

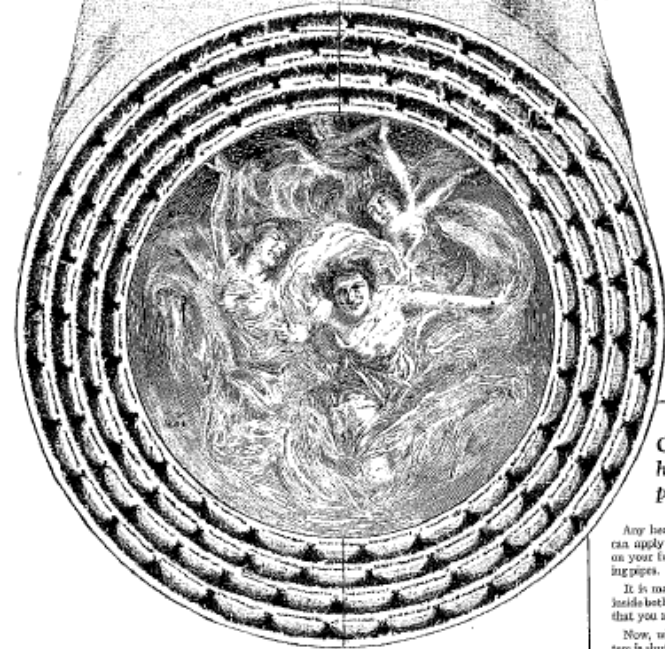
Challenges in Risk Assessment for Asbestos: An Update

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"Air Cell" Insulation

- Pre-formed, cardboard-like insulation.
- Lower heat applications (hot water pipes, radiators).
- Banned in 1975 for manufacturing.
- Some relatively intact pieces found on-site.

Using dead air to keep
heat *alive*



Cover your
heater and
pipes now!

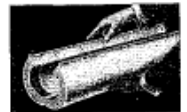
Any heating man or plumber can apply Improved Asbestocel on your furnace body and heating pipes.

It is marked with a red band inside both ends of each length so that you may readily identify it.

Now, while your heating system is shut down, is the best time to have a heating man figure on cleaning out your heating plant and applying Improved Asbestocel. Do it now, and save next winter's coal before you buy it.

Inexpensive!

The cost of Improved Asbestocel is small compared to your usual fuel bill. Sometimes it pays for itself in one heating season.



Look for the Red Band

TO keep heat alive from furnace to radiator is everybody's problem. But it is not a difficult one.

To preserve live heat, surround it with dead air—a scientific principle.

It is upon this principle that Johns-Manville Improved Asbestocel is designed. There are multitudes of separate dead air cells in every three-foot length of this pipe covering. Ordinary pipe covering contains long, open cells through which air circulates and carries away heat.

It is this difference that makes Improved Asbestocel the most efficient pipe insulation, per dollar of cost.



Cells open like this are bad.



Cells closed like this are efficient—Asbestocel.

JOHNS-MANVILLE Inc., 292 Madison Avenue at 41st Street, New York City
Branches in the Latin Cities: P.O. CASABLANCA: CANARIAN JOHN-MANVILLE CO., Ltd., TORREMO

JOHNS-MANVILLE
Improved **Asbestocel** saves coal



Intact Air Cell



Damaged Air Cell from NRE



"Mag Block" Magnesium Calcium Silicate Insulation

He's Taming High Temperatures
...With One Material



KAYLO ...first in calcium silicate
...pioneered by OWENS ILLINOIS Glass Company, Toledo 3, Ohio

THE COVERING he's installing will keep scorching heat under control—efficiently serving the needs of industry. This revolutionary heat-saving material is Kaylo hydrous calcium silicate.

A single layer of Kaylo material, in the form of heat insulations, provides heat savings over a wide temperature range—up to 1200°F.—temperatures which used to require two thicknesses of different materials.

Kaylo calcium silicate is an inorganic and noncombustible chemical compound (not glass). It is insoluble in water, has exceptional stability, strength and light weight. These advantages indicate why Kaylo calcium silicate is replacing materials long used in the insulating field.

Owens-Illinois introduced Kaylo calcium silicate in 1943. Today, heat insulation is an outstanding example of Kaylo material's versatility and service to industry. Moreover, it offers innumerable possibilities for use in the building field.




- Typically pre-formed.
- Used for high temperature applications (boilers, piping).
- Banned in 1975 for manufacturing.
- On-site – heavily weathered.

ASBESTOS LIMITED INC.
Has been processing and selling every type of grade asbestos for more than twenty years

ASBESTOS

ARIZONA CRUDE
AUSTRALIAN CHRYSOTILE BLUE
CANADIAN CHRYSOTILE BLUE
CANADIAN SPINNING FIBRE
CANADIAN SHINGLE FIBRE
CYPRUS ASBESTOS
ITALIAN CRUDE
INDIA CRUDE
RUSSIAN CRUDE
RHODSIAN CRUDE
SOUTH AFRICAN BLUE CRUDE
SOUTH AFRICAN YELLOW CRUDE
AND OTHER TYPES OF ASBESTOS



You are cordially invited to visit our New York office where the largest and finest collection of asbestos samples in the world is on display.

Creators and Exclusive manufacturers of **NEW ERA INSULATION**—the lightest Rigid Insulation made for High or Low Temperatures.

ASBESTOS LIMITED INC.
8 WEST 40th STREET - - - NEW YORK, N. Y.
27 SIMMONS ST. • JOHANNESBURG, S. AFRICA • Works: MILLINGTON, N. J.

"ASBESTOS" — May 1941 Page 18





Dust on Rafters and Floor Joist in the Crawl Space – Portland Vermiculite Site



Piles and bags of vermiculite were found in the crawl space. The removal effort took more time and EPA resources than expected.

TOE OF SWIFT CREEK LANDSLIDE

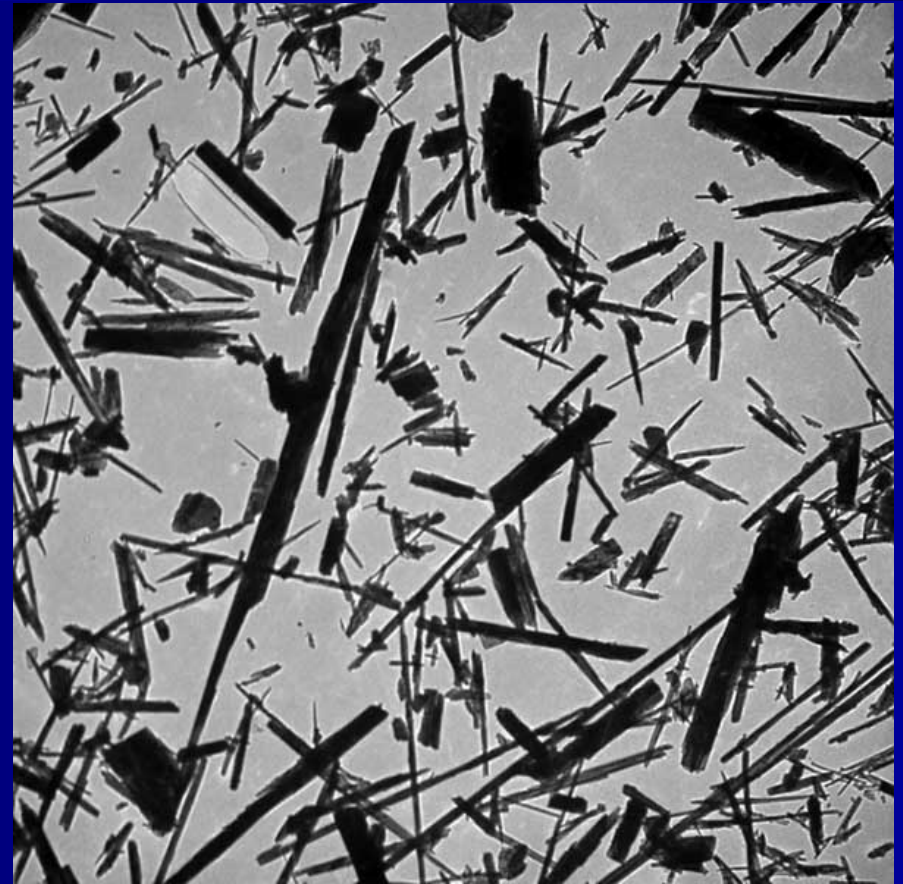




EPA and OSHA regulate six types of asbestos

- **chrysotile**
- **crocidolite**
- **anthophyllite**
- **amosite**
- **actinolite**
- **tremolite**

Chrysotile and Tremolite Asbestos



There are other types of
abestiform minerals that are not
regulated

**Richterite/Winchite – similar to
actinolite and tremolite, associated with
Libby vermiculite**

**Taconite – Minnesota (was asbestos
responsible for illness in taconite
workers?)**

**Erionite – Oregon, South Dakota,
Turkey**

How Can a Person Become Exposed to Asbestos?

- Fibers become airborne and can be breathed into the lungs
- Not a problem if asbestos-containing minerals in soil are left undisturbed.

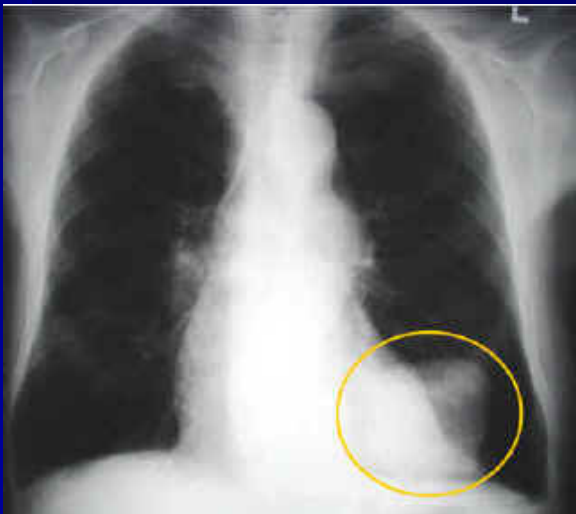
Conceptual Site Model



Asbestos Related Health Concerns

■ Cancer

- Lung Cancer
- Mesothelioma
- Other Cancers (GI? Larynx?)



■ Non-Cancerous Lung Abnormalities

- Asbestosis
- Pleural Plaques
- Pleural Thickening
- Pleural Effusion (fluid)

Toxicity Approaches for Asbestos

- IRIS (1986)
 - PCME fibers are related to toxicity
 - Assumes equivalent toxicity
 - Traditionally fiber counts were done using PCME
- Emerging Approaches
 - ?Weight amphiboles more heavily than chrysotile
 - ?Weight longer fibers more heavily
 - ?Thinner fibers may be more potent
 - Electron microscopy is needed for assessment

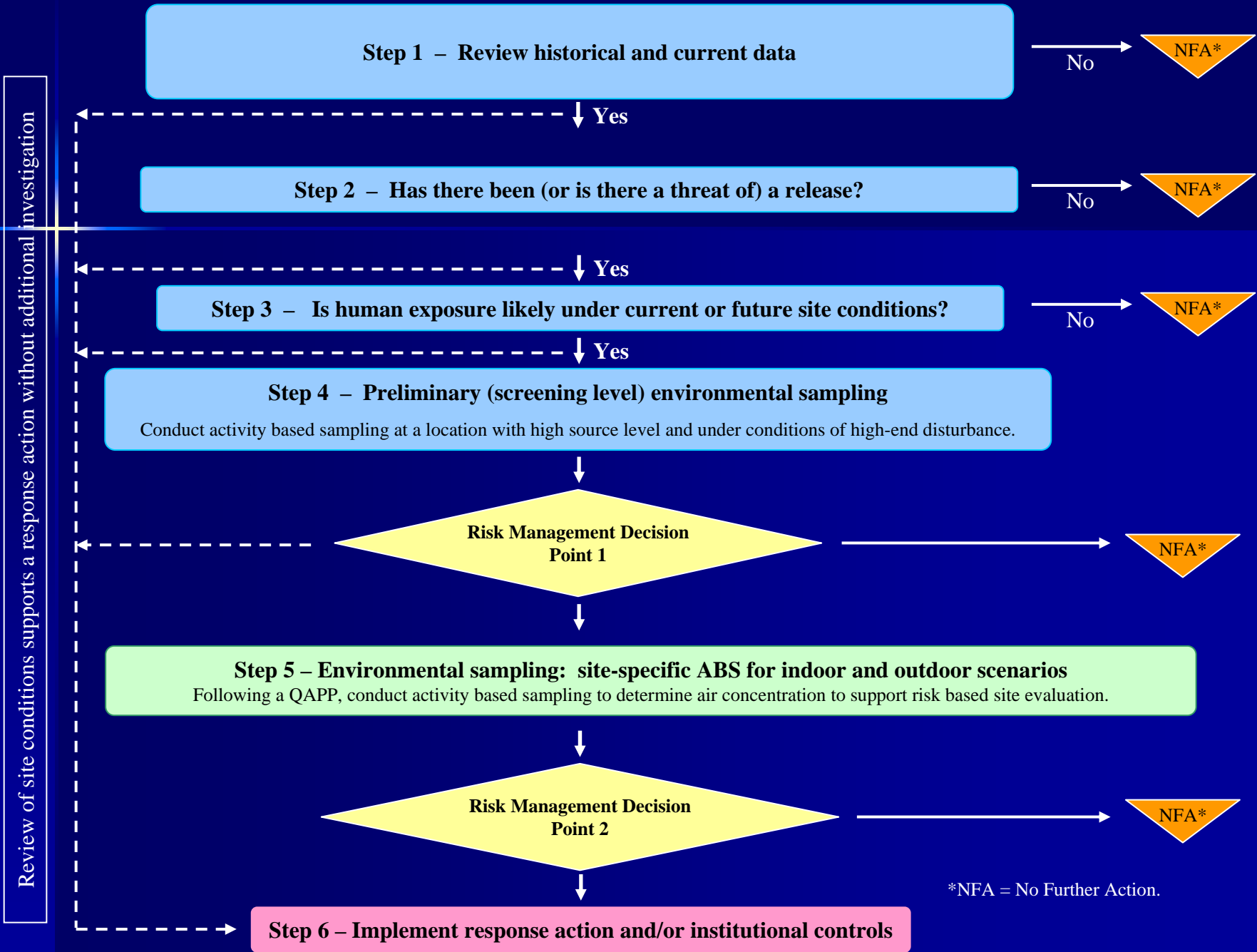
Background for Recommended Approach

- 1% in soil historically used as clean-up level – NOT risk-based
- August 2004 Cook memo rescinded 1%
 - Regions should develop risk-based, site-specific action levels based on air concentrations
 - “an accurate exposure value could only be determined through site sampling techniques that generate [airborne] fibers from soil”

Asbestos Exposure Assessment

- Measurements made directly from the breathing zone are most appropriate for incidental soil exposures
- Measurements from stationary monitors may not provide reliable estimates of human inhalation exposure
- Solid media (e.g., soil or dust) measurements cannot be reliably converted to derive airborne exposure concentrations

Outline of the DRAFT Framework



Activity-Based Outdoor Sampling

- Uses an activity that provides a high-end soil disturbance
- Currently recommend a “raking scenario”
- Rake for specified time over a template area
- Collect personal air samples (breathing zone) and perimeter air samples
- Provides a measure of fiber release from soil



Activity-Based Indoor Air Sampling

- Activity-based sampling, if possible, if not, then generic using fans/leaf blower recommended
- Collect air samples
- Provides quantitative estimate of fibers in air



Activity-Based Sampling



Activity 1 – Digging and loading





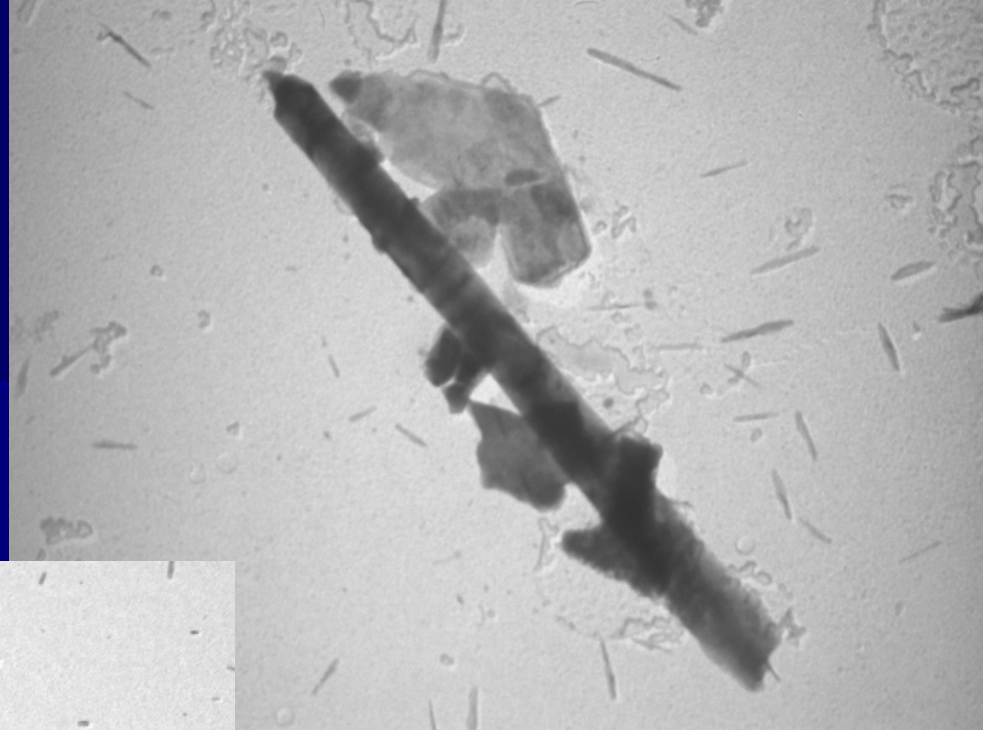
Activity 2 – Spreading Dredged Material



Activity 3 – Recreational Activity along the Creek – note one person always trailed the other



Actinolite Fiber from Swift
Creek ->



<- Chrysotile Fiber from
Swift Creek

How to Estimate Exposure to Swift Creek Dredged Materials

Time Weighting Factors

Scenario	Hours/day	Days/year	Years	TWF
Walking	1	156	30	0.007632
Cross Country	1	30	4	0.00020
Dredger/Hauler	8	30	25	0.009785
1 year	8	30	1	0.000391
Child Play	2	350	10	0.011416
Farming	12	10	30	0.005871
Gardening	10	50	30	0.024462

Cancer Risk Calculation

- Risk can be estimated by multiplying the Air Concentration by the TWF and the **lifetime unit risk (UR)** for Asbestos:
 - Conc. (f/cc) x TWF (unitless) x **UR** (f/cc)⁻¹
 - **UR** = 0.23 per PCME f/cc



National EPA Work

- Noncancer reference concentration for asbestos is forthcoming
- Cancer models are being evaluated
- Releasability studies are being performed to better understand available methods/tools
- Several workgroups have formed – internal review/support
- Framework for Investigating Asbestos-Contaminated Hazardous Waste Sites (to be released soon)