Innovative Approaches

Lead-Based Paint and Pesticide Investigations at School Sites

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Role of Department of Toxic Substances Control at Schools

- Under Education Code, DTSC identifies environmental contaminants prior to school construction or expansion financed by state bonds
- DTSC oversees environmental assessments and response actions at prospective, expanding, and existing school sites
- DTSC evaluates environmental health risks, protects children and adults from exposure to hazardous materials

DTSC Process for School Sites

- Step 1 - Identification
  - Phase I Environmental Site Assessment (Phase I)
    - May include LBP soil sampling data
- Step 2 - Investigation
  - Preliminary Environmental Assessment (PEA)
- Step 3 - Cleanup
  - Supplemental Site Investigation (SSI)
  - Removal Action Workplan (RAW)

DTSC Guidance for Lead-Based Paint Sampling in Soils

- Residential and/or commercial structures constructed before 1978 may contain lead-based paint on internal and external surfaces
- DTSC's role at prospective school sites: identify if presence of lead contamination in soil poses a threat to human health and the environment

Applicability of LBP Guidance for Schools

- LBP Building Survey
  - Age of structures (Constructed pre-1978)
  - LBP surface sampling
  - Visual inspection for evidence of sloughing of paint
  - Target areas: Along drip lines, high activity areas such as door frames, windows, stairs, walls, drainage ditches.
- If actual or potential LBP identified, soil sampling required using analytical methods:
  - X-Ray Fluorescence (XRF) - EPA Method 6200
  - Laboratory analyses - EPA Methods 6010B, 6020, 7420, 7421

Pre-Demolition or Renovation - Sampling for LBP at Schoolsites

- Collect surface soil samples
  - from exposed soil areas around the drip line of structures
  - near doors or windows prior to demolition of buildings
  - from nearest unpaved areas, including drainage areas

Structure	**Minimum sampling frequency**
Single family home	Four discrete samples per home
Duplex/triplex/quadraplex residences	Six discrete samples per building
Mixed residential land use	Consult with DTSC

Post-Demolition and Debris Removal - Sampling for LBP at School Sites

- Collect surface soil samples (0-6”)
  - in the disturbed, potential source area around each former structure
  - before site is graded
  - around building footprint
  - randomly if no known building footprint
  - from nearest undisturbed soil, irrespective of paving
- Collect surface and subsurface soil samples
  - where demolition has occurred, foundations were removed, and/or soil was graded
  - in random, grid pattern

Post –Demolition Sample Frequency for LBP at School Sites

Structure	**Minimum frequency**
Single family home	4 discrete per building
Duplex/triplex/ Quadraplex	6 discrete per building
Apartment building or commercial structure	4 samples per building of one sample per 4000 square feet of building (whichever is greater)
Undisturbed and yard area	Minimum of 2 samples per buildings

Health Screening Evaluation for LBP at School Sites

- DTSC Lead Spread 7 Worksheet
- Current Screening Value = 255 mg/kg
  - Greater than 10 ug/dl Lead blood levels
  - Corresponds to 99th percentile
  - Based on regional and statewide air concentrations of Pb and 15 ug/l for water
  - Does not include homegrown produce exposure pathway

DTSC School Site Statistics for Agricultural Properties

- 50% of Phase Is were for Ag Sites
- 40% of Phase Is for Ag Sites required PEAs
- 8% of PEAs for Ag Sites required Cleanups

Guidance for Sampling Agricultural Fields for School Sites

- Guidance supplements DTSC's Preliminary Environmental Assessment Manual
- Purpose of Guidance
  - Streamlines and standardizes characterization of former agricultural sites
  - Assists in designing investigations
- Pesticides commonly detected: DDT, DDD and DDE, toxaphene, dieldrin, aldrin, chlordane

Application of Agricultural Sampling Guidance for School Sites

- Agricultural properties where pesticides were uniformly applied
- Does not apply to disturbed land (e.g., graded, imported fill, other disturbance or soil impacts)
- Does not apply to pesticide mixing/loading or storage areas

Guidance for Sampling at Agricultural Fields for School Sites

- **Identify bio-persistent agricultural chemicals used**
  - **Organochlorine pesticides, paraquat**
  - **Metals, specifically arsenic**
  - **Based on history, crop type to determine analytes**
- **Identify time period of agricultural use**
  - **Sampling not required if historical use prior to 1950s**

Guidance for Sampling Frequency at Agricultural Fields for School Sites

Land Size	Suggested Minimum Sampling Locations
One (1) to two (2) acres	Discrete samples taken on ¼ acre centers
Greater than two (2) up to four (4) acres	Discrete samples taken from eight (8) locations evenly spaced across the site
Greater than four (4) up to twenty (20) acres	Eight (8) composite samples from discrete samples taken on half-acre centers.
Twenty-one (21) to sixty (60) acres	Fifteen (15) composite samples from discrete samples taken on one (1) acre centers.
Sixty-one (61) to one hundred (100) acres	Twenty five (25) composite samples from discrete samples taken on one (1) acre centers

Guidance for Sample Collection at Agricultural Fields for School Sites

- Sampling depths
  - Surface (0-6 inches)
  - Subsurface (2-3 feet)
- For row crops, collect one-half of samples from the furrows and one-half from beds
- For orchards, collect samples from current drip line
- Collect offsite background samples for background
  - Near site (same soil types)
  - From areas not been impacted by agricultural or industrial chemicals

Guidance for Data Interpretation of Agricultural Field Sampling for School Sites

- Use highest concentrations of each detected pesticide and metal above background in the risk assessment
- Determine if pesticides or metals present an unacceptable risk or hazard on the site
- Determine if elevated levels are “hot spots” or a site-wide concern
- Prepare report with recommendations based on data and interpretation

Emerging Issues - Pesticide Usage at Residential Properties

- Study funded by US-EPA
- Evaluated pesticides used as termiticides at three residential properties with multiple dwellings
- Included 3 counties (San Bernardino, San Diego and Los Angeles)
- 176 soil samples from three sites

DTSC Study Findings for Pesticides at Residential Properties

- Organochlorine pesticides frequently detected in surface soils (0-0.5')
  - Chlordane (98%), DDT (95%), DDE (91%), Dieldrin (71%)
- 50% of chlordane and dieldrin detections had cancer risk >1 $x10^{-6}$
- 20% of chlordane and dieldrin detections had cancer risk >1 $x10^{-5}$

DTSC Sampling Guidance for LBP and Agricultural Fields for School Sites

- http://www.dtsc.ca.gov/PolicyAndProcedures/Schools/SMP_REP_GuidanceLeadAsbestosSchool.pdf
- http://www.dtsc.ca.gov/PublicationsForms/interim-ag-soils-guidance.pdf

For Further DTSC Information

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