

STATE OF MICHIGAN
Rick Snyder, Governor



DEPARTMENT OF ENVIRONMENTAL QUALITY

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**Response to Public Comments for
Hexachlorobenzene (CAS # 118-74-1)**

Summary:

Based on public comments, the Air Quality Division (AQD) has reviewed the Initial Threshold Screening Level (ITSL) for hexachlorobenzene. As a result of this review, AQD is changing the ITSL from 0.035 ug/m³ (24 hour averaging time) to 0.35 ug/m³ (24 hour averaging time).

Background:

Revisions to the Air Pollution Control Rules¹ were promulgated December 22, 2016. Subsequently, the Michigan Department of Environmental Quality (MDEQ) Air Quality Division (AQD) published toxic air contaminant screening levels and their basis as required by Rule 230(1). Pursuant to Rule 230(2), AQD solicited and received public comments on these screening levels for 60 days: February 14 through April 14th, 2017. AQD must respond to these comments within 180 days; the latest date for response is October 11th, 2017.

Comments and Responses:

¹ Air Pollution Control Rules in Michigan Administrative Code promulgated pursuant to Article II Pollution Control, Part 55 (Sections 324.5501-324.5542), Air Pollution Control, of the Natural Resources And Environmental Protection Act, 1994.PA 451, as amended (NREPA)

Comment:

The Air Quality Division (AQD) received comments from one party regarding the ITSL for hexachlorobenzene (HCB). The commenter stated that the ITSL of 0.035 ug/m³ was based on reproductive toxicity and, specifically, microscopic changes in ova. However, the commenter believes that these changes are not necessarily adverse, and have been shown to have no impact on ovulation and fertility (Jarrell et al., 1993). Based on the apical outcome of fertility, the ITSL should more appropriately be based on a NOAEL = 1 mg/kg/day, rather than the current ITSL basis of a LOAEL of 0.01 mg/kg/day. Thus, a more scientifically valid ITSL would be 3.5 ug/m³.

Response:

AQD obtained and reviewed the recommended paper by Jarrell et al. (1993), and reviewed the key study (Bourque et al., 1995) and the assessments of HCB by EPA (2010), ATSDR (2015), and ACGIH (2001). As a result of this review, AQD disagrees with the commenter that the microscopic evidence of reproductive toxicity is not adverse and not an appropriate basis for an ITSL. Both ATSDR (2015) and EPA (2010) used this same key study and LOAEL for the critical effect and point of departure for deriving their subchronic benchmarks, along with a rationale for regarding the finding as adverse. AQD agrees with their interpretation. ACGIH (2001) did not base their TLV-TWA on reproductive toxicity, however, they did not cite the key study of Bourque et al. (1995). AQD noted that ATSDR (2015) and EPA (2010) applied uncertainty factors differently, although they used the same key study and LOAEL for their point of departure for risk assessment. EPA (2010) applied a total uncertainty factor of 1000. ATSDR applied a total uncertainty factor of 90, by reducing the factor for the LOAEL from 10 to 3 in recognition of the relative subtlety of the effect, and by reducing the interspecies uncertainty factor from 10 to 3 because the key studies were performed in cynomolgous monkeys, which are believed to be a good animal model for humans. Both agencies additionally applied an uncertainty factor of 10 for human variability. Therefore, AQD is revising the ITSL to be consistent with the ATSDR intermediate duration MRL with these reduced uncertainty factors. As a result, the ITSL is being revised from 0.035 ug/m³ (24 hour averaging time) to 0.35 ug/m³ (24 hour averaging time). These and further details have been described in an updated ITSL justification document for HCB posted to AQD's screening levels website.

Summary and Conclusions:

Based on public comments, the AQD has reviewed the Initial Threshold Screening Level (ITSL) for hexachlorobenzene. The AQD disagrees with the commenter's view that the critical effects seen microscopically are not truly adverse and appropriate for ITSL derivation. However, the AQD has found that the uncertainty factors used for ITSL

derivation should be reduced. Therefore, the ITSL is being changed from 0.035 ug/m³ to 0.35 ug/m³ (24 hour averaging time).

The primary AQD reviewer for these comments was Robert Sills, AQD Toxics Unit Supervisor. The secondary (peer) reviewer was Doreen Lehner, AQD Toxicologist.

References:

ACGIH. 2001. Documentation of the TLVs and BEIs. 7th Edition. Hexachlorobenzene TLV-TWA.

ATSDR. 2015. Toxicological Profile for Hexachlorobenzene. US DHHS. August 2015.

Bourque, A.C., et al. 1995. Ultrastructural changes in ovarian follicles of monkeys administered hexachlorobenzene. *Am J Vet Res.* 56 (12): 1673-1677.

EPA. 2010. Provisional Peer-Reviewed Toxicity Values for Hexachlorobenzene (CASRN 118-74-1). Superfund Health Risk Technical Support Center, NCEA, ORD.

Jarrell, J.F., et al. 1993. Hexachlorobenzene toxicity in the monkey primordial germ cell without induced porphyria. *Reproductive Toxicology* 7: 41-47.