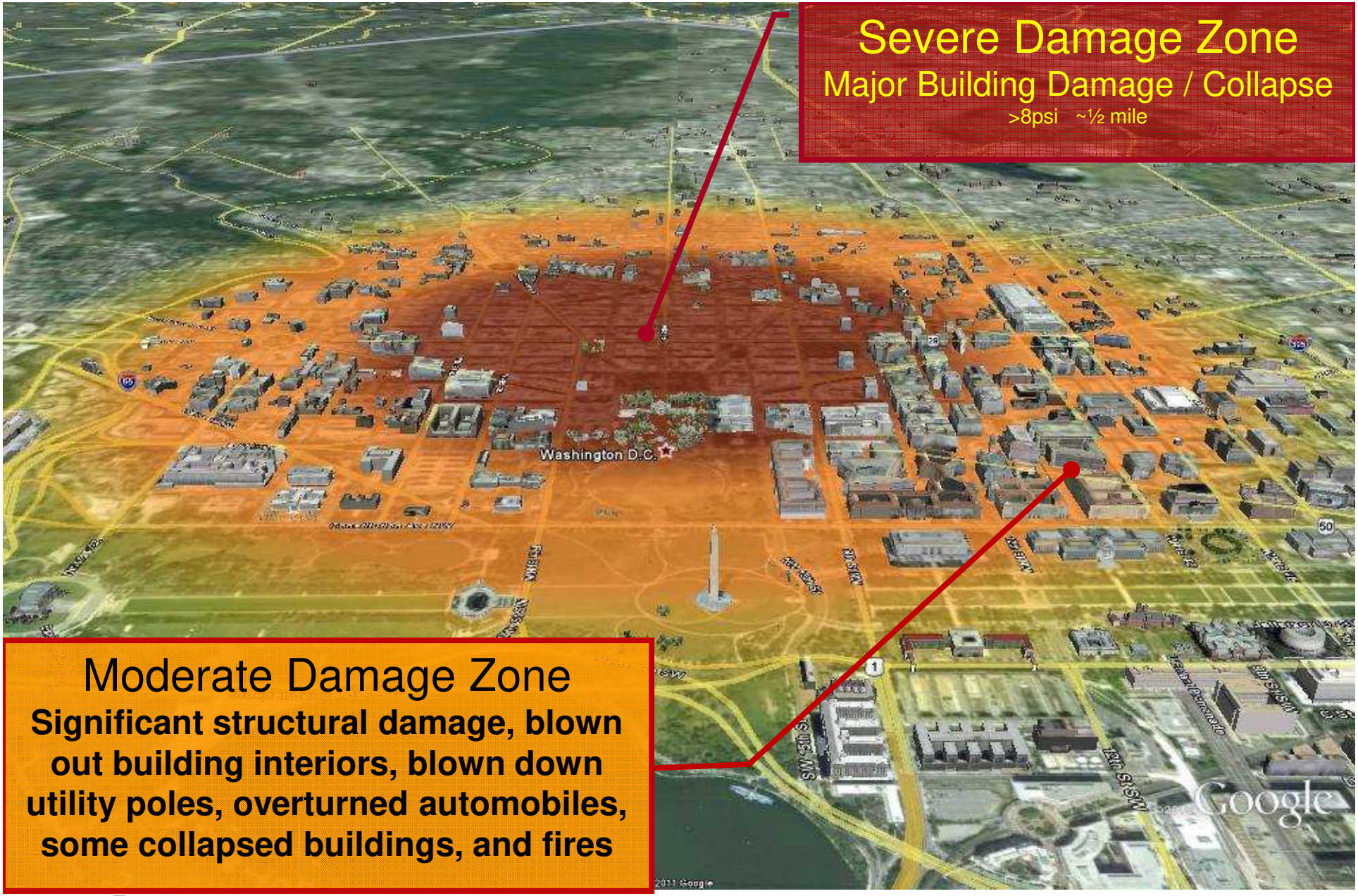
Although a significant life saving potential, these individuals will require sooner (<3 days) and more intensive care than those with less severe exposures (above). Even with advanced medical care ~50% will perish.

These candidates come from the area where the DFZ overlaps the LDZ and MDZ.

Putting It Into Perspective



Zone Recognition

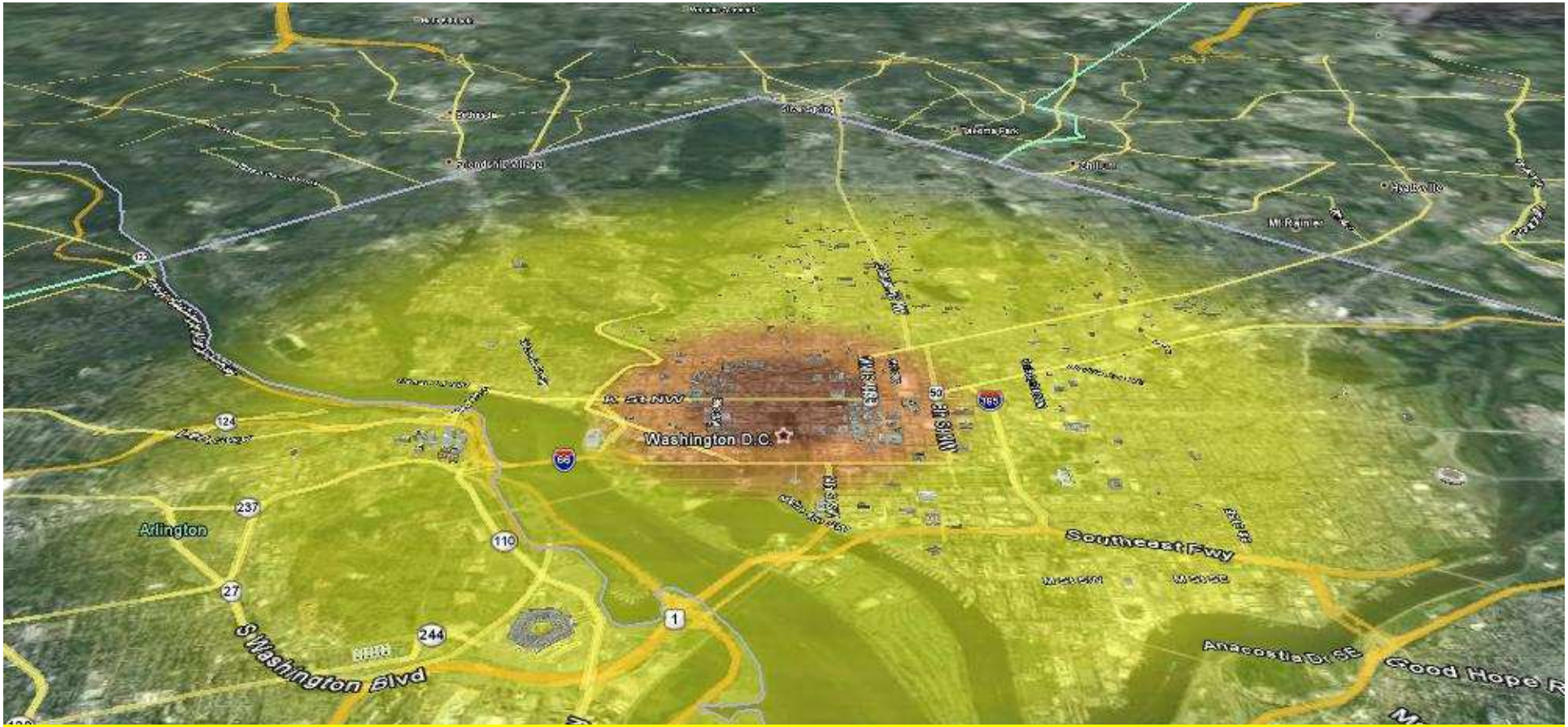

Severe Damage Zone
Major Building Damage / Collapse
>8psi ~½ mile
Washington D.C.
Moderate Damage Zone
Significant structural damage, blown out building interiors, blown down utility poles, overturned automobiles, some collapsed buildings, and fires
Google

Recognizing the Severe Damage Zone

- Few, if any, buildings are expected to be structurally sound or even standing
- Very few people would survive; however, some people protected within stable structures (e.g., subterranean parking garages or subway tunnels) at the time of the explosion may survive the initial blast.
- Very high radiation levels and other hazards are expected in the SDZ, significantly increasing risks to survivors and responders. Responders should enter this zone with great caution, only to rescue known survivors.
- Rubble in streets is estimated to be impassable in the SDZ making timely response impracticable.

Recognizing the Moderate Damage Zone

- Responders may expect they are transitioning into the MDZ when building damage becomes substantial, such as blown out building interiors, blown down utility lines, overturned automobiles, caved roofs, some collapsed buildings, and fires.
- In the MDZ, sturdier buildings (e.g., reinforced concrete) will remain standing, lighter commercial and multi-unit residential buildings may be fallen or structurally unstable, and many wood frame houses will be destroyed.
- The MDZ is expected to have the highest proportion of '***survivable victims'*** who require medical treatment.
- The MDZ presents significant hazards to response workers, including elevated radiation levels, unstable buildings and other structures, downed power lines, ruptured gas lines, hazardous chemicals, asbestos and other particulates released from damaged buildings, and sharp metal objects and broken glass, for which consideration and planning is needed.



Light Damage Zone

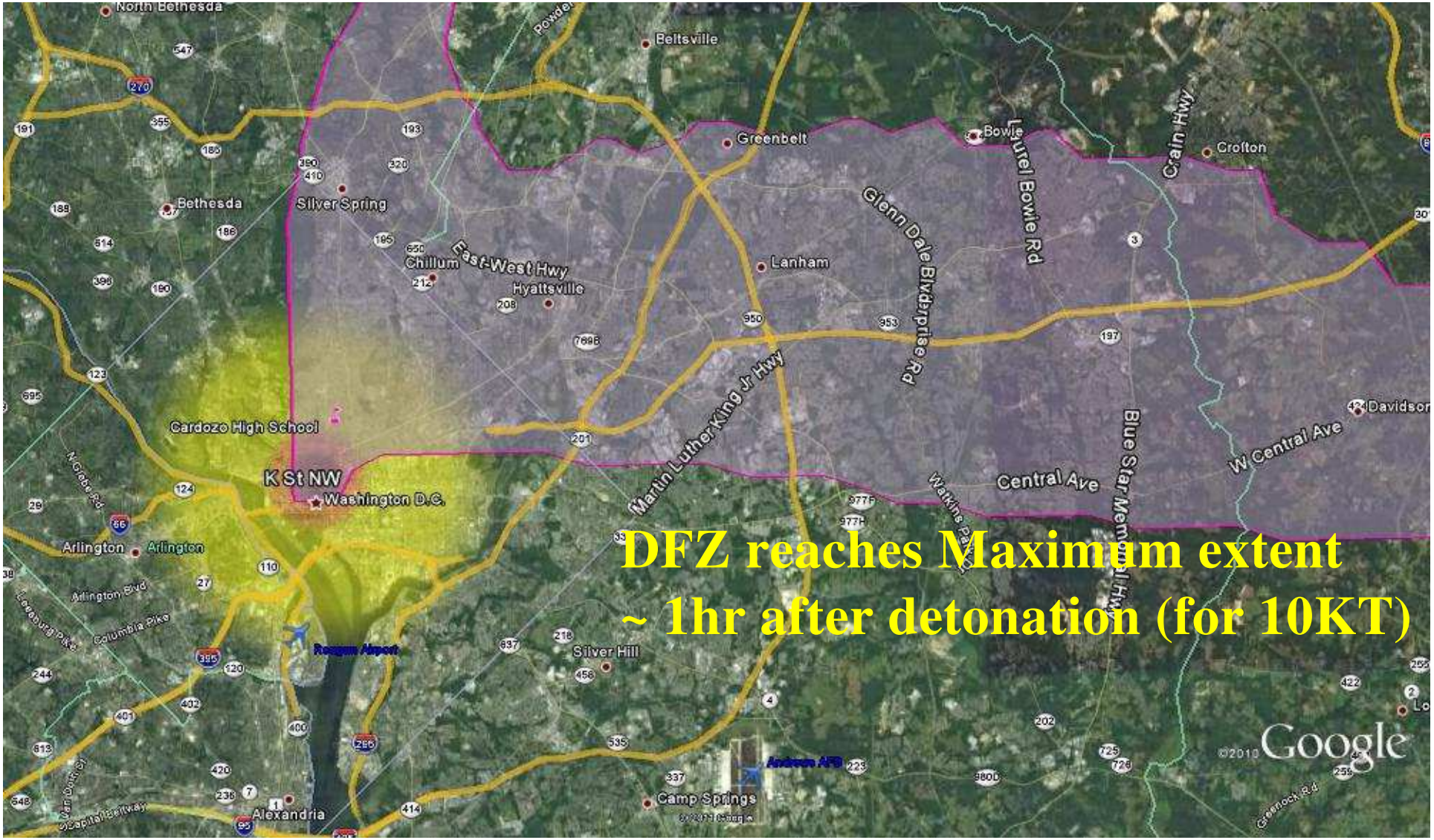
Outer boundary may be defined by the prevalence of broken windows

1. **Zone extends from ~1 mile up to ~3 miles (10kT Example)**
2. **Damage NOT caused by dynamic (wind-like) pressure, but the "shockwave" of peak free field overpressure**
3. **Damage not just to windows, but other larger flat (and weak) features**
4. **Mostly superficial wounds from flying glass and debris**

Recognizing the Light Damage Zone

- Nearly all windows will be broken and there will be external panel damage on most structures.
- The damage in this area will be highly variable as shock waves rebound multiple times off of buildings, the terrain, and even the atmosphere.
- As a responder moves inward, windows and doors will be blown in and gutters, window shutters, roofs, and lightly constructed buildings will have increasing damage.
- The severity of injuries responders will encounter in the LD zone should be relatively light and, consist of mostly superficial wounds with occasional flash burns.

Dangerous Fallout Zone Changes with Time **Day 7**



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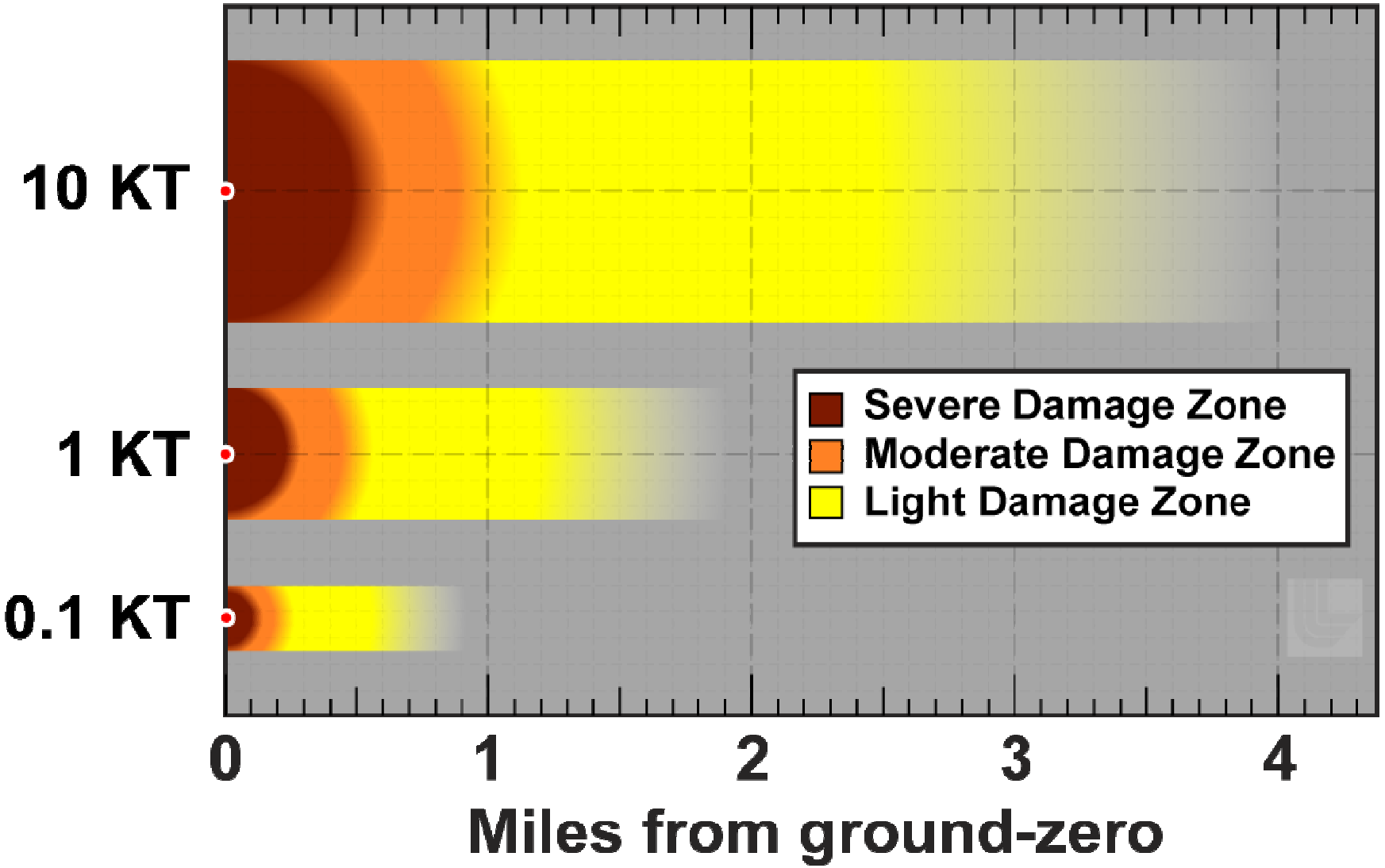
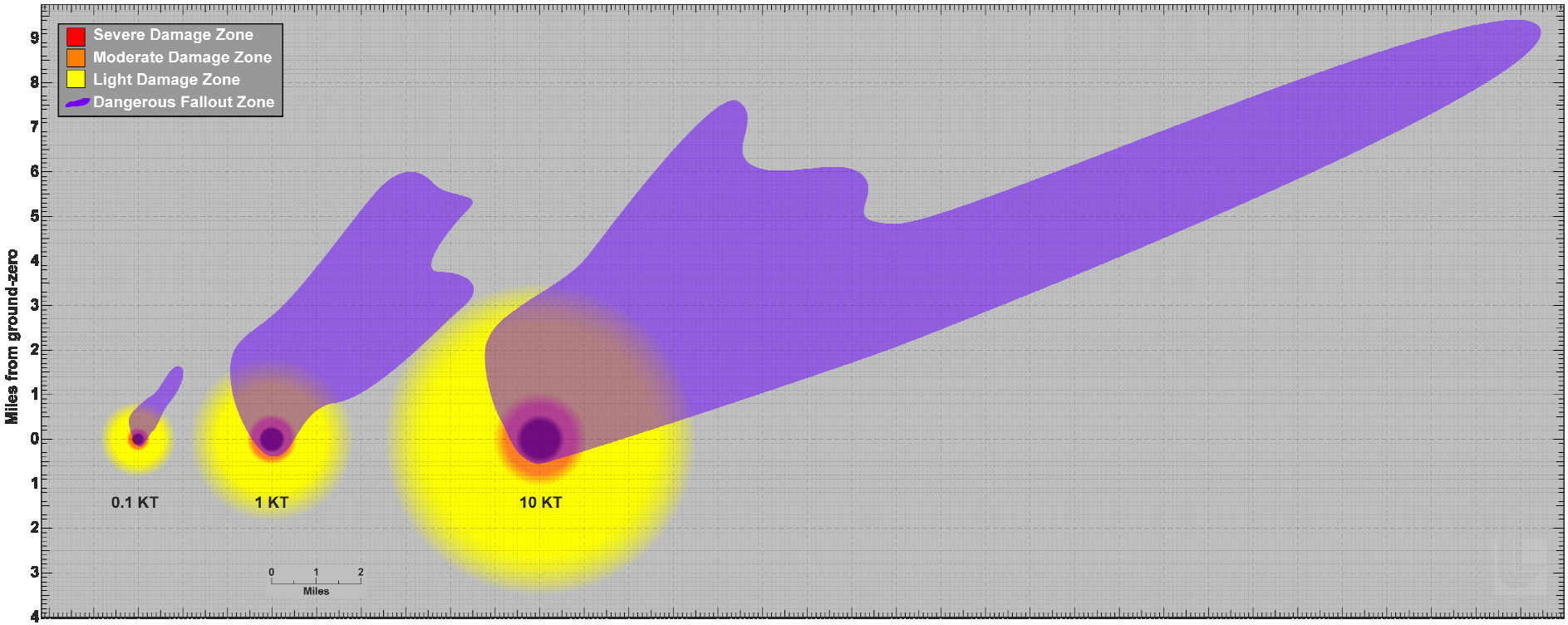
Damage Zone Ranges Will Change With Yield



Dangerous Fallout Zone Precautions Take Precedent

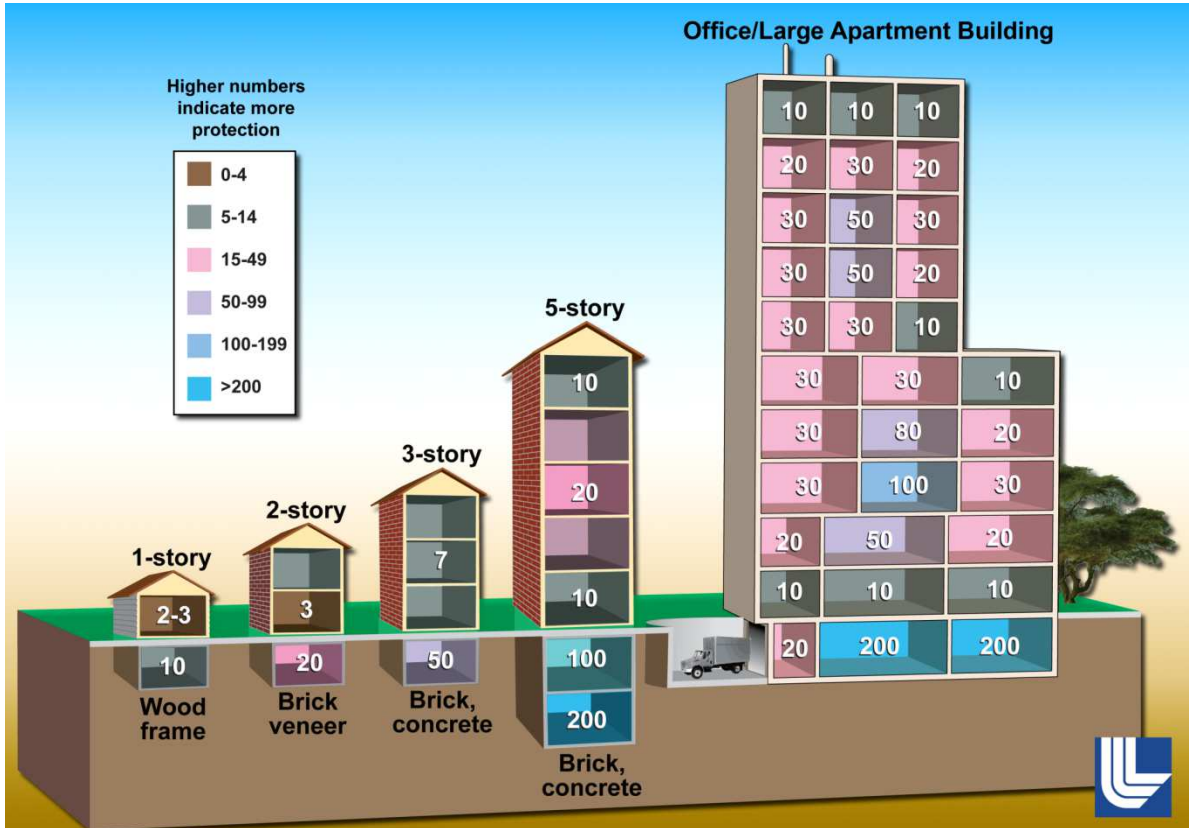


- The Dangerous Fallout Zone (DFZ) will overlap the damage zones
- When zones overlap, DFZ precautions take precedent.
- Initial efforts should focus on the portions of the damage zones that are outside of the DFZ

(First hour) Public: Find Early, Adequate Shelter

- It is important *to be in the shelter when the fallout arrives.*
- There should be ***several minutes*** before fallout arrives.
- If you are outside or in a car, seek the nearest adequate shelter.
- If you are already in an adequate shelter, shelter in place.
- ***Adequate Shelters*** are Protection Factor 10 or higher

- Note: Buildings do not have to be "air tight," even a building with broken windows can offer significant protection.



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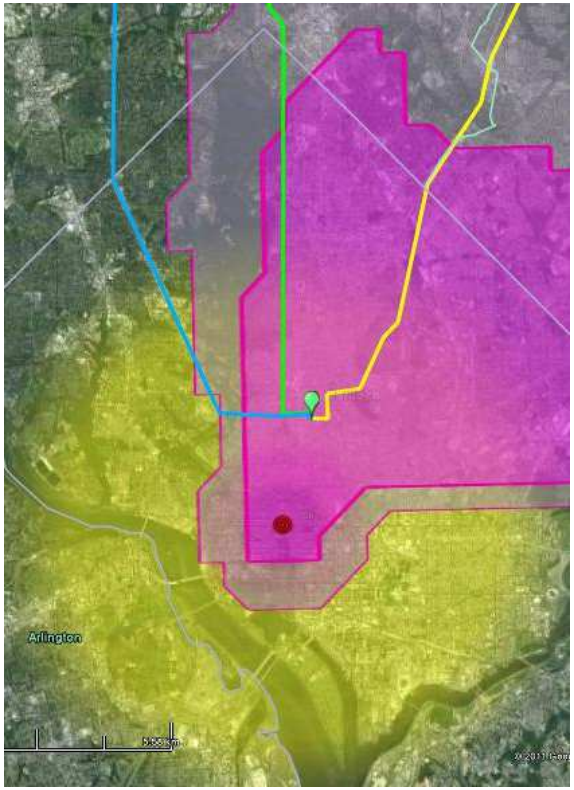
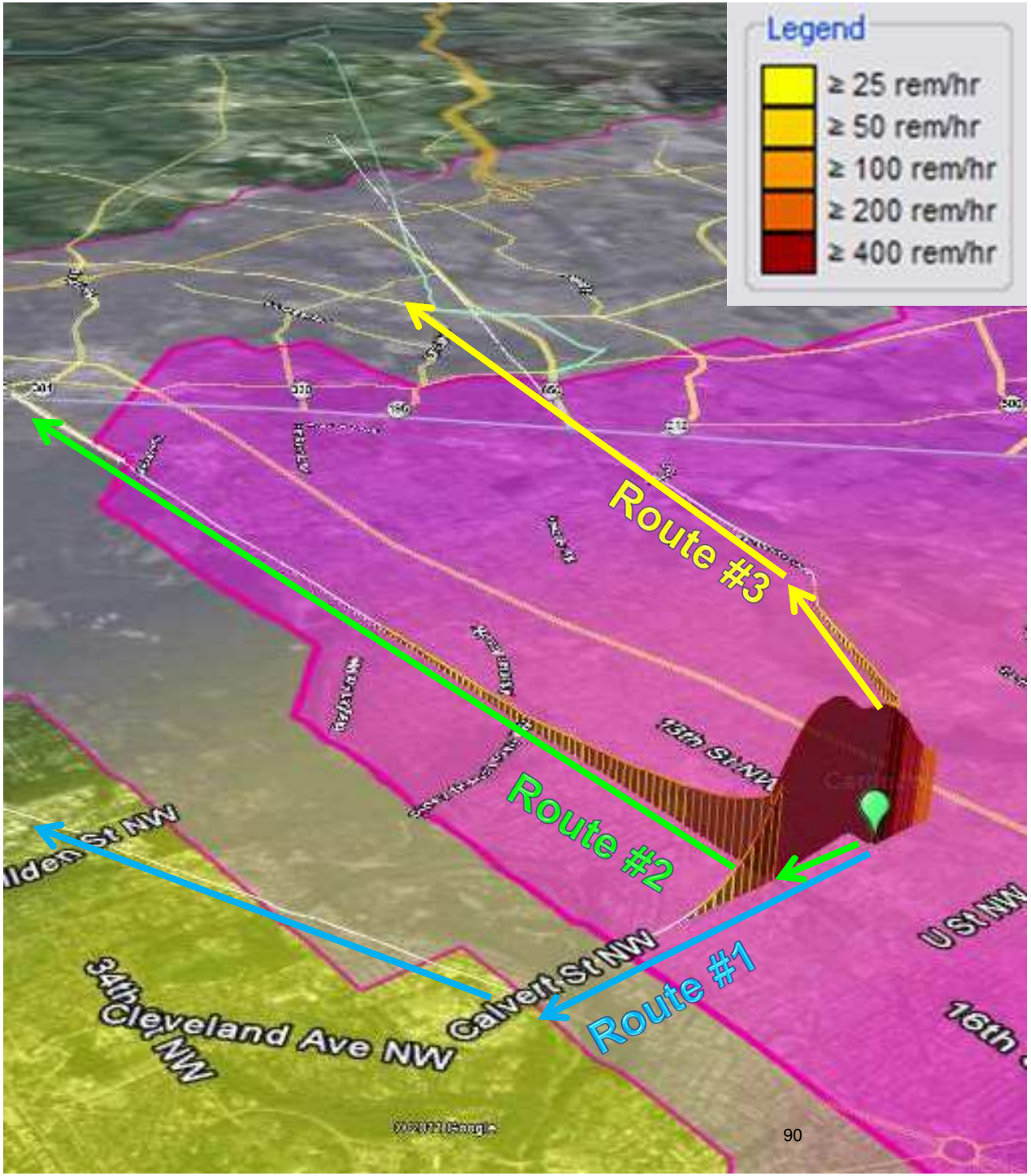
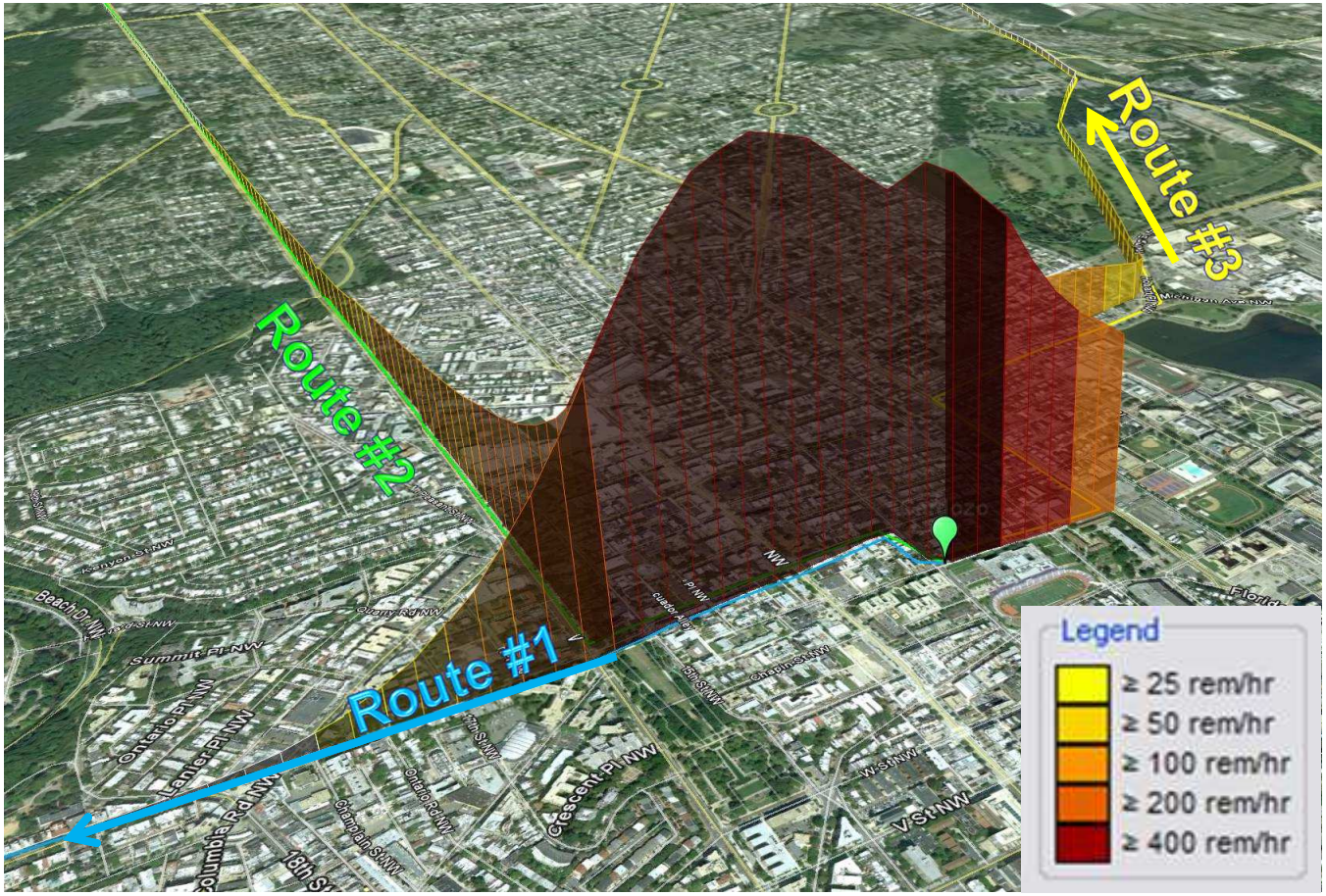
Response Strategy

- **Protect Response Force**
  - Identify protection strategy
  - Identify early response priorities
- **Local Emergency Management:**
  - Establish early public communication
  - Rapid identification of hazard zones
  - Established coordinated safe evacuation routes
  - Identify priority candidates for early shelter departure (i.e., those in inadequate shelters or threatened by other hazards)
- **Knowing what to do before the event is critical**


Arlington

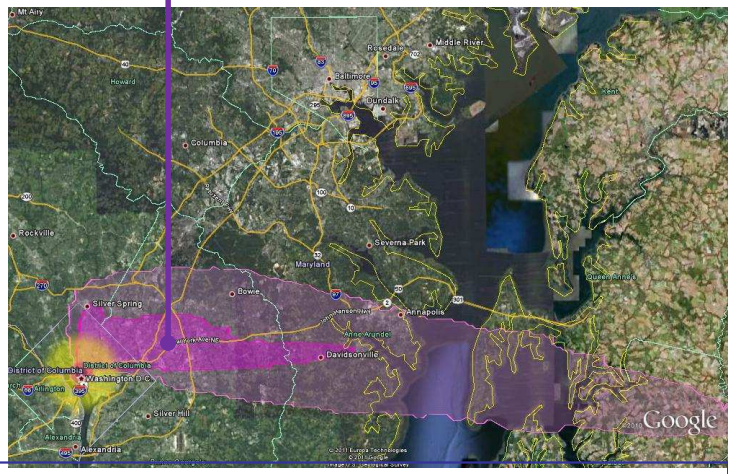

Legend
≥ 25 rem/hr
≥ 50 rem/hr
≥ 100 rem/hr
≥ 200 rem/hr
≥ 400 rem/hr
Route #3
Route #2
Route #1
Calvert St NW
Cleveland Ave NW
34th St NW
U St NW
16th

FEMA


Route #1
Route #2
Route #3
Legend
≥ 25 rem/hr
≥ 50 rem/hr
≥ 100 rem/hr
≥ 200 rem/hr
≥ 400 rem/hr

Dangerous Fallout Zone (DFZ)

- Bounded by radiation levels of 10 R/hr
- Reaches 10-20 miles downwind
- Reaches maximum extent at 1 hour
- Also Called:
  - High-Hazard Zone *(Key Response Factors)*
  - Dangerous Radiation Zone *(NCRP Report #165)*



"Identifying the dangerous-radiation zone [exposure rate ≥10 R/h] will have critical implications on response activities in or near fallout areas. The dangerous-radiation zone is an area where large doses could be delivered to emergency responders in a short period of time."

~National Council of Radiation Protection and Measurement, Report #165

In physical locations where the dangerous fallout (DF) zone overlaps the LD or MD zones, response activities should be guided by the potentially lethal radiation hazard of the DF zone.

The most important mission in the DF zone is communicating protective action orders to the public. Effective preparedness requires public education, effective communication plans, messages, and means of delivery in the DF zone.

~OSTP, Planning Guidance for the Response to a Nuclear Detonation (2010)

Hot Zone (0.01 R/h boundary)

- Bounded by radiation levels of 10 mR/hr (0.01 R/h) (1/1000th of the DRZ)
- Extends 150 miles
- Reaches maximum extent at ~ 1 day
- Extended Response Actions will NOT result in life threatening exposures (>100 rem)
- Also Called:
  - 0.01 R/h Boundary *(Planning Guidance for Response to a Nuclear Detonation)*

In routine radiation emergency response entering the zone bounded by 0.01 R/h entails donning appropriate personal protective equipment (PPE) and being properly monitored for radiation. For a nuclear detonation, the 0.01 R/h line can reach a maximum extent of several hundred miles within hours of the incident.

~OSTP, Planning Guidance for the Response to a Nuclear Detonation (2010)

Evacuation Considerations

- Those in shelters threatened by fire, building collapse, or other life endangering hazard should evacuate or relocate immediately.

Once DFZ and 0.01 R/h Boundary are established

- Evacuation planning should begin to move sheltered populations out of harms way.
- Evacuation routes should be cleared if possible
- Routes that take advantage of sheltered passage:
  - subways,
  - underground connectors, and
  - building lobbies

- Execution should be phased to reduce the time spent transiting through fallout areas