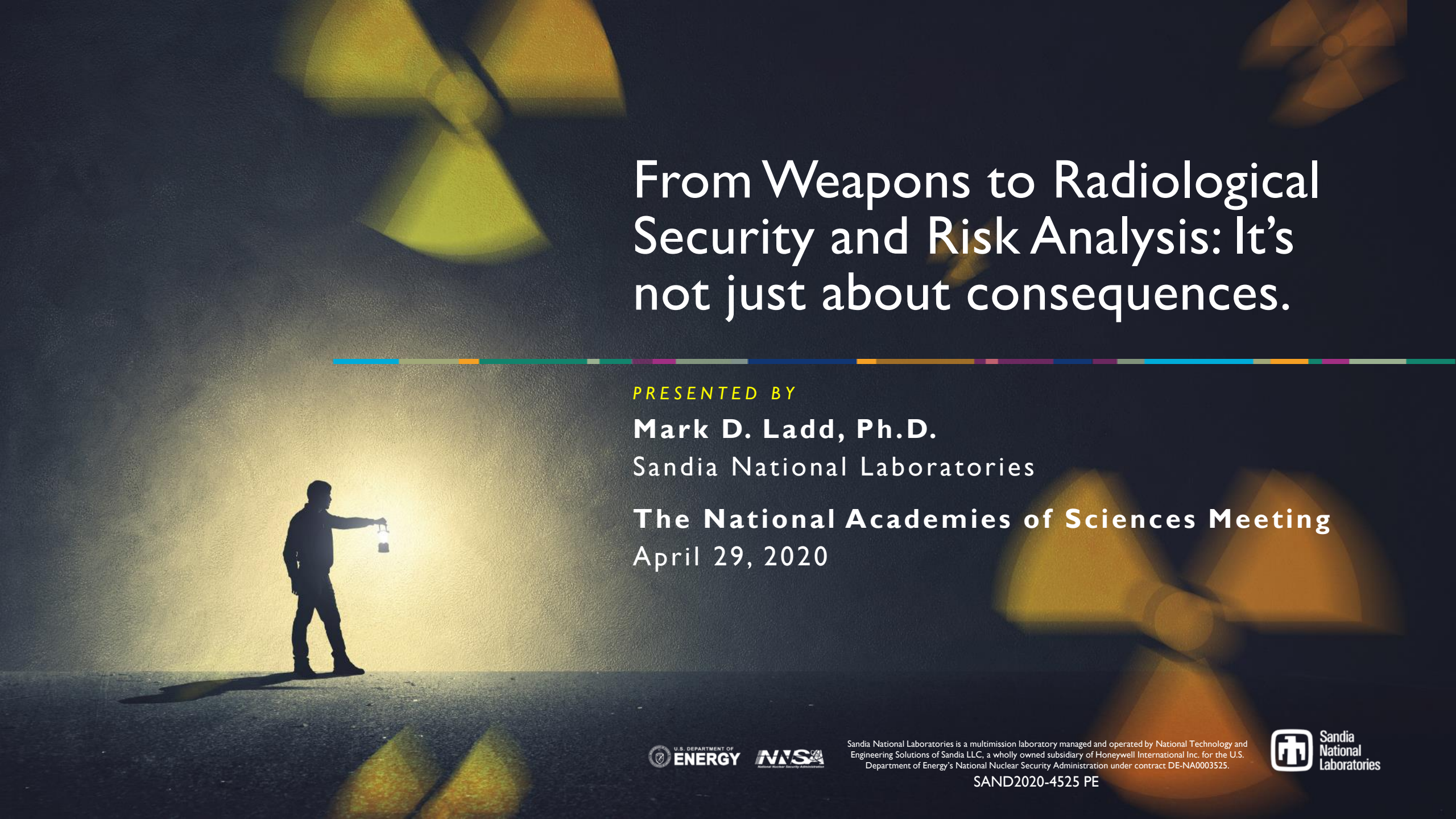

From Weapons to Radiological Security and Risk Analysis: It's not just about consequences.

PRESENTED BY

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Sandia National Laboratories

The National Academies of Sciences Meeting

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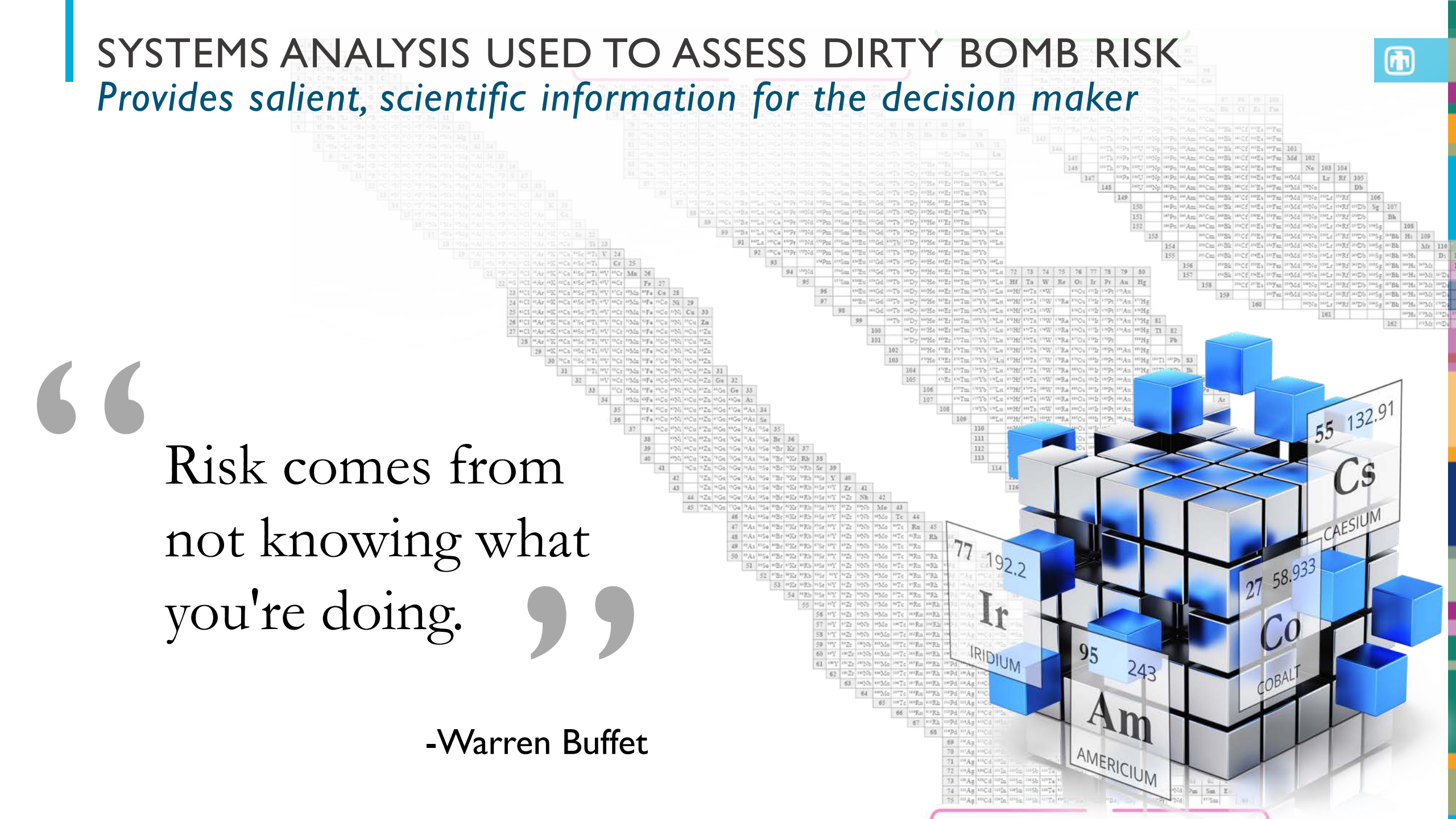
SYSTEMS ANALYSIS USED TO ASSESS DIRTY BOMB RISK

Provides salient, scientific information for the decision maker

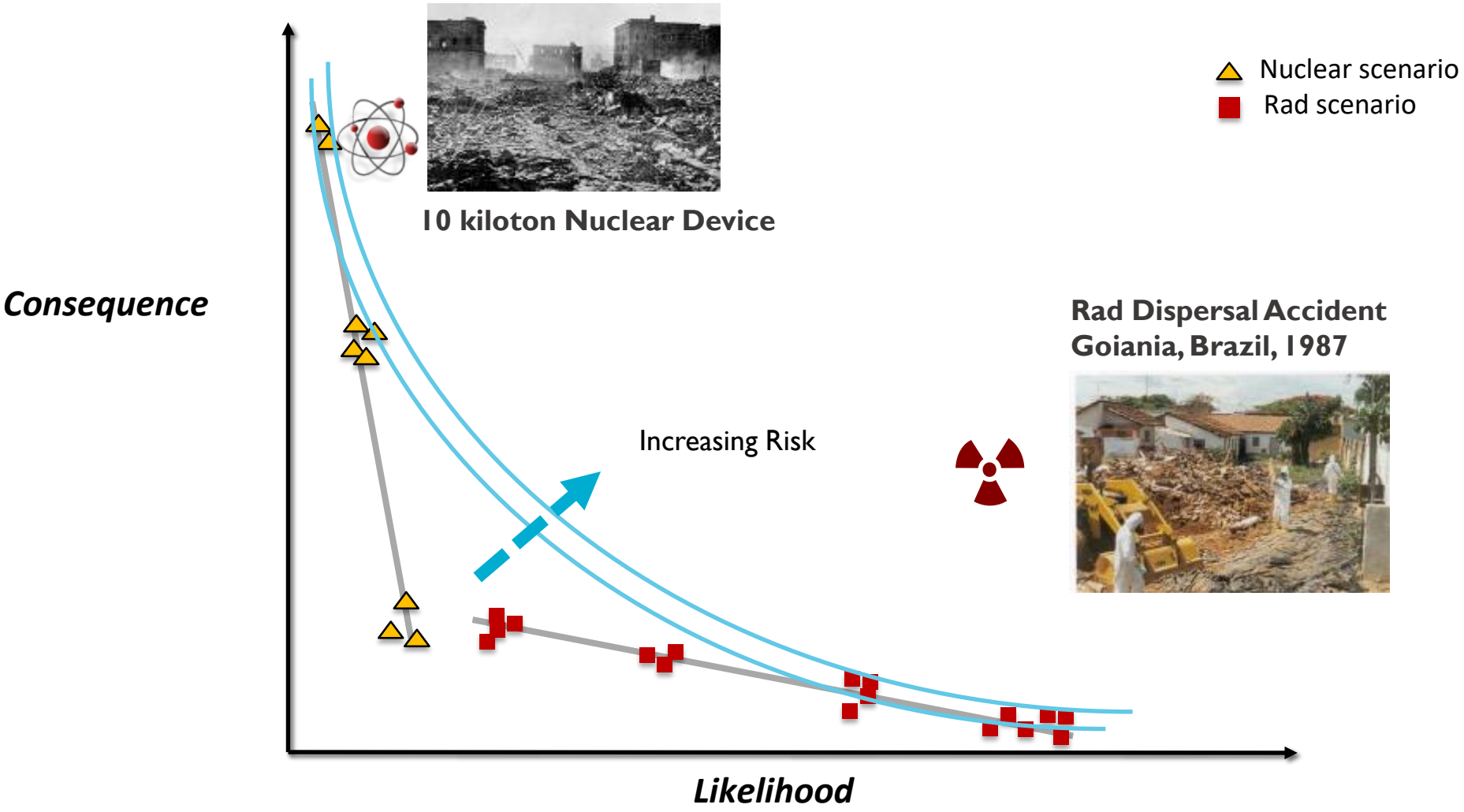


"Risk comes from not knowing what you're doing."

-Warren Buffet

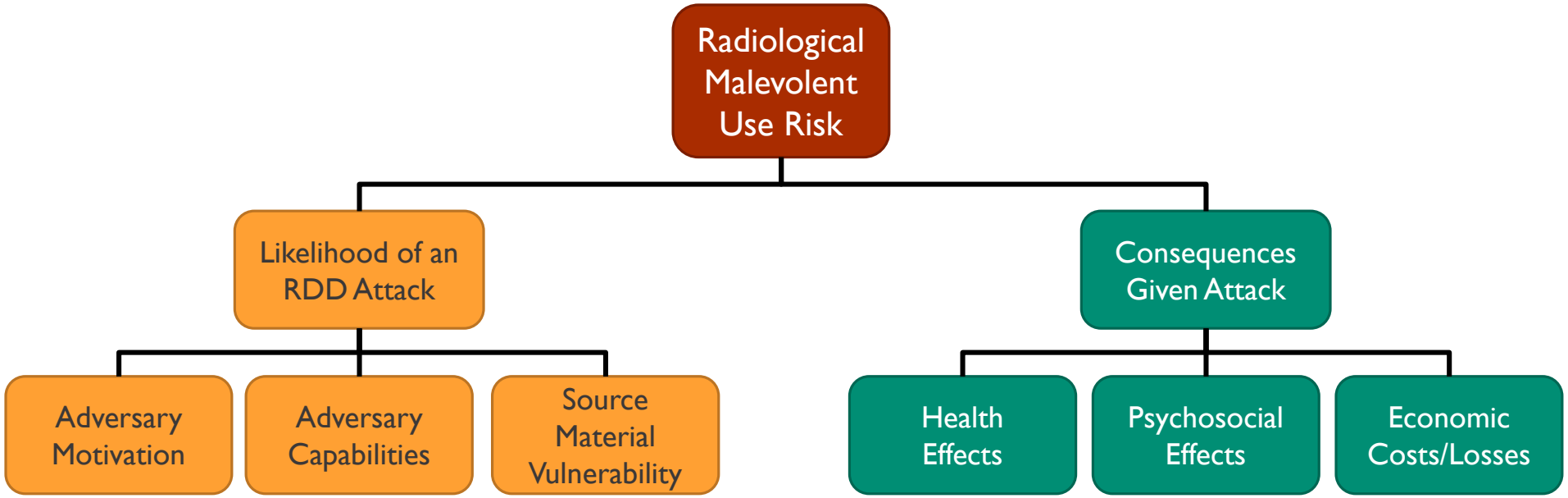
RISK IS MORE THAN POTENTIAL CONSEQUENCES

Opened U.S. view of nuclear risk to include radiological attacks



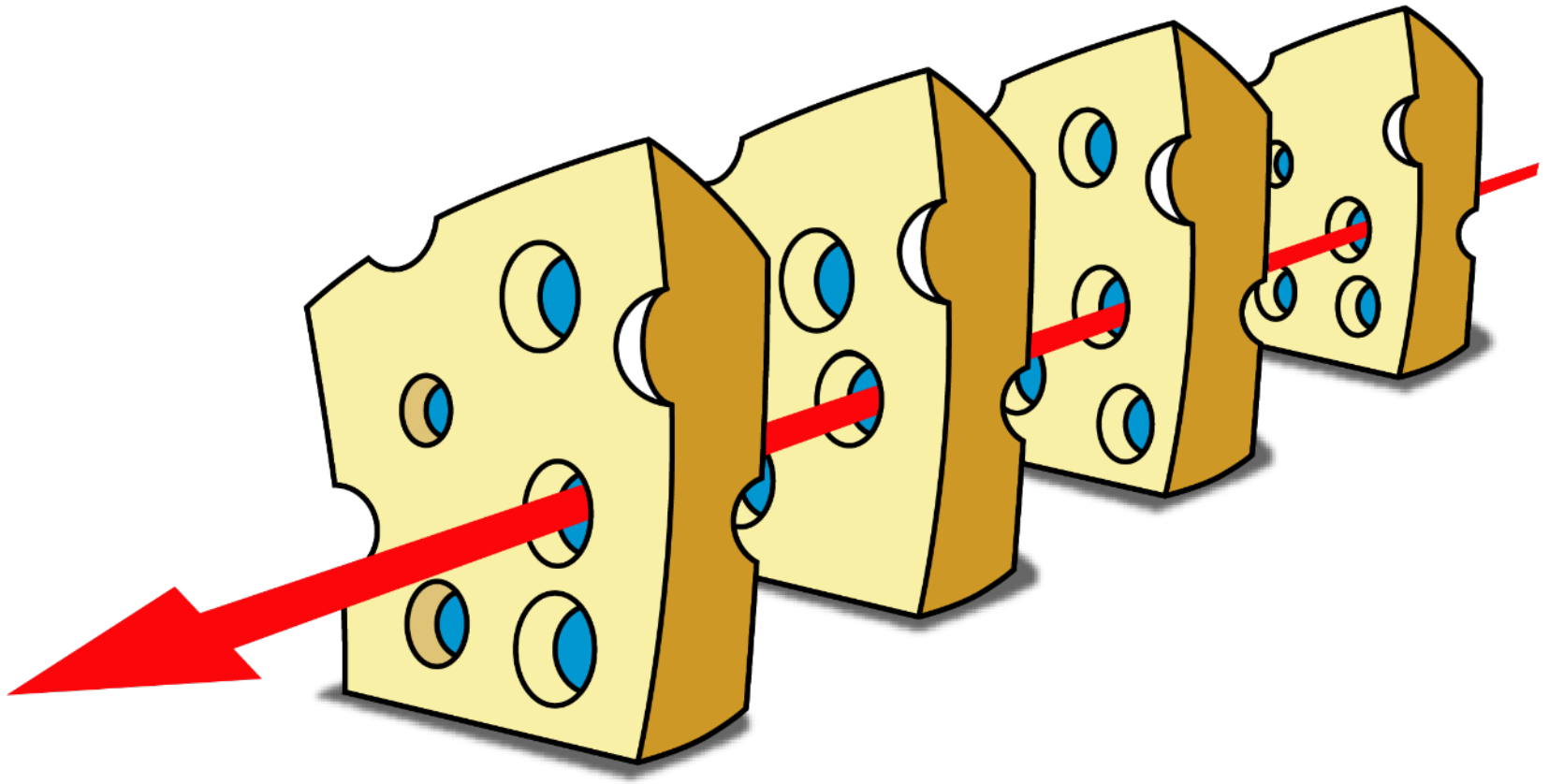
RISK ASSESSMENT FRAMEWORK

Drives comprehension



RISK ASSESSMENT FRAMEWORK

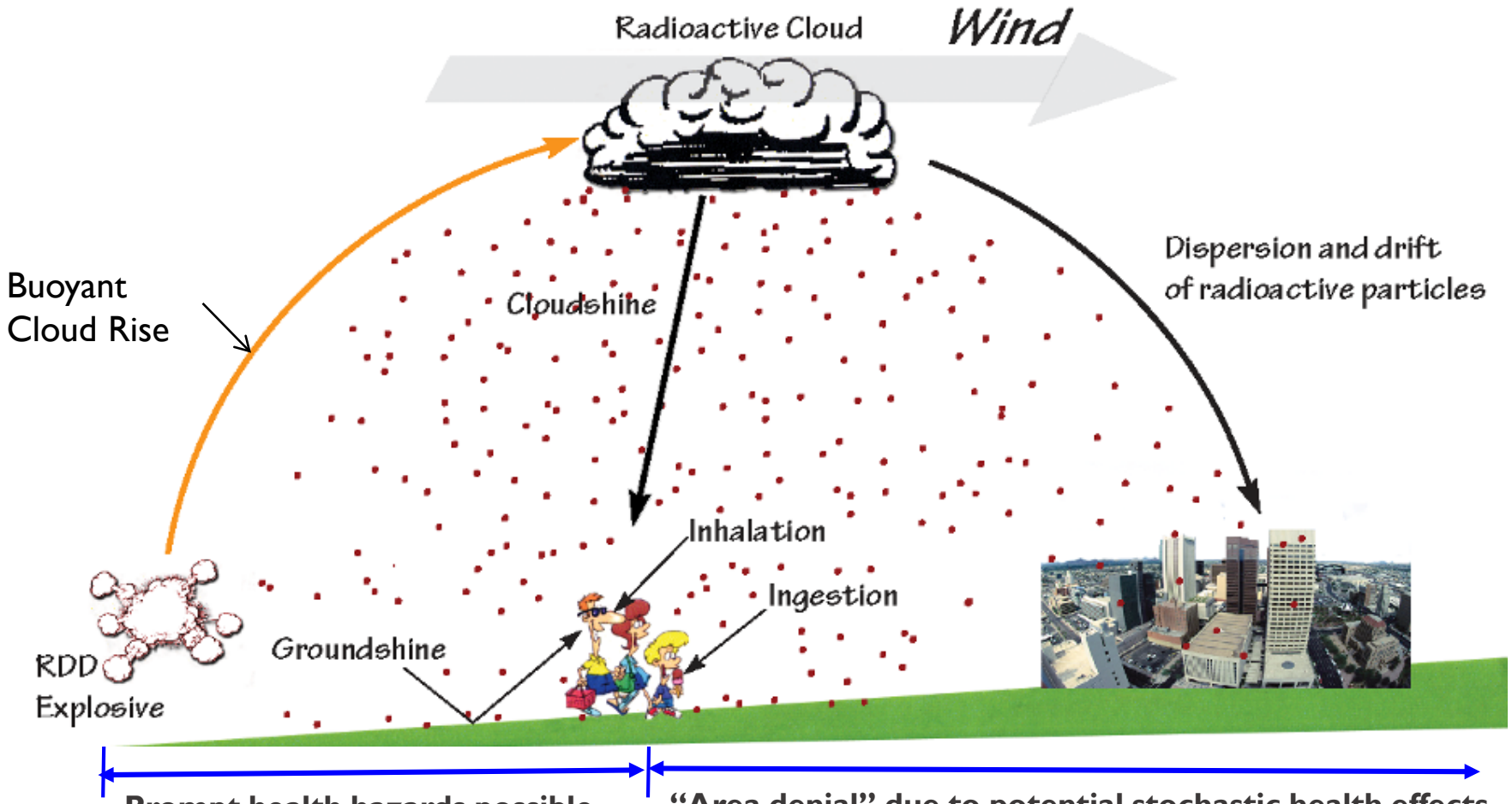
Identify paths that lead to an "easy" attack with significant consequences



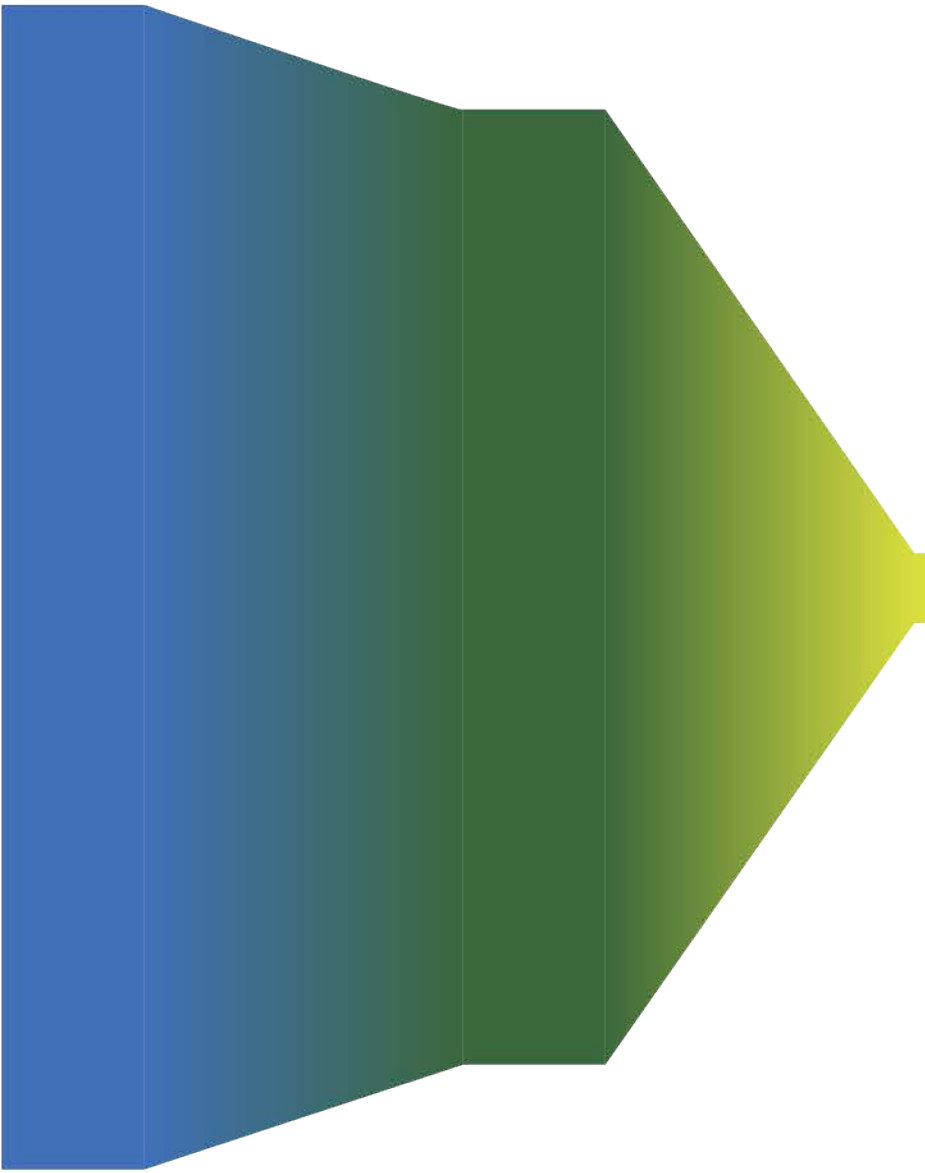
Radiological Dispersal Device (RDD) scenario identified as the path with high likelihood and high consequence.

CONSEQUENCES FOR THE EXPLOSIVE RDD

Radioactive ground contamination can have a lasting, mass effect by creating an "area denial"



RDD MATERIAL ATTRACTIVENESS:
Final four were … A new study identifies five.



Identify the top four materials available in quantities suitable for a significant RDD

Down selection process criteria
Radioactivity
Moderate half-life with high activity
Commercially available

Radionuclide	Material Form Type
Co-60	Hard Metal
Cs-137	**Salt Powder**
Ir-192	Hard Metal
Am-241/ Be	Oxide Powder

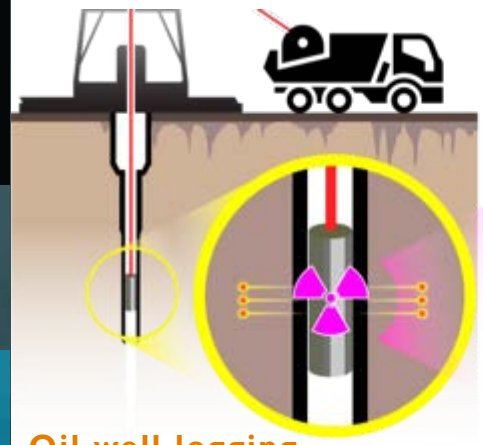
CsCl poses unique concerns as a salt powder.

TOP FOUR ARE FOUND IN CRUCIAL MEDICAL AND INDUSTRIAL APPLICATIONS

Co-60

Normal Device Activity
1,000 – 1,000,000+ Ci

- Teletherapy and Gamma Knife units (cancer treatment)
- Self-shielded and panoramic irradiators (research and sterilization)



Am-241

Normal Device Activity
5-20 Ci

Oil well logging
(industrial imaging)

Ir-192

Normal Device Activity
10-100 Ci

Radiography
(industrial imaging)

Cs-137

Normal Device Activity
1,000 – 50,000 Ci

- Self-shielded irradiators (i.e. blood and research irradiators)
- calibrators (dosimeter and detector calibration)

IS IT DIFFICULT TO STEAL A SOURCE?

Source removal analysis shows it is not

Attack Exposure Analysis for Fixed Devices

- Typical Cs-137 blood irradiators: less than 24 rems
- Teletherapy: less than 2.3 rems
- Gamma Knife: up to 330 rems

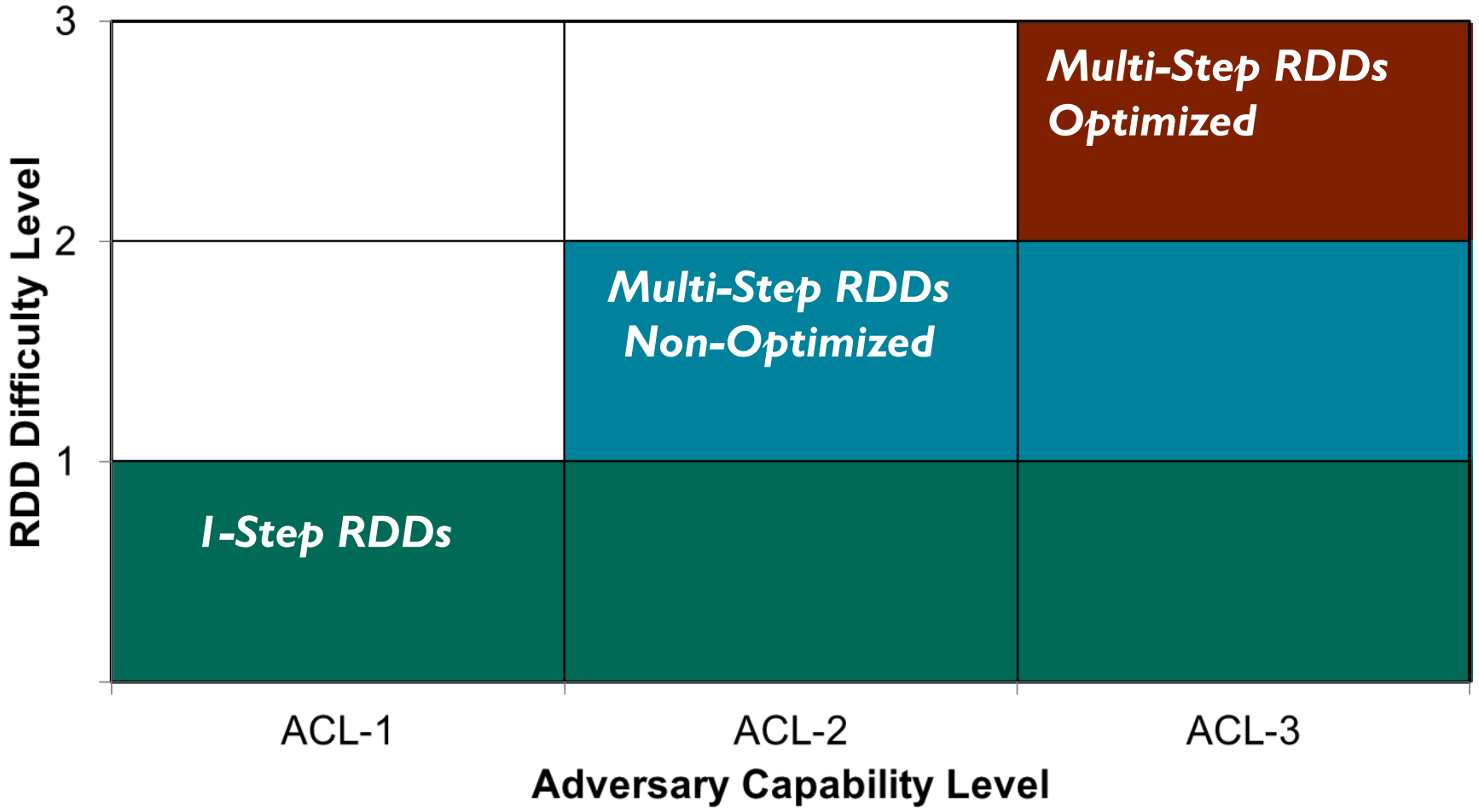
Interagency program to develop security enhancements.

- **Collaborate with manufacture's engineers and regulators**
- **In-field retro-fit plates to delay attacks**

Avoid assuming that sources and devices are "self-protecting"

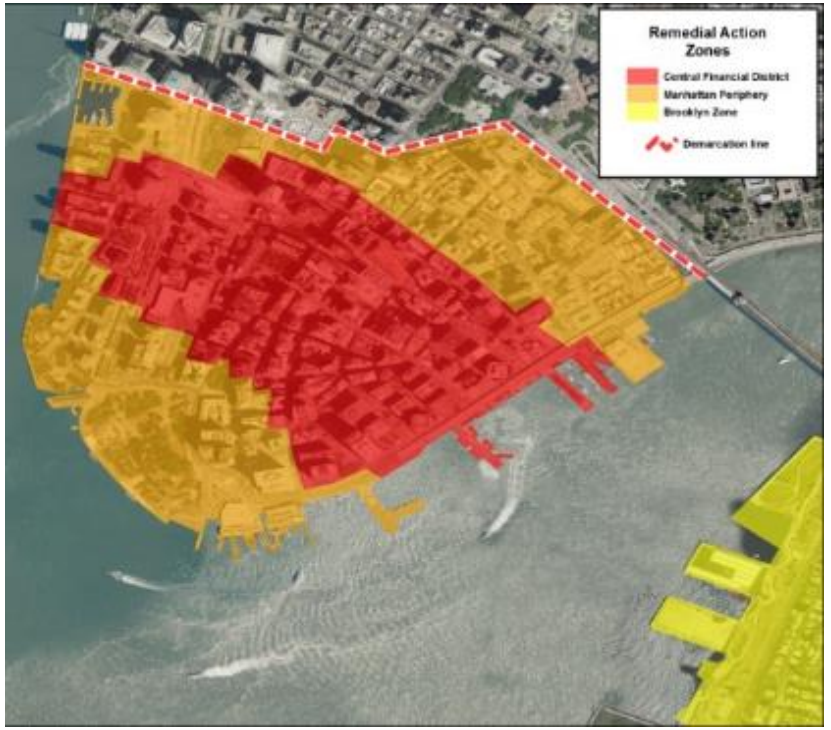
IS IT DIFFICULT TO MAKE AN RDD?

Adversary capability analysis shows it is not



Cs-137 RDD in NEW YORK CITY

Representative, not worse case, scenario shows the contamination area leads to significant consequence



Plume large but missed air and seaports.

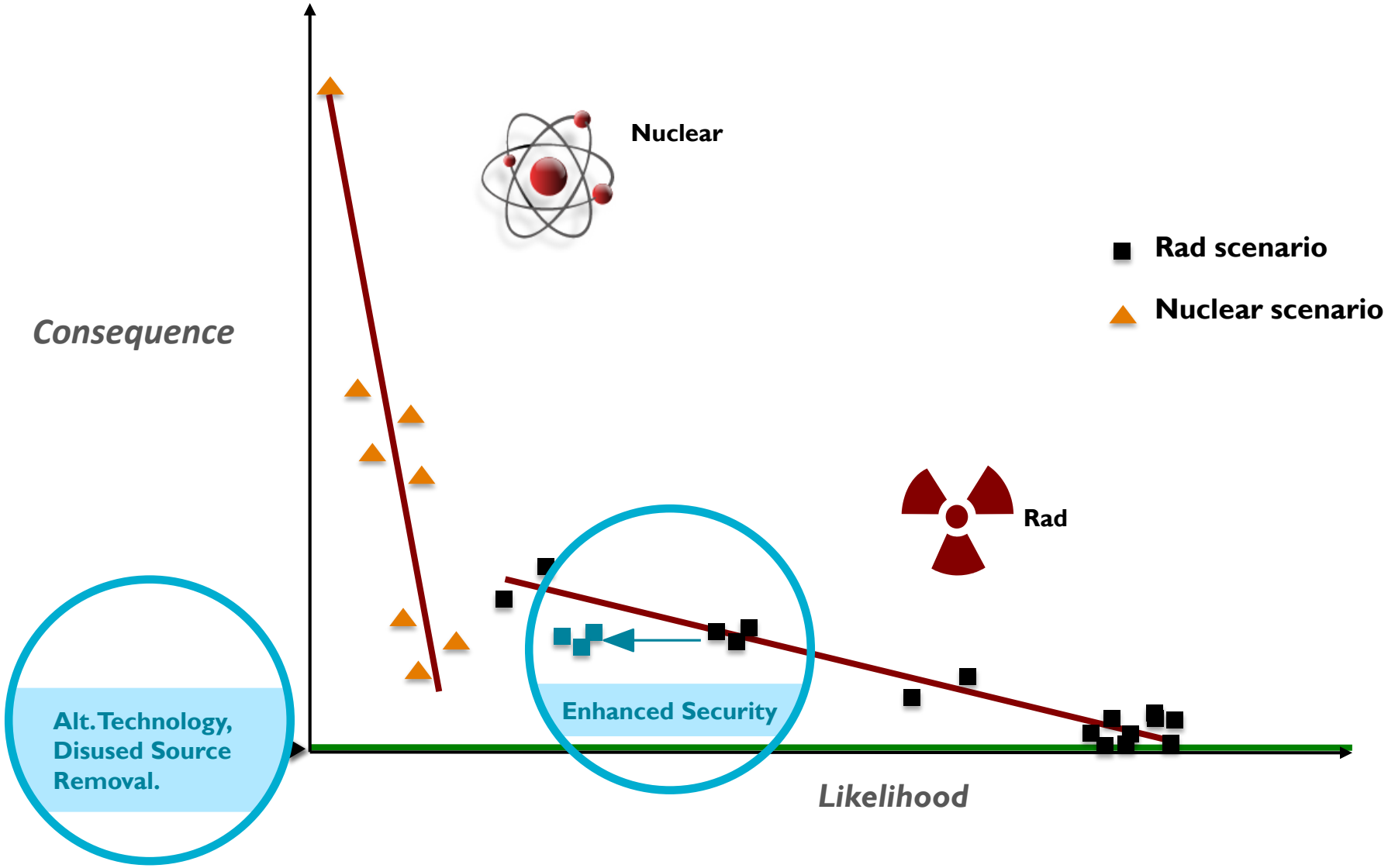
The study used the US relocation threshold of 500 mrem second year, which is guidance, not the law.

PSYCHOSOCIAL IMPACTS OF AN RDD ATTACK ARE THE LARGEST CONTRIBUTOR TOWARDS THE ECONOMIC IMPACTS

NYC is preparing to screen nearly one million people for contamination...

RISK MITIGATION

RDD risk can be high but can be mitigated through security, alternative technology, and removing disused sources.



QUESTIONS?