MINNESOTA DEPARTMENT OF HEALTH

MINEWORKER QUESTIONNAIRE

You have been identified by your union or current/former employer as someone who either worked in, supervised or is otherwise knowledgeable about the job listed below.

Job title: Maintenance Mechanic
Company: Jones & Laughlin
Time period of interest: 1935-83

More than 100 job titles from the different mining companies are being studied. Only a small number of these jobs are known to have been held by a person who later developed mesothelioma. The rest of the jobs are not known to be linked to asbestos exposure or mesothelioma. So the fact that we're asking you about a particular job does not necessarily mean that your former job involved exposure to asbestos or that the job is linked to asbestos-related diseases.

Instructions for completion of the questionnaire:

- Please review these questions prior to your interview. You may write down your answers in the space provided. These are the questions that will be asked during your interview.

- Please answer the questions according to your knowledge of the job at the company and in the time period listed above.

- **These questions refer only to the job listed above in reference to commercial asbestos exposure.** Keep in mind that we will be asking about the job as it was in the time period listed – which may be 20 - 40 years ago.

- If you were identified for more than one job, you will have received more than one questionnaire. Please fill out one for each job.

- If you have any questions prior to the interview, please call 1-888-642-8498 for assistance.

MINEWORKER QUESTIONNAIRE

1. Did you… ? *(Check all that apply.)*

- ❑ Work in this job
- ❑ Work with someone else who did this job
- ❑ Supervise someone who did this job
- ❑ Other (*explain*) _____

2. Do you know this job title by any other names? ❑ Yes ❑ No

IF YES:

a. By what other names was this job known?

_____

_____

_____

_____

3. What years did you (work in / work with / supervise) this job and at what facility?

Job title	Years	Facility
EXAMPLE: General laborer	1968-1971	Butler

4. In what location(s) or department(s) did a person with this job usually work?

_____

_____

_____

_____

_____

_____

_____

_____

5. <u>Briefly</u> describe what a person who had this job during this time period would have done on a typical day.

_____

_____

_____

_____

_____

_____

_____

_____

6. Would a person with this job ever have worked with, maintained, tooled, installed, handled or had contact with any of the following items?
Check Yes, No or Unsure for each item.

		Yes	No	Unsure
a.	Brake or clutch linings	❑	❑	❑
b.	Ceiling tiles and panels	❑	❑	❑
c.	Elevator brake shoes	❑	❑	❑
d.	High temperature gaskets	❑	❑	❑
e.	Cement sheets, pipes, or heat-resistant panels (such as Transite)	❑	❑	❑
f.	Fixed heat-source insulation (furnaces, pipes, turbines, boilers, kilns, coolers, duct work, etc.)	❑	❑	❑
g.	Tank insulation and casings	❑	❑	❑
h.	Spray-applied insulation	❑	❑	❑
i.	Blown-in insulation	❑	❑	❑
j.	Breeching insulation	❑	❑	❑
k.	High temperature hot water pipe insulation	❑	❑	❑
l.	Adhesives (mastics) used with tile, carpet or ceiling tile	❑	❑	❑
m.	Spray-applied or trowel-applied refractory	❑	❑	❑
n.	Brick refractory	❑	❑	❑
o.	Raw asbestos	❑	❑	❑
p.	Elevator equipment panels	❑	❑	❑

		Yes	No	Unsure
q.	Electrical cloth	❑	❑	❑
r.	Fire blankets	❑	❑	❑
s.	Fire curtains and draperies	❑	❑	❑
t.	Fireproofing materials	❑	❑	❑
u.	Heat-protective clothing such as gloves, aprons or coats	❑	❑	❑
v.	Asbestos fibers in oil or grease, also known as “bear grease” or “dam babbit”	❑	❑	❑
w.	Joint compounds and/or sheet rock	❑	❑	❑
x.	Heating and electrical ducts	❑	❑	❑
y.	Fabric duct connections	❑	❑	❑
z.	Heat-protective mats	❑	❑	❑
aa.	Packing materials, such as pump packing	❑	❑	❑
bb.	Heat-resistant plastic parts, such as Bakelite	❑	❑	❑
cc.	Roofing shingles	❑	❑	❑
dd.	Roofing felt	❑	❑	❑
ee.	Thermal taping compounds	❑	❑	❑
ff.	High temperature wiring	❑	❑	❑
gg.	Other_____	❑	❑	❑

7. Would a person with this job ever have been involved in any of the following work situations?

Check Yes, No or Unsure for each item.

	Yes	No	Unsure
a. Asbestos spraying, application, removal or maintenance of fixed heat-source insulation (furnaces, pipes, turbines, boilers, kiln, cooler, duct work, etc.)?	❑	❑	❑
b. Machining, maintaining or repairing manufactured products containing asbestos (not including sprayed asbestos and fixed heat-source insulation)?	❑	❑	❑
c. Demolition of installations containing asbestos?	❑	❑	❑
d. Warehousing of asbestos products or asbestos in bulk?	❑	❑	❑
e. Emergency maintenance or repairs?	❑	❑	❑

If you answered "Yes" or "Unsure" to ANY items in question #6 or #7, then go to question #8 on page 5.

If you answered "No" to all items in questions #6 and #7, then go to question #9 on page 6.

8. Would a person doing this job ever have worked with commercial asbestos-containing materials in a way that caused the fibers to go into the air? ❑ Yes ❑ No ❑ Unsure

For example, would this person have sprayed asbestos insulation, swept asbestos-containing material or used compressed air in their work?

IF YES, answer a, b and c below:

a. What specific tasks did they do that would have caused the asbestos to become airborne?

_____

_____

_____

_____

_____

_____

b. Describe the location(s) in which they would have done these tasks.

_____

_____

_____

_____

_____

_____

c. How often do you think a person doing this job would have been exposed to asbestos during regular work hours? *(Check one.)*

❑ Daily ❑ Weekly ❑ Monthly

❑ Annually ❑ Other (*specify*)_____

Please continue with question #9 on the next page.

9. Would a person doing this job ever have worked around or near asbestos-containing materials but not have had direct contact with these materials? ❑ Yes ❑ No ❑ Unsure

For example, would they have worked around refractory material or near pipes that had intact asbestos insulation surrounding them?

IF YES:

a. Specifically what asbestos-containing materials would they have worked around? *Please refer to list in question #6 on page 3.*

_____

_____

_____

_____

_____

10. Would a person doing this job ever have worked around <u>others</u> who were using asbestos-containing materials? ❑ Yes ❑ No ❑ Unsure

For example, would they have worked near people who were repairing or removing asbestos insulation from equipment or piping, opening bags of asbestos, or jack hammering asbestos-containing material?

IF YES:

a. Specifically what kinds of activities would other workers have been doing?

_____

_____

_____

_____

_____

11. Do you think your experience with this job was the same as what the average person with this job in this location experienced? ❑ Yes ❑ No ❑ Unsure

12. Would a person doing this job ever have been exposed to asbestos-containing materials during <u>scheduled maintenance repair or shutdowns</u>? ❑ Yes ❑ No ❑ Unsure

IF YES or UNSURE, answer a-f below:

a. What tasks would a person with this job have performed during scheduled maintenance repair or shutdowns?

_____

_____

_____

_____

b. In what location would they have worked during scheduled maintenance repair or shutdowns?

_____

_____

_____

c. What kinds of asbestos-containing materials did they work with?
Please refer to list in question #6 on page 3.

_____

_____

_____

_____

d. Would they ever have worked around <u>others</u> who were using asbestos-containing materials during scheduled maintenance repair or shutdowns? *If yes, please explain.*

_____

_____

_____

e. How often did scheduled maintenance repair or shutdowns take place at this company? *(Check one.)*

❑ Once per year ❑ Twice per year ❑ Other (specify)_____

f. How many weeks did scheduled maintenance repair or shutdowns last?

☐ week(s)

13. Do you think your experience with this job during shutdowns was the same as what the average person with this job experienced during shutdowns? ❑ Yes ❑ No ❑ Unsure

14. Can you think of any other tasks or situations a person with this job would have been involved in that could have had the potential for exposure to commercial asbestos? ❑ Yes ❑ No ❑ Unsure

IF YES:

a. Please describe these other tasks or situations.

_____

_____

_____

_____

_____

15. Do you have any other comments about this job?

_____

_____

_____

_____

_____

16. May we call you back if we have further questions about this job? ❑ Yes ❑ No

THANK YOU FOR YOUR ASSISTANCE WITH THIS PROJECT.

An interviewer from the Minnesota Department of Health will call in two weeks

OCCUPATIONAL ASBESTOS EXPOSURE ASSESSMENT WORKSHEET

Job Title:	Department:
Company:	Period Job Classification Existed:

	Comments:
Regular Exposures Check all that apply and describe task(s) for the checked categories: ❑ Present, no contact ❑ Present, disturbed by others ❑ Present, disturbed by self ❑ Unknown	
Shutdown Exposures Check all that apply and describe task(s) for the checked categories: ❑ Present, no contact ❑ Present, disturbed by others ❑ Present, disturbed by self ❑ Unknown ❑ Not involved in shutdowns	
Presumed Asbestos Containing Material (PACM) Check all that apply on attached list of PACM.	
Exposure Frequency ❑ Daily ❑ Weekly ❑ Unknown ❑ Monthly ❑ Other ❑ Annually	
Asbestos Abatement Data Describe asbestos abatement projects relevant to this job/company.	
Exposure to Respirable Commercial Asbestos in this Job? ❑ No ❑ Unknown ❑ Yes: **Intensity**	

		High	Low
Likelihood	High		
	Low		

Minnesota Department of Health
Mesothelioma/Exposure Study

Occupational Asbestos Exposure Assessment Form

Panelists: **Date:** _____

Company _____

Labor _____

Other _____

Job under review:

Company:
Job Title:
Department:

Panel decision regarding exposure to commercial asbestos in this job:

REGULAR JOB:

❑ **Exposed**

Likelihood \ Intensity	HIGH	LOW
HIGH		
LOW		

❑ **Not exposed**

❑ **Unknown exposure**

SHUTDOWN JOB:

❑ **Exposed**

Likelihood \ Intensity	HIGH	LOW
HIGH		
LOW		

❑ **Not exposed**

❑ **Unknown exposure**

❑ **Panel unable to agree** (document at bottom of page)

Comments: (relating to any of the above exposure categories)

_____
_____
_____
_____
_____
_____

Panel disagreements: (continue on reverse if necessary)

_____
_____
_____
_____
_____

RESOURCES FOR MORE INFORMATION ABOUT ASBESTOS

Minnesota Department of Health
-licenses and certifies professionals performing asbestos work
651-215-5800
Asbestos Unit: 651-215-0900
www.health.state.mn.us/divs/eh/asbestos/index.html

Minnesota Pollution Control Agency
-regulates emissions of asbestos to the environment
520 Lafayette Road
St. Paul, MN 55155-4194
651-296-7300
1-800-657-3864
Asbestos Hotline: 651-297-8685
www.pca.state.mn.us/hot/asbestos.html

Minnesota Department of Labor and Industry
-regulates worker exposures to asbestos
Occupational Safety and Health Division
443 Lafayette Road N.
St. Paul, MN 55155-4307
(651) 296-6107
1-800-DIAL-DLI (1-800-342-5354)
www.doli.state.mn.us

Mine Safety and Health Administration
Office of Information and Public Affairs
Room 627
4015 Wilson Boulevard
Arlington, VA 22203
203-235-1452
www.msha.gov/asbestos/asbestos.html

Occupational Safety and Health Administration (OSHA)
Dept. of Labor
Room 3647
200 Constitution Ave., NW
Washington, DC 20210
202-693-1999
1-800-321-6742
www.osha.gov/SLTC/asbestos/index.html

National Institute for Occupational Safety and Health
Office of Information
Robert A. Taft Laboratories
Mailstop C-19
4676 Columbia Parkway
Cincinnati, OH 45226-1998
www.cdc.gov/niosh/asbestos

U.S. Environmental Protection Agency
Toxic Substances Control Act (TSCA) Assistance Information Service
U.S. EPA
Mailcode 7408
401 M Street, SW
Washington, DC 20460
202-554-1404
www.epa.gov/asbestos/index.htm

Agency for Toxic Substances and Disease Registry (ATSDR)
Division of Toxicology
Mailstop E-29
1600 Clifton Road, NE
Atlanta, GA 30333
404-498-0110
1-888-422-8737
www.atsdr.cdc.gov/tfacts61.html

Consumer Product Safety Commission
Office of Information and Public Affairs
4330 East-West Highway
Bethesda, MD 20814-4408
1-800-638-2772
TTY 1-800-638-8270
www.cpsc.gov/cpscpub/pubs/453.html

National Cancer Institute (UK)
"Q&A: Asbestos Exposure"
www.cancerweb.ncl.ac.uk/cancernet

Chronology of the Minnesota Department of Health's Involvement in Respiratory Disease Issues in Northeastern Minnesota, 1985 to Present

1985 Virginia, Minnesota physician reports possible lung abnormalities
- Concern about generalized environmental contamination
- National panel (Range Studies Advisory Committee) assembled
- Panel recommendations include:
  - occupational studies
  - x-rays of Iron Range workers
  - development of statewide cancer registry (Minnesota Cancer Surveillance System established in 1988)

1988-89 Medical screening of Conwed (Cloquet) workers and spouses as required by 1988 Session Law
- Lung abnormalities found in 19% of male workers
- Excess of asbestos-related cancer found
- Statewide occupational surveillance system recommended by MDH

1989-94 Identification, tracing and notification of former Conwed (Cloquet) workers who had possible asbestos exposure
- Tracing and notification required by legislature
- Identification of nearly 6,000 former workers
- Nearly 5,000 workers notified of their health risks
- Evaluation of usefulness of high-risk worker notification

1991 Proposal for occupational health surveillance system developed by MDH
- Focus on lung diseases
- Funding requested from private and government sources
- No funding available for implementation

1992-93 Concern about cancer incidence (lung cancer and mesothelioma) raised by retired miners and IRRRB
- Resulted in recommendation that statewide respiratory disease information system be pilot-tested in northeastern Minnesota
- Proposal not funded

1994 Occupational health study of taconite miners proposed by MDH
- Per request of mining company
- Proposal not funded

1997 Minnesota Cancer Surveillance System (MCSS) reports 70% excess of mesothelioma in men in northeastern Minnesota

1998-2001 Legislature approves funding of Occupational Respiratory Disease Information System (ORDIS)
- Northeastern Minnesota Advisory Work Group assembled
- Pilot-testing of ORDIS in northeastern Minnesota
- Job histories of iron miners who developed mesothelioma are studied

2003 Release of final report on mesothelioma in northeastern Minnesota iron miners

GLOSSARY

Asbestos – a group of naturally-occurring minerals that exist as masses of small fibers. These fibers are heat-resistant and very strong, and are usually invisible to the naked eye.

Asbestosis – scarring of the lungs due to prolonged exposure to high levels of asbestos. Asbestosis can have a latency period of 15 or more years.

Cohort – a group of people with something in common, such as an occupation. For example, the Conwed cohort consists of people who were employed by the Conwed plant in Cloquet.

Concentrator – the building in which the concentrating part of taconite processing takes place.

Crusher – machine used in the processing of taconite that crushes the rock into smaller pieces.

Latency period – the time between exposure to asbestos or any other disease-causing agent and the appearance of disease symptoms. For example, if a worker was first exposed to asbestos in 1950 and was diagnosed with asbestosis in 1987, the latency period would be 17 years. The latency period for asbestos-related diseases ranges from 15 years for asbestosis to 20 years or more for lung cancer and mesothelioma.

Mesothelioma – a rare cancer of the lining of the lung or abdomen. Its primary cause is exposure to asbestos. Mesothelioma generally has a latency period of 20 or more years.

Shutdowns – scheduled periods (often weeks) when regular processing at a mining operation stops so that equipment can be retooled or maintained. Workers may change jobs or even move to a different facility to perform shutdown duties.

Appendix F. Mesothelioma in Northeastern Minnesota: 1988-1999

The MDH first documented the rates of mesothelioma and other cancers in Northeastern Minnesota in a 1997 report (MCSS, 1997). This analysis showed that overall cancer rates in Northeastern Minnesota were virtually identical to statewide rates. For several specific types of cancer, some differences were observed, typical of almost all such geographic comparisons of cancer rates. However, a large and significant elevation was found for mesothelioma – a rare cancer that typically occurs several decades after exposure to asbestos. These findings were confirmed in a 1999 analysis that included two additional years of cancer data (MCSS, 1999). Between 1988 and 1996, 54 cases of mesothelioma were diagnosed among men in northeastern Minnesota. This was 73% higher than the expected number of cases (31) based on the statewide average and the population of the region. Mesothelioma rates were not elevated among women (3 cases, 8 expected).

This report provides another update on mesothelioma and other cancer rates in Northeastern Minnesota incorporating three additional years of cancer data. Table F-1 contains the number of newly occurring cancers compared to the number expected based on statewide cancer rates for the 12-year period 1988 through 1999. This analysis again finds that overall cancer rates in NE Minnesota are comparable to the statewide averages, with the expected variability for specific types of cancer. For both sexes combined, 20,755 new cases of cancer were found among NE Minnesota residents, a rate identical to the statewide average. Again, this analysis finds a large and significant elevation in the rate of mesotheliomas among men, but not among women. During the 12-year period, 81 men were diagnosed with mesothelioma while 45 cases would have been typical, representing an 81% excess. Among women, 10 new cases of mesothelioma were diagnosed, while 11 would have been expected. Figure F-1 shows mesotheliomas rates for all Minnesota counties in which cases were diagnosed for the period 1988-1996. [1]

[1] As the final draft of this report neared completion MCSS data for 2000 and 2001 became available. During the period 1988-2001 99 men in Northeastern Minnesota were diagnosed with mesothelioma while 50 would have been expected, a 100% excess. Among women 10 mesotheliomas occurred and 12 would have been expected.

Apparent excesses and deficits of specific cancers over specific time periods, geographic regions, age groups, or other groupings are quite common and easily identified. These differences, although sometimes very alarming to the public, very rarely represent situations requiring further investigation (Bender et al., 1990; Williams, 1998). The finding of almost a two-fold elevation of mesothelioma among men in this report and previous reports represents a very different scenario than the usual (and expected) statistical variability in cancer rates in small populations.

Several factors point to a true increased risk of mesothelioma in this population with a likely causal agent. First, mesothelioma is a very rare cancer. Second, the primary cause of mesothelioma is: exposure to asbestos. Most (but not all) people with mesothelioma have an identifiable history of exposure to asbestos that occurred several decades prior to diagnosis. Third, the excess is only evident in men, strongly suggesting workplace exposures. Men are much more likely historically to be employed in industries and occupations with potential asbestos exposure. Many types of industries and occupations have been shown to have elevated rates of mesothelioma or other specific cancers. Fourth, the excess is persistent and possibly increasing as additional years of cancer data have been analyzed. Fifth, large numbers of people in northeastern Minnesota were employed during the 1950s through the 1970s in industries and occupations in which exposure to commercial asbestos was likely or possible. At least two industries are unique to that part of the state.

The former Conwed Corporation plant in Carlton County used vast quantities of commercial asbestos in the manufacturing of ceiling tiles during the period 1958-1974. Over 5,000 people were employed at that plant during those years. A medical screening study in 1988 of 1552 workers and spouses of workers showed a significant rate of asbestos-related abnormalities (few abnormalities were found among spouses of workers). From 1988 through 1996, 11 former workers who were still residing in Minnesota were diagnosed with mesothelioma. Nine of the 11 resided in northeastern Minnesota at the time of diagnosis, thus contributing to the excess. As shown in Figure F-1, Carlton County had the highest rate of mesothelioma in the state. If Carlton County

is excluded from the analysis for northeastern Minnesota, over a 60% excess of mesothelioma remains among men.

The iron mining industry has been a major employer in northeastern Minnesota for many decades. According to census data for 1960, 14% of employed workers in the seven-county northeast region were employed in the mining industry. In two of the counties, over 25% of workers were employed in mining. Statewide, only 0.2% of workers were employed in mining. As described elsewhere in this report, over 70,000 people were identified as current or former iron mining employees through a study by University of Minnesota researchers in the early 1980s. As documented in this report, a variety of job titles in the iron mining industry would have conferred probable or possible exposure to commercial asbestos.

This study identified 17 iron miners who were diagnosed with mesothelioma between 1988 and 1996 who still resided in Minnesota. Fourteen of the 17 were diagnosed in northeastern Minnesota and thus contributed to the excess. However, not all of these workers had obvious exposures to asbestos based on their job titles, and two also worked at Conwed. Removing the miners who had also worked at Conwed, Conwed and the mining industry are associated with 21 of the 23 excess cases of mesothelioma (there were 54 observed cases, for an excess of 23 cases over the expected number of 31).

These data suggest that previous employment at Conwed and in the iron mining industry largely accounts for the excess of mesothelioma in NE Minnesota. The extent to which other industries specific to that region of the state could also contribute to the excess was beyond the scope of this study. That would have required interviews with families of all mesothelioma cases in northeastern Minnesota to obtain complete occupational histories

Due to the long latency between asbestos exposure and the risk of mesothelioma, mesothelioma rates in men are likely to remain elevated for years to come. Mesothelioma cases that are occurring now are the result of exposures that probably took place several decades ago, often prior to the regulation of asbestos exposures. The

Conwed plant used asbestos in its manufacturing processes until 1974, so cases of mesothelioma due to these exposures would be possible for another 20 years.

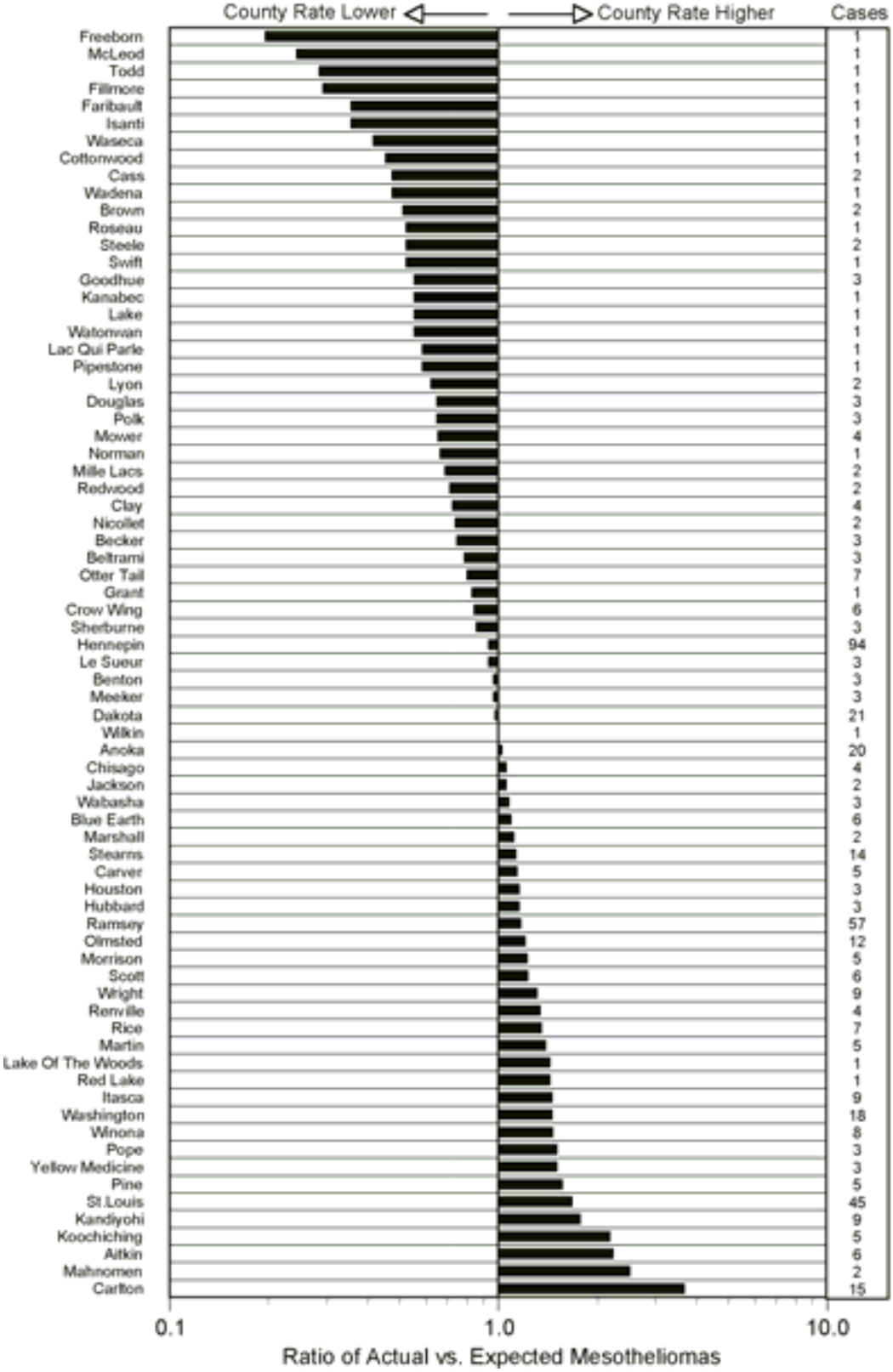
Table F-1. Actual and Expected[1] New Cancers Diagnosed Among Residents in Northeastern[2] Minnesota, 1988-1999.

	Males			*Females*		
Cancer	Actual Cases	Expected Cases	Ratio of Actual to Expected	Actual Cases	Expected Cases	Ratio of Actual to Expected
Oral Cavity	358	358	1.00	171	168	1.02
Esophagus	174	139	1.25	64	45	1.42
Stomach	234	210	1.12	136	113	1.21
Colon	954	932	1.02	968	992	0.98
Rectum	411	389	1.06	267	277	0.96
Liver	67	79	0.85	40	41	0.98
Pancreas	183	196	0.93	207	173	1.20
Larynx	176	148	1.19	39	31	1.26
Lung And Bronchus	1,619	1,543	1.05	1,131	1,002	1.13
Mesothelioma	81	45	1.81	10	11	0.90
Soft Tissues	68	71	0.96	63	55	1.14
Melanomas of Skin	277	313	0.89	259	257	1.01
Breast	18	19	0.95	3,133	3,075	1.02
Cervix Uteri	-	-	-	178	168	1.06
Corpus Uteri	-	-	-	701	616	1.14
Ovary	-	-	-	426	394	1.08
Prostate	3,259	3,725	0.87	-	-	-
Testis	103	107	0.96	-	-	-
Urinary Bladder	757	739	1.02	261	253	1.03
Kidney And Renal Pelvis	282	320	0.88	155	185	0.84
Brain	143	151	0.95	108	113	0.96
Thyroid Gland	76	64	1.19	123	154	0.80
Hodgkin's Disease	57	66	0.86	43	54	0.80
Non-Hodgkin's Lymphomas	495	472	1.05	430	414	1.04
Multiple Myelomas	130	131	0.99	92	105	0.88
Leukemias	326	349	0.93	264	251	1.05
All Cancers	10,850	11,120	0.98	9,905	9,553	1.04

[1]The "expected" number of cancers represents the number of cancers that would have occurred in the region assuming its rates were identical to the statewide average.

[2]Defined as the following seven counties: Aitkin, Carlton, Cook, Itasca, Koochiching, Lake, and St. Louis

Figure F-1. Male Mesothelioma Rates by County Compared to Statewide Average, 1988-99. (Rates not shown for 14 counties with 0 cases and a total of 22 expected cases).



Appendix G: ORDIS Legislation

Statutory Language Passed in 1998 Legislative Session
(Minnesota Statutes 2000)

144.6905 Occupational respiratory disease information system advisory group.

Subdivision 1. Advisory group. The commissioner of health shall convene an occupational respiratory disease advisory group and shall consult with the group on the development, implementation, and ongoing operation of an occupational respiratory disease information system. Membership in the group shall include representatives of academia, government, industry, labor, medicine, and consumers from areas of the state targeted by the information system. From members of the advisory group, the commissioner shall form a technical and medical committee to create information system protocols and a legal and policy committee to address data privacy issues. The advisory group is governed by section 15.059, except that members shall not receive per diem compensation.

Subd. 2. Data provisions. No individually identifying data shall be collected or entered into the occupational respiratory disease information system without further action of the legislature.

Funding: $250,000 per year, beginning fiscal 1989.

ORDIS repealed 2002
Minnesota Statutes 2002, Chapter 144
144.6905 Repealed, 2002 c 220 art 16 s 3

Appendix H: Minutes from final Commissioner's Advisory Work Group Meeting
March 7, 2003, Virginia, Minnesota

Present: Paul Horoshak, Local 6860 Safety Co-chair; Jim Labernik, Local 6115 Safety Co-chair; David Mlaker, Local 2660 Safety; Timothy Carlson, Local 1938 Safety Chair - Minntac; Larry Sundberg, St. Louis County Public Health Department; Laurie Potter, US Steel – Minntac; Gus Josephson, Sipot Inland Mining Co.; George Schorr, UDOL/MSHA; Frank Ongaro, Iron Mining Assoc. of Minn.; Rick Goutermont, Lake County; Brian Hiti, Iron Range Resource & Rehab Agency; Peter Makowski, Office of Congressman Jim Oberstar; Allen Caligiuri, USWA Local 2705 (Hibbing Tac.); Wade Roseth, Minnesota Power; Terry Browning, EVTAL Mining; Terry Severn, Cleveland Cliffs, Inc.; David Trach, Steelworkers Organization of Active Retirees; Joseph Scholar; Tom Techar, Hibbing Community College; Dave Skolasinski, Northshore Mining Company; Alan Bender, MDH; Wendy Brunner, MDH; Allan Williams, MDH; Steve Golat, MDH

Opening remarks and introduction: The meeting was called to order by Tom Techar at 10:00 a.m.

Brief overview of history of ORDIS including funding and legislation: Alan Bender

Cancer incidence in northeastern Minnesota: Allan Williams presented information from four graphs compiled by the MDH Cancer Surveillance Section.

Report – Exposures to Commercial Asbestos in Northeastern Minnesota Iron Miners who Developed Mesothelioma: Wendy Brunner

Advisory Group Discussion

Dave Trach: Asked why the headlines from the Minneapolis paper indicated that taconite may not be the culprit and the headlines from the Mesabi paper stated that commercial exposure is responsible. He cited findings from LTV Steel that asbestos screening has been ongoing since 1999 and about 455 people have been screened. Thirty percent of those people are showing up with something, he didn't know if it was mesothelioma or other asbestos related problems. He also believed that work comp cases will result from the screening. He emphasized that observations related to mesothelioma did not imply that other conditions were not occurring as there were many other medical problems that are showing up at LTV Steel.

Wendy Brunner: Agreed and stated that the report also echoed this point.

Dave Trach: Expressed concern about any reference in the report to taconite fibers since they were not specifically studied.

Wendy Brunner: Stated that certain background information was required for the context of the study. She emphasized that the study itself was based on the two objectives stated in the report.

Dave Trach: Expressed concerned about several screenings that were uncovering positive findings in workers who were negative in the first screening. Sometimes the problems show up 30, 40, maybe even 50 years later. But there were people who were showing up and the first time they were ok and the second time they were not. He said that for Conwed 27.8% of workers had lung abnormalities, while at LTV they already had 30% or more.

Dave Mlaker: Asked about non-mining jobs. Were they filled by contractors in the mines? Did they go to work in the mines during shut down?

Wendy Brunner: Stated that could be a limitation of the MRHAP data base. If the contract workers were included in the personnel records or if they received their paycheck from that company then they were included. She was fairly sure that they were included in the mining cohort which would mean they were included in table 3 of the report.

Dave Mlaker: Questioned whether the contractors were included in the MRPHAP database.

Wendy Brunner: Responded that's a limitation of the study. If they were in the University of Minnesota mining cohort then we would have captured them as a mining job. We have no way of knowing how complete that was or whether that covers all of the people that were paid by the company.

Dave Mlaker: Said that the committee did not have much time to read the report. How long will they have to submit written comments that will be added to the report?

Alan Bender: Apologized. Said he wished that there had more time so that their review could have been more fruitful in that regard. The committee deliberations would be included in appendix H of this report. We will compile the responses and append them to the report. The Health Department had an independent responsibility to state its position and views. But the committee review and comments will be included in appendix H.

Peter Makowski: Asked how long will this comment period be left open? If people want to look at this report and want to ask questions or have concerns how long will they have to respond?

Alan Bender: Stated the MDH staff did not know how much resources and time it will take to prepare a summary. It's going to be a reasonable period of time which we will communicate to you. It's related to the resources we have to apply to it.

Larry Sundberg: Asked if the MDH could provide a minimum time frame?

Alan Bender: Responded that we are not going to be able to look at this until April. It could be longer than that. Completing the compilation is important because we do want to fulfill the understanding that this process has created. This is the second time we have used a community process like this and it places an additional responsibility on the health department that's different than just conducting a community study. Your insights and your responses need to be included and that's what appendix H is for.

Joe Scholar: Was very upset. It was his personal view that the health department stole his initiative to do the study. He offered his and Louis Jagunich's responses, which entailed three pages. He said that it was not complete, because they did not go through the technical committee. The truth was contained in his report. The MDH report provides no answers. He believed that without the proper autopsies nothing could be determined. The asbestos in the world is different. Anybody that has knowledge will tell you that if the asbestos comes from Russia it has certain crystals, if it come from Portugal it's different, if it comes from here it really is different, but it's still asbestos.

Alan Bender: Responded that appendix G of the report documented that the statutory mandate has been followed.

Dave Mlaker: In your presentation you said that the primary cause of mesothelioma is asbestos, does that mean there is a secondary cause?

Wendy Brunner: Not that I know of. I think in the report we say primary and only known.

Larry Sundberg: There is a question, is asbestos a cause or the only cause? I guess we can say that we know asbestos is a cause of mesothelioma. Obviously in this study we've seen people develop mesothelioma who have no identified exposure to asbestos. So there probably are other causes. What those are we don't know.

Allan Williams: Replied that it goes beyond what is the primary cause. You can have a risk factor for a cancer that only accounts for a few percent of the cases. The question is what proportion of mesothelioma can be traced back to asbestos? There have been many research studies that have addressed that question and they say that about 85% of mesothelioma cases will show an identifiable history of asbestos exposure.

Dave Mlaker: Responded that there is a percentage out there that could be other causes.

Alan Bender: If you were to autopsy every one of our lungs you would find ferruginous bodies, everybody is exposed to asbestos, rural and urban alike. And the ferruginous body is the body's response to this asbestos. There are a lot of questions that are not answered. The problem with mesothelioma, and the terrorizing aspect of it, is it's not known to be dose responsive – meaning that no one knows the threshold below which any exposure is safe. It's unlike lung cancer where the greater the exposure the greater the risk. We know there is a very tight relationship between commercial asbestos and

mesothelioma. There are a number of factors which came together that allowed us to develop more information today than we could have developed before. However, five years from now, ten years from now this may look entirely different again based upon new emerging information, that's why there is a date on the report.

Frank Ongaro: Thanked the MDH for staying with the unfortunately long process, but a necessary process that was inclusive, that had everyone involved, participating, working together, agreeing on that process, how it would work, and having all of the stakeholders involved. Some of the people from Dr. Marian Marbury, Dr. Boyle, Dr. French, certainly the current staff, and Tom Teacher should all be commended and everyone on the committees for sticking with this, for MDH again for doing what they said they would do, in coming back to us, and making a commitment to what they said they would do and reporting back to this committee. He responded that Dave Mlaker's comments about the headlines couldn't be more important, because this is rushed because the media felt they needed to have something before everything was finalized, reported back openly, so learned people could have a chance to look at things objectively and making sure that the report comes out. It's not the fault of MDH, they did what they had to do. I've criticized MDH when I felt it was necessary, ask some of the staff, my decibel level may have even risen a couple of times in recent conversations.

David Trach: I'm not blaming MDH for the short notice of this meeting. What I'm saying is reading the StarTribune article and hearing responses from other people that teach public health at the University of Minnesota and the University of Wisconsin. They're saying that this is not a final answer, and it's not a total picture. There are some questions out there yet. I don't know if you'll ever reach a place where you can get everything answered. People that have a better education than I have are questioning the report.

Dave Mlaker: Questioned whether the people working in the hematite mines could have been exposed to asbestos.

George Schorr: Said that you should find asbestos contained in the hematite. He did not know whether it's naturally occurring or man introduced. The Marquette ranges have similar rock as they have here. There are several veins that they know contain asbestos. They dig it up, move it , and bury it. So it's a known containment.

Dave Mlaker: Said that if Mr. Schoor is correct then the report is wrong saying that hematite miners couldn't have been exposed. This is in reference to the statement that the miners couldn't have had any other type of exposure. The MDH said that they were just exposed to commercial asbestos while they could have been exposed to hematite dust.

Wendy Brunner: Responded that on page 31 where it's mentioned that 5 of the 17 appear to have only worked at hematite operations, that information came from the University of Minnesota study.

Dave Mlaker: You're saying they couldn't have been exposed to any other type of asbestos, I think that's wrong and it needs to be changed.

Wendy Brunner: So you are entering into question, that they could not have been exposed to taconite dust.

Terry Severn: Asked about the Michigan deposit, was it magnetite or hematite?

Larry Sundberg: We are probably getting into an area where it is not scientifically possible to answer the question. The concern I hear expressed is, could the exposure to asbestos fibers in the ore also be a cause of mesothelioma? To find that you would have to find a lot of people who did not have exposure to commercial asbestos. When you have people exposed to a known cause you can't identify if there is something else in there causing it.

Dave Mlaker: But you can't exclude it.

Larry Sundberg: You can't exclude it. You can say you haven't seen evidence of, or we are seeing evidence of, but no you cannot give an absolute answer. You cannot say that iron ore does not cause mesothelioma.

Dave Mlaker: I think the statement that hematite miners couldn't have been exposed is wrong. There is an opportunity that they could have had exposure. I'm not saying that they were, I'm saying that they could have. I think it needs to be reflected in the report.

Joe Scholar: I think it should be in the report that it could be exposure to dust. There are other possibilities that could have caused it that the MDH didn't look into.

Wendy Brunner: We were very focused in the study. We couldn't explain for example the one person for whom we couldn't find commercial asbestos exposure.

Alan Bender: This discussion is interesting, because this is what we struggled internally on how to convey the findings, without conveying the impression that there was no other possibility. This is the most likely explanation, it doesn't exclude any other. There are many factors that are unknown. If we were going to develop a public policy statement relative to what levels of dust are acceptable you would need to have measurements, you would need to have dose response, you would need bioassay. You would need many other things that are beyond the realm of this report. Whatever the other possibilities are this is the most likely explanation. The fact that for 15 people, that doesn't sound like a lot but for a rare disease like mesothelioma that is a large number of people. For the 15 people that have adequate work histories, 14 had an identified history of exposure to commercial asbestos. We are not trying to trivialize or minimize things we don't know. For 14 out of 15 having commercial asbestos exposure it makes it the most likely explanation. This is statistically significant. It is the obvious explanation, it doesn't mean it's the only one. Commercial asbestos exposure causes mesothelioma. In some

ways this is no news. We found what you would find whenever individuals have had these kind of work experiences anywhere.

Dave Trach: Experts in the Minneapolis paper are saying that it leads to a conclusion that commercial asbestos is the only factor.

Alan Bender: What the experts were looking at was a draft of a summary of a report. They did not have a full report. I would not personally review or publicly comment on a scientific endeavor without having the full report in front of me. A draft of the executive summary is all they had. What they said, what they did, they will have to be responsible for defending.

Dave Trach: It was like two different stories in two different papers.

Dave Mlaker: Thanked MDH and technical subcommittees for their help and everyone who worked on the report.

Dave Trach: I hope what this leads to is, if there is a problem, with dust or whatever, that the mining companies furnish masks or protective equipment. I would like for the younger guys to use this equipment so they can have a good life when they retire.

Paul Horoshak: I would like in the future if they would study the dust that is in the plants to find out if it does contain asbestos, being that asbestos is a primary cause of this disease.

The meeting was concluded by Tom Techer at 11:45 a.m.

Appendix I: Submitted Comments on Draft Report

1. LABOR UNION COMMENTS ON DRAFT REPORT

United Steelworkers of America
District 11

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David A. Foster • Director

May 29, 2003

MDH Mesothelioma Study Comments

The study not being a comprehensive study of commercial asbestos in the mining industry did show significant areas of usage of commercial asbestos with probable and possible exposures. Also, in talking with many miners PPE usage and industrial hygiene controls were lacking in the mining industry during the time frame associated with the study.

In reference to this study we requested the minutes from the last Advisory Group meeting of March 7, 2003 so we could comment on any issues we felt necessary. To date we have yet to receive these minutes, and we would like to be able to comment on those minutes if we deem necessary when they become available.

Although, the MDH's interpretation of the data holds merit and is a plausible explanation to the excess of mesothelioma in Northeastern Minnesota, we cannot dismiss the possibility of the exposures coming from the geology of the area. The areas of concern are as follows.

First, all 17 miners could have been exposed to asbestos-like fibers from the geology. No geological evidence is given to support the MDH's claim asbestos-like fibers are only on the eastern end of the Iron Range. By adding this evidence to the study strengthens the MDH's premise that asbestos-like fibers are only on the eastern end of the Iron Range.

Second, a non-asbestos fiber could cause mesothelioma. This was the case in Turkey with the fiber, eironite. The question then, is there a non-asbestos form fiber across the Iron Range with the potential to cause mesothelioma.

Third, the Sheehy study compared older impinger sampling methods to newer filter sampling methods to establish a basis for utilizing the older impinger sampling data. The material being sampled was silica-containing dust. The MDH needs to explain the correlation between dustiness and fiber counts.

Timothy Carlson, Safety Chair USWA 1938

Ross Erickson, Safety Chair USWA 2660

Paul Horoshak, Safety Chair USWA 6860

Allen Caligiuri, Safety Chair USWA 2705

Gerry Knaeble, Safety Chair USWA 6115

2. INDUSTRY COMMENTS ON DRAFT REPORT

Industry comments were submitted by Laurie Potter (US Steel – Minntac) via an electronically edited version of the entire draft report of March 7, 2003. Specific edits and comments were extracted and are shown below. Page and paragaph numbers refer to the original March 7, 2003 draft report; inserts are underlined, deletes are strikethroughs.

***Page 1, para** 1*

There is a long history of community concern about a possible link between the mining industry in northeastern Minnesota and the occurrence of cancers and respiratory diseases in that part of the state. In 1973, asbestos-like fibers were found in the Duluth water supply and traced to tailings that had been disposed of in Lake Superior by the Reserve Mining Company.

***Page 2, para** 1*

This roster included taconite workers and persons who had worked in certain hematite mine operations.

Page 2, para 2

The rate in women was not elevated, opening the potential for exposure to commercial asbestos.

Page 4, para 1

Since asbestos exposure is the primary ~~and only known~~ cause of mesothelioma, this finding demonstrates that exposure to asbestos may have ~~has~~ occurred in the iron mining industry during previous decades.

Page 4, para 4

Also, 5 of the 17 appear to have worked only at hematite mine operations (presumably where they would not have been exposed to taconite dust).

Page 5, para 3,4

~~This study shows that potential exposure to commercial asbestos has occurred within specific occupations in the iron mining industry in northeastern Minnes.ta Iron miners as a group are at risk of developing mesothelioma and possibly other asbestos-related diseases. Because of the long latency of asbestos-related disease, these risks will continue into the future even n the absence of ongoing exposures.~~ This study indicates

that exposure to commercial asbestos within specific occupations in the iron mining industry in northeastern Minnesota may have occurred.

Mesothelioma in Northeastern Minnesota

This study was not done because of any scientific evidence that the miners are at an elevated risk for mesothelioma.

Page 6, para 2, 4

Other limitations include the lack of control subjects (i.e., there was no comparison with miners who did not develop mesothelioma), incomplete work histories, and the lack of information on potential non-occupational asbestos exposures including hobbies, home heating systems such as hot water, etc.

While these findings suggest that miners are at some risk of mesothelioma and that past exposure to commercial asbestos is a likely explanation, this study does not answer many of the questions about the health and safety of iron miners in Minnesota that have been raised over many decades. It is not a comprehensive study of the use of commercial asbestos in the iron mining industry. Furthermore, this case-study does not address the morbidity and mortality among iron miners

Page 7, para 1

In 1973, asbestos-like fibers were found in the Duluth water supply and traced to tailings that had been disposed of in Lake Superior by the Reserve Mining Company. This finding, along with litigation surrounding Reserve's disposal of tailings, prompted studies of the fibers (Langer et al., 1979), the effects of ingestion of the fibers (Hilding et al., 1981), and the morbidity and mortality of taconite workers (Clark et al., 1980; Higgins et al., 1983; Cooper et al., 1988; Cooper et al., 1992), among other studies. The Higgins and Cooper studies found taconite workers to be healthier than other Minnesota men and other men in the United States.

Page 8, para 3

Mesothelioma is a rare form of cancer whose primary ~~only known~~ cause is exposure to asbestos. Other causes include: therapeutic radiation, thorotrast, family history of cancer, viruses (SV40), idiopathic (10% of cases). The risk of mesothelioma and other respiratory cancers is based on the type of asbestos. Ninety-five percent (95%) of asbestos is chrysotile. Chrysotile will dissolve in the lungs over time and is used in low temperature applications. Crocidolite is often found in brakes, ships, gas masks, boilers and high temperature hot water (HTHW) applications.

Page 9, para 2

While an increased rate was observed in men, the rate in women was not elevated, opening the potential for exposure to commercial asbestos.

Page 10, para 2, 3

In the present study, the iron miner database was used to determine whether individuals diagnosed with mesothelioma in Minnesota had any history of working in the mining industry. COMMENT TO MDH: Explain why the 17 miners with mesothelioma were not followed to determine specifically where they worked and where they may have received their exposures either from occupational or non-occupational exposures.

Nor is it a study of the health effects of exposure to dust from the mining and processing of taconite. Rather, it is a descriptive case study whose purpose is to evaluate possible occupational exposure to commercial asbestos and to ask: (1) whether any of the mesothelioma cases diagnosed throughout the state were individuals who had been employed in the iron mining industry, and (2) to what extent any mesotheliomas among miners could be explained by occupational exposures to commercial asbestos used in the mining industry (as with many other industries during that period).

Page 12, para 3,4

Asbestos is a ~~general~~ commercial, not scientific term referring to a variety of minerals that can in certain geologic environments possess unique physical properties that lend to their suitability for industrial purposes. These unique physical properties consist of strong, thin, flexible mineral fibers that are capable of being woven and are resistant to fire and corrosion. ~~of a particular fiber-type~~. ~~The minerals known as asbestos include chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite. These minerals, which exist in nature as masses of fibers, are strong and resistant to fire and corrosion.~~ The discovery of these physical properties led to the mining and use of asbestos in thousands of commercial products.

Asbestos is a collective term for a number of minerals that are capable of generating these unique physical properties. The following table provides a breakdown of the common mineral phases that can under proper geologic conditions occur in asbestiform habits:

Mineral Group	Mineral Name/Series (Non-Asbestiform)	Commercial or Asbestiform Name
Serpentine		
	Antigorite	Chrysotile
Amphibole		
	Riebeckite	Crocidolite
	Cummingtonite-grunerite	Amosite
	Actinolite – tremolite	Actinolite – tremolite Asbestos
	Anthophyllite	Anthophyllite Asbestos

In nature, the asbestiform habit of these minerals is the exception rather than the norm.

Asbestos was used extensively in the United States from the 1930s through the 1960s, mirrored by the increase in mesothelioma rates observed nationwide in the 1970s and 1980s (Price, 1997). Asbestos was used in the manufacture of ships during World War II across the country and specifically in Duluth. It was also used in American homes and commercial buildings as insulation from 1946 to 1972. Iron range home heating systems were wrapped in asbestos insulation based on steam heat provided by several local public utilities. Asbestos usage declined in the mid-1970s when EPA began banning asbestos from various applications including spraying, high temperature hot water applications(HTHW), and patching. ~~and specifically~~~~and continues to be used in automobile brake linings, cement, and ceiling and floor tiles (Antman, 1993).~~ Products that may have contained asbestos include (but are not limited to): construction and building materials (insulation, fireproofing, or soundproofing materials), gaskets, brake linings and clutches, paper or filter products and textiles.

Page 13, para 4

Past studies of taconite workers from three Minnesota operations have not shown statistically significant elevations in rates of death due to respiratory disease or cancer (Higgins et al., 1983; Cooper et al., 1992). In fact, these studies have shown Minnesota miners to be healthier than other Minnesota and American men.

Page 15, following para 1

Table 1 shows a breakdown of the number of workers included from each mining company.

It should be noted that many of the mining occupations that are identified on Table 3 were those held by iron miners in either underground or hematite mines(natural ore) and did not become occupations associated with taconite mining.

Page 16, footnote to Table 1

*Includes hematite or natural ore mine operations

Page 21, para 2

A final review of these jobs was provided by MDH's consulting industrial hygienist. COMMENT TO MDH: Add a discussion about the lack of information on non-occupational exposures from hobbies, steam heating where homes, schools businesses, churches in Buhl, Eveleth, Virginia and Hibbing were heated with steam heat from the 1940's onward. (2600 customers in Virginia for example, on steam heat)

Page 25, footnote to Table 3

COMMENT: It should be noted that many of the mining operations that are identified on Table 3 were those held by iron miners in either underground or hematite mines (natural ore) and did not become occupations associated with taconite mining.

Page 26, footnote to Table 3

Blaster helper is an open pit mine position. Scrammer is an underground mine position.

Page 30, para 3

One of the 15 had no apparent occupational exposures to commercial asbestos based on the occupational information that was available. It was found that 14 of 15 iron miners had jobs with potential exposure to commercial asbestos either with mining or non-mining companies: 11 had a *probable* source of exposure to commercial asbestos and another 3 had a *possible* source of exposure to commercial asbestos.

Page 33, after para 1

Key limitations:

1. The review of work exposures has been undertaken in the absence of evidence that there is an increased risk of mesothelioma in miners. The study does not determine if there is an increased risk in miners.
2. The study is purely descriptive.

3. Lifetime work histories are deficient in that mesothelioma cases working in the mines may also have had exposure to asbestos or other potential etiological agents while working elsewhere before or after working in the mines.
4. Information on non-occupational exposures and other factors, which may be related to the etiology of mesothelioma in individuals, is lacking.
5. Because the mesotheliomas have not been subjected to independent review, the validity of the diagnoses of mesotheliomas in the study is not known.
6. The study cannot exclude the possibility of an occupational or non-occupational explanation for any of the mesotheliomas.
7. Inconsistencies in diagnosis.

Page 33, para 2

In addition, nothing was known about any non-occupational asbestos exposures (e.g. occupations of parents or siblings, hobbies, use and condition of asbestos in home heating, therapeutic radiation treatment, nuclear materials handling or exposure, or vaccination for polio in the late 1950's or early 1960's).

Page 36, para 1

As noted previously in this report, there is a long history of health evaluations that have been conducted including the Shuman, Cooper, and Higgins reports. Many previous studies and investigations—epidemiological and otherwise—have been conducted to address specific issues.

Page 36, para 2,3

For the 15 miners who developed mesothelioma and for whom sufficient occupational histories were available from existing records, 14 had an identifiable source of exposure to commercial asbestos. No identifiable sources of exposure were identified but probable or possible exposures were noted.

While these findings suggest that miners may be at some risk of mesothelioma and that past exposure to commercial asbestos is a possible explanation, this study does not address other significant health questions.