

US EPA ARCHIVE DOCUMENT

## **SESSION 16**

**RCRA CORRECTIVE ACTION:**

**CONCEPTUAL SITE MODEL /  
ENVIRONMENTAL INDICATORS**



## Section 16 Agenda: Conceptual Site Model & Environmental Indicators

- ▶ Introduction
- ▶ Conceptual Site Model (CSM)
- ▶ Environmental Indicators (EIs)



## Conceptual Site Models and Environmental Indicators are tools that identify:

- ▶ Critical source areas, pathways, and receptors that may require immediate attention
- ▶ Potential data gaps and help prioritize data gathering efforts
- ▶ Potential corrective measures to implement

## Conceptual Site Model (CSM)

# A Conceptual Site Model (CSM) is a 3-dimensional vision of the site

- ▶ Indicates what is known or suspected about:
  - Contaminant sources, releases, and mechanisms
  - Contaminant fate and transport
  - Exposure pathways
  - Potential receptors
  - Site risks
  
- ▶ Used to organize and communicate information on the site
  
- ▶ Used to focus site investigation and resources on the most significant problems



## The CSM is initially based on limited information

- ▶ As new data is collected, the CSM is refined
- ▶ The CSM provides information on:
  - Site characteristics
  - Actual/potential receptors
  - Release and transport mechanisms
  - Source characteristics



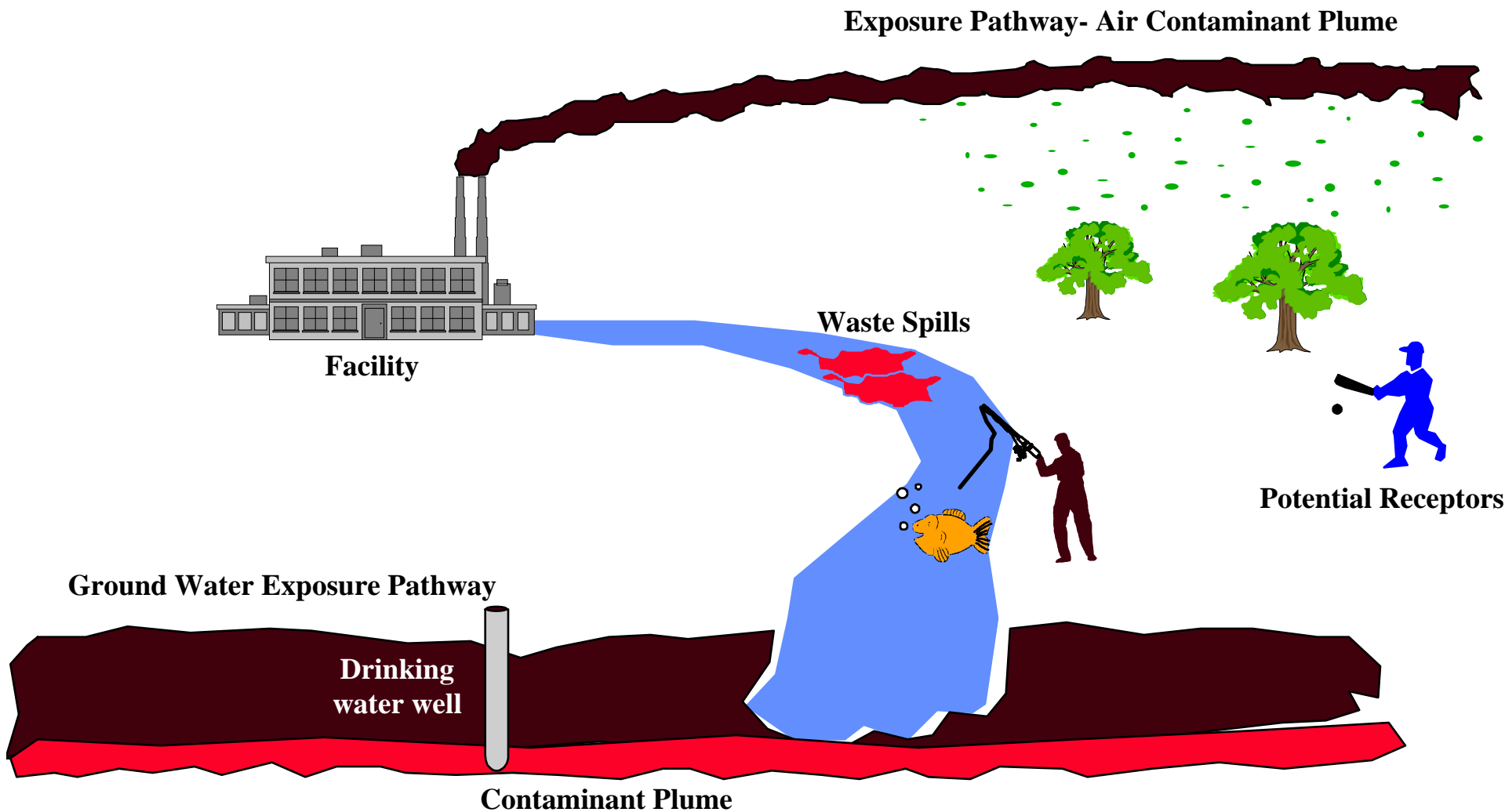
## The CSM also serves the following purposes

- ▶ The CSM provides the framework to organize
  - What is known about the site
  - What is not known about the site
  - What questions need to be answered
  - What decisions need to be made
  - Your investigation activities and resources
  
- ▶ The CSM helps to prioritize data gathering efforts
  
- ▶ A CSM is a living document that should be developed for every site during the initial phase of the corrective action process, and refined as more information becomes available



Conceptual Site Model (CSM)

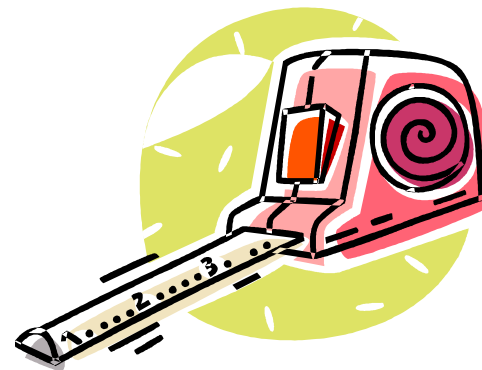
# An example of a Conceptual Site Model





## Environmental Indicators (EIs) measure cleanup progress

- ▶ Purpose
  - Government Performance and Results Act (GPRA)
  - Assist sites through RCRA corrective action process, focus on results
  - Method for determining if site is stabilized
  - Method for identifying status of sites and tracking changes in site status
  
- ▶ Goal
  - Near-term objectives to measure performance of RCRA corrective action program
  - Results are presented to Congress and will be available to the public



## EPA had developed two Environmental Indicators

- ▶ The RCRA/HSWA Program has developed Environmental Indicator Codes for use in RCRAInfo database
  - Human Exposures Controlled (CA725)
  - Groundwater Migration Controlled (CA750)
  
- ▶ Status Codes for CA725
  - YE = Yes, Human exposures controlled
  - NO = No, Human exposures not controlled
  - IN = Unknown whether human exposures controlled
  
- ▶ Status Codes for CA750
  - YE = Yes, Groundwater migration is under control
  - NO = No, Groundwater migration is not under control
  - IN = Unknown whether groundwater migration controlled

## CA725 Overview

- ▶ Are Current Human Exposures Under Control?
  - Based on site-wide conditions and current available information
  - Current land use and exposure scenarios
  - Institutional and engineering controls can be utilized to mitigate exposure
  - Ecological receptors are not evaluated
  - Strictly focused on human health issues



## CA725 Checklist – Question No. 1

- ▶ All relevant information evaluated?
  - All available documentation
    - Regulatory investigations, sampling data, risk assessments
  - All SWMUs, AOCs, and regulated units (open, closed, interim status)
  - Site history and site maps
  - Information regarding surrounding land use and possible receptors



## CA725 Checklist – Question No. 2

- ▶ Are media contaminated above appropriate risk-based levels?
  - All impacted media (on and off site, various zones of contamination)
  - List all contaminants currently present above applicable standards in each media
  - Identify the maximum detected concentration
  - Applicable standards are those approved by region or state
  - Standards should consider location of contamination
  
- ▶ *Evaluating Possible Indoor Air Impacts*
  - Interim Draft Subsurface Vapor Intrusion Guidance (November 29, 2002) can help determine whether indoor air is a medium of concern. Available at [www.epa.gov/epaoswer/hazwaste/ca/eis/vapor.htm](http://www.epa.gov/epaoswer/hazwaste/ca/eis/vapor.htm)
  - Guidance is primarily for residential settings



## CA725 Checklist – Question No. 3

- ▶ Are any exposure pathways currently complete?
  - Consider all potential receptors
  - Residents
  - Workers (on-site industrial, construction)
  - Day-care
  - Trespasser
  - Recreation
  - Food



## CA725 Checklist – Question No. 3 (continued)

- ▶ Are any exposure pathways currently complete?
  - Evaluate all complete exposure pathways associated with any impacted media
    - Dermal
    - Inhalation
    - Ingestion
  - Consider only those media identified as impacted in Question No. 2



## CA725 Checklist – Question No. 3 (continued)

- ▶ Are any exposure pathways currently complete?
  - Evaluate current site and surrounding area use, NOT future or potential use
  - Consider institutional and/or engineering controls that prevent/eliminate exposure pathways
  - Deed Restrictions
  - Fencing
  - Site security
  - Pavement





## CA725 Checklist – Question No. 4

- ▶ Are exposures expected to be significant?
  - Evaluate only the receptors identified as having potentially complete exposure pathways (i.e., “Yes” in Question No. 3)
  - If a risk assessment has been conducted, it is likely that exposures were expected to be significant and should be identified as such in the response to this question and further evaluated in Question No. 5

## CA725 Checklist – Question No. 5

- ▶ Are exposures demonstrated to be within acceptable limits?
  - Evaluate only the receptors identified as having potentially significant exposures in Question No. 4
  - Quantitative analysis is unnecessary
  - Present risk assessment results (if available)
  
- ▶ If risks are not shown to be within acceptable limits, you must enter a “NO” Determination (Question No. 6)



## CA725 Checklist – Question No. 6

- ▶ Status Codes and Signatures
  - Check the appropriate status code and ensure that you have included the necessary information with your response



## CA750 Checklist – Question No. 1

- ▶ All relevant information evaluated?
  - All available documentation
  - Site maps and/or site history
  - Hydrogeologic and contaminant plume characterization reports
  - Nature and type of contaminants
  - Available sampling data



## CA750 Checklist – Question No. 2

- ▶ Is groundwater contaminated above appropriately protective levels?
  - List of contaminants detected along with maximum concentrations detected
  - Identify contaminants that exceed applicable standards
  - Applicable standards should be those used in the region or state
  - Standards should also be based on the potentially impacted areas

## CA750 Checklist – Question No. 3

- ▶ Has groundwater migration stabilized?
  - The plume should not be increasing in size
  - Limits of the plume should not be increasing vertically or horizontally
  - Contaminant concentrations may increase or fluctuate within the interior of the plume
  
- ▶ Monitoring well network should define limits of plume
  
- ▶ If the plume discharges to surface water body, additional information is required under Question No. 5

*Note: Plume can be considered stable even if contamination is significantly above drinking water standards*



## CA750 Checklist – Question No. 4 and 5

- ▶ Is there discharge to surface water?
  - Information on the location of monitoring wells relative to the surface water body
  
- ▶ Is discharge to surface water insignificant?
  - Insignificant means contaminant concentrations discharging to the surface water less than 10 times the appropriate groundwater standard
  
- ▶ Insignificant
  - Answer Question 6

## CA750 Checklist – Question No. 6

- ▶ Is discharge to surface water acceptable?
  - Generally, this question should be answered if contaminant concentrations exceed 10 times the appropriate standard
  - Ecological risk assessment results may be referenced to show that there are no significant impacts to the ecosystem
  - If discharge is unacceptable, EI is a No



## CA750 Checklist – Question No. 7

- ▶ Any planned groundwater monitoring?
  - Information on the frequency, location, and analytes to be sampled for each monitoring well
  - Remember that if a facility changes its monitoring program after the EI is approved, the response to this question may need to be revised accordingly



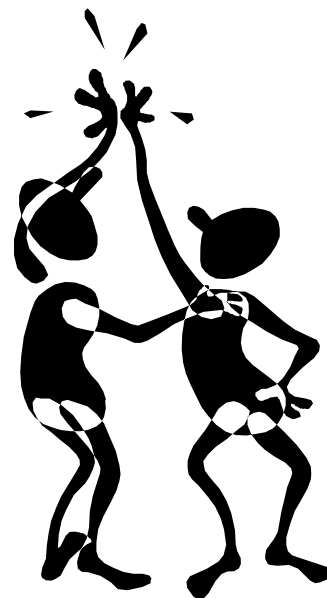
## CA750 Checklist – Question No. 8

- ▶ Status Codes and Signatures
  - Check the appropriate status code



## Environmental Indicators – Wrap up

- ▶ Completing the EI Checklists to determine EI Status Code
  - Should be simple and straightforward
  - Not a research project
  - Based on best professional judgment
  - Can be changed if/when new information becomes available
  - Not the end of the RCRA corrective action process



## The following guidance provides additional information:

- ▶ [www.epa.gov/epaoswer/hazwaste/ca/eis.htm](http://www.epa.gov/epaoswer/hazwaste/ca/eis.htm)
- ▶ U.S. Environmental Protection Agency. 2000. Results-Based Approaches to Corrective Action. July 26, 2000.
- ▶ U.S. Environmental Protection Agency. 1999. RCRA Cleanup Reforms, Faster, Focused, More Flexible Cleanups. July 1999. (EPA 530-F-99-018).

