



SCHOOL HAZARDS, INCLUDING NATURALLY OCCURING ASBESTOS (NOA)

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ROLE OF DEPARTMENT OF TOXIC SUBSTANCES CONTROL AT SCHOOLS

- **California Education Code, DTSC to identify environmental contaminants prior to school construction or expansion financed by state bonds**
- **Oversee environmental assessments and response actions at prospective, expanding, and existing school sites**
- **Evaluate environmental health risks to protect children and adults from exposure to hazardous materials**



ROLE OF DTSC AT SCHOOL SITES WITH NATURALLY OCCURRING ASBESTOS

- **DTSC requires identification and investigation of NOA:**
 - A) serpentine (chrysotile mineral)
 - B) amphibole (actinolite, amosite, anthophyllite, crocidolite, tremolite minerals)
- **Mitigation (barrier to prevent or reduce exposures)**
- **Monitoring for long-term protection**
- **Maintenance of engineering and administrative controls**



GEOLOGIC OCCURRENCE OF ASBESTOS IN CALIFORNIA

- **Ultramafic rock formations (90% dark, iron-magnesium-silicate minerals)**
- **Serpentine, California's state rock**
- **Fault shear zones, alluvial deposits, in surfacing and fill materials**
- **Downstream sediments**
- **Almost all counties in California**
 - See Geologic Survey Maps



HEALTH EFFECTS FROM ASBESTOS

- Airborne asbestos fibers can lodge in lungs
- Lung and bowel cancers, e.g., mesotheliomas; synergistic impacts associated with cigarette smoking
- Asbestosis (respiratory disease)
- Short- and long-term hazards; the longer the exposure, the greater the potential risk



DTSC PROCESS FOR SCHOOL SITES WITH NOA

- Step 1 – Identification:
 - Phase I Environmental Site Assessments
- Step 2 – Investigation:
 - Preliminary Environmental Assessments
- Step 3 – Mitigation:
 - Response Actions
- Step 4– Monitoring:
 - Long-Term Protection



IDENTIFICATION OF NOA AT SCHOOL SITES

- **Phase I Environmental Site Assessment**
- **Map review**
- **Site inspection by qualified professional consultant**
- **If no evidence of NOA or other recognized environmental conditions, DTSC will issue “No Action” determination**



INVESTIGATION OF NOA AT SCHOOL SITES

- **PEA Required if NOA identified in Phase I**
- **Environmental Oversight Agreement**
- **Qualified professional consultant**
- **Scoping Meeting**
- **PEA Workplan for testing and analysis**
 - DTSC approval required



INVESTIGATION OF NOA AT SCHOOL SITES

- **Soil samples from:**
 - Areas suspected of NOA
 - Soils or aggregate with NOA, even if no visible presence of NOA
 - Imported fill or surfacing materials
- **Sites with identifiable geologic formations**
 - Focused Sampling
- **Sites with homogenous topography and lithology**
 - Trenching
 - Identification of each mineral type at soil lithology interface
- **Existing schools**
 - Evaluate exposed areas, consider activity pattern sampling
 - Collect surface and subsurface samples if future excavation is likely



INVESTIGATION OF NOA AT SCHOOL SITES

- **Analysis by:**
 - Polarized Light Microscopy (PLM)
 - Transmission Electron Microscopy (TEM)
- **Data validation:**
 - Specify in PEA Workplan and PEA Report
 - Preparation methods and counting rules
- **Strategy:**
 - Analyze all samples by PLM (CARB 435 method) to screen site
 - Analyze some samples by TEM (USEPA Method 600/R-93/116) if PLM results are non-detect or trace



RISK MANAGEMENT APPROACH FOR NOA AT SCHOOL SITES

- **PEA: No Health Risk Assessment for NOA**
 - Difficult to model, predict airborne fiber concentrations from asbestos fibers in soil
- **Further Action depends on frequency and location of soil samples with NOA concentrations exceeding thresholds:**
 - **PLM Criteria: NOA greater than 0.25% (number of asbestos structures)**
 - **TEM Criteria: NOA greater than or equal to 0.001% (asbestos fibers by weight)**



MITIGATION OF SCHOOL SITES WITH NOA

- **Mitigation (response actions)**
 - Require DTSC approval
 - Performed under Health and Safety Code
- **School Cleanup Agreement**
- **Major elements of Removal Action Workplans:**
 - Site background and investigation
 - Evaluation of remedial alternatives; selection of remedy
 - Applicable or Relevant and Appropriate Requirements
 - Public Participation
 - Implementation plans, control measures
 - Long-term administrative, institutional, and engineering controls



APPLICABLE REMEDIES FOR NOA AT SCHOOL SITES

- **Removal and offsite disposal**
 - All surfacing or fill materials containing NOA
- **Cap or Cover with:**
 - Clean fill (properly tested)
 - Buildings
 - Hardscape
 - Landscaping
- **Marker between fill and native soils**
- **Operations & Maintenance Plan**



CONSIDERATION FOR REMEDY SELECTION FOR NOA AT SCHOOL SITES

- **School design and land uses**
 - Hardscape areas
 - Landscape areas
 - Playfields
 - Utility Corridors
 - Embankments
- **Cleanup criteria may vary depending on uses:**
 - 0.001% TEM in high-use areas where soil disturbance is likely
 - 0.01% TEM in areas where heavy activities are not anticipated, such as planter boxes or landscaped areas



OPERATION AND MAINTENANCE PLAN

- **Required for Site Certification**
- **O&M Plan:**
 - Identifies inspection schedule
 - Defines reporting requirements
 - Parameters for reviews of operation, monitoring, data collection, & maintenance
 - Includes a Standard Operation Procedure Workplan for NOA intrusive work



O&M AGREEMENT

- **O&M Agreement**
 - Enforceable Agreements
 - Implements O&M Plan
 - If remedy fails, requires additional investigation and remediation
 - Requires O&M throughout life cycle of remedy, may extend 30 years or more



FOR FURTHER INFORMATION

- **See DTSC's Website dtsc.ca.gov for:**
 - Fact Sheet #4: Further Action/Response Actions at School Sites
 - Interim Guidance: Naturally Occurring Asbestos at School Sites
 - Importing Clean Fill
- **Contact Unit Supervisors:**
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