INTERNATIONAL ENVIRONMENTAL RESEARCH FOUNDATION

COMMENTS ON THE

World Health Organization's Draft Policy Paper to

Ban All Asbestos Fibers-type to Reduce Asbestos-related Disease

Submitted to
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We are writing to comment on the Draft WHO Policy Paper (http://www.who.int/occupational_health/publications/draft.WHO.policy.paper.on.asbestos.related.diseases.pdf) that calls for a ban of *all* forms of asbestos. We believe that any such ban must be proposed with a full understanding of the history of similar proposals. The 35-year old international effort to reduce the permissible exposure to asbestos, including banning those activities and products that are inherently dusty, has reduced, and perhaps eliminated occupational asbestos-related diseases.

All of these have to wrestle with the fundamental definition of asbestos. Starting with Pliny, asbestos means "does not burn" (Ross and Nolan 2003). Your first sentence correctly adds further restrictions: fibrous, tensile strength, and resistance to chemical attack. Some of the alternates to asbestos (mineral wool) might satisfy this definition. Further restrictions are usually made as the next sentence reveals. But then you fail to face up to the next fundamental question. What justification is there for treating all forms of commercial asbestos the same, or what justification is there for treating them differently? We suggest that enough is now known to treat them differently.

Proposals to ban asbestos completely started in 1968 with the United Kingdom's voluntary limited ban on crocidolite with Iceland following in 1983 with a limited ban on some uses of asbestos. In 1979 the US Environmental Protection Agency proposed a phased ban of asbestos. This was very fully discussed perhaps because judicial review was anticipated (United States 1991). We are therefore recommending that the WHO carefully review the 1991 US court decision in this case for lessons learned and specifically address the stated reasons why the US court *declined* to ban any forms of asbestos.

Since 1991 several additional developments have occurred that have changed the nature of, and understanding of, asbestos exposure worldwide. First, the use of the more dangerous amphibole asbestos minerals has been eliminated from commerce. WHO failed to comment on this important development when reviewing the US Geological Survey's mineral year books and we bring this to your attention. Secondly, quantitative risk assessments which distinguish the three significant commercial asbestos fiber-types (crocidolite, amosite and chrysotile) were published by Hodgson and Darnton (2000). Although Hodgson and Darton's work has been criticized, and there is considerable uncertainty, no WHO proposal can be complete without addressing asbestos fiber-type specific health risks in a modern way. The dilemma has been simply expressed. Should we treat all types of asbestos the same until they are proved to be different or should we treat them differently until we can prove they are the same? Referring in their policy paper to asbestos as "it" when "it" is known to be a set of substances emphasizes the incompleteness of the WHO proposal. Banning the above three major fiber-types (crocidolite, amosite and chrysotile) might easily be justified but would now be irrelevant. Any justification to ban *all* asbestos should therefore be focused on the evidence against the last asbestos fiber-type remaining in commerce - chrysotile asbestos - rather than the combined health hazards of all the asbestos fiber-types and treating them as one substance (see Figure 1 and 2).

As written the WHO's policy paper does not present a reasonable justification for banning chrysotile asbestos now that amphibole asbestos minerals have been eliminated from commerce. The adverse health effects attributed to high exposures of undifferentiated asbestos exposures can all be attributed to past, mostly very high, exposures of amphibole asbestos. There is little or no evidence that the health risks from chrysotile asbestos are too great and the exposures cannot be, and have not been, controlled (Nolan *et al.* 2001, Wilson *et al.* 2001, Bragg *et al.* 2001). Not only is it probably a much less carcinogenic form than other asbestos types, but the exposures now contemplated in regulation and in practice are 100 times lower than in the "bad old days". At a very minimum the WHO should address the various agency and court decisions in the USA rejecting this approach and specifically address the papers referenced above, and below in the specific comments section, in the conferences specifically convened in the last 15 years to address this issue. They were not addressed in the IARC supplement 7 (1987) nor the IARC volume 83 to which the policy document refers.

Since these comments were prepared on short notice, we have not yet had the opportunity to read the WHO consensus report on chrysotile of November 2005.

Below are our some specific comments on specific sections of the report.

Specific Comments:

The policy paper's title should be changed to read "Banning Asbestos to Eliminate Asbestos-Related Disease" as it less ambiguous.

1. *Page 1, Paragraph 1:* The only asbestos fiber-type with any significant present commercial consumption is chrysotile asbestos which is unstable in slightly acid solutions not "relatively resistant to chemical attack". In the 21st Century commercial use of amphibole asbestos has been eliminated and WHO should state this up front and focus the ban justification specifically for chrysotile asbestos as the marketplace has already banned the amphibole asbestos minerals from commerce.

2. *Page 2, Paragraph 3, Last Sentence:* There is no reference supporting the statements about intensity of exposure with various activities or numeric fiber concentrations.

3. *Page 1, Paragraph 3:* Currently the global population is excess of 6,542 million while WHO reports only 124 million with asbestos exposure or 1.9%. Chrysotile asbestos has been found in ice cores from both the Arctic and Antarctic icecaps (Bowes *et al*. 1977, Kohyama 1999). The depth of the asbestos fiber in the icecaps indicates airborne asbestos was present prior to the start of its significant industrial use about 125 years ago. Therefore chrysotile was airborne in both the earth's

hemispheres prior to its industrial use. Much more than 1.9% of the Earth's population is asbestos exposed primarily to chrysotile asbestos (Langer *et al.* 1971, Nolan *et al.* 2007). The WHO's statement the "about 124 million in the world are asbestos exposed" is misleading and incorrect. The percentage of asbestos exposed individuals in the world is closer to 100% than it is to 1.9%. Does WHO mean 1.9% have "significant occupational exposure" to differentiate them from the vastly larger population with low-level background exposure to asbestos? About 1% of the population dies each year and therefore 1.24 million deaths occur in the "asbestos exposed group" of which WHO claims 89,000 deaths or 7.2% are asbestos-related. Such a high mortality from asbestos-related disease would only occur in a cohort with a significant occupational asbestos exposure including amphibole asbestos (Hodgson and Darnton 2000, Nolan *et al.* 2006).

4. Historically the incidence of asbestos-related disease has been poorly estimated in large populations and these "projections" were then used to provide misleading information for public policy. Claims of large numbers of asbestos-related deaths derived from "tricky arithmetic" are dramatic and therefore readily accepted by journalists. In 1978 two US federal agencies - the National Cancer Institute and the National Institute of Environmental Health Science – predicted in the next 30 year period 2,000,000 premature deaths from asbestos making the astonishing claim that 17% of all US cancer deaths would be asbestos-related (Efron 1984, page 437). They simply assumed, with extraordinary exaggeration that unfortunately was common at the time, that everyone exposed to *any* asbestos fiber-type at *any* airborne concentration in his occupation would experience an incidence of asbestos-related disease similar to that of a highly exposed asbestos insulation worker. This assumption is false and therefore the estimate is high. The WHO statements on *page 1 in paragraph 3* indicate mesothelioma mortality in WHO's 124 million asbestos exposed group is about 3.5% (43,000 cases in 1.24 million deaths). This is a higher mesothelioma mortality than has ever been reported in any chrysotile asbestos exposed cohort (McDonald and McDonald 1996, Hodgson and Darnton 2000). The WHO should, at a minimum, carefully explain their projected asbestos deaths and their argument should be specific for chrysotile asbestos as this is the only commercially important asbestos fiber-type presently in commerce. For example, Figure 2 compares the relative potency of crocidolite asbestos to chrysotile asbestos. Crocidolite asbestos has been reported by Hodgson and Darnton (2000) to be 500-fold more potent at causing human mesothelioma than chrysotile asbestos. A 1% mesothelioma mortality occurs after a cumulative crocidolite asbestos exposure of just 2f/mL x years while chrysotile asbestos requires an exposure of 1,000 f/mL x years to reach the 1% level. To reach the 3.5% mesothelioma mortality WHO is predicting for their 124 million asbestos exposed people would require a cumulative chrysotile asbestos exposure in excess of 3,000 f/mL x years. At a current permissible exposure level (PEL) of say 2f/mL this would require 1,500 years of work or 40 years at 37.5 times the 2f/mL PEL. To reach the 3.5% mesothelioma incidence WHO is assuming that all present and

future exposure is to amphibole asbestos. The asbestos-related disease pattern in the 124 million group is misleading and should not be used to justify banning chrysotile asbestos.

5. *Page 1 in Paragraph 3:* Exposure to amphibole asbestos, particularly crocidolite and tremolite asbestos, in the 21st Century will be primarily environmental (Browne and Wagner 2001, Ross and Nolan 2003, Nolan et al. 2006). The asbestos ban policy WHO is proposing will have little or no effect on these causes of asbestos-related disease.

6. *Page 1, paragraph 4:* The increased risks of lung cancer have been reported in at least three crocidolite exposed cohorts why "mixtures containing crocidolite"? (Hodgson and Darnton 2000). What is "tremolite material mixed with anthophyllite and small amounts of chrysotile"? Is the WHO referring to the tremolitic talc mined in New York State? If so, this section is misleading and incorrect. Tremolitic talc exposure has not been causally associated with increased risk of mesothelioma or lung cancer (Lamm *et al.* 1988, Honda *et al. 2002*). WHO is not proposing to ban tremolitic talc, even though there are data suggesting there is no justification? References to tremolitic talc should be deleted from the policy paper.

7. *Page 1, paragraph 4:* There is *no* established evidence of mesothelioma occurring in the general population living in the neighborhood of asbestos factories even for all the amphibole asbestos fiber-types listed and certainly not for chrysotile asbestos and tremolitic talc (Browne and Wagner 2001, Nolan *et al.* 2006 Nolan *et al.* 2007). The only cohort study of the general population living around an amosite factory was done in Paterson, New Jersey. The results were negative for increased risk of asbestos-related lung cancer and mesothelioma (Hammond *et al.* 1979). The statements by WHO are incorrect. No such information exists for increased risk of mesothelioma from living around a tremolitic talc mine or mill let alone a factory using this mineral assemblage commercially. Chrysotile asbestos has rarely, if ever, been associated with increased risk of human mesothelioma even after historically high occupational exposures to large populations (McDonald and McDonald 1996, Hodgson and Darnton 2000, Nolan *et al.* 2006). No consistent pattern linking environmental exposure to chrysotile asbestos with increased risk of mesothelioma has been found in the general population in South Africa or the Russian Federation (Browne and Wagner 2001, Shcherbakov *et al.* 2001, Nolan *et al.* 2006).

8. *Page 2, first full paragraph, last sentence:* "No threshold has been identified for carcinogenic risk" is a misleading and over simplified statement. That it is often said is no excuse for it being said by WHO. A threshold for asbestos-related cancer (or for respiratory diseases caused by fine particles for that matter) has never been proven to exist, nor shown not to exist (Wilson and Price 2001). Hodgson and Darnton (2000) speculate that peritoneal mesothelioma may have a threshold. The only point that can be made for any ailment is that very low asbestos exposures are

associated with small, if any, increase in cancer risk (Figure 1 and 2 and Nolan *et al. 2005*). Is the WHO position that only a zero risk of asbestos-related cancer from its commercial use is acceptable? We remind WHO of Wildavsky's famous paper: "Zero risk is highest risk of them all" (Wildavsky 1979).

9. Page 3, paragraph 1: "Lung cancer and mesothelioma have been observed in populations exposed to very low levels of asbestos" Limitations in our knowledge of the smoking history in asbestos exposed cohorts limits our ability to accurately estimate increased lung cancer risk after slight asbestos exposures. The statement should be divided and the limitation of smoking history addressed. The WHO draft policy is silent on the significant role that smoking plays in determining the number of asbestos-related lung cancer in a cohort. The increased risk of asbestos-related lung cancer is a percentage of the underlining lung cancer risk which is markedly increased by smoking (Figure 1). Only populations with "low-level environmental" exposure to crocidolite asbestos and tremolite asbestos develop increase incidence of mesotheliomas (Constantopoulos *et al.* 1987, Browne and Wagner 2001, Ross and Nolan 2003, Nolan *et al.* 2006). The importance of asbestos fiber-type in producing mesothelioma after low-level asbestos exposure should be fully investigated by WHO.

10. *Page 3, paragraph 4:* "Therefore, the most efficient way to eliminate asbestos-related disease is to cease to use asbestos". The approach WHO characterizes as the most "efficient" others have characterized as the most burdensome regulatory option! It therefore requires the greatest justification (United States 1991). If WHO proceeds with a policy that eliminates the possibility of controlled use of chrysotile asbestos by their Member States they must provide a risk benefit analysis and comment in detail about the safety of the asbestos substitutes (Camus 2001, Wilson *et al.* 2001). The US Environmental Protection Agency proposed such a ban but could not justify such a burdensome solution. WHO should review in detail the EPA's justification and why it failed (United States 1991).

11. *Page 3, paragraph 4:* The WHO policy mentions a desire to eliminate asbestos cement as did EPA in their 1979 proposal to ban asbestos. WHO did not comment on EPA's estimate that a ban on asbestos cement pipe would save three lives in the entire US population over a 13-years period at a cost of $43-76 million per life while the ban on asbestos shingles would cost $23-34 million to save 0.32 statistical life (or $76-106 million per life saved). Is WHO asking its Member States to accept the ban which was remanded back to the EPA in 1991 because they "failed to muster substantial evidence" to support their position that modern asbestos products present an unacceptable risk to the public? The EPA did not provide this evidence. We have argued that such evidence does not exist (Nolan *et al.* 2001, Wilson *et al.* 2001) and the elimination of the commercial asbestos amphiboles from commerce strengthens this argument.

12. *Page 4, paragraph 4:* WHO should comment on the impact the ban on asbestos cement pipe would have on other important aspects of society and in particular those for which WHO is responsible such as their efforts in increase the percentage of the global population with clean drinking water. This is a hard task, but should be done before a complete ban is accepted as the best option. We illustrate in what follows the difficulties that immediately arise which should be addressed. Over 1 billion people lack clean drinking water according to UNCEF and WHO. Sanitation is available for only 40% of the global population with 80% of the "have nots" in sub-Saharan Africa and Eastern or Southern Asia. Yet we understand that these are the regions of the world currently using chrysotile asbestos for their water pipes. Obviously no such ban should be contemplated without verifying that safer substitutes are available *that are known to be safer* using the same procedures as used to justify that chrysotile asbestos is dangerous. The two most common substitutes for asbestos cement water pipe are both human carcinogens – ductile iron and vinyl chloride (United States 1991). Neither of these two materials appears in the WHO list of "safer substitutes". It seems to us that comprehensive analysis of the technological feasibility, and the risk, assessed with proper regard to the precautionary principle, of "safer substitutes" would be more helpful to the Member States than a recommendation to use safety goggles and protective gloves when working with asbestos.

13. *Page 4, bullet points*: WHO's policy draft has *not* made a persuasive argument explaining why a ban on chrysotile asbestos is necessary, or even helpful, in reducing asbestos related diseases, nor is it obvious why WHO should partner with "major international actors" to attempt such a task.

In conclusion, we submit that WHO, rather than pursing the instant policy paper, should initiate a seminar and update of its Environmental Health Criteria 203 on chrysotile asbestos which was published in 1998. Such action would be better for society at large. If you have any questions or would like additional information please feel free to contact us.

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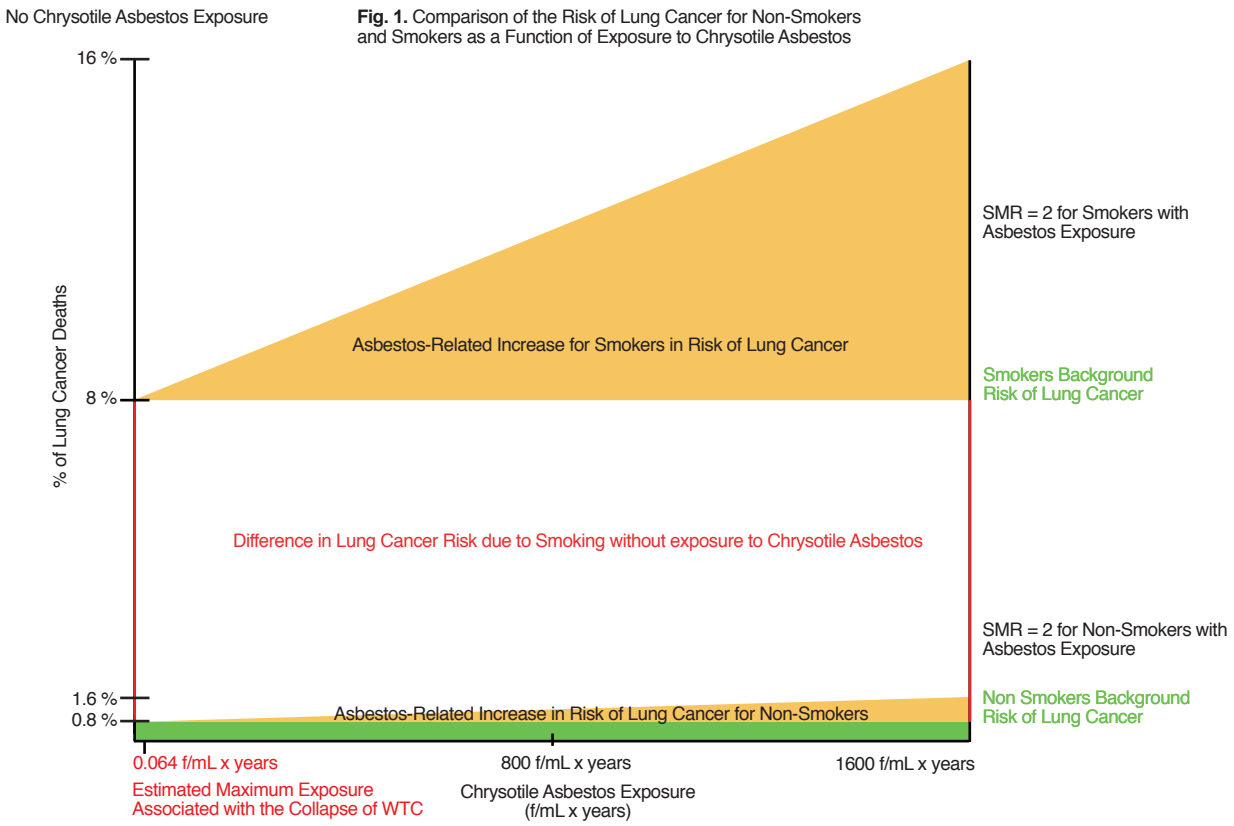

Fig. 1. Comparison of the Risk of Lung Cancer for Non-Smokers and Smokers as a Function of Exposure to Chrysotile Asbestos

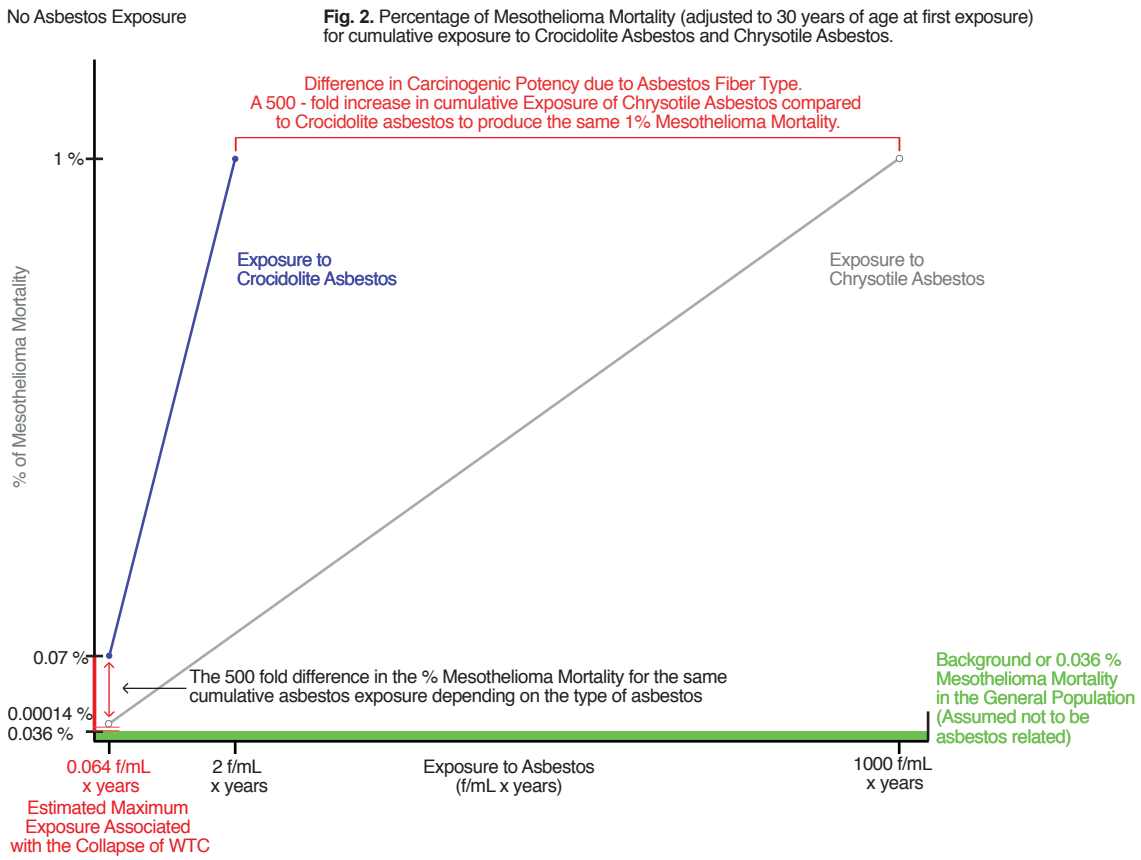

Fig. 2. Percentage of Mesothelioma Mortality (adjusted to 30 years of age at first exposure) for cumulative exposure to Crocidolite Asbestos and Chrysotile Asbestos.