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CENTRAL RESEARCH AND DEVELOPMENT DEPARTMENT

June 28, 1982

K. D. DASTUR
CHEMICALS AND PIGMENTS DEPARTMENT
B-6314

MAN-MADE MINERAL FIBERS VS. ASBESTOS

Our literature-searching process shows that there is no consistent body of information which would mandate a clear choice in selecting a risk-free fiber for insulation. At present, there is insufficient test information to permit such a selection. Unfortunately, there is no uniform consensus on the mechanism of fiber fibrosis and carcinogenesis. The long-term empirical tests which could support a provisional course of action have not been run.

A summation of this state-of-the-art was attempted in the "World Symposium on Asbestos" held in Montreal beginning May 25, 1982. Some highlights are noted below.

The provisional conclusion of this meeting suggests that all mineral fibers (natural or man-made) should be handled with great care. It is reasonable to foresee that all these fibers will be regulated and not prohibited.

Conference Highlights

- The key-note speaker, G. Atherly (Canadian Centre for Occupational Health and Safety), emphasized that "a complex scientific question has been approached through less than adequate science and the whole has been conditioned by economic and political factors."
- E. van der Rest, Asbestos International Association, advocated controlled use of asbestos with an industry responsibility to ensure no socially unacceptable risk. (Including an international adoption of 2 fibers/cm³ limit).

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BETTER THINGS FOR BETTER LIVING ... THROUGH CHEMISTRY

SC-DP-07335

- J. Peto, Oxford epidemiologist, noted that man-made fibers contain long fibers in the respirable range and until such materials receive a clean bill of health, they should be treated like asbestos products.
- J. Wagner, Pneumoconiosis Unit at Llandough Hospital, Wales, noted that there is potential for some man-made fibers, where size can be controlled, to be proven to be hazard free.
- I. Selikoff, Mount Sinai School of Medicine, noted that the limited success in controlling asbestos-related disease since the 1964 International Conference "is a measure of past (scientific) inadequacies and current uncertainties."



CARL S. HORNBERGER
SENIOR INFORMATION
SPECIALIST

CSH:mjh

Attachs. appendix - future sources of data
Canadian News reprints
Speech - G. Atherly

Note on File Copy

Draft reviewed by H. J. Trochimowicz and
G. L. Kennedy

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APPENDIX

Concurrent with this conference

- (a) The Canadian Asbestos Information Centre begins operation (partially federally funded).

Mr. Georges Dahmen (Director)
1130 Sherbrooke St. W.
Suite 410
Montreal H3A 2M8
Telephone (514) 844-3956

- (b) Extensive hearings of the Royal Commission on Asbestos continue (include - P. Kotin, Johns-Manville)

Contact: Linda Kahn
(416) 965-1885

New contact for developments in Canada.

Ms. Norma Gibson-MacDonald
Canadian Centre for Occupational Health and Safety
250 Main St. E/rue Main est
Hamilton, Ontario, Canada, L8N 1H6
Telephone (416) 527-6590

C. S. Hornberger:mjh
June 25, 1982

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KEY NOTE.

WORLD SYMPOSIUM ON ASBESTOS

ASBESTOS -- A CONTROVERSIAL MATERIAL

by

Dr Gordon Atherley

President and Chief Executive Officer

Canadian Centre for Occupational Health and Safety

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C'est un grand nonneur d'être invité à faire la présentation à la session d'ouverture, de cette conférence.

Tout le monde sait que l'amiante est une fibre minérale importante dans la vie du Québec pour ce qui est de l'économie, mais l'amiante a envahi aussi bien d'autres aspects de la vie, par exemple, il y a même une ville qui s'appelle 'Asbestos'.

L'amiante se trouve aussi dans la vie culturelle du Québec, comme par exemple dans le roman couronné de l'écrivain Andre Langevin "Poussière sur la Ville". A cause de cette "Poussière sur la ville" ... "Même dans les champs, la neige a pris une teinte sale, grisâtre qui donne au paysage une morne tristesse. Les arbres dressent là-dessus leur bois mort, déchiqueté. Des champs de poussière avec des formes calcinées.

The greyish shade described by Andre Langevin reminds us that, in Québec, asbestos means white asbestos, chrysotile, only.

The controversy which makes asbestos a controversial material appears to centre on a conflict between the health of people and the economies of corporations and nations.

With the controversy expressed in these terms, would it not be right to say that asbestos should be banned altogether because where there is any doubt the benefit of it must be given to human health and because human health represents an asset too precious to be balanced against the economies of nations, capitalist or otherwise, and corporations?

The decision to put human health ahead in an economic society rests with the political decision makers -- among whom should be represented those at risk -- and not with the scientific community, though at times that community seems to want that responsibility in its advocacy of techniques such as risk assessment. The political decision makers have to base their decisions on comparisons of apples and oranges: they find themselves weighing death against unemployment, industrial disease against economic stagnation, and health protection against the annihilation of an industry. The decision makers depend on scientific evidence, yet there exist no scientific methods for making these comparisons let alone the judgements.

The decision makers may have to decide willy-nilly. I personally believe that a close examination of the issue of the relative danger of blue asbestos shows that the benefit of the doubt has not always been given to human health.

Let me explain.

There are two groupings of opposed opinion relative to this matter.

There is one grouping holding that all types of asbestos are equally dangerous.

Among the partners in this grouping, in the USA there are the Occupational Safety and Health Administration, the National Institute for Occupational Safety and Health, sectors of the asbestos industry, several labour unions, major sectors of the scientific community, and other groups whom I would style the progressive environmentalists.

There exists another grouping which insists that all forms of asbestos are not equally dangerous, that blue is the worst of the bunch by virtue of mesothelioma. That grouping includes nations such as the United Kingdom, Australia, and Holland. In addition, in several other countries such as Germany and Norway, some authoritative opinion falls in with this point of view.

Gerry Clarke's survey of the utilization of asbestos¹ shows the pattern in the USA in the recent past: no selective banning of any particular asbestos type, but a shift away from asbestos generally.

- I ask why blue asbestos should have continued to be used in North America generally for at least a decade after its use had been banned, in effect, from some parts of Europe. Is this not an example where blue asbestos, not human health, has been given the benefit of the doubt?

I can see three possible reasons why there should have been no selective banning of blue asbestos in North America and certain other places:

¹Gerry Clarke Asbestos - A Versatile Mineral Under Seige, Industrial Minerals, March 1982 p 19-37.

- (1) The problem posed by the issue of blue asbestos may be a genuinely difficult scientific issue which so far careful science has failed to resolve.
- (2) The scientific research so far applied to the issue may have been inadequate because of its reliance on inadequate techniques, from epidemiology for example, or because the research effort has not been appropriately directed to relevant issues such as this.
- (3) There was an economic or political decision to generally phase asbestos out of industrial and commercial use in the USA which, unlike Canada, possesses no exploitable natural resources of asbestos. Thus, a shift from asbestos to substitutes like glass fibre not only favours the domestic chemical industry in the USA, but cuts down reliance on imported material.

For Canada, and other nations in which asbestos is economically important, however, there remain other fundamental questions: whether the asbestos they produce and/or use does in fact represent such a severe threat to health for their own people or for others that they, too, must count it out. All types of asbestos appear to be dangerous. If they are all as dangerous as blue has been shown to be in the worst case then their continued use must surely be unacceptable. On the other hand, if, repeat if, there is a spectrum of danger, involving the types of asbestos and circumstances of asbestos exposure, then it may be that those at the low danger end do not threaten health to the extent that they should be extinguished.

All this, fundamentally comes down to a question of science: is it scientifically true that all forms of asbestos are equally dangerous, or is it scientifically true that some types or conditions or uses of asbestos, for whatever reason, are associated with greater danger than others?

I view the issue of blue asbestos as a subset of the larger issue of the relative danger of the various types, conditions, and uses of asbestos. A critical review was carried out by an independent

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epidemiologist from McMaster University, Dr H Shannon, of the scientific evidence on the statement (amongst others) that working with different fibre types leads to different risks of incidence of mesothelioma. He found limited supporting data which can not be said to be established by valid scientific evidence. In my view, scientific research has therefore not answered the subset question yet, either way. And when I look at the reasons I can only conclude that the researches have been affected by all three reasons I just mentioned. Put simply, a complex scientific question has been approached through less than adequate science and the whole has been conditioned by economic and political factors.

Put bluntly, I am saying that the decision makers cannot find the trustworthy scientific evidence they need, and neither can they assume that further research effort will improve things, for the three reasons I stated.

The decision-making about asbestos for decision makers in Québec and elsewhere is greatly complicated by the uncertainty of scientific knowledge. But this cloud of doubt throws its shadow not only over the relative danger of asbestos but also over the relative safety of the asbestos substitutes similar in morphology to the asbestos fibres they are intended to replace. After all, if the science has been too uncertain to categorically settle the issue of blue asbestos, how can it perform any better relative to the asbestos substitutes?

The research community urges the decision makers to command research on an increasing scale, yet scientific research is itself entering an era of increasing skepticism, skepticism on the part of the public towards scientists and scientific research. In the past year or two, the newspapers have carried stories of corruption and scandal in science and, more important, science and scientific research have manifestly failed to produce clear or at least usable answers to public concerns, like asbestos, like low level radiation, like the risks of nuclear power.

It is not hard to persuade people that scientific researchers have to be tactful towards the organizations sponsoring their research. Research funds are running down, and scientists have an anxious time getting the money to keep their

laboratories going, hold their teams together and, sometimes, to support even their own personal salaries. In the complex world of grant getting, moral sponsorship -- for example, the support of the labour movement -- may be critically important in the getting of research grants from government or industry. And are researchers willing to go against government scientific policies when grants are at stake?

These pressures may be just too much for scientific objectivity to be maintained at a consistently high level at all times.

Scientific research is a multi-million dollar industry and it is itself an economic interest just like business and labour -- and often much more effective than either at advocating its cause. Some scientists criticize the media, in relation to asbestos, for distorting scientific data, for oversimplifying issues, and for partial reporting. But can we truly claim, in relation to asbestos, that scientists have never manipulated the media? After all, uncertainty is a fertile breeding ground for speculation.

And yet, despite all this, the decision makers and the public continue to expect trustworthy science from scientists on scientific questions, on asbestos and other matters too. Are they hopelessly misled, are the expectations doomed to disappointment, or are they really right in viewing science as a process capable of functioning independently of political and economic factors? Some people regard any such idealism as hopeless: scientists, they point out, are flesh and blood, prey to the same prejudices and weaknesses as everyone else, prejudices and weaknesses which no amount of intelligence or training can combat. Some people maintain that history shows that science does represent a higher ideal in its search for underlying scientific truth and that scientists, flesh and blood though they be, belong to a discipline strong enough to override the dictates of political and economic life even though some scientists have always been willing to betray the discipline and sacrifice its standards.

If we are to speak of scientific discipline, we must think of something more than a rigidity of formal process enforced for its own sake: we must instead think of a discipline growing out of a set of ethical standards. The principles and philosophy of science, if these are to be seen as something more worthy than the rules for a complex game, must surely reflect a set of ethical standards which, at root, derive from a fundamental and unshakable belief in truth, that is scientific truth.

Scientific truth deals with more than facts. It has to contend with scientific issues of scientific complexity which stretch human intellect to its very limits. Scientific truth has to cope with uncertainty as well as certainty; the existence of uncertainty is itself sometimes a scientific truth.

Numerous issues of great scientific importance will be dealt with at this World Symposium. But there is no need to go beyond that of the relative danger of asbestos in order to see how economic factors may crush the delicate spring-shoot of scientific truth. On that one issue, scientific truth has to survive the economic pressures which in one group of nations act in the opposite direction to those in another group of nations; it has to survive the economic pressures of conflicting commercial interests, it has to survive the contradiction that scientific research is itself an economic interest group often needing to live by handouts from government and industry.

Under these circumstances, surely, the only hope for scientific truth lies in a return to ethical standards for science?

Ethics is a system of moral principles or values. It encompasses high-standards of honest and honorable dealing.

The ethical dilemmas in morally or financially sponsored research persist when the right course of action is not clear, action in which honorable people may differ and no consistent rule obtains.

Society tends to look at the relation between science and human ethics in an inconsistent manner. On the one hand there is much fear that science is interfering with morality, and on the other hand some people expect science and its methods to define morality, looking to science for their ethical principles as others look to their religion.

Although people use science to make value judgements, they do not make these judgements according to the principles of science.

The ethical principles of science were recognized by Fresenius, the founder of analytical chemistry in the 19th century²: He said

Knowledge and ability must be combined with ambition as well as with a sense of honesty and a severe conscience. Every analyst occasionally has doubts about the accuracy of his results, and also there are times when he knows his results to be incorrect.

And further on:

A chemist who would not take an oath guaranteeing the authenticity, as well as the accuracy of his work, should never publish his results, for if he were to, then the result would be detrimental, not only to himself, but to the whole of science.

And J R Ravetz was right when he wrote³:

In scholarship, a good name is achieved by talent and protected by integrity; and an over-riding commitment to the quality and trustworthiness of work with which one is personally associated in any way is the essence of a genuine scientific ethic.

We can add two of the Fresenius terms to those of Ravetz to give us four essential characteristics of ethical science: quality, trustworthiness, authenticity, and accuracy.

Research into the consequences on health of asbestos depends not upon well-organized scientific experiments but often on epidemiological surveys based upon observations of people, their working lives, and their deaths, where the data were largely gathered for other purposes, and where the research may be focused on the questions of the researchers rather than the concerns of the decision makers.

²F Szabadvary, History of Analytical Chemistry (Pergamon Press, 1966), p 176.

³J R Ravetz, Scientific Knowledge and Its Social Problem, Oxford: 1971.

Under these circumstances, a commitment to quality means the full and honest acknowledgement of shortcomings of the data, neither understatements nor overstatements in the conclusions, and full descriptions of the weaknesses as well as the strengths of the methods. Scientific reports habitually finish with the recommendation that further research is required: because the scientist has an economic interest in the existence of further research, there is an ethical duty not to make exaggerated claims for the research being advocated.

Trustworthiness must include, amongst other things, the taking of honest account of all valid scientific evidence relevant to the subject, and the scrupulous avoidance of partiality. Surely, it is unethical for a scientist to play down the scientific evidence of others which happens to be unpalatable to the scientist's sponsors?

Authenticity implies that the scientific observations of whatever nature are true in substance.

Accuracy can always be questioned because health-related research is not favoured by generally accurate methods of measurement. Even where the tools of precision science are being applied, there remain weak links in the chain of reasoning linking the measurements and the interpretations. The strength of a chain is judged by its weakest link, not its strongest.

There are people here at the World Symposium who have come not to talk but to listen. They are the clients in the professional-client relationship, where the scientists presenting their science are the professionals. Do these listeners truly believe that ethical standards govern this relationship and, if so, do they believe that the scientists speaking to them are observing those ethical standards? But apart from the people attending this Symposium, there is a gallery of unseen spectators beyond: workers wondering if they are to be scheduled to die from asbestos-related disease, and workers wanting to know if they and their families are to be deprived of livelihood by the economic policy towards asbestos.

Will they be witnesses of a principled science addressing itself to their unvoiced questions? Only if those present now insist upon the scientific truth: it is for the audience at this Symposium to act as the guardian of the ethical standards of science for this Symposium, by their insistence upon quality, trustworthiness, authenticity, and accuracy. In the end, you and not just the scientists addressing the Symposium will be judged by how well the discipline of science and truth has been served during the days to follow.

SPECIAL REPORT

World Symposium on Asbestos, Part II

Science must maintain neutral role

The question of rights and responsibilities pertaining to asbestos production and use was addressed by representatives of the scientific, industrial, labor and government sectors in England, Belgium and the U.K.

Oxford University epidemiologist Julian Peto was emphatic in stating that scientists should not adopt a position in the discussion of rights and responsibilities; their role, he said, should be to insist on the use of proper scientific data as a basis for any decisions made, and to prevent misinterpretation of data. At various times, he explained, scientific facts and figures have been misused by governments, labor and management alike. Until agreement has been reached on the degree of risk associated with asbestos exposure, claims made by any of these sectors regarding the safety (or lack of safety) of asbestos are not justifiable, he said.

Peto added that if governments — who have primary responsibility for (worker) protection — want truly valid answers concerning asbestos issues, they should seek from scientists detailed explanations of their work, rather than simply calling them in for brief presentations.

This form of scientific debate was supported by Anthony Mazzochi, international representative for the Oil, Chemical and Atomic Workers International Union. However, he stated, until scientists have resolved their differences on these issues, a moratorium on asbestos use should be declared.

In labor's view, governments have developed regulations aimed at controlling asbestos hazards, but have not followed up this development with implementation. Thus, stated Mazzochi, the promise of protection has been an illusion, since the means of its delivery has not been present. Litigation instigated by workers in the face of the ineffectiveness of legislation has done more to bring about removal of asbestos from the workplace and its replacement by substitute materials, and has also served to draw attention to the magnitude of the problem, he stated.

Speaking on behalf of the government side, John F. Martonik Jr of the U.S. Occupational Safety and Health Administration pointed out that the agency's asbestos standard was the first standard promulgated by OSHA (in 1972). Since then, a massive amount of further information has been made available to OSHA concerning the

health effects of asbestos. This, combined with technological advances and the agency's 10 years of enforcement experience, has prompted OSHA to begin a re-examination of previous regulatory decisions concerning asbestos, with the objective of promulgating a revised asbestos standard, said Martonik.

Controlled use supported

The industry viewpoint was presented by Etienne van der Rest, chairman of the governing council of the Asbestos International Association and of the Belgian Federation of Asbestos-Cement Industries. He strongly advocated the controlled use of asbestos, an option which would, he said, permit society to benefit from the positive features of the mineral (e.g. fire resistance) while seeking to eliminate as far as possible its problematic aspects.

Van der Rest went on to list both rights and responsibilities of the industry, beginning with the latter. First and foremost, he said, the industry is responsible for taking all necessary precautions to ensure that no socially unacceptable risk is created during the course of asbestos mining, milling and product manufacturing. Part of this responsibility includes maintaining fiber levels of 2 fibers/cm³ or lower, he noted. It is also the industry's policy to urge adoption of this standard in countries where regulations in this area do not yet exist, he added.

The banning of asbestos use in applications where controlled use is not practically possible is supported by the industry as well, he noted. Seen as additional responsibilities are: the maintenance of an open dialogue with governments, unions and the medical and scientific sectors; the provision of information to workers concerning exposure risks and precautions; the implementation of plant monitoring and medical surveillance programs; and support, in terms of both time and money, of further research.

Van der Rest listed three basic rights sought by the industry: the right to be viewed as a legitimate industry rather than as an exploitive body operating solely in its own interests without regard for its workers, customers or society at large; the right to a reasonable degree of legislation which does not seek to impose technically and economically unachievable requirements without suffi-

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COHSN, June 14, 1982, p. 2

cient medical justification; and the right of the media to complete information for as objective as possible coverage of a complex problem.

No single substitute possible

Discontinued use of asbestos for a particular purpose because of health hazards necessarily entails consideration of replacement materials which will provide the benefits. Discussing the potential for substitution of asbestos in industrial applications, Andrew Pye, deputy editor of the U.K. publication *Design Engineering*, emphasized that no single product can be expected to replace asbestos in applications such as industrial textiles, millboard, high-temperature insulation, jointings and seals (including gaskets), friction materials, bearings, electrical insulation and fiber-reinforced composites. Rather, he said, each application must be considered individually.

In many cases, substitutes are not readily available or, if they are, user industries must pay more for them. And in some instances, Pye noted, user industries must bear the costs of research and development of new materials and of acquiring new or modified processing equipment. However, the cost of asbestos has escalated considerably in recent years, he pointed out, while the cost of some substitute materials has been reduced as they have become more widely specified.

Pye added a note of caution, observing that many substitute materials such as mineral wools, ceramic fibers and other fibrillated or pulped materials contain a proportion of fibers classifiable as respirable. Until such materials receive a clean bill of health, he said, their use should be treated with the same degree of caution afforded to asbestos-based products.

Focusing on the health hazards of asbestos substitutes, Dr John Wagner of the Pneumoconiosis Unit at

Llandough Hospital in South Glamorgan, Wales, reported on studies of various materials considered as possible replacement substances. These included samples, taken from various regions in the world, of man-made mineral (vitreous) fibers, non-commercial forms of asbestos (particularly tremolite), fibrous zeolites (erionites), and fibrous clays (palygorskite, sepiolite, and attapulgite).

He said that in certain fiber forms of a specific diameter-to-length ratio, both tremolite and erionite were found to be potentially hazardous. Results did not indicate any hazard arising from the man-made mineral fibers, which, he noted, can be controlled as to fiber size, an advantage not available with natural fibers. Nor was any hazard associated with sepiolites in the size ranges contained in samples collected in Spain, Dr Wagner added.

Comment on the rationale for development of legislation and regulations pertaining to asbestos was offered by William Simpson, chairman of the Health and Safety Commission, the agency responsible for developing ob&s policy in Great Britain. He maintained that the setting of control limits for asbestos follows directly from three crucial pieces of information about the substance: the size of the problem, the dose-response relationship, and the different effects of different fibers. Increasing knowledge about the dangerous effects of asbestos has been paralleled by continually improving standards and work practices. Legislators have a great responsibility to support both of these trends, he stated, because sensible legislation depends to a large extent on the development of knowledge not only about what needs to be done, but also about what can be done. As knowledge continues to increase and working conditions and practices to improve, so will legislative controls on asbestos continue to develop, said Simpson.

Asbestos**SELIKOFF CALLS FOR WIDER SAFEGUARDS;
CONTROL ADEQUACY, DATA MEANING DEBATED**

MONTREAL — (By a BNA Staff Correspondent) — A ban on the use of asbestos will not be requested if "proper control" of exposure is achieved in the wide spectrum of workplaces where fibers are found, according to Irving J. Selikoff, director of the Environmental Sciences Laboratory of the Mount Sinai School of Medicine.

Selikoff made his remarks May 23 during the opening session of the World Symposium on Asbestos, a three-day meeting sponsored by the governments of Canada and Quebec and the Commission of the European Communities (see related article in this issue). Other first-day speakers discussed varying effects of different fibers, diagnostic and analytic uncertainties, and adequacy of existing controls.

Industry has "done what it can" to limit exposure in asbestos mines and mills but now must expand its efforts to control it in workplaces where asbestos products are used, Selikoff told the symposium. The remaining disease problems, he warned, will be found among construction workers and others who work where there are "virtually no controls, respirators, or instruction."

Turning his remarks to Johns-Manville Corporation, the world's largest asbestos producer, Selikoff stated, "You deserve credit for what you have done, but you must do more." He said he agreed with the industry position that the disease cases seen today are the result of past exposure, but added, "The exposure now will result in future disease."

Selikoff urged the asbestos industry to begin a surveillance and notification program of exposed workers. Noting that cessation of cigarette smoking has been found to contribute to a reversal of disease risk in previously exposed workers, he argued that companies have the responsibility to inform workers of past exposure and warn them of the effects of smoking. In addition, he said, "virtually no exposed workers are under surveillance," asserting that periodic medical examinations could make early cures possible.

Fiber Types, Uncertainties

Epidemiologists have not made progress in helping society control the risks of asbestos exposure since the basic data were reported 20 years ago, according to John Corbett McDonald, head of the McGill University Institute of Occupational Health and Safety. Conclusions still must be reached concerning a dose-response relationship and variations between the effects of different asbestos fiber types, he told the session.

Noting that only four cohorts of workers have been studied using individual exposure estimates — Quebec miners and millers, New Jersey factory pensioners, New Orleans cement workers, and South Carolina textile workers — McDonald contended that "it would still be very rash to say that we know what the dose-response relationship is for mesothelioma," the cancer of the pleural lining of the lung linked almost exclusively to asbestos exposure.

Substantial differences have been found, he said, between the effects of amosite and crocidolite asbestos and the more widely used chrysotile type. While he has seen no evidence of crocidolite use without a hazard, "it is probably possible"

to use chrysotile safely in such products as brake linings, McDonald maintained. He speculated that health effects "depend perhaps on the size and type of fiber."

Remaining uncertainties also were stressed by John Higginson, until recently the director of the International Agency for Research on Cancer, and Hans Weill, professor of medicine at Tulane University.

Weill maintained that diagnosis of asbestos-related disease "remains to be a problem after passing a century." He

argued that four of the six indicators used to detect asbestos-related disease are "non-specific" and commonly found in both patients with the disease and those without it.

The medical researcher characterized diagnosis as a question of "weighing the probabilities based on the total picture, including exposure." He reported that a forthcoming document prepared by the National Institute for Occupational Safety and Health and the College of American Pathologists will recommend that, when available, both lung fibrosis and a demonstrated finding of fibers in the lung are needed for adequate diagnosis from tissue samples.

Weill also contended that no definitive mortality data have linked pleural plaques to mesothelioma. With some rare exceptions, he said, no functional consequences can be expected from benign plaques.

Higginson, discussing science's limited understanding of the variables of cancer causation in general, predicted that research in the next decade into the mechanisms of carcinogenic action will aid regulators in determining what alternative preventive measures should be taken. Better comprehension of which factors initiate the formation of tumors and which promote or deter their growth may help scientists determine an "operational threshold," the conditions under which no effect can be found, he urged.

Mazzocchi, Rietze Debate Control

Industry and labor representatives disagreed over the state of current controls in the workplace. William B. Rietze, chief environmental scientist and vice president of Johns-Manville Sales Corporation, argued that currently available controls allow asbestos to be used "safely and effectively without any measurable health effects." But Anthony Mazzocchi of the Oil, Chemical and Atomic Workers International Union called for a moratorium on asbestos use until a "meaningful" plan of controls is implemented.

Rietze detailed a wide range of control devices, including vacuum units that can be used with saws, drills, and other small power tools. "Today we have adequate engineering technology available to reduce asbestos fiber levels in virtually all instances where asbestos is mined, milled, and manufactured, and in those areas where asbestos-containing products are used," he summarized. "Even in those few areas where control is somewhat difficult, such as demolition or routine maintenance work, there are methods that can be used to reduce the asbestos fiber to acceptable levels," Rietze asserted.

Mazzocchi contended that, with a few exceptions, management has been negligent in controlling exposure. Less than one percent of workplaces surveyed by OCAW were in compliance with exposure standards, he said, arguing that scientific evidence, while somewhat persuasive to manufacturers, has not changed the attitudes of user employers.

Only a moratorium, in which a complete inventory of uses and exposures would be conducted, would end the "criminal" exposure of workers that has occurred over "15 years of haranguing" over science, the labor official stated. "You don't have to be a scientist to see the absence of controls," he argued.

Third-party liability litigation has done more to advance the cause of removal and substitution than regulations, Mazzocchi maintained. "Regulations have not changed the lives of workers," he asserted, saying unions "would totally immobilize the regulatory agencies if we were to complain every time."

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Asbestos**SELIKOFF CALLS FOR WIDER SAFEGUARDS;
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Selikoff made his remarks May 25 during the opening session of the World Symposium on Asbestos, sponsored by the governments of Canada and Quebec and the Commission of the European Communities.

Industry has "done what it can" to limit exposure in asbestos mines and mills but now must expand its efforts to control exposure in workplaces where asbestos products are used. Selikoff told the symposium. The remaining disease problems, he warned, will be found among construction workers and others who work where there are "virtually no controls, respirators, or instruction."

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Fiber Types, Uncertainties

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World Symposium draws delegates from 60 countries

Asbestos: should use be controlled or banned?

During a three-day period in Montreal late last month, internationally-recognized authorities from the five continents debated not only the scientific, but also social and economic issues pertaining to asbestos and asbestos use, at the World Symposium on Asbestos: Asbestos, Health and Society.

That this was one of the broadest-ranging conferences ever held on the subject was made clear by Dr Irving Selikoff of the Mount Sinai School of Medicine (New York), who contrasted the diversity of issues to be addressed in Montreal with the singularly scientific focus of a 1964 international conference convened in New York by the New York Academy of Sciences. At that time, he pointed out, it was still believed that expanded scientific knowledge and data would lead to control of the disease hazards of asbestos.

This optimism has gradually eroded, in the light of continuing asbestos disease and widespread doubt regarding the achievement of control over the hazard. And the fact that the Montreal Symposium is addressing the question of whether or not asbestos use should be continued "is a measure of our past inadequacies and current uncertainties," Dr Selikoff stated. In addressing this question, he added, the meeting, while still science-based, must also consider the economic, political, social, administrative and ethical problems associated with the continued and projected use of asbestos.

Progress in scientific research since 1964 has led to a much greater understanding of questions relating to asbestos disease, he continued. With respect to the spectrum of asbestos-related disease, for example, studies have indicated that the major concerns are lung cancer, mesothelioma, asbestosis and gastrointestinal cancer. The number and range of populations at risk have also been greatly expanded, to take into account more than asbestos workers alone (e.g. miners, millers, product manufacturing workers). Workers in the construction industry (especially insulation workers) and in shipyards have also

come to be included in the at-risk category.

Subsequent studies have even further expanded the potential for disease and the necessity for controls (e.g. chemical plants, refineries, power production plants and utilities). Finally, using the incidence of mesothelioma as a marker, has come evidence that families of exposed workers are also at risk, Dr Selikoff noted.

The question of latency has also taken on a new aspect, as it has become clear that there is a definite difference between "duration of exposure" and "duration from onset of exposure". Dr Selikoff explained that it has become evident that with asbestos exposure of sufficient intensity, only short-term exposure is needed to yield long-term risk. "We have not yet learned how to loosen this iron grip of latency," he stated.

This point was reinforced by Dr William Nicholson, also of the Mount Sinai School of Medicine, who noted that the risk of disease, such as lung cancer, will remain long after the onset of exposure. He said studies have indicated a linear pattern in dose-response relationships, and recommended that such a pattern be used in making any estimates of asbestos-related health effects.

Dr Nicholson estimated that between 1940 and 1979, approximately 27.5 million people sustained occupational exposure to asbestos, with most of these exposures of a low-level or short-term nature. He said that in his opinion, the number of documented cases of mesothelioma during that period have totalled only one-third of the number of cases that will eventually appear.

Surveillance program problems

Problems associated with running medical surveillance programs for workers exposed to asbestos were outlined by Dr Clark Cooper, a San Francisco-based occupational health consultant, who has been involved for the last 14 years in supervising such a medical surveillance program for construction industry insulation workers in the

western U.S. Under this program, he explained, physical examinations are made available in 10 to 12 participating clinics; the data is kept in a central file, which now contains 3,200 reports on 1,600 insulation workers.

Although worker participation has not been as high as desired, the program has been a success in terms of providing physical examinations to construction trades workers who often move from one jobsite to another, noted Dr Cooper. It has also provided centralized maintenance of data and has assured consistency of diagnostic criteria. However, he said, it is not possible to determine the impact of the program on the incidence or effects of asbestosis, lung cancer, mesothelioma or other malignancies.

Using his experience with the program as a basis for his comments, Dr Cooper said one of the first issues to be addressed is the question of objectives of medical surveillance. Unlike surveillance programs for most other occupational hazards, primary prevention of disease cannot be considered as a major objective, in view of the delay between initial exposure and the appearance of related abnormalities. Primary prevention must depend on drastic reductions in exposure, he stated.

Beyond compliance with laws or regulations, there are several other objectives which could be used to justify a medical surveillance program for asbestos, he said, including:

- baseline appraisal of the worker's health;
- possible detection of hypersusceptibility;
- early detection of asbestos-related disease;
- detection of abnormalities not related to asbestos;
- appraisal of ability to wear a respirator;
- health education; and
- collection of epidemiological data (although this is seldom viewed as an acceptable objective, he noted.)

The next questions to be addressed, said Dr Cooper, are those of optimum content of examinations and frequency of examinations. The content of an examination intended for medical surveillance will differ markedly from that of an examination designed for epidemiologic purposes, he explained. The basic surveillance examination content required by the Occupational Safety and Health Administration and included in the program supervised by Dr Cooper includes: occupational history; medical history; postero-anterior 14 x 17-inch chest roentgenogram;

pulmonary ventilatory tests; and examination by a physician directed primarily to the cardiorespiratory system.

OSHA exam frequency requirement challenged

Dr Cooper disagreed with the OSHA requirement for examinations to be made available annually, saying that this is more often than needed. In his program, he said, the schedule calls for examinations every three years for the first 12 years, every two years until 20 years, then annually thereafter.

Quality control, relating to chest radiograms, pulmonary function measurements and sputum cytology are critical factors in a medical surveillance program, he noted. While improvements have been made in such areas as film quality and certification of technologists, the interpretation of results remains a difficult area, since there frequently exists the possibility of exaggeration or misinterpretation of results.

Communication is also critical, Dr Cooper noted: the worker must be given frank, clearly understandable (to him or her) information on the test results, as well as advice relating to continued employment and wearing of a respirator. In this area, the issue of confidentiality crops up as well, he noted, especially with regard to making records available to government agencies. He advocated adherence to accepted practices of medical confidentiality; governmental information needs for hazard detection should be handled on a case-by-case basis, giving priority to the safeguarding of (the worker's) rights, he said.

The ineffectiveness of intervention constitutes the most discouraging aspect of medical surveillance programs, Dr Cooper observed. He said he had been unable to document evidence that medical surveillance has any effect on the incidence or course of asbestosis, or on survival from lung cancer, mesothelioma or any other malignancy. In the future, factors such as awareness of the need for health precautions, cessation of smoking and treatment of respiratory infections may well have an impact, he said. In the meantime, Dr Cooper urged provision of periodic health status re-evaluation for workers currently or previously exposed to asbestos.

Next week: Asbestos substitutes, legislative perspectives, rights and responsibilities of government, industry and labor.



Tripartite advisory task force also to be formed

Ottawa lends support to asbestos data centre

This week the Canadian Asbestos Information Centre will officially begin operations at its Montreal headquarters. Its establishment is the result of a decision made earlier this year by the two founding organizations — the Institut de médecine du travail et de l'environnement (Institute of Occupational and Environmental Health), and the Institut de recherche et de développement sur l'amiante (Institute for Research and Development on Asbestos) — to combine their resources, experience and knowledge to create a central source of information on asbestos.

The federal government has joined these two institutes in supporting the Asbestos Information Centre. In Montreal last week, at the World Symposium on Asbestos, Herb Gray, federal Minister of Industry, Trade and Commerce (also responsible for Regional Economic Expansion) informed delegates that Ottawa is contributing \$400,000 toward the establishment of the Centre which, in addition to its Montreal office and medical library, will also have an Ottawa office. (For coverage of the Symposium, see Special Report, pp 3,4).

Besides serving as a reference, documentation and information distribution centre, the agency also aims to promote the safe use of asbestos. It is also responsible for promoting adherence to safety standards and practices in asbestos mining, processing, product manufacturing, and use. Accordingly, it has a dual role to play, encouraging the use of the safest methods and processes while simultaneously ensuring that users comply with proposed standard practices.

In its role as a collector and distributor of up-to-date, wide-ranging technical and scientific information on asbestos-related matters, the Centre seeks to ensure that all interested parties — workers, users, governments and

the general public — receive this information. In addition, it gives special consideration to countries which have not yet adopted standards and regulations for the safe use of asbestos.

The Centre is located at 1130 Sherbrooke St W, Suite 410, Montreal H3A 2M8; 514-844-3956.

Herb Gray followed up his announcement of federal funding for the Asbestos Information Centre with another one on the creation of a Consultative Task Force on the Asbestos Industry. Comprised of representatives from industry, labor and government, the task force will help the government recognize and respond to current and future sectoral problems and opportunities. Gray explained.

Royal Commission hearings resume

In Toronto, meanwhile, hearings of the Royal Commission on Asbestos have resumed and will be continued through June, with testimony to be presented on standard-setting, enforcement, implementation and workers' compensation. Among the witnesses and parties with standing scheduled to make presentations and give testimony are Robert Sass, Saskatchewan Associate Deputy Minister of Labor and director of the Department's Occupational Health and Safety Branch; Robert Wilson, director of Ontario Hydro's safety and health division (both on June 15); and Dr Paul Kotin, former vice-president of health, safety and environment for Johns-Manville in the U.S. (June 23). Others will appear at the hearings on a to-be-announced basis; further information on the schedule can be obtained after June 1 by calling Linda Kahn at the Commission office, 416/965-1885.

Director of Centre: Mr. Georges Dahmen

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Asbestos

BNA - 6/10/82

**SCIENTIST SEES FUTURE POSSIBILITY
OF SCREENING WORKERS FOR RESISTANCE**

MONTREAL — (By a BNA Staff Correspondent) — Recent advances in the field of immunology raise the possibility that blood tests can be used to determine how susceptible an exposed worker will be to asbestos-related disease, according to Elliot Kagan, an associate professor of pathology at Georgetown University.

The researcher told a May 27 session of the World Symposium on Asbestos that scientists now possess the technology to apply techniques of immunological measurement to humans in practical situations. Research in the next five years, he reported, may produce the definition of precise "susceptibility markers" in the cell functions of workers that would allow the use of screening and early disease detection as preventive measures.

Kagan said early reports that an association between asbestos disease and certain deficiencies in resistance mechanisms had not withstood the test of time, but added that they were not performed with the superior technology now available. Sophisticated assays of immunological function in use today, he continued, make it possible to examine different groups of exposed workers and compare the susceptibility of those showing disease symptoms to the resistance of those showing no effects.

Because the assays could be accomplished by means of the "non-invasive" procedure of taking blood tests, Kagan suggested, they may be preferable to other scanning techniques, such as X-rays, that present hazards in themselves.

Taking issue with Kagan's approach was Herbert Otto, director of the pathology department at the Municipal Hospital in Dortmund, West Germany. He stated that, if immunological susceptibility contributed to an asbestos-related death, he would expect to find lymphatic evidence in a postmortem. He has not observed any such signs, however, he added. In any case, he said, he believed scientists must look at the agent of disease to prevent it, not at its host.

The symposium (see related article in this issue) was sponsored by the governments of Canada and Quebec and the Commission of European Communities.