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THE ASBESTOS INSTITUTE

sensible management of a natural resource

G. R. LARSON

No Excess Lung Cancers Detected From Chrysotile Exposures Less Than 50 f/cc

Important Study Finds That at Exposure Levels Below a Threshold of 50 f/cc, Chrysotile Asbestos Is Not Linked to Any Increased Incidence of Lung Cancer.

Preliminary results from the largest cohort study of chrysotile workers ever undertaken were released this past September at the 9th International Symposium on Epidemiology and Occupational Health held in Cincinnati, Ohio. The study, conducted by Doctors F.D.K. Liddell, A.D. McDonald and J.C. McDonald of McGill University evaluated

more than 11,000 chrysotile miners in Québec born between 1891 and 1926. Initiated in 1966, the study was designed to define as accurately as possible the quantitative relationship between exposure to chrysotile asbestos and the incidence of lung cancer. Cohort data has been collected five times since, the latest in May of 1992.

Based on exposure data gathered by the mines, and comparisons of Standard Mortality Ratios (SMR = observed mortality / expected mortality) the authors concluded that any excess cancer mortality was found only among workers exposed to more than 50 f/cc for a period of 20 years or more.

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Policy Considerations and Theory, Not Science Have Guided Asbestos Regulations

For years the linear model of risk analysis has been applied to the regulation of chrysotile asbestos exposure. Today scientists are questioning the validity of this approach.

The linear model of risk analysis holds that a substance which is toxic at extremely high doses can have a health impact at levels many orders of magnitude lower - even if there are no observable effects at these levels. The linear model maintains that effects may exist, yet

are not detectable with current techniques. This model has traditionally served as a guideline for setting exposure limits and other regulatory action. In the face of mounting evidence that for many known carcinogens there appears to be a threshold level of exposure below

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No Excess Lung Cancers ...

This landmark study confirms the findings of other less extensive research which has found no excess mortality risks resulting from low-level exposures to chrysotile asbestos. For example, Churg (1986) discovered that residents of chrysotile mining communities who were exposed to fibre levels from 200 to 500 times higher than those common in most North American cities showed no evidence of a higher incidence of asbestos-related disease. Other studies examining work place exposures have corroborated these findings. Newhouse & Sullivan (1989) conducted a 40 year mortality study in a factory producing chrysotile-based friction materials. They concluded that despite exposure levels substantially higher than those currently found, chrysotile asbestos was processed with no detectable excess mortality. Similar findings have also been observed in studies of chrysotile exposure in the asbestos/cement industry (Ohlson & Hostedt, 1985; Thomas et al, 1982; Weill et al, 1979).

The Liddell, McDonald & McDonald report not only supports these previous findings, but it makes a significant new contribution to our understanding of the nature of the threshold level of exposure responsible for inducing chrysotile-related disease. In terms of its implications for industrial hygiene policy, the study provides compelling evidence that the controlled-use approach to chrysotile asbestos is not only feasible, but given that current exposure levels around the world are frequently 1 f/cc or less, it is the most logical regulatory option. ■

Previous Data on Chrysotile Exposure Support New Findings

Although the Liddell, McDonald & McDonald study is the largest and most thorough cohort study to date, a number of scientific antecedents support its conclusions.

Churg, A. Lung. *Asbestos content in long-term residents of a chrysotile mining town.* American Review of Respiratory Disease, 1986, 134(1): 125-127.

Study comparing health effects in residents of chrysotile mining towns, where levels are from 200 to 500 times higher than in most North American cities. In spite of higher levels, no evidence of higher asbestos-related disease was found.

Newhouse, M.L. and Sullivan, K.R. *A mortality study of workers manufacturing friction materials :1941-86.* British Journal of Industrial Medicine, 1989, 46(3): 176-179

The authors confirm that there was no excess mortality from lung cancer, other asbestos-related tumours or chronic respiratory disease.

Ohlson, C.G. and Hogstedt, C. *Lung cancer among asbestos cement workers; A Swedish cohort study and review.* British Journal of Industrial Medicine, 1985, 42(6): 397-402.

A cohort study of 1176 asbestos-cement workers in a Swedish plant using chrysotile asbestos found no excess mortality at exposures of between 10-20 f/ml.

Thomas, H.F., Benjamin, I.T., Elwood, P.C. and Sweetnam, P.M.. *Further follow-up study of workers from an asbestos cement factory.* British Journal of Industrial Medicine, 1982, 39(3): 273-276.

A follow-up study of 1,970 workers in an asbestos-cement factory using chrysotile only showed no significant Standard Mortality Ratio (SMR) excesses. The causes of death investigated included neoplasms and cancers of the lung, pleura and gastrointestinal tract.

Weill, H., Hughes, J. and Waggespack, C.. *Influence of dose and fibre type on respiratory malignancy risk in asbestos cement manufacturing.* American Review of Respiratory Disease, 1979, 120(2): 345-354.

An investigation of 5,645 asbestos-cement manufacturing workers found no increased mortality resulting from chrysotile exposures of approximately 15 f/ml. years.

A/C Pipe Makes a Resurgence in the U.S.

After several years of uncertainty, the overturn of the ban on asbestos products in the U.S. is beginning to revitalize its asbestos cement pipe industry.

Following the reversal of the U.S. Environmental Protection Agency's (EPA) ban rule many water authorities are considering returning asbestos cement (a/c) pipe to their specifications. Although it has long been recognized for its superior durability, performance and relatively low cost, the introduction of any new a/c pipe systems had been all but eliminated by the EPA ban rule.

In its ruling striking down the ban and phase-out of most asbestos products, the Fifth Circuit Court of Appeals concluded that no substantial evidence was presented to support a ban of asbestos pipe. In fact the proceedings did more to raise concerns regarding the health risks of competing products such as PVC or ductile iron pipe. With the reputation of A/C pipe clearly restored, so too are the prospects for its manufacturers.

In June of 1992, the West San Bernadino Water District officially announced that because of the reversal of the EPA ban, it will henceforth return A/C pipe to its specifications and sanction its installation. Several other city water agencies have followed suit with similar announcements, and many more are considering returning a/c pipe to their specifications.

In addition, the Bureau of Reclamation, a long-time user of a/c pipe and a U.S. Government agency has revoked its moratorium on its installation and has returned it to its material specification list. The Bureau explained that changes in technology and controlling regulations have made it possible to work safely with A/C pipe and have minimized the environmental concerns once thought to be presented by its use.

Prior to the EPA's ban, A/C pipe's technical and cost advantages resulted in more 500,000 km's being installed throughout the U.S.. Although the process of rebuilding the A/C pipe market will be a lengthy one, these latest developments are an encouraging sign for the industry. ■

An in-depth Special Report on the advantages of A/C pipe is available through the Asbestos Cement Pipe Producers Association (ACPPA) or the Asbestos Institute.

EPA's Science Advisory Board Critical of Agency's Asbestos Program

In a letter to EPA Administrator William K. Reilly dated April 21, 1992, the U.S. Environmental Protection Agency's Science Advisory Board (SAB) was critical of the agency's regulatory approach on asbestos.

The comments of the SAB followed a public meeting held on Feb. 24-25, 1992 of SAB's Indoor Air Quality and Total Human Exposure Committee which included several presentations by EPA officials.

Amongst other things, the SAB questioned the scientific basis for past EPA regulatory action regarding asbestos and criticized its research programs which appear to be based on outmoded notions of which fibres need to be measured and controlled..."

In terms of the risks of substitute fibres, the SAB had this to say; "It is possible that replacement fibres for asbestos in products and buildings may be as hazardous or more hazardous than the asbestos products they replace. Such research [on the critical issue of fibre properties] is needed if the Agency is to make scientifically sound policy decisions regarding asbestos and substitute products." ■

" stringent regulation and frightening publicity have led to public anxiety and chemophobia... the cost of cleaning up phantom hazards will be in the hundreds of billions of dollars with minimal benefit to human health. In the meantime, real hazards are not receiving adequate attention."

P. Abelson

Associate Editor, Science

Policy considerations ...

which there are no detrimental health effects, many scientists are recommending that we rethink our approach to risk assessment. As such, legislators are asked to recognize the limitations of the linear model as a basis for regulatory policy.

Scientific Limitations of the Linear Model

There are a number of serious problems which can arise from applying the linear model of risk assessment which extrapolates from high dose exposures to much lower ones. Any of a number of experimental flaws can alter the slope of the dose-response curve and result in an inaccurate estimate of risks at the low end of the exposure scale. Experimental errors, and the effects of insufficiently large data pools or slight variations in chemical composition are magnified many times over as data from very high doses is extrapolated to very low doses. The end result is that predictions based on the linear model have resulted in gross exaggerations of the actual health risks and carcinogenicity of many substances at low levels of exposure. This has clearly been the case for asbestos. The actual number of asbestos-related cancers observed in the U.S. is more than 20 times less than the original estimates based on the linear extrapolations of Dr. Irving Selikoff and the U.S. Department of Health Education and Welfare (HEW).

Despite these and other serious limitations as well as the existence of other more realistic interpretations of the data, extrapolations from high dose exposures have fre-

quently been used as the principal instrument for determining chrysotile exposure limits and regulatory policy. The reality is that once a risk estimate is calculated and published, regardless of its validity or accuracy, it can be used as a platform to justify unwarranted and extreme action.

All Substances are Potential Toxins

Supporters maintain that it is prudent to err on the side of caution. They believe that although at low doses no carcinogenic effect may be observed, it is possible that these effects exist, but are undetectable with current data and methodology. In theory, this is true. Zero risk for any substance cannot be proven with absolute certainty, nor will it ever be. Clearly all substances are potential toxins and can never be proven to be without risk. This includes exposures to common and essential substances such as salt, water or even oxygen. At very high doses any substance can be carcinogenic and the risk factor will always decline as the dose declines. Conversely, even the most toxic substances such as arsenic are not only safe at low doses, but necessary to our survival. The challenge for regulators, with the assistance of scientists, is to determine what level of safety is acceptable. In the case of chrysotile asbestos and many other substances, the linear model of extrapolations has proven ineffective. The high level of uncertainty in extrapolating from high doses to much lower ones is beyond that which is acceptable. It has led to misinformation, unrealistic risk estimates and ultimately to ill conceived and unrealistic regulations.

Redefining the Basis for Regulatory Action

Today many scientists believe that extrapolations should be restricted to one order of magnitude outside the observable range (see article on National Toxicology Program). As the faulty risk estimates for chrysotile have demonstrated, extrapolations below this range are not reliable, accurate or useful. In addition, the notion of a threshold level of cancer induction is gaining acceptance in the scientific community as well as in the regulatory arena. Research such as the Liddell, McDonald and McDonald study provide compelling evidence for the existence of a threshold for chrysotile related disease which is many times higher than currently acceptable exposure limits. Critics may say that in theory, even though no increased cancers were observed below 50 f/cc, it is possible that chrysotile has a carcinogenic effect that is not detectable. If there is no observable carcinogenicity and no increased incidence of cancers, and this has been shown time and again through numerous studies across different populations, perhaps the issue of theoretical risk is a moot one. Regulators must look at the observed threshold, consider an adequate safety factor and determine exposure limits based on the strength of human epidemiological data. ■

Sources:

Tubiana, M., *The Carcinogenic Effect of Low Doses of Carcinogens*. British Journal of Industrial Medicine, 1992; 49:601-605

Harris, W.E., *Low-Dose Risks and Authoritative Misinformation*. Department of Chemistry, University of Alberta, 1991

Abelson, P.A., *Testing for Carcinogens with Rodents*. Science, 1990, 249:258.

Overturning the Verdict on Carcinogens

Review Board Says Methodology for Classifying Carcinogens Is Flawed; Questions validity of existing procedures.

In a surprising announcement, an Advisory Review Board established by the U.S. National Toxicology Program (NTP) has questioned the scientific basis for applying the concept of *Maximum Tolerated Dose* (MTD) in identifying and classifying human carcinogens. The review board concluded that two thirds of NTP carcinogens would no longer be identified as such if the MTD was not used. "The implicit assumptions underlying extrapolations from the MTD ... do not appear to be valid."

As its name implies, the MTD method involves injecting laboratory animals with the highest dose compatible with bare survival. Based on their response and the level of cancerous effect produced, predictions are made regarding the carcinogenicity of vastly lower exposures in humans.

The NTP Review Board noted several major concerns with the MTD methodology employed. In particular it questioned assumptions about the rate at

which substances are absorbed at different doses; the linearity of the dose-response relationship; the rate at which the body repairs genetic damage at different doses; and the generalizability of data from animals to humans. G.B. Gori, the former deputy director of the Cancer Cause and Prevention Division of the National Cancer Institute commented that "some of these assumptions are intuitively questionable and, as the report makes clear, there is now ample evidence and widespread consensus that they are scientifically untenable."

Mr. Gori goes on to say that despite fundamental flaws in the MTD methodology, these studies "have been the basis of far-reaching regulatory actions costing the U.S. economy billions of dollars." Moreover, he believes that these mistaken assumptions have created and sustained many of the myths associated with the pervasive fear of cancer in our society.

"Most regulatory policy in the U.S. has been based on the twin dogmas that animal and human susceptibilities to carcinogens are equivalent, and that 'no-effect thresholds' at low doses do not exist. Both have been the philosophical underpinnings of most health and safety regulations regarding carcinogens for more than 30 years. Both are faulty assumptions that the Advisory Review Report now questions," concluded Mr. Gori. ■

Source: The Wall Street Journal, Aug 27, 1992.

U.S. Study Links Fiberglass to Lung Disease

Does prolonged exposure to fiberglass adversely affect pulmonary functions or produce radiographic abnormalities in humans ?

A recent study by researchers at the University of Southern California (USC) School of Medicine concluded that commercial rotary spun fiberglass appears to produce human disease that is similar to asbestosis. The study, conducted by K. Kilburn, D. Powers and R.H. Warshaw was published in the October issue of *The British Journal of Industrial Medicine*. It examined 284 workers at an appliance factory where refrigerator doors and cabinets were insulated with fiberglass sheeting and loose rotary spun fiberglass. Workers with exposures of twenty years or more were evaluated on a number of tests of respiratory functioning including lung volumes, chest x-rays and physical examination.

The researchers found that in addition to eye and throat irritation in about 20% of the population studied, expiratory flows, which indicate pulmonary dysfunction, were significantly impaired. 43 workers also had evidence of pneumoconiosis on chest radiographs. The authors believe that 36 (13%) of these pulmonary opacities or plural abnormalities were due to fiberglass exposure.

A postmortem analysis of one worker who died just prior to the study showed a substantial accumulation of glass fibres in the lungs. A transmission electron microscopy examination showed that each lung contained approximately 178,000 fibres.

Charles Rossiter, former professor at the London School of Hygiene and Tropical Medicine who currently acts as a consultant to the insulation industry disputes the study's conclusions. He argues that the study does not adequately recognize the compounding effects of smoking and that the control group was not representative. Mr. Rossiter does nonetheless urge the Man Made Mineral Fibre industry to undertake further study into the health effects on users.

Jim Merchant, a leading American authority and director of the Occupational and Environmental Health Department at the University of Iowa believes that this study is "in line with what we know about fiberglass". Mr. Merchant warns that "this may have a lot of implications for people who work in building and construction." Other major American and European cohort studies of the occupational health risks for workers in the Man Made Mineral Fibre (MMMF) manufacturing sector have found lung, trachea and bronchus cancer rates in excess of those expected. ■

Sources:

Marsh, G.M., Enterline, P., Stone, R. & Henderson, V.L., *Mortality among a Cohort of USD Man-Made Mineral Fibre Workers: 1985 Follow-up*. J. Occ. Med. 32, 594-604, 1990.

Simonato, L. et al. *The man-made mineral fibre European Historical Cohort study: Extension of the Follow-up*. Scand. J. Work, Env. Hlth, 12, Suppl 1, 34-47, 1986

Code of Practice for Synthetic Mineral Fibres

In response to recent human and animal data, representatives from the Quebec Federation of Labour (QFL), with the support of the Canadian Labour Congress have written a draft Code of Practice for the use of Synthetic Mineral Fibres (SMF). The code would include descriptions of SMF, summaries of their health effects, as well as recommendations for proper monitoring, safe work practices and exposure limits. The code would detail work practices based on the different risk factors accorded to various fibres.

A number of recent studies (see article *U.S. Study...*) have found evidence that exposures to some types of SMFs can have serious health effects, including eye and throat irritation, pulmonary dysfunction, non-malignant disease and cancer. Despite the growing concerns of scientists, regulators and the labour movement, some industry representatives such as Frank Cereghini, manager of Occupational Health and Safety at Owens-Corning/Fiberglass Canada maintain that insulation fibres are not carcinogenic.

A new Code of Practice is intended to eliminate the inter-provincial inconsistencies which exist in worker protection policies across Canada and provide guidelines for government policy and industry practices. ■



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RIO '92: UNCED AND ASBESTOS

For many organizations, the conclusion of the United Nations Conference on Environment and Development (UNCED) marked the beginning of another process; that of revision, evaluation and analysis. Each is taking stock of what transpired, both positive and negative, and what the implications are for the future.

The experience of The Asbestos Institute (AI) at UNCED is perhaps representative of the difficult task of arriving at global environmental solutions. On the one hand, AI witnessed the detrimental impact, which strong sectoral and national interests can have on environmental problems, as well as the potential, which exists for developing intelligent solutions to complex environmental issues, based on the strength of scientific evidence.

AGENDA 21

The principal goal of UNCED was to achieve consensus among nations on a plan of action on issues of the environment and of

economic development for the 21st century. This plan of action is called AGENDA 21.

One component of AGENDA 21 is the formulation of recommendations regarding the Environmentally Sound Man-

agement of Toxic Materials. Specifically, this section of AGENDA 21 addresses the "beneficial use of chemicals for sustainable development and safe manufacturing with minimum risks to health and environment." (see AGENDA 21 on page 2)

Earth Summit background

UNCED may have been the biggest and most ambitious global summit on the environment, but it has a number of predecessors to thank for setting its course. The first such global summit was held twenty years ago. The Stockholm Conference of 1972 was one of the first major steps in bringing environmental protection to the UN agenda. It was attended by 1,200 delegates from 113 countries.

In some ways, this ground-breaking conference set the tone for future international discussions concerning the environment and development. It defined and set parameters for monitoring many of the global environmental concerns which were on the discussion table at RIO. At the same time, it was a foreshadowing of the types of disagreements which blocked progress in several areas at UNCED. As far back as 1972, the lines were clearly drawn between the interests of the developed and the developing countries, between North and South.

One of the highlights of the Stockholm Conference was the establishment of the United Nations Environment Program (UNEP), which would initiate a number of global programs throughout the 70's and into the 80's.

In 1984, the World Commission of Environmental Protection and Development released the now famous Brundtland Report, named after the Norwegian Prime Minister who chaired the Commission. It proposed far reaching changes to the way we view the use of our natural resources as well as concrete, legal, financial and institutional structures to guide the process of 'sustainable development'.

The concept of sustainable development became critical to the evolution of the UNCED agenda. In fact, the RIO Summit was billed as the "best chance to put the world on the path to sustainable development."

The structure of the conference, which sought input from business, non-government environment organizations and other national and international interest groups, reflected the growing trend towards multilateral environmental solutions.

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- In search of zero risk
- Experts and risk
- Dangers of RCFs
- Risk assessment



RIO '92

AGENDA 21...

Specific proposals and texts, which were to be presented for ratification in Rio, were first developed and debated at meetings of the Conference's Preparatory Committee (Prep

Com) which took place in the two years preceding UNCED.

At the third Prep Com meeting, held in Geneva in September 1991, there was much discussion concerning the most effective approach to the use of chemicals and toxic products. At the outset, several delegations noted that the soundest approach was not to totally prohibit the use of these beneficial products, but to use them in a responsibly controlled manner in order to minimize or eliminate risks for workers and the general public.

Although AGENDA 21 was not designed to deal specifically with any one chemical or mineral substance, Venezuela nonetheless proposed the inclusion of three specific references to 'asbestos materials'. These references called for the ban, phase-out and replacement "of those chemicals which are on the prohibition list of international conventions, in particular asbestos materials and organohalogen compounds." Many delegates took issue with both the accuracy and the intent of the paragraphs and their inclusion remained unresolved at the conclusion of Prep Com III. It also remained unclear why Venezuela sought to include specific mention of a ban of asbestos given the strong support from both political and scientific communities for its controlled-use.

A strong Venezuelan substitute fibre industry based on its petro-chemical capacity may have been a critical factor in the process. Venezuela has a large PVC (Polyvinyl chloride) pipe industry which sees its products as a substitute for asbestos-cement pipe in water transportation and sewage systems. Interestingly enough, (see AGENDA 21 on page 3)

Text of the Venezuelan proposals

Venezuela proposed the inclusion of three paragraphs in AGENDA 21 which make specific reference to asbestos. They were as follows:

ITEM 53

- b) Adopt policies and legal frameworks and procedures to identify, regulate and minimize the use of hazardous chemicals by substitution severely restricting the user, and phasing-out of the production and use, as a priority for those chemicals, which are on the prohibition lists of international conventions, in particular, asbestos materials and organohalogen compounds.
- f) Develop programmes including research, to replace toxic chemicals with alternative clean technologies and less hazardous substitutes, and especially such toxic chemicals for which there is reason to believe that their use may need to be restricted or banned, including ones which are on the prohibition list of international conventions, in particular asbestos materials and organohalogen compounds.

ITEM 56

International organizations with active participation of governments and non-governmental organizations should:

- i) Promote and develop legal instruments and mechanisms to phase out the production and use of asbestos materials, formulating programmes to substitute for them with safer alternatives.

"Beware of false claims and irrational thinking," top scientists warned Rio delegates

More than 418 scientists from 29 countries — including 61 Nobel Prize winners — launched an outspoken attack on environmental extremists in a signed petition, which was presented to UNCED delegates during the *Earth Summit*. They warned delegates to ignore the 'pseudo-science' which passes for truth among many environmentalists.

The statement — one of the first organized attempts by the scientific community to influence the international environmental debate — represents the concerns of many researchers, academics, and medical practitioners. It says: "We are worried to see the emergence of an irrational ideology which opposes scientific and industrial progress and is damaging to social and economic developments."

Sir Richard Doll, the Nobel Prize winning scientist who first proved the link between smoking and cancer, commented on his group's statement, saying: "We are 100 per cent behind the RIO Summit and its resolutions on global warming and the protection of species, but we think the greatest threats to the world come from poverty, disease and overpopulation. It's only through science and industry that we can tackle these things."

Linus Pauling, two time Nobel Laureate, summed up the group's approach, commenting that the needs of the environment had to be balanced against the needs of people.

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the U.S. Environmental Protection Agency admitted to the Court of Appeals during the proceedings evaluating the risks of asbestos substitutes that *"vinyl chloride, used in PVC is a human carcinogen that is*

especially potent during the manufacture of PVC pipe."

Given the disagreements, which existed over the Venezuelan proposals, they were identified as items requiring further discussion or negotiation and carried forward to the Fourth Prep Com meeting held in March/April 1992 in New York City.

Position of The Asbestos Institute

- Items 53 b) and f) are based on the mistaken assumption that asbestos is on the prohibition list of one or more international conventions. Asbestos is on no such list.
- With existing dust control techniques, asbestos can be used with no undue risk to the health and safety of industry workers or to the general public. This is supported by a vast body of scientific research as well as international organizations such as the ILO and the WHO.
- Many asbestos substitutes have known carcinogenic effects. Based on the results of animal experiments and epidemiological studies, the International Agency for Research Cancer (IARC) has identified many man-made mineral fibres as Class 2B carcinogens. The potential health risks of substitutes was also one the principal reasons why the U.S. Court of Appeals rejected the EPA's ban of asbestos.
- Hundreds of chemicals constitute a potential health risk if not used properly. There is no logical reason why asbestos, whose properties are well documented and for which control measures for its safe use have been well established, should be singled out in AGENDA 21 or any other international environmental decree.

MISTAKEN ASSUMPTIONS

The position of The Asbestos Institute was and is that the Venezuelan proposals were unjustified, ill-conceived and out of line with the broader objectives of AGENDA 21. The overwhelming body of scientific evidence suggests that as with many other chemical and mineral substances, given adequate control measures, asbestos can be used safely and to the benefit of society. Ironically, Venezuela, a country which has used asbestos cement successfully in its low cost housing projects, chose to ignore this evidence.

Moreover, the items put forth by Venezuela were based on the mistaken assumption that asbestos is on the prohibition list of one or more international conventions. It is not on any such list. As such, the Venezuelan proposal was clearly and fundamentally flawed. In fact, the only international convention which deals specifically with asbestos is ILO Convention 162, *Safety in the Use of Asbestos*. Adopted by 125 participating countries in 1986, Convention 162 does not call for the ban of all types of asbestos and asbestos products, nor does any other international convention.

Most industrialized countries have opted for controlled-use, and the decision of the U.S.

Court of Appeals to strike down the EPA's ban rule has lent further support to this approach. These developments, as well as increasing concerns regarding the carcinogenicity of substitute fibres, underscore the need for regulatory authorities to undertake comprehensive risk assessment and cost/benefit analyses of all replacement materials and products.

In summary, the position of AI was that in the case of asbestos and other risk-related fibres, the objectives of AGENDA 21 could best be achieved through a controlled-use approach rather than through an outright ban. Rather than single out asbestos, it would seem more desirable to retain a general recommendation for government (see AGENDA 21 on page 4)

UNCED Final Position

ARTICLE 19.50

- b) Undertake concerted activities to reduce risks for toxic chemicals, taking into account the entire life cycle of the chemicals. These activities could encompass both regulatory and non-regulatory measures, such as promotion of the use of cleaner products and technologies; emission inventories; product labelling; use limitations; economic incentives; and the phasing out or banning of toxic chemicals that pose **unreasonable and otherwise unmanageable risk** to the environment or human health...
- c) Adopt policies and regulatory and non-regulatory measures to identify, and minimize exposure to toxic chemicals by replacing them with less toxic substitutes and ultimately phasing out the chemicals that pose **unreasonable and otherwise unmanageable risk** to human health and the environment...

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ments and international organizations to formulate and adopt regulations for the controlled-use of all toxic chemicals and products (including asbestos and all other industrial fibres) in order to safeguard human health and environment.

PREP COM IV — THE FINAL MEETING BEFORE RIO

In anticipation of the Fourth Preparatory Committee meeting, AI undertook an extensive program to put forth its views concerning the Venezuelan proposals. With the assistance of diplomatic and trade delegations of both Québec and Canada, AI travelled to Venezuela and Columbia to further discuss the validity of its controlled-use approach; representatives met with the UN initiated Council for Sustainable Development (a group of 48 international business leaders headed by Swiss industrialist Stephan Schmidheiny); and in Geneva, AI met with key UNCED personnel. In the days leading up to Prep Com IV in New York, the effort was intensified and numerous delegates were briefed on the issue. As a result of the intervention of AI and delegations from Québec, Canada, Brazil, India, Zimbabwe and other countries, any specific reference to asbestos was dropped from AGENDA 21.

Those sections of AGENDA 21 dealing with the management of toxic materials remained general statements on the need to carefully study, manage and control potential health risks resulting from the use of chemicals. ♦

Toxicologists debate dangers of RCFs

At the annual meeting of the Society of Toxicology held in Seattle this spring, one of the most hotly debated topics was the health risk of Refractory Ceramic Fibres (RCF), reported the publication *Science* (March '92).

Toxicology is the science that deals with poisons and their effects, as well as their clinical, industrial and legal implications. The field has been paying close attention to developments in the area of man-made mineral fibres, and RCFs in particular, as mounting concerns are raised as to their safety.

(see RCFs on page 6)

In search of a zero risk society?

"It is imperative that our national health policy be reevaluated to recognize that moneys spent to reduce or eliminate exposure to a perceived health hazard should be proportional to the risk associated to that hazard," according to Dr. Malcom Ross, Research Minerologist with the U.S. Geological Survey.

In a paper presented at the 28th Forum on the Geology of Industrial Minerals, Dr. Ross maintains that the increasingly stringent Federal regulations promulgated in the United States are based on a health policy that appears to demand a risk-free living environment.

The prevailing cancer dogma in the U.S. espouses the 'no threshold' theory of cancer induction. Proponents of this theory believe that since no one knows the minimum amount of a carcinogen required to initiate the growth of a tumor, it must be assumed that any amount of a carcinogen is unsafe.

Thus the public is led to believe that exposure to just one molecule of a chemical carcinogen can cause cancer. Regarding exposure to asbestos and other mineral fibres, this paradigm becomes 'one fibre kills'. *"What the public has not been told,"* commented Dr. Ross, *"is that simply living on Earth exposes us to innumerable naturally occurring carcinogens."* Probably one half of all minerals and chemicals, when tested in animals at very high doses will produce tumors.

Naturally occurring chemical carcinogens at concentrations of 50,000 parts per billion (ppb) are found in such common foods as apples, strawberries, cauliflower, cabbage etc. They are often part of natural defence systems of these edible plants.

Dr. Ross believes that millions of dollars are being wasted in futile efforts to reduce risks levels which are already immeasurably low. For example, the city of San Jose, California, has put a hold on an extension of its mass transit line because it would require cutting through a hill composed of serpentine rock, a commonly occurring rock containing small amounts of chrysotile asbestos. If serpentine rock is considered toxic, thousands of square miles of land in the U.S. might be placed off limits for any kind of development.

Dr. Ross goes on to cite a number of other examples which are representative of the great lengths and expense which policy makers, due to pressure from interest groups, are willing to go in order to create a zero risk society.

"The 'no threshold' dogma for cancer induction that is being foisted on the American public is generating a national crisis that could seriously damage our economy," concludes Dr. Ross. ♦

Predicted rate of asbestos linked disease has not materialized: experts say risk estimates were not realistic

"The huge number of asbestos-related cancer cases once forecast by the [US] government and its advisors have not materialized, and experts say the dire predictions of the 1970's were overblown", reports the Journal of the National Cancer Institute in its April 15th edition.

In 1978, Joseph Califano, Secretary of the U.S. Department of Health Education and Welfare (HEW) predicted, based on estimates provided by Dr. Irving Selikoff and others, that about 17% of all cancers in the future would be caused by asbestos — an annual total of between 58,000 and 75,000 asbestos-related cancer deaths were anticipated.

Scientists have believed for more than a decade that these projections were much too high. At a 1981 conference, cancer epidemiologists rejected the government estimates believing that they were more than 10 times too high. More recent

evidence shows that the actual figure is even lower than this. A study conducted by P.E. Enterline of the University of Pittsburgh concludes that only 1% of cancers are related to past asbestos exposure — almost 20 times less than the original HEW estimates.

Marvin Schneiderman, Ph.D., one of the authors of a report upon which the 1978 estimates were based, now believes that the overestimation resulted from applying Selikoff's data on heavily exposed workers to a much larger population whose exposures were generally much briefer. "We made the inappropriate assumption that short-term exposures were just as carcinogenic and deadly as long-term exposures."

Schneiderman said: "Now it looks as if you have to have fairly continuous exposure to cause the worst effects."

FLAWED EPA ESTIMATES LED TO BAN RULING

HEW was not alone in overesti-

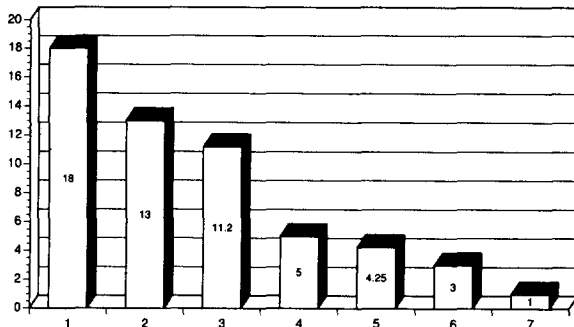
imating asbestos-related cancer rates. The EPA based its 1986 ruling to ban and phase out almost all uses of asbestos on estimates, which purported that eliminating asbestos would 'save' more than one thousand lives over 15 years. In 1988, this figure was revised to 315.8 cases of cancer, and again in 1989 to 148-202.

EPA'S ESTIMATES OF CANCER CASES AVOIDED BY ASBESTOS BAN IN THE FUTURE PERIOD OF 13-15 YEARS

Type of products	1986	1988	1989
Vinyl-asbestos floor tiles	468	0	0
Friction products	386	282	99.4 - 143.7
Asbestos-cement pipes	82	6	2.1 - 4.4
Asbestos-cement plates	31	0.9	0.7 - 1.5
Gaskets	0	14	6.7 - 42.5
Other	33	12.9	39.1 - 9.9
Total	1 000	315.8	148 - 202

In light of the ruling by the U.S. Court of Appeals, which overturned the EPA's asbestos ban, serious doubts remain as to the accuracy of even the latest revised risk estimates. There are two principal reasons why these estimates are being questioned. Firstly, they fail to take into account the carcinogenicity of substitutes, and secondly, many experts are concerned that the risk estimates are based on faulty assumptions. Among the skeptics is Philip Enterline, Ph.D., of the University of Pittsburgh School of Public Health who recalls his incredulous reaction to inflated estimates of future asbestos-related cancers. "If it were true," Dr. Enterline said, "it would have been the best news I've ever heard. If we could eliminate 17% (see EXPERTS on page 6)

ESTIMATES OF PERCENTAGE OF LUNG CANCER DEATHS RELATED TO ASBESTOS IN THE USA



1. National Cancer Institute (Estimates Paper) [75,000 cancer deaths/year]
2. National Cancer Institute (Estimates Paper) [58,000 cancer deaths/year]
3. I. Selikoff (OSHA Hearings, June 1978) [50,000 cancer deaths/year]
4. Nicholson et al. (Branbury Report No. 9, Cold Spring Harbor Laboratory, 1981) [10,000 deaths/year]
5. Nicholson et al. (Branbury Report No. 9, Cold Spring Harbor Laboratory, 1981) [8,500 deaths/year]
6. Hogan and Hoel (Risk Analysis, Vol. 1, pp. 67-76, 1981)
7. Enterline (Branbury Report No. 9, Cold Spring Harbor Laboratory, 1981)

If you have any comments, suggestions or ideas for future stories or special reports, we would be delighted to hear from you. If you would like to be on our mailing list, you can reach us at: The Asbestos Institute, c/o Editor, 1130 Sherbrooke Street West, Suite 410, Montréal, Québec, Canada H3A 2M8, telephone: (514) 844-3956, fax: (514) 844-1381. This newsletter is also published in French.

EXPERTS...

of all cancers just like that, it would be marvelous. But it was too good to be true."

In its final rule, the EPA attributed almost 200 projected cases of cancer to exposure to friction materials. With respect to friction materials, the Court of Appeals noted that the EPA had *"failed to evaluate the toxicity of likely brake substitutes."* It mentioned specifically that the EPA had *"overlooked credible contentions that substitute products might actually increase fatalities."*

Scientists are also beginning to question how the EPA determined that almost 200 people would develop cancer due to asbestos in friction materials. Professor F. Valic, consultant to the WHO's International Programme on Chemical Safety (IPCS), believes that the basic premise, which extrapolated incidents of mortality in industry workers exposed to amphiboles or to amphiboles and chrysotile to a general population which comes into contact with very low levels of chrysotile fibres, is seriously flawed.

In a recent paper presented at the *International Colloquium on Dust Measurement Techniques and Strategy*, Prof. Valic goes on to say that *"these [EPA's] risk assessments were obtained using a geometric mean of risks derived from 11 studies in different industries of which the friction materials industry is only one."* The report goes on to cite a number of highly reputable studies, which found little or no excess lung cancer amongst brake industry workers. On the basis of this and other credible evidence, an IPCS/WHO working group concluded that *"provided good work practices are followed and no amphibole fibres are used, detectable risks in vehicle maintenance and repair workers are not expected."* ♦

RCFs....

In the mid-1980's, researchers found that rats injected with RCFs developed lung fibrosis, lung cancer and mesothelioma. Then in 1988, a team of toxicologists headed by Richard Mast, chief toxicologist at the Carborundum Co., began a study in which rats and hamsters inhaled aerosolized RCFs. The research team found that animals that inhaled RCFs developed far more lung tumors than control animals did. In addition, mesothelioma rates were higher than those of most forms of asbestos fibres.

Discussions centered around the generalizability of the data, the existence of a threshold level of exposure necessary to produce disease and the potential for regulatory responses by the EPA.

In general, there was agreement that the overall risk to the population is low because RCFs are used in industrial equipment rather than in public buildings or homes, and therefore few people outside the industry are exposed to dangerous levels of them.

EPA scientist Jim Willis nonetheless believes that *"there are a fair number of workers who manufacture and use RCFs. We've determined that RCFs present or will present a significant [cancer] risk."* A decision from EPA on how it plans to proceed is expected within a few months. ♦

U.S. to standardize risk assessment procedures

According to inside sources, the White House is expected to issue an executive order designed to standardize risk assessment procedures. The new review procedure, under the auspices of the Office of Science and Technology

Policy (OSTP), would require regulatory agencies to base their health and safety assessments on realistic estimations of risk — as opposed to worst case hazards.

"Science is subordinated in the decision-making process", according to Thorne Auchter, director of the Institute for Regulatory Policy and former OSHA administrator. *"This (new order) would let scientists have their day in the regulatory process."*

Auchter also believes that contrary to prevailing criticism, the regulatory process is manipulated less by 'big business' interests than by federal regulators and policy makers. *"An effort to standardize the risk assessment process would eliminate the opportunity for some 'manipulation',"* he said.

Given that those sectors currently being regulated did not undergo the same risk assessment review procedure, the new executive order would provide a process in which agencies could be petitioned by the public to revise risk assessment and risk management decisions on the basis of new scientific information. ♦

Source: *Occupational Safety & Health Reporter*, 6-3-92

On a sad note...

It is with great sorrow that we announce the death of Jean-Pierre Chevalier-Bultel, the Institute's Director of Research and Development and International Relations. Mr. Chevalier-Bultel, who has been with The Asbestos Institute since 1986, is survived by his wife Françoise and three children.

Our deepest sympathy goes out to his family and friends.



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