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PLAINTIFF'S EXHIBIT JMMC-9

6.0 CONCLUSIONS

The conclusions summarized here are based upon interviews with asbestos producers, manufacturers and users, their technical staffs, and the information reviewed in Section 2 which is applicable to Ontario. It should be emphasized that all calculations and figures given in this study represent the best control practice observed. This best practice may require considerable expertise in its implementation. As a result, even for the cases cited in detail, some companies may be faced with spending considerably more money than that suggested in our calculations. All fibre levels reported are based upon the membrane filter method where levels below 0.5 f/cc are questionable.

Our overall finding is that the quality of asbestos dust control in industry is considerably improved over the last three to five years. This is due to the increase in application of known control technology rather than to the development of new control technologies. As a result, our conclusions are different from the most recent report which covered the technological aspects of dust control (Daly et al. 1976). In the Weston report it was stated that "best available technology will not achieve 0.5 f/cc TWA in secondary industries." We have found some secondary industries capable of producing fibre levels consistently at or near this level; however, this capability has only been achieved in the last year or two and, typically, for processes with low emissions originally. On the other hand, a number of specific processes are not capable of achieving fibre levels below 2 f/cc with engineering controls.

With respect to the cost of control, our studies indicate similar costs to those found in previous studies but with significantly higher costs for the lower fibre levels (0.5 f/cc and 0.1 f/cc) where they are achievable.

Our findings further suggest that:

(a) There has been an enormous improvement in the reduction of industrial fibre level concentrations over the last five to ten years. The fundamental reason for this has been a considerable increase in the expertise of those attempting the controls. Although there have been few or no technological breakthroughs in this field, many of the best practices have been adapted from other fields where the toxicity level of the material being handled is much higher than that of asbestos.

(b) There are a small number of processes which we believe cannot be controlled by engineering controls below 2 f/cc. Specific examples are dry asbestos milling, removal of friable asbestos, and, possibly, debagging.

(c) Control of dust emissions to the 0.1 f/cc level, where possible, would require extensive redesign and rebuilding of control systems. For some industries purchase of new production equipment would be necessary, making this level of control significantly more expensive than the higher levels.

(d) While purely technical considerations imply that 2 years is the minimum time to move to significantly lower control levels, the very large expenditures necessary would require longer times so that the large amount of capital necessary could be accumulated.

(e) The lack of a proper monitoring device for asbestos fibre levels presents one of the greatest technological problems restraining achievement of good asbestos dust control. For example, if a 0.1 f/cc standard were to be maintained, then the capacity to measure levels below this is necessary.

(f) Best available technology in asbestos dust control is now approaching that for beryllium which is the most toxic solid in industrial production.

(g) Because of equipment failures and human error, it is impossible to guarantee achievement of a specific fibre level at all times. This point is particularly important when considered along with the fact that true time-weighted averages are very seldom available due to monitoring difficulties.

(h) General hood-type local exhaust ventilation is not capable of providing dust control levels beyond approximately 2 f/cc in most machining operations.

(i) Industries which have enclosed those processes capable of enclosure have obtained significant decreases in fibre levels; in some instances, this has produced plant environments consistently at a level of 0.1 f/cc. Total enclosure is limited by the necessity to allow worker contact with all processes if only for maintenance and enclosure cleaning.

(j) At low fibre levels, maintenance of enclosed equipment requires personal protective devices and a high level of housekeeping control. Workers committed to full-time maintenance would be required to spend large amounts of time wearing respirators. Achieving fibre levels below 1.0 f/cc would require a significant number of personnel (maintenance, cleaners, etc.) to wear respirators constantly.

(k) The dustiest operation in most plants remains the debagging operation. It is not susceptible to enclosure except by the use of automated debaggers which are unreliable and expensive. We have been unable to determine what fibre levels can be achieved by automated debaggers.

(l) There are unlikely to be many significant innovations in the field of asbestos control in the foreseeable future. Advances have come from improvements in the application of existing knowledge.

(m) Achievement of low fibre levels is both easier and cheaper in some industries than in others. Fully automated processes are typically easier to enclose than hand operations. The implementation of stricter levels of control would give a strong competitive advantage to those companies presently having considerable expertise in the control field. This expertise lies, typically, with the larger organizations and is heavily dependent upon a detailed knowledge of the process being controlled.

(n) Low employee exposure levels can be achieved by the use of personal protective devices. This is, however, undesirable for reasons of comfort and permanent safety in most applications.

(o) Customer knowledge and preference both at the industrial and consumer level as well as future liability and government regulation are forcing asbestos substitution more quickly than a narrow economic analysis would indicate.

(p) With the exception of a few highly technical uses, most manufacturers are actively looking for substitutes.

(q) Asbestos will remain a specialized component in certain industrial products. For example, these include acetylene tanks, certain types of fireproofing, gasketing, and filters.

(r) In the construction industry, local exhaust ventilation of the low volume, high velocity type is not commonly used. However, asbestos cement products and asbestos roofing compounds are seldom used in Ontario.

(s) Asbestos insulation removal is an activity which will continue for a long period. Since every installation is physically unique it is very difficult to provide standardized and safe removal practices. There is considerable activity in this field in the United States. We believe, however, that personal protective devices are necessary for this operation on a permanent basis and that as far as possible procedures should be codified.

(t) In a large majority of buildings, the places where asbestos has been sprayed makes total removal or total encapsulation very difficult.

(u) Dry milling of asbestos cannot be controlled by enclosures to a level much below 2 f/cc. The only other alternative is wet milling which is unsuitable for most applications. Achievable fibre levels for wet milling are unknown.

(v) The effect of implementing stringent controls over a short time frame is likely to cause a number of industries to move out of the province.