



Worker Protection in High Dose Rate Emergency Operations

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John MacKinney, DHS



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Emergency Workers

- Emergency Worker refers to those individuals who in the early stages of an incident are responsible for the protection and preservation of life, property, evidence, and the environment (NCRP)
- With respect to emergency workers, ...
 - They mostly have no field experience with radiation
 - Training is scarce or inadequate
 - Radiation often viewed with mystery, fear
 - Still, many appear willing to delve in



Emergency Worker Protection Goals

- Basic goals of radiation emergency worker protection (NCRP 116, etc.)
 1. Prevent radiation-induced conditions (acute and chronic deterministic) in exposed persons, and
 2. Reduce stochastic effects to a degree acceptable in relation to the benefits of the action



Basic Guides; High Dose Environment

- Actions that result in doses in excess of the OSHA 5 rem annual limit must be voluntary
- Accepting increased dose requires increased comprehension of the risk being taken
 - Decision points;
 - ❑ >5 rem – must understand increased cancer risk with increasing dose
 - ❑ >50 rem – must understand increased cancer risk, and potential for acute effects
- There is *no dose cap* for lifesaving actions
 - (Neither has a cap been established for infrastructure)
- Practice ALARA



Judgment and Justification; Protecting Infrastructure (e.g. firefighting)

- When protecting infrastructure (>5 rem), a commander must make judgment decisions
 - Is the property particularly important/valuable, or is the mission essential?
 - Is estimation of worker radiation dose sufficiently accurate?
 - Will the mission be successful?
- When protecting infrastructure, a commander must make a justification decision
 - Is the value/benefit of the action worth the risk to workers?
 - Does action to preserve property also protect public health and welfare?



Judgment and Justification; Lifesaving

- A commander should only allow a worker to undertake a lifesaving mission in which a very high dose is expected (>50 rem) if there is confidence that a life(s) can be saved
 - There must be confidence there are survivors
 - There must be confidence that the survivors can be saved
 - A commander must be able to estimate the worker radiation dose attributable to the mission, and consider other hazards
- The lifesaving benefit must outweigh the cost



Lifesaving

- Lifesaving considerations – high cancer risk, acute effects, possible death vs. potential to save one or many lives
 - Modifiers: health of the responder, availability of follow-up medical care, age of the worker, family
- Worker radiation risk should be seen in the context of other first responder risks
 - Fire fighting, HAZMAT response, USAR, etc.
- Workers should not perform high-dose response activities without proper training!
 - Reality not always accommodating



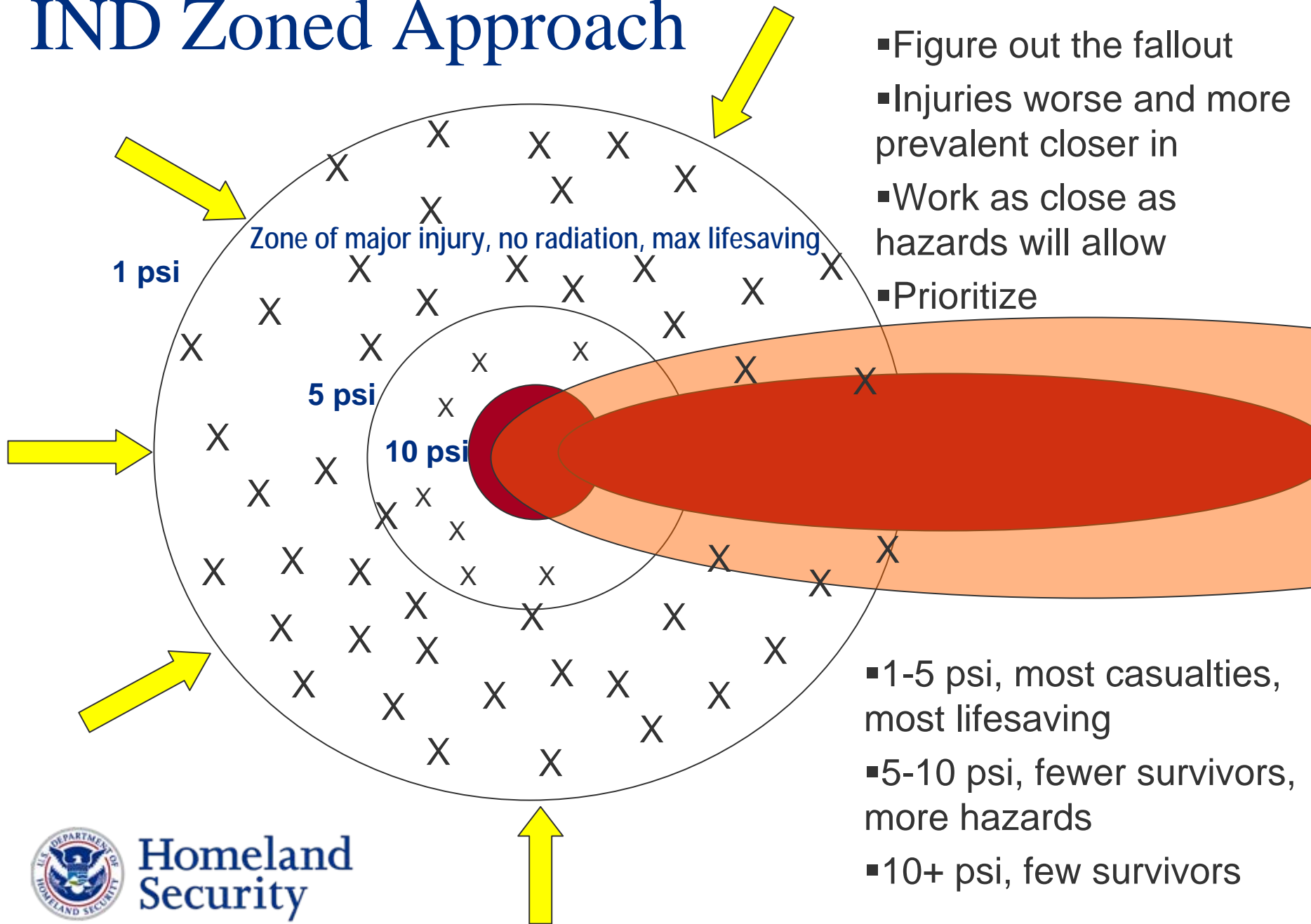
Lifesaving in an IND

- A commander must understand the IND incident:
 - Size and scope; not all a fallout zone
 - Hazards present – radiation, fire, building collapse, chemicals (esp. burst fuel tanks), downed power lines, leaking gas lines, “sharps”
 - Impediments to the mission – hazards, smoke/soot, blocked streets, structural collapse, lack of water pressure
 - The whole lifesaving mission; how to maximize lives saved
 - Nature of casualties
 - Time pressures, constraints
 - The number of workers available
 - Medical supplies needed/available
 - Manage worker cumulative doses
 - How much is too much?



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IND Zoned Approach



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Emergency Worker Protection Guidance

- DHS published interagency RDD/IND Guidance for interim use and comment
 - Developed by a federal interagency working group
 - Draft published in the Federal Register Jan. 3, 2006
 - Includes a section on emergency worker protection
 - Final is done, but not yet signed/published
- Other guidance
 - NCRP 65, 116, 138, Com. 19; IAEA; ICRP



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