VALUE(S) ADDED 7-24-85

FACT SHEET REVISED _____

VALUE(S) REMOVED _____

AMBIENT SURFACE WATER QUALITY STANDARDS DOCUMENTATION

CHEMICAL: Chrysene

CAS NO.(s): 218-01-9

BASIS (Human/Aquatic): Human

WATER CLASSIFICATION: AA; AA-s; A; A-s

STANDARD: 0.002 ug/l Note D

REMARKS:

SUMMARY INFORMATION:

Polynuclear aromatic hydrocarbons (PAHs) are a class of compounds which contain three or more aromatic rings. PAHs are ubiquitous substances generated from natural sources such as forest fires and volcanoes as well as from human activities, including emissions from coal- and gas-fired boilers, electric power plants, municipal and industrial incinerators and a wide variety of industrial processes. Benzo(a)pyrene, the most thoroughly studied of the PAHs, is an animal oncogen as defined in Part 701.1(p).[1] Other PAHs have also been implicated as oncogens although the data may be less conclusive than for benzo(a)pyrene. Some investigators have proposed that if a characteristic "bay region" exists in the molecule, the PAH can be transformed to a reactive metabolite which is able to react with genetic material.[2] Available oncogenicity and mutagenicity data on PAHs with four or more rings and a "bay region" have generally supported this hypothesis. PAHs with four or more rings and a "bay region" will be considered as potential human oncogens unless there are sufficient data to the contrary.

The toxicologic data base for chrysene has been reviewed.[3-6] It is a 4-ring PAH, has a "bay region", and available bioassay data indicate it has oncogenic activity in laboratory animals and genotoxic activity in short-term tests.[3-7]

STANDARD DERIVATION:

The human health effects data, animal toxicologic data, and aesthetic threshold data are not sufficient for establishing a specific standard on the basis of Section 701.4 through 701.6. Although the available bioassay data on the PAH chrysene are suggestive of oncogenicity in laboratory animals, the data were not considered adequate for use in cancer-risk extrapolation procedures. However, chrysene is a 4-ring PAH with a "bay region" and is structurally similar

to the PAH benzo(a)pyrene (an animal oncogen as defined in Part 701.1(p)). It has similar functional groups and probably similar metabolic pathways and toxicologic effects as benzo(a)pyrene.[3-6] The recommended ambient water quality standard for benzo(a)pyrene is 0.002 ug/l. There are sufficient data to consider chrysene a potential human oncogen. Based on a chemical correlation to benzo(a)pyrene as defined in Section 701.7(a), the recommended ambient water quality standard for chrysene is 0.002 ug/l.

REFERENCES:

(1) N.Y.S. Department of Health. 1984. Documentation for ambient surface water quality standard for benzo(a)pyrene.

(2) Lehr, R.E. et al. 1981. The bay region theory: history and current perspectives. In: Polynuclear Aromatic Hydrocarbons. Cooke, M. et al. (eds.). Batelle Press. Columbus, Ohio. pp. 21-37.

(3) National Research Council (U.S.A.) 1983. Polycyclic Aromatic Hydrocarbons: Evaluations of Sources and Effects. National Academy Press. Washington, D.C.

(4) International Agency for Research on Cancer. 1973. IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. 3: 159-177.

(5) International Agency for Research on Cancer. 1983. IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. 32: 247-261

(6) U.S. Environmental Protection Agency. 1980. Ambient water quality criteria for polynuclear aromatic hydrocarbons. NTIS No. PB81-117806.

(7) LaVoie, E. et al. 1979. A comparison of the mutagenicity, tumor-initiating activity and complete carcinogenicity of polynuclear aromatic hydrocarbons. In: Polynuclear Aromatic Hydrocarbons. Jones, P.W. and P. Leber (eds.). Ann Arbor Science Pub. Ann Arbor, MI. pp. 705-721.

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