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② BACKGROUND RE: WATER PIPES
Sarah

The

STEPHEN FEARING

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Samy Mesbah (samy@interlog.com)

Last updated: 26 July 1999

description. Essentially, it attempts to suss out why certain individuals are driven to acts of seemingly inexplicable violence and madness. "I had been thinking about the anger so many people carry around with them. Their rage overwhelms and engulfs them and then they explode. The idea is not to look at these people as aberrations but as very real products of society."

"The Assassin's Apprentice" exerts the strongest undertow on an album that is generally more personal than *Blue Line*. "Give It Up" deals with the fragile nature of love and friendship. "The Station" rocks out with finger-picking verve and full-blooded electric guitar. Another railway tune, "(I Heard That) Lonesome Whistle," is a sprightly cover of the Hank Williams/Jimmie Davis standard. Two exquisite acoustic guitar instrumentals, "Lark and Duke" and "Martin's", are evidence of what Fearing means when he talks about his playing as a form of of becalmed meditation. "Down The Wire" he admits with mock horror, "is the first straight-forward love song I've ever written."

"What's interesting for me is that there is a lot less anger on this album. My last album *Blue Line* surprised me in terms of how angry some of the tunes were. There's more of a relaxed, mature center to these songs, which is good. It means there's been some motion and growth in my life over the last three years."

Motion has been a constant in Fearing's life. "The Longest Road," one of the new album's highlights, is a vivid autobiographical tale of his journey at the age of seven to relocate from Vancouver to Dublin, Ireland with his family.

By the mid-Eighties, Fearing was back in his Vancouver hometown. Along with *Spirit of the West* and Calgary singer-songwriter James Keelaghan (both of whom appeared on "Out To Sea"), he was classified as part of "The Western Invasion" of Celtic-influenced folk artists. "That was flattering, but it wasn't at all accurate," says Fearing. "There were some Celtic elements in what I did, but I saw myself more as a contemporary songwriter on the same continuum as Richard Thompson, not the more traditional players."

Fearing spent much of 1989 and 1990 on the road, touring the U.S. as part of an acclaimed bill with Keelaghan, Connie Kaldor and Ferron and appearing at such events as Peter Gabriel's World of Music, Arts and Dance (WOMAD) and the Reading, Edinburgh, and Belfast festivals. *Blue Line* was produced in London, England by famed folk/rock guitarist Clive Gregson and featured musical support by vocalist Christine Collister and pedal steel veteran B.J. Cole (Joan Armatrading, Chris de Burgh), among others. The reviews were excellent - "An important, energetic new artist on the scene," stated the bible of the British acoustic scene, *Folk Roots*.

Biography courtesy of True North Records/The Finklestein Management Co. (1985) Limited



[Back to Stephen Fearing Info Page](#)

Samy Mesbah (samy@interlog.com)

Last updated: 7 November 1995

Biography

Don't mistake Stephen Fearing for a novice. The Vancouver singer-songwriter has two albums, a raft of enthusiastic press notices and eleven years of experience on the club and festival circuits to his credit. Nonetheless, there's a strong sense of new beginnings about *The Assassin's Apprentice*, his first bona fide album for True North Records. It is the product of his first encounter with a world class recording studio and a major label budget. Not coincidentally, it's also the first time he's put his own distinctive stamp on his recorded work.

"Making this album I suddenly realized, 'Oh, this is what I do,'" laughs Fearing, 30. "It's all been a little foggy and indistinct in the past. Now I can hear a personal style in terms of how I play the guitar - my choice of chords and tunings - and in the lyrical images that come up repeatedly in the songs. It's pretty scary to finally start encountering and recognizing myself in my songs and on record."

Stripping back the full-bodied production that characterized *Blue Line* (1990) and bringing his smoky voice and powerful guitar technique to the fore was Fearing's primary objective. Friend and inspiration Richard Thompson adds his trademark Telecaster guitar runs to "Down The Wire." Sarah McLachlan's unearthly vocal beauty is heard on the album's first single, "Expectations." Acoustic bassist and live sideman Paul Blaney anchors the songs throughout, while Ashwin Sood, who has recorded with McLachlan and Mae Moore, is featured on drums and percussion. Despite the accomplices, however, this is unquestionably Fearing's album from start to finish.

"I think people have always recognized Stephen's abilities as a songwriter, but you've had to see him live to know just how talented a guitarist and singer he can be," explains Bernie Finkelstein, the long-time manager of Bruce Cockburn who signed Fearing in 1991 and reissued *Blue Line* and *Out To Sea* (1988) on his own True North label. "With this album, Stephen's finally going to get his due as a musician and performer."

Much of the credit goes to producer Steve Berlin, one-time sax player with the legendary Texas band The Blasters and a member of Los Lobos since 1985. Berlin has worked with T-Bone Burnett on such landmark Los Lobos albums as *By the Light of the Moon* and *How Will the Wolf Survive?* and produced sessions for the Crash Test Dummies (*The Ghosts That Haunt Me*) and Leo Kottke (*Great Big Boy*). When Berlin heard the unadorned demos of Fearing's new material, he was keen to take the short trip North from his Seattle-area residence for a month of sessions at Jim Vallance's state-of-the-art Armoury Studios in Vancouver.

The album's title derives from some light-hearted studio banter. "Steve is a dark character, but very passionate and involved," explains Fearing. "By contrast, our recording engineer, Greg Reely, is cool and analytical to the point where he earned the title 'The Assassin.'" At one point, Berlin displayed a Reely-like quirk and was instantly dubbed "The Assassin's Apprentice."

The humorous nickname stuck both as the project's overall handle and as an apt title for the lead track, a searching examination of the darker reaches of human nature. Like many of Fearing's songs, "The Assassin's Apprentice" works on a number of levels and defies easy

Stephen Fearing was born to an Irish mother and English father in Horseshoe Bay, British Columbia on January 12th, 1963. He, his parents and his two sisters remained in neighboring Vancouver until 1969, when Fearing's life took a dramatic turn. After the divorce of his parents a year earlier, Stephen, his mother and sisters (Judith and Jane) moved to Dublin to live with his stepfather-to-be, who his mother had previously met at a family wedding. Much of the imagery from this childhood exodus have been beautifully documented in Stephen's song *The Longest Road*, found on 1992's *The Assassin's Apprentice*.



As a young teenager, Stephen attended boarding school at Mount Temple Comprehensive, outside of Cork. There he began to develop an interest in music and at age 14 started out on nylon-string guitar, playing the standard repertoire of beginner's classical music. Apparently it came fairly easily to him, possibly due to having been raised in a musically focused family (many of his relatives are musicians, including his father who is an opera singer). By high school Stephen had become quite competent at both acoustic guitar and singing, and under the encouragement of Donald Moxam, a history teacher at his school, he started to consider the possibility of making a profession of it. On an interesting side note, other students attending Mount Temple at the time had similar inclinations as they later went on to form the bands *The Stars of Heaven* and *U2*.

Although one would suspect that Ireland's strong musical heritage was influential on young Stephen, this is not quite the case. In an interview with *The Globe and Mail's* Alan Niester, Fearing once noted how it was Top-Forty Radio that mostly held his interests at the time. "I didn't learn a whole bunch of Irish song's when I was over there... Ireland's charts were dominated by England, so on Top of the Pops you'd see ABBA at No. 1, the Sex Pistols at No. 2, the Stranglers at No. 3, and some disc jockey doing a novelty song at No. 4. So you had this mix of music going on". There are however, several folk-leaning musicians that he does often credit as having been vital to the development of his style. Among them is John Martyn, who captivated a 16 year-old Stephen with his ability to create a strong sense of groove, with minimal gear and no backing band. "I [once] stumbled upon a live concert on the TV in my parents room... It was just [John Martyn], an acoustic guitar and an echoplex and he had the whole crowd on their feet, screaming. I was gob smacked. After that performance I never looked at a acoustic guitar the same way



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Stephen Fearing circa 1997

again". Other artists he often notes as having been highly influential include Martin Carthy, Richard Thompson and Canadian songsmith Willie P. Bennett.

At the age of seventeen, Stephen decided against joining the British Navy and moved to Minneapolis with American exchange student Paul Delmain, who he had met in school the previous year. There he worked odd jobs ranging from dishwasher to Montessori schoolteacher. His musical carrier was limited to doing cover songs in coffee shops and restaurants. It would still be two years before he penned an

original song. In a feature article on Fearing, *Dirty Linen* magazine quoted Stephen musing over that first song saying "I remember when I left Minneapolis, my friends and I took this trip - we hopped freight trains from Minneapolis to Seattle, except we ended up in Portland by mistake. I came back to Minneapolis and did some more playing, and then I caught a bus out west. I remember sitting on the bus and just going through hell trying to write this song and wondering if it was good or bad. And that was the start... I don't know how many years later, I'm still wondering if it's good or bad". The song in question is *Rocky Mtn. Side*, found on his 1986 self-titled demo recording (*The Yellow Tape*).

In the following years, Fearing kept his life in a perpetual state of wanderlust moving to northern BC to live with his sisters in Hazelton and Smithers. In 1983 he found himself employed at Lake O'Hara as the resident bus driver. Lake O'Hara has always been a bit of an artist colony (past employees include such talent as folk singer Katherine Wheatly) and several of Stephen's early songs were penned there including *Beguiling Eye's* and *Dublin Bay*.

The following year, Fearing moved into his sister Jane's house in Canmore and "spent a winter, trying to figure out exactly what the hell I was doing". Fearing came to the decision that school would be a step in the right direction and that spring shipped himself off to the now dismantled David Thompson University in Nelson, BC. There he met up with future band mates Charlie Wake and Keith Hunter, future album collaborator (and governor-general's award winner) Paulette Jiles and the women he would spend the next eight years with, Angela Hyniuk. Although this was a very productive time in Fearing's life, it was short lived as the Governing party in BC closed down the school after Fearing had only been there for one and a half years. During, and briefly after his stay in Nelson, Fearing released two albums with his band Fearing, Hunter, Wake (self-titled and *I Was Here and You Were There*). The albums, which feature mostly covers and a few originals penned by Fearing (*Beguiling Eyes*, *Sarah's Song* and *Carusin'* among others), received a limited printing of about five hundred and were sold at the bands gigs.

In 1985 Angela Hyniuk, who had been taking creative writing at David Thompson University and Stephen Fearing moved west to Vancouver to pursue their respective careers. With Angela's help, Stephen applied for and received a Canada Council grant that permitted him to continue work on 'The James Project' with poet Paulette Jiles. The collaboration married Jiles' poems on Jesse James (released in 1988 as *The Jesse James Poems* ISBN 0-19-541097-1) with an instrumental soundtrack by Stephen. Two of the pieces on this album were later released by Fearing on separate recordings (Jesse Meets His Future Wife Zee Mimms [on 'The Yellow Tape' and 'Blueline'] and The James Medley [on *Out To Sea*]). Originally intended as a book/CD package to be sold at bookstores, the album was never pressed for the commercial market, although it was aired in its entirety on CBC radio.



Angela Hyniuk

Shortly thereafter, in 1986, Fearing released his first solo effort, produced by local jazz guitarist Sid Perez. *The Yellow Tape* (actually self-titled, but this is how Stephen now refers to it)

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It is wise to periodically check materials containing mineral fibres for signs of deterioration. Avoid skin contact with fibrous glass and mineral wool during renovations, ensure good ventilation and disturb as little as possible. Advice should be sought before removing and disturbing materials thought to contain asbestos.

Reducing Exposure

In a home, if material that might contain asbestos has become exposed, it should be assessed by a professional. If it has fallen on the floor, it should not be dusted, vacuumed, or swept. It can be wiped up with wet rags or sponges and contained in a dust-proof plastic bag for disposal. Professional guidance or services should be sought on repair or removal of asbestos-containing materials. Home owners should not undertake such activities themselves.

Substitute asbestos materials have been developed for private in-house applications. They are called "man-made mineral fibres" (MMMFs). There are however, health implications associated with exposure to these substitute materials. Asbestos is still used in industrial settings.

Human Health Considerations

No deaths due to acute exposure to asbestos have been reported. Diseases associated with high occupational exposure (through inhalation) are asbestosis (fibrosis of the lung), mesothelioma (cancer of the pleural sac lining the lung or the peritoneal sac lining the abdomen), and cancer of the lung. Asbestos-related diseases generally develop 10 to 30 years after exposure. Two studies have investigated asbestos exposure in individuals living in cities for a number of years. Over half of the subjects had some asbestos fibres in their lung tissues; none had evidence of resulting disease.

Extensive studies have revealed that ingested asbestos causes little or no risk of noncarcinogenic injury. Dermal exposure has been associated with the formation of small warts or corns, mostly on the hands.

Table 1

HUMAN HEALTH EFFECTS FROM BREATHING ASBESTOS

<i>Short-term exposure (less than or equal to 14 days)</i>		
Levels in air	Length of exposure	Description of effects
		The health effects resulting from short-term exposure of humans to air containing specific levels of asbestos are not known
<i>Long-term exposure (greater than 14 days)</i>		
Levels in air (f/m ³)	Length of exposure	Description of effects*
1 000 000	20 years	Lung injury in some people
3 400 000	20 years	Death from asbestosis in some people

* These effects are listed at the lowest level at which they were first observed. They may also be seen at higher levels.

Adapted from: U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry (ATSDR). *Public Health Statements – What you need to know about toxic substances commonly found at Superfund hazardous waste sites.* Atlanta, Georgia.

Table 2**DRINKING WATER VALUES FOR ASBESTOS**

Agency	Focus	Level	Comments
U.S. EPA	Drinking water	7 million fibres/L	see below
Health Canada	Drinking water		see below
WHO	Drinking water		see below

The U.S. Environmental Protection Agency's proposed (no regulation exists) maximum level for asbestos in drinking water is 7 million fibres (larger than 10 microns in length) per litre.

The WHO and Health Canada have not established a guideline for asbestos in drinking water, as it is believed that asbestos ingestion at the concentrations found in drinking water do not constitute a health hazard. Exposure to high concentrations of asbestos in drinking water is unlikely, as standard water treatment processes effectively remove asbestos fibres from drinking water supplies.

References

Canada. Health Canada. *Guidelines for Canadian Drinking Water Quality — Sixth Edition*. Prepared by the Federal-Provincial Subcommittee on Drinking Water of the Federal-Provincial Committee on Environmental and Occupational Health. Ottawa: Canada Communication Group, 1996.

———. Health Canada, Health Protection Branch. *Issues — Asbestos*. Ottawa. September 11, 1989.

United States. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry. "Toxicological Profile for Asbestos." Draft. October 1993.

———. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry. *Toxicological Profile for Asbestos*. Atlanta, Georgia, December 1990.

World Health Organization. *Guidelines for drinking-water quality*. 2nd ed. Vol. 2. Geneva, 1996.

A Benefit for Concerned Walkerton Citizens

On Saturday, September 23rd, 2000 a special dinner and benefit concert is being held for the Concerned Walkerton Citizens (CWC) to help fund their intervention in the Walkerton Public Inquiry starting next week. CELA is representing CWC in the Inquiry that promises to be lengthy, complex and costly. It is the objective of CWC to make sure that the tragedy they have endured will never happen again in Ontario.

This event is being held at Stonyground, the local farm of University of Toronto Professor Douglas Chambers. His unique garden is renowned in gardening circles and is the subject of his recent book, **Stonyground: The Making of a Canadian Garden**. Come at 3:00 pm, and take a guided tour around the garden.

A 5:00 pm, there will be a concert in the barn by singer/songwriter **Stephen Fearing**. The concert will be followed by dinner, provided by local Ecuadorian eatery, Dos Rios Cafe. Tickets for this event are \$40.00 each.

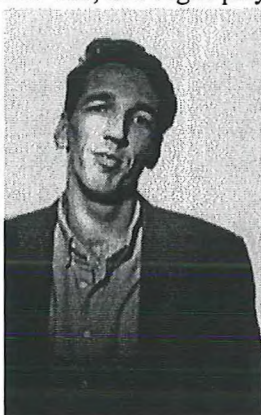
Enjoy a wonderful day in the country and support this good cause.

Tickets and maps to Stonyground are available in Toronto from Sarah at CELA (416) 960-2284 or locally in Walkerton from Chris Peabody (519) 881-2318.



Stephen Fearing - Biography

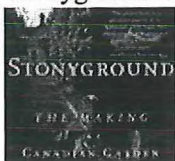
Singer/songwriter Stephen Fearing was born in the mid-'60s in Vancouver, but spent most of his boyhood in Dublin, where he picked up the traces of Celtic folk that colour his music. He returned to Canada in the mid-'80s, and began playing clubs and festivals in the area. Fearing self-released his debut album, *Stephen*



Fearing (The Yellow Tape) in 1986, and signed with Canadian label Aural Tradition for a second album. 1988's *Out to Sea*. The LP also appeared in the U.K. on Black Crow Records. Though he recorded the album *Blue Line* in 1989, Fearing spent most of that year and the next touring the U.S. and Europe on a Celtic bill that played at Peter Gabriel's WOMAD Festival and the Reading Festival. Canada's True North signed him in 1991 and reissued *Out to Sea* and *Blue Line* before releasing his major-label debut *The Assassin's Apprentice* in 1994. It featured appearances from Sarah McLachlan and longtime friend Richard Thompson. The album was also Fearing's U.S. debut, on Cooking Vinyl Records. *Industrial Lullaby* followed in 1998. -- John Bush, All Music Guide Stephen Fearing is also a member of the band *Blackie & the Rodeo Kings* and has appeared on recordings made by other artists such as Bob Bossin, Willie P. Bennett, Katherine Wheatley, Eileen McGann and James Keelaghan.

Stonyground: The Making of a Canadian Garden
by Douglas Chambers

"Stonyground is the book for all true lovers of gardens. Douglas Chambers chronicles the trials and triumphs of his ten year (and on-going) labour of love to turn his family's 150-year-old farm into a celebration of garden history and design - a labour that created remarkable vegetable and herb gardens, the multi-hued Great garden, a profusion of roses, the linden hedge-on-sticks, trees and shrubs to





of roses, the linden hedge-on-sticks, trees and shrubs to offset the driving northern winds, and much more. This unique gardening book is a treasury for all types of gardeners, and will enthrall readers to the last page."

ASBESTOS IN ONTARIO DRINKING WATER SUPPLIES

Report prepared by:

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INTRODUCTION

This report consists of two parts; the first section provides an overview of asbestos in drinking water. Part II of this report presents the results of an Ontario-wide asbestos survey of 368 municipal drinking water supplies conducted between 1977 and 1983.

The term asbestos refers to a large group of naturally-occurring fibrous inorganic silicates. Asbestos fibers are generally categorized according to morphological characteristics into two sub-groups, namely chrysotile and amphibole.

Chrysotile fibers are cylindrical in shape and tend to be extremely fine; individual fibers may be as small as 0.01 μm in diameter. Amphibole fibers are generally longer and have a greater cross-sectional area than the chrysotile type (Commins, 1979). Chrysotile fibers are the most common type found in water supplies, although the specific source will dictate relative abundance and fiber size characteristics (Millette et al, 1980; Toft et al, 1981).

PART I BACKGROUND : ASBESTOS IN DRINKING WATER SUPPLIES

Asbestos fibers have been found regularly in municipal water supply systems and in surface and ground water throughout Canada. In a study reported by Toft et al (1981) approximately five percent of 71 Canadian municipal water supplies were found to have levels of asbestos in excess of 10 million fibers liter⁻¹ (MFL). This study surveyed water supplies used by approximately 55 percent of the Canadian population. Kay (1974) found asbestos levels as high as 3.87 MFL while examining asbestos trends in 21 Ontario cities.

The occurrence of asbestos fibers in drinking water supplies is not unique to Canada as detectable levels have frequently been reported in the USA, USSR, South Africa (Commins, 1979) and in Europe (Shugar, 1979). A survey of 47 States including Puerto Rico and the District of Columbia revealed that 45.8 percent of the water supplies monitored contained more than 1.0 MFL asbestos (Millette et al, 1980).

SOURCES OF ASBESTOS IN WATER

The sources of asbestos fibers in water are numerous. Runoff exposed to natural asbestos formations or old mine tailings may contain significant concentrations of asbestos (Commins, 1979). During a study of 22 Quebec municipalities the water supply systems of two asbestos mining communities exhibited concentrations greater than 200 MFL (Wigle 1977 in: Toft and Meek, 1983).

Industrial waste effluents may also contain asbestos fibers. Waste discharged into Lake Superior from an iron ore processing plant in Minnesota resulted in concentrations of 600 MFL in Duluth drinking water (Millette et al, 1980). High levels of asbestos fibers were found in

lake-bottom sediments a distance of 200 miles from the point of discharge (IJC, 1975).

Asbestos has been used extensively in the building industry for insulation, tiling, filters, adhesives, asbestos-cement pipe and in the automotive industry for brake linings and clutch pads. Lee and Selikoff (1979) provide an overview of the historical development of the asbestos industry. The ultimate fate of asbestos released into the atmosphere is, like many other airborne contaminants, surface water.

WATER CORROSIVENESS AND ASBESTOS-CEMENT PIPE

The contribution of asbestos to drinking water from asbestos-cement (AC) pipe is difficult to assess. Asbestos is used to complement the strength of cement in the fabrication of AC pipe, which is widely used in the distribution of municipal waters. Soft or corrosive waters may have a tendency to dissolve the cement matrix of AC pipe, allowing fibers to be released into the water supply (Davis et al, 1979; Toft et al, 1981). Hard or non-corrosive waters are less likely to dissolve cement and subsequently do not tend to cause the release of asbestos fibers (AWWA, 1974; Commins, 1979; Welch, 1981).

In order to quantify the degree of corrosiveness of water, a number of indices have been developed. Singley (1981) observes that the Langelier Index, essentially a comparison of the observed pH with the calculated pH at calcium carbonate saturation, may provide an indication of the tendency of water to be corrosive but fails to reflect the degree of corrosiveness. This index may be used to determine the probability of the formation of a calcium carbonate coating on the inner surfaces of pipe or other exposed materials. Such a coating tends to aid in resistance to corrosion (Energy & Environmental Analysis Inc., 1979). Calculation of a negative Langelier Index value corresponds with a tendency for water to be corrosive, while a positive value suggests that deposition of scale may occur.

The ASTM - C500 Aggressiveness Index (AI) is another measure of the corrosion potential of water. This method addresses the pH, alkalinity and hardness of a water supply. Generally, water having an AI less than 10 is said to be aggressive and when the AI is estimated to be between 10 and 12 the water is designated moderately aggressive. Should calculation of the AI yield a value in excess of 12, the water is considered non-aggressive (Buelow et al, 1980). During a study of ten municipal water supply systems in the US employing AC pipe, Buelow et al (1980) concluded that water is not expected to attack AC pipe when the AI is greater than 11.

Many other factors may be involved in the ability of AC pipe to resist corrosion; metals such as iron may form a protective, resistant layer. Buelow et al (1980) reported that high concentrations of iron in water apparently inhibited corrosion of pipe when the AI was less than 11. Waters possessing characteristics that would normally indicate corrosive potential may in fact not behave as such due to the presence of some corrosion inhibiting mechanism.

however, may not provide an accurate measure of asbestos fiber concentration. Finished water with a turbidity of 0.10 NTU will generally have low fiber levels (Logsdon, 1979). Similarly, Hunsinger et al (1977a) reported that reduced turbidity generally coincided with low chrysotile asbestos concentrations. Lawrence and Zimmerman (1976 in: Hunsinger et al, 1977b) however, point out that turbidity does not relate to fiber levels when such fiber concentrations in finished water are very low.

The University of Minnesota has developed an optical particle counter that is capable of on-line detection of fibrous particles. Although not as accurate as TEM, this method was proven superior to turbidity in providing an immediate indication of asbestos fiber concentration (Schleppenbach, 1984).

ASBESTOS FIBER REMOVAL BY CONVENTIONAL WATER PURIFICATION PROCESSES

The removal of asbestos from a water source is readily accomplished by the coagulation, flocculation, sedimentation and filtration processes of conventional drinking water purification (Commins, 1979; Lawrence and Zimmerman 1976 in: Hunsinger et al, 1977b; IJC, 1975). Toft et al (1981) report that conventional treatment yielded asbestos levels 300 times below initial raw water concentrations. Granular media filtration has given asbestos removal of 99.99 percent; however, such reduction was attained by careful control of pH and coagulant dosages and close monitoring of raw and filtered water turbidity (Logsdon, 1979).

Schleppenbach (1984) suggests that filtering-to-waste for the first five to ten minutes following filter backwash may substantially reduce asbestos fiber concentration in finished water. Asbestos fiber levels as high as 15 MFL were reported during the first 5 minutes of operation after filter backwash in a Minnesota pilot plant designed specifically for asbestos removal.

Hunsinger et al (1977b) employed a pilot plant in attempting to determine the efficiency of asbestos fiber removal by coagulation/filtration. Difficulties were encountered in maintaining the stability of artificially spiked asbestos concentrations in raw water. Although actual results were obscured by operational problems, qualitative analysis led to the conclusion that significant reductions of asbestos fiber levels were achieved by conventional treatment.

Generally, when a conventional water treatment plant is operating under optimal conditions (provided that raw water asbestos concentrations are not excessively high) the concentration of asbestos fibers in finished water will approach zero (Toft et al, 1981).

ASBESTOS IN DRINKING WATER AND ASSOCIATED DISEASE

The incidence of cancers associated with the human respiratory tract is significantly higher among people exposed to airborne asbestos fibers (Logsdon, 1979 ; Becklake, 1982). Becklake (1982) provides a review of work by numerous investigators concerning exposure to airborne asbestos.

Information concerning the effects of ingestion of such fibers, however, remains inconclusive (Toft and Meek, 1983; Ontario Ministry of the Attorney General, 1984; Federal Register, 1985).

Fiber size has been recognized as a determinant of the carcinogenicity of asbestos. High concentrations of fibers of lengths in excess of 10 um have been correlated with tumors in laboratory animals (Millette et al, 1980; Federal Register, 1985).

Wigle (1977 in: Toft and Meek, 1983) studied human cancer mortalities in 22 Quebec municipalities between 1964 and 1973. Two of these locations had been heavily involved in asbestos mining since the late 1800's and drinking water surveys indicated fiber concentrations on the order of 200 MFL. Cancer mortality was significantly higher among males occupationally exposed to asbestos. Female members of the populations (assumed to be drinking water from the same source as males) did not exhibit any excess cancer mortalities.

DRINKING WATER GUIDELINES

The US EPA has proposed a Recommended Maximum Contaminant Level (RMCL) for fibers longer than 10 um of 7.1 MFL in drinking water (Federal Register, 1985). Controversy has surrounded this RMCL; the proven carcinogenicity of inhaled fibers appears to be the basis for this recommendation for drinking water (AWWA, 1986).

Although it has been recommended that asbestos levels be kept as low as possible (Ontario MOE, 1983), a drinking water objective has not been warranted due to a lack of conclusive evidence suggesting disease promotion of ingested asbestos. The Guidelines for Canadian Drinking Water Quality (Health and Welfare Canada, 1987) states that there is no need to set quantitative numerical guidelines. These Guidelines are set by the Federal-Provincial Subcommittee on Drinking Water, on which Ontario has representation. Ontario adopts the recommendations of this Subcommittee and can set more stringent objectives for specific parameters if considered appropriate.

Appendix 1: Abridged Results of Asbestos Survey

Municipality	Date Sampled	SAMPLE DESCRIPTION			ASBESTOS COUNT (10^6 fibers L^{-1})		
		Surface or Ground	Raw or Treated	General/Source	Result ¹	Range	Detection Limit ¹
Vankleek Hill	13/02/80	G	R	Well #1	BMDL	0	0.2
	13/02/80	G	R	Well #2	BMDL	0	0.2
	13/02/80	G	R	Well #3	BMDL	0	0.2
Verner	15/01/80	S	R	Veuve River	BMDL:C	0	0.35
					0.35:A	0.00-1.11	0.35
	15/01/80	S	T	WTP	BMDL:C	0	0.09
					0.17:A	0.0-0.56	0.09
Victoria Harbour	11/04/78	S	R	Georgian Bay	BMDL	0	0.2
	11/04/78	S	T	Pump House	BMDL	0	0.2
Vineland	25/01/78	S	R	Lake Ontario	BMDL	0	1.0
	25/01/78	S	T	WTP	BMDL	0	0.2
Virginiatown	03/09/80	S	R	Larder Lake	BMDL	0	0.09
	03/09/80	S	T	WTP	BMDL	0	0.09
Wabauskene	12/04/78	S	R	Georgian Bay	BMDL	0	2.0
	12/04/78	S	T	Pump House	BMDL	0	0.2
Walden	22/02/78	S	R	Vermillion River	BMDL	0	0.4
	22/02/78	S	T	WTP	BMDL	0	0.2
Walkerton	01/03/78	G	R	Well #1 & 2	BMDL	0	0.4
	01/03/78	G	T	WTP	BMDL	0	0.2

1. Result or detection limit followed by :A or :C denotes Amphibole or Crystotile fiber types. This designation only used when result or detection limit of the two fiber types are not identical. BMDL indicates Below Minimum Detection Limit.

Appendix 1: Abridged Results of Asbestos Survey

Municipality	Date Sampled	SAMPLE DESCRIPTION			ASBESTOS COUNT (10 ⁶ fibers L ⁻¹)		
		Surface or Ground	Raw or Treated	General/Source	Result ¹	Range	Detection Limit ¹
Walkerton (cont'd)	01/03/78	G	R	Well #3	BMDL	0	0.4
	01/03/78	G	T	WTP	BMDL	0	0.4
Wallaceburg	12/04/78	S	R	Chenal Ecarte	BMDL	0	0.4
	12/04/78	S	T	After filters	BMDL	0	0.2
Wallace (Gowanstown)	08/03/78	G	R	Well	BMDL	0	0.4
	08/03/78	G	T	WTP	BMDL	0	0.4
Wanapetoi	07/11/78	S	R	Wanapetoi	BMDL	0	0.4
	07/11/78	S	T	WTP	BMDL	0	0.2
Warkworth	28/02/78	S	R	Mill Creek	BMDL	0	0.4
	28/02/78	S	T	WTP	BMDL	0	0.2
Warren	04/09/80	G	R	Well	BMDL	0	0.09
	04/09/80	G	T	WTP	BMDL	0	0.2
	15/10/80	G	R	Well	BMDL	0	0.09
	15/10/80	G	T	WTP	BMDL	0	0.09
Waterford (Nanticoke)	31/01/78	G	R	Well	BMDL	0	0.2
	31/01/78	G	T	WTP	BMDL	0	0.2
	31/01/78	G	R	Deer Park	0.2:C	0.0-0.6	0.2
					BMDL:A	0	0.2
	31/01/78	G	T	WTP	BMDL	0	0.2
Wawa	29/04/78	S	R	Wawa Lake	BMDL	0	0.2

1. Result or detection limit followed by :A or :C denotes Amphibole or Chrysotile fiber types. This designation only used when result or detection limit of the two fiber types are not identical. BMDL indicates Below Minimum Detection Limit.



The Health and Environment Handbook
for Health Professionals

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Asbestos and Fibrous Materials

Origin and Uses

Asbestos is the commercial name for a family of minerals that separate into dust-like fibres when crushed. They are present naturally in rock formations worldwide. Of the six common types, chrysotile is the major type used in Canada.

Asbestos is a very good insulator against heat, cold, electricity and noise. It is also resistant to fire and many corrosive metals. It has been used for fireproofing (sprayed onto steel beams and overhead surfaces in commercial buildings, apartments and houses), as heat insulation (pipes, furnace boilers, heating and ventilation ducts), and as noise insulation (ceilings and walls). Both the spray application of asbestos and its use as pipe and boiler insulation on heating systems were stopped in 1973. Some of its current uses include insulation in brake linings, clutch facings and automatic transmissions in automobiles.

Fibrous glass (pink insulation) and mineral wool are examples of fibrous materials small enough to be inhaled.

Persistence and Movement in the Environment

Asbestos and fibrous materials tend to be inert until they are installed, removed or otherwise disturbed. It is non-biodegradable and environmentally cumulative. Asbestos does not evaporate, dissolve, burn, or undergo significant reactions with other chemicals. It does not evaporate into the air or dissolve in water. Small fibres may be transported long distances in the air or water. Asbestos fibres do not generally build up in plants or animals.

Exposure

Asbestos exposure is primarily through inhalation, while ingestion and dermal absorption are minor exposure routes. The size and shape of asbestos fibres affect the ability of the lungs to effectively remove them.

Exposure to asbestos fibres (through inhalation) is greatest in the occupational environment (mining, milling, industrial use of asbestos, and construction). Asbestos levels in ambient air may be elevated near asbestos-emitting industries, but in general concentrations are some thousand-fold less than those in occupational settings. Intake of asbestos from air has been suggested to be $< 0.6 \mu\text{g/day}$. In a Canadian survey, the fibre concentrations in raw water ranged from 6.4×10^6 – 190×10^6 chrysotile fibres/L. Water treatment further reduces asbestos levels in drinking water. Asbestos intake from water has been estimated at 1.88 ng (2 L/day of water containing 1.9×10^6 fibres/L). See the guidelines section for further explanation of asbestos in water. Nearly all ingested asbestos fibres are excreted in the feces.

Personal exposures to asbestos are determined by the fibre concentrations in the immediate vicinity of a person — measured in fibres per cubic centimetre of air (f/cm^3). In other words, risk is determined by exposures to airborne fibres rather than the presence of asbestos-containing materials in the building. This is an important concept because more exposure can be generated by attempts to remove asbestos than by preventing its release into the air by methods such as enclosure or encapsulation. For general occupants of a building asbestos is not a public health hazard **except**:

- a) if they are within the vicinity or range of air circulation of maintenance work disturbing asbestos; or
- b) significant quantities of asbestos-containing insulation have fallen onto building surfaces and are being disturbed.

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product liability suits to compensate workers or their heirs), Johns-Manville expressed the view that product liability suits were inadequate and inefficient methods of compensation. As an alternative, Johns-Manville proposed that government and labor join with industry to defray the costs of workers compensation through the creation at a state level of a "second injury fund" an alternative that industry, in general, is now vigorously supporting.

Public Exposure

In 1960 an alarming report came from J.C. Wagner in South Africa of sixteen new cases of the rare mesothelioma.³⁴ While six of these were in asbestos mine workers, none of the other ten had ever worked in the mines. All had lived in the vicinity of the mines, though, many as children. Public or non-occupational mesotheliomas have since been reported from nine other countries, including the United States. These cases are generally thought to be due to exposure of family members to asbestos brought home on the clothes of asbestos workers. Additional sources of exposure include contamination of the air with asbestos from nearby plants or factories. High concentrations of asbestos fibers have recently been demonstrated in communities adjacent to asbestos industries.

The indestructibility of asbestos, its indiscriminate use, and the careless disposal of its waste products make it difficult to predict the extent and level of exposure of the general public. For instance, Certain-Teed Products Corporation, an asbestos-cement pipe manufacturer, has in the past dumped about 2,700 tons each year of crushed asbestos pipe in an open-air landfill site in Ambler, Pennsylvania.

The dump not only snakes diagonally

through the very center of the town, which has a population of 8,000, but it is fifty feet high, anywhere from one to two city blocks wide, and about ten city blocks long. In fact, it is estimated to contain some million and a half cubic yards of waste material . . . Kids play on an asphalt basketball court that has been built smack on top of material from the dump, and is literally covered with loose asbestos fiber and wads of waste material containing (chrysotile) asbestos.³⁵

Drinking water is an additional possible source of non-occupational exposure to asbestos. Reserve Mining Company, a subsidiary of Armco and Republic Steel, for years has been dumping taconite mine wastes, rich in asbestos fibers, into Lake Superior at levels of about 67,000 tons a day. Not unreasonably, this gave rise to fears that polluting the drinking water of Great Lakes communities with asbestos would lead to excess cancer rates, especially of the stomach and colon.³⁶

In April, 1974, Federal District Judge Miles Lord issued an injunction in Duluth, Minnesota, restraining the Reserve Mining Company from further dumping its taconite mine wastes into Lake Superior. Reserve Mining witnesses attempted to prevent this ruling by testifying that there were no alternatives to this lake dumping, although it appears that the company had developed plans for land disposal sites as early as 1970.

It is not yet known whether the resulting asbestos contamination of drinking water of Lake Superior towns, including Duluth, will lead to cancer. Preliminary studies with laboratory animals have so far yielded ambiguous results. Certainly, it has been established that persons occupationally exposed to asbestos have an increased risk of alimentary tract

health problems, which reflected "a very apparent antibusiness bias." In the following month Johns-Manville threatened Congressman George Miller (D-Calif.) with a libel suit if he repeated

outside Congress statements he had made charging the industry with decades of "cover-up and lies" and failing to disclose the other workers' information on compensation settlements.

cancer* as well as lung cancer. Without waiting for answers to these questions, a Federal Appeals Court reversed Judge Lord's decision, on grounds that it was not based on adequate proof of risks to health, and permitted Reserve Mining to resume dumping its tailings into the lake, pending the development of alternate land disposal sites.

In May, 1975, Congress approved \$4 million to build a water treatment plant in Duluth to filter out the asbestos fibers from drinking water. The State of Minnesota appropriated \$2.5 million in local funds for the project, which became operative in November, 1976. Reserve Mining is now phasing out lake dumping, and is building a land disposal site, in accordance with a court order that dumping is to be terminated by 1980.³⁷

In addition to environmental exposure to asbestos in air and water, the general public receives a wide range of further exposures.³⁸ Particularly important sources are construction operations involving the spraying of asbestos, the use of crushed stone containing unbound asbestos in roads and driveways, and demolition. Exposure to asbestos also results from its use in fireproofing and insulation, air ducts, automobile brake linings, cement water pipes, filter pads for beers, wine, and drugs, cosmetic talcs, and hand-held hair dryers. Resulting levels of public exposure can be high. For example, counts of 10 million fibers per cubic meter of air have been found

in the vicinity of construction sites during asbestos spraying, and counts of 3 million fibers have been found in public buildings, and schools treated with asbestos as a fire retardant.^{†39}

Regulation of Public Exposures

In an ineffective attempt to protect the general public from asbestos air pollution, EPA developed an emission standard for asbestos as a hazardous air pollutant in April, 1973. The standard, however, is only based on visible emissions and on poorly enforced work practices, and not on asbestos fibril counts.[‡]

Acting on a petition from a public interest group, the Natural Resources Defense Council, the Consumer Product Safety Commission announced in December, 1977, that patching and spackling compounds containing asbestos would be banned from the \$400 million market by June, 1978. Under the commission's order, fifty manufacturers ceased production in January, 1978, leaving retailers the next six months to clear their shelves. While these patching compounds are used primarily by professional builders, about 10 percent of the market is for home hobbyists and craftsmen.

The Future

Realization is gradually dawning that except under the most restrictive conditions all forms of asbestos have become too expensive

* These include pharynx, esophagus, stomach, colon and rectum cancers.

† In May, 1979, the House Education and Labor Committee voted to establish a three-year, \$330 million program to detect and remove asbestos material from schools, where it had been widely used for soundproof ceilings and insulation from about 1960 to 1973, when its use was banned. Under heavy lobbying, the Committee voted against levying the industry for a \$30 million detection fund, but directed the Justice Department to investigate whether the government "should or could" sue the industry to recover all or part of the costs. Johns-Manville, which sup-

plied the asbestos to the manufacturers and construction industries, contends that levels in schools are too low to cause cancer. Also in May, 1979, Gloria Zwerdling, a former school teacher, filed a \$2.5 million suit in Manhattan Supreme Court against fourteen corporations including Johns-Manville, claiming that she had contracted lung cancer from asbestos insulation used in schools.

‡ The only effective method of measuring community exposure to asbestos is by counting fibrils using electron microscopy, which in fact is rarely done. Results are expressed as a mass in nanograms per cubic meter.

in terms of human disease for commercial use. Further illustration of this are the individual and class action suits for asbestos cancer and disease, in the multimillion-dollar range now being filed by some of the four and one-half million workers employed in Naval shipbuilding yards during World War II.

The Navy has since abandoned the use of asbestos in shipbuilding in favor of alternative materials, including fiberglass. However, there are also reasons for concern on the use of fiberglass as an asbestos replacement. Experimental studies indicate that fiberglass, particularly the more modern short-fiber products which were introduced into large-scale use in the early 1960s, may produce a type of disease and cancer similar to that produced by asbestos.⁴⁰ Epidemiological studies are now only suggestive of an increased cancer risk, probably because exposed workers have not been followed up for the three or so decades it generally takes for asbestos fibers to induce cancer. Industry is attempting to quiet these concerns in moves which reflect the growing shift from asbestos to fiberglass for insulation and a wide range of consumer products, including draperies. An interesting insight into such tactics was afforded by a recent letter to *New Times* by Johns-Manville's Kotin, bearing no reference at all to his industry employment, protesting that "epidemiological studies show that there is no chronic health effect in humans as a result of exposure to fibrous glass."⁴¹

Apart from fiberglass, other possible replacements for certain asbestos applications include long inorganic fibers made from aluminum or zirconium, such as those manufac-

tured by Imperial Chemical Industries of England.

Another area of growing concern relates to the emerging trend in the asbestos industry to relocate in lesser developed countries, such as Mexico and Taiwan, where their capital investment is welcomed and not restricted by governmental health and safety regulations.⁴²

On April 26, 1978, HEW Secretary Joseph Califano issued the most explicit warning ever made by government on the dangers of asbestos. Califano estimated that as many as half of all workers exposed to asbestos could develop serious diseases such as cancer of the lung and gastrointestinal tract, mesotheliomas, and asbestosis. Califano also estimated that from 8 to 11 million workers may have been exposed to asbestos since the start of World War II. Besides urging exposed workers to have a chest X-ray, HEW has sent a "physician advisory" letter regarding the dangers of asbestos to the nation's 400,000 doctors.* While Califano properly stressed the added danger of smoking to asbestos workers, an impression of "blaming the victim" appears to have been created by the absence of any balancing reference to the more urgent needs for control of exposures in the workplace.

Califano's statement appears to have been prompted by the growing number of lawsuits filed against federal agencies for having failed to notify workers in the past of the known hazards of asbestos exposure.† As such, Califano's statement is also important for what it failed to say. Workers were not informed of their rights to sue the government. Nor were any plans announced for organization of a surveillance program, including con-

* The gravity of the Califano statement has been underlined by preliminary findings in May, 1978, of lung abnormalities in 59 percent of 360 workers in northern California shipyards, and by the subsequent report that of 6,640 workers who handled asbestos products for over seventeen years at the Long Beach Naval Shipyard, 31 percent are now suffering from asbestosis. In spite

of Califano's warnings, as of January, 1979, neither NCI, NIOSH, nor any other agency has yet developed plans for the surveillance and examination of the millions of asbestos workers at risk.

† So far, about 1,000 asbestos law suits have been filed and some 500 asbestos workers have collected \$20 million in damages, including \$5 million from the federal government.

tacting and examining former government workers. Nor was any mention made of the long overdue need to implement the recommendation of NIOSH for a 100,000 fiber standard as the only meaningful way to protect against asbestos-induced cancers and disease. Finally, no mention was made of the growing evidence of the hazards to the public-at-large, particularly those living in the vicinity of asbestos plants, quite apart from exposures due to asbestos containing consumer products.‡

In spite of all the problems of omission and emphasis in the Califano statement, its significance is epochal and unique. It opens the door of national health care policies to preventive medicine. Specifically, the statement recognizes in principle that prospective surveillance is needed for groups at high risk of cancer, although how this will be achieved for asbestos workers is still unclear. It is likely that the high costs of surveillance may well act as future incentives to reduce risks of occupational exposure to carcinogenic and other highly toxic agents, forcing the ultimate realization that prevention is cheaper than "cure."

Summary

While the dangers of asbestos have been well recognized for over five decades, the industry was able to largely ignore or suppress these until studies in the 1950s by Doll in England and by Selikoff in the U.S. (sponsored by the asbestos insulators union) established the relationship between asbestos and asbestosis and cancers at various sites. Since then the industry has employed scientific expertise to advocate its position in professional journals and to successfully resist and prevent effective government regulations. With an estimated 8 to 11 million workers

having been exposed since World War II, the toll of asbestos occupational disease and cancer is now reaching epidemic proportions. Workers have begun to exercise legal initiatives, including third-party and medical malpractice suits, resulting in multimillion dollar awards.

Concerns are also mounting on the dangers to the public from "low-level" asbestos contamination of air and water and from asbestos-containing consumer products such as hair dryers.

As the realization is dawning that asbestos is too expensive in terms of disease and death to continue using, the industry is beginning to develop the strategies of relocating in lesser developed countries and promoting the use of fiberglass as an asbestos substitute in the United States. There are serious unresolved questions as to the dangers of fiberglass and there are possibilities that it may be no less hazardous than asbestos.

The massive human toll taken by asbestos is probably the single most important incentive to the development of coherent national policies recognizing preventive medicine as a major future component in the delivery of health care.

Vinyl Chloride

One of the most common pejoratives applied to modern times is "the plastic age." And just as age-old natural materials like wood, glass, and metal have been replaced by cheaper synthetic plastics, this seems to imply, so has the value of our lifestyle been degraded. Many things we now touch or use daily are made of plastic. Yet the plastic transformation of our society has only taken place over the last forty years. The consequences to society of its plasticization, in terms both

‡ Effective regulation of the countless asbestos-containing consumer and industrial products must necessitate complete inventorying and material

balance audits of all asbestos imported, mined, processed, and fabricated in the U.S.