

# **WELCOME**

## **Minnesota Taconite Workers Lung Health Partnership**



UNIVERSITY OF MINNESOTA  
**Driven to Discover<sup>SM</sup>**

# **Taconite Worker Health Studies Update December 18, 2008**

University of Minnesota School of Public Health  
Natural Resources Research Institute



UNIVERSITY OF MINNESOTA  
**Driven to Discover<sup>SM</sup>**

# What We'll Cover Tonight

- Introduction of study coordinators
- Update on overall status of health project  
(Jeff Mandel)
- Updates on individual health studies  
(Bruce Alexander, Ian Greaves)
- Updates from NRRI on environmental project  
(Don Fosnacht)
- Questions and comments



# UM Studies

## 1. Health Study Components Include:

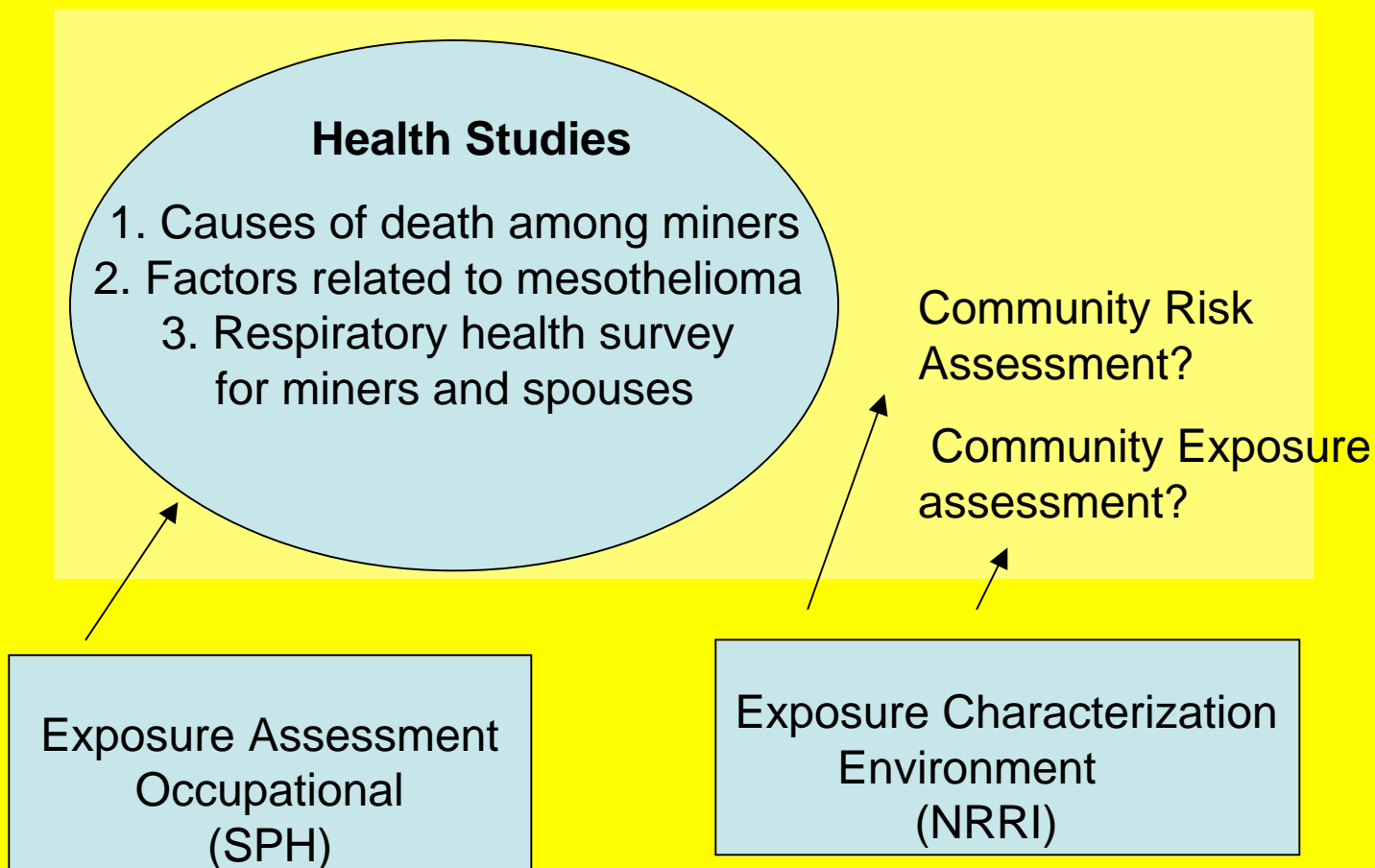
- Exposure sampling at worksites to determine amounts of exposures
- Factors related to mesothelioma study
- Causes of death study
- Respiratory survey (workers and spouses)

2. NRRI will do exposure sampling in communities and along Iron Range to determine insights on types of dusts

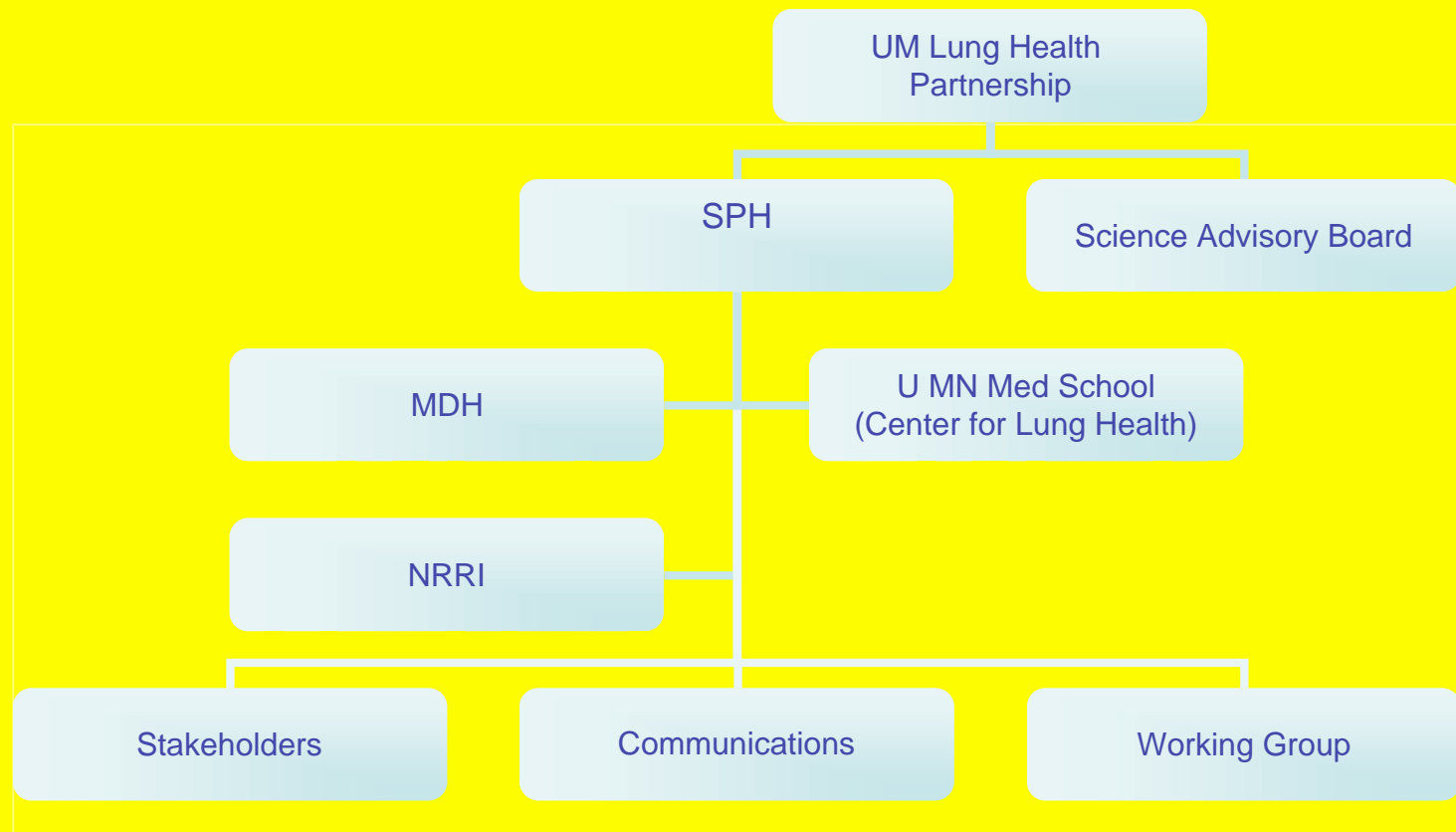


UNIVERSITY OF MINNESOTA  
**Driven to Discover<sup>SM</sup>**

# Scientific Approach



# Administrative Chart



# Questions to Address in Health Studies

- What is the relationship of working in the mining industry to the mesothelioma cases?
- Are other diseases occurring as a result of working in this industry?
- Are spouses at risk for diseases?



# Accomplishments to Date for Health Studies

- Proposal developed for all 5 parts
- Occupational exposure assessment under way:
  - MSHA data base reviewed
  - Dust composition underway
  - Environmental measures being finalized
- Confidentiality agreements finalized for all mining companies



# Accomplishments to Date for Health Studies

- Preliminary meetings with union, retirees, industry
- Tours of mining facilities
- Seminars with professional communities
- Website running
- 800 number/nurse line staffed
- Science Panel formed and input provided





UNIVERSITY OF MINNESOTA  
**Driven to Discover<sup>SM</sup>**

# Community Risk

- Difficult to do this. Need accurate individual exposure information as well as who lived in the communities and when they lived there.
- NRRI will be doing more exposure characterization work which will address what's in the dust



# Community Risk

- We are performing an exposure feasibility study which would tell us what it would take to accurately estimate community exposures
- We are performing a community risk feasibility study which would tell us what we would need to do to address whether there is risk for dust-related disease in the communities



# Health Studies Milestones

## Next Six Months

- Fall, 2008-protocol completion (SPH, NRRI)
  - Start community focus groups (2 months)
  - Epidemiology studies started (files transferred from MDH)
- Winter, 2009-hiring for survey workers/spouses
  - Occupational exposure gathering (18-24 months)
  - Community sampling (NRRI)
  - Community exposure and risk feasibility (SPH)
  - NDI submission (causes of death)
  - Legislative report
- Spring, 2009-respiratory survey starts (6-12 months)



# Taconite Workers Health Study

Studies of Mesothelioma, Other  
Cancers, and Mortality



UNIVERSITY OF MINNESOTA  
**Driven to Discover<sup>SM</sup>**

# Goals

To determine whether dust from taconite industry is related to:

- **Mesothelioma**
- **Lung cancer**
- **Nonmalignant respiratory disease**
- Colon cancer
- Pharyngeal cancer
- Esophageal cancer
- Laryngeal cancer
- Stomach cancer
- Other cancers and causes of death



# Approach

- Link Taconite Study Population to death records
  - Causes of death on death certificate
  - Allows us to broadly evaluate health
- Identify cancers using Minnesota Cancer Surveillance System
  - Cancers diagnosed in Minnesota from 1988 forward (how mesotheliomas were identified)
  - Allows us to ascertain all cancers



# Approach

- Focus on taconite processes
- Determine exposure to fibers, silica, other dust
- Work history records
- Exposure information



# Progress

- Final study population being defined
- Developing protocol for abstracting work history records
- Exploring historical data
- Data use agreements for death certificates and cancer



# Respiratory Health Survey of Taconite Miners and Spouses

---

**Ian A Greaves, MD**  
Division of Environmental Health Sciences  
School of Public Health  
University of Minnesota  
*[igreaves@umn.edu](mailto:igreaves@umn.edu)*



UNIVERSITY OF MINNESOTA

**Driven to Discover<sup>SM</sup>**  
(MPR Photo/Bob Kelleher)

## Primary Questions

1. Is exposure to dust from taconite operations associated with non -cancerous lung diseases in taconite miners and their spouses?
2. Which particles are associated with possible non-cancerous lung diseases and at what levels of exposure?

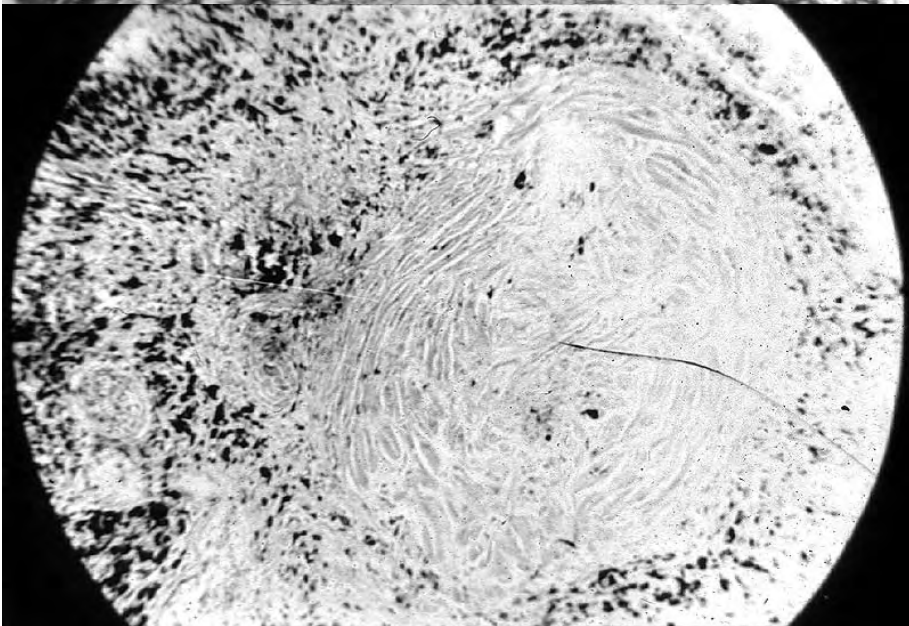
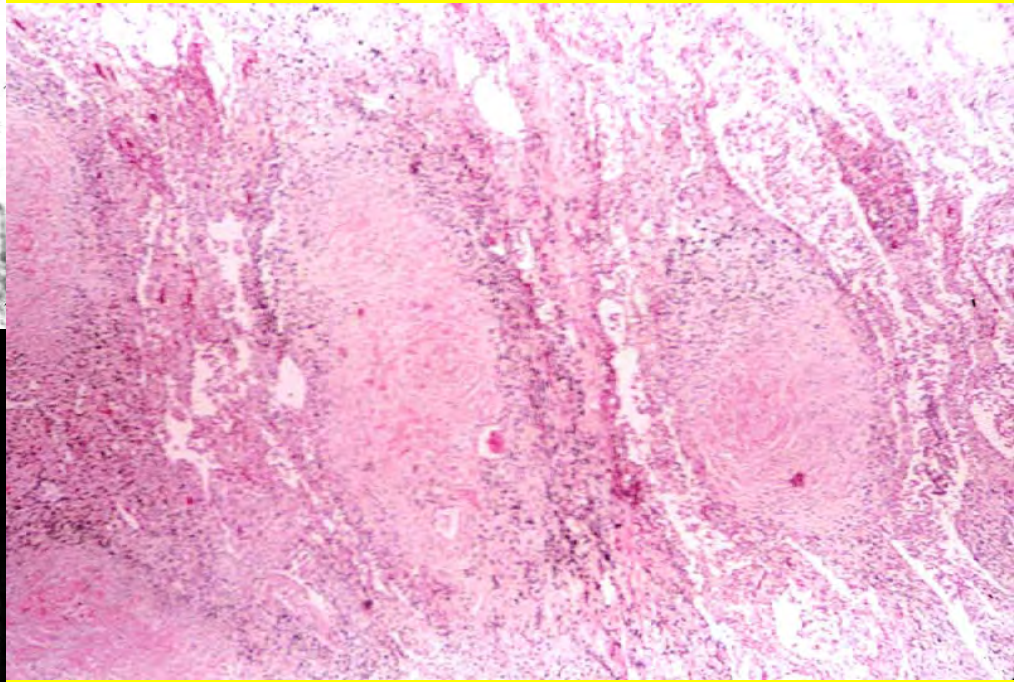
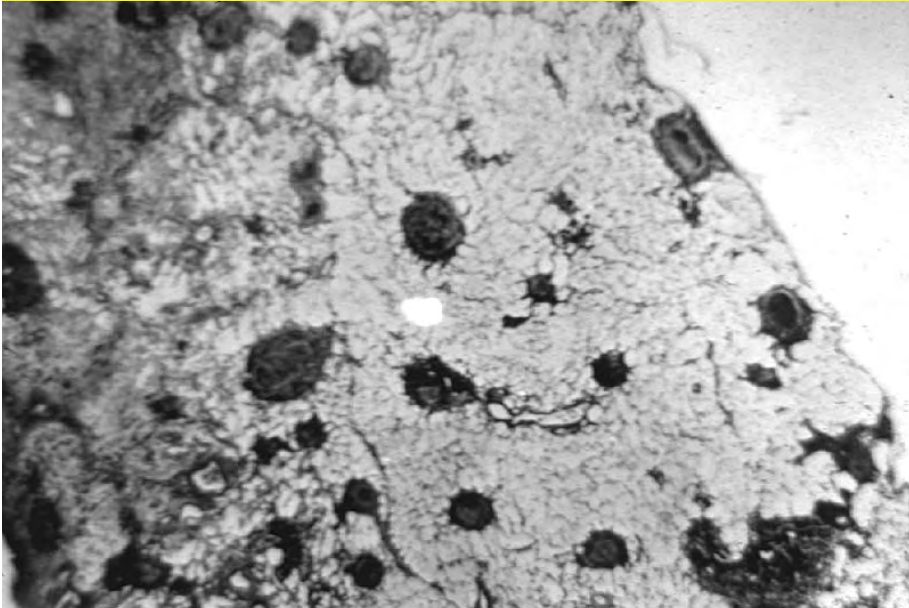


## **Additional Questions**

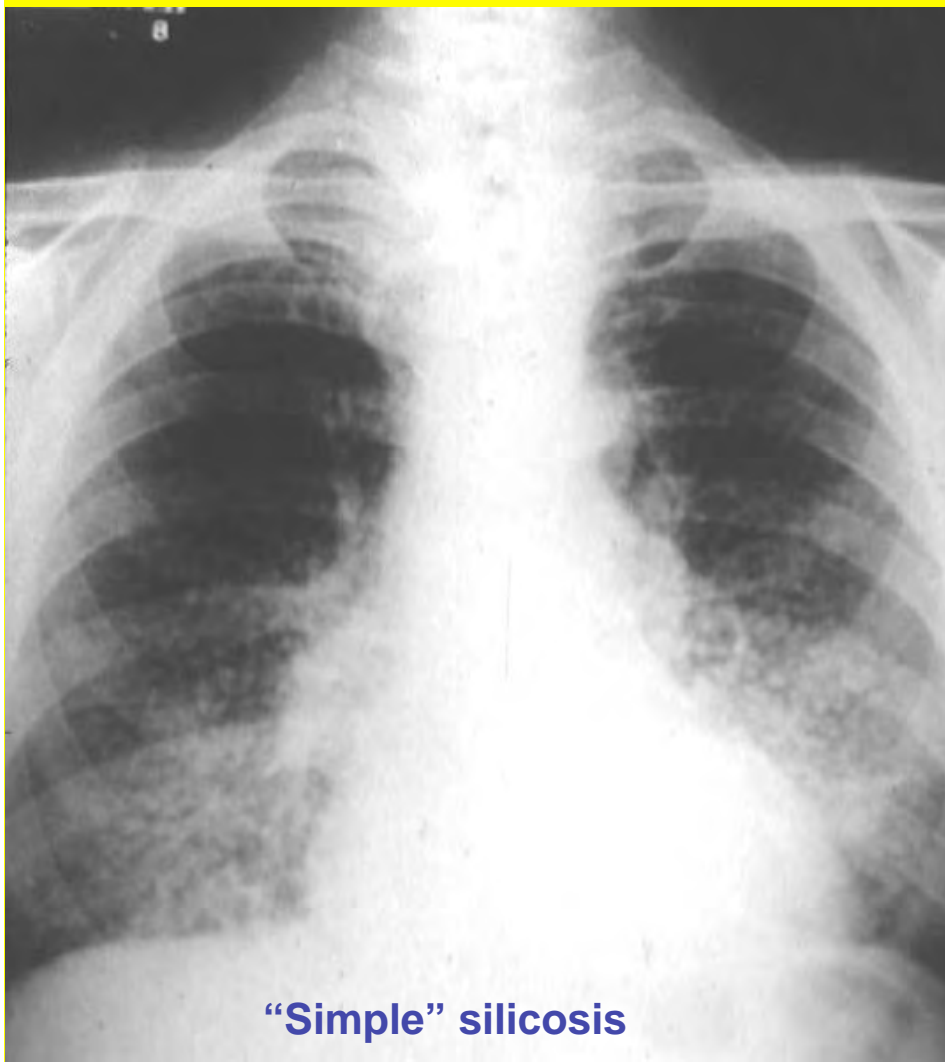
- 1. How do changes on traditional x-ray pictures relate to changes seen on CT scans?**
- 2. What exposure control measures might logically follow from the findings of this investigation?**



# Silicosis

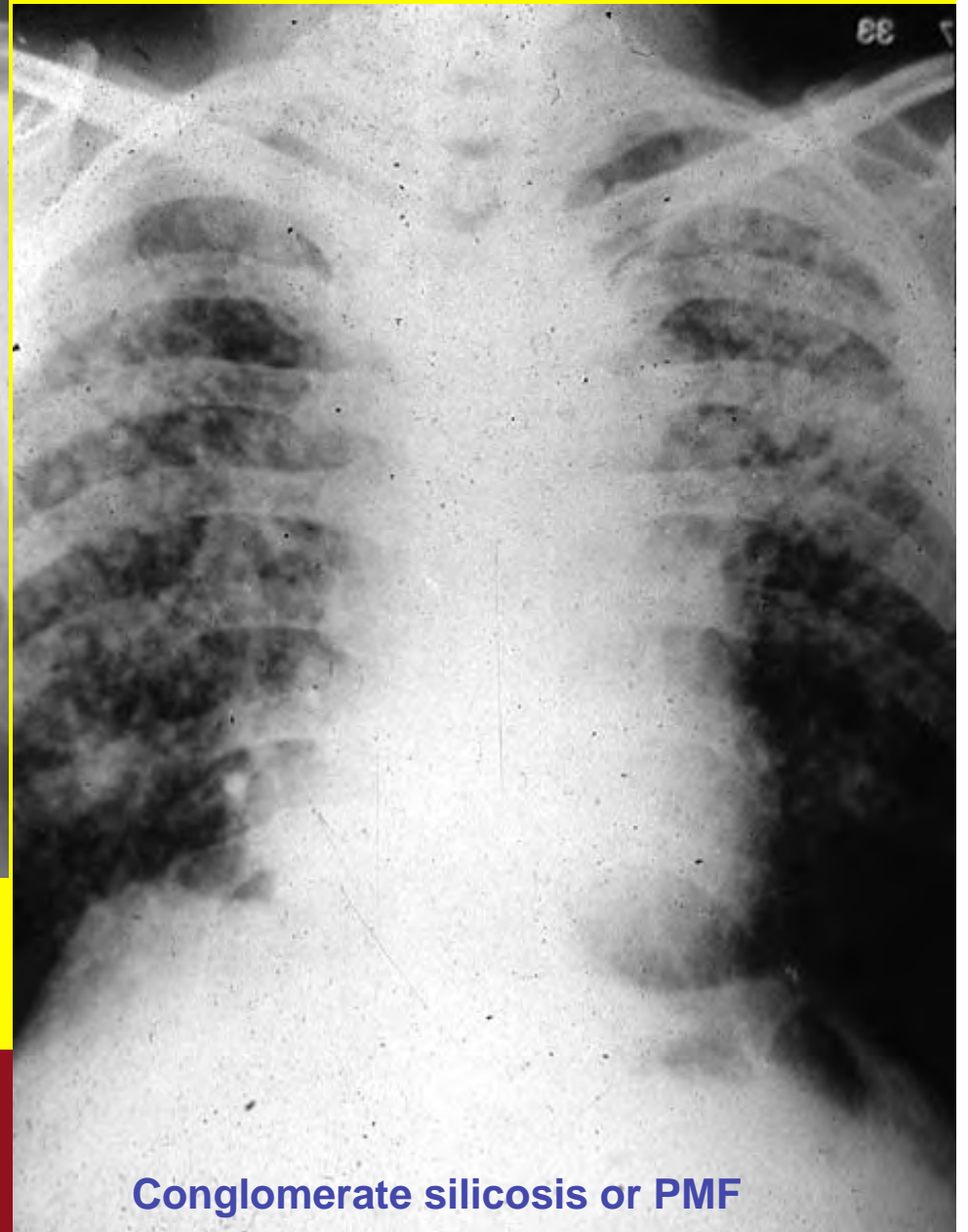


UNIVERSITY OF MINNESOTA  
**Driven to Discover<sup>SM</sup>**

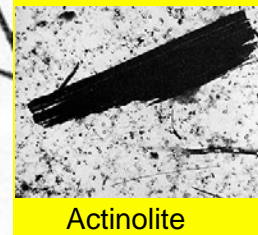
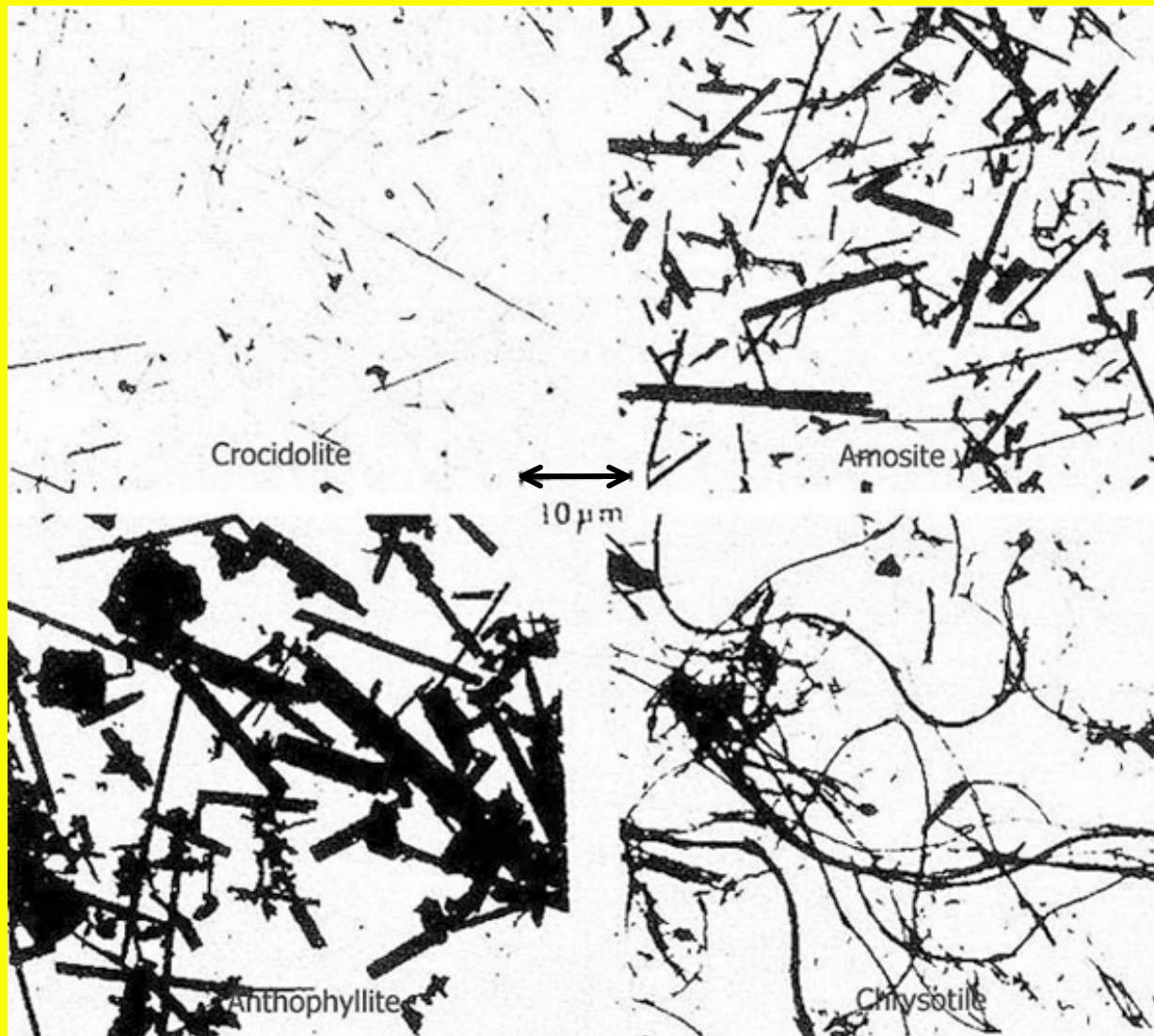


**“Simple” silicosis**

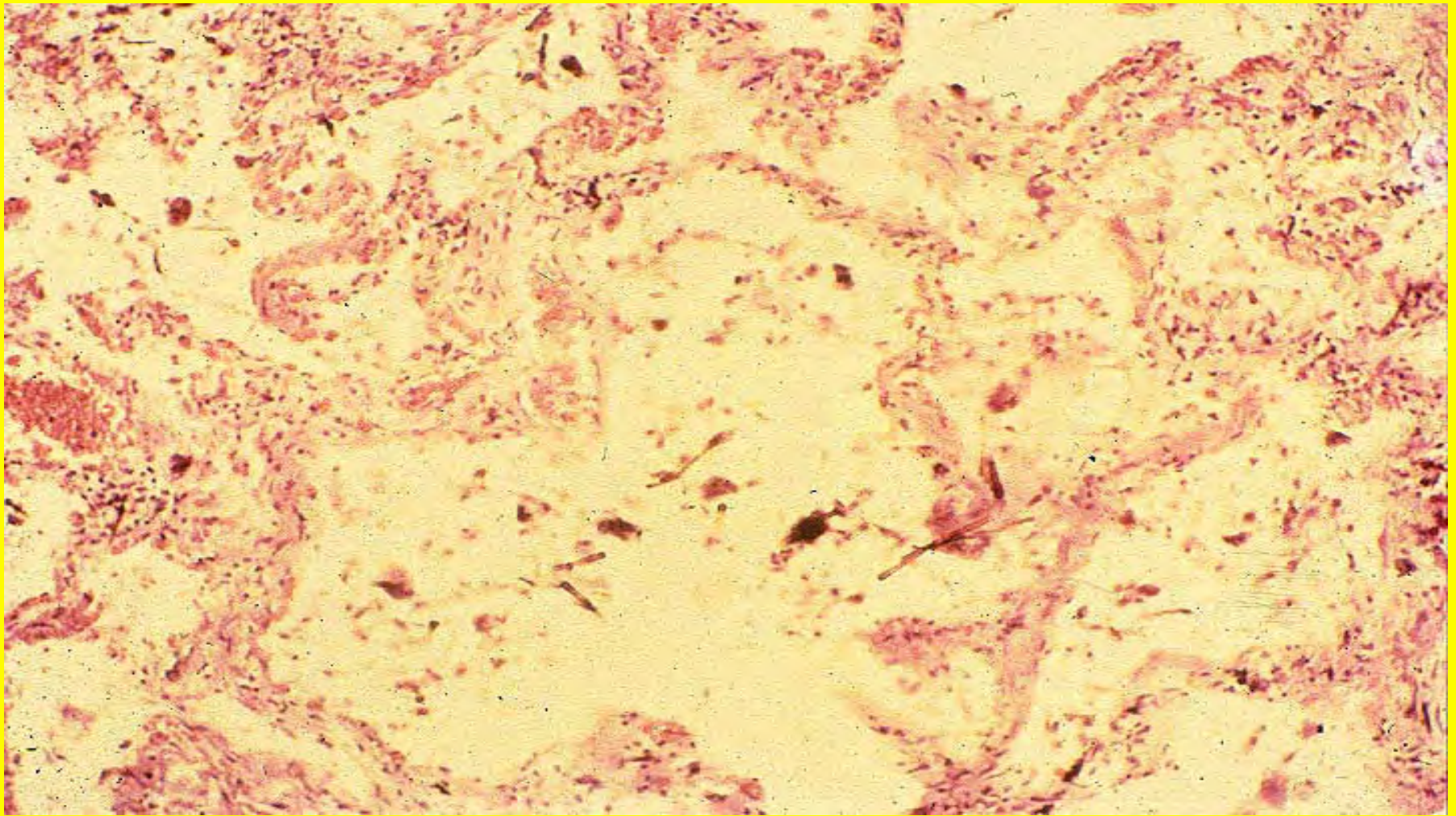
## **Silicosis**



**Conglomerate silicosis or PMF**



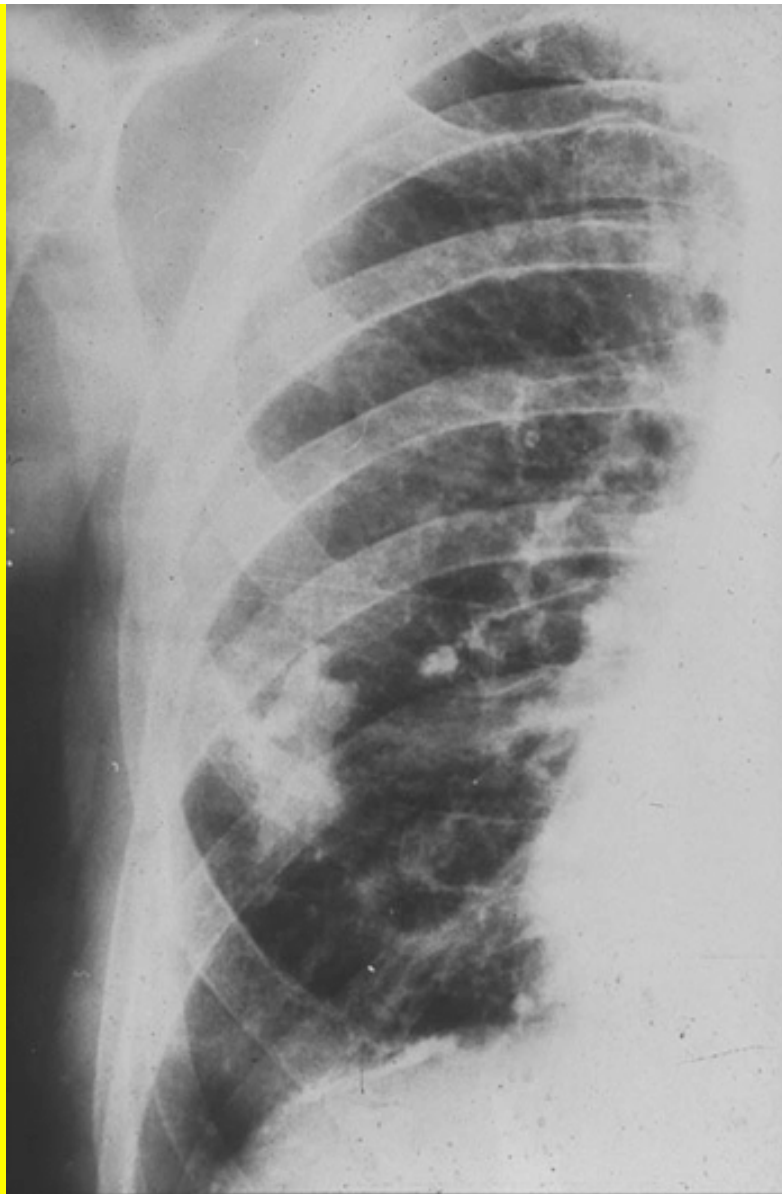
UNIVERSITY OF MINNESOTA  
**Driven to Discover<sup>SM</sup>**



## Mild Asbestosis



UNIVERSITY OF MINNESOTA  
**Driven to Discover<sup>SM</sup>**



UNIVERSITY OF MINNESOTA  
**Driven to Discover<sup>SM</sup>**

# Evaluate 1200 Current and Former Taconite Workers and Their Spouses/Partners (800)

## Why 1200 workers and 800 spouses?

- ✂ Not possible to study everyone
- ✂ Need to obtain a scientifically based sample that reflects the whole group in a meaningful way
- ✂ Calculations indicate that 1200 workers and 800 spouses will provide sufficient information to answer the questions we are asking
- ✂ Selection will be based on:
  - Employment records
  - Present age
  - Period of time in the taconite industry
  - Where worked on the Range



## Selection of Current and Former Taconite Workers

Age, yr	Years worked in taconite operations					Total
	≤10	11-20	21-30	31-40	>40	
35-44	80	80				160
44-54	80	80	80			240
55-64	80	80	80	100		340
65+	80	80	80	100	120	460
Total	320	320	240	200	120	1200



# Examinations Performed (~ 2 hours)

## Questionnaire

- Respiratory health –symptoms, illnesses, medications (ATS -DLD questionnaire)
- Smoking history
- Other illnesses
- Jobs and exposures
- Lived with people who worked with taconite

## Physical examination

- Blood pressure
- Listen to your chest

## Lung Function Tests

- Spirometry (FEV<sub>1</sub>, FVC, flows)
- Single breath diffusing capacity for carbon monoxide (D<sub>L</sub>CO<sub>sb</sub>)

## Chest X-Ray

- Single PA film (B-reader)
- CT-scan (subset of 200 workers)
- Blood sample



# Follow-up

## Notification of results and medical care

- ⌘ Everyone will receive a copy of their results and a brief summary of what they mean within 2 -3 weeks of testing
- ⌘ A copy of the tests will be sent to their local doctor if they wish
- ⌘ If further medical attention is needed, we will provide people with a list of doctors in the area who could help them
- ⌘ The study does not have funds to support treatment of any conditions that may be discovered
- ⌘ For those do not have health insurance, we are exploring whether Minnesota Care may provide coverage for additional care



# What about people who are not selected?

**We are making some alternative arrangements**

- ✧ Started talking with local physicians about the nature of the tests we are performing
- ✧ It is feasible for anyone who wants to get the same set of tests to have them done through a private physician
- ✧ For those do not have health insurance, we are exploring whether Minnesota Care may provide coverage for this testing



UNIVERSITY OF MINNESOTA  
**Driven to Discover<sup>SM</sup>**

# **Update on Taconite Particulate Environmental Project**

**December 18, 2008**



UNIVERSITY OF MINNESOTA  
**Driven to Discover<sup>SM</sup>**

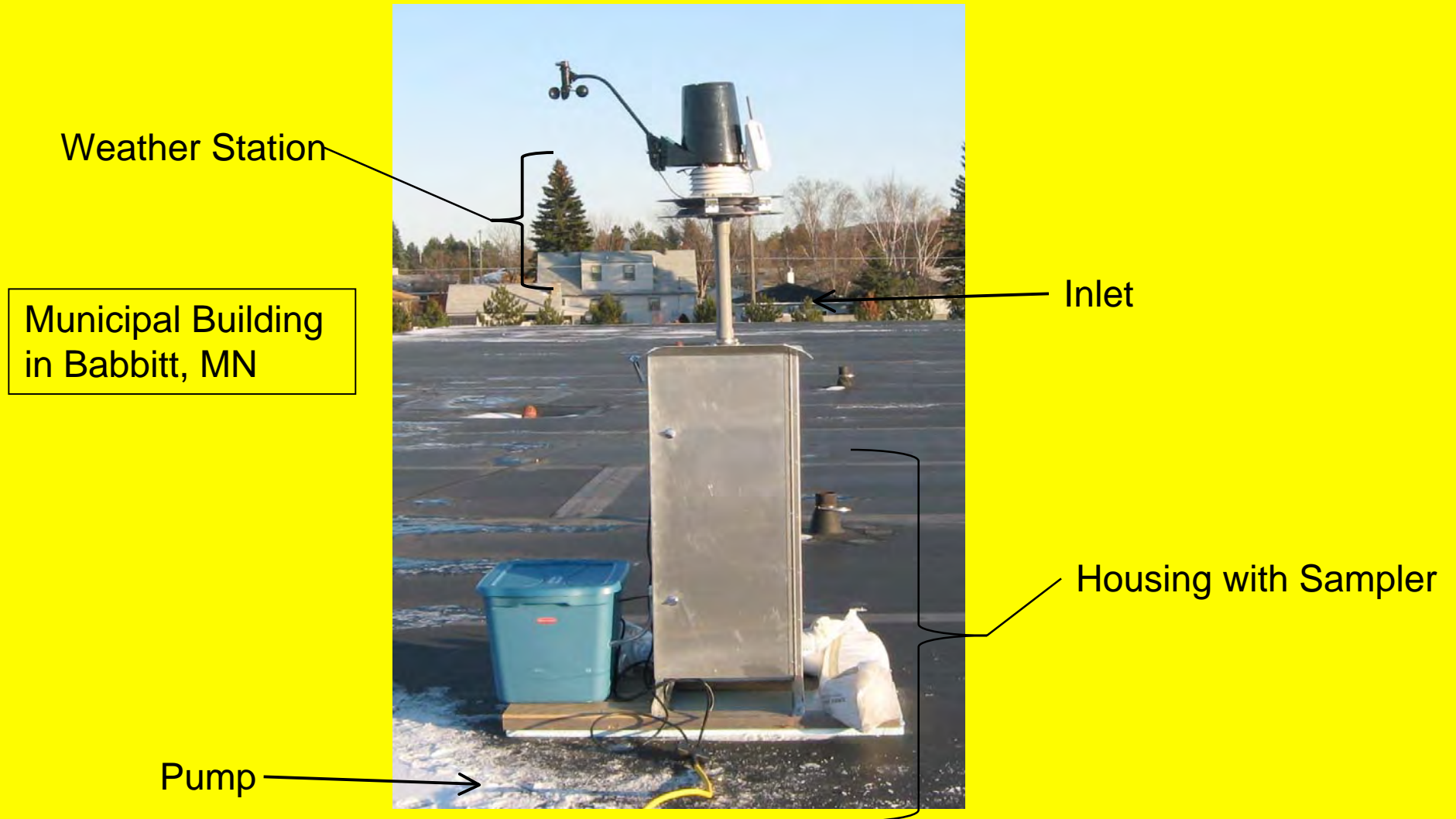
# Scientific Advisory Board Meeting October 2008

- Reviewed draft of work plan and study glossary
- Toured UTAC plant in Forbes and pit in Eveleth; environmental sampling site in Virginia; Peter Mitchell Pit; and overlook at Silver Bay



UNIVERSITY OF MINNESOTA  
**Driven to Discover<sup>SM</sup>**

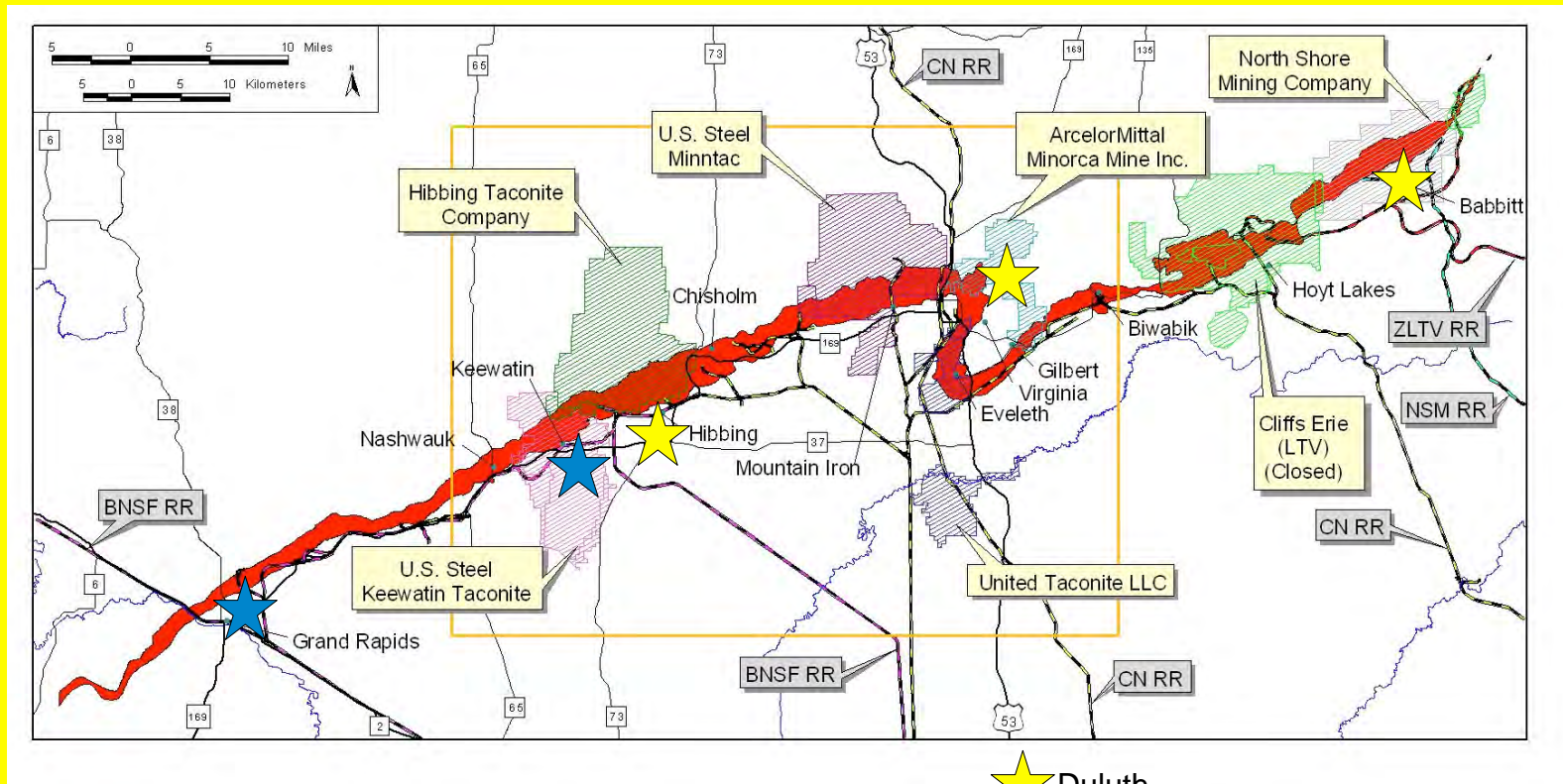
# Environmental Sampling Station



UNIVERSITY OF MINNESOTA  
**Driven to Discover<sup>SM</sup>**

# Sampling Sites

★ Ely



★ Silver Bay

★ Duluth  
↓

★ Sampling has begun at these sites

★ Sampling will begin over winter and spring



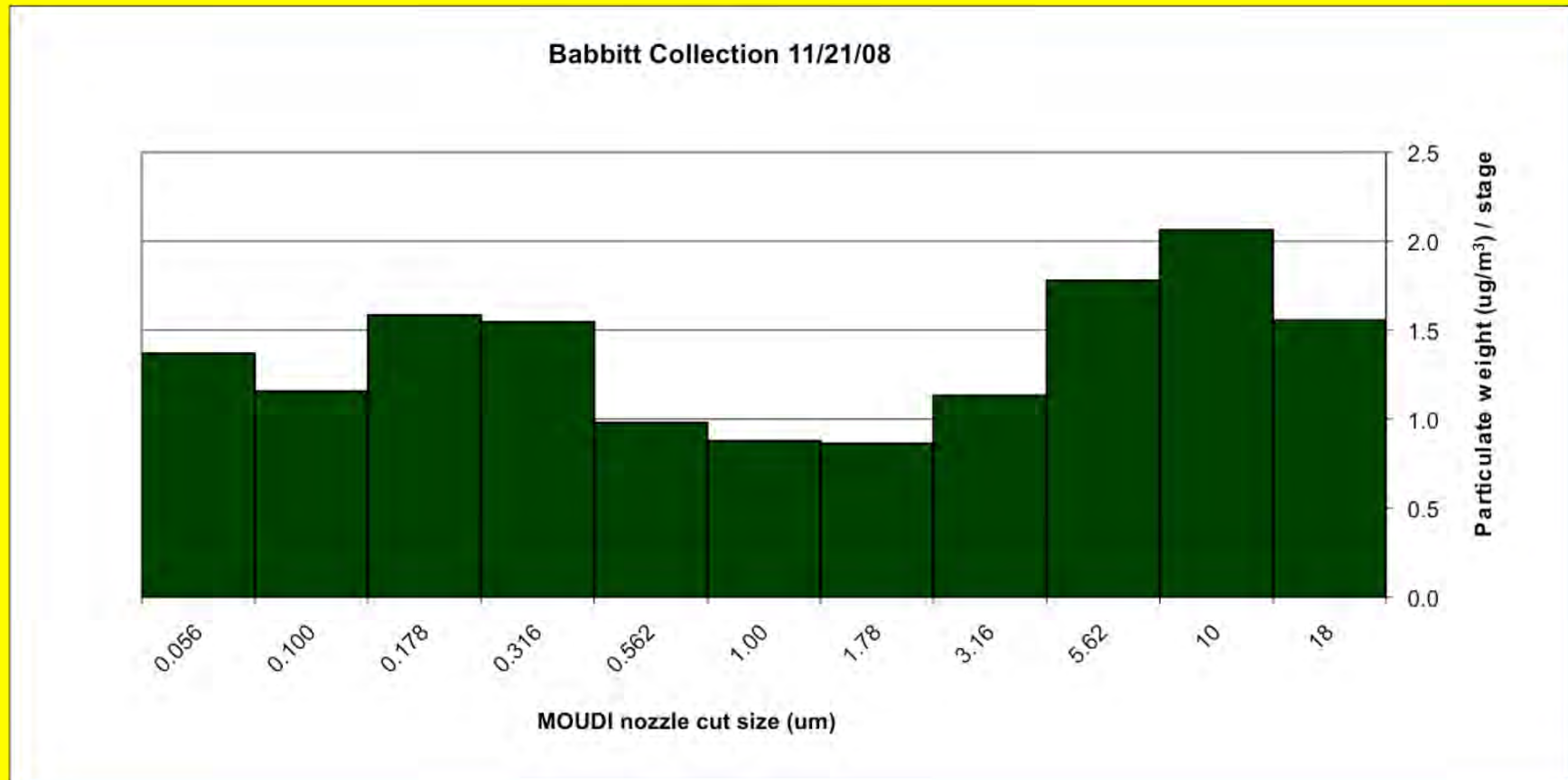
UNIVERSITY OF MINNESOTA  
Driven to Discover<sup>SM</sup>

# Sampling Sites (continued)

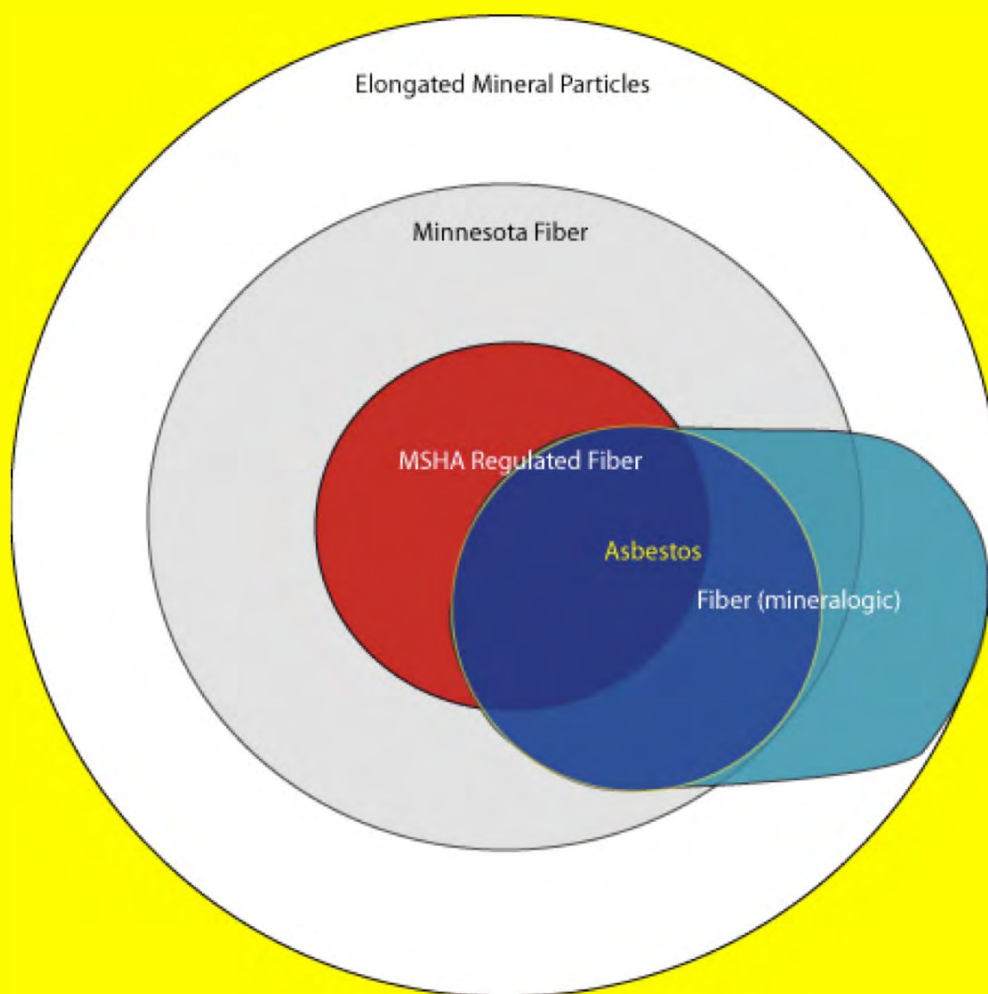
Location	Site
Duluth	NRRI Rooftop
Virginia	City Hall
Hibbing	Hibbing High School
Keewatin	Keewatin Elementary
Grand Rapids	undetermined
Babbitt	Municipal Building
Ely	Fernberg Site (approx. 18 miles NE of Ely)
Silver Bay	William Kelley Elementary School



# Example of Total Particulate and Size Distribution Data



# What is being counted?



**Fiber:** Crystal or polycrystalline aggregate displaying “fibrous” growth habit

**Minnesota Fiber:** Chrysotile and amphibole mineral particles with 3-to-1 or greater aspect ratios

**MSHA-regulated Fiber:** Chrysotile or regulated amphibole particle with an aspect ratio of 3:1 or greater, length of greater than 5 microns and a width greater than 0.25 microns.

**Asbestos:** Asbestiform variety of chrysotile or regulated amphibole mineral.

**Elongated Mineral Particle:** “single crystal or similarly elongated polycrystalline aggregate particle with a length to width ratio of 3 to 1 or greater” (Bruce Vento Ban Asbestos and Prevent Mesothelioma Act of 2007)

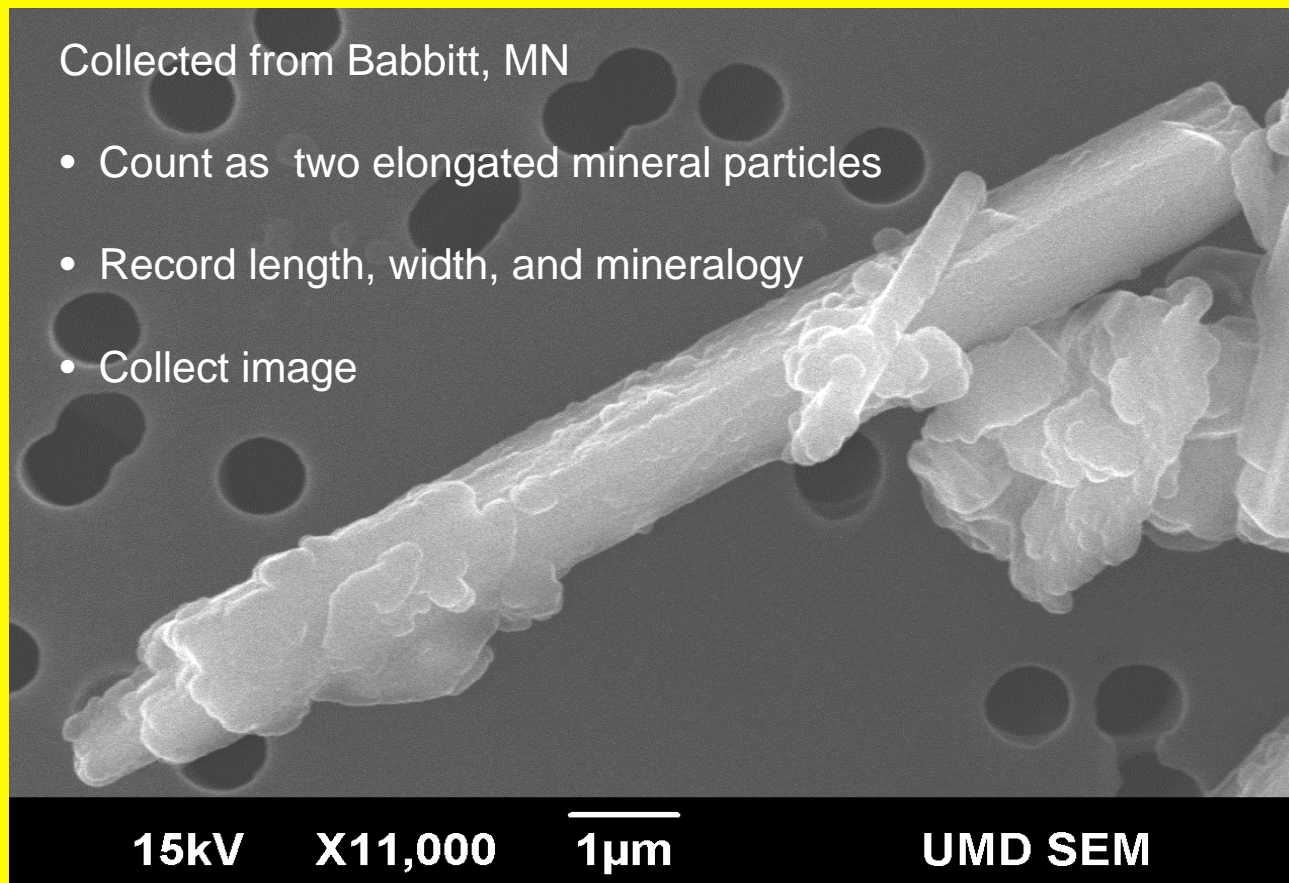


UNIVERSITY OF MINNESOTA  
Driven to Discover<sup>SM</sup>

# Scanning Electron Imaging of Particles

Collected from Babbitt, MN

- Count as two elongated mineral particles
- Record length, width, and mineralogy
- Collect image



UNIVERSITY OF MINNESOTA  
**Driven to Discover<sup>SM</sup>**

# IN CONCLUSION

- Scientific Advisory Board meeting in October which resulted in helpful feedback on project; members visited multiple sites on Iron Range
- Sampling has begun across Iron Range; more sites will continue to be added throughout winter and spring
- Analysis of samples is ongoing



# THANK YOU!



UNIVERSITY OF MINNESOTA  
**Driven to Discover<sup>SM</sup>**

# For more information

- [www.sph.umn.edu/lunghealth](http://www.sph.umn.edu/lunghealth)
- Toll-free Nurse Line: 1-888-840-7590
- E-mail: sphdean@umn.edu



UNIVERSITY OF MINNESOTA  
**Driven to Discover<sup>SM</sup>**