

WATCH COMMITTEE PAPER		WATCH/2007/4	
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## WATCH COMMITTEE

**The risk of ill-health from low-level exposures to asbestos – exploring what can (and can't) be reliably discerned about the dose-response relationships involved in “low level exposure”**

**Further discussion about scope of project and plan for progression**

### Issue

1. In the “new and emerging issues” session at the November 2006 WATCH meeting, a high priority issue was deemed to be the submission titled “risks from low-level exposure to asbestos”. This was discussed on the 22 February 07 meeting under the item of the same title as above. The following actions were agreed

**2. The Chairman then sought and received confirmation from WATCH that its recommendations were: that WATCH is the appropriate committee to progress this issue; and that, in dealing with this issue in the future, WATCH would be strengthened with a number (perhaps up to 5) of ad hoc experts. At the June 2007 meeting, WATCH would look to agree how it will tackle this issue (e.g. timeline, additional ad hoc experts to be invited, the work to be done in the first stage, etc). He also advised WATCH that Garry Burdett (HSL) had offered to be the HSE anchor point for progressing this issue.**

**3. HSE ACTION: For the June 2007 meeting, to prepare a scoping document setting out a draft plan for how this work should be advanced through WATCH.**

4. The issue for this paper is the draft plan called for in the HSE actions:

### Timing

5. It is planned that a substantial part of the November 07 WATCH meeting is devoted to this issue. In order to allow enough time to assemble the data and experts necessary for such a debate, it is essential that the basic features of the planned November session are agreed at this June 2007 meeting.

## **Recommendation**

6. WATCH is invited to consider and adopt this draft plan.

## **Plan**

7. It is proposed that in November 2007 WATCH will discuss the underlying epidemiological evidence for risk, derived from the dose response relationships of asbestos workers and how this can be extrapolated to assess the risk at the current 0.1 f/ml control limit.

8. At the above meeting, or subsequently, WATCH will be invited to take a view on holding further meetings to discuss what additional extrapolation of risk can be justified from the data sets available and what form the extrapolation should take.

## **Background**

9. In its “new and emerging issues” session at the November 2006 meeting, WATCH (expanded with additional Community of Practice and Interest [COPI] members) identified as a high priority issue the submission titled “risks from low-level exposure to asbestos”.

10. There is an awareness that specific regulatory issues on asbestos arise on a regular basis, for HSE and other authorities, that relate back to a general question. That is, what does the available science indicate can be said, with confidence, about the dose-response curves, at relatively low levels of exposure, for the various forms of asbestos and the diseases that they can produce?

## **Argument**

11. Various international and national agencies have carried out expert in-depth reviews of the epidemiology and toxicology of asbestos and generally classify the six “regulated” types of asbestos as class 1 human carcinogens. The diseases and hazards associated with asbestos are due to the inhalation and deposition and of airborne fibres into the respirable region of the lung. Of the large number of industrial cohorts of asbestos workers only a minority have sufficient airborne exposure data in relation to specific types of asbestos to investigate quantitative risks. However, the limited nature of the exposure data, differences in the types and standards of measurement carried out, and the different types of asbestos and industrial processes used in the cohorts at different periods often introduce substantial limitations and complexities.

12. Previous assessments had identified significant differences between the types of asbestos in use and the risk of asbestos related disease. The UK had for many years up until 2006 used two separate control limits for chrysotile and the 5 other regulated types of amphibole asbestos. HSE epidemiologists (Hodgson and Darnton, 2000) carried out a meta analysis of 21 cohorts (some cohorts were

subdivided) to look at the risk from the different types of asbestos, in more detail and found far greater differences in the risk outcome due to the type of asbestos for different lung diseases (e.g. 500: 1 for mesothelioma in relation to crocidolite and chrysotile respectively). Paradoxically the EU asbestos workers protection directive (AWPD, 2003) chose to adopt a single control limit for all types of asbestos based on an assumption that workers may be exposed to a mixture of fibres and a single (lower) limit offers more protection.

13. Risk models only strictly apply within the range of exposures of the source data on which they are based. Extrapolation outside this range requires the assumption that the shape of the dose-response continues to hold and this introduces additional uncertainty, which cannot be quantified statistically. The range of exposures in historic asbestos exposed cohorts on which risk models for mesothelioma and lung cancer can be derived are in the region of 10-1000 f/ml.years – i.e. typically much higher than the levels of exposure of interest currently. For example, the new control limit introduced by the EU AWPD and implemented in the UK by CAR, 2006, introduced a single 0.1 f/ml control (exposure) limit, based on socio-economic considerations rather than the estimated risk. If enforced, this implies that current workers if exposed on a daily basis for their entire working life to the new control limit, their maximum cumulative exposure would be 4 f/ml.years. In practice cumulative exposures under the new regulations are unlikely to exceed 1 f/ml.years, suggesting that there is around a 100 -fold extrapolation (two order of magnitude) from the cumulative exposures, which define the gradients of the dose-response relationships of the historical occupational data to the new control limit.

14. In the absence of any EU or UK assessment of the risk associated with the new 0.1 f/ml control limit, it is suggested that the robustness of the data and the uncertainties for extrapolation should first be examined within the occupational context, before moving to non-occupational / environmental risk estimates based on exposures to airborne asbestos fibre concentrations up to a thousand fold lower than the new control limit.

15. To help with the session planned for the November 2007, it is proposed that there are two presentations (20 –30 minutes each) by HSE to summarise:

- The extent, types and quality of the exposure data associated with the industrially exposed asbestos worker cohorts:
- The dose response relationships derived from quantitative exposure to asbestos workers and their extrapolation to the 0.1 f/ml control limit.

16. It is also proposed that experts who have researched and authored papers on historical cohorts, are invited as ad hoc members to participate in the debate and to give a summary of their findings and how accurately it can be used to estimate the risk at the current 0.1 f/ml control limit. (15 minutes).

### **Link to HSC Strategy**

17. This work relates directly to HSC/E's statutory responsibilities in relation to asbestos; it also has potential relevance for the asbestos strand of the Cancer Project within HSE's Disease Reduction Programme.

### **Consultation**

18. There has been no external consultation on this paper.

### **European Context**

19. The regulatory framework for asbestos is EU-wide and it is possible that the output of this work might have some EU applicability in that it would give estimated risk for workers exposed at the new control limit.

### **Action**

20. WATCH is invited to consider and offer its thoughts on the proposed plan and to consider appropriate ad hoc experts.

Contact:

Nicola Gregg  
WATCH Secretariat