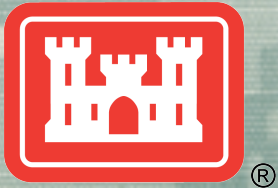


Baseline Risk Assessing



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Agenda

- Basic QAPP
- A Look At Risk Assessment



Basic QAPP

When Accepting Data & Writing The RI Report

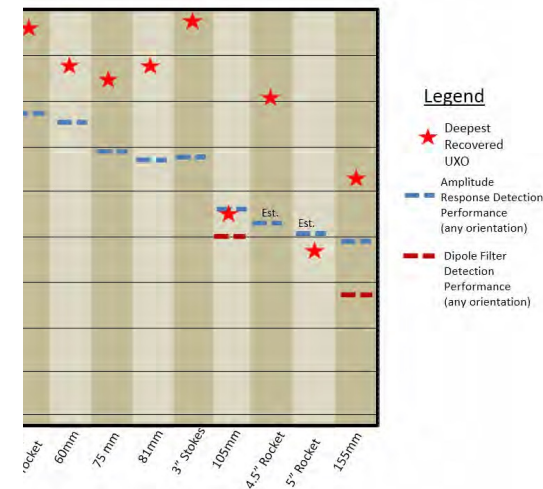
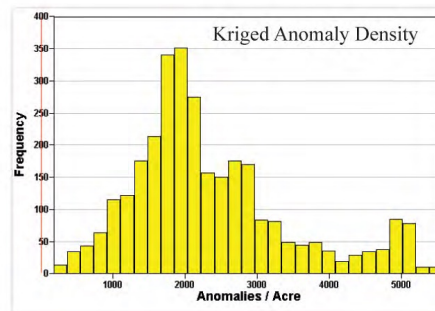
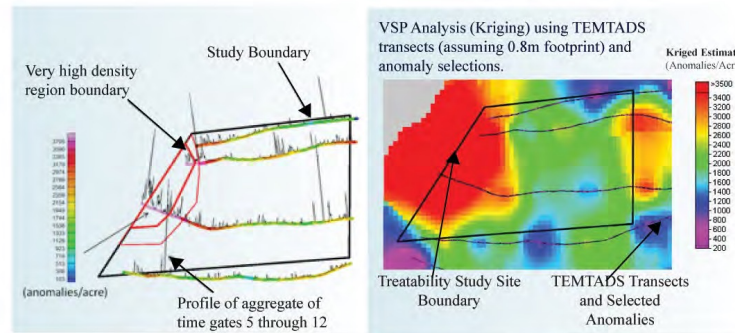
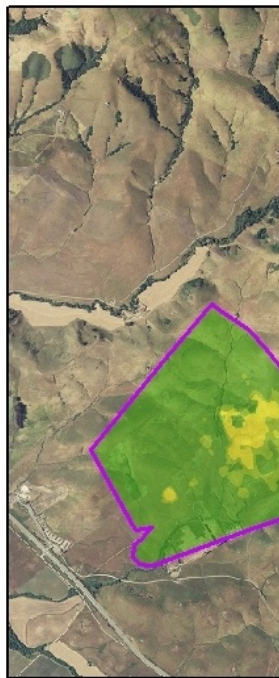
- Critical Worksheets according to Andy
 - ▶ WS10: Conceptual Site Model
 - ▶ WS11: Data Quality Objectives
 - ▶ WS12: Measurement Performance Criteria
 - ▶ WS22: Measurement Quality Objectives



Basic QAPP

When Accepting Data & Writing The RI Report

- WS10: Conceptual Site Model
 - ▶ Foundation of entire project
 - ▶ Explains why we planned what we planned



Basic QAPP

When Accepting Data & Writing The RI Report

- WS11: Data Quality Objectives
 - ▶ *This can be pretty easy!*
 - DQOs for VSP – easy!
 - **DQOs for Target Area Assessment**
 - ▷ Evidence is all we need in general
 - **DQOs for Buffer/Safety Fan Assessment**
 - ▷ Statistical Sampling (à-la UXO Estimator)
 - **DQOs for Risk Assessing**
 - ▷ All the above plus land use
 - **DQOs for all the MC stuff**
 - ▷ Yadah yadah yadah...



Basic QAPP

When Accepting Data & Writing The RI Report

- **WS12: Measurement Performance Criteria**
 - ▶ The single most important Worksheet
 - Because if we meet all these requirements, we should be DONE!
 - ▶ Stuff like,
 - Transect spacing & transect coverage
 - Digging sufficient anomalies to support statistical tests
 - Showing where targets were found
 - Showing what's NOT there



What do you mean by “What’s not there?”



No evidence High
Explosives were ever used

**FUDS (in Arizona)
Practice Bomb Target
Target Center**



No evidence
UXO spotting
charges
persisted



Basic QAPP

When Accepting Data & Writing The RI Report

- WS22: Measurement Quality Objectives
 - ▶ Second most important worksheet
 - ▶ Tells us the data we're using is good



Assessing Risk



®

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Agenda

- Next Up: Make you smarter on what you're starting out with
- To Think About For The FS



Context

- How We Got Here...
 - ▶ PA→SI→RI QAPP→Field Work→RI Risk Assessing
- Problem Statement: Do we have an unacceptable risk scenario?
- The answer is yes for HTRW problems when
 - ▶ Cancer risk > ____ or hazard quotient > ____
- The answer is yes for MMRP problems when
 - ☐ I'll know it when I see it
 - ☐ Someone thinks there might be a UXO somewhere
 - ☐ Someone is likely to get hurt or die
 - ☐ All of the above
 - ☐ None of the above



In Plain English

We have an unacceptable risk when:

1. People are likely to encounter UXO, **AND**
2. People don't know what NOT to do if they encounter a UXO, or
3. An unintentional encounter could result in a detonation, **AND**
4. The consequences are severe



Risk Calculations

Andy's Auto Insurance
Who's ahead, Andy or his
insurance company?

Event	Value
Sound System theft 2010	\$1,500
Sound System theft 2012	\$1,000
Crazed Soccer Mom driving a minivan talking on the phone	\$6,700
Total Claims Payouts	\$9,200
My approximate lifetime premiums paid to date	~\$350/6mo for 12 years = \$8,400

Risk is essentially a combination of probabilities

Example: Your Car Insurance Rate

- ▶ probability of having an accident

Hours on the road, your experience, your driving history



We Are Talking Probabilities

What's the probability of rolling a 6?

One in six, or about 16%



What's the probability of rolling two sixes?

one in six? (~16%)

two in twelve? (~16%)

one in six + one in six? (~32%)

one in six X one in six? (~3%)



Risk Calculations

- Risk is essentially the multiplication of several probabilities
- Example: Lead In Soil
 - ▶ probability of exposure
(being present where the contamination is)
 - ▶ probability of intake
(something happens that results in ingestion)
 - ▶ probability of bioloading
(probability your body retains the contaminant)
 - ▶ probability of adverse health effect
(probability that the retention ultimately leads to a health effect)



Something Bad Happens When:

- UXO or DMM is at a location
- Someone imparts energy to the item
- The item functions
- Energy from the detonation injures that someone

Consider Reality:

UXO are generally rare

Just because it's there does not mean someone finds it

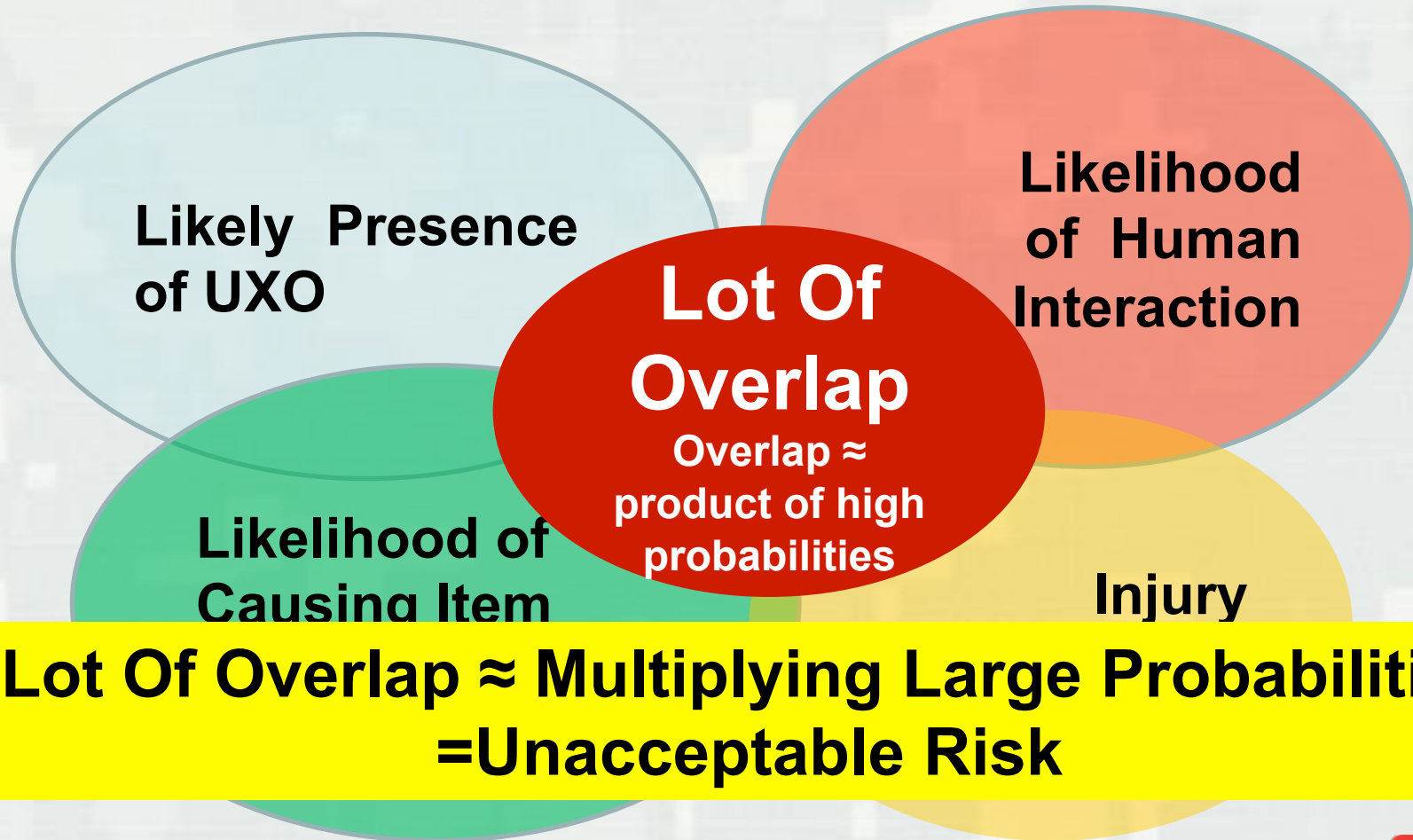
If it is found, it's not always picked-up

If it is picked up, it doesn't automatically detonate

If it does detonate, injury is proportional to energy release



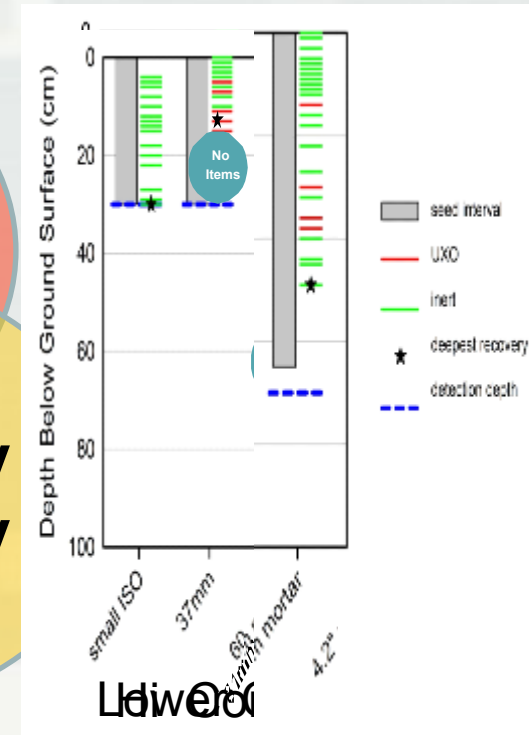
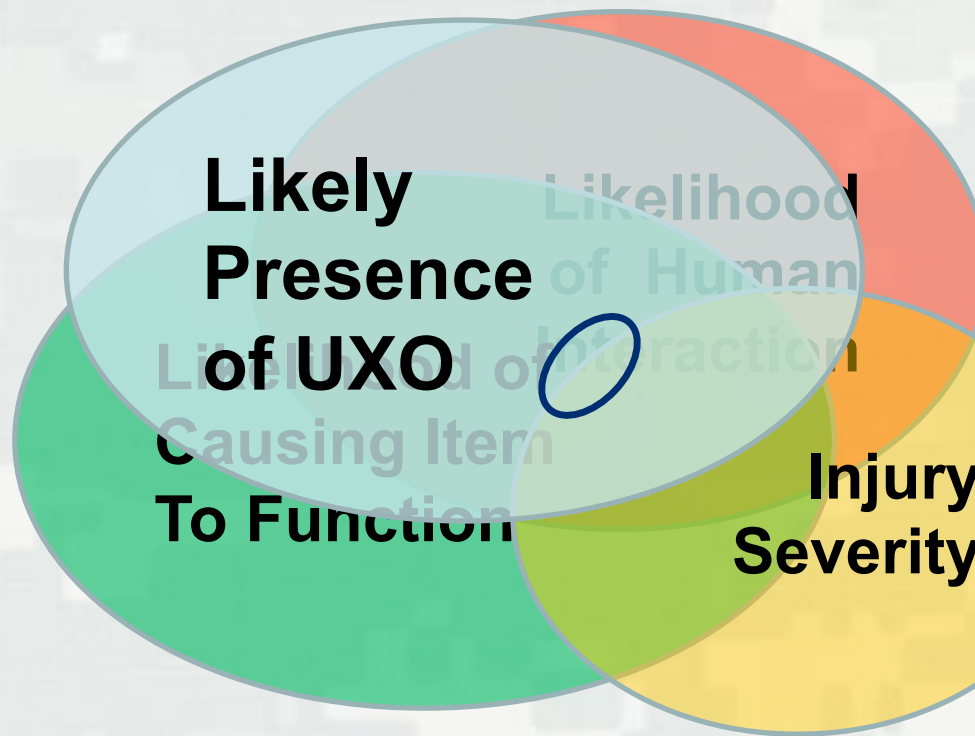
Risk Management



- Let's Consider FS Analyses

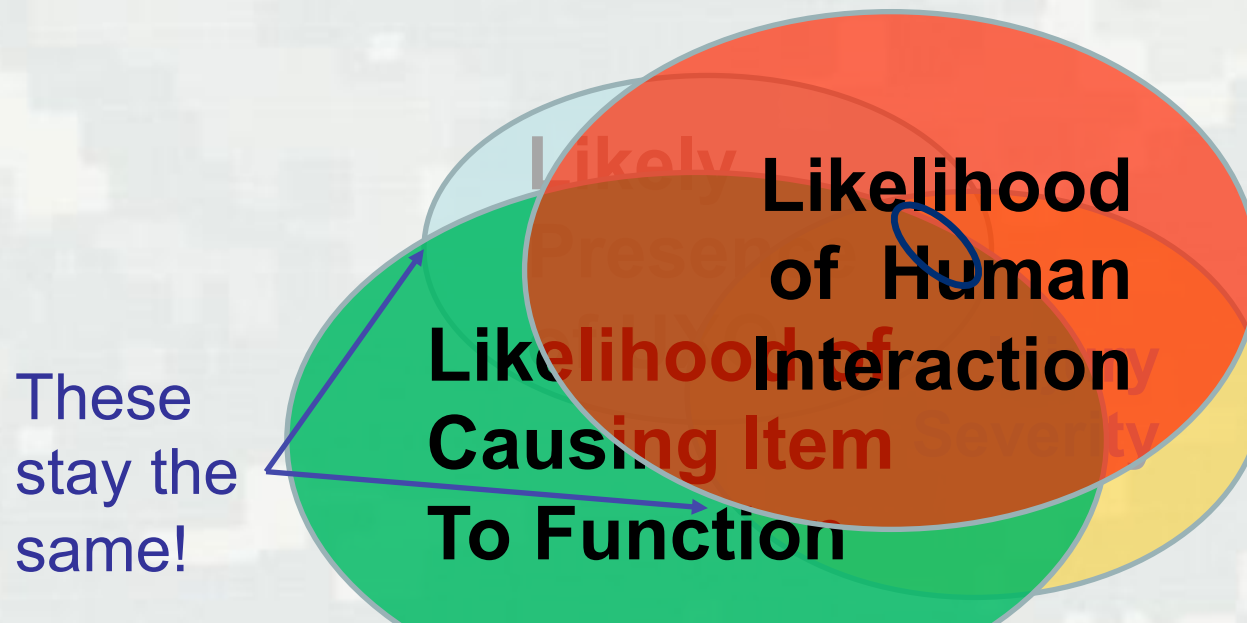


Let's Look At: Physical Removal



**Little To No Overlap $\approx$ Multiplying small probabilities
= Acceptable End State**

Let's Look At: Education



**Little To No Overlap $\approx$ Multiplying small probabilities
= Acceptable End State**



MMRP Risk & Acceptable End States

ON-GOING WORK

USACE working to publish white paper as a policy memo with a trial period. IGD to follow...

- Matrix 1: Amount of MEC vs. Accessibility
 - ▶ Likelihood of Encounter
- Matrix 2: Likelihood of Encounter vs. Severity
 - ▶ Likelihood of Casualty or Injury
- Matrix 3: Sensitivity vs. Site Activities
 - ▶ Likelihood of Incident
- Matrix 4: Matrix 2 vs. Matrix 3
 - ▶ Differentiate **Acceptable** vs. **Unacceptable**



Questions?

