Environmental Health Criteria 20

SELECTED PETROLEUM PRODUCTS

World Health Organization

IPCS INTERNATIONAL PROGRAMME ON CHEMICAL SAFETY

ENVIRONMENTAL HEALTH CRITERIA 20

SELECTED PETROLEUM PRODUCTS

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The International Programme on Chemical Safety (IPCS) is a joint venture of the United Nations Environment Programme, the International Labour Organisation, and the World Health Organization. The main objective of the IPCS is to carry out and disseminate evaluations of the effects of chemicals on human health and the quality of the environment. Supporting activities include the development of epidemiological, experimental laboratory, and risk-assessment methods that could produce internationally comparable results, and the development of manpower in the field of toxicology. Other activities carried out by IPCS include the development of know-how for coping with chemical accidents, coordination of laboratory testing and epidemiological studies, and promotion of research on the mechanisms of the biological action of chemicals.

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NOTE TO READERS OF THE CRITERIA DOCUMENTS

While every effort has been made to present information in the criteria documents as accurately as possible without unduly delaying theft publication, mistakes might have occurred and are likely to occur in the future. In the interest of all users of the environmental health criteria documents, readers are kindly requested to communicate any errors found to the Division of Environmental Health, World Health Organization, Geneva, Switzerland, in order that they may be included in corrigenda which will appear in subsequent volumes.

In addition, experts in any particular field dealt with in the criteria documents are kindly requested to make available to the WHO Secretariat any important published information that may have inadvertently been omitted and which may change the evaluation of health risks from exposure to the environmental agent under examination, so that the information may be considered in the event of updating and re-evaluation of the conclusions contained in the criteria documents.

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ENVIRONMENTAL HEALTH CRITERIA FOR SELECTED PETROLEUM PRODUCTS

Further to the recommendations of the Stockholm United Nations Conference on the Human Environment in 1972, and in response to a number of World Health Assembly Resolutions and the recommendation of the Governing Council of the United Nations Environment Programme, a programme on the integrated assessment of the health effects of environmental pollution was initiated in 1973. The programme, known as the WHO Environmental Health Criteria Programme, has been implemented with the support of the Environment Fund of the United Nations Environment Programme. In 1980, the Environmental Health Criteria Programme was incorporated into the International Programme on Chemical Safety. The result of the Environmental Health Criteria Programme is a series of criteria documents.

The Office of Occupational Health, WHO, was the unit responsible for the development of the Environmental Health Criteria document on Selected Petroleum Products.

The Task Group for this document met in Geneva from 15-19 October 1979. The meeting was opened by Dr M. A. El Batawi, Chief, Office of Occupational Health, who welcomed the participants and the representatives of other international organizations on behalf of the Director-General.

The Task Group reviewed and revised the second draft criteria document and made an evaluation of the health risks of exposure to selected petroleum products.

The first and second drafts were prepared by Dr K. W. Jager, Shell Internationale Research, Maatschappij B. V., The Hague, Netherlands. Comments on the second draft, which have been incorporated in this report, were received from the national focal points for the WHO Environmental Health Criteria Programme in Australia, the Federal Republic of Germany, Mexico, the United Kingdom, and the USA, and from the WHO Collaborating Centres of Occupational Health in: Chile, Finland, Indonesia, Netherlands, Singapore, Sweden, Switzerland, the United Kingdom, and the USSR. Additional comments were received from Dr. R. E. Eckardt (USA), Dr M. Rouhani (Iran), from the International Petroleum Industry Environmental Conservation Association, and from the American Petroleum Institute.

The collaboration of these national institutions, international organizations, and individual experts is gratefully acknowledged. The Secretariat also wishes to thank Dr K. W. Jager and Dr M. Sharratt for their invaluable assistance in the final stages of the preparation of the document.

As the final text of the evaluation could not be distributed at the meeting, it was circulated to all participants in November 1978. The comments received were then considered by the Rapporteur and some members of the Secretariat, and suggested alterations were included. Later, section 2.1.2, Methods of sampling and analysis, was completely rewritten by Mr. T. P. C. M. van Dongen of the Shell Laboratory (Amsterdam) and Dr K. W. Jager, the Rapporteur.

The document has been based, primarily, on original publications listed in the reference section. However, several recent reviews of health aspects of petroleum products have also been used, including: Petroleum Handbook (1966); API Toxicology Reviews (API, 1965, 1967, 1969); US DHEW (1970); and Lazarev & Levina (1976).

The purpose of this document is to review and evaluate available information on the biological effects of some petroleum products, and to provide a scientific basis for decisions aimed at the protection of

human health from the adverse consequences of exposure to these substances in both the occupational and general environments.

It was only feasible to discuss several groups of related products, and to select priorities among them. Thus, non-fuel products derived from crude oils are considered in three broad groups, i.e., petroleum solvents, lubricating base-oils, and bitumens. These have been selected as priorities, because of their widespread use and because large sub-groups of the population may come into close contact with them through occupational or domestic use. Moreover, adverse health effects are known to occur from occupational exposure to some of these products.

Base chemicals derived from the cracking of crude oil fractions, such as ethylene, propylene, and other olefins, and fuels derived from crude oils ranging from gasoline to heavy fuel oil, are not discussed in this document. As fuels and non-fuels of a similar boiling range may have similar effects, e.g., on the skin or, after aspiration, on the respiratory tract, most toxicological data discussed in this review are more or less relevant to crude oil-derived fuels of a similar boiling range. In fact, it is impossible to make a strict division between data relating to fuels and non-fuels and they have been considered together, whenever relevant.

The published literature and other available information have been critically evaluated and where possible, an attempt has been made to establish whether or not, under certain conditions, a potential risk to man exists. Suggestions for avoiding established risks and for further studies have also been made.

The environmental impact, if any, of the products has only been considered where it is directly related to the health of man.

Details of the WHO Environmental Health Criteria Programme including some terms frequently used in the document may be found in the general introduction to the Environmental Health Criteria Programme published together with the environmental health criteria document on mercury (Environmental Health Criteria 1, Mercury, Geneva, World Health Organization, 1976), now also available as a reprint.

Financial support for the publication of this criteria document was kindly provided by the United States Department of Health and Human Services through a contract from the National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina, USA -- a WHO Collaborating Centre for Environmental Health Effects.

The following conversion factors have been used in the present