MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
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INTEROFFICE COMMUNICATION
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February 8, 2018

TO: File for Endothall (CAS No. 145-73-3)

FROM: Mike Depa, Air Quality Division, Toxics Unit

SUBJECT: Rescind the Initial Threshold Screening Level

The Initial Threshold Screening Level (ITSL) for endothall of 70 µg/m³ with annual averaging time is being rescinded.

After reviewing the basis of the endothall Reference Dose (RfD), which is the basis of the ITSL (Depa, 2015 and Depa, 1994; see appendix), it was determined that the oral RfD is inappropriate to use for protection of inhalation exposures.

Since endothall is a solid at standard temperature and pressure (melting point = 144 °C), the particulate matter (PM) National Ambient Air Quality Standard (NAAQS) should be protective of inhalation exposures. The current PM2.5 NAAQS is 12 µg/m³ for annual averaging time, and 35 µg/m³ for 24-hr averaging time.

A SciFinder™ search (February 6, 2018) on the CAS No. 145-73-3 did not reveal toxicity data relevant to derivation of an inhalation screening level.

Reason for Rescinding ITSL
The U.S. Environmental Protection Agency Integrated Risk Information System (IRIS) RfD of 0.02 mg/kg (EPA, 2018), and the EPA Reregistration Eligibility Decision (RED) RfD of 0.007 mg/kg (EPA, 2005) were based on gastro-intestinal tract effects of increased organ weight compared to control groups. The oral critical effects for both RfDs were a portal-of-entry effects; therefore, neither RfD should be used to derive an inhalation benchmark.

Derivation of a Potential ITSL
The RED document (EPA, 2005) identified a no-observed-adverse-effect-level (NOAEL) of 9.4 mg/kg/day based on decreased pup body weight from a two-generation rat reproduction study (Trutter, 1993). Details of the study were not reported or available.

An RfD can be derived from reproductive effects using the NOAEL of 9.4 mg/kg/day and uncertainty factors (UFs) of 10x for intraspecies variations, and 10x for interspecies differences (total UF = 100):

       RfD = (9.4 mg/kg-day)/100
       RfD = 0.094 mg/kg/day

Pursuant to Rule 232(1)(b), a potential ITSL can be calculated from the RfD as follows:

potential ITSL = RfD x 70kg/20m³
potential ITSL = 0.094 x 70/20 x 1000μg/mg
potential ITSL = 330 μg/m³

The averaging time of 24-hour applies to the potential ITSL. Annual averaging time would not be appropriate since a short-term exposure used in the reproductive toxicity study resulted in adverse effects.

However, since endothall is expected to exist as a solid particle in the ambient air, and the ITSL of 329 μg/m³ w/24-hr averaging time is much higher than the PM2.5 NAAQS of 35 μg/m³ (24-hr averaging time), the PM2.5 NAAQS should be used to evaluate inhalation exposures.

References

Trutter, J. (1993) Two-Generation Reproduction Study in Rats with Disodium Salt of Endothall: Final Report: Lab Project Number: 153/142. Unpublished study prepared by Hazleton Washington, Inc. 1479 p.

EPA (U.S. Environmental Protection Agency). 2018. Endothall; CASRN 145-73-3. Chemical Assessment Summary. Integrated Risk Information System. National Center for Environmental Assessment. last updated: 03/31/1987. Accessed 2/7/2018. https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0155_summary.pdf

EPA (U.S. Environmental Protection Agency). 2005. Reregistration Eligibility Decision for Endothall. Prevention, Pesticides and Toxic Substances. EPA 738-R-05-008. Accessed 2/7/2018. https://archive.epa.gov/pesticides/reregistration/web/pdf/endothall_red.pdf

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

April 1, 2015

TO: File for Endothall (CAS# 145-73-3)

FROM: Michael Depa, Toxics Unit

SUBJECT: Screening Level Correction

The initial threshold screening level (ITSL) for endothall is 70 µg/m³ based on annual averaging time.

The ITSL was erroneously calculated in 1994 (see attached memo) using an incorrect reference dose (RfD) of 1×10^{-2} mg/kg/day. The correct RfD is 2×10^{-2} mg/kg/day.

The ITSL was calculated as follows:

ITSL = Oral RfD x 70kg/20m³
ITSL = 2×10^{-2} mg/kg/day x 70kg/20m³
ITSL = 0.07 mg/m³ x 1000 µg/m³
ITSL = 70 µg/m³

Additionally, the averaging time is changing from 24-hrs to annual. The chronic ITSL was calculated pursuant to Rule 229. Rule 229 does not specify an averaging time. Annual averaging time would be appropriate for this ITSL because the screening level was adjusted for and based on data to account for chronic continuous inhalation exposure up to a lifetime.

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

OCTOBER 19, 1994

TO: File for Endothall (CAS# 145-73-3)

FROM: Michael Depa, Toxics Unit

SUBJECT: Screening Level Determination

The initial threshold screening level (ITSL) for endothall is 35 μg/m³ based on a 24 hour averaging time.

The following references or databases were searched to identify data to determine the ITSL: IRIS, RTECS, ACGIH Threshold Limit Values, NIOSH Pocket Guide to Hazardous Chemicals, Environmental Protection Bureau Library, IARC Monographs, CAS Online (1967-July 23, 1994), National Library of Medicine, Health Effects Assessment Summary Tables, and NTP Status Report. Occupational exposure limits (OELs) were not available. The EPA has not established an RfC for endothall. There was no chronic inhalation data available. The EPA has established an RfD for endothall (IRIS, 1994). The EPA used a two-year feed study in dogs to develop the RfD. In this study, a LOAEL of 6 mg/kg/day was identified based on increased absolute and relative weights of the stomach and small intestine. A NOAEL of 2 mg/kg was identified and was then used to calculate the RfD. There were no data for endothall concerning the absorption, distribution and metabolism via the inhalation route. Limited pharmacokinetic data were available based on the oral route of exposure (EPA, 1988). Overall, no data were found that indicated that the oral route to inhalation route extrapolation was inappropriate. Therefore, the ITSL was determined according to Rule 232 (1)(b) as follows:

ITSL = Oral RfD x 70kg/20m³

ITSL = 1 x 10⁻² mg/kg/day x 70kg/20m³

ITSL = 0.035 mg/m³

ITSL = 35 μg/m³

The ITSL for endothall is 35 μg/m³ based on a 24 hour averaging time.

REFERENCES:

U. S. Environmental Agency (EPA). August 1988. Health Advisories for 50 Pesticides. Endothall Health Advisory, Office of Drinking Water.

IRIS. 1994. Integrated Risk Information System. Endothall 145-73-3