University of Minnesota Taconite Workers Health Study

http://taconiteworkers.umn.edu/

Stakeholder Presentation

March 30, 2010

Agenda

1. Welcome: John Finnegan and Ron Dicklich, Partnership co-chairs
2. Agenda Overview: Jeff Mandel, principal investigator
3. Environmental Exposure Characterization Study: George Hudak, Ph.D., University of Minnesota-Duluth Natural Resources Research Institute
4. Occupational Exposure Assessment: Gurumurthy Ramachandran, Ph.D., University of Minnesota School of Public Health
5. Mortality and Cancer Incidence Studies: Bruce Alexander, Ph.D., University of Minnesota School of Public Health
6. Taconite Worker Respiratory Health Survey: Jeff Mandel, M.D., University of Minnesota School of Public Health
7. Discussion: All Partnership Members

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Environmental Exposure Characterization Study

Natural Resources Research Institute
Environmental Study of Airborne Particulates – 2009 Summary

Community Sampling

Iron Range Communities	Sampling Events	Non-Iron Range Communities	Sampling Events
Silver Bay High School	11	Duluth NRRI Rooftop	5
Virginia Court House	9	Ely Fernberg Site	2
Hibbing High School	9		
Keewatin Elementary School	6		
Babbitt Municipal Building	13		

In-Plant Sampling

Taconite Facility	Sampling Events	Taconite Facility	Sampling Events
United Taconite (Cliffs Natural Resources)	1 active	Keetac (U. S. Steel Corp.)	1 inactive
Hibtac (Cliffs Natural Resources)	1 inactive	Northshore (Cliffs Natural Resources)	1 inactive 1 active

Natural Resources Research Institute
Environmental Study of Airborne Particulates – 2009 Summary

Sample Analysis - Filters

Sample Type	Number
Mineral Fibers in air utilizing MDH 852 TEM Method (Braun Intertec Corp.)	29
Indirect TEM Analyis (EMSL Analytical, Inc.)	39
Proton-induced X-ray Transmission Analysis (Elemental Analysis, Inc)	42
Modified Elutriator Method (EMS Laboratories)	10
Scanning Electron Microscopy / Energy Dispersive Spectroscopy (UMD/NRRI)	11

Lake Sediment Sample Analysis

Lake	General Location	Comments
“North of Snort”	Eastern Mesabi Range	Core has been age dated by Pb^{210} method; samples ready for follow-up analysis
Silver Lake	Central Mesabi Range	Samples currently being age-dated using Pb^{210} method

Natural Resources Research Institute
Environmental Study of Airborne Particulates – 2010

In-Plant Sampling

Taconite Facility	Sampling Events	Taconite Facility	Sampling Events
Minorca (ArcelorMittal)	1 active	Northshore (Cliffs Natural Resources)	1 active

Reports in Preparation

- Quality Assurance Project Plan (QAPP)
- Glossary of Terminology for the Environmental Characterization Study
- Several Standard Operating Procedures (SOPs)

Plans for Second Quarter 2010

- Completion of QAPP, Glossary, SOPs
- Continued in-plant and community sampling
- Completion of community sampling
- Continued lake sediment sampling and age dating
- Continued laboratory analysis of samples
- Initiate preparation of community sampling reports
- Initiate preparation of in-plant sampling reports

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Occupational Exposure Assessment

Exposure Assessment Team

- Dr. Gurumurthy Ramachandran, Ph.D, CIH
  - Industrial Hygiene, Exposure Assessment
- Dr. Peter C. Raynor, Ph.D
  - Industrial Hygiene, Assessment of exposure controls
- Jooyeon Hwang
  - Graduate Student

Goals for Exposure Assessment

1. **Assess historical exposures** of workers to dust from taconite operations and relevant components (asbestos and non-asbestos fibers, respirable dust, and respirable silica).

2. **Assess current exposures** of workers to the dust from taconite operations and relevant components.

3. **Evaluate existing practices and methods** to control worker exposures in this industry.

Assessing Historical Exposures - 1

- Identify all the sources of primary exposure measurements for the time period 1955-present.
  - Mining companies' internal databases–Done
  - Mine Safety and Health Administration - Done.
  - Previous studies conducted by University of Minnesota (mid-1980's) - Done
  - Studies conducted by the Department of Health - Done

Assessing Historical Exposures - 2

- Reconstruct historical exposures of workers for studies of the relationship between exposures and health effects.
  - Available measurements
  - Exposure modeling
  - Interviews with plant personnel and veteran workers
  - Statistical techniques that allow combining these various sources of information in a systematic manner.

Assessing Current Exposures

- **In selected areas/processes within the industry, characterize current exposures of workers to**
  - Fibers (PCM and TEM) - Personal
  - Respirable silica dust (XRD) – Personal
  - Mineralogical analysis of dust samples through certified laboratories – (MOUDI size classifier samples through TEM) - Area
  - Real-time instruments – (Particle number, mass, and surface area concentrations, size distributions) - Area

Assessing Current Exposures

Northshore: February-April 2010 (almost completed)

HibbTac – April-May 2010

MinnTac – June 2010

Keetac – June-July 2010

Minorca – July 2010

Utac – July-August 2010

Assessing Controls in Current Workplaces

- Gather process and work environment information – Ongoing alongside current EA
- Evaluate existing exposure control measures through detailed walkthrough surveys – Ongoing alongside current EA
- Make concrete recommendations, if needed, for improvement of control measures

Timeline

- Evaluating exposure controls: January 2010 – December 2010
- Assessing current exposures: January 2010 – August 2010
- Assessing historical exposures: August 2008 – August 2011

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Mortality and Cancer Incidence Studies

Studies

- Mortality (cause of death) Study
  - Entire cohort
- Cancer Incidence Study
  - Alive as of January 1, 1988
  - Cases reported to Minnesota Cancer Surveillance System

Work History Records

- Converted the historical work history records on microfilm and hard copy to an electronically readable format to aide abstraction.
- Review of historical documents to properly classify work history information.
- Protocol established for abstracting the work history records.
  - Standardized process to abstract records from different mining companies
- Work history records are being abstracted for causes of death of interest

Mortality Records

- Vital status determined
  - Social Security Administration service for epidemiologic studies
- Death record information obtained
  - Minnesota Department of Health
  - National Death Index.
  - Hard copy death certificates being obtained as necessary.
    - Died before 1979 and not in Minnesota
- Underlying and contributing causes being evaluated

Cancer Case Identification

- Final linkage to the Minnesota Cancer Surveillance underway
  - Update number of mesotheliomas
  - Identify other cancers of interest

Summary of Cohort

Status	Year of Birth			Total
	<1920	≥ 1920	Missing	
Alive	525	29,792	0	30,317
Deceased	11,871	12,925	69	24,865
Presumed deceased	4,899	1,424	0	6,323
Unknown/presumed alive	4,989	2,061	182	7,232
Total	22,284	46,202	251	68,737

Next Steps

- Complete abstraction of work history records and update information
- Finalize cause of death identification
- Combine work history information with exposure assessment
- Initial analyses for mortality and cancer

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Taconite Worker Respiratory Health Survey

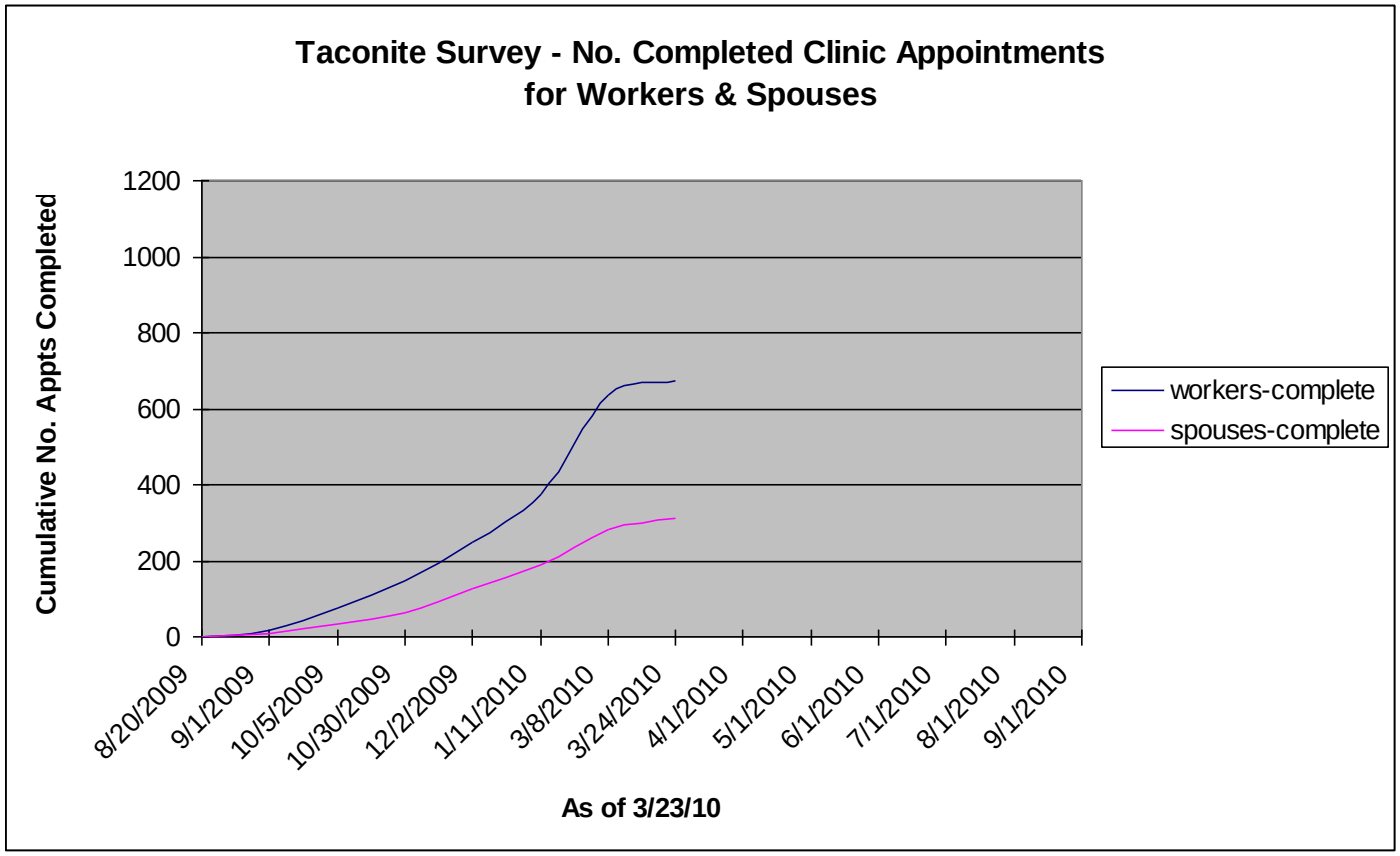
Respiratory Health Survey

- Provides information on lung function and scarring from dusts
- Not done to look for mesothelioma
- Chest x-ray, breathing tests, blood test

Respiratory Health Survey Update

Progress to date

- Good consistency in testing
- Excellent evaluations from participants
- Feedback to participants going smoothly
- B-reading in progress
- Nearing half-way point in terms of numbers of participants


Taconite Survey - No. Completed Clinic Appointments
for Workers & Spouses
Cumulative No. Appts Completed
1200
1000
800
600
400
200
0
8/20/2009
9/1/2009
10/5/2009
10/30/2009
12/2/2009
1/11/2010
3/8/2010
3/24/2010
4/1/2010
5/1/2010
6/1/2010
7/1/2010
8/1/2010
9/1/2010
As of 3/23/10
workers-complete
spouses-complete

Respiratory Health Survey

Needs

- Increased participation all age groups, especially 35-45
- If you received invitation, let us know one way or the other (toll-free number)
- If you receive call, let us know whether you received the invitation and/or whether you have any questions

Respiratory Health Survey

- Toll-free number: 1-888-840-7590
- Website: taconiteworkers.umn.edu