READ 1

Creosote# CASRN 8001-58-9 (08/01/89)

Health risk assessment information on a chemical is included in IRIS only after a comprehensive review of chronic toxicity data by work groups composed of U.S. EPA scientists from several Program Offices. The summaries presented in Sections I and II represent a consensus reached in the review process. The other sections contain U.S. EPA information which is specific to a particular EPA program and has been subject to review procedures prescribed by that Program Office. The regulatory actions in Section IV may not be based on the most current risk assessment, or may be based on a current, but unreviewed, risk assessment, and may take into account factors other than health effects (e.g., treatment technology). When considering the use of regulatory action data for a particular situation, note the date of the regulatory action, the date of the most recent risk assessment relating to that action, and whether technological factors were considered. Background information and explanations of the methods used to derive the values given in IRIS are provided in the five Background Documents in Service Code 5, which correspond to Sections I through V of the chemical files.

STATUS OF DATA FOR Creosote

File On-Line 09/07/88

Category (section)	Status	Last Revised
Oral RfD Assessment (I.A.)	no data	
Inhalation RfD Assessment (I.B.)	no data	
Carcinogenicity Assessment (II.)	on-line	09/26/88
Drinking Water Health Advisories (III.A.)	no data	
U.S. EPA Regulatory Actions (IV.)	no data	

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_I. CHRONIC HEALTH HAZARD ASSESSMENT FOR NONCARCINOGENIC EFFECTS

Substance Name -- Creosote
CASRN -- 8001-58-9

Not available at this time

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II. CARCINOGENICITY ASSESSMENT FOR LIFETIME EXPOSURE

Substance Name -- Creosote
CASRN -- 8001-58-9
Last Revised -- 09/26/88

Section II provides information on three aspects of the carcinogenic risk assessment for the agent in question; the U.S. EPA classification, and quantitative estimates of risk from oral exposure and from inhalation exposure. The classification reflects a weight-of-evidence judgment of the likelihood that the agent is a human carcinogen. The quantitative risk estimates are presented in three ways. The slope factor is the result of application of a low-dose extrapolation procedure and is presented as the risk per mg/kg/day. The unit risk is the quantitative estimate in terms of either risk per ug/L drinking water or risk per ug/cu.m air breathed. The third form in which risk is presented is a drinking water or air concentration providing cancer risks of 1 in 10,000, 1 in 100,000 or 1 in 1,000,000. Background Document 2 (Service Code 5) provides details on the rationale and methods used to derive the carcinogenicity values found in IRIS. Users are referred to Section I for information on long-term toxic effects other than carcinogenicity.

<<< Creosote >>>

II.A. EVIDENCE FOR CLASSIFICATION AS TO HUMAN CARCINOGENICITY

II.A.1. WEIGHT-OF-EVIDENCE CLASSIFICATION

Classification -- B1; probable human carcinogen.

Basis -- limited evidence of the association between occupational creosote contact and subsequent tumor formation, sufficient evidence of local and distant tumor formation after dermal application to mice, and some evidence of mutagenic activity, as well as the well-documented carcinogenicity of other coal tar products to humans.

<<< Creosote >>>

II.A.2. HUMAN CARCINOGENICITY DATA

Limited. Creosote is a mixture of over 200 chemical compounds, most of which are aromatic hydrocarbons. This chemical mixture is obtained by fractional distillation of coal tar, which is a by-product of high temperature coking of butuminous coal. Wood preservative creosote is commonly used on railroad cross ties, utility poles, lumber and timber, fence post and pilings for docks and foundations (U.S. EPA, 1977).

Several case reports of human carcinomas associated with exposure to creosote have been published. Cookson (1924) described the case of a 66-year-old creosote factory worker who had developed a squamous cell carcinoma of the right hand after 33 years of heavy exposure. The patient died 8 weeks after the diagnosis of the tumor. The autopsy revealed metastases to the lungs, liver, kidneys, heart and auxillary lymph nodes. Haldin-Davis (1935) described a similar case in which a worker developed squamous cell papillomas of the hands, forearms, nose and thighs after several years of employment in the creosote impregnation of logs. Lenson (1956) reported a case of a 64-year-old man who developed five primary cutaneous carcinomas of the face. The man had been employed from 1947 to 1950 at a creosote shipyard.

It has been demonstrated that chimney sweeps exposed to creosote from the burning of wood and coal have an elevated risk of cancer. There are no adequate studies of workers exposed to creosote wood preservatives. Creosote wood preservatives contain many of the compounds present in other polycyclic aromatic hydrocarbon mixtures (roofing tar pitch and coke oven emissions) that have been found to be human carcinogens (U.S. EPA, 1986a).

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II.A.3. ANIMAL CARCINOGENICITY DATA

Sufficient. Poel and Kammer (1957) applied blended creosote oil (mixture of creosote, anthracene oils, and the oil drained from naphthalene recovery operations) to the skin of C57L female mice for the animals' lifetimes or until persistent papillomas developed. Skin carcinomas and papillomas were observed in all eight mice receiving 1 drop of 80% solution 3 times/week for 18-25 weeks as well as in eight mice receiving 1 drop of 20% solution 3 times/week for 21-44 weeks (1 drop = 0.0087-0.009 cc). No tumors developed in the 10 control animals after the administration of 1 drop of toluene 3 times/week for their lifetime. Lijinsky et al. (1957) applied 1 drop of creosote oil twice a week to the skin of female Swiss mice for 70 weeks. Skin tumors, 16 of which were carcinomas, were reported in 23/26 of the mice. The average latent period was 50 weeks. Although no untreated control group was included in the study, a control group of 50 mice receiving a single application of 1% dimethyl benz[a]anthracene in mineral oil developed no tumors after 80 weeks. Boutwell and Bosch (1958) applied 25 uL of creosote oil (Carbasota) twice weekly to 8-week-old female mice (random bred) for 28 weeks. No untreated control group was included. Among the 30 treated mice, the average number of skin papillomas was 5.4 at 28 weeks. The average induction time for papillomas and carcinomas was 20 and 26 weeks, respectively. Tumor incidence was not reported, although it appeared to be 100%.

Roe et al. (1958) applied 25 uL of creosote oil, known as Carbasota, to the skin of 3-week-old female random bred mice twice weekly for 21 weeks. After 8 months, 24 of the 25 surviving mice bore a total of 139 lung adenomas. In the untreated control group of 19 mice, a total of nine lung tumors were reported. Creosote oil (25 uL twice weekly for 4 weeks) was also applied dermally to 8-week-old mice. After 10 months, 23 of the 30 surviving mice bore a total of 37 lung adenomas. Among 50 surviving control mice treated with croton oil or benzene oil alone, 15 lung adenomas were reported.

Other studies indicate that creosote produced an additive effect on skin tumor response in mice when applied together with benzo[a]pyrene (Poel and Kammer, 1957).

<<< Creosote >>>

II.A.4. SUPPORTING DATA FOR CARCINOGENICITY

Creosote caused mutations in S. typhimurium strains TA98, TA100 and TA1537 and in L5178y mouse lymphoma cells (Federal Register, 1978).

The carcinogenic effect of creosote is supported by reports of studies in which other coal tar products produced tumors in mice and rats by topical application and by inhalation, and by the identification of carcinogenic polycyclic aromatic hydrocarbons in coal tar products (NIOSH, 1977).

Creosote displayed tumor-promoting activity when applied topically to mice after a single initiating treatment with 7,12-dimethylbenz[a]anthracene (Boutwell and Bosch, 1958).

II.B. QUANTITATIVE ESTIMATE OF CARCINOGENIC RISK FROM ORAL EXPOSURE

Not available.

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II.C. QUANTITATIVE ESTIMATE OF CARCINOGENIC RISK FROM INHALATION EXPOSURE

Not available.

II.D. EPA DOCUMENTATION, REVIEW, AND CONTACTS (CARCINOGENICITY ASSESSMENT)
<<< Creosote >>>

II.D.1. EPA DOCUMENTATION

U.S. EPA. 1986a. Evaluation of the Potential Carcinogenicity of Creosote (8001-58-9). Prepared by the Carcinogen Assessment Group, Office of Health and Environmental Assessment, Washington, DC for the Office of Emergency and Remedial Response and the Office of Solid Waste and Emergency Response.

U.S. EPA. 1986b. Reportable Quantity Document for Creosote. Prepared by the Carcinogen Assessment Group, Office of Health and Environmental Assessment, Washington, DC for the Office of Emergency and Remedial Response and the Office of Solid Waste and Emergency Response.

U.S. EPA. 1977. Carcinogen Assessment Group's Report on Creosote. Office of Health and Environmental Assessment, Washington, DC, October 27. (unpublished)

II.D.2. REVIEW (CARCINOGENICITY ASSESSMENT)

The 1986 Reportable Quality Document for Creosote (review draft) has received limited Agency review.

Agency Work Group Review: 05/13/87

Verification Date: 05/13/87

II.D.3. U.S. EPA CONTACTS (CARCINOGENICITY ASSESSMENT)

Herman Gibb / ORD -- (202)382-5720 / FTS 382-5720

Robert McGaughy / ORD -- (202)382-5889 / FTS 382-5889

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III. HEALTH HAZARD ASSESSMENTS FOR VARIED EXPOSURE DURATIONS

Substance Name -- Creosote
CASRN -- 8001-58-9

Not available at this time

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IV. U.S. EPA REGULATORY ACTIONS

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Substance Name -- Creosote
CASRN -- 8001-58-9

Not available at this time

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V. SUPPLEMENTARY DATA

Substance Name -- Creosote
CASRN -- 8001-58-9

Not available at this time

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VI. BIBLIOGRAPHY

Substance Name -- Creosote
CASRN -- 8001-58-9
Last Revised -- 08/01/89

VI.A. ORAL RfD REFERENCES

None

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VI.B. INHALATION RfD REFERENCES

None

------<<< Creosote >>>------

VI.C. CARCINOGENICITY ASSESSMENT REFERENCES

Boutwell, R.K. and D.K. Bosch. 1958. The carcinogenicity of creosote oil: Its role in the induction of skin tumors in mice. Cancer Res. 18: 1171-1175.

Cookson, H.A. 1924. Epithelioma of the skin after prolonged exposure to creosote. Br. Med. J. 1: 368.

Federal Register. 1978. Vol. 43, No. 200, October 18, 1978, p. 48199.

Haldin-Davis, H.W. 1935. Multiple warts in a creosote worker. Proc. Royal Soc. Med. 29: 89-90.

Lenson, N. 1956. Multiple cutaneous carcinoma after creosote exposure. New England J. Med. 254(11): 520-522.

Lijinsky, W., U. Saffiotti and P. Shubik. 1957. A study of the chemical constitution and carcinogenic action of creosote oil. J. Natl. Cancer Inst. 18(5): 687-692.

NIOSH (National Institute for Occupational Safety and Health). 1977. Criteria for a Recommended Standard . . . Occupational Exposure to Coal Tar Products. DHEW (NIOSH) Publication No. 78-107.

Poel, W.E. and A.G. Kammer. 1957. Experimental carcinogenicity of coal-tar fractions: The carcinogenicity of creosote oils. J. Natl. Cancer Inst. 18(1): 41-55.

Roe, F.J.C., D. Bosch and R.K. Boutwell. 1958. The carcinogenicity of creosote oil: The induction of lung tumors in mice. Cancer Res. 18: 1176-1178.

U.S. EPA. 1986a. Evaluation of the Potential Carcinogenicity of Creosote (8001-58-9). Prepared by the Carcinogen Assessment Group, Office of Health and Environmental Assessment, Washington, DC for the Office of Emergency and Remedial Response and the Office of Solid Waste and Emergency Response, Washington, DC.

U.S. EPA. 1986b. Reportable Quantity Document for Creosote. Prepared by the Carcinogen Assessment Group, Office of Health and Environmental Assessment, Washington, DC for the Office of Emergency and Remedial Response and the Office of Solid Waste and Emergency Response, Washington, DC.

U.S. EPA. 1977. Carcinogen Assessment Group's Report on Creosote. Office of Health and Environmental Assessment, Washington, DC, October 27. (unpublished)

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VI.D. DRINKING WATER HA REFERENCES

None

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SYNONYMS

8001-58-9
AWPA #1
BRICK OIL
COAL TAR CREOSOTE
COAL TAR OIL
Creosote
CREOSOTE OIL
CREOSOTE P1
CREOSOTUM
CRESYLIC CREOSOTE
LIQUID PITCH OIL
NAPHTHALENE OIL
PRESERV-O-SOTE
RCRA WASTE NUMBER U051
TAR OIL
UN 1136

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