

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

July 8, 1999

TO: File for Naphtha, Full Range Alkylate (CAS No. 64741-64-6)

FROM: Michael Depa

SUBJECT: Initial Threshold Screening Level

The initial threshold screening level for full range alkylate naphtha is 3500  $\mu\text{g}/\text{m}^3$  (8-hour averaging time).

The following references or databases were searched to identify data to determine the screening level: U.S. EPA Integrated Risk Information System (IRIS), Registry for Toxic Effects of Chemical Substances (RTECS), American Conference of Governmental and Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), National Institute for Occupational Safety and Health (NIOSH) Pocket Guide to Hazardous Chemicals, Environmental Protection Bureau Library, International Agency for Research on Cancer (IARC) Monographs, Chemical Abstract Service (CAS) Online (1967- April 27, 1999), National Library of Medicine (NLM), Health Effects Assessment Summary Tables (HEAST), and National Toxicology Program (NTP) Status Report. The EPA has not established a reference concentration (RfC) or reference dose (RfD) for full range alkylate naphtha. There were no occupational limits available.

Full range alkylate naphtha is a complex combination of hydrocarbons produced by distillation of the reaction products of isobutane with monoolefinic hydrocarbons usually ranging in carbon numbers from C3 through C5. It consists of predominantly branched chain saturated hydrocarbons having carbon numbers predominantly in the range of C7 through C12 and boiling in the range of approximately 90°C to 220 °C (194°F to 428°F). The average molecular weight of full range alkylate naphtha is 99g (NIOSH, 1997). Vapor pressure is 300-800 mmHg at 100°F.

The only toxicological study available was a 21-day inhalation toxicity study (Standard Oil Company, 1982). Mature Sprague-Dawley rats were divided into groups of 10 and exposed to three graded concentrations of full-range alkylate naphtha (CAS No. 64741-64-6) in whole-body exposure chambers for 6 hours per day, 5 days per week for a total of 15 exposures in 21 days. Two separate control groups were also included. All of the animals were sacrificed at the end of the exposure period. A summary of the preliminary histopathology results are presented in Table 1. No other information was provided.

**Table 1. Renal Histopathology – Proximal Tubule Epithelium**

Exposure Level	Degeneration or Necrosis		Regeneration	
	Male	Female	Male	Female
15 mg/L	10/10	0/10	10/10	0/10
5 mg/L	10/10	0/10	9/10	0/10
1.5 mg/L	10/10	0/10	2/10	0/10
Filtered Air	0/10	0/10	2/10	0/10
Sham Control	0/10	0/10	0/10	0/10

Unfortunately this study did not describe the following toxicological endpoints: clinical observations, body weight, organ weight, histopathology (other than renal proximal tubule epithelium) or clinical chemistry. Since the shortcomings this study were too numerous it was determined that this study was unacceptable for the use in derivation of a screening level.

A Recommended Exposure Limit (REL) of 350 mg/m<sup>3</sup> was developed by NIOSH for refined petroleum solvents. The REL applies to the hydrocarbon fractions referred to as stoddard solvent and mineral spirits but can also be applied to other hydrocarbon fractions. Physical and chemical properties for full range alkylate naphtha and the NIOSH refined petroleum solvents are presented in Table 2.

**Table 2. Comparison of NIOSH Petroleum Distillate and 64741-64-6**

CAS Number	Carbons	Boiling Point	Paraffins	Oleffins	Aromatics
NIOSH Petroleum Distillate	C5-C12	30-210°C	not specified	not specified	<20%
64741-64-6	C7-C12	90-220°C	98-100%	<2%	<2%

Other than boiling point, the properties of full range alkylate naphtha are within the ranges characterizing refined petroleum solvents. Since the boiling point range is only slightly greater than that for the NIOSH REL it was determined that the REL for refined petroleum solvents is appropriate to use to develop the ITSL for full range alkylate naphtha. Pursuant to Rule 232(1)(c) the ITSL was calculated as follows:

$$\text{ITSL} = \text{REL} \div 100$$

$$\text{ITSL} = 350 \text{ mg/m}^3 \div 100$$

$$\text{ITSL} = 3.5 \text{ mg/m}^3$$

$$\text{ITSL} = 3,500 \text{ } \mu\text{g/m}^3$$

The ITSL for full range alkylate naphtha (CAS No. 64741-64-6) is 3500  $\mu\text{g/m}^3$  based on an 8-hour averaging time.

**REFERENCE:**

NIOSH, 1997. NIOSH Pocket Guide to Chemical Hazards. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. DHHS (NIOSH) Publication number 97-140.

Standard Oil Company. 1982. TSCA section 8(e) report – naphtha refinery streams with cover letter and EPA response dated 063082. Obtained from U.S. Environmental Protection Agency, Office of Toxic Substance, EPA/OTS Doc # 8EHQ-0682-0446S (88-8100378) [microfiche]