

Overview of RFI and CMS Process

RFI: RCRA Facility Investigation
CMS: Corrective Measures Study

Middleport, NY
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RCRA Background

- RCRA: Resource Conservation and Recovery Act
 - Major Federal Law to Address Hazardous Waste Management in the Nation
 - Primary Focus is on Management of Waste during or soon after Generation
 - Also Covers Actions to Correct Problems
- RCRA is not Superfund

Steps in Corrective Action Process

- RCRA Facility Assessment—RFA
 - Gather Information to determine whether a cleanup is necessary
- RCRA Facility Investigation—RFI
 - Gather detailed information to determine the nature and scope of necessary corrective action
- (Interim Actions)
 - Used to control or mitigate serious issues before final corrective action begins
- Corrective Measures Study—CMS
 - Used to identify potential corrective action techniques or technologies
- REMEDY SELECTION
- Corrective Measures Implementation—CMI
- Completion

Risk: Concepts and Definitions

- Risk is the Probability of Suffering Harm as the Result of a Hazard
- People Face Multiple Risks Everyday
- Risks to People are Often Discussed in Terms of Deaths per Year that Result from the Hazard

Mortality Rates from Certain Events in the Netherlands

<u>Activity</u>	<u>Annual Mortality Rate</u>
Being Struck by Lightning	1 in 10 million
Flying	1 in 814,000
Walking	1 in 54,000
Driving a Car	1 in 5,700
Riding a Motorcycle	1 in 1,000
Smoking Cigarettes (one pack a day)	1 in 200
U.S. Standard for Acceptable Environmental Risk	1 in 1 million

Calculation of Risks

- Simplified Formula:

$$\text{Risk} = k \text{ (degree of toxicity)} \text{ (exposure)}$$

- Risk Can Be Reduced by Lowering the Degree of Toxicity
- Risk Can Be Reduced by Lowering the Level of Exposure

Complications of Risk Calculation from Chemicals

- There are Issues Related to Exposure:
 - How Much Chemical Was Involved (Dose)?
 - Was the Exposure One Time (Acute Exposure)?
 - Or Was the Exposure Repeated for Many Times (Chronic Exposure)?
 - What Was the Route of Exposure?
 - Breathing--Respiratory
 - Eating or Drinking--Ingestion
 - Through the Skin--Dermal

Complications of Risk Calculation from Chemicals

- There are Issues Related to Degree of Toxicity
 - What is the Age and Size of the Individual Exposed?
 - How Long Does the Toxin Stay in the Body (Half Life)?
 - Where Does the Toxin Concentrate in the Body?
 - What is the Type of Toxicity or Damage?

Toxicity of Arsenic

What are the minimal risk levels (MRL) for arsenic exposure?

An MRL is an estimate of the daily human exposure to a hazardous substance that is likely to be without appreciable risk of adverse non-cancer health effects over a specified duration of exposure.

ATSDR Minimal Risk Levels (MRLs), December 2005

Name	Route	Duration	MRL	Factors	Endpoint
Arsenic	Oral	Acute	0.005 mg/kg/day*	10	Gastrointestinal
		Chronic	0.0003 mg/kg/day	3	Dermal

*Provisional; mg/kg/day = milligrams per kilogram of body weight per day

Corrective Action Approaches

- No Action
- Removal—Dig and Haul
- Soil Washing
- Soil Incineration
- Bioaccumulation/Removal (Phytoremediation)
- Stabilization and Solidification
- Capping (Institutional and Engineering Controls)