

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

To: File for Naphtha (CAS No. 8030-30-6)
From: Cathy Simon, Air Quality Division
Subject: Screening Level Update
Date: February 27, 2013

The initial threshold screening level (ITSL) for naphtha has been changed from 3,500 $\mu\text{g}/\text{m}^3$ (8-hour averaging time) to 4,000 $\mu\text{g}/\text{m}^3$ (8-hour averaging time). This change is being made as part of a project to update ITSLs that are derived from outdated occupational exposure limits. The evaluation of data being done as part of this project is limited to identifying the most recent occupational exposure limit, and does not include a review of all the available scientific literature.

The original ITSL for naphtha of 3,500 $\mu\text{g}/\text{m}^3$ was set by the Air Quality Division, Michigan Department of Natural Resources (MDNR) in 1992 (MDNR, 1992; 1993). This ITSL was derived from the National Institute of Occupational Safety and Health (NIOSH) recommended exposure level (REL) of 350 mg/m^3 for refined petroleum solvents established by NIOSH in 1977 (NIOSH, 1977). The current NIOSH REL for naphtha is 100 ppm (400 mg/m^3) (NIOSH, 2013). NIOSH adopted this value by concurring with the permissible exposure level (PEL) for naphtha proposed by the Occupational Safety and Health Administration (OSHA) during a rulemaking effort in 1988-1989 (NIOSH, 1992).

The American Conference of Governmental Industrial Hygienists (ACGIH) first adopted a Threshold Limit Value (TLV) of 400 ppm for naphtha in 1977. This TLV was withdrawn in 2009 and replaced with a TLV that remains in effect as of today. The current TLV is not a numeric specific TLV, but instead, uses an algorithm methodology for refined hydrocarbon solvents to derive a mixture specific time weighted average limit. The methodology, "Reciprocal Calculation Method for Certain Refined Hydrocarbon Solvent Vapor Mixtures", is documented in Appendix H of the ACGIH TLV booklet (ACGIH, 2012). Due to the way the methodology is applied and the associated limitations, it is not amenable for use in deriving a generic ITSL for naphtha. It may, however, be considered on a case-by-case basis where applicable, and where adequate data are available.

Rule 232(1)(c) of the Michigan Air Pollution Control Rules specifies that when an occupational exposure level (OEL) is available, the ITSL equals the OEL divided by 100. Therefore, the new ITSL for naphtha was derived as follows:

$$ITSL = \frac{NIOSH\ REL}{100} = \frac{400 \frac{mg}{m^3}}{100} = 4 \frac{mg}{m^3} = 4,000 \frac{\mu g}{m^3}$$

The above ITSL of 4,000 $\mu\text{g}/\text{m}^3$, with an eight hour averaging time, was derived pursuant to Rules 232(1)(c) and 232(2)(a) of the Michigan Air Pollution Control Rules.

References

ACGIH. 2012. 2012 TLVs and BEIs Based on the Documentation of the Threshold Limit Values and Biological Exposure Indices for Chemical Substances and Physical Agents. American Conference of Governmental Industrial Hygienists. Cincinnati, OH.

MDNR. 1992. *Memo from Gary Butterfield to Naphtha File (CAS # 8030-30-6). Subject: ITSL for Naphtha.* December 10, 1992. Michigan Department of Natural Resources, Air Quality Division.

MDNR. 1993. *Memo from Gary Butterfield to Petroleum Hydrocarbon File. Subject: CAS numbers which can use the ITSL based on the NIOSH refined petroleum products REL.* January 25, 1993. Michigan Department of Natural Resources, Air Quality Division.

NIOSH. 1977. Criteria for a Recommended Standard. Occupational Exposure to Refined Petroleum Solvents, U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. Washington, D.C. DHEW (NIOSH) Publication No. 77-192. July 1977.

NIOSH. 1992. NIOSH Recommendations for Occupational Safety and Health. Compendium of Policy Documents and Statements. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. Cincinnati, OH. DHHS (NIOSH) Publication No. 92-100. January 1992.

NIOSH. 2013. Naphtha. 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. Online version accessed on February 27, 2013.

<http://www.cdc.gov/niosh/npg/npgd0438.html>

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

January 25, 1993

TO: Petroleum hydrocarbon files

FROM: Gary Butterfield

SUBJECT: CAS numbers which can use the ITSL based on the NIOSH refined petroleum products REL

A search for review documents on petroleum hydrocarbons located the 1977 NIOSH document for an REL of 350 mg/m³ for refined petroleum solvents. This document establishes an REL for various refined fractions and describes those fractions (petroleum ether, rubber solvent, VM & P naphtha, mineral spirits, and stoddard solvent) as having hydrocarbon chain lengths C5 to C12, a boiling point between 30 and 210 degrees Celsius, and being composed of less than 20 percent aromatic hydrocarbons. The chemical names and descriptions from the EPA ToSCA inventory and CAS-on-line were consulted to determine which CAS numbers might be covered by these three criteria, and could therefore, have an ITSL of 3500 µg/m³ (eight hour averaging time) established, as based on one percent of the NIOSH REL.

<u>CAS No.</u>	<u>ToSCA Chemical name</u>
8030-30-6	naphtha
8032-32-4	ligroine
8052-41-3	stoddard solvent
64742-48-9	naphtha (petroleum) hydrotreated heavy
64742-88-7	solvent naphtha (petroleum) medium aliphatic
64742-89-8	solvent naphtha (petroleum) light aliphatic

In addition to the above fractions, CAS # 1 64741-41-9 and ToSCA chemical name: naphtha (petroleum) heavy straight-run may also have the ITSL of 3500 µg/m³, with eight hour averaging, applied to it if it can be verified that the fraction contains less than 20 % aromatics. If the above materials are present in any combination, the ITSL applies to the total concentration of all those materials present — combined. As these petroleum hydrocarbon materials can be expected to impact the same organ systems because of their similarity, an additive effect is expected. Attached are printouts from CAS-on-line which contain CAS name, definition, and synonyms for each of the above petroleum fractions.

References:

- ACGIH. 1992. Threshold limit values for chemical substances and physical agents and biological exposure indices.
- EPA. 1979. ToSCA Inventory Appendix A.
- NIOSH. 1977. Criteria for a recommended standard ... occupational exposure to refined petroleum solvents. NIOSH 77-192.

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