Advisory Committee on Toxic Substances			ACTS/03/2008
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ADVISORY COMMITTEE ON TOXIC SUBSTANCES

ANNUAL REPORT ON THE WORK OF THE WORKING GROUP ON ACTION TO CONTROL CHEMICALS (WATCH)

Issue

1. Fourth annual report to ACTS Members on the activity of its scientific subcommittee WATCH.

Timing

2. Routine

Recommendation

3. That ACTS takes note of the recent activity of the subgroup.

Background

4. Reconstituted WATCH has completed its fourth year of activities, having met on 19 June 2007, 7 & 8 November 2007 and 14 February 2008.

5. The three year renewable membership cycle for WATCH ended in March 2007. Resignations from two members were received. Two new members, with expertise in Occupational Hygiene and Medicine were appointed to WATCH for the start of the new three year cycle. A list of members of the WATCH committee is provided in Annexe 1.

6. The rules of operation of WATCH permit additional ad hoc expertise to bolster the expertise of the committee for any particular item on the agenda. This opportunity was utilised with three ad hoc experts contributing to meetings in 2007/8.

7. In its fourth year WATCH considered a wide range of technical issues. The issues are briefly summarised below and the advice provided by WATCH is presented. Minutes of each meeting provide more detail and are published on the HSE web site when agreed by members (http://www.hse.gov.uk/aboutus/hsc/iacs/acts/index.htm#watch).

8. Annex 7 lists the papers presented to WATCH in 2007/8.

9. As a scientific advisory committee that adheres to the Office of Science and Technology's Code of Practice for Scientific Advisory Committees (COPSAC), there are requirements for inclusion of specific information in the Annual Report. Hence, the relevant information is attached in Annexes 1-6.

Argument

10. **Assessing the risks of lung cancer and mesothelioma arising from relatively low-level exposure to different forms of asbestos.**
This topic was considered by WATCH to be a high priority 'new/emerging' issue in the previous reporting year. In this context, "relatively low-level exposures" are exposure levels around and below the current asbestos Control Limit and other regulatory standards, such as Clearance Levels. Given the widespread presence of asbestos-containing materials in our environment, there are various situations that give rise to important questions about the potential health risks associated with exposure at such levels. Dose–response relationships for asbestos-induced cancers have been identified and published, based on the results of individual epidemiology studies or from syntheses of the combined findings of collections of such studies. In recent years a particularly influential analysis in the UK has been that published by two HSE statisticians, John Hodgson and Andrew Darnton (Hodgson & Darnton, 2000). For the groups of workers studied in these investigations, a common feature has been that exposures to asbestos (of different types) were generally at levels appreciably above those that we are now seeking to address. Hence two questions can be posed:

i) what can be said, with confidence, about the observed dose-response relationships emerging from the available data?;

ii) and what is the most scientifically defensible position as regards predicting from such observed data the nature of the dose-response curve at exposure levels substantially below those covered by the observed data?

11. A preliminary discussion of how to progress this issue was held at the June 2007 meeting. There was a clear consensus amongst WATCH members that this was an important issue that should be addressed by WATCH at the November 2007 meeting. The ultimate objective for this topic was to explore the associated scientific evidence base and consider whether clear position statements could be derived about the risks to human health of relatively low-level asbestos covering different asbestos fibre types and diseases.

12. In planning for a full-day session at the November meeting, WATCH members considered that the committee should be strengthened by the inclusion of ad hoc members with particular expertise in asbestos. HSE assembled a package of papers for circulation to WATCH members consisting of key reviews by Hodgson and Darton (2000) and Berman and Crump (2005) and a related comparative analysis; original asbestos cohort worker studies considered in these reviews; and additional relevant papers.

13. At the November 2007 meeting, the WATCH committee was expanded to include three ad hoc members who are recognised experts in epidemiology, statistics and occupational hygiene in relation to asbestos : Professor Julian Peto (Cancer Research UK Chair of Epidemiology, London School of Hygiene and Tropical Medicine), Robin Howie (Industrial Hygienist, Robin Howie Associates) and Dr. Brian Miller (Consultant Epidemiologist, Institute for Occupational Medicine, Edinburgh). WATCH considered the information provided in the package of papers, in conjunction with presentations from HSE officials on the key issues associated with the available data from occupational cohort studies and on the analyses of Hodgson and Darnton and Berman and Crump and expert advice from the attending ad hoc members. WATCH approached the question of what could be said about the dose-response relationships (particularly at relatively low exposure levels) for lung cancer and mesothelioma caused by different asbestos fibre types - crocidolite, amosite and

chrysotile by discussing the quality and reliability of data reported in asbestos cohort studies.

14. Following consideration of the available occupational epidemiological data and extensive discussion and debate, WATCH indicated that, in its view, there were substantial concerns about the reliability of some aspects of the data within the asbestos workers cohort studies included in the key assessment made by Hodgson and Darnton and Berman and Crump. The major concern was the quality of the asbestos fibre exposure data presented in many of these studies. WATCH considered that further work was needed before statements about the dose-response relationships and/or the level of risk for different fibre types and different cancers can be made with confidence.

15. In respect of the concerns raised in [14] and the difficulties this posed in terms of using occupational epidemiological data to inform the understanding of the risks of low-level exposure to asbestos, WATCH discussed potential alternative approaches based on the following themes :

iii) Direct observations from low-level ambient exposures

iv) Further exploration of asbestos worker cohort studies

v) Exploring directly the risks of cancer in different contemporary occupational exposure scenarios.

16. WATCH suggested a number of approaches for how the issue of characterising risks associated with low-level exposure to asbestos could be progressed further at future meetings by the committee :

vi) There was scope for looking more closely at the individual occupational epidemiological studies included in the Hodgson and Darnton (and Berman and Crump) reviews, with a view to distinguishing those which are of better quality (and hence contain more reliable information) from those which have identifiable serious deficiencies in respect of exposure data quality. Any overall analysis might then lean more heavily on the more reliable data.

vii) Given that the Hodgson and Darnton analysis was performed almost a decade ago, there might be merit in revisiting it. In doing so, alternative approaches to viewing and utilising the data from the original epidemiology studies could be considered, for example, using uncertainty analysis techniques such as those applied by Berman and Crump in their analysis.

viii) As an alternative or supplementary approach to extrapolation from higher-level exposure, it might be possible to identify better the risks involved in lower level asbestos exposure by investigating directly such “lower-level” occupational exposure scenarios. One example might be to explore the situation for carpenters who have worked with amosite asbestos insulation board. If any exposure data are available for such work, these could be compared with the data we have on mesothelioma and lung cancer occurring in this workforce.

ix) During the discussion it was stated that there is an indication that the incidence of ‘non-attributable’ mesothelioma has increased in the general population; this *might* be causally associated to past asbestos exposures in the general air, particularly near to sites of asbestos use. Further work could be carried out to investigate the apparent relationship between the data for

environmental air asbestos levels (historically and currently) and the risk of mesothelioma in the general population. Any apparent relationship so derived might then be "reality checked" against predictions for this exposure scenario that would be made by extrapolating from data relating to higher levels of asbestos exposure.

17. HSE agreed to formulate a plan for taking the issue of estimating risk involved in low level exposure to asbestos further forward at WATCH that incorporated the key points that had emerged from the discussion (as summarised in [16]).

18. At the February meeting WATCH considered HSE's proposal for progressing the issue of risks of lung cancer and mesothelioma arising from relatively low-levels of exposure to different types of asbestos fibres. Four lines of approach were suggested, following on from recommendations at the November 2007 WATCH meeting :

i) Approach 1 : Identifying the reliability of stated historical exposures in the cohorts investigated; and thereby separating out and putting greater weight on the more reliable studies.

ii) Approach 2 : Revising the overall " Hodgson and Darnton" analysis, ten years on.

iii) Approach 3 : Assessment of specific occupational circumstances – can the risk of asbestos-induced cancer at particular exposures levels by directly observed.

iv) Approach 4 : "Reality checks" of the predictions of the Hodgson and Darnton models for various populations subgroups.

19. HSE informed WATCH that work carried for Approach 1 and some work for Approach 2 would be delivered for the June 2008 WATCH meeting. Approach 3 would be taken forward significantly in time for the November 2008 WATCH meeting. The HSE team needed more time to consider how Approach 4 could be taken forward.

20. Overall, WATCH members endorsed the HSE plan for progressing the further exploration of the dose-response relationship for lung cancer and mesothelioma caused by exposure to different forms of asbestos. HSE agreed to carry out tasks in respect of the plan against the proposed time-frame and to schedule a substantial session for the June 2008 WATCH meeting to address the outcomes from Approaches 1 and 2.

21**. Progressing the new/emerging issue : metal working fluids.**
In the 'new and emerging issues' session at the November 2006 WATCH meeting, metal working fluids (MWF) was considered a priority for further consideration, and consequently this topic was scheduled for discussion at the June 2007 meeting.

22. At the June meeting, WATCH considered a comprehensive collection of papers prepared by HSE/HSL on the topic. A representative from HSE Occupational Hygiene (FOD) informed WATCH that concerns about health risks posed by MWF had emerged from a large-scale investigation of reported cases of extrinsic allergic alveolitis and occupational asthma at Powertrain Ltd in Longbridge, Birmingham. As a consequence of this investigation, HSG 231 was withdrawn by HSE and replaced by new leaflets that placed more emphasis on control measures. Investigations by HSL indicated that bacteria-derived endotoxins might be involved.

23. WATCH discussed whether the causative agents were chemical, bacterial, or both; one enhancing the effect of the other. They also questioned whether this was a genuine new and emerging issue or an issue for better management and control and whether further investigation of the causative factors would inform the debate or whether it was more efficient to intervene to improve management of the problem.

24. Overall, WATCH expressed a consensus opinion that the understanding and avoidance of respiratory disease potentially arising from working with MWF was an issue for the committee. Although the health outcomes may be linked to bacterial contamination, the issue still related to the control of chemical substances and therefore aligned with the focus of WATCH.

25. Subsequent to the June WATCH meeting, HSE enforcement, inspection and regulatory specialists and HSL scientists incorporated recommendations made by WATCH in June 2007 meeting in to a proposal for a three-year programme of research to take the issue further forward. The programme comprised two key strands of activity : (1) further investigations of ill-health associated with exposures to MWF and (2) investigation of potential contamination of MWF. A representative from HSE Occupational Hygiene (FOD) presented an outline of the research programme to WATCH in November.

26. Two initiatives recommended at the June meeting had been approved for funding by the HSE :

i) A critical review of outbreaks of respiratory disease associated with MWF.

ii) A case definition of respiratory ill-health (including extrinsic allergic alveolitis and asthma)

27. The proposal for further work on MWF included a number of additional initiatives for which HSE had considered the business cases (in November):

i) Development of an action plan for managing and further investigation of future outbreaks of respiratory ill-health associated with MWF

ii) A workplace study of micro-organism growth, endotoxins, immunogenic proteins and chemical constituents of conventional and “bio-concept” MWF

iii) Alternative methods for monitoring contaminants in MWF

iv) A workplace research study of MWF-exposed workers.

v) A study of immunological response to biological contaminants associated with MWF

28. Overall, WATCH considered that the proposed research programme on MWF reflected the key points raised by the committee at the June meeting and was an appropriate strategy for progressing the issue further. HSE agreed to provide WATCH with regular updates on the progress of individual projects.

29. **IGHRC document on chemical mixtures.**
As a government Scientific Advisory Committee, WATCH was asked by the Interdepartmental Group on Health Risks from Chemicals (IGHRC) to provide comments on the final draft of its report “Chemical Mixtures: A Framework for Assessing Risks from Chemicals”.

30. Members commented that the draft provided a great deal of good material, was well laid out and was generally content with the report. Some suggestions were

made. For example, the completeness of the suggested framework for assessing risk of chemicals presented in the report could be improved by incorporating more emphasis on exposure. These comments were forwarded to the IGHRC Secretariat.

31. **New/emerging issue : recycling**
This topic was considered a priority for further consideration in the 'new and emerging issues' session at the November 2006 WATCH meeting. Recycling was discussed again in February and June 2007. At the June meeting additional information made available to WATCH included reports from HSE's Horizon Scanning Intelligence Group.

32. WATCH discussed whether they were the appropriate committee to consider this issue and what further information and data would be useful. Overall, members did not see any immediate work that WATCH, as a committee, should do on the topic of recycling. However, WATCH highlighted the following points :

i) The industry had several important characteristics (i.e. rate of growth; demographics; accident figures; general awareness of health and safety issues and the lack of familiarity with existing hazards) that needed to be monitored over time. As well as gathering general information, useful insights into emerging trends across the industry could be gained by initiatives to track specific metrics over a number of years. In making a case for such work, one could draw attention to the particular issues that might warrant further consideration.

ii) In carrying out recycling activities, employers should be aware of the moral obligations towards their own employees but also in respect of other workers elsewhere, in transferring hazards overseas.

iii) Given that health and safety issues associated with recycling are broad and involve physical, biological and chemical hazards, control and management measures should address the whole spectrum.

33. HSE conveyed these key points to the Horizon Scanning Unit.

34. **Progressing the 'new/emerging' issue of low toxicity dusts**
At the February 2007 meeting of WATCH, the committee considered an item concerning the dose-response relationships for the effect on the respiratory tract of respirable, poorly soluble dusts of limited cytotoxicity. Much of the emphasis in the paper was on coalmine dust and on research and analysis conducted by the Institute of Occupational Medicine (IOM). In the follow-up period after the February meeting, HSE and WATCH agreed on the best means by which the WATCH conclusions on the dose-response relationship for coalmine dust should be presented to ACTS. This information was then presented to ACTS at its meeting in May 2007. The outcome of the ACTS meeting was reported to WATCH at the June 2007 WATCH meeting.

35. In a verbal report back from ACTS, WATCH was informed that the analysis had been well received. The ACTS committee had acknowledged that the dose-response curve was related specifically to respirable coal mine dust but thought it effectively pointed out that the current reference levels for airborne concentrations of dust (10 $mg.m^{-3}$ inhalable dust and 4 $mg.m^{-3}$ respirable dust) may be too high if adherence to them is judged to offer adequate health protection for workers. ACTS considered that the control of dusts should be a key part of the HSE Disease Reduction Programme, specifically in relation to reducing the occurrence of long-term respiratory disease including chronic obstructive pulmonary disease (COPD). ACTS agreed that work to review the '10/4' reference levels was needed, but also

suggested that more immediate action to control exposures could be taken and that WATCH should finish its work based on the information already available.

36. In discussions on how to progress the topic further held at the June meeting, WATCH considered outstanding issues raised at previous discussions in February 2007. WATCH considered that the further work was needed to address the recommendation of deriving defensible statements justified by data for other poorly soluble dusts (e.g. carbon black and kaolin) included in the Institute of Occupational Medicine Report.

37. The comparative analysis of the dose-response relationship for the respiratory effects of respirable coalmine dust with similar, although less comprehensive, relevant data available for other poorly soluble dusts of limited toxicity prepared by HSE was considered by WATCH at the November meeting.

38. Discussions at the November meeting covered defining the scope of 'dusts' being considered within this topic; the significance of the lung function metrics that were available; the outcomes of the comparative analysis of the dusts; dust solubility and benchmarking of other dusts against coalmine dust. Overall, WATCH thought the analysis carried out by HSE presented a clear and concise overview of dose-response relationships for poorly soluble dusts of limited cytotoxicity, as compared to coalmine dusts. The analysis indicated to WATCH that for the different dusts examined, there was some variability in the data for the estimated reduction in forced expiratory volume in 1 second (FEV_1) that would arise from exposure to 4 $mg.m^{-3}$ of respirable dust; and there were a number of variable factors between the dusts (e.g. variable degrees of solubility within the "poorly soluble" general characteristic; distribution of particle size within the respirable range) that could influence their properties. WATCH, however, observed two important general points:

i) for each of the dusts examined, a significant effect on FEV_1 with exposure to 4 $mg.m^{-3}$ respirable dust is apparent; and

ii) notwithstanding some variability, the scale of reduction in FEV_1 under such conditions is of the same general order as that for coalmine dust.

39. With regards to i) and ii), these findings reinforce the conclusion that a range of dusts of the "poorly soluble, limited cytotoxicity" type are predicted to produce reductions in FEV_1 on long-term exposure to 4 $mg.m^{-3}$ respirable dust.

40. WATCH made several suggestions for potential further work:

i) Exploration of the effects of dust exposure on lung function parameters other than FEV_1, such as FVC, to gain a more comprehensive picture of the total range and degree of effects.

ii) Meta-analysis of the total data available from all of the individual studies, to further probe issues such as relative quality of data, consistency, uncertainty etc.

iii) Advocacy of experimental work aimed at producing a solubility test that would be a reliable indicator of the relative solubility of different dusts in the lung; this might be useful in assessing the degree to which the unknown toxicological properties of a dust with respect to the lung might correspond to the properties of the poorly soluble dusts studied here.

iv) Further development of benchmarking methods that might be used to find "best fit" approaches to connect a poorly soluble dust of limited cytotoxicity that has very limited data on it, with the dose-response data available for a more thoroughly studied dust with the most similar physicochemical characteristics.

41. WATCH agreed that, given the broad scope presented by the options for progressing 'dusts', its considerations on this issue had reached a stage where it was appropriate to ask for a steer from ACTS about what direction should be taken for any further work. However, as the next ACTS meeting had been in the week immediately after the WATCH November meeting and there had been insufficient time for WATCH members to clear the position emerging such that it was available for presentation to ACTS. The issue of dusts will therefore be taken to ACTS at its next meeting.

42. **New and emerging issues – horizon scanning within HSE and a review of 2 years WATCH experience of this process**
At the November meeting, HSE's Chief Scientific Advisor provided WATCH with an overview of the challenges facing HSE in deciding on its science and technology priorities, given the breadth of responsibilities HSE has. He demonstrated how horizon scanning techniques have been used to help with the prioritisation process. This included the use of horizon scanning categories (e.g. the workplace; science and technology; political change and socioeconomic trends) and formal 'scenario-casting' techniques to test different propositions.

43. The current challenge facing HSE is how to incorporate the outputs of HSL's Horizon Scanning team, which is endeavouring to address issues in 10 years time, into HSE's business planning process that typically looks 3 years ahead.

44. Several members acknowledged there were difficulties associated with trying to predict future health and safety issues but agreed that WATCH had an important role to uphold in horizon scanning. It was suggested working more closely with HSL's horizon scanning team could involve more flexible approaches in the future to deal better with the identification of new and emerging issues. This could include providing views by correspondence on issues requiring immediate action.

45. WATCH agreed that a structured horizon-scanning workshop delivered by the HSL Horizon Scanning team, which featured different techniques and approaches, would mutually benefit the committee and HSE prior to a third WATCH horizon scanning session.

46. HSE will develop a horizon-scanning workshop as a component of a 2008 WATCH meeting.

47. **REACH – update on activities of UK REACH CA**
The future impact on risk management of chemicals resulting from the implementation of new legislation in the EU was identified as high priority in the reporting year 2005/6. Hence, WATCH requested that HSE provide updates on relevant new legislation. At the November meeting, HSE provided WATCH with an update on the new 'Registration, Evaluation, Authorisation and Restriction of Chemicals' (REACH) legislation and the activities of the UK REACH Competent Authority (CA) function.

48. WATCH was advised that the role of the REACH CA was distinct from other familiar UK CA roles that involved decision-making at the national level, in that most of the decision-making would be carried out by the European Chemicals Agency (ECHA), based in Helsinki, assisted by REACH committees that comprise nominees from EU Member States. As host of the UK REACH CA, HSE had a coordination role in linking together the various UK regulatory authorities that will have roles in the REACH enforcement arrangements in the UK. At present the key roles of the UK

REACH CA, utilising some 65% of total CA resource, involve raising awareness of REACH amongst UK duty-holders; operating a helpdesk function and providing advice to industry.

49. WATCH discussed registration deadlines; prioritisation; evaluation and authorisation. It was envisaged that WATCH would provide input to generic technical issues, classification and labelling issues and the evaluation of substances by offering perspectives on draft evaluations and therefore assisting the UK nominees in their input to relevant EU REACH Committee deliberations.

50. Although some input may be required sooner (e.g. on generic issues, restrictions of use of particular substances), significant involvement of WATCH in individual substance evaluations was not expected before the first deadline for registration of "phase-in" substance evaluations of 1st December 2010.

51. **Global Harmonised System for Classification and Labelling (GHS) – update on progress towards implementation and impact on current system.**
The future impact on hazard classification resulting from the implementation of new legislation in the EU was also identified as high priority in the reporting year 2005/6. At the November meeting, HSE provided WATCH with an update on the current situation regarding the adoption of GHS by the EU.

52. GHS, which started in 1992 with an international commitment to develop a global system to harmonise classification and labelling processes, culminated in the recent agreement of the United Nations Globally Harmonised System. The EU has now decided to adopt much of GHS into EU law via the proposed new Classification, Labelling and Packaging of Substances and Mixtures Regulations, a draft of which was published in 2007. Public consultation and Member State negotiations were expected to continue into 2008. The European Commission is aiming to bring GHS into force by 2009. The current draft regulation proposes transitional arrangements such that from 1 December 2010 substances should be classified under the new system and also according to the current EU system, but should be labelled and packaged only in accordance with the new system. From 1 June 2015 substances and mixtures shall be classified, labelled and packaged according to the new regulation only. The Helsinki European Chemicals Agency (ECHA) will be the centre for the new EU classification & labelling work, in addition to REACH.

53. HSE highlighted to WATCH key issues on GHS raised by Member States:

i) The necessity, not yet assured in the new draft regulation, for consistency with REACH (especially in regard to terminology, confidentiality rules, language provisions)

ii) Concerns over whether or not the transition period is too ambitious

iii) The need to ensure all other EU legislation affected by changes to classification & labelling rules and positions is amended prior to entry into force of the new regulation.

iv) Concern over possible ambiguity by the proposed shift away from classification of 'what is placed on the market' to 'the form or state in which a substance/mixture to be used or reasonably be expected to be used'.

v) The need to clarify the roles and responsibilities within the supply chain.

54. WATCH discussed the implications of classification and labelling responsibilities for endpoints other than carcinogencity, mutagencitiy and reproductive toxicity lying

with industry. They also discussed the impact of GHS on COSSH Essentials including issues such as new terminology and symbols.

55. **Cancer risks from use of Azo Dye Penetrants**
In the context of the Cancer Project of the Disease Reduction Programme, stakeholder concern has been raised with HSE about the use of CI Reactive Red 164 as a penetrant dye in the non-destructive testing of metal components. The concern arises because of the assertion that o-toludine (1-amino-2-methylbenzene), classified as a category 2 carcinogen in the EU, could be released from the reductive cleavage of the azo bonds of CI Reactive Red 164. At the February meeting, HSE invited WATCH to consider, based on the available information, what level of concern about potential ill-health consequences is warranted in relation to the occupational use of CI Solvent Red 164 as a penetrant for the detection of cracks in metal components and the appropriateness of recommending potential substitutes.

56. As background to this topic, WATCH considered information provided by HSE on the supply, formulation, use and control of detection penetrants in the UK as well as a summary of the carcinogenic potential of o-toluidine. HSE officials informed WATCH that searches had identified little useful toxicological hazard or exposure data on CI Solvent Red 164. HSE also provided WATCH with an overview of limited information on potential substitutes for CI Solvent Red 164 : there were three types of potential substitutes (i) closely related variants of CI Solvent Red 164 (ii) Rhodamine B and (iii) metal complexes involving tightly bound complexes.

57. WATCH members discussed a number of aspects relating to CI Solvent Red 164 : the potential for occupational exposure; biological monitoring and occupational health surveillance; how the substance should be addressed under REACH; issues regarding classification and labelling; and the appropriateness of recommending alternatives.

58. WATCH was disappointed with the paucity of hazard and exposure data on CI Solvent Red 164. Based on the limited hazard data available, members thought it appropriate to consider CI Solvent Red 164 to have carcinogenic potential and should, therefore be subject to the same exposure control approach as for other suspect carcinogens. Members observed however, that exposure data were currently lacking to inform on the degree to which current practices and associated exposures conform to these expectations. In this respect, WATCH considered that the issue required more attention from industry.

59. In terms of the relative priority that should be given to this issue in the context of intervention activity on carcinogens in general, given the paucity of the data WATCH could not, at the present time, make judgements on the relative priority that should be given to CI Solvent Red 164 used in metal crack detection. However, members considered that addressing the lack of data and awareness concerning the potential health threat of CI Solvent Red 164 was a priority of a different type that should encompass the pursuit of the following issues :

i) Fulfilment of the responsibilities held by companies involved in formulating CI Solvent Red 164 into crack-detecting penetrants - these being to properly characterise and communicate to users the hazardous properties of the components of the formulation, including CI Solvent Red 164.

ii) Fulfilment of the responsibilities of user companies in implementing controls on exposure commensurate with the use of a suspect (category 3) carcinogen within COSHH Essentials.

iii) Better awareness and co-ordination across all relevant parties of the work practices involving the use of CI Solvent Red 164, what health issues have been explored and observations made and what awareness- raising activities could be implemented).

60. In relation to potential substitutes for CI Solvent Red 164, WATCH did not consider it appropriate to make a recommendation at this time, given the paucity of hazard and exposure information presented for this substance and potential alternatives.

61. **Proposal for BMGV for Chlorobenzene**
In 2000 the former WATCH committee considered whether a biological monitoring value (BMGV) could be established for chlorobenzene. However, although a BMGV was considered worthwhile, the data that were available were not sufficient to set either a health guidance value or a benchmark value. WATCH was able only to endorse the relationship between biological monitoring values and airborne concentrations of chlorobenzene.

62. Since then a more flexible approach to the establishment of BMGVs has been adopted and in 2005 the WELs system (replacing the former OES/MEL system of occupational exposure limits) was introduced. This opened up the possibility to set a BMGV at a level that equates to an 8-hr exposure at the WEL. HSE therefore proposed to use the relationship between urinary 4-chlorocatechol and airborne chlorobenzene that was endorsed by WATCH in January 2000 to establish a BMGV for chlorobenzene that equates to an 8-hr exposure at the WEL.

63. At the February meeting WATCH was invited by HSE to consider a proposal for establishing a biological monitoring guidance value (BMGV) for chlorobenzene of 5 mmol 4-chlorocatechol/mol creatinine in the end-of shift urine to correspond with the 1 ppm (8-hr time weighted average) Workplace Exposure Limit (WEL) value.

64. WATCH examined an overview of biological monitoring data available for chlorobenzene and the argument in support of a BMGV proposal prepared by HSL's Biological Monitoring Unit for HSE. Members considered the correlation between inhaled chlorobenzene levels and levels of 4-chlorocatechol and 4-chlorophenol in urine samples presented in published occupational exposure and volunteer studies and whether the UK WEL of 1 ppm (8 hr TWA) was the appropriate occupational exposure reference level.

65. In establishing a BMGV value, members considered the outcome of HSE's analysis of available biomonitoring data that urinary levels of 4-chlorocatechol could range from 5 to 10 mmol/mol creatinine following exposure to chlorobenzene at the UK WEL. Although members generally regarded both values to be appropriate based on the available data, following a discussion of the implications of setting the BMGV at either 5 or 10 mmol/mol, they expressed a preference for a BMGV to be set to 10 mmol/mol creatinine to reflect the upper range of acceptable urinary levels.

66. Overall, WATCH expressed a consensus opinion that it was now appropriate to establish a BMGV for chlorobenzene of 10 mmol 4-chlorocatechol/mol creatinine that was derived by association with the UK 8-hour TWA WEL of 1 ppm. Members recommended that the associated EH64 documentation should explain that this value is at the upper end of the range of urinary levels that correspond to exposure at the WEL; and that interpretation of biological monitoring values against this BMGV should be made in accordance with the guidance in HSG 167 "biological monitoring in the workplace.

67. **Inflammatory response to carbon nano-tubules: findings from a recent research project.**
In a HSE review of potential hazardous properties of particles arising from nanotechnology, seen by WATCH in 2005, it had been stated that there were some similarities in the structural and solubility characteristics of carbon nanotubes (CNT) and asbestos fibres. Professor Ken Donaldson and Craig Poland from the Centre for Inflammation Research, University of Edinburgh were invited to the February WATCH meeting to elaborate on this theme, for information, by presenting to the committee their findings from recent research on the toxicity of CNT.

68. In their presentation to WATCH, a 'fibre pathogenicity paradigm' was described based around the proposal that the pathogenicity of fibres was largely determined by their 'dimension', 'dose' and 'durability' such that if a sufficient quantity of long, thin fibres, that cannot be cleared normally from the lung via macrophage phagocytosis, could persist in the lung and potentially cause lung disease. Experimental findings for short/tangled and long CNT versus short and long amosite fibres and nano-particulate carbon black (NPCB) were described.

69. Using a rodent mesothelial exposure model, a marked inflammatory response had been observed in mice 24 hours and 7 days after mesothelial exposure to long amosite fibres or CNT. In contrast, no inflammatory responses had been observed in mice exposed to NPCB, or short/tangled amosite fibres or CNT.

70. Mr Poland concluded the presentation to WATCH by highlighting :

(i) CNT have been created with varying physical characteristics.

(ii) The greater the proportion of longer, straighter 'fibre-like' CNT in a given sample, the more likely it was to behave like asbestos.

(iii) There was scope for 'engineering-out' the 'asbestos-like' attributes of CNT

(iv) It is not currently known whether exposure to CNT might occur in the workplace/environment at levels sufficient to cause disease.

(v) The CNT tested displayed a high level of bio-persistence allowing, in theory, for sufficient time for migration through the lung to the mesothelium. A key question in terms of human exposure is whether inhalation exposures of CNT could occur at levels that would deliver sufficient long fibres to the mesothelium to bring about mesothelial disease.

71. The presentation was well received by WATCH. Members posed a number of questions to Prof Donaldson and Mr. Poland on the characteristics of typical commercially available CNT; the preparation of the nanotubes for experimentation and the potential for human exposure. Professor Donaldson agreed to provide WATCH with a copy of the published paper on the research work presented, when it becomes available.

72. **Biological monitoring : A general overview.**
Biological monitoring (BM) is an approach to assess the overall exposure of people to chemicals by measurement of the chemicals or their breakdown products in blood, urine and/or breath. At the February meeting, the Head of the Biological Monitoring Section at HSL provided WATCH with a general update on BM, covering 'past, present and future' aspects of this topic. He informed WATCH that :

i) Until January 2005, two types of biological monitoring guidance value (BMGV) were used : health guidance values and benchmark value

ii) From 2005, to coincide with the introduction of the new WEL occupational exposure limit system in the UK, the associated HSE guidance document EH40: Occupational Exposure Limits, provided a list of substances for which a corresponding BMGV has had been established (in 2007, there were established BMGVs for 16 substances)

iii) Beyond the UK, other organisations involved in deriving biological limits include : the American Conference of Governmental Industrial Hygienists (ACGIH), it having established 'Biological Exposure Indices' for 47 substances, and the Deutsche Forschungsgemeinschaft (DFG, a German Research Foundation) having set 'Biological Tolerance Values' for 51 substances.

iv) Each year HSL's Biological Monitoring Section analyses between 8000 – 10,000 biological samples from a range of occupational health providers

v) BM has been carried out for a number of substances across different workplaces. Case-studies of BM experiences for some of these substances (i.e. 4,4'-methylenebis (2-chloroaniline) [MbOCA] and isocyanates) have provided valuable insights into practise and problems, for example :

a. BM is a useful tool for assessing the effectiveness of exposure control.
b. Regular BM against 90th percentile BMGVs can identify lapses in the operation of controls or in individual behaviour
c. Regular or periodic BM within a workplace regime of increasingly stringent controls having been introduced can show gradual reductions in exposure and risk
d. A programme of BM-derived exposure assessments for carcinogens would provide an up-to-date picture of current UK industry practice and aid the safe management of workplace carcinogens

73. In general discussion on BM, WATCH members raised a number of comments. Members thought it would be helpful to provide industry with more guidance on BM and the interpretation of biological limits. In addition, workplace-based BM raised important ethical questions, particularly at the individual level. The reporting of

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References

COPSAC December 2001, Office of Science and Technology, Code of Practice for Scientific Advisory Committees, Department of Trade and Industry.

Attachments

Annex 1 WATCH Membership Template 2007/8

Annex 2 Register of Members' Interests 2007/8

Annex 3 WATCH Terms of Reference

Annex 4 WATCH Financial Statement 2007/8

Annex 5 Methods of Resolving Conflict

Annex 6 Glossary of Terms

Annex 7 Papers Issued to WATCH in 2007/8

As a scientific advisory committee WATCH is required to adhere to the Office of Science and Technology's Code of Practice for Scientific Advisory Committees (COPSAC). The COPSAC requires committee arrangements/procedures to be established and some of these arrangements/procedures to be presented in the Annual Report; these have been included in Annexes 1-6.

Annex 1

WATCH Membership Template 2007/8

MEMBERS

TUC Nominees	**Area of Expertise**
Dr T Fletcher	Epidemiology
Prof A W M Hay	Toxicology
Dr M van Tongeren	Occupational hygiene/epidemiology
CBI Nominees	
Dr S P Binks	Toxicology
Mr R Chapman	Occupational hygiene
Mr S D Williams	Toxicology
Independent Members	
Prof T-C Aw	Medicine
Mr S R Bailey	Occupational hygiene
Mr D G Farrar	Toxicology
Prof L S Levy	Toxicology
Dr S R Hutchinson	
Chairperson	
Dr S Fairhurst	Toxicology
Ad hoc Members co-opted in 2007/8	
Mr R Howie	Occupational hygiene
Dr B Miller	Epidemiology
Prof Julian Peto	Epidemiology

Annex 2

Annual Register of Interests 2007

Members have declared the following interests (ie share holdings or fundings received)

Name and Employer or Nominating Body	Declaration	Personal Profile (optional)
Dr S Fairhurst	None	
Prof T-C Aw	Medical consultant / advisor for Elementis Chromium (chromium chemicals)	
Mr S Bailey	Employee and Share Holder of GlaxoSmithKline (principally pharmaceuticals)	
Dr S P Binks	Employee and Share Holder of GlaxoSmithKline	
Mr R Chapman	Employee and Share Holder of BASF	
Mr D Farrar	Employee of Ineos ChlorVinyls Limited. Consultant to Ineos Enterprises Ltd, Ineos Fluor Ltd, Ineos Silicas Ltd, Ineos Healthcare Ltd, AGC Chemicals Europe Ltd, Saffil Ltd, ICI plc, CXR Biosciences. Share Holder of ICI plc.	
Dr T Fletcher	None	
Prof A Hay	None	
Dr S R Hutchinson	None	
Prof L Levy	Scientific Adviser on Occupational & Toxicological research to International Carbon Black Association (specifically, carbon black)	
Prof M van Tongeren	Research grants received from CONCAWE (heavy fuel ols), Manganese Health Research Program (manganese), ILZRO (lead)	
Mr S Williams	Employee and Share Holder of BP	
Ad Hoc Members		
Mr R Howie	None	
Dr B Miller	None	
Prof Julian Peto	None	

Annex 3

WATCH Terms of Reference

TERMS OF REFERENCE FOR THE WORKING GROUP ON ACTION TO CONTROL CHEMICALS (WATCH)

1. To be the ACTS scientific sub-committee to advise ACTS and HSC/E on issues relating to the assessment and control of health risks of chemicals.

2. WATCH's terms of reference are:

To provide scientific and technical advice to ACTS and HSE on matters within its competence. In particular, to provide scientific and technical advice to ACTS and its other sub-groups and where requested, HSE, on issues relating to chemicals, their actual or potential health impact and the means of their control in the workplace.

3. Should issues arise which require additional expertise, the Chair and the Secretariat, in consultation with WATCH members, may appoint other persons to attend meetings of WATCH to meet particular needs, including co-opting independent experts for particular issues/meetings.

4. WATCH will provide annual reports on its work to ACTS.

Annex 4

WATCH Financial Statement 2007/8

Costs incurred are travel and subsistence reimbursements to members, hire of conference facilities and equipment, refreshments and meals during meetings and overnight rooms for residential meetings.

Members do not receive a fee for time spent preparing for or attending WATCH meetings.

In 2007/8 WATCH met on three occasions: a 1-day meeting at Local Council offices in Bootle, a 1-day meeting at HSE's offices in London, and a 2-day residential meeting in Birmingham.

Total travel and subsistence costs	=	£ 2967.43
Total conference expenses including meals, room/equipment hire, overnight rooms	=	£ 7309.28
Total WATCH expenditure in 2007/8	=	£10,276.71

NB. Several members have not claimed for travel and subsistence reimbursement in 2007/8 as expenses are met by their employers.

Annex 5

Methods of Resolving Conflict

Extract from Members' Terms and Conditions (WATCH/2004/8) :

8. Handling conflict of interests

WATCH members are appointed on a personal basis, even when nominated by stakeholder groups. However, to avoid any public concern that commercial interests might affect the advice of WATCH, HSE has decided that the arrangements that govern relationships between members and the chemicals industry and information on significant and relevant interests should be on public record. Members will be required to declare any interests on appointment and at relevant meetings. Such interests can be direct or indirect. Examples of a direct interest would be employment at a company that manufactures chemicals and personal involvement in the subject under discussion or being retained as an expert witness in a legal case involving the subject under discussion. An example of an indirect interest would be when a member, working at a University Department, is aware that the Department is part-funded by grants from a particular company, but where the member is not involved in the work funded by that company.

If an interest is declared the member should seek the Chair's guidance on whether they should take part in the proceedings.

To avoid any danger of WATCH members being influenced, or appearing to be influenced, by their private interests in the exercise of their public duties, all members should declare commercial interests.

Annex 6

Glossary of Terms

ACTS	Advisory Committee on Toxic Substances
BM	Biological Monitoring
BMGV	Biological monitoring guidance value
CA	Competent Authority
CNT	Carbon nanotubes
COPD	Chronic Obstructive Pulmonary Disease
COPSAC	Code of Practice for Scientific Advisory Committees
COSHH	Control of Substances Hazardous to Health
CSD	Corporate Sciences Directorate
DEFRA	Department for Environment, Food and Rural Affairs
EChA	European Chemicals Agency
FEV	Forced expiratory volume
FOD	Field Operations Directorate
FVC	Forced vital capacity
GHS	Globally Harmonised System of classification and labelling of chemicals
HSE	Health and Safety Executive
HSG	Health and Safety Guidance
HSL	Health and Safety Laboratory
IGHRC	Interdepartmental Group on Health Risks from Chemicals
IOM	Institute of Occupational Medicine
MEL	Maximum exposure limit
MWF	Metal working fluid
NPCB	Nano-particulate carbon black
OES	Occupational Exposure Standard
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
TWA	Time weighted average
WATCH	Working Group on Action to Control Chemicals
WEL	Workplace Exposure Limit

Annex 7

Papers Issued to WATCH in 2007/8

- WATCH/Agenda/2007/2 - Agenda for 10th Meeting, 19th June 2007
- WATCH/2007/4 - The risk of ill-health from low-level exposures to asbestos – Further discussion about scope of project and plan for progression
- WATCH/2007/5 - Metal Working Fluids, a potential 'new and emerging issue'
- WATCH/2007/6 -Chemical Mixtures: A framework for assessing risks – draft document by IGHRC
- WATCH/2007/7 - Recycling, a potential 'new and emerging issue'
- WATCH/SecReport/2007/2 - Secretary's Report for 10th Meeting, 19th June 2007
- WATCH/MIN/2007/2 - Minutes of the 10th Meeting, 19th June 2007

- WATCH/Agenda/2007/3 - Agenda for 11th Meeting, 7th & 8h November 2007
- WATCH/2007/8 - The risks of lung cancer and mesothelioma from relatively low-level exposures to different forms of asbestos
- WATCH/2007/9 - Comparison between the dose-response relationship for the respiratory effects of respirable coalmine dust with similar relevant data available for other poorly soluble dusts of limited cytotoxicity
- WATCH/SecReport/2007/3 - Secretary's Report for 11th Meeting, 7th & 8th November 2007
- WATCH/MIN/2007/3 - Minutes of the 11th Meeting, 7th and 8th November 2007

- WATCH/Agenda/2008/1 - Agenda for 12th Meeting, 14th February 2008
- WATCH/2008/1 - Cancer risks from use of Azo Dye Penetrants
- WATCH/2008/2 - Proposal for a BMGV for Chlorobenzene WATCH/2008/3 – Towards a modern exposure intelligence strategy
- WATCH/2008/3 - The risks of lung cancer and mesothelioma from relatively low-level exposures to different forms of asbestos - Proposal for Progressing the Issue
- WATCH/SecReport/2008/1 – Secretary's report for 12th Meeting, 14th February 2008
- WATCH/MIN/2008/1 – Minutes of the 12th Meeting, 14th February 2008

Papers are available on the HSE website at:
http://www.hse.gov.uk/aboutus/hsc/iacs/acts/watch/index.htm