U.S. Environmental Protection Agency

Our goal is to ensure cleanups are protective of human health and the environment

Former Koppers Wood Treating Plant

November 14, 2013

6:30 - 8:00 p.m.

EPA Representatives

Land and Chemicals Division
Region 5 – Chicago

- Carolyn Bury, Project Manager
- Rafael Gonzalez, Public Affairs Specialist
- Bhooma Sundar, Toxicologist

Topics

- Things You Know - Site Review
- Condensed Timeline
- Cleanup Highlights
- What EPA is Doing Now
- Outlook

Corrective Action Sites

A long history of industrial operations, much of which occurred prior to modern environmental practices, left a legacy of contamination at sites across the country.

Koppers
Carbondale, Illinois

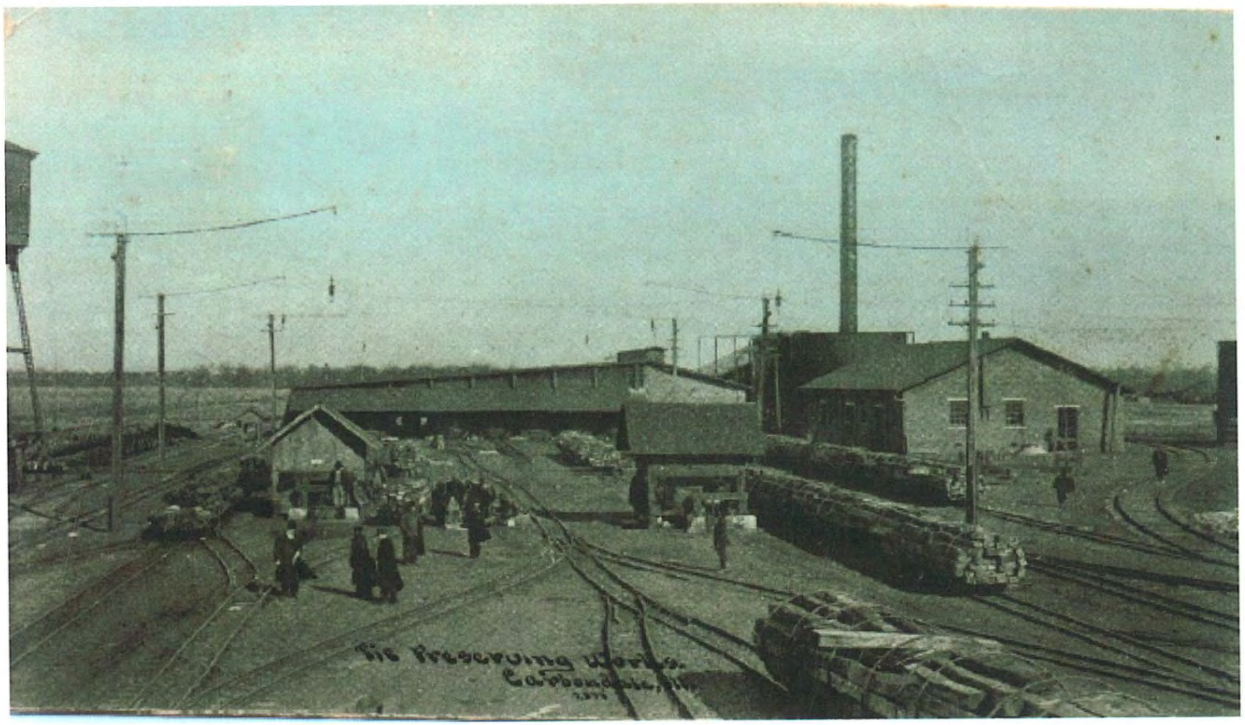
Neighborhood where soil was tested

Koppers History

Wood Treating Plant from 1901 - 1991

Significantly African American Workforce

Largest Wood Treater in the World



Tie Preserving Works.
Carbondale, Ill.

View in Yards of Ayer & Lord Tie Plant. Carbondale, Ills.

Chemicals Used

Creosote (PAHs)

Pentachlorophenol (source of dioxin)

Fluoro-chrome-arsenate phenol

Chromated zinc-chloride

Ayer & Lord Tie Plant Opens
1901

Koppers Plant Closes
1991

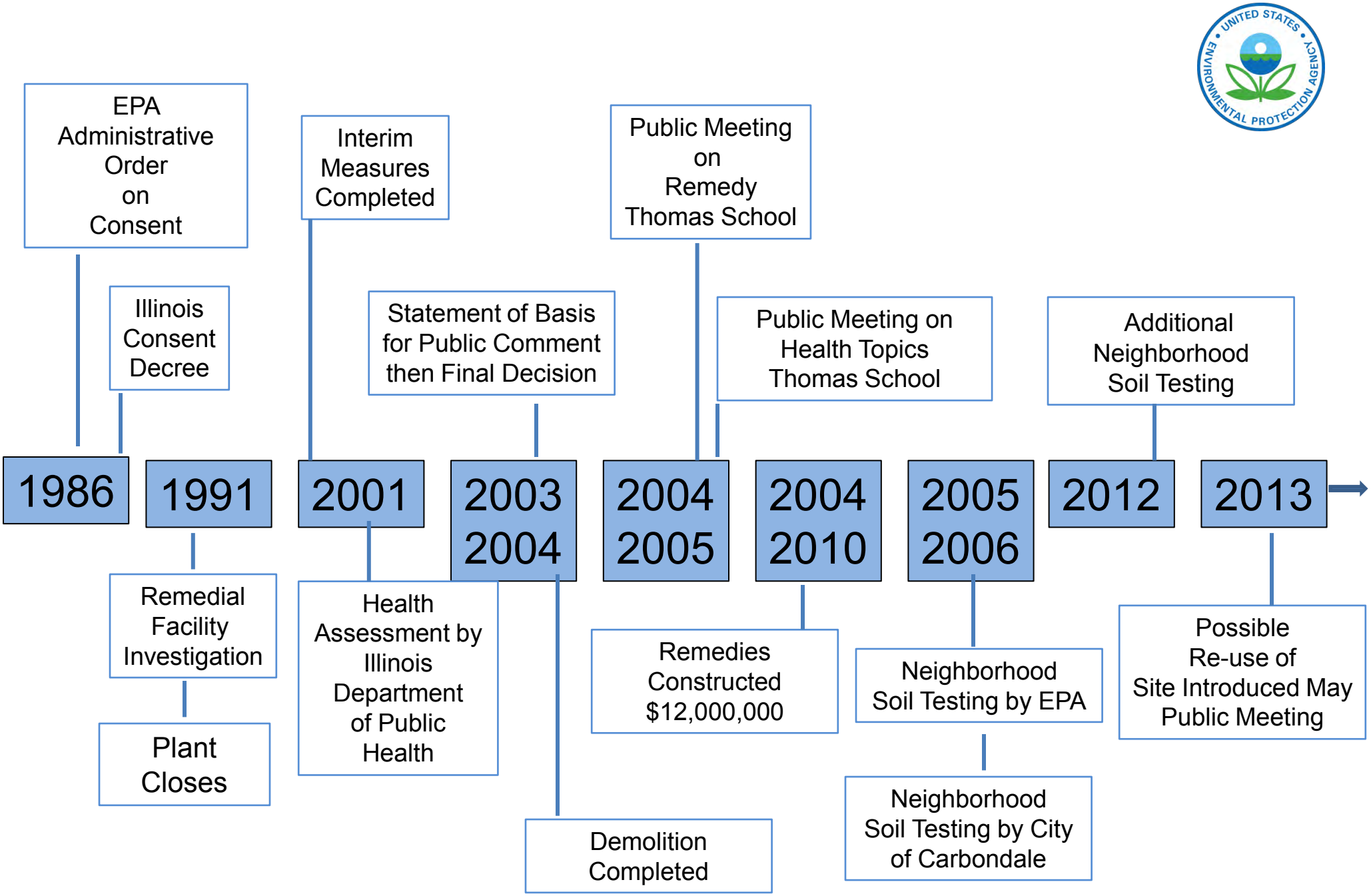
Sold to Koppers

U.S. EPA Created
1972

Sold to Beazer East, Inc.
1988

RCRA Hazardous Waste 1976
Amendment 1984

Federal and State Cleanup Orders
1986


EPA Administrative Order on Consent
Illinois Consent Decree
1986
1991
Remedial Facility Investigation
Plant Closes
Interim Measures Completed
2001
Health Assessment by Illinois Department of Public Health
Statement of Basis for Public Comment then Final Decision
2003 2004
Demolition Completed
Public Meeting on Remedy Thomas School
2004 2005
Public Meeting on Health Topics Thomas School
2004 2010
Remedies Constructed $12,000,000
2005 2006
Neighborhood Soil Testing by EPA
Neighborhood Soil Testing by City of Carbondale
Additional Neighborhood Soil Testing
2012
2013
Possible Re-use of Site Introduced May Public Meeting

Trust Fund for Future Monitoring

Well Sampling Inspection of Remedies

2004 into Perpetuity

Creosote Removal

Stream Monitoring

2005 until Completed

Complete New Risk Assessments

Additional Soil Removals(?)

2013

2014

timeline

Remediation

What is Remediation?

- Making a contaminated property safe
- Remediation is tailored to the intended use of the land
- Koppers – cleaned to industrial re-use standards and not to residential standards
- Used Illinois TACO rules to guide design
- ***Most, if not all, former industrial sites have residual contamination***

Remediation at Koppers

What were the remedies and what did they accomplish?

Removal, cover/containment of contaminated soil

- Exposure to harmful levels of chemicals prevented by the removal and containment remedy
- Off-site contamination remedy in creeks was removal, containment, and monitoring
- Off-site contamination not in neighborhood

Source Control - Creosote removal from subsurface soil
Recovery Trench and Recovery Well

Removal, Cover, Containment, Monitoring

Standard approach at remedial sites across the country

Engineered containment unit (CAMU) requires routine monitoring and inspection

Remedy Construction Cost - $12,000,000

Soil Covers

CAMU

DNAPL Recovery Trench

The worst contamination was in Glade Creek, a 1939 release was mainly responsible

Creosote globules in water

Sediment and soil saturated with creosote

1,300 feet
Channel Relocation

4,000 feet
Creek Excavation

Contaminated sediment/soil stabilized with kiln dust then moved to containment unit

Before

After

SOILS at Koppers

- Soils tested for contamination – heavy metals and organic compounds
- Chemicals in soil exceeded Illinois TACO standards for industrial exposure

SOIL REMEDY

Dug out some areas, installed containment unit, and 37 acres of engineered soil cover barriers - three layers

Creosote Collection Remedy

As of September 2013
14,500 gallons collected and sent off-site for disposal and recycling

- Glade Creek Collection Trench
- Former Operations Area Recovery Well

Beazer caretaker monitoring collection sump

Groundwater collected with creosote is treated in on-site plant and sent to Carbondale POTW

Koppers caretaker starting up water treatment plant on the site

Plant is an oil-water separator with a carbon filter

Operated under City POTW permit conditions

Neighborhood Soil Testing

2005 USEPA and IL EPA
*Conclusion: not contaminated**

2006 City of Carbondale
*Conclusion: not contaminated**

2012 Beazer with EPA oversight
*Conclusion: not contaminated**

**with wood-treating chemicals*

Health Assessment

Illinois Department of Public Health 2001 Assessment

Conclusions:

- Nearby residents were most likely exposed to airborne contaminants during past wood-treating operations.
- Two private wells on the north side of the facility were contaminated; these were connected to public water supply in 1992
- Current conditions do not threaten the health of nearby residents and farms as operations had ceased and all residents are on public water supply

EPA Oversight and Requirements

YOU CAN'T DO THAT

1555 North Marion Street Carbondale, IL 62901	
No housing, church, or day-care	No excavation in specified areas
Industrial or Commercial Only	No disturbance of Soil Covers
No well construction for water use	No disturbance of CAMU
No use of groundwater for drinking water, cooking, or bathing	Any erosion or degradation of remedies must be repaired
Local land-use approvals and restrictions apply	Monitoring of groundwater

If the property is sold, the purchaser must either accept these restrictions as part of the deed transfer or further clean up the property.

Ongoing Management and Monitoring

- Long-term, into perpetuity
- This requirement stays with the property deed
- Any redevelopment keeps this requirement
- Groundwater sampling every year
- Fish sampling until fish advisory lifted
- Yearly inspections of covers, CAMU, roads
- 2-3X week checking of creosote recovery sumps and removal of collected creosote
- Water treatment plant operations
- 24/7 alert for CAMU leakage containment
- Permanent Caretaker
- Funding must be maintained to cover repairs and inspections into the future

Potential Re-use of Site

- Most, if not all, former industrial sites have residual contamination even after clean-up
- EPA promotes re-use of these Brownfield sites - development of abandoned, idle and underused industrial and commercial facilities with contamination
- Any redevelopment subject to EPA, State, and City requirements
- For EPA, future use must avoid future recontamination or inappropriate use of site
- No contaminant migration allowed during or after construction

Possible Re-use of Site
(owned by Beazer East, Inc.)

- Limited Commercial
- Limited Industrial
- Limited Storage
- Renewable Energy
- Educational
- None
- Other

Thank you!

Exposure pathways have five parts

1. a source of contamination like a hazardous waste site,

2. an environmental medium like air, water, or soil that can hold or move the contamination,

3. a point where people come into contact with a contaminated medium like water at the tap or soil in the yard,

4. an exposure route like ingesting (contaminated soil or water) or breathing (contaminated air), and

5. a population who could be exposed to contamination, like nearby residents.

The historical exposure pathway

1. The Koppers facility was the source when the facility operated, per the Health Assessment.

2. Small soil particles (dust) blown by the wind into the nearby neighborhood was the pathway.

3. The residential area just south of the Koppers facility and surrounding areas was the point of exposure.

4. Accidentally inhaling very small amounts of particulates, was the historical exposure route.

5. Nearby residents were the exposed population, to what degree is unknown.

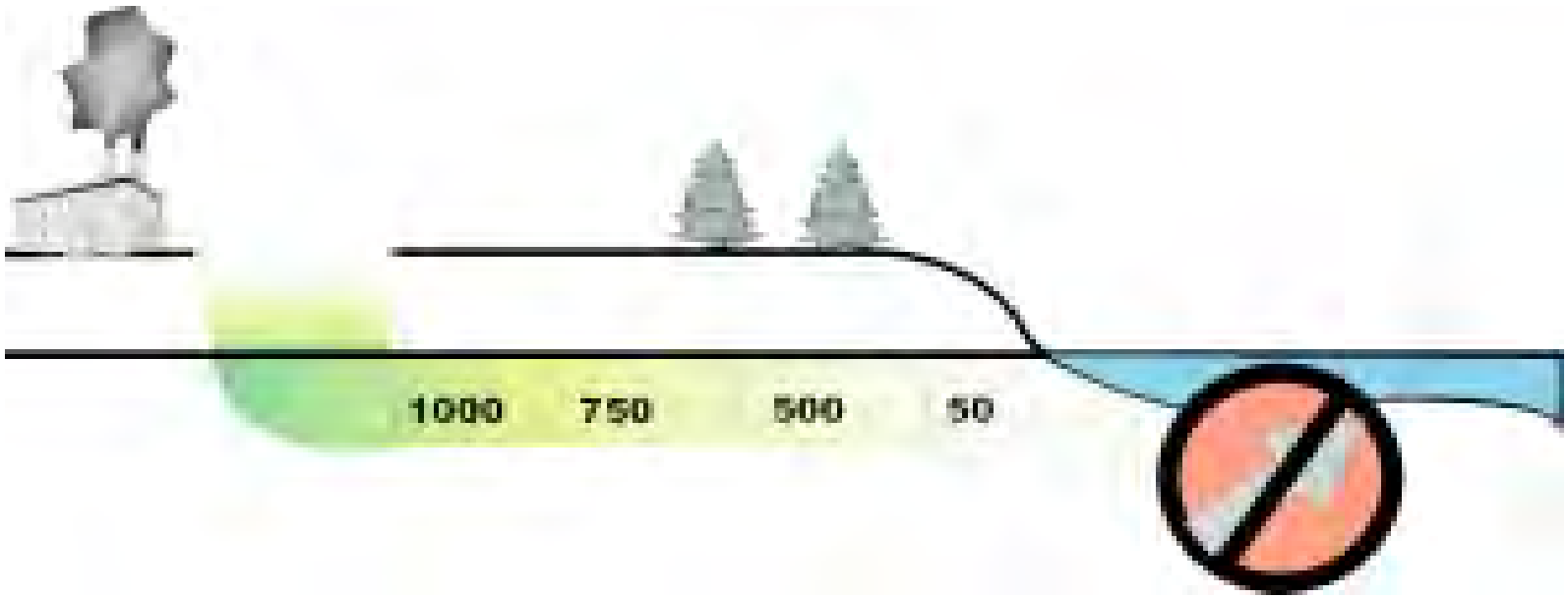
Remedial Action Objectives

- Land Revitalization is one of EPA's important goals.
- Each CA must meet Performance Standards:
  - Overall protection of human health and the environment
  - Meet Media Clean Up Standards
  - Control Source of releases
  - Comply with applicable standards for Mgmt. of wastes

Corrective Action process is flexible and allows for various pathways forward a long as performance standards are met.

Dissolved and NAPL Plume Example of Source Control

Dissolved Groundwater Plume Discharging to Surface Water Example of Source Control



Corrective Measure Technologies

- Design the selected Remedy
- Pilot test promising technologies
- Evaluate whether any interim stabilization measures are appropriate as the final CM.
- Evaluate Technologies
  - Performance Standards
  - Balancing Factors
- Recommend additional data collection as necessary to evaluate, select and design technologies

Corrective Measure Implementation Activities

- Design the selected Remedy
- Construct the selected remedy
- Document completion of Construction
- Operate, maintain, optimize performance and monitor the selected remedy
- Complete the selected remedy

Risk Assessment

- Could exposure to a specific chemical cause significant health problems?
- How much of the chemical would someone have to be exposed to before it would be dangerous?
- How serious could the health risks be?
- What activities might put people at increased risk

- *Site cleaned up to industrial standards*

The Exposure Assessment Process

STEP 1

Characterize Exposure Setting

- Physical Environment
- Potential exposed populations

STEP 2

Identify Exposure Pathways

- Chemical source / release
- Exposure point
- Exposure route

Quantify Exposure

STEP 3

Source: US EPA 1989c

Safety Factors

1000 µg/kg-day

LOAEL / 10 NOAEL 100 µg/kg-day

/ 10

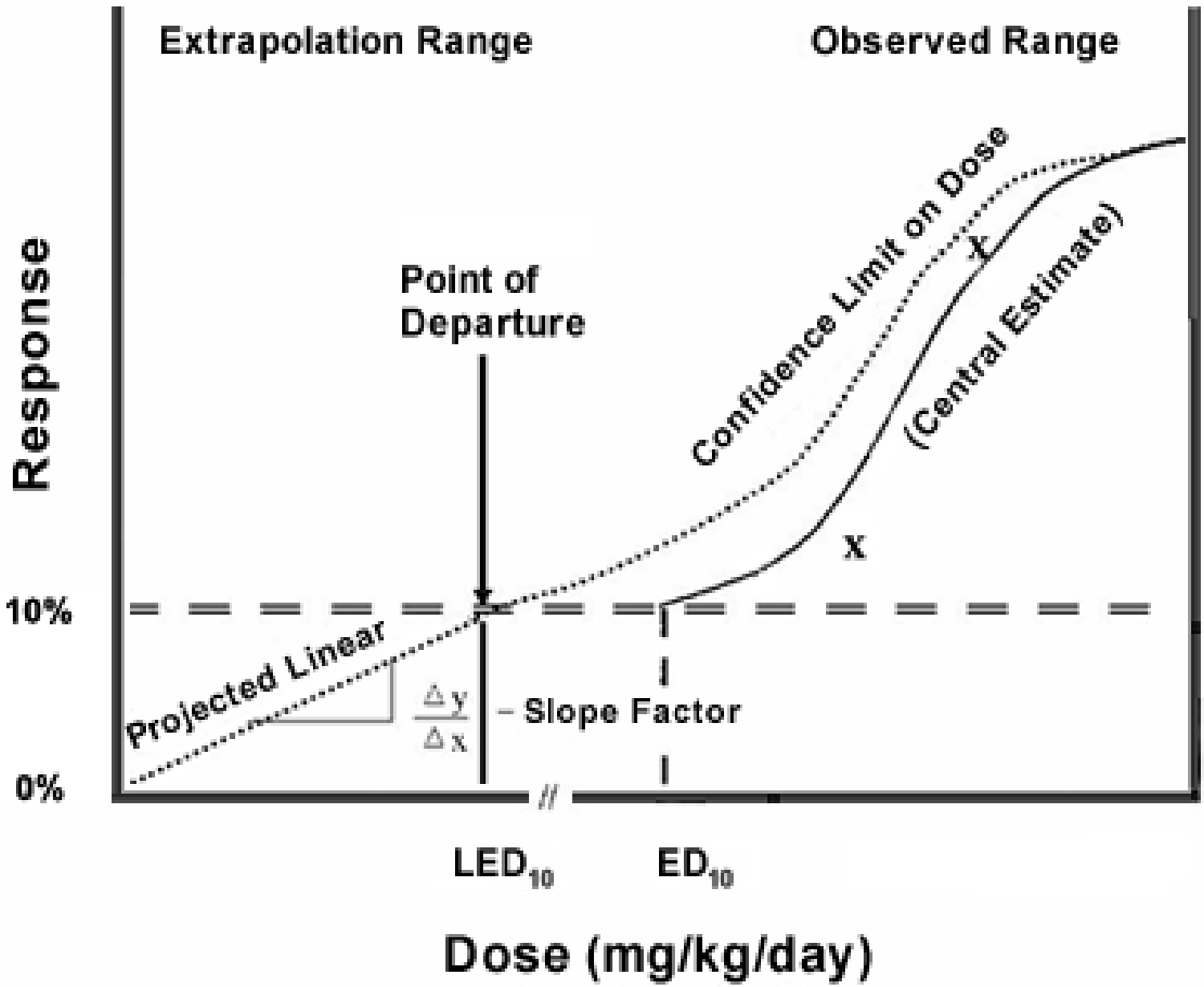
10 µg/kg-day

/10

1 µg/kg-day

Reference Dose

Cancer


Extrapolation Range
Observed Range
Response
Point of Departure
Confidence Limit on Dose
(Central Estimate)
10%
0%
Projected Linear
Δy / Δx – Slope Factor
LED10
ED10
Dose (mg/kg/day)

Quantify Cancer Risks

EPA uses the target risk range of 1 in 10,000 to 1 in 1,000,000 ($1x10^{-4}$ to $1x10^{-6}$) to manage risks as a part of a site cleanup

1 in 100

1 in 1,000

1 in 10,000

1 in 100,000

1 in 1,000,000

Application of Risk Assessment

- Risk Assessments are used to estimate whether current or future chemical exposures will pose health risk to broader population.

- Scientific methods used in health risk assessment cannot be used to link individual illnesses to past chemical exposures, nor can health risk assessments and epidemiologic studies prove that a specific toxic substance caused an individual's illness.