



**2003 AFCEE Technology Transfer Workshop**

San Antonio, Texas

*Promoting Readiness through Environmental Stewardship*

# **Taking Control of the Risk Assessment Process**

**Overview for Planning the  
Risk Assessment Process**

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# Overview of Course

- **What this session is about?**
  - **Risk Assessment**
  - **Risk Management**
  - **Risk Communication**
  - **Tiered Approach**
  - **Consistent with future land use**
- **What are we going to leave with?**



# Why are we here?

**Our Goal is to Achieve Environmentally Protective Site Close-Outs that meet Applicable or Relevant and Appropriate Requirements**



# Why are we here?

**To discuss approaches to conduct and review human health risk assessments which are scientifically valid and legally defensible and to utilize an approach to risk management which is health protective at least cost.**



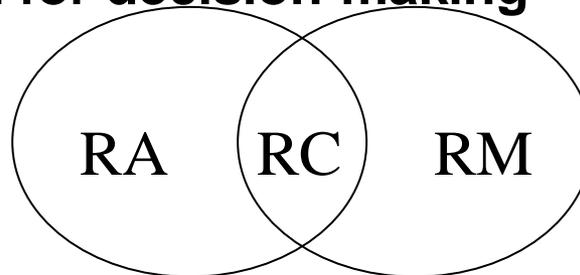
# What Are We Going to Leave With?

- **How to Utilize a Tiered Approach**
- **When to Conduct Risk-Based Screening**
- **How to Improved Oversight of Human Health Risk Assessments**
- **How to Improved Oversight of Ecological Risk Assessments**
- **Improve Risk Management Knowledge Tailored to Future Use**



# What is this session about?

- **Risk Assessment**
  - Numerical computations to assess health protection
- **Risk Management**
  - Response to the results of the assessment
- **Risk Communication**
  - Transfer of information for decision-making





# What is Risk Assessment ?

- Risk: the possibility of suffering harm or loss from a hazard, it is inherent in any action.
- Risk Assessment: technical assessment of the nature and magnitude of risk

Environmental Context: Risk Assessment is the process used to determine whether and to what extent substances in the environment pose a risk to public health and the environment.



# Risk Assessment

- Risk = Conc. x Exposure x Toxicity
- $\text{Risk}_{\text{NC}} = \frac{\text{Conc.} \times \text{Exposure}}{\text{Reference Dose}}$

Math is simple

Impact of each input is important



# Risk Assessment Objectives Under CERCLA

- **Assess baseline risk and determine whether remediation action is warranted or necessary**
- **Manage risk by assessing**
  - **Which contaminants pose the greatest risk**
  - **Which exposure pathways are most important**
  - **Which receptors face significant risks**
  - **What is the range of risks that can be attributed to the site**



# CERCLA Risk Assessment Objectives (cont'd)

- **Establish health protective remediation goals (risk-based cleanup goals)**
- **Determine if remediation poses risk**
- **Evaluate appropriateness of ARARs**
- **Provide consistent evaluation of remedial alternatives**
- **Assist in decision making**



# Risk Assessment Benefits

- **Gain greater insight and understanding of site problems**
- **Use as a primary decision tool for establishing a defensible basis for action (or no action)**
- **Provide a more objective and quantitative methodology for comparing options**
- **Save money by focusing resources and efforts on real problems (optimize use of limited funds)**
- **Achieve better communication among all parties**



# What is Risk Management

- **Risk Management:** Determination of the best means to reduce or eliminate a risk using the information from risk assessment together technical resources, social, economic, and political information



# Risk Management

- **Risk assessors and risk managers should be sensitive to distinctions between risk assessment and risk management.”**

EPA, 1995 Guidance for Risk Characterization

- **Economic, social and legal aspects (policy) have a legitimate place in RM, but no place in the scientific process of RA**

National Academy of Sciences



# Risk Management Policy

- **Since Risk involves Uncertainty, Risks are often Managed by being Conservative**
- **Regulations are health protective**
  - **Protective of the most sensitive population**



# Risk Management

## Making Risk-Based Decisions

- **Forward Assessment of Risk**

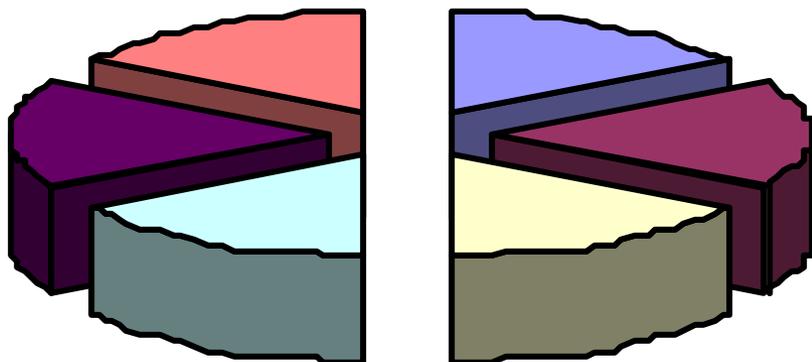
$$\text{Risk}_{\text{Ca}} = \text{Conc.} \times \text{Exposure} \times \text{Toxicity}$$

- **Backward Assessment**

$$\text{Conc.} = \text{Risk} / (\text{Exposure} \times \text{Toxicity})$$



# Pieces of the Risk Management Pie



- Risk Information
- Economic Information
- Social Issues
- Political Issues
- Policy Issues
- Regulatory Issues



# Nine Evaluation Criteria of the NCP

## Threshold Criteria

**Overall Protection  
of Human Health  
and the Environment**

**Compliance  
with ARARs**

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## Primary Balancing Criteria

**Long-Term  
Effectiveness  
& Permanence**

**Reduction of  
Toxicity, Mobility or  
Vol by Treatment**

**Short-Term  
Effectiveness**

**Ability to  
Implement**

**Cost**

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## Modifying Criteria

**State  
Acceptance**

**Community  
Acceptance**



# Risk Assessment/Risk Management

- **Risk Assessment** is the scientific process of investigation to estimate the level of risk
- **Risk Management** is an effort to reduce risk to human health and the environment by active or passive actions.

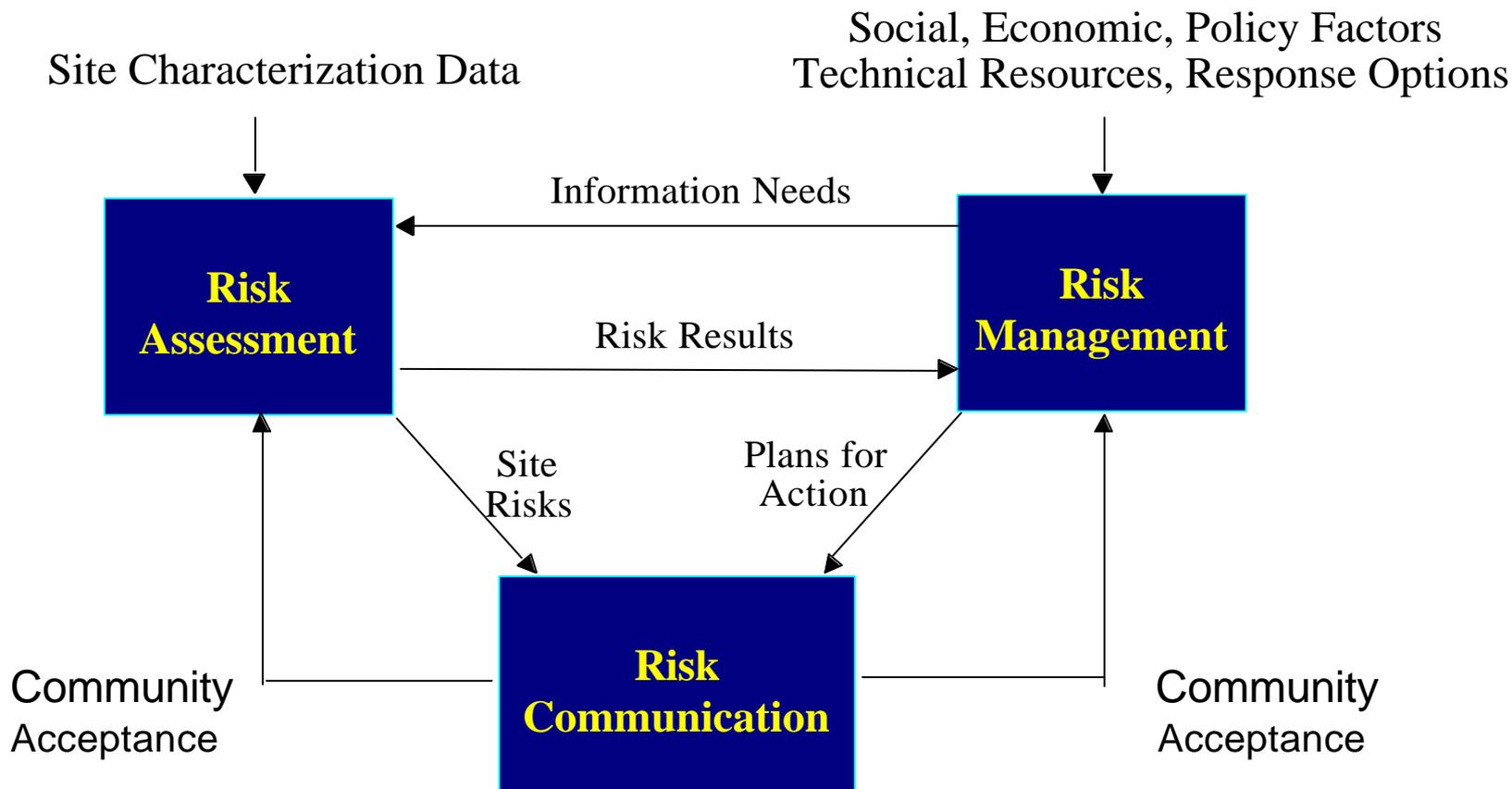


# Risk Communication

- **Process of exchanging information and opinion**
- **Building a relationship based on trust and credibility**
- **Important in Risk Characterization**
- **Important for Community Involvement, and Decision-making**



# Risk Analysis Components and How They are Interrelated



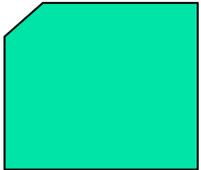


# Tiered Approach for Risk Assessment and Management

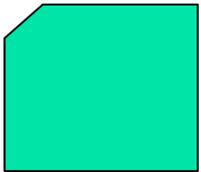
- **Organizational Framework for assessing and managing risks**
- **Consistent with EPA Risk Assessment Guidance for Superfund (RAGS)**
- **Consider complexity of the site**
- **Purpose is to make your life easier!**
- **Is Health Protective**



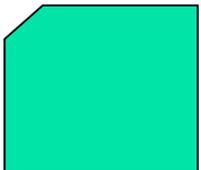
# Tiered Risk Assessment & Management



- Tier I
  - Demonstrate that the site is below a health protective level



- Tier II
  - Assess the risk at the site



- Tier III
  - Assess the risk of the remedial action(s)



# How are we going to get there?

- **Topics:**
  - **Technical presentations**
  - **Land use policy**
  - **Planning**
  - **Screening and site-specific risk assessments**
  - **Reviewing risk assessments**
  - **Using risk assessment results**
- **Agenda follows Tiered Approach**
- **Course Materials as Future References**



# How are we going to get there?

- **Develop a Strategy**
- **Based on future land use**
- **Plan to implement the strategy**
- **Data and Data Quality Objectives**
- **Conceptual Site Model**
- **Communicate**



# Summary

**This session provides information on Human Health and Ecological Risk Assessment and Risk Management in order to:**

- **Identify and understand human health risk issues**
- **Implement a tiered approach for cost effective risk assessment and management**
- **Effectively review and manage contractor-proposed risk assessment activities**
- **Utilize the results in the cleanup decision-making process**
- **Communicate the results and the risk management decisions that these results support**



# Risk Assessment Support

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# Questions?



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