



*California Department of Toxic Substances  
Control (DTSC)  
Update of the Schools NOA Guidance*

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*Presented at the*

*AEG Naturally Occurring Asbestos TWG Meeting.  
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*By*

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## *DTSC Guidance for Schools with NOA*

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- See DTSC's Website [dtsc.ca.gov](http://dtsc.ca.gov) for:
  - “Information Advisory, Clean Imported Fill Material”, October 2001
  - “Interim Guidance – Naturally Occurring Asbestos at School Sites”, Revised 9/24/04
  - “Operations & Maintenance Plan Template NOA Response Actions at Schools”, October 2005
- Each currently under revision



## *DTSC, NOA and Schools*

	DSTC NOA School Sites Project Stage		
	Investigations completed	Mitigation completed	O & M in place
cy2010	3	3	7
cy2011	3	0	7
cy2012	0	1	10
cy2013	2	0	11
cy2014	2	1	11



## *Risk Management Approach for NOA at School Sites*

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- 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
- Objective is to minimize NOA exposure potential from school site soils



# *Investigation of NOA at School Sites*

## *Soil Sampling Strategies*

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- **Soil samples from:**
  - Areas suspected of NOA, including soils or aggregate with NOA, even if no visible presence of NOA
  - Imported fill or surfacing materials suspected of NOA
- **Sites with identifiable geologic formations (heterogeneous topography and lithology)**
  - Focused Sampling
- **Sites with homogeneous topography and lithology**
  - Trenching or borings
  - Identification of each mineral type at change in soil lithology
- **Existing schools**
  - Evaluate exposed areas, consider activity pattern sampling
  - Collect surface and subsurface samples



# *Investigation of NOA at School Sites Soil Sampling Strategies (Discrete Sampling at Homogeneous Site)*

	Site in Acres		
	<8	8 to 20	>20
Min. No. of Locations	2 to 4	4 to 10	10 plus 1/5 acres
Min. No. of Samples	4 to 8	8 to 20	20 plus 2/5 acres



## *NOA Soil Sample Analysis*

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- Analysis by:
  - Polarized Light Microscopy (PLM – 0.25%)
  - Transmission Electron Microscopy (TEM – 0.005wt%)
- Data validation:
  - Specify In PEA Workplan and PEA Report
  - Preparation methods and counting rules
- Strategy:
  - Analyze samples by PLM (CARB 435 method)
  - Analyze by TEM (USEPA Method 600/R-93/116) if PLM results are non-detect or trace



## *NOA Guidance Revisions*

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- TEM reporting limit 0.005%
- Minimum thickness of cap now 6-inches rather than 1 to 2 feet
- Not prescriptive on number of discrete samples
- Incremental Sampling Methodology (ISM) option





# *What is Incremental Sampling Methodology (ISM)?*

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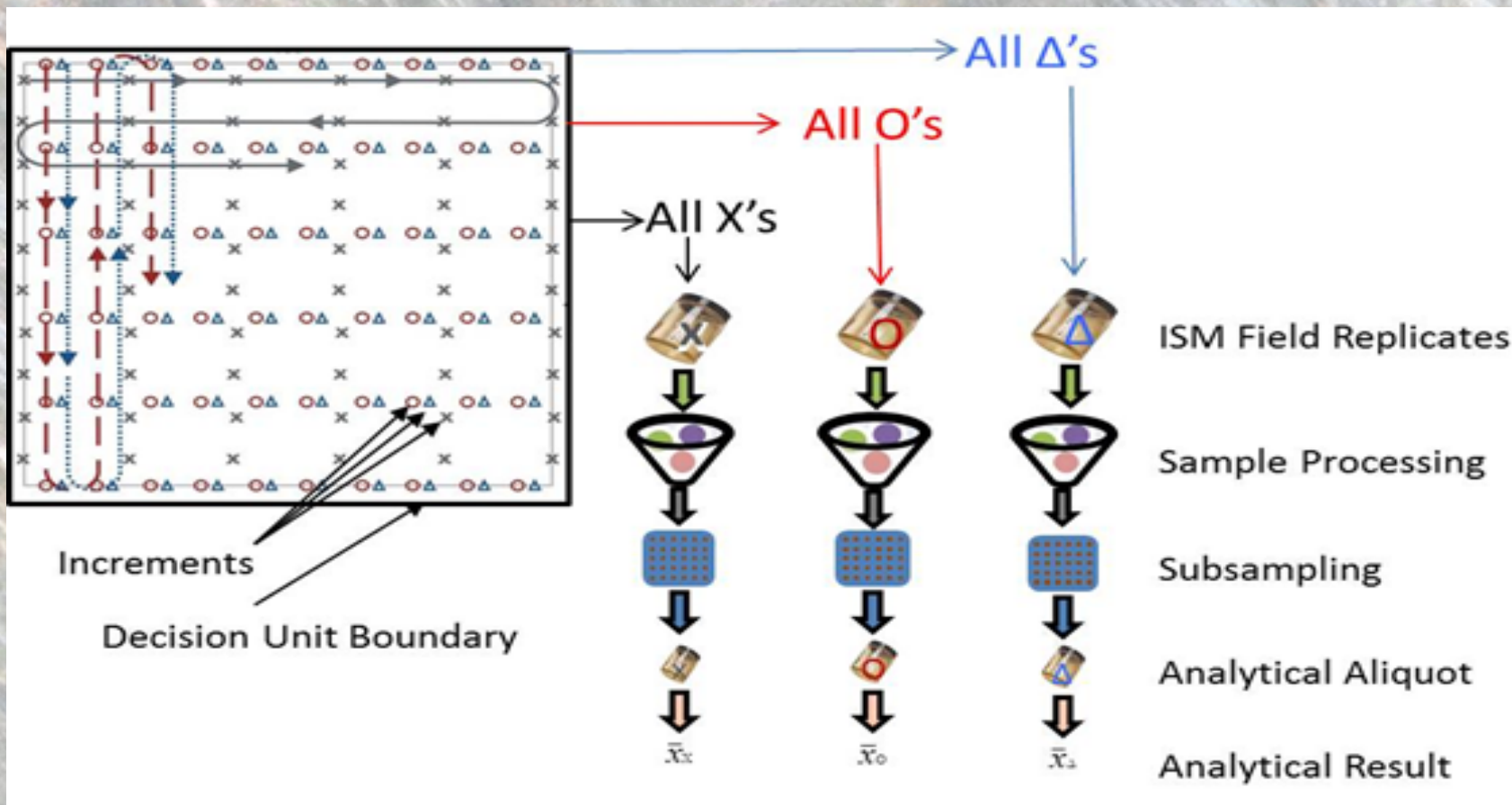
**ISM Objective:** To obtain a single sample for analysis that has the mean analyte concentration representative of the decision unit

- Structured composite sampling and processing protocol
- Reduces data variability
- Provides a reasonably unbiased estimate of mean contaminant concentrations in a volume of soil targeted for sampling

**Decision Unit (DU):** the smallest volume of soil (or other media) for which a decision will be made based upon ISM sampling



# What is Incremental Sampling Methodology (ISM)?





# *Advantages and Limitations of ISM*

Advantages of ISM	Effect
Improved spatial coverage (increments x replicates)	<ul style="list-style-type: none"> <li>• Sample includes high and low concentrations in proper proportions</li> </ul>
Higher Sample Mass	<ul style="list-style-type: none"> <li>• Reduces errors associated with sample processing and analysis</li> </ul>
Optimized processing	<ul style="list-style-type: none"> <li>• Representative subsamples for analysis</li> </ul>
Fewer non-detects	<ul style="list-style-type: none"> <li>• Simplifies statistical analysis</li> </ul>
More consistent data	<ul style="list-style-type: none"> <li>• More confident decision</li> </ul>
Limitations of ISM	Effect
Small number of replicates	<ul style="list-style-type: none"> <li>• Limits Upper Confidence Limit calculation methods</li> </ul>
No spatial resolution within Decision Unit	<ul style="list-style-type: none"> <li>• Limits remediation options within Decision Unit</li> <li>• Limits multivariate comparisons</li> </ul>
Assessing Acute Toxicity	<ul style="list-style-type: none"> <li>• Decision Unit has to be very small</li> </ul>



## *ISM – What's In It For YOU?*

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- Fewer analyses but a more representative sample
- High quality data leads to a more confident decision
- Potential for cost savings



## *ISM – For More Information*

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- <http://www.itrcweb.org/ISM-1/>
- [http://dec.alaska.gov/spar/csp/guidance/multi\\_increment.pdf](http://dec.alaska.gov/spar/csp/guidance/multi_increment.pdf)
- [http://itrcweb.org/ism-1/references/DU-MIS\\_Notes\\_\(Final\\_March\\_15\\_2011\).pdf](http://itrcweb.org/ism-1/references/DU-MIS_Notes_(Final_March_15_2011).pdf)
- [http://www.clu-in.org/conf/itrc/ISM\\_110612/](http://www.clu-in.org/conf/itrc/ISM_110612/)
- [http://www.itrcweb.org/ism-1/references/IGD\\_9-02v2.pdf](http://www.itrcweb.org/ism-1/references/IGD_9-02v2.pdf)



## *Regulated vs Non-regulated Asbestos*

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- Regulated minerals:
  - chrysotile (Serpentine mineral group, hair-like)
  - actinolite, amosite, anthophyllite, crocidolite, and tremolite (Amphibole mineral group, needle-like)
- Non-regulated minerals:
  - fibrous erionite, winchite and richterite
- Aspect ratio of 3:1 regardless of length



## *Dialogue Questions*

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- How many discrete samples
- Non-regulated asbestiform minerals



## *Contact Information*

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