MILITARY MUNITIONS RESPONSE PROGRAM 101

An Overview of the Remedial Process for Munitions Response Sites

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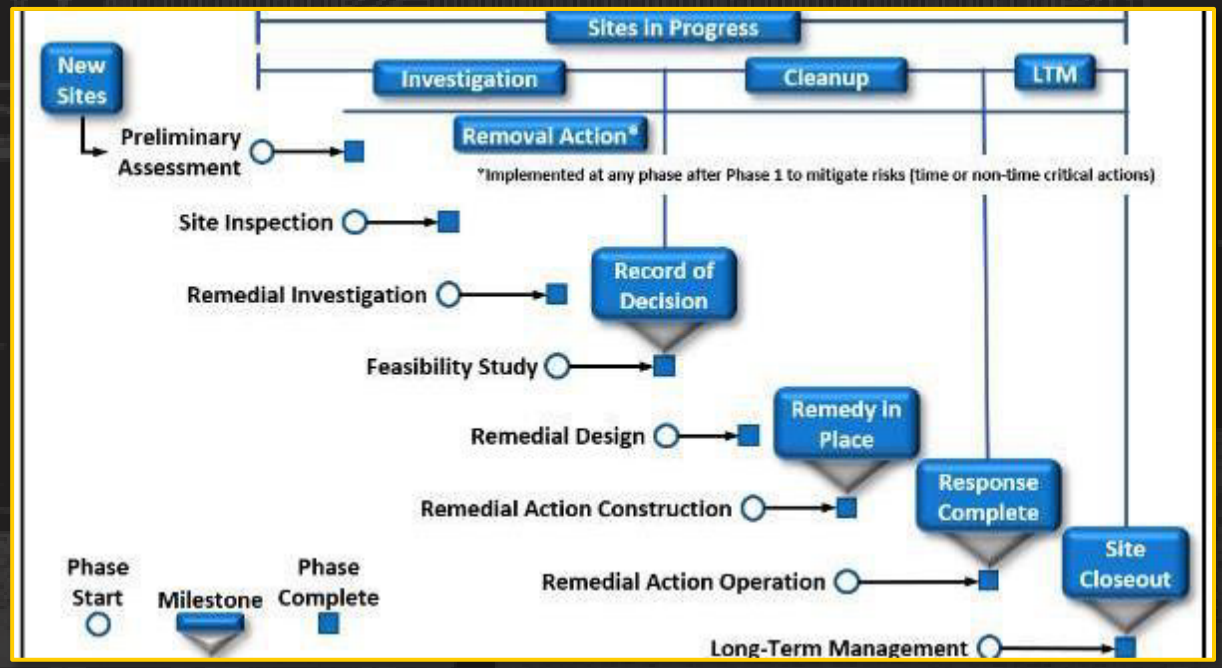

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INTRODUCTION AND AGENDA

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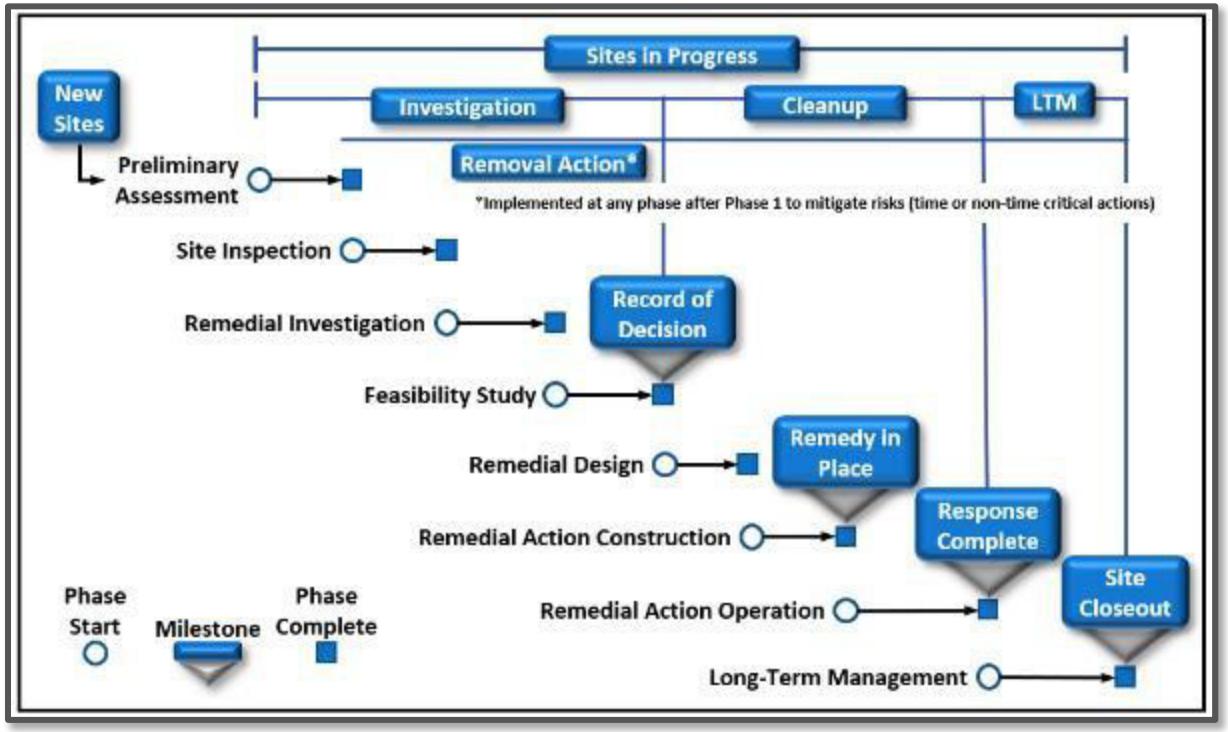
This presentation will describe the basics of munitions response

Topics will include

- General concepts
  - Project team and initial planning
  - Conceptual site model (CSM) and data quality objectives (DQOs)
- Review of steps for munitions response
  - Primary Assessment (PA) through Long-term Management (LTM)
- "Bonus topics"
  - Geophysical investigation and Visual Sample Plan (VSP)
  - Risk Management Methodology (RMM) overview



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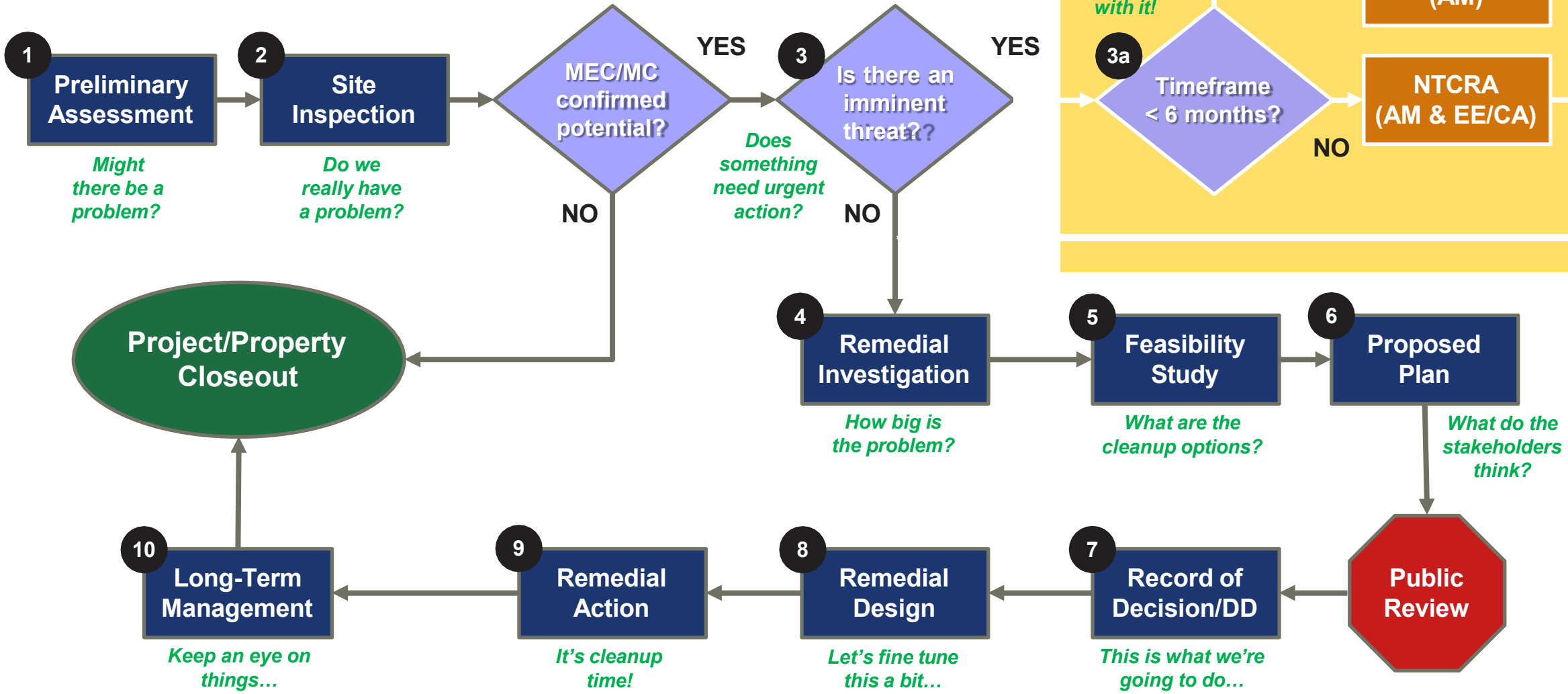
MUNITIONS RESPONSE PROCESS

REMEDIAL RESPONSE



REMOVAL RESPONSE

IT ALL STARTS WITH THE RIGHT TEAM…

USACE TEAM

1. Project Manager
2. Technical Lead
3. OESS
4. Geophysicist
5. Chemist
6. Risk Assessor
7. Biologist/Ecologist

OTHER TEAM MEMBERS

1. Regulator
2. Landowners
3. Contractor (post-award)

RESPONSIBILITIES

Lead PDT; Scope, Schedule, Budget, Metric Responsibilities
Technical Team Task Manager, Supports District PM
QA for all things Munitions and Safety
QA for all things Geophysics
QA for all things Chemistry
QA for all things Risk
QA for all things Biological/Ecological

Assist Lead Agency in DQO development
Provide Regulatory Perspective
Provide perspective on land use and acceptable activities for execution
Prepares remaining MR-QAPP worksheets

… AND THEN COMES INITIAL PLANNING

Before we start a project, it's essential to answer some key questions –

- What do we know about the site?
- What is the problem we are trying to solve?
- What are we trying to do about it?
- What limitations are we working under, if any?

To answer these questions, we need to start thinking about –

- Conceptual site model (CSM)
- Data quality objectives (DQOs)

"If you don't know where you want to go, ***how will you know when you get there***?"

CONCEPTUAL SITE MODEL (CSM)

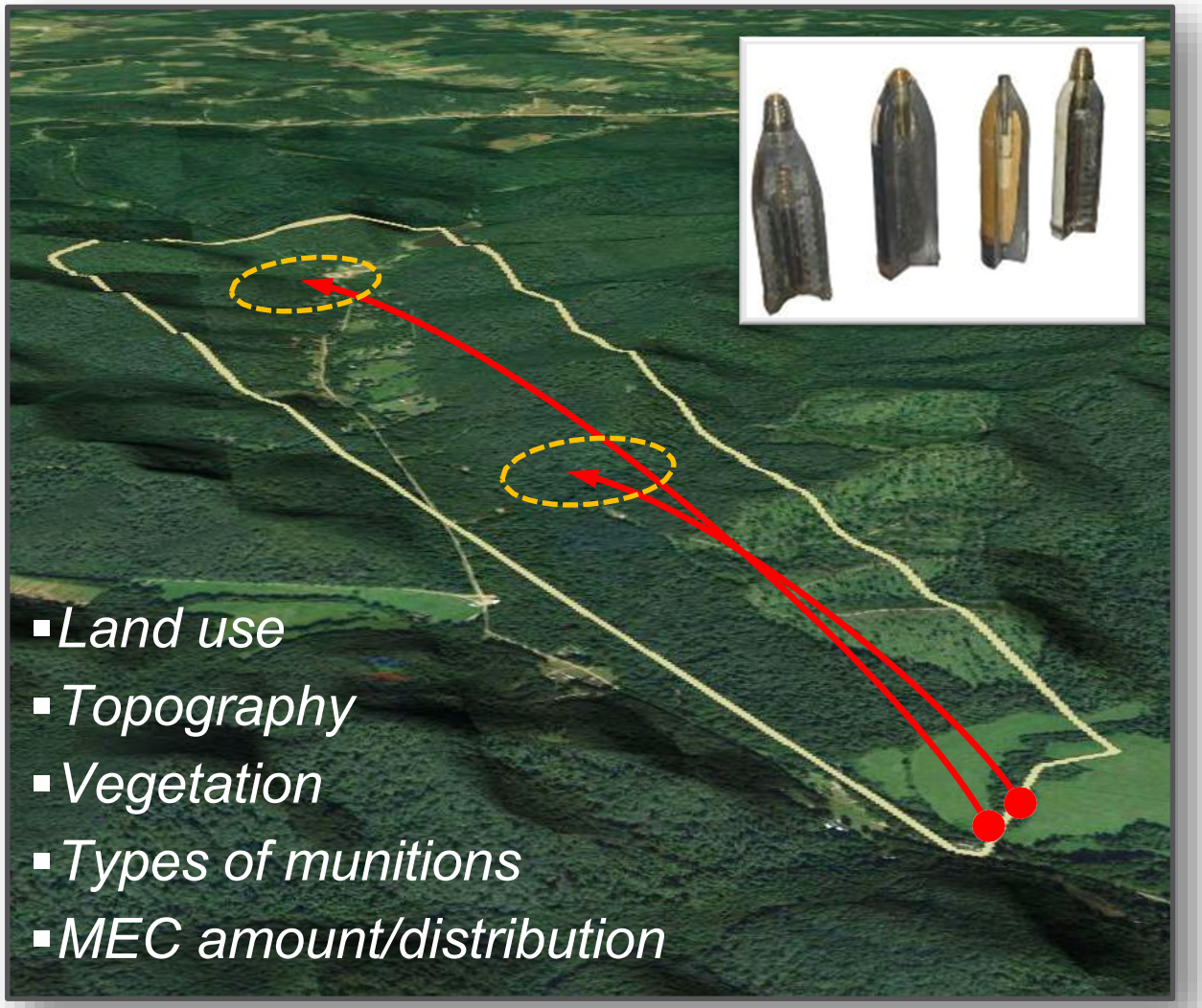
What is the CSM?

– The most current description of the site
  - How did MEC/MC get there?
  - Where are MEC/MC located?
  - What types of MEC/MC are present?
  - What is the site used for now?
  - Who are the receptors and what do they do there?

Forms basis for understanding the site and communication with stakeholders

– The initial CSM assists in developing investigation strategy and Data Quality Objectives (DQOs)

– The updated CSM describes the results



CONCEPTUAL SITE MODEL (CSM), CONT'D.

Initial CSM Assumptions for an MRS

- Suspected locations of HUAs and LUAs
- Possible extent and size of contaminated areas
- Known/suspected type, depth, and amounts of MEC
- Current and future land use activities

What is known will change as we move through the process

The CSM is the **core** of the project

The beginning of each phase will consider the initial CSM, while a final step will be updating the CSM to reflect the results

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DATA QUALITY OBJECTIVES (DQOs)

A DQO…

– Summarizes project goals & data needs

– **Tells us *when the project is done***

More specifically, the DQO explains when we have project data of

– The right type(s)

– Sufficient quantity

– Adequate quality

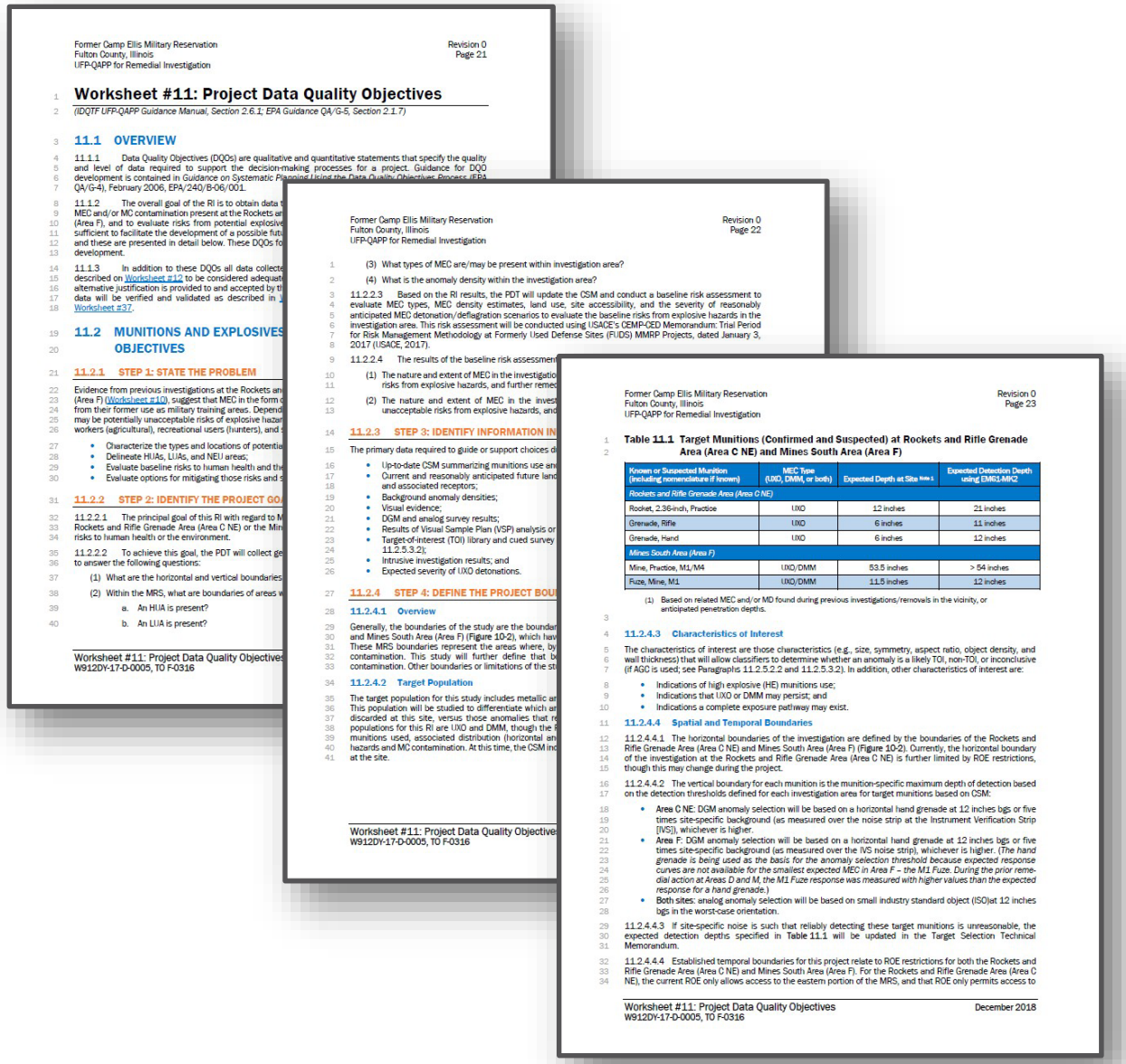
… to support defensible project decisions & revisions to the CSM

– ***So, DQOs MUST be measurable!***

Similar to the CSM

– Forms a basis for communication with stakeholders

– Text supported by tables, figures, & graphics



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Worksheet #11: Project Data Quality Objectives

(IDQTF UFP-QAPP Guidance Manual, Section 2.6.1; EPA Guidance QA/G-5, Section 2.1.7)

11.1 OVERVIEW

11.1.1 Data Quality Objectives (DQOs) are qualitative and quantitative statements that specify the quality and level of data required to support the decision-making processes for a project. Guidance for DQO development is contained in *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA QA/G-4), February 2006, EPA/240/B-06/001.

11.1.2 The overall goal of the RI is to obtain data t MEC and/or MC contamination present at the Rockets ar (Area F), and to evaluate risks from potential explosive sufficient to facilitate the development of a possible futu and these are presented in detail below. These DQOs fo development.

11.1.3 In addition to these DQOs all data collecte described on Worksheet #12 to be considered adequat alternative justification is provided to and accepted by t data will be verified and validated as described in Worksheet #37.

11.2 MUNITIONS AND EXPLOSIVES OBJECTIVES

11.2.1 STEP 1: STATE THE PROBLEM

Evidence from previous investigations at the Rockets an (Area F) (Worksheet #10), suggest that MEC in the form c from their former use as military training areas. Depend may be potentially unacceptable risks of explosive hazar workers (agricultural), recreational users (hunters), and

- Characterize the types and locations of potentia
- Delineate HUAs, LUAs, and NEU areas;
- Evaluate baseline risks to human health and th
- Evaluate options for mitigating those risks and

11.2.2 STEP 2: IDENTIFY THE PROJECT GO

11.2.2.1 The principal goal of this RI with regard to M Rockets and Rifle Grenade Area (Area C NE) or the Min risks to human health or the environment.

11.2.2.2 To achieve this goal, the PDT will collect ge to answer the following questions:

(1) What are the horizontal and vertical boundaries

(2) Within the MRS, what are boundaries of areas w

a. An HUA is present?

b. An LUA is present?

Worksheet #11: Project Data Quality Objectives
W912DY-17-D-0005, TO F-0316

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(3) What types of MEC are/may be present within investigation area?

(4) What is the anomaly density within the investigation area?

11.2.2.3 Based on the RI results, the PDT will update the CSM and conduct a baseline risk assessment to evaluate MEC types, MEC density estimates, land use, site accessibility, and the severity of reasonably anticipated MEC detonation/deflagration scenarios to evaluate the baseline risks from explosive hazards in the investigation area. This risk assessment will be conducted using USACE's CEMP-CED Memorandum: Trial Period for Risk Management Methodology at Formerly Used Defense Sites (FUDS) MMRP Projects, dated January 3, 2017 (USACE, 2017).

11.2.2.4 The results of the baseline risk assessment

(1) The nature and extent of MEC in the investigatio risks from explosive hazards, and further remed

(2) The nature and extent of MEC in the invest unacceptable risks from explosive hazards, and

11.2.3 STEP 3: IDENTIFY INFORMATION IN

The primary data required to guide or support choices d

- Up-to-date CSM summarizing munitions use an
- Current and reasonably anticipated future land and associated receptors;
- Background anomaly densities;
- Visual evidence;
- DGM and analog survey results;
- Results of Visual Sample Plan (VSP) analysis or
- Target-of-interest (TOI) library and cued survey 11.2.5.3.2);
- Intrusive investigation results; and
- Expected severity of UXO detonations.

11.2.4 STEP 4: DEFINE THE PROJECT BOU

11.2.4.1 Overview

Generally, the boundaries of the study are the boundar and Mines South Area (Area F) (Figure 10-2), which hav These MRS boundaries represent the areas where, by contamination. This study will further define that b contamination. Other boundaries or limitations of the st

11.2.4.2 Target Population

The target population for this study includes metallic ar This population will be studied to differentiate which ar discarded at this site, versus those anomalies that re populations for this RI are UXO and DMM, though the F munitions used, associated distribution (horizontal an hazards and MC contamination. At this time, the CSM inc at the site.

Worksheet #11: Project Data Quality Objectives
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Table 11.1 Target Munitions (Confirmed and Suspected) at Rockets and Rifle Grenade Area (Area C NE) and Mines South Area (Area F)

Known or Suspected Munition (including nomenclature if known)	MEC Type (UXO, DMM, or both)	Expected Depth at Site [Note 1]	Expected Detection Depth using EM61-MK2
Rockets and Rifle Grenade Area (Area C NE)			
Rocket, 2.36-inch, Practice	UXO	12 inches	21 inches
Grenade, Rifle	UXO	6 inches	11 inches
Grenade, Hand	UXO	6 inches	12 inches
Mines South Area (Area F)			
Mine, Practice, M1/M4	UXO/DMM	53.5 inches	> 54 inches
Fuze, Mine, M1	UXO/DMM	11.5 inches	12 inches

(1) Based on related MEC and/or MD found during previous investigations/removals in the vicinity, or anticipated penetration depths.

11.2.4.3 Characteristics of Interest

The characteristics of interest are those characteristics (e.g., size, symmetry, aspect ratio, object density, and wall thickness) that will allow classifiers to determine whether an anomaly is a likely TOI, non-TOI, or inconclusive (if AGC is used; see Paragraphs 11.2.5.2.2 and 11.2.5.3.2). In addition, other characteristics of interest are:

- Indications of high explosive (HE) munitions use;
- Indications that UXO or DMM may persist; and
- Indications a complete exposure pathway may exist.

11.2.4.4 Spatial and Temporal Boundaries

11.2.4.4.1 The horizontal boundaries of the investigation are defined by the boundaries of the Rockets and Rifle Grenade Area (Area C NE) and Mines South Area (Area F) (Figure 10-2). Currently, the horizontal boundary of the investigation at the Rockets and Rifle Grenade Area (Area C NE) is further limited by ROE restrictions, though this may change during the project.

11.2.4.4.2 The vertical boundary for each munition is the munition-specific maximum depth of detection based on the detection thresholds defined for each investigation area for target munitions based on CSM:

- Area C NE: DGM anomaly selection will be based on a horizontal hand grenade at 12 inches bgs or five times site-specific background (as measured over the noise strip at the Instrument Verification Strip [IVS]), whichever is higher.
- Area F: DGM anomaly selection will be based on a horizontal hand grenade at 12 inches bgs or five times site-specific background (as measured over the IVS noise strip), whichever is higher. (*The hand grenade is being used as the basis for the anomaly selection threshold because expected response curves are not available for the smallest expected MEC in Area F – the M1 Fuze. During the prior remedial action at Areas D and M, the M1 Fuze response was measured with higher values than the expected response for a hand grenade.*)
- Both sites: analog anomaly selection will be based on small industry standard object (ISO)at 12 inches bgs in the worst-case orientation.

11.2.4.4.3 If site-specific noise is such that reliably detecting these target munitions is unreasonable, the expected detection depths specified in Table 11.1 will be updated in the Target Selection Technical Memorandum.

11.2.4.4.4 Established temporal boundaries for this project relate to ROE restrictions for both the Rockets and Rifle Grenade Area (Area C NE) and Mines South Area (Area F). For the Rockets and Rifle Grenade Area (Area C NE), the current ROE only allows access to the eastern portion of the MRS, and that ROE only permits access to

Worksheet #11: Project Data Quality Objectives
W912DY-17-D-0005, TO F-0316

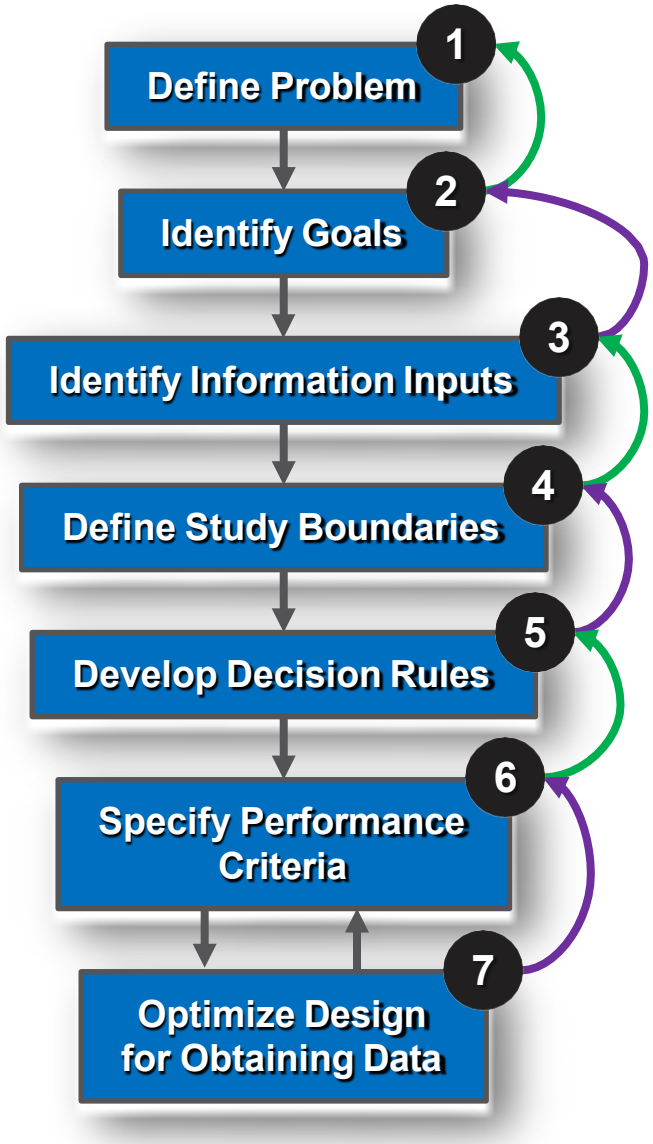
December 2018

EPA'S 7-STEP DQO PROCESS

1. Define the problem
   - What problem do we need to address?
2. Identify the decision to be made (goals)
   - What questions do we need to answer to address that problem?
3. Identify the inputs to the decision
   - What data do we need to answer those questions?
     - Consider ALL data
4. Define boundaries of the study
   - What are the limitations on collecting those data?
5. Develop decision rules
   - How are we going to use the data to make our decisions?
6. Specify performance criteria
   - How good do the data need to support those decisions?
7. Optimize the design
   - Considering all of the above, how are we going to do this?

Notice how these steps follow each other logically

- Approach **MUST** address data needs and limitations!
- Don't forget that when you're putting them together



[1] Guidance on Systematic Planning Using the Data Quality Objectives Process, U.S. EPA, EPA QA/G-4, February 2006.

PRELIMINARY ASSESSMENT

Might there be a problem?

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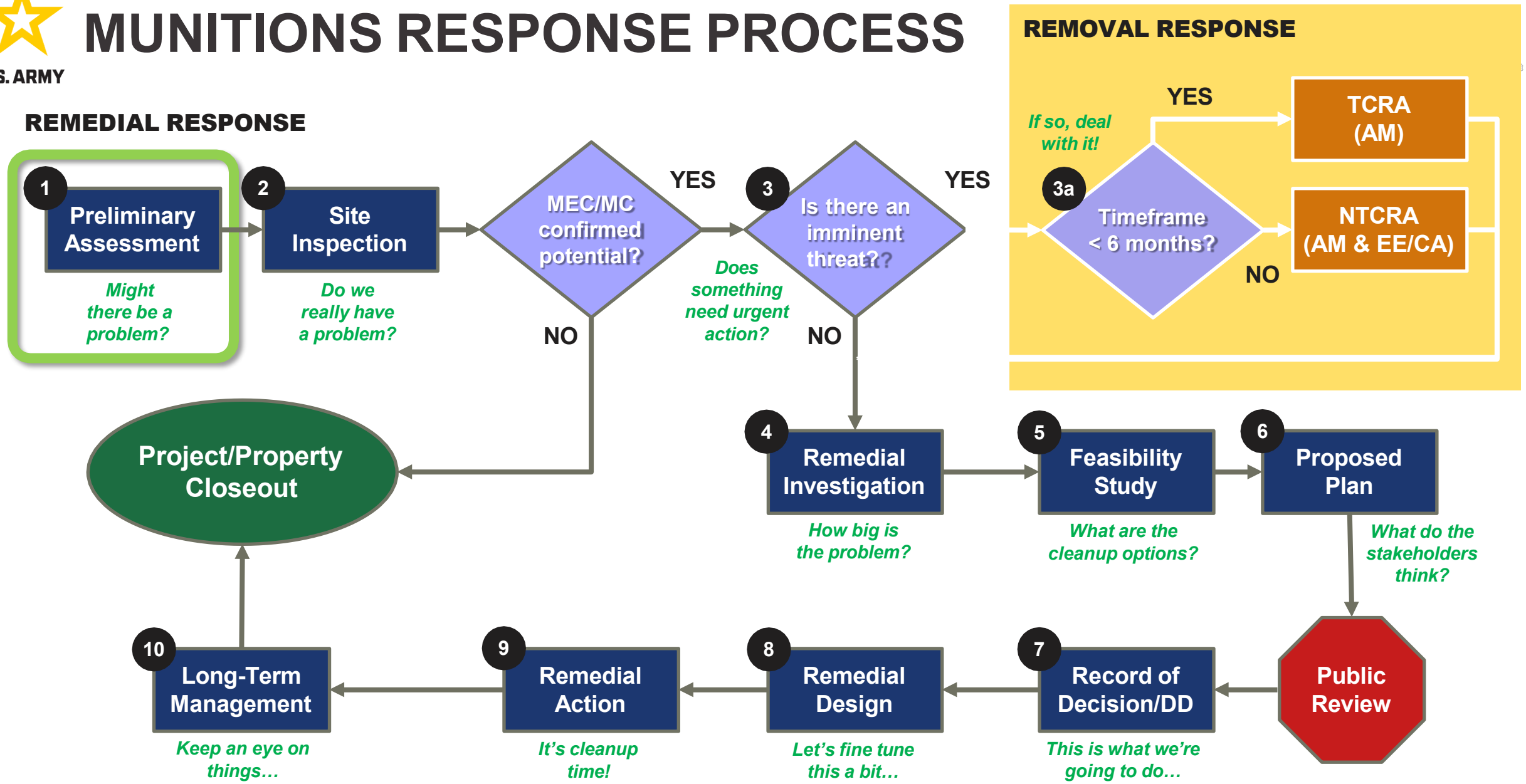
MUNITIONS RESPONSE PROCESS



PRELIMINARY ASSESSMENT (PA)

The PA is the first step in the remedial process described in the NCP

The purpose of the PA is to:

- Eliminate properties from further consideration that pose little or no threat to public health or the environment
- Determine if there is any potential need for removal action
  - i.e., there's an imminent threat
- Set priorities for site inspections (SIs)
- Gather existing data to facilitate later evaluation of the release pursuant to the Hazard Ranking System (HRS) conducted by EPA
- Collect data to complete the Explosives and Chemical Weapons (EHE/CHE) modules of the Munitions Response Site Prioritization Protocol (MRSPP)

PRELIMINARY ASSESSMENT (PA), CONT'D.

Elements:

- Review historical records related to:
  - DOD use of land
  - Non-DOD land use and property ownership
  - Use of military munitions
  - Suspected releases
- Possible limited site visit and/or interviews
- If MEC are suspected to be present, recommend approval of MMRP project

SITE INSPECTION

Do we really have a problem?

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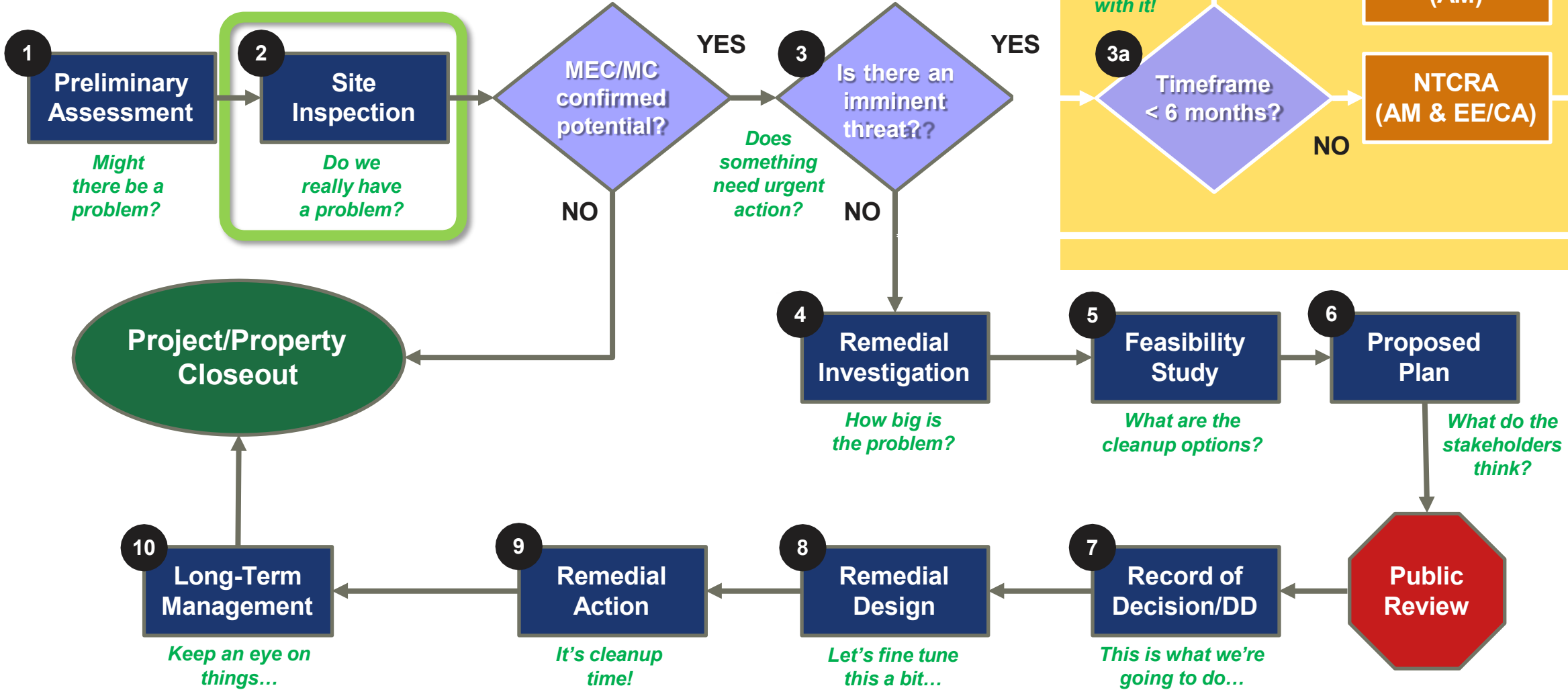
MUNITIONS RESPONSE PROCESS

REMEDIAL RESPONSE



REMOVAL RESPONSE

SITE INSPECTION (SI)

The SI is not intended as a full-scale study of the nature and extent of contamination or explosive hazards

The objectives of the SI are to:

- Eliminate from further consideration those releases that pose no significant threat to public health or the environment
- Determine potential need for removal action
- Collect data, as appropriate, to characterize release for effective and rapid initiation of remedial investigation and feasibility study (RI/FS), and
- Collect or develop additional data, appropriate for Hazard Ranking System (HRS) scoring by EPA
- Collect data to update the EHE/CHE modules and complete the Munitions Constituents (HHE) module of the Munitions Response Site Prioritization Protocol (MRSPP)

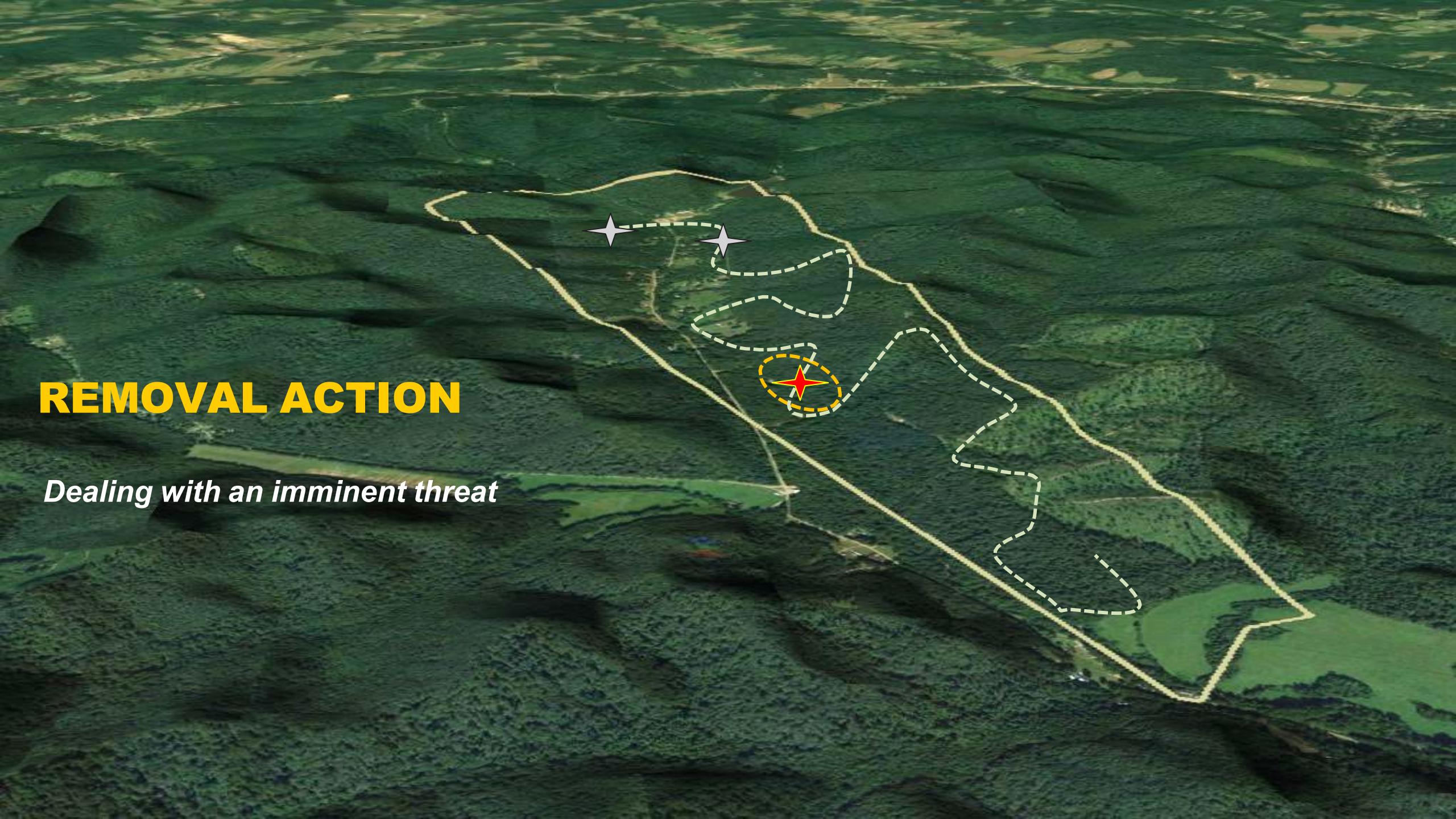
SITE INSPECTION (SI), CONT'D.

Determine presence or absence of MEC/MC

- Limited fieldwork
  - No need to evaluate extent
  - Usually no geophysics, but not prohibited
- MD typically considered to be indicative of MEC
- Determine if removal action is needed to address imminent threats to human health or the environment

Produce initial conceptual site model (CSM)

Imminent threat?


REMOVAL ACTION
Dealing with an imminent threat

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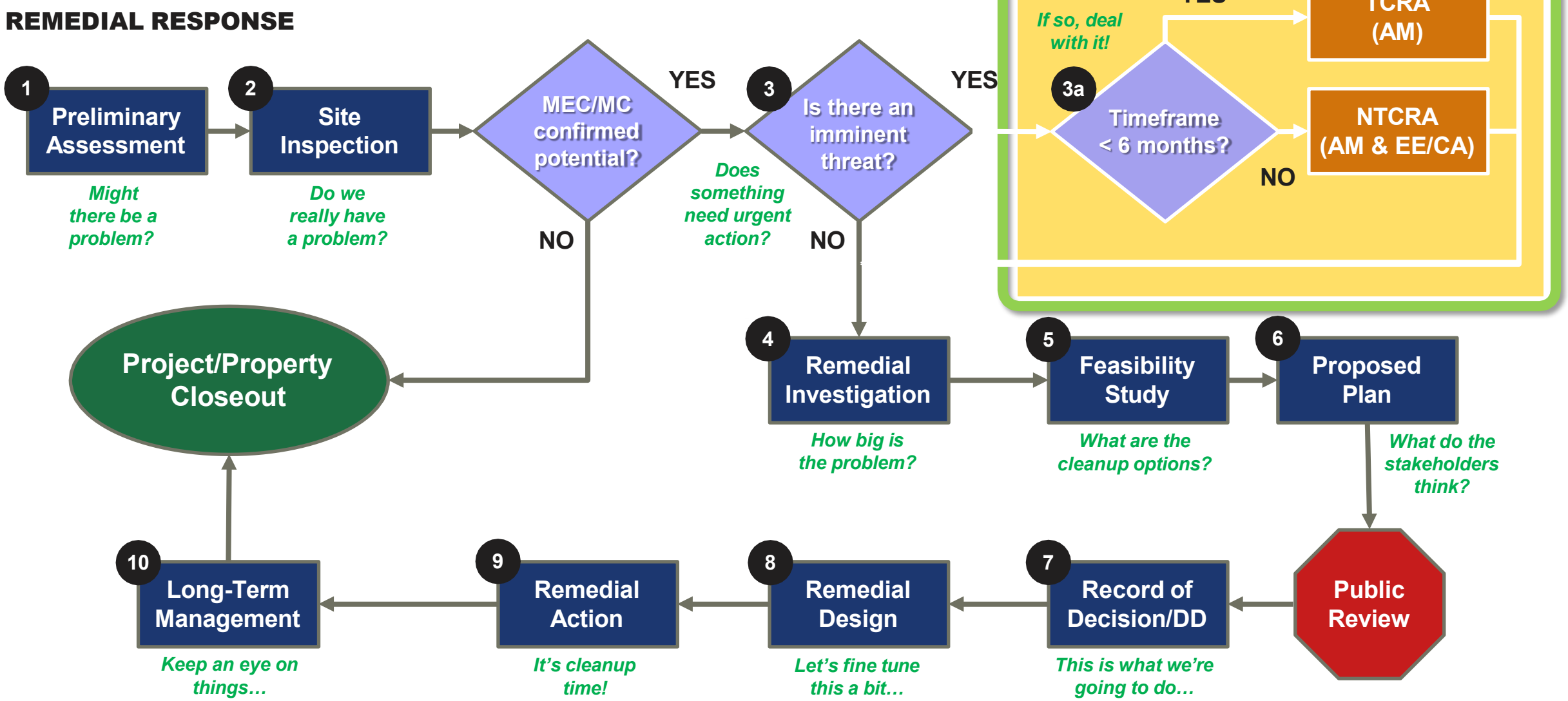


REMOVAL ACTION

Definition –

– A short-term or immediate action taken to address the presence and/or releases of MEC or MC that require expedited response due to threats to human health and/or the environment

Removal actions are interim actions

– Do not have to involve physical removal
  - May include interim LUCs only

Can be time critical or non-time critical

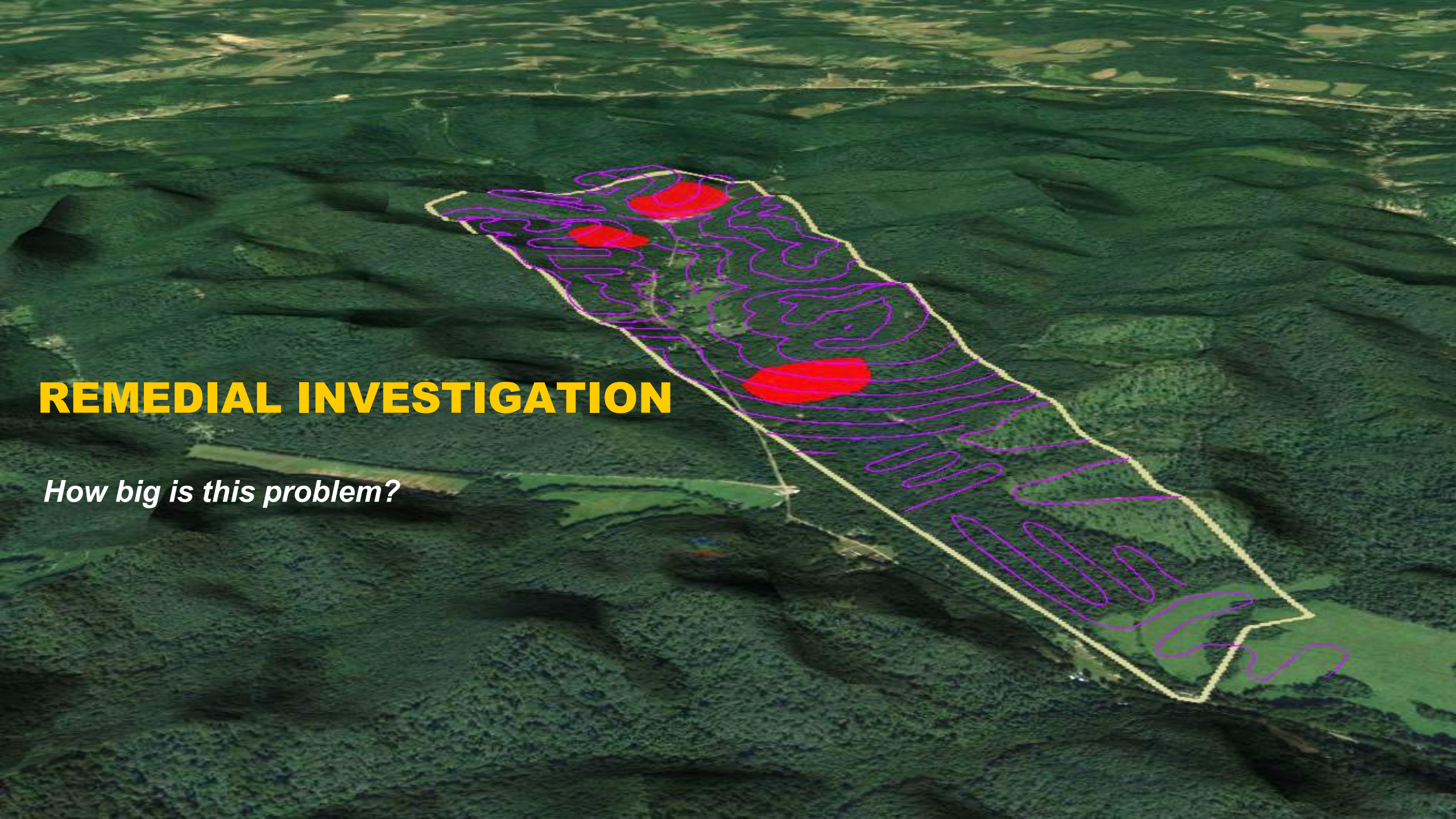
REMOVAL ACTION, CONT'D.

Time Critical Removal Action (TCRA)

- Less than 6-month planning period
- Requires:
  - Action Memorandum
    - Explosives Safety Submission (ESS)
  - Uniform Federal Policy – Quality Assurance Project Plan (UFP-QAPP)
  - Community Relations Plan (CRP)

Non-Time Critical Removal Action (NTCRA)

- More than 6-month planning period
- Requires
  - Engineering Evaluation/Cost Analysis (EE/CA)
    - Explosives Site Plan (ESP)
  - Action Memorandum
    - Explosives Safety Submission (ESS)
  - UFP-QAPP
  - Community Relations Plan (CRP)



REMEDIAL INVESTIGATION

How big is this problem?

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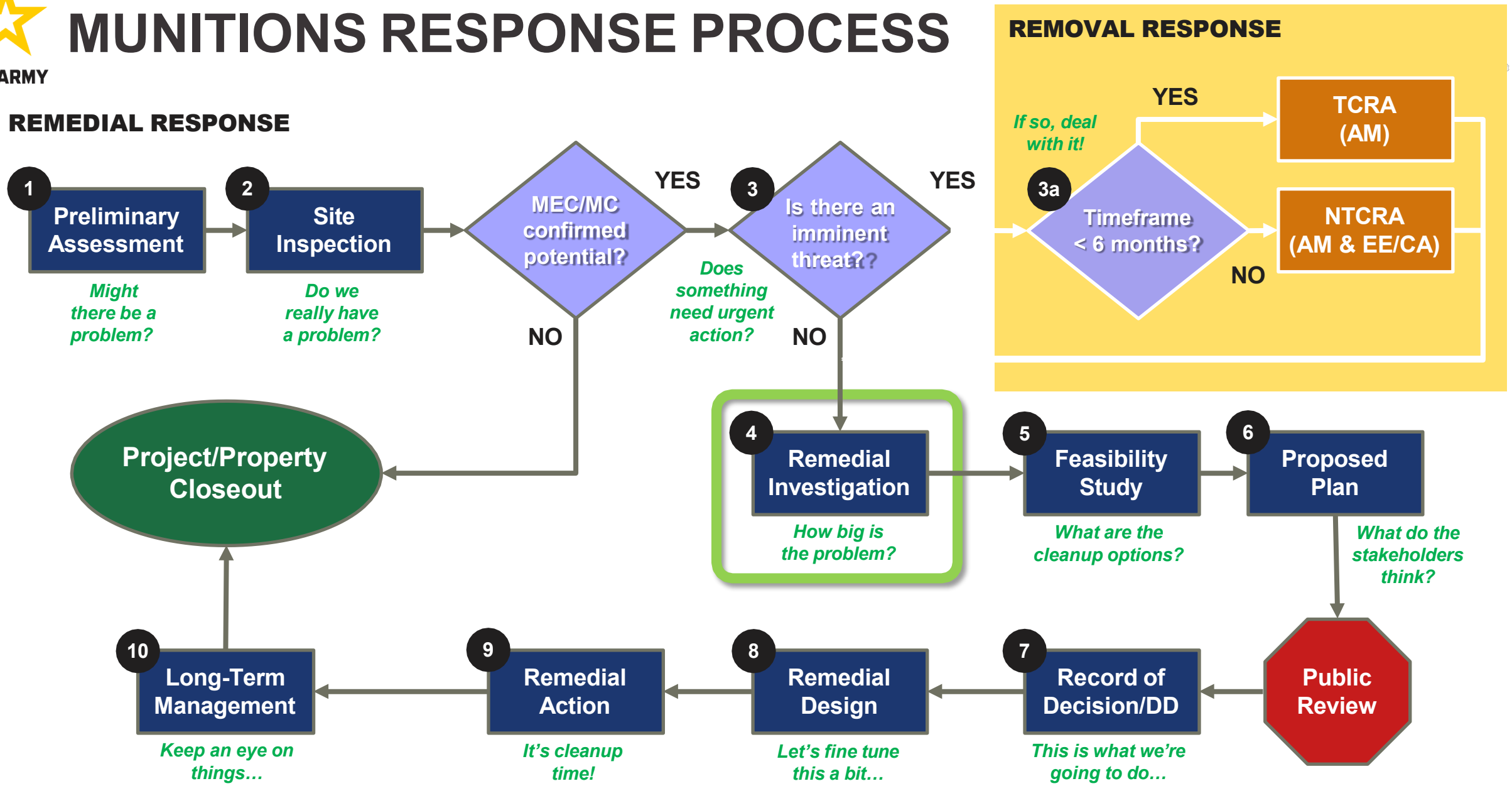
MUNITIONS RESPONSE PROCESS



REMEDIAL INVESTIGATION (RI)

The objective of the RI is to gather information necessary to make an informed risk management decision

- Identify hazard characteristics (nature)
- Determine extent (lateral & vertical) of hazard
- Document exposure pathways in terms of land use activities and frequency
- Conduct an institutional analysis to support potential remedial alternatives

In short…

- Collect data to assess how serious the problem is and support plans for cleaning it up

RI DATA NEEDS

Identify/describe

- High Use Areas (HUA)
  - MEC-contaminated areas with elevated risk
  - Formerly Concentrated Munitions Use Areas (CMUAs)
- Low Use Areas (LUA)
  - Areas with limited suspected MEC contamination
- No Evidence of Use (NEU) Areas
  - Areas with negligible or no suspected MEC contamination
- Types of MEC present (nature)
  - Types of munition and suspected condition (UXO/DMM)
- Depth profiles for MEC across the MRS
  - "Vertical" Conceptual Site Model
- Detailed current and future land use data
  - Physical site characteristics

WHAT CAN WE SAMPLE FOR?

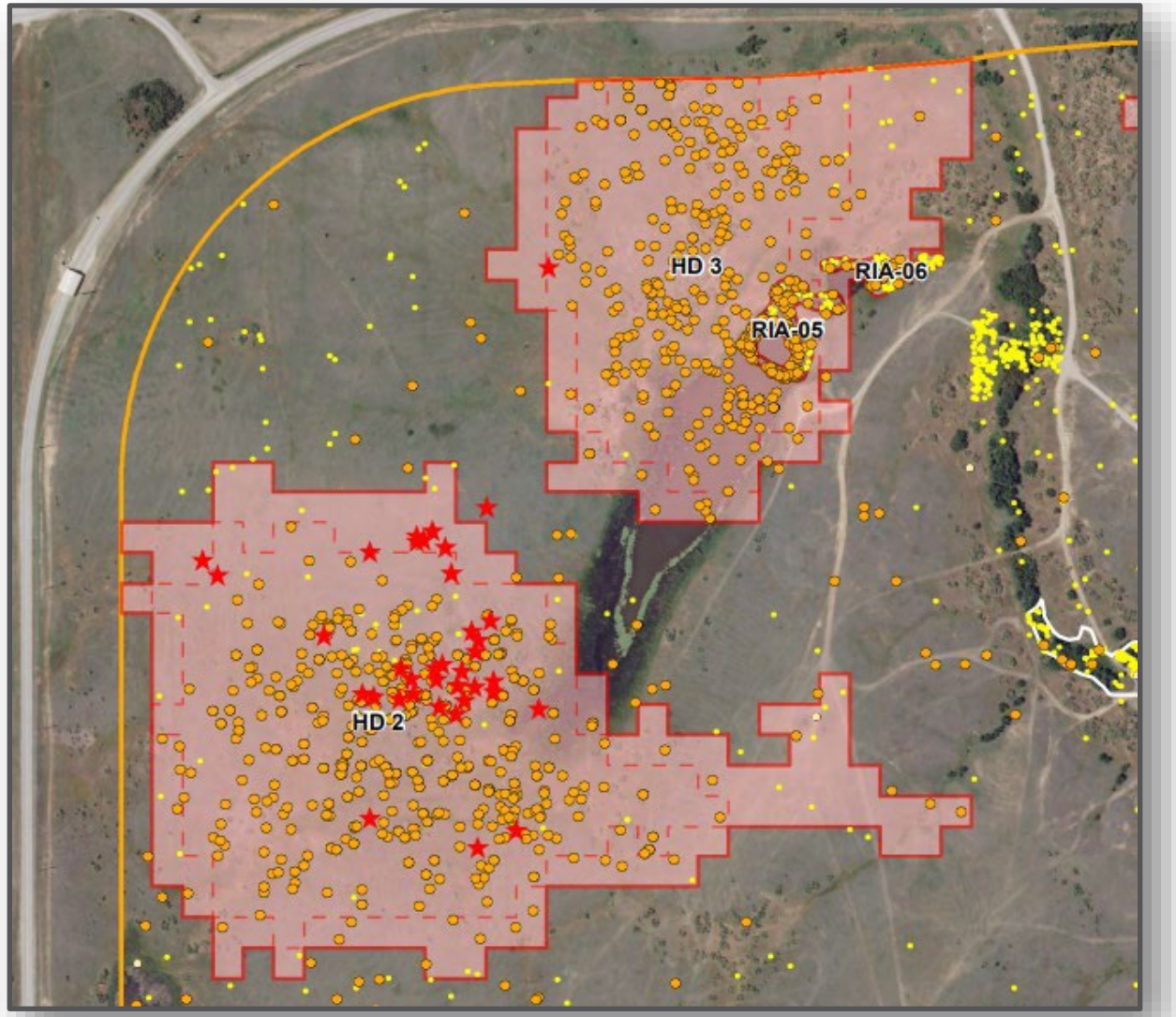
Site characteristics

- Anomaly density and MC concentrations
- Presence of MEC/MD and MC
- Types of MEC/MD and MC
- Depths of MEC/MD

Use data to determine

- Existence and location of HUAs, LUAs, and NEUs
- Depth/distribution of MEC in HUAs and LUAs
  - Vertical profile
- Nature and extent of MC contamination

A major data collection method for MMRP RIs is geophysical surveys…



LET'S TAKE A MOMENT TO DISCUSS...

Geophysical Investigations, Advanced Geophysical Classification, and Visual Sample Plan

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IMPORTANCE OF GEOPHYSICAL INVESTIGATIONS

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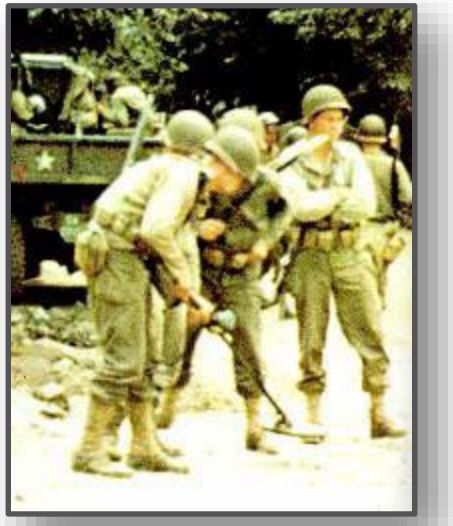
Geophysical investigation is a critical part of MEC investigation & remediation

- During characterization
  - Type of problem
  - Extent of problem
- During Removal/Remedial Action
  - Detection and Selection

Decisions affect:

- Total project costs
- The quality of the removal/remedial action
- Future public safety



Normandy

Southwest Proving Grounds

Fort Ord

WHAT IS THE RISK OF NOT CONDUCTING SOUND GEOPHYSICAL INVESTIGATIONS?

Poorly planned or poorly executed geophysical investigation will produce:

- Undocumented, unusable or misleading information
- Indefensible predictions and conclusions

Erroneous conclusions can result in:

- Recurring site revisits and expenses
- Poor public and professional reputation
- Safety hazard

DOD/ EPA MANDATE

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MOU Mandates

- **A permanent record including:**
  - Digitally recorded geophysical data, georeferenced to the maximum extent practical
  - A clear audit trail of pertinent data, analysis, and decisions
- **Full project costs must be considered:**
  - All costs for activities that flow from the initial geophysical investigation must be considered (these costs can be more than the actual geophysical investigation).

DoD and EPA Management Principles for Implementing Response Actions at Closed, Transferring, and Transferred (CTT) Ranges ***7MAR2000***

DERP Manual

- **Administrative Record must include:**
  - Data gathered to characterize an MRS (including geophysical sensor data that is digitally recorded and geo-referenced) accompanied by a clear audit trail of pertinent analyses and resulting decisions.
- **When analog is used:**
  - "Where collecting digitally recorded, geo-referenced, geophysical sensor data is impractical or unwarranted, the installation shall forward a memorandum documenting the determination to the DoD Component Secretariat; the memorandum shall be included in the AR."

DERP Manual Chapter 7(a)(1)(a)(3)(c)

ANALOG DETECTION SYSTEMS – OVERVIEW

Audible output or meter deflection is interpreted in real time by the instrument operator

- Commonly known as “Mag & Flag” or “Mag & Dig”
- Uses either magnetometer or EMI instrument
- Teams sweep lanes 3-5 feet wide using visual navigation

Data collection

- No recorded data
- No geolocated data

ANALOG SYSTEMS – PROS AND CONS

Pros

- Can be used in any terrain and vegetation where an operator can safely walk

Cons

- No recorded data = no auditable decision record
  - Coverage
  - Anomaly selection
- Performance depends on human factors that can't be measured
- Lower detection capability
- No information about the source of the anomaly – requires digging
- Difficult to perform QC

DIGITAL GEOPHYSICAL MAPPING (DGM) – OVERVIEW

Digital sensor output is recorded for subsequent analysis

– Uses either magnetometer or EMI instrument

Includes

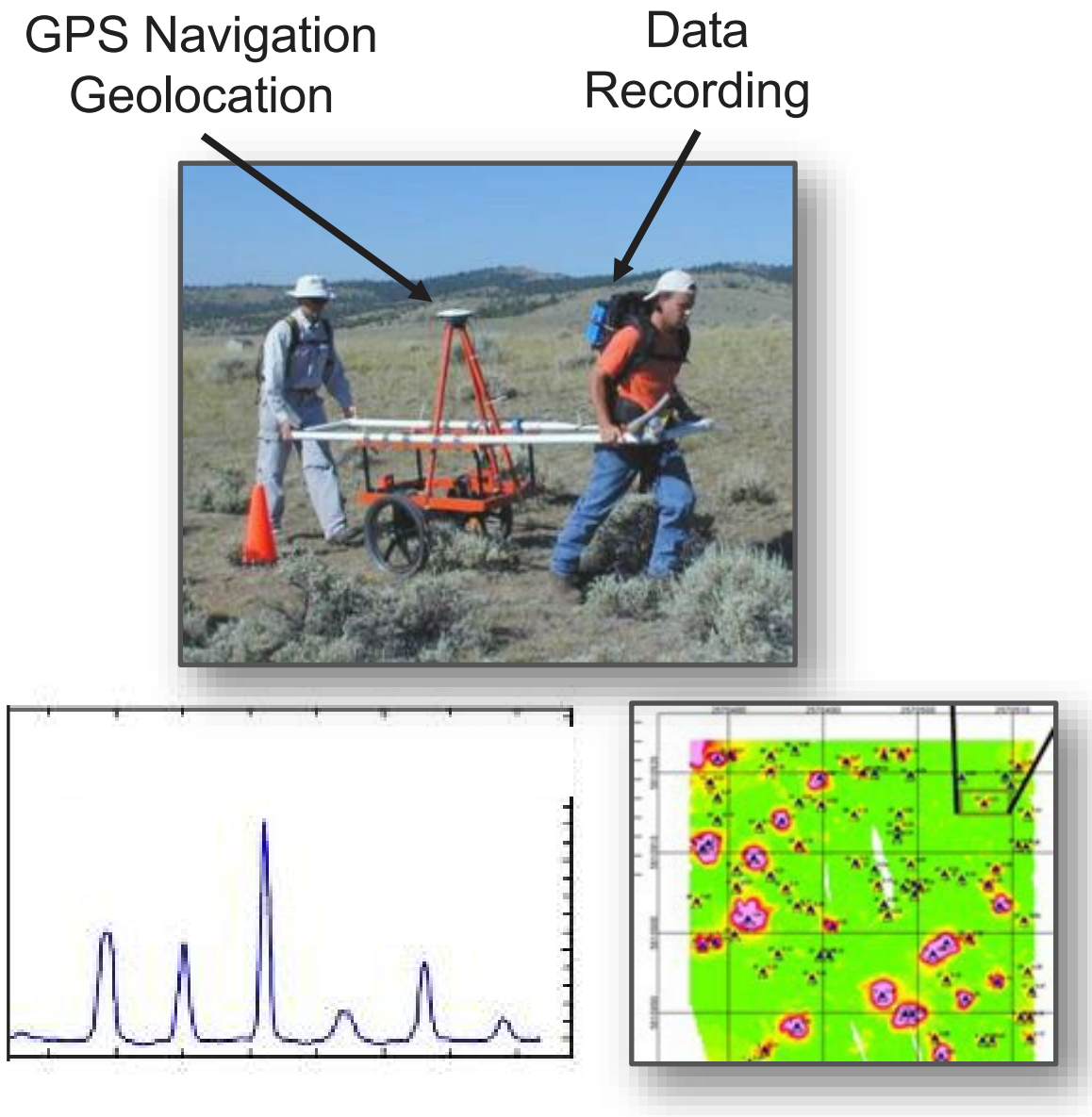
– GPS to allow geolocation and navigation

– Digital recording of geolocated sensor output

Supports

– Principled anomaly selection based on targets of interest and site conditions

– Quality checks on data



DGM – PROS AND CONS

Pros

- Reliable, robust, efficient data collection
- Well-characterized detection capability
- Widely available
- Data record for QA/QC and reanalysis

Cons

- Not suitable for extreme terrain and vegetation
- Provides little information about the source of the anomaly - requires digging for source identification and depth
- Lower spatial resolution than AGC

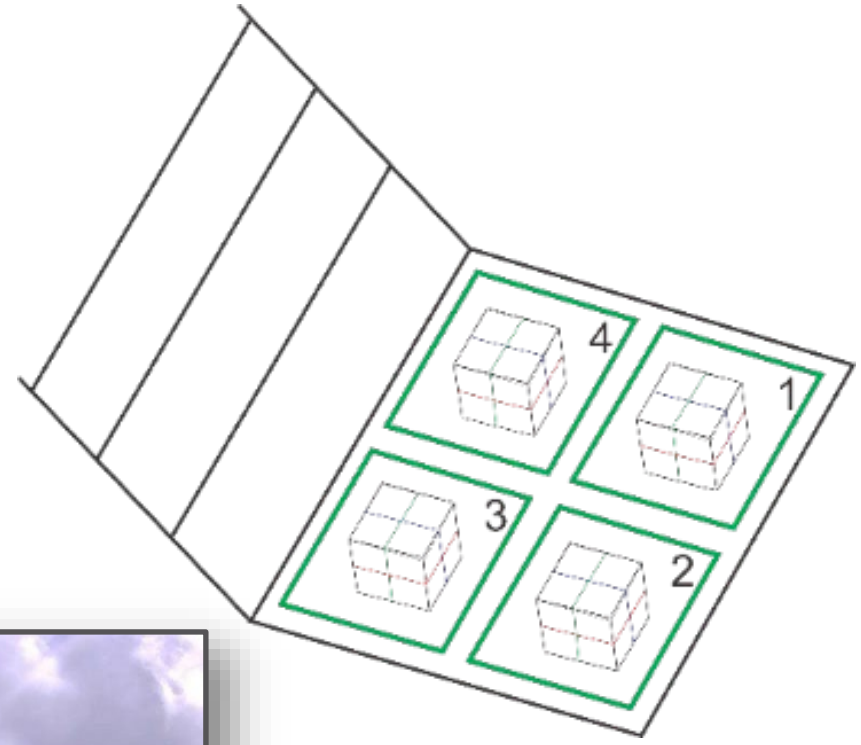
ADVANCED GEOPHYSICAL CLASSIFICATION (AGC) – OVERVIEW

High resolution signal detected by an advanced sensor is recorded digitally

- Uses electromagnetic induction
- "Illuminates" the target and measure its response from multiple directions

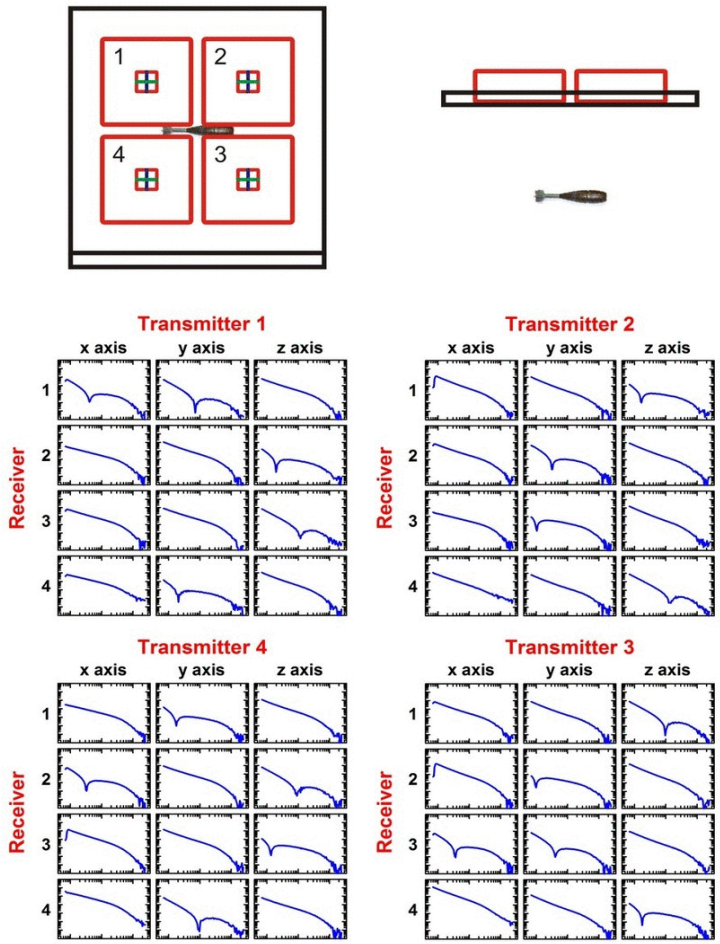
Analysis provides information related to

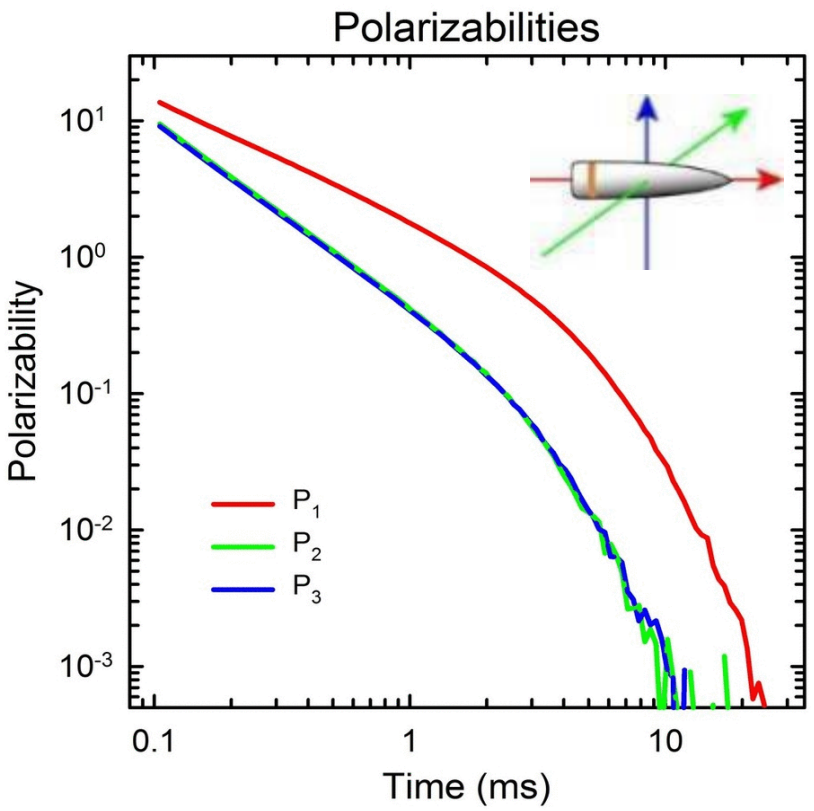
- Size and shape of object
- Material properties



AGC – HOW IT WORKS

Polarizabilities *do not change* with item depth or orientation

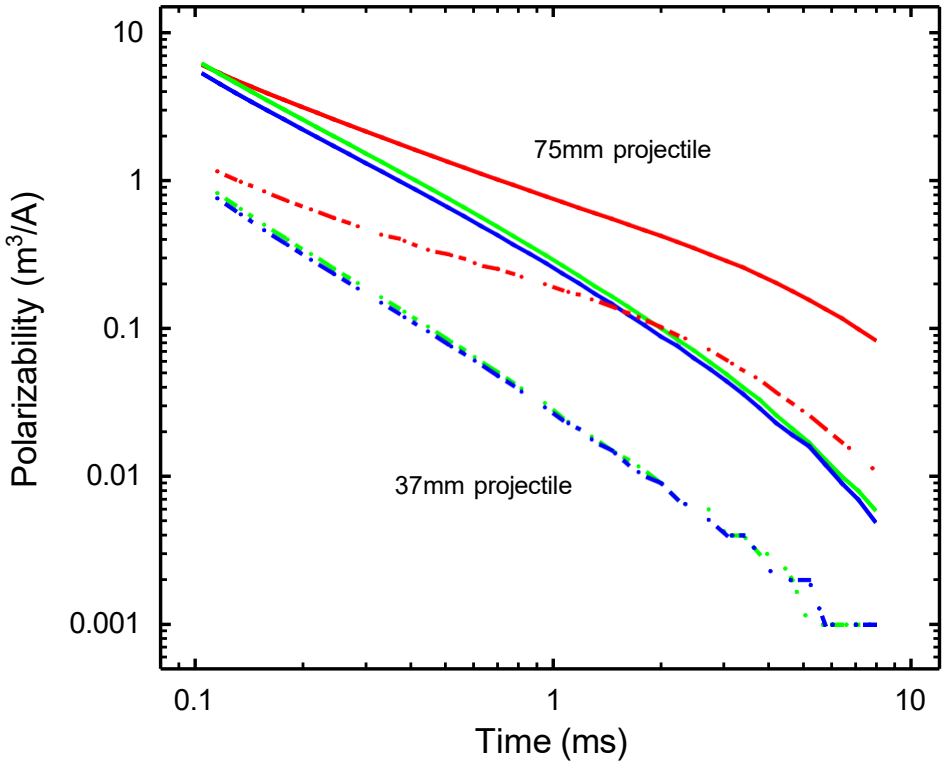




AGC – HOW IT WORKS, CONT'D.

The high-resolution signal tells us a lot about the source

- Munitions "look like" long, slender, symmetric objects
- Fragments "look" asymmetric
- Large objects have stronger responses than small objects



AGC – PROS & CONS

Pros

- Provides information about size, shape, material properties & depth of sources – requires less digging
- Higher spatial resolution
- Complete data record for QA/QC
- Well-characterized system: 25 demonstrations in a wide variety of site conditions
- Contractors using AGC must be accredited

Cons

- More expensive data collection and analysis
- Slower survey speed
- Not suitable for extreme terrain and vegetation
- Requires specialized training

Only AGC can provide this information *without digging!*

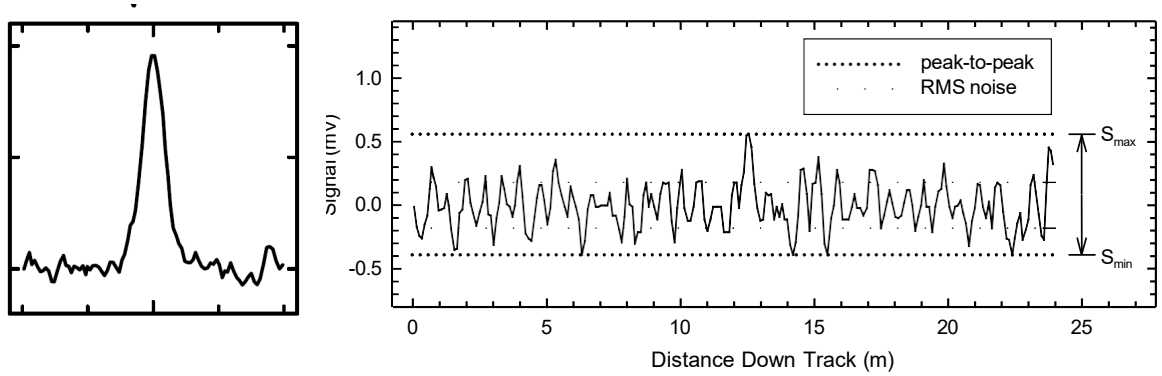
WHAT CAN THESE GEOPHYSICAL SENSORS DETECT?

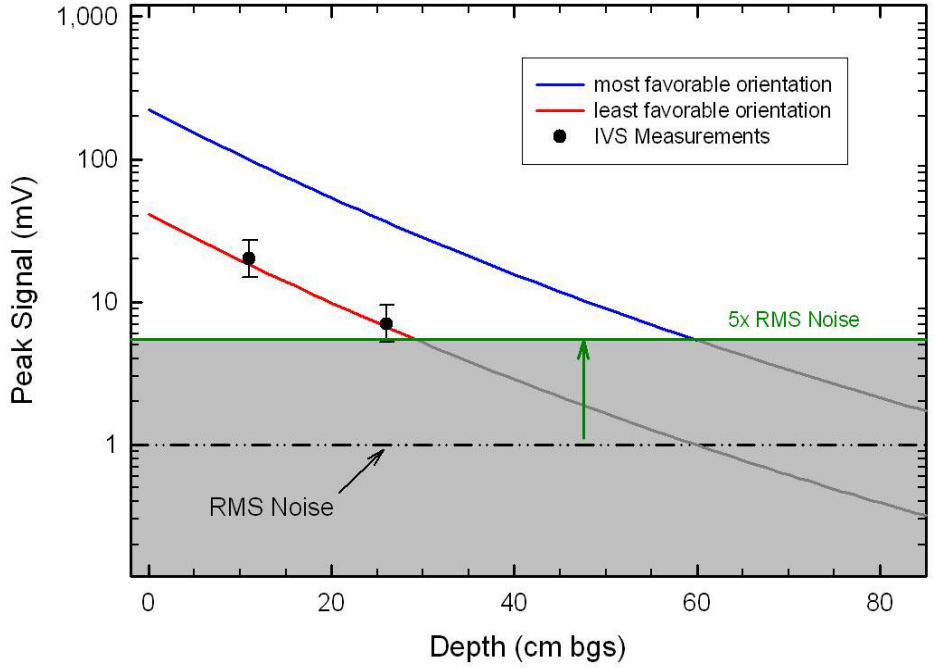
Depends on

- Signal – the response of the sensor to the object you want to detect
- Noise – variations in sensor response due to other factors such as geology, motion, interference, and so on

Signals from common munitions are well characterized for EM61 DGM and AGC

- Quantitative understanding of depth to which specific munitions can be reliably detected in the noise environment at a site





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WHAT IS VISUAL SAMPLE PLAN (VSP)?

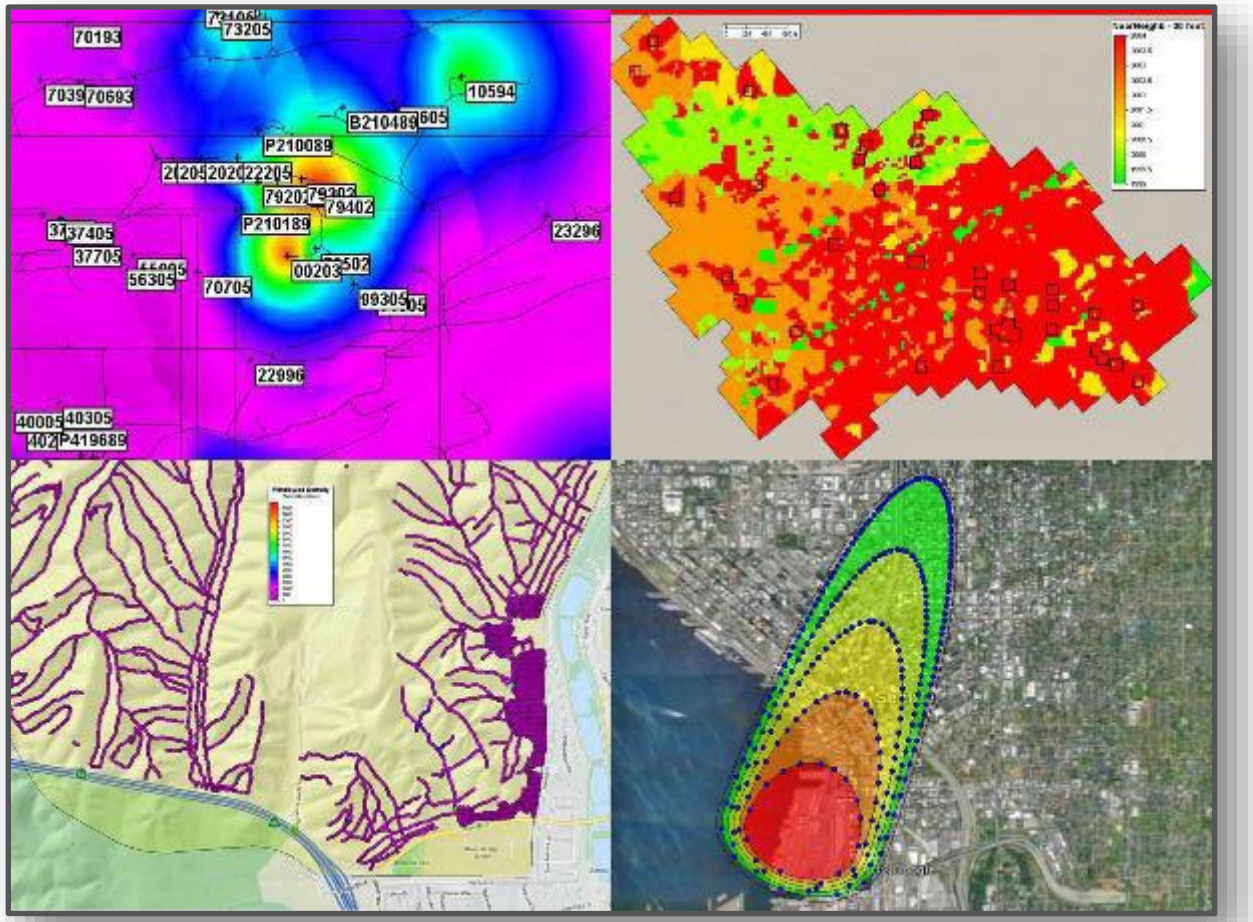
Visual Sample Plan is a statistical sampling design tool for environmental problems

- Developed by Pacific Northwest National Lab
- Supported by multiple government agencies including, DOE, EPA, DoD, DHS, and CDC

Multiple modules for different sampling requirements

Focus today on the Munitions Response Module:

- Locating and characterizing areas on a site with a high density of metal that could be target areas
- Mostly munitions debris (MD) and range related debris (RRD)

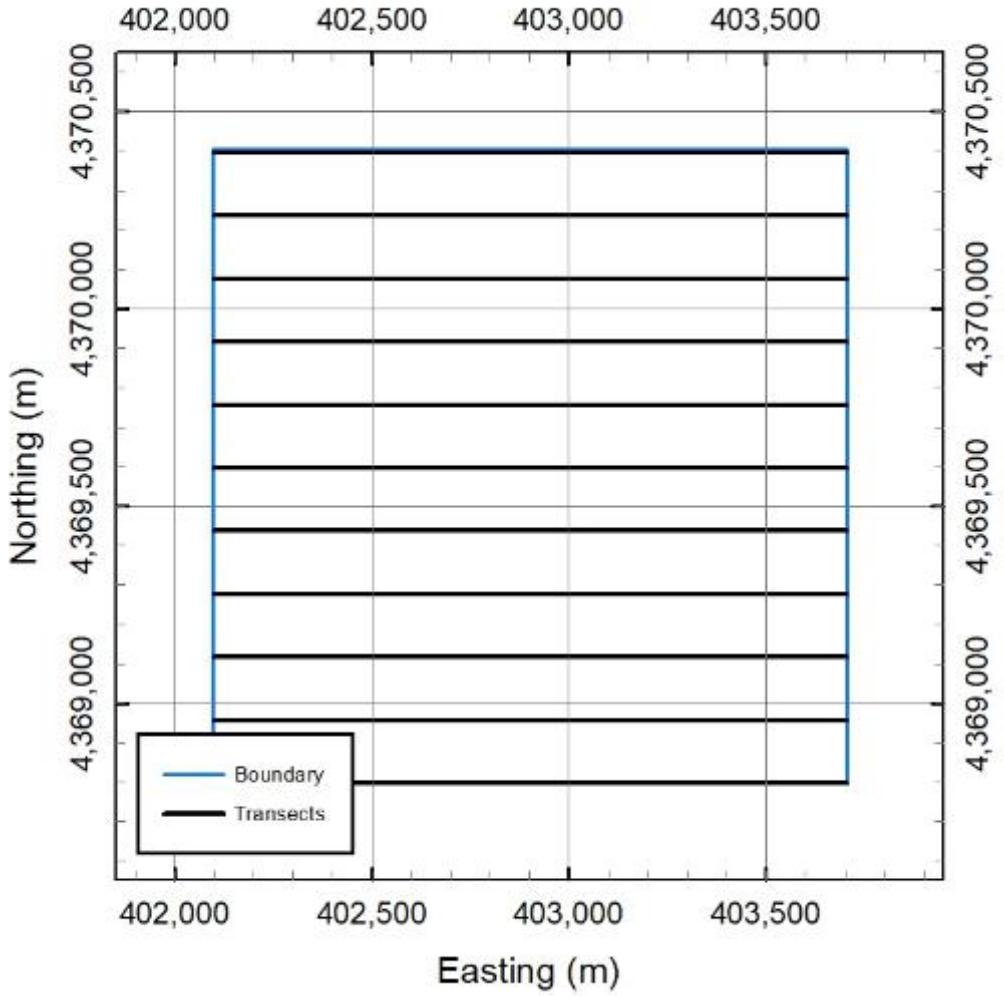


WHAT DOES VSP DO?

Plan transect sampling to **traverse and detect** a target area of specified size and anomaly density

Analyze transects to

- Locate high density areas
- Estimate size and anomaly density



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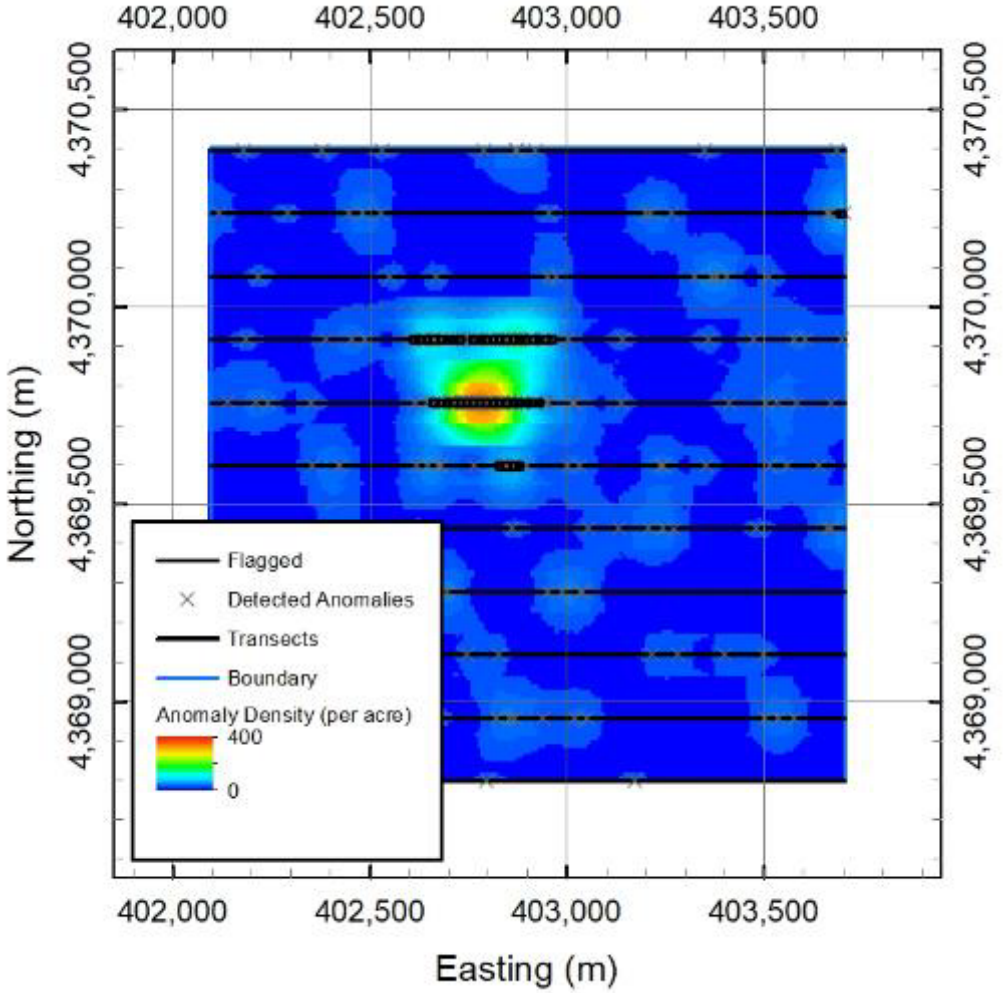
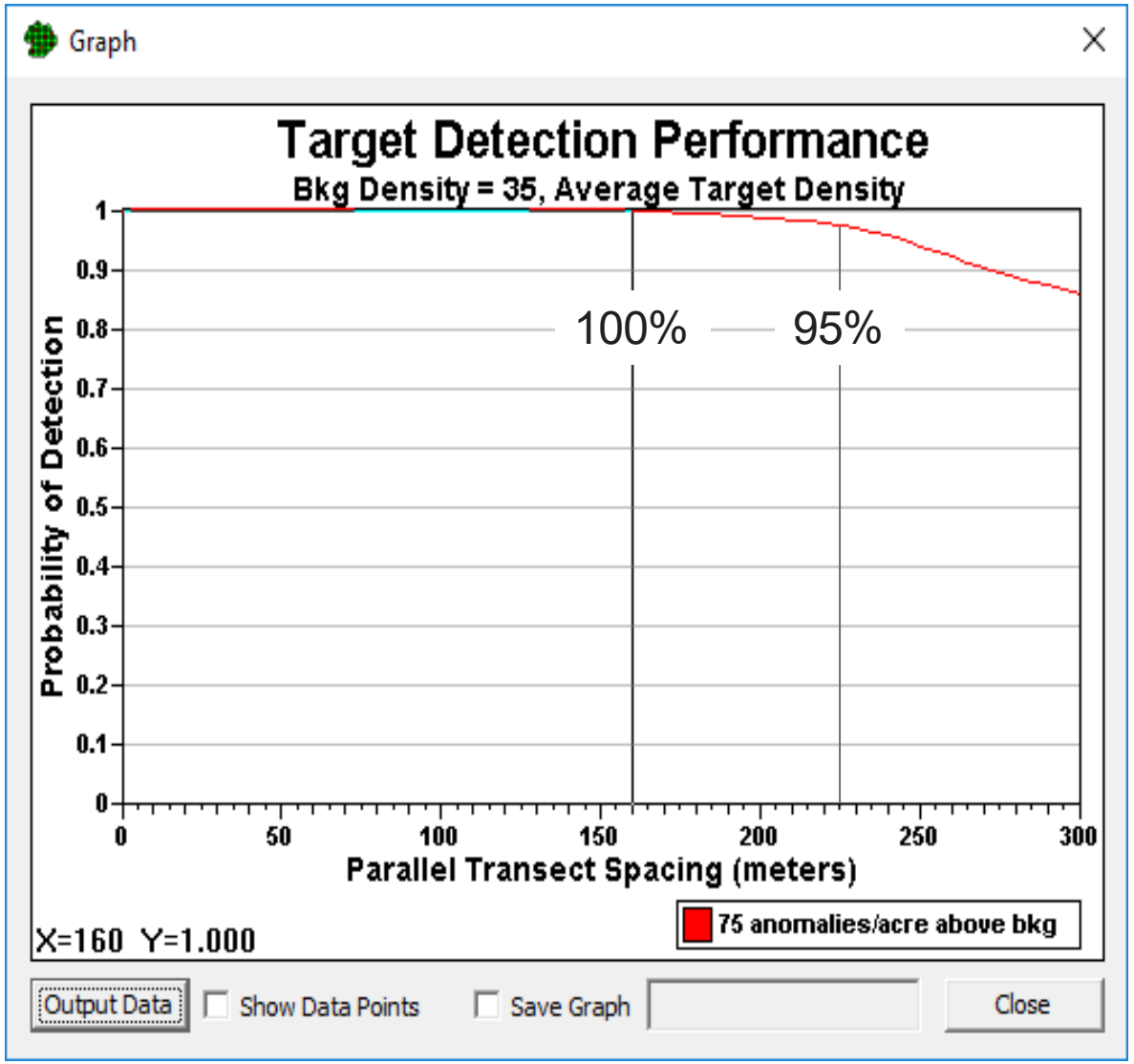


SELECT PROBABILITY OF DETECTING TARGET AREA



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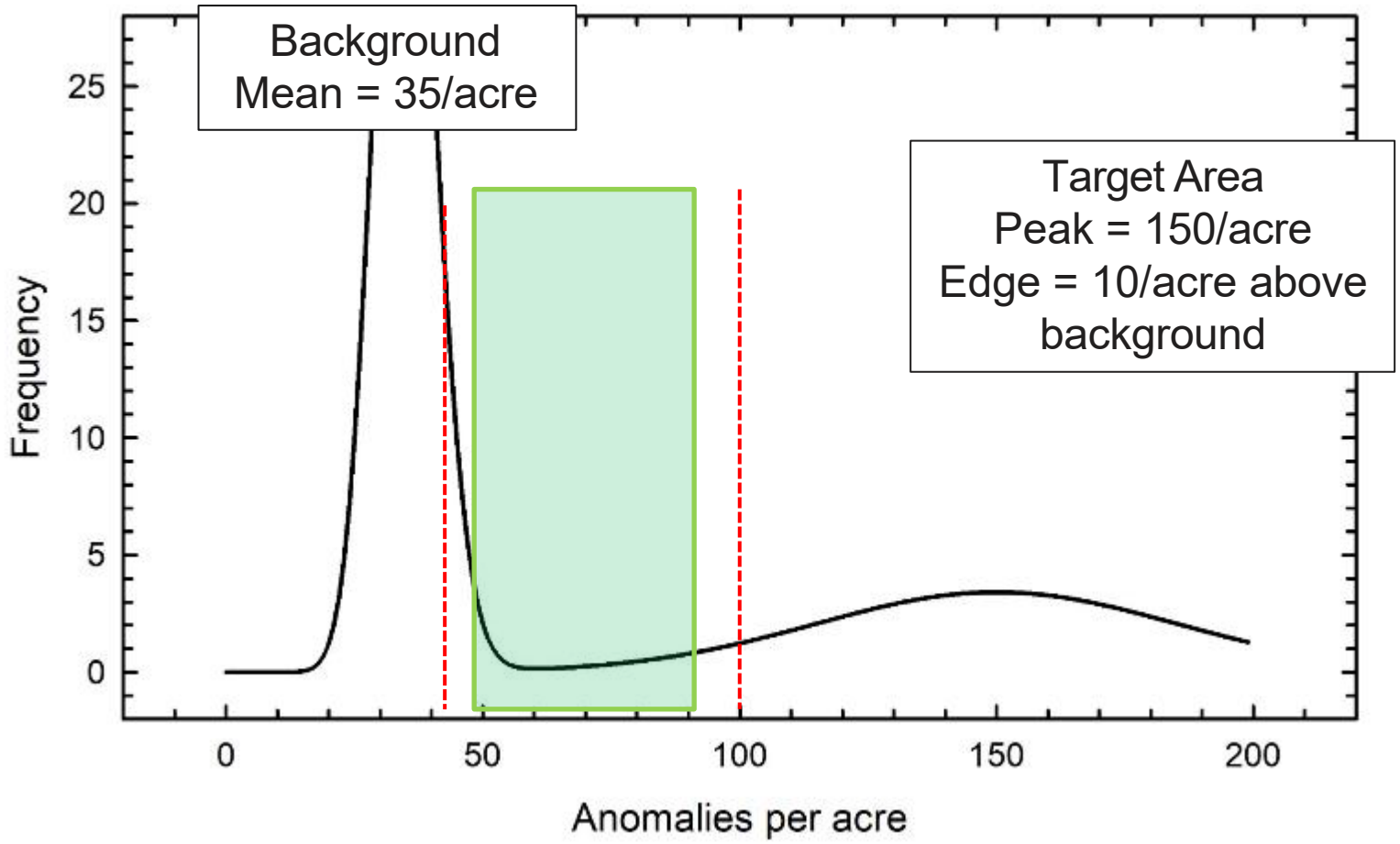
WHAT IS "CRITICAL DENSITY"?



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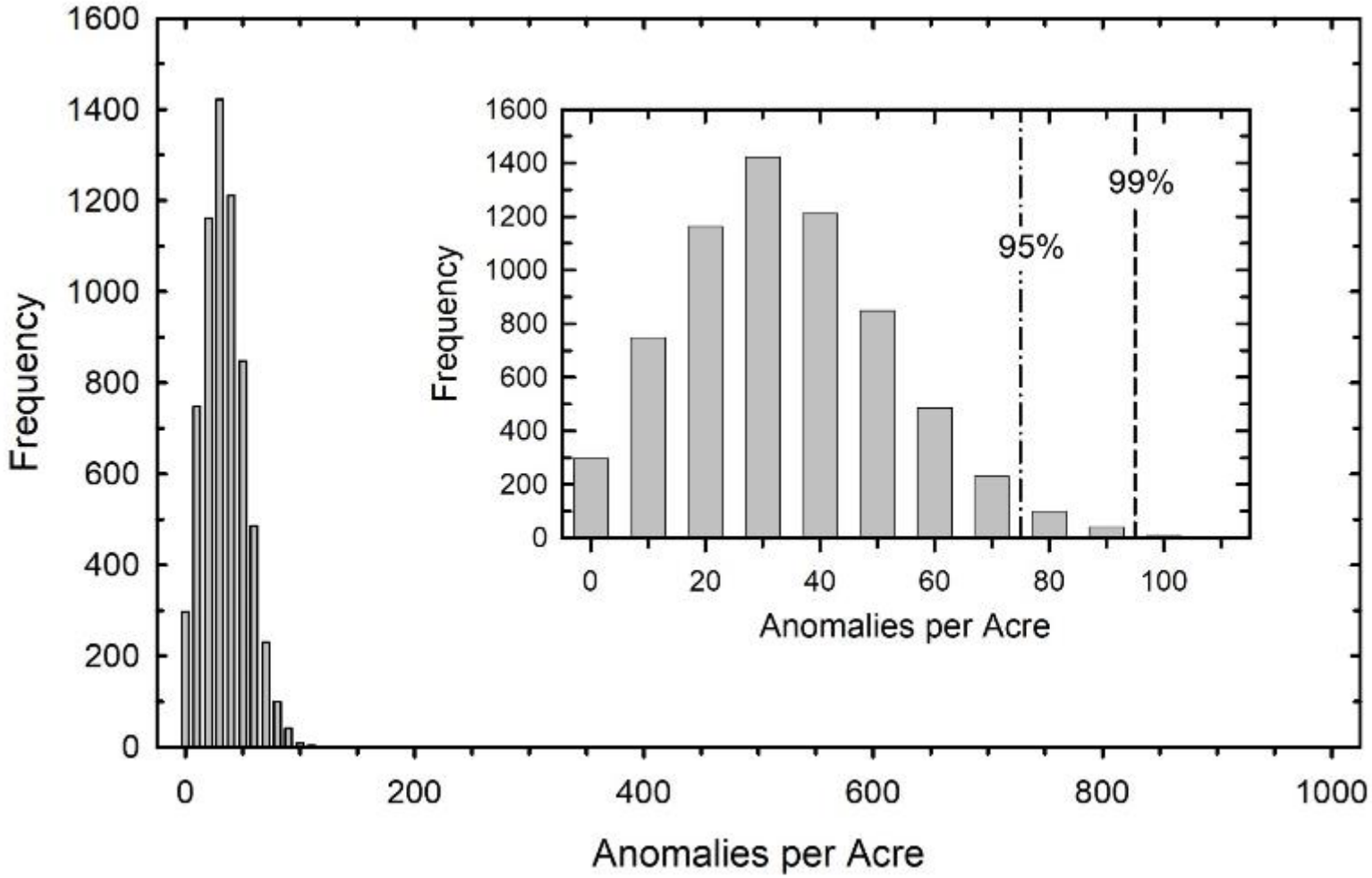
BACKGROUND ANOMALIES IN OUR EXAMPLE



EFFECT ON HD AREA SIZE

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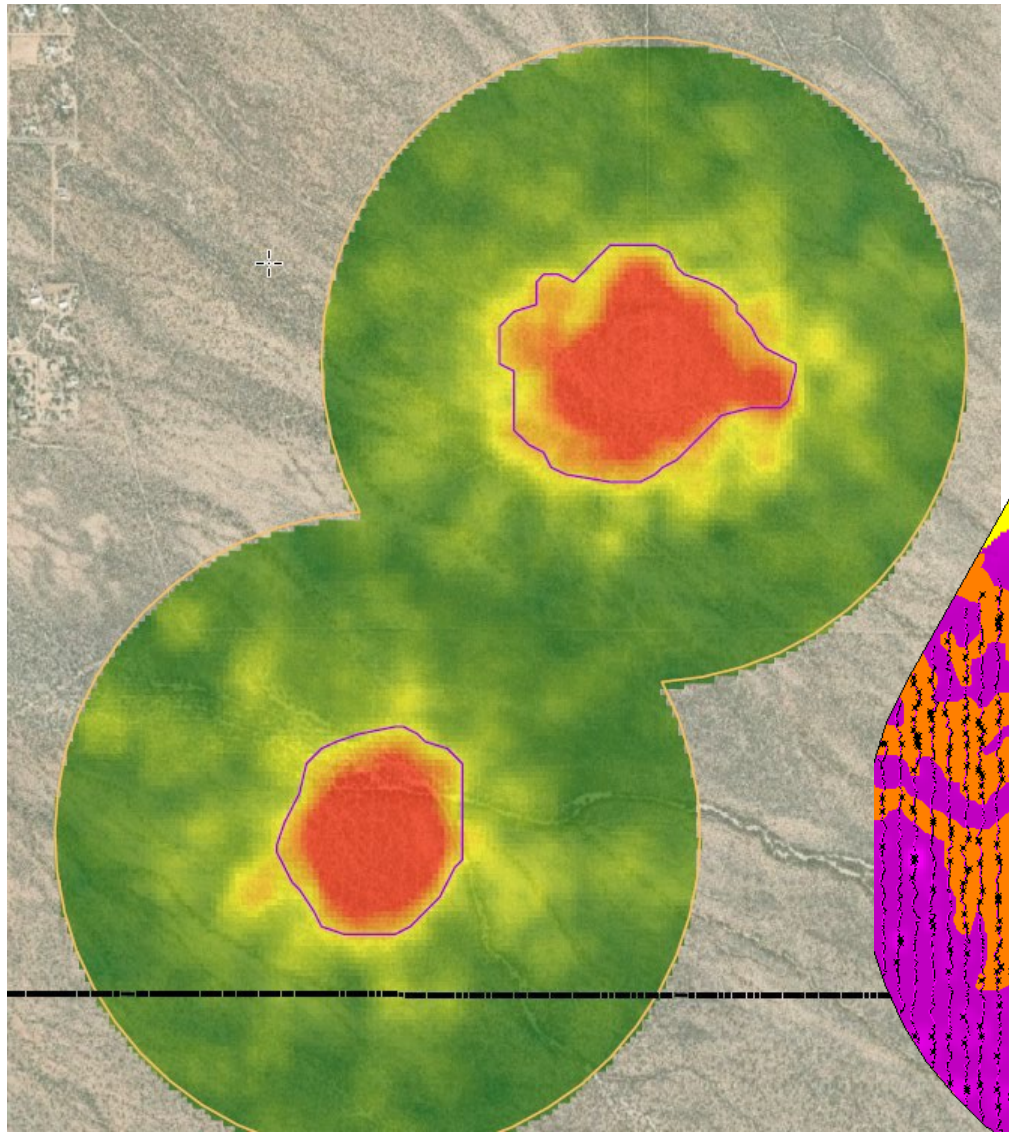

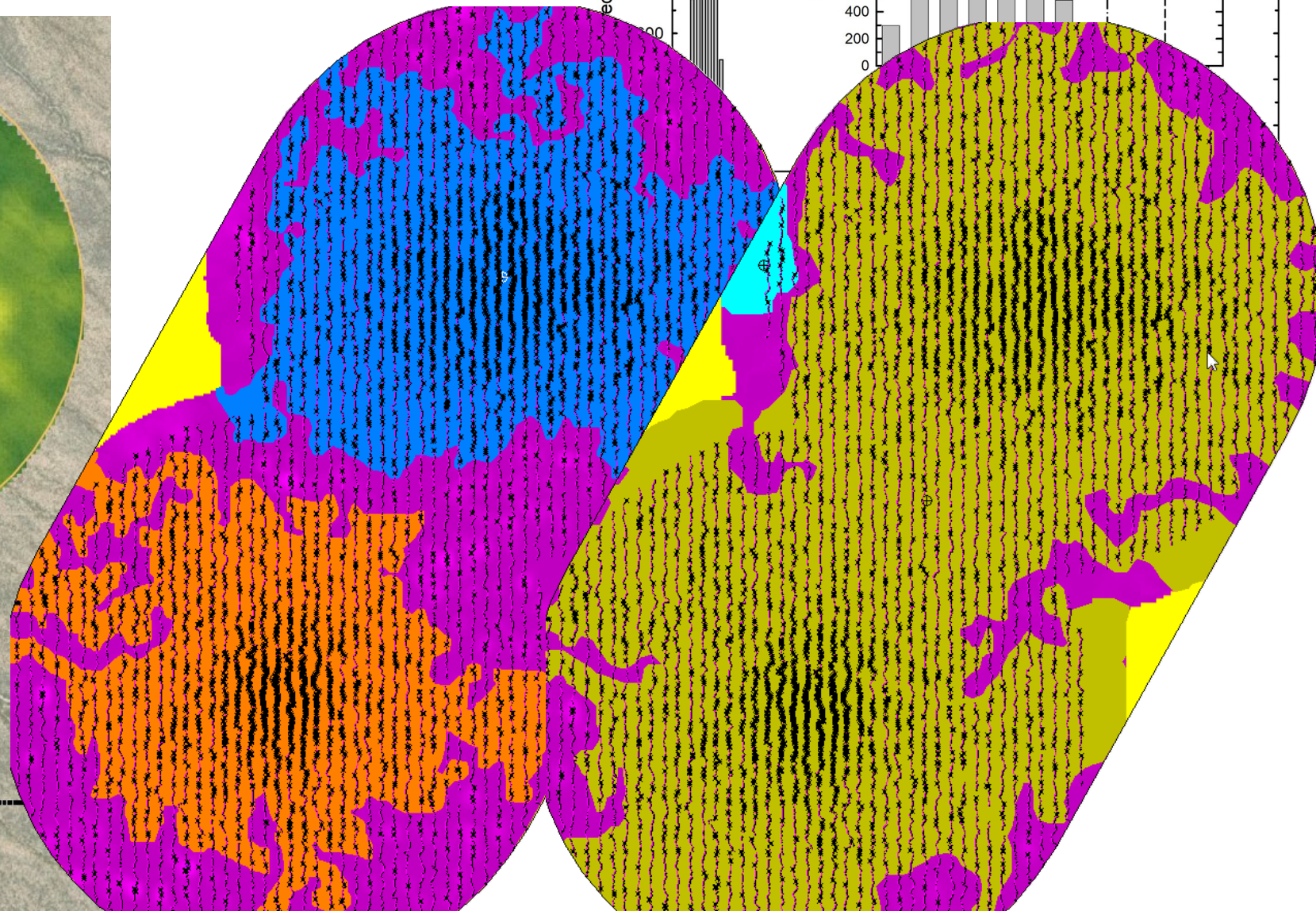

AND NOW, BACK TO THE REMEDIAL INVESTIGATION…

How the geophysical and other data collected supports the RI

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US Army Corps of Engineers®

OTHER CHARACTERIZATION DATA

Land use

- Onsite structures?
- Who is onsite and what do they do?
- Will shovels go in the ground? How deep?
- Are there development plans?

Number of MEC encounters over the years

Site features

- Topography, vegetation

Natural resources

Cultural resources

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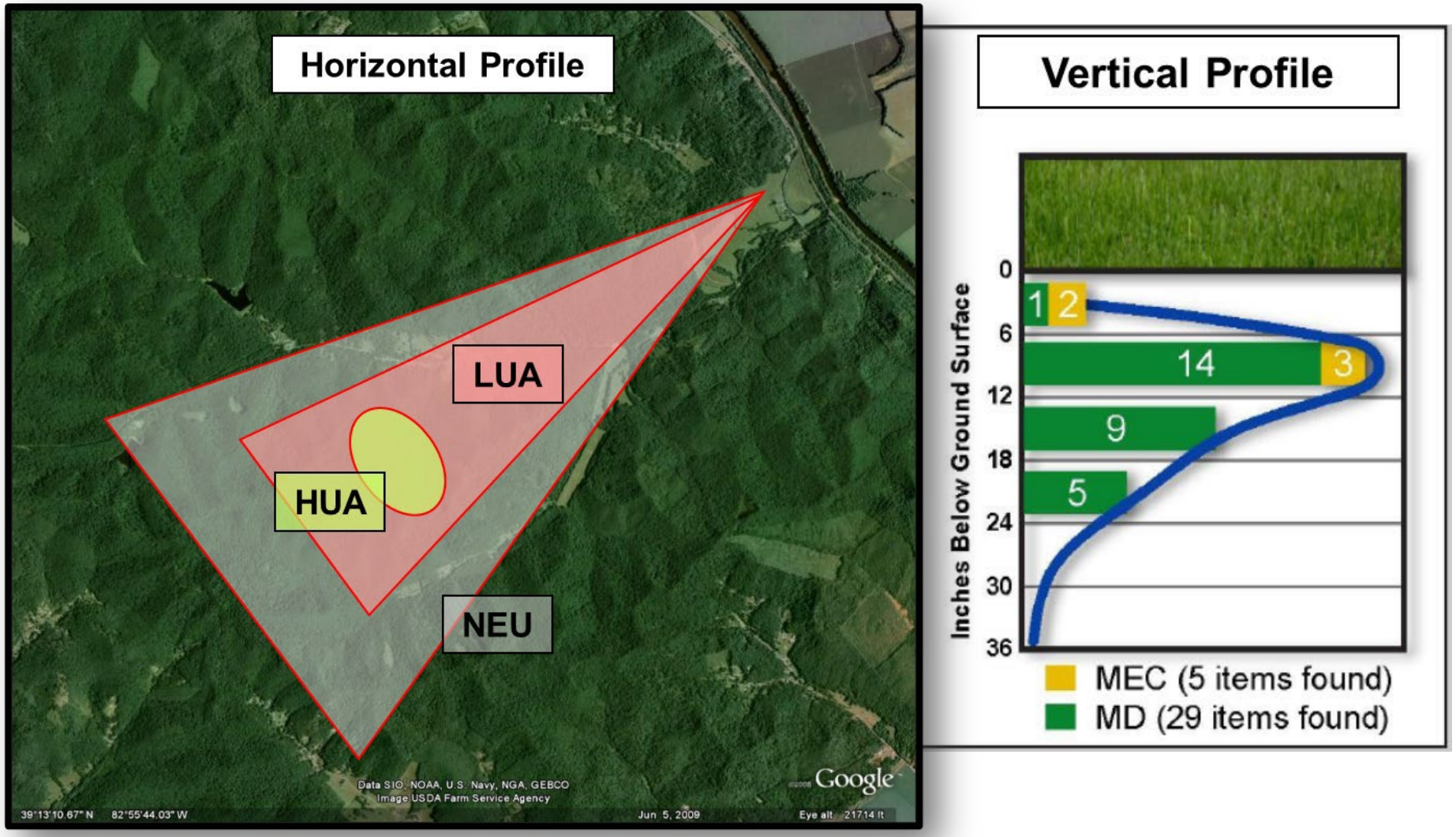
POTENTIAL RI RESULTS



MEC AND MC RISK ASSESSMENT

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Baseline risk assessments should adhere to the requirements of CERCLA and the NCP

MEC Risk Assessment

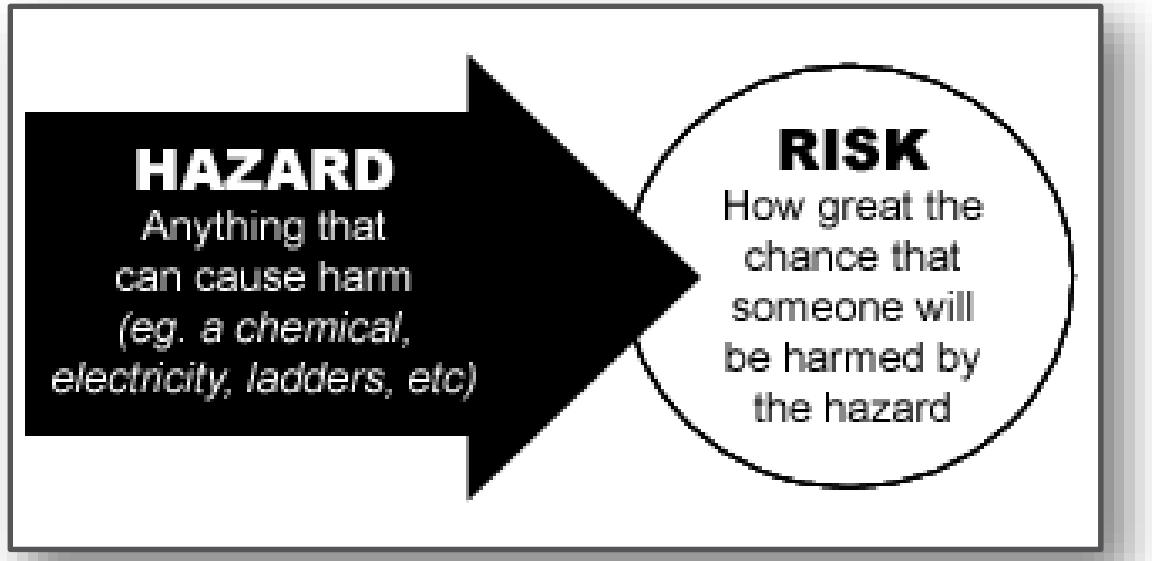
– No accepted quantitative method available to assess risk from MEC hazards

– Qualitative methods consider MEC hazard, severity of outcome, and likelihood of occurrence

MC Risk Assessment

– Well-established quantitative methods

- Risk Assessment Guidance for Superfund (RAGS)



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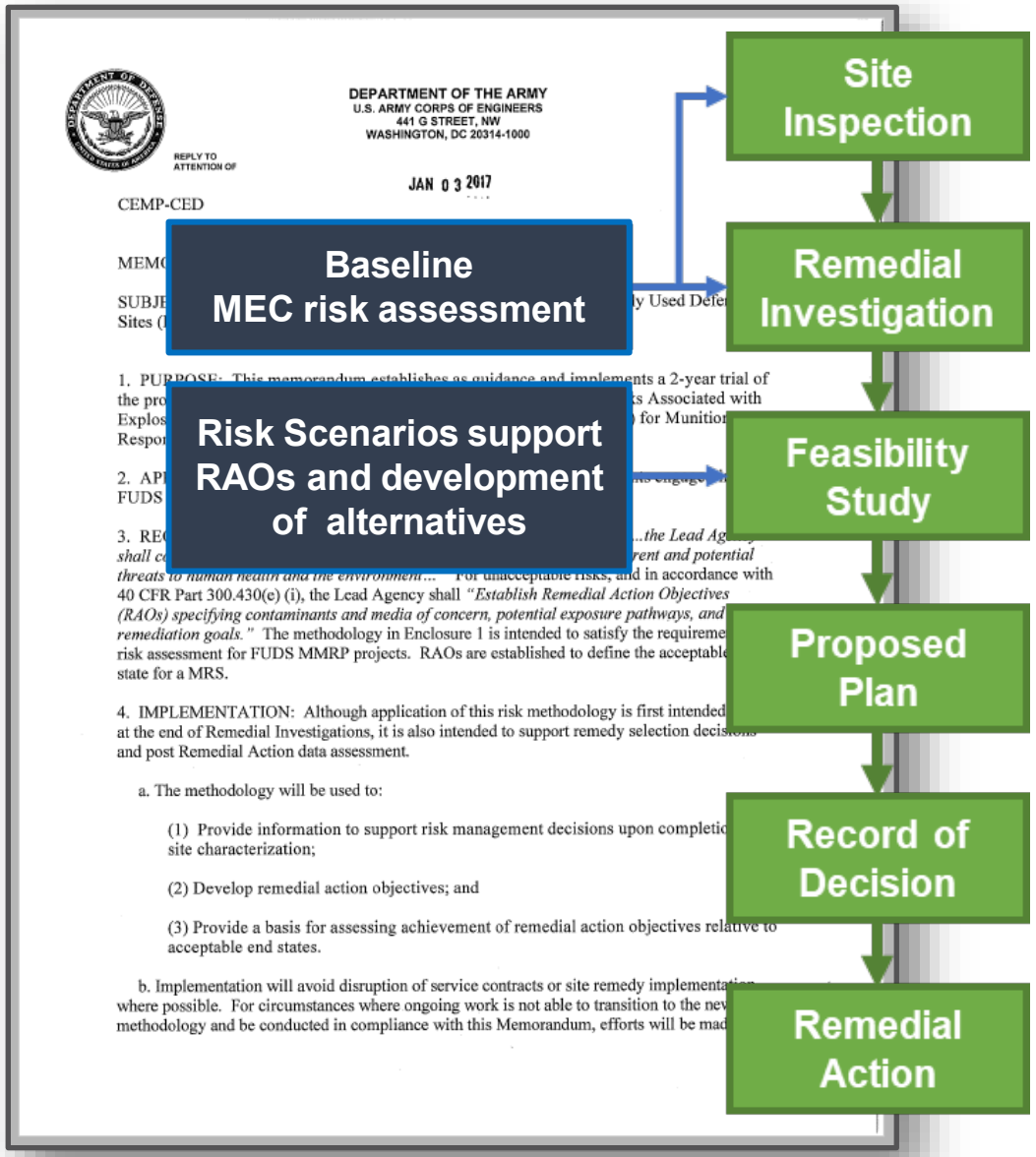
RISK MANAGEMENT METHODOLOGY OVERVIEW

RMM is the recommended method

– *Decision Logic to Address Risks Associated with Explosive Hazards, and to Develop RAOs for MRSs*
(i.e., Risk Management Methodology)

- Established as interim guidance on 3 Jan 2017 for a two-year trial period
  – Has been extended to Mar 2022 (and beyond…)
- Purpose
  – RI baseline risk assessment
  – Supporting RAOs and development of remedial alternatives
- Uses decision matrices to guide PDTs through risk management process
- Now being updated by Office of the Secretary of Defense (OSD)
  – Coming ***REALLY*** soon



RISK MANAGEMENT METHODOLOGY OVERVIEW

Why use the RMM?

– Consistent tool to support risk-based decisions at MRSs

– Evaluates MEC exposure pathway

Source → Encounter → Interaction → Incident

and the likelihood receptors will

- Encounter MEC
- Interact with MEC
- Experience a harmful incident

– Considers site-specific factors that influence risks from MEC exposure

- Uses them to guide the PDT's risk management decisions

RISK MANAGEMENT METHODOLOGY OVERVIEW

When to use the RMM?

– Remedial Investigation (RI)
  - Framework for the baseline MEC risk assessment

Where is RMM information needed?

– Feasibility Study (FS)
  - Risk scenarios help develop remediation goals
  - Risk scenarios help identify needed outcomes from different alternatives

RMM is NOT a “black box”

– Inputs do NOT drive precise outputs
– PDTs must use the RMM to
  - Facilitate discussion
  - Build consensus on risk management decisions

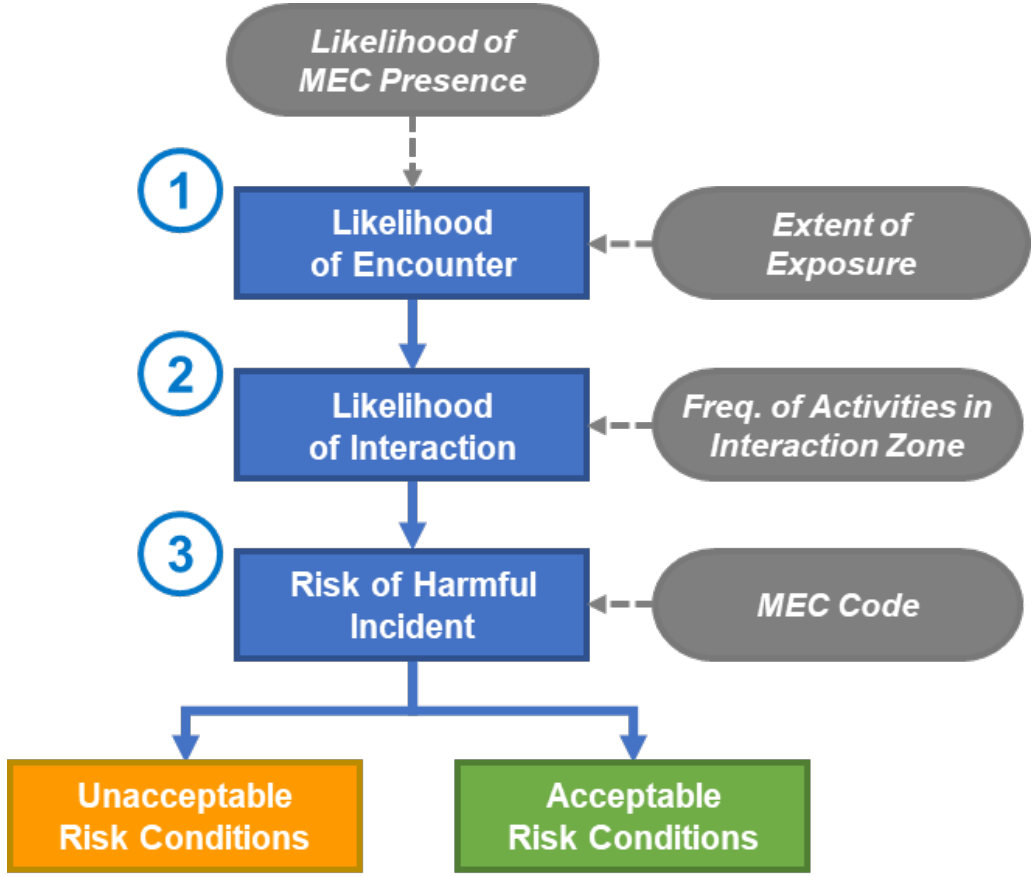
RISK MANAGEMENT METHODOLOGY MATRICES

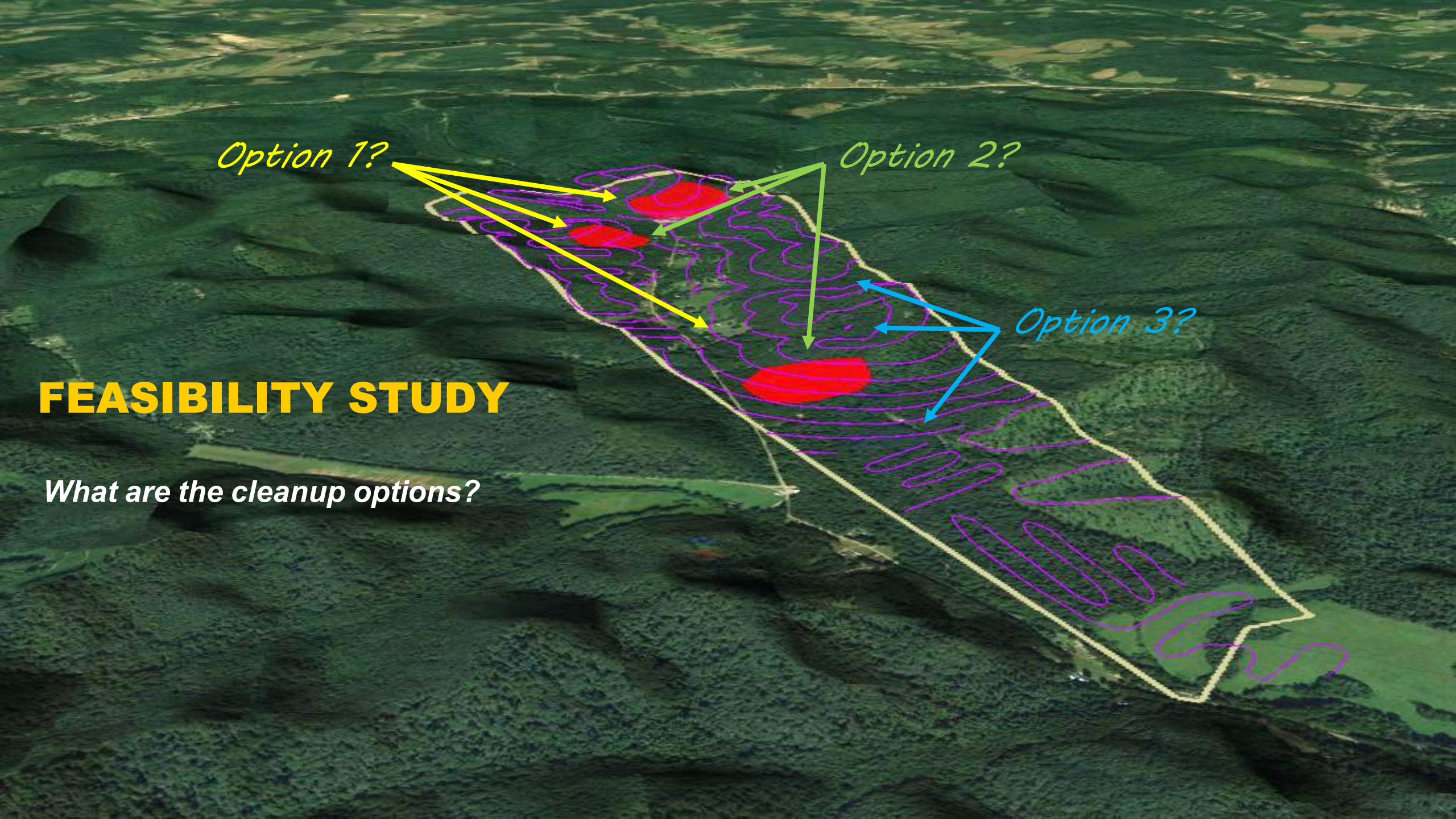
Considers three primary risk factors

- Likelihood of Encounter (Matrix 1)
  - Likelihood of MEC presence
  - Extent of exposure
- Likelihood of Interaction (Matrix 2)
  - Likelihood of encounter (from Matrix 1)
  - Frequency of activities in interaction zone
- Risk of Harmful Incident (Matrix 3)
  - Likelihood of interaction (from Matrix 2)
  - MEC Code
    - Based on munitions severity and sensitivity

They help the project team draw conclusions

- Based on the three factors, is overall site risk *acceptable* or *unacceptable*?





FEASIBILITY STUDY

What are the cleanup options?

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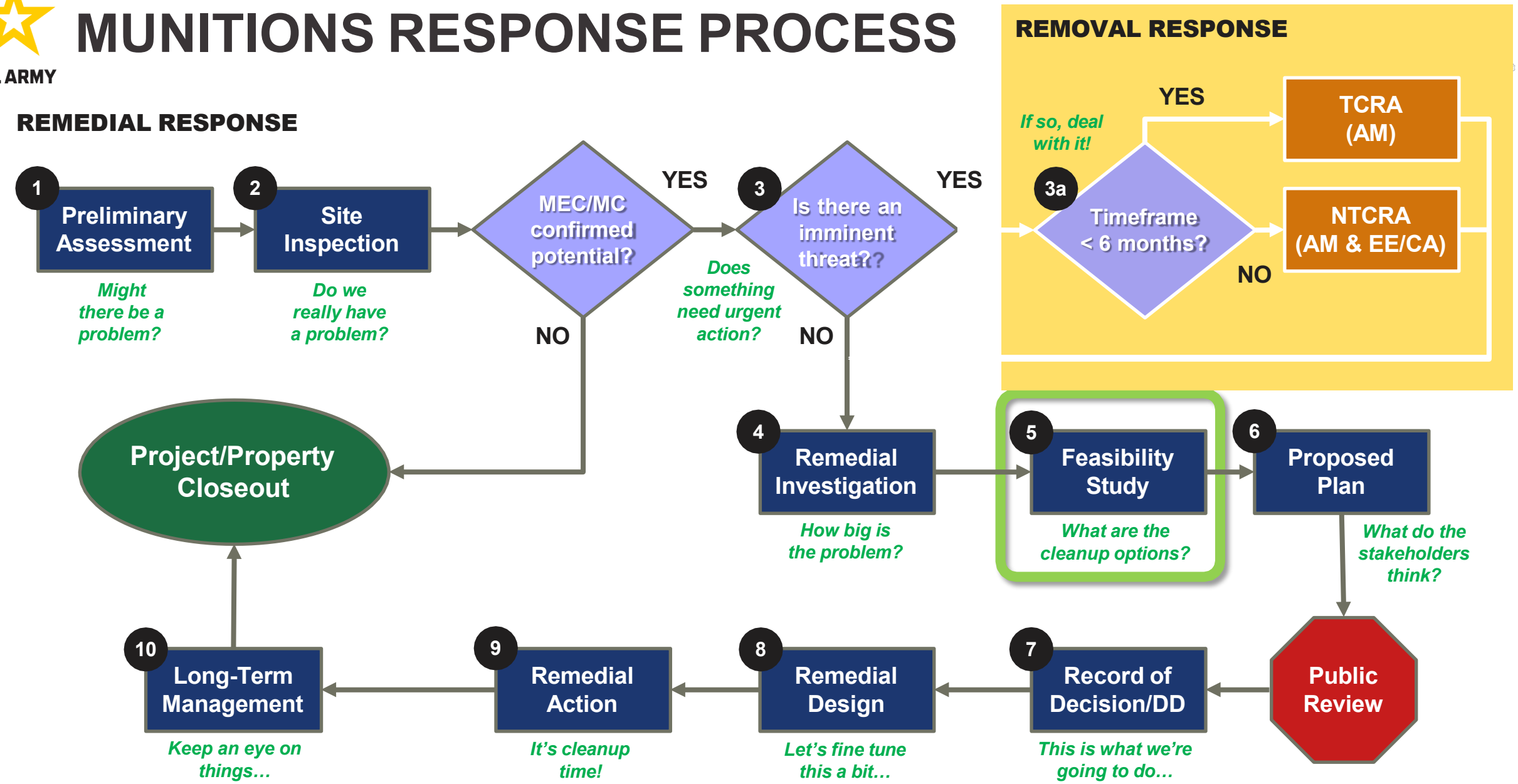
MUNITIONS RESPONSE PROCESS



THE FEASIBILITY STUDY

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The primary focus is to ensure that appropriate remedial alternatives are developed and evaluated to present decision-makers with options

- FS does NOT select the remedy

The general process includes:

- Assessing general remedial action process options and technologies
- Assembling these process options and technologies into remedial alternatives
- Evaluating the alternatives for their suitability to address the risks, and other factors (including cost)

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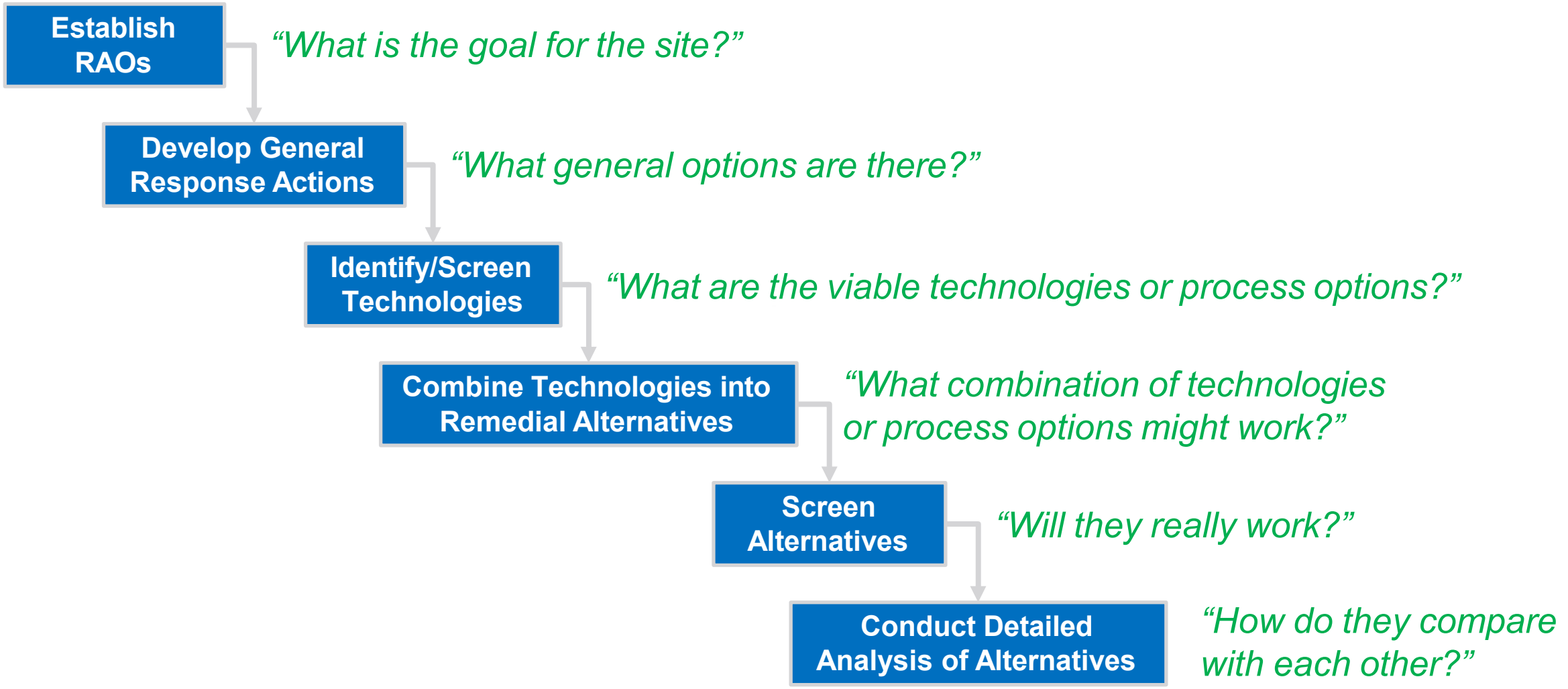
OVERALL FEASIBILITY STUDY PROCESS



DEVELOP GENERAL RESPONSE ACTIONS

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There seven General Response Actions (GRAs):

1. Treatment actions
2. Containment actions
3. Institutional actions
4. Treatment and containment actions
5. Treatment and institutional actions
6. Containment and institutional actions4
7. Treatment, containment, and institutional actions

#4-7 are combinations of #1-3

Each GRA is composed of one or more process options and/or technologies

– Treatment actions can include methods of MEC detection, excavation, and demolition
– Containment actions can include fences and other barriers, including covers
– Institutional actions can include hazard notification and education, as well as activity or use restrictions

DEVELOP REMEDIAL ALTERNATIVES

Project team will design multiple remedial alternatives

– Must all be designed to achieve the Remedial Action Objective (RAO)
  - Except the No Action alternative, which has to be evaluated
  - At minimum, alternatives must also include
    – An alternative that uses LUCs (*not necessarily LUCs **only***)
    – An alternative that allows for unlimited use/unrestricted exposure (UU/UE)
  - Ideally, there should be more than just those
    – Look at a range of possible options

Details for each alternative should **not** be generic

– Each one should be site-specific and account for details such as technology requirements, site limitations, and stakeholder issues
– These details may become SPECIFIC CLEANUP GOALS (if the alternative is selected)

REMEDIAL ALTERNATIVES SCREEN

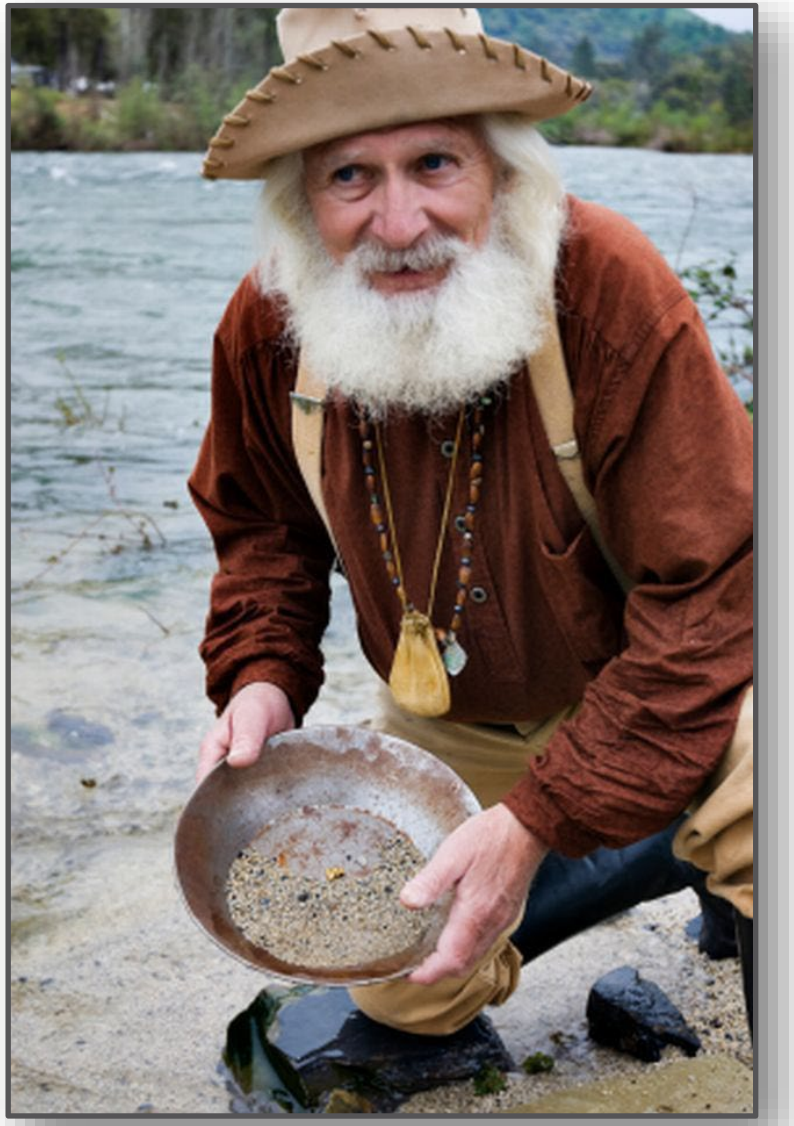
Remedial alternatives may be screened

Three initial screening criteria:

- Implementability
  - Feasibility of alternative
- Cost
  - Considers both capital and O&M costs
- Effectiveness
  - How well it protects human health, safety, and the environment
  - How well it reduces toxicity, mobility and volume of contaminants/contaminated media

Screening is aimed at reducing a long alternatives list (>10) to a more manageable list (5-10)

- It should not reduce the list to just one remedial alternative
- It might not be needed if the list of alternatives is already <10



DETAILED ANALYSIS OF ALTERNATIVES

Retained remedial alternatives are then evaluated against nine CERCLA Criteria

1. Overall protection of human health and the environment (meet RAO?)
2. Compliance with ARARs (unless waived)

3. Long-term effectiveness and permanence
4. Reduction of toxicity, mobility or volume through treatment
5. Short-term effectiveness
6. Implementability
7. Cost

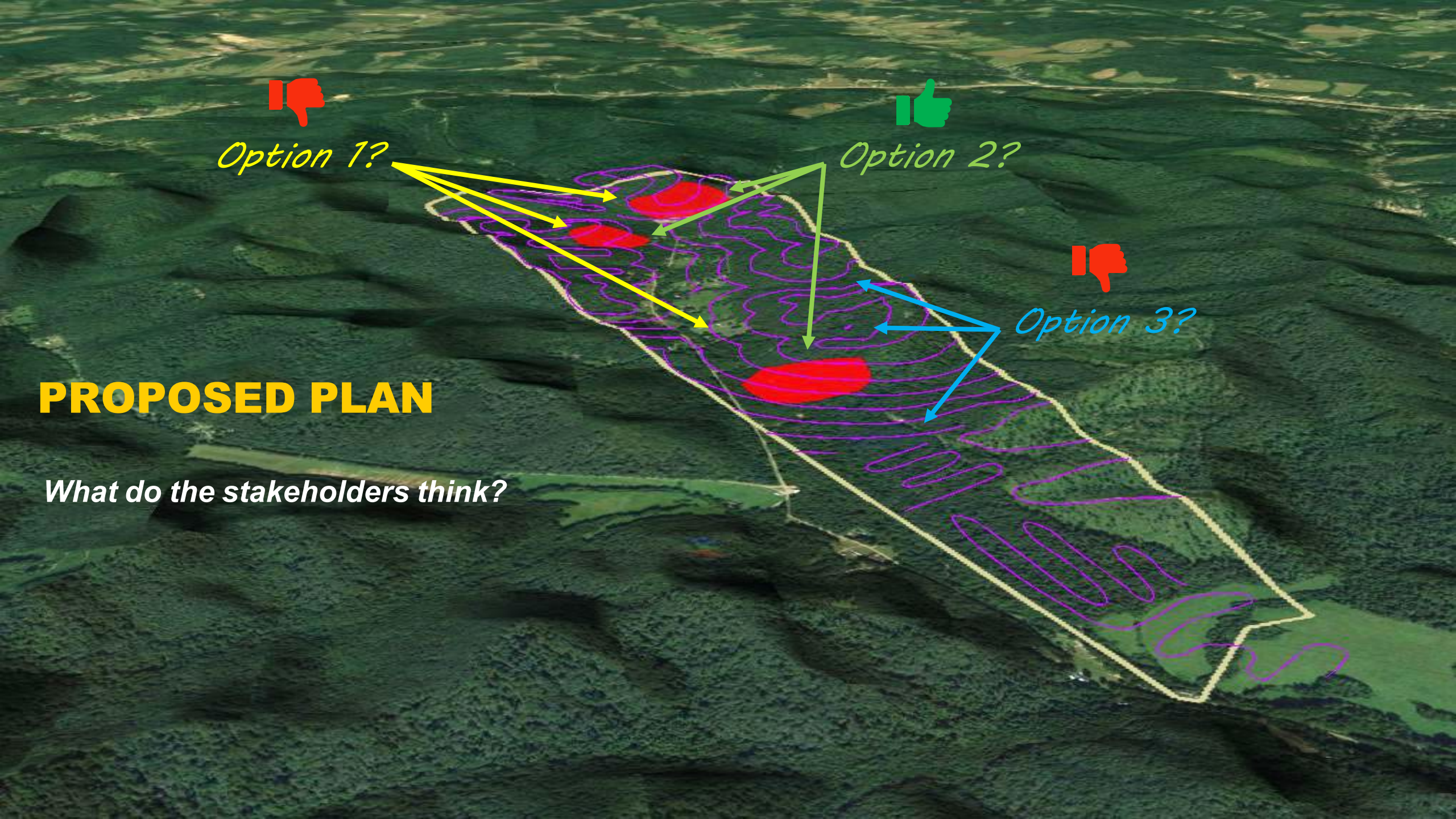
8. State acceptance
9. Community acceptance

Feasibility Study does NOT select a remedial alternative!

Threshold

Balancing

Modifying



PROPOSED PLAN

What do the stakeholders think?

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MUNITIONS RESPONSE PROCESS

REMEDIAL RESPONSE

1 **Preliminary Assessment**
Might there be a problem?

2 **Site Inspection**
Do we really have a problem?

MEC/MC confirmed potential?
YES
NO

3 **Is there an imminent threat??**
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This is what we're going to do…

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Let's fine tune this a bit…

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It's cleanup time!

10 **Long-Term Management**
Keep an eye on things…

Project/Property Closeout

REMOVAL RESPONSE

If so, deal with it!

3a **Timeframe < 6 months?**
YES
NO

TCRA (AM)

NTCRA (AM & EE/CA)

THE PROPOSED PLAN

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Proposed Plan comes after the FS

- Summarizes the salient elements of RI/FS and includes Army preferred alternative
- Should be succinct and clearly written
  - For a non-technical audience
  - Avoid jargon and minimize acronyms
  - Use tables and figures

Opportunity for public to comment

- Make available for public review at information repository and in admin. record
- Publish Notice of Availability
- Reasonable public comment period, ***not less than*** 30 days
  - Extension of comment period upon timely request
- Offer opportunity for public meeting
  - Prepare transcript

CONTENTS OF THE PROPOSED PLAN

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Introduction
– Identifies the site and describes the public participation process

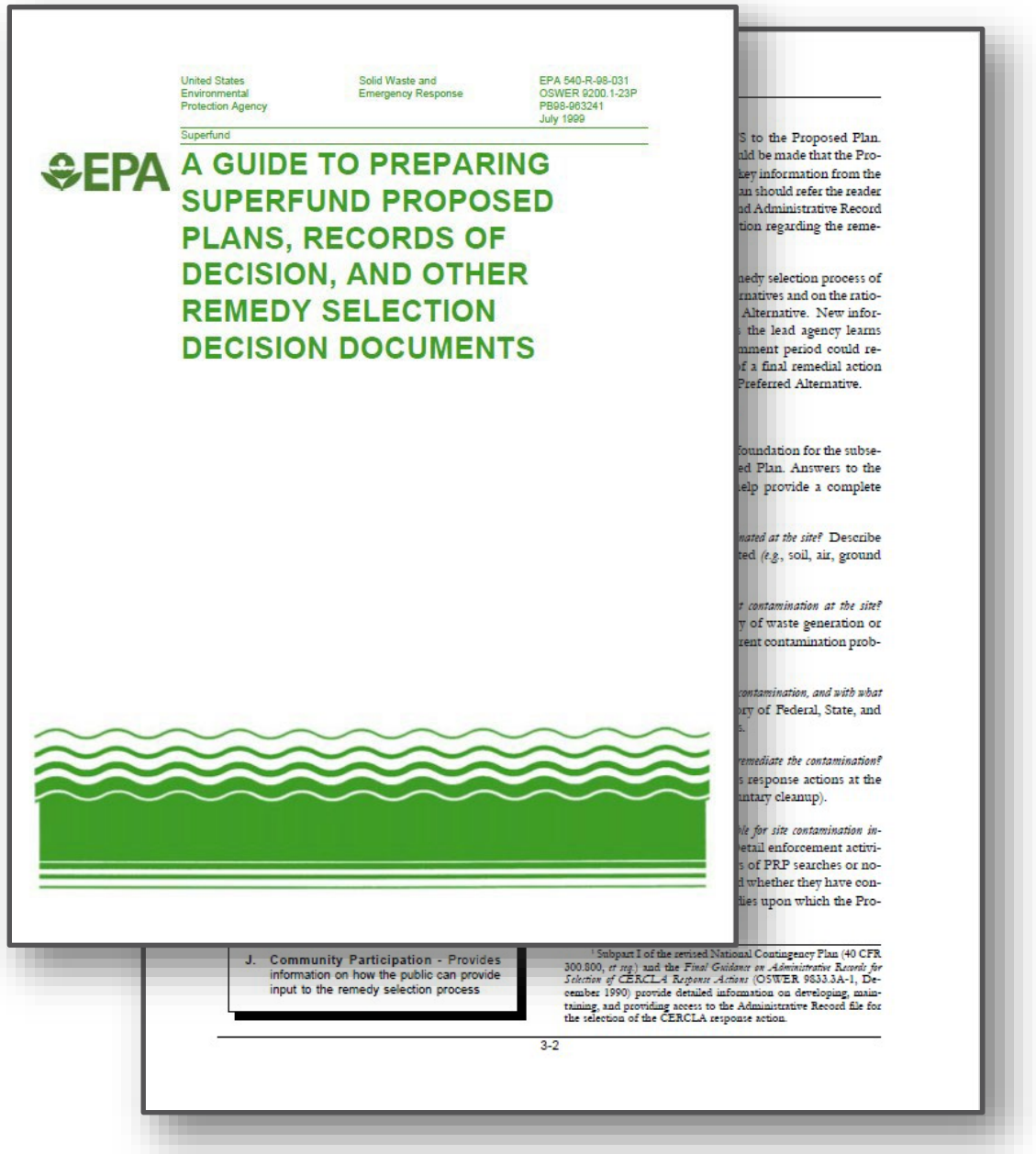
Site Background
– Facts about the site providing context for subsequent sections of the Plan

Site Characteristics
– Nature and extent of contamination

Scope and Role of Response
– How the MRS or response action fits into the overall site strategy

Summary of Site Risks
– Results of the baseline risk assessment and related land use assumptions

Remedial Action Objectives
– What the proposed cleanup is expected to accomplish


United States Environmental Protection Agency
Solid Waste and Emergency Response
EPA 540-R-98-031
OSWER 9200.1-23P
PB98-963241
July 1999
Superfund

EPA A GUIDE TO PREPARING SUPERFUND PROPOSED PLANS, RECORDS OF DECISION, AND OTHER REMEDY SELECTION DECISION DOCUMENTS

J. Community Participation - Provides information on how the public can provide input to the remedy selection process

3-2

CONTENTS OF THE PROPOSED PLAN, CONT'D.

Summary of Alternatives

– The options for attaining the RAOs

Evaluation of Alternatives

– Rationale for Preferred Alternative

Preferred Alternative

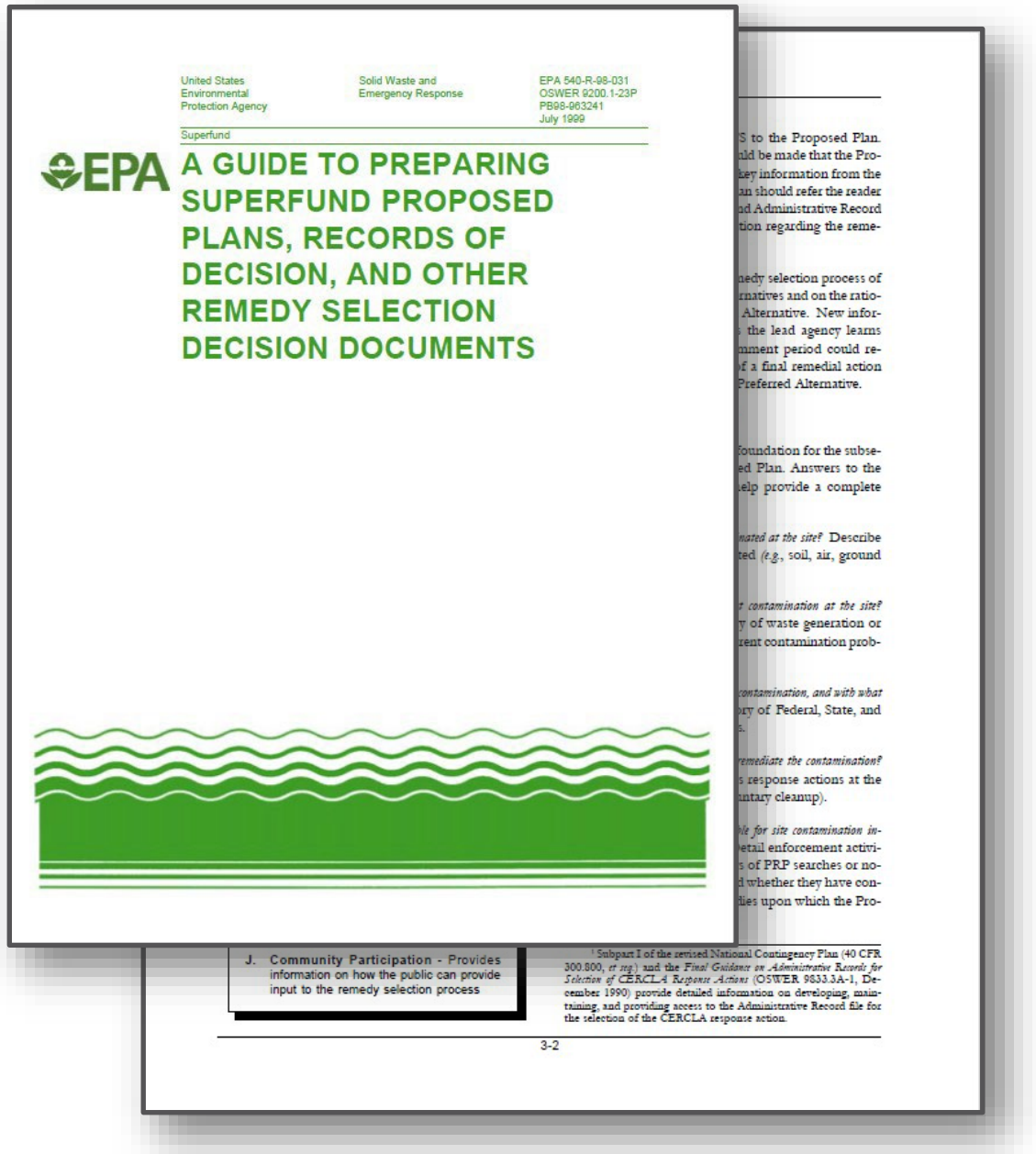
– Description of Preferred Alternative

– Explanation of ARARs and Proposed Waivers

– Statement on whether support agencies agree with lead agency's PP (or explain concerns)

Community Participation

– How the public can provide input to the remedy selection process



AFTER THE PUBLIC COMMENT PERIOD

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Lead agency responds to significant comments

- Project team prepares a written summary

Responsiveness summary will be prepared to accompany ROD

- See next segment

RECORD OF DECISION

This is what we're going to do…

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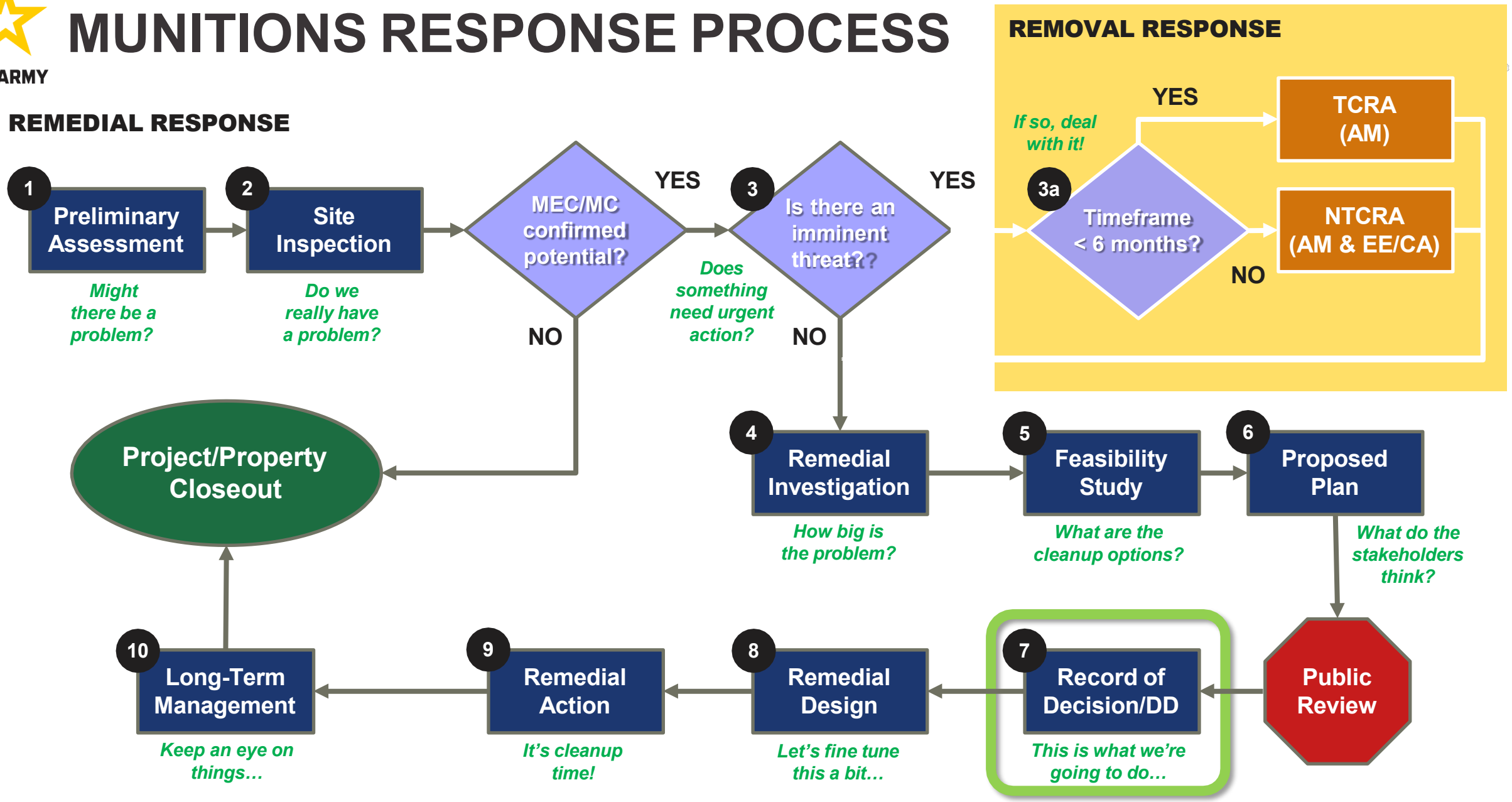
MUNITIONS RESPONSE PROCESS



RECORD OF DECISION

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Per DERP Management Manual (DoDM 4715.20)

- Identify legal authority for response
- Describe hazards & unacceptable risks
- Describe response alternatives
- Show how preferred alternative was selected
- State specific environmental restoration objectives (i.e., cleanup goals)
  - More specific than RAOs
  - Removal depths, etc. for MEC
  - Site-specific and residual concs. for chemicals of concern
  - *Should including sufficient detail to judge response complete (RC)*
- List entities responsible for implementation and maintenance
- Document ARARs at time of signature
- Describe regulator and community involvement
  - Responsiveness summary
- Provide declaration, approval, and signature by DoD Component official with delegated authority

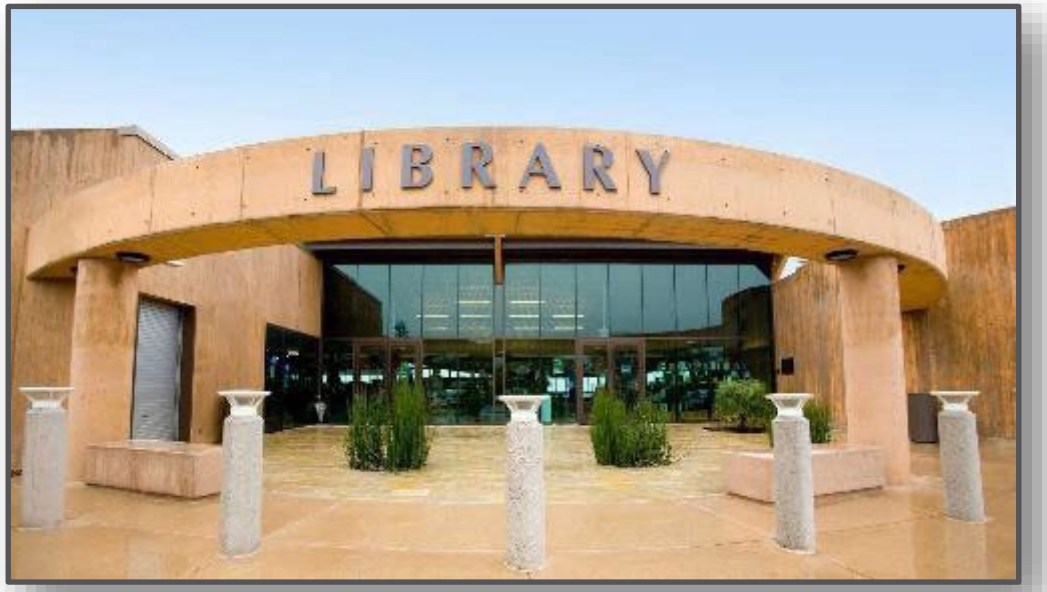
AFTER THE RECORD OF DECISION IS SIGNED

Publish a notice of availability

Send copy of signed ROD to regulators

Make document available for public inspection and copying

– Must be near the facility



MODIFICATIONS TO THE REMEDY

What if the selected remedy is not the one described in the Proposed Plan?

- Minor changes
  - Modifications to the selected remedy
    - e.g., type or cost of materials, equipment, facilities, services, and supplies
  - No significant impact on scope, performance or cost
- Significant changes
  - Change to a remedy *component*
  - Does not fundamentally alter the overall cleanup approach
- Fundamental changes
  - Appreciable change or changes in the scope, performance, and/or cost
  - Change resulting in reconsideration of overall waste management approach selected in the original ROD
  - May be several significant changes that together have the effect of a fundamental change

MODIFICATIONS TO THE REMEDY, CONT'D.

What needs to be if changes occur?

- Minor changes
  - Document in project file
- Significant changes
  - Must be formally documented in an Explanation of Significant Differences (ESD)
- Fundamental changes
  - Must be formally documented in a ROD Amendment
- How to figure out what is "minor", "significant", and "fundamental"?
  - Talk to your Office of Counsel

PUBLIC INVOLVEMENT MINIMUM REQUIREMENTS

Administrative Record

- Collection of documents that contribute to remedy selection
- Available to public in two locations
- Established at beginning of process

Restoration Advisory Board (RAB)

- Representatives of affected community
- Advises commander on environmental restoration issues
- Poll for interest every 2 years

MRS Prioritization Protocol (MRSPP)

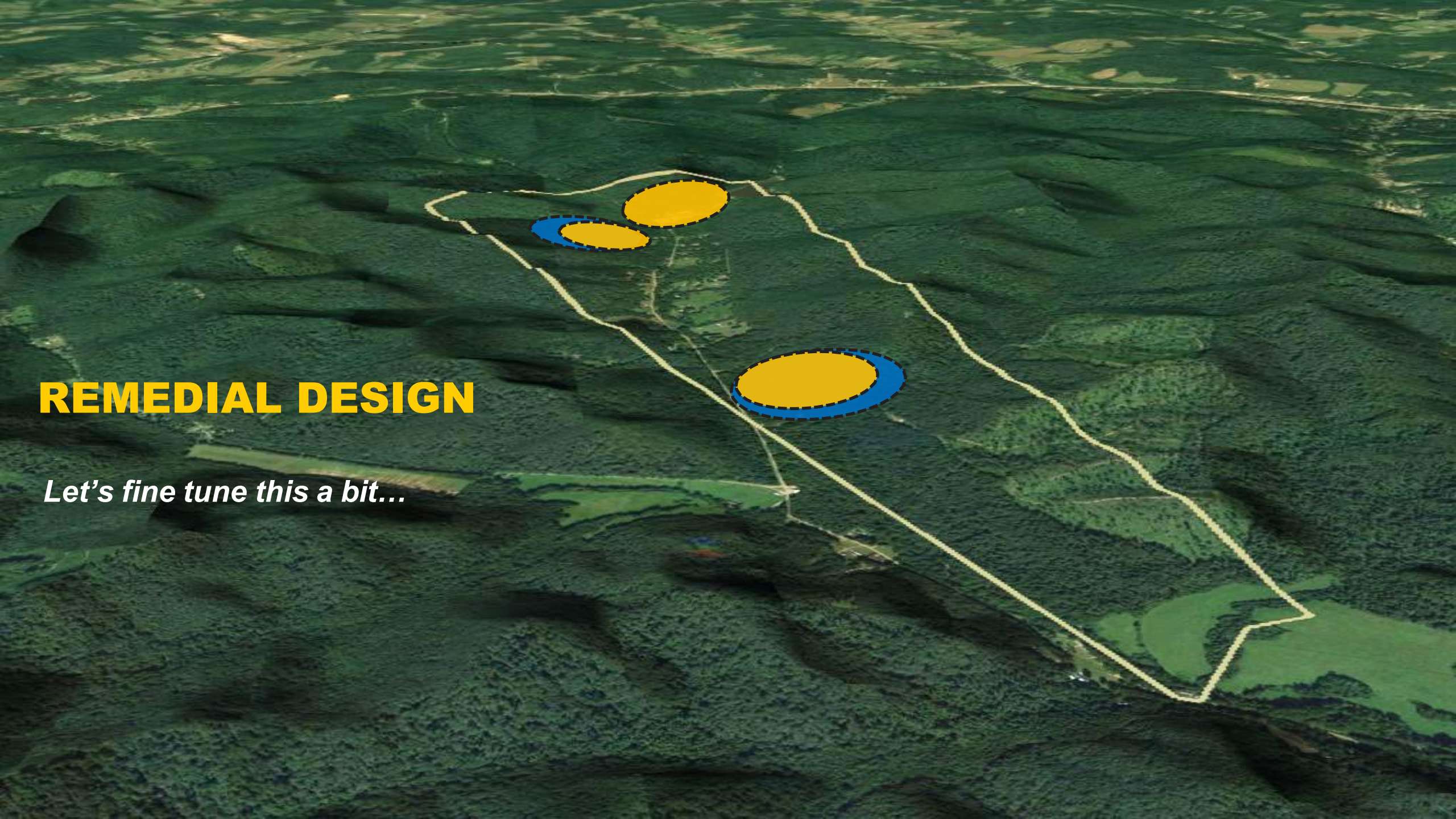
- Notify public and solicit info which may affect score

Systematic Planning Process

- Collaborative planning tool reference in Army RI/FS guidance

Proposed Plan

- Solicit input on proposed remedy, address comments


REMEDIAL DESIGN
Let's fine tune this a bit…

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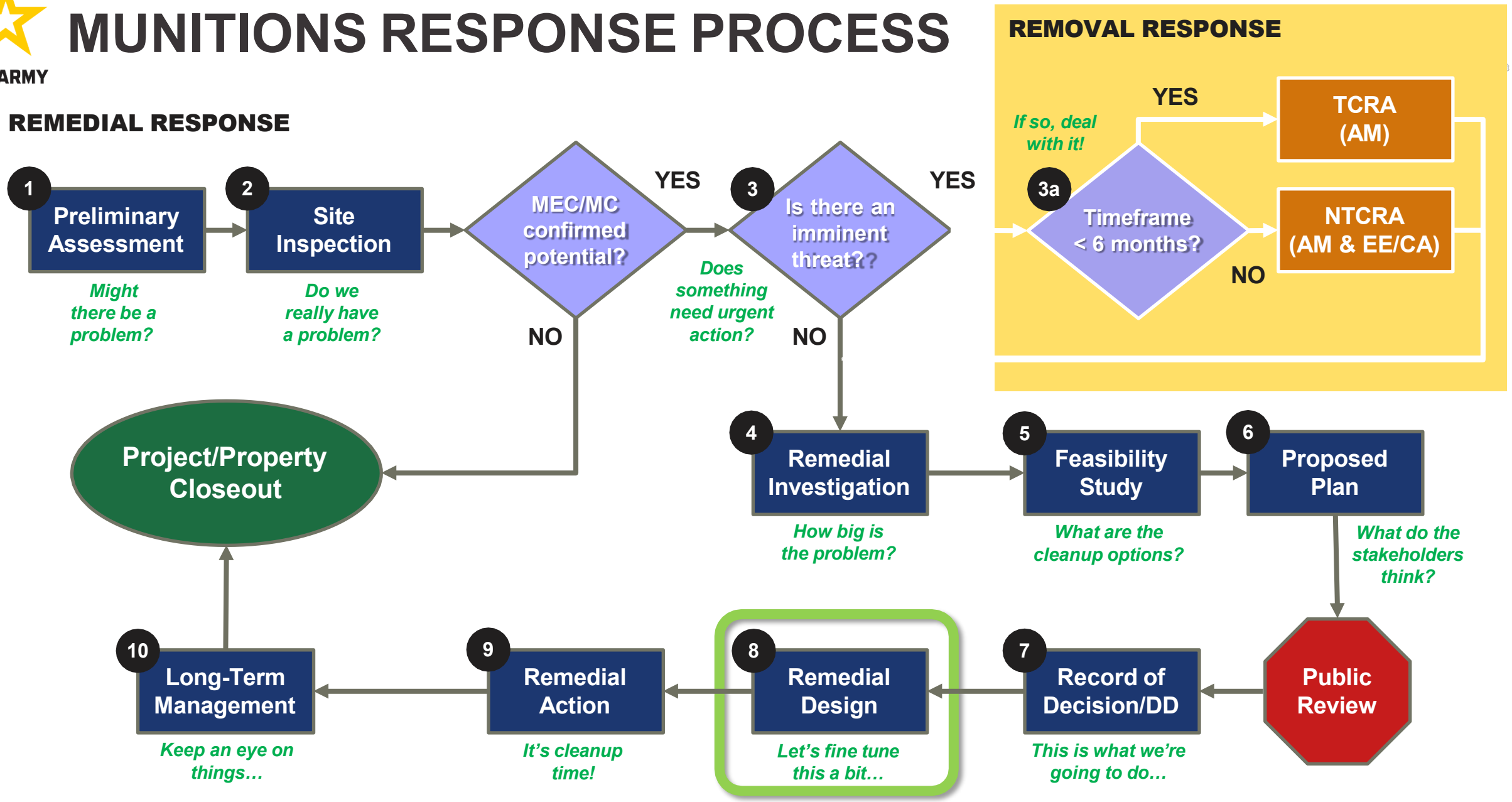
MUNITIONS RESPONSE PROCESS



REMEDIAL DESIGN

Definition

– Technical analysis and procedures that follow remedy selection or a site
– Result in a detailed set of plans and specifications for remedial action implementation

Identify exactly what needs to be done according to ROD

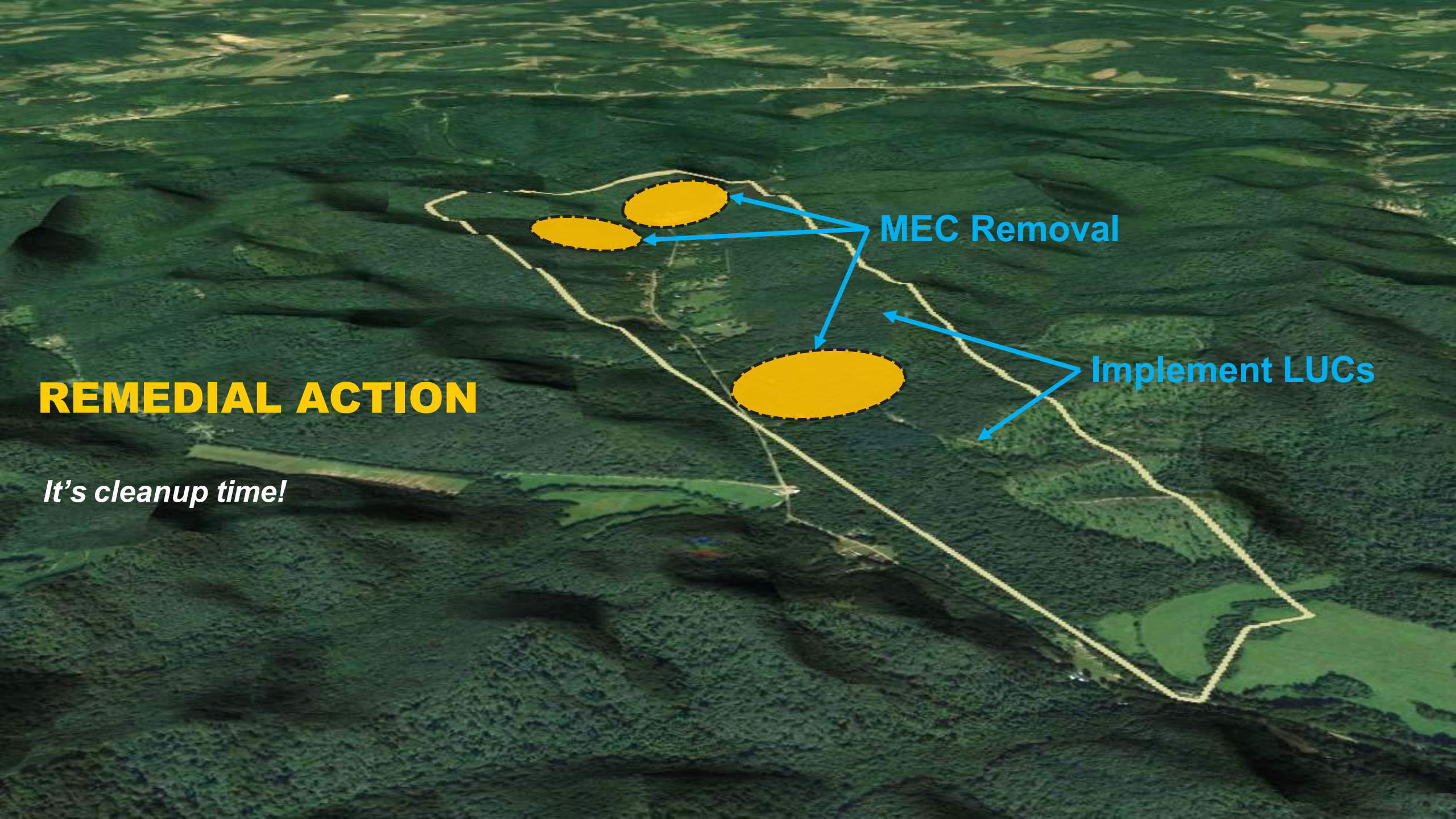
– Design for leaving metal in the ground
– Design for excavation
– Design for LUCs
– Consider exit criteria
– Helps bound contractors' risk

Perform initial fieldwork

– Additional geophysical investigation
  • Refine anomaly densities
  • Possibly 100% dynamic survey
– Further site evaluation to support design and planning
  • Terrain/topography, etc.
  • Access issues

Produce initial QAPP worksheets

– Complete WS #10, #11
– Critical components of WS#12, #17, & #22



REMEDIAL ACTION

It's cleanup time!

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NO

TCRA (AM)

NTCRA (AM & EE/CA)

REMEDIAL ACTION – CONSTRUCTION (RA-C)

Remedial response is “constructed” in the RA-C phase

– Can include ***both*** MEC removal and implementation of LUCs

Remedy-in-Place (RIP)

– Considered achieved at the end of the RA-C phase

Response Complete (RC)

– Attained at the end of this phase if there is not an RA-O phase

REMEDIAL ACTION COMPLETION REPORT (RACR)

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Overview
- MRS characteristics, contaminants, major findings, and investigation results
- If final RACR, also summarizes prior RACRs

Remediation Goals
- Remediation goals and cleanup goals from ROD

Remedial Actions
- Actions taken to implement the selected remedy and meet cleanup goals

Demonstration of Completion
- Information to demonstrate attainment of remediation goals

Ongoing Activities
- Activities still being performed or to be performed (e.g., O&M, 5-year reviews, etc.)

Community Relations
- Public outreach activities conducted at the site

This is everything you will have to tell the story of how you achieved the ROD requirements and the cleanup goal

LONG-TERM MANAGEMENT

Keep an eye on things…

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MUNITIONS RESPONSE PROCESS

REMEDIAL RESPONSE

1 **Preliminary Assessment** — *Might there be a problem?*

2 **Site Inspection** — *Do we really have a problem?*

MEC/MC confirmed potential? — YES / NO

3 **Is there an imminent threat??** — *Does something need urgent action?* — YES / NO

4 **Remedial Investigation** — *How big is the problem?*

5 **Feasibility Study** — *What are the cleanup options?*

6 **Proposed Plan** — *What do the stakeholders think?*

Public Review

7 **Record of Decision/DD** — *This is what we're going to do…*

8 **Remedial Design** — *Let's fine tune this a bit…*

9 **Remedial Action** — *It's cleanup time!*

10 **Long-Term Management** — *Keep an eye on things…*

Project/Property Closeout

REMOVAL RESPONSE

If so, deal with it!

3a **Timeframe < 6 months?** — YES: **TCRA (AM)** / NO: **NTCRA (AM & EE/CA)**

LONG-TERM MANAGEMENT

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Long-Term Management (LTM) is necessary…

– … if a remedial action "results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE)"

LTM involves

– Maintenance of land use controls (LUCs), if needed
  - e.g., inspecting/repairing fences or signs, mailing education materials, etc.

– Five-Year Reviews (FYRs)
  - Reviewing the site and the remedy to evaluate whether
    – The remedy is functioning as intended by the Record of Decision
    – The Conceptual Site Model (CSM) and Remedial Action Objectives (RAOs) used at the time of remedy selection are still valid
    – There is any new information to suggest the remedy is no longer protective
  - Occur at a frequency of at least every five years
    – May be performed on a site-wide basis

AND NOW YOU KNOW HOW TO MMRP!

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QUESTIONS?