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Andrea Matzke, *WQ Standards and Assessment Section***Subject:** Implementation Instructions for the Water Quality Criterion Hexachlorocyclohexane-Technical (CAS #: 608-73-1)

This memo clarifies how Hexachlorocyclo-hexane-Technical (synonyms Technical-HCH or Technical BHC) concentrations in effluent and surface water are measured to determine compliance with water quality criteria.

### **Criteria Summary**

Oregon water quality standards include human health criteria for Hexachlorocyclo-hexane-Technical and separate human health criteria for the isomers BHC alpha, BHC beta, and BHC gamma (Lindane). There are also aquatic life criteria for BHC gamma (See table below).

Chemical	Human Health Criteria		Aquatic Life Criteria (Freshwater)		Aquatic Life Criteria (Saltwater)	
	Water + Org (µg/L)	Org Only (µg/L)	Acute (µg/L)	Chronic (µg/L)	Acute (µg/L)	Chronic (µg/L)
Hexachlorocyclohexane-Technical	0.0014	0.0015	---	---	---	---
BHC Alpha	0.00045	0.00049	---	---	---	---
BHC Beta	0.0016	0.0017	---	---	---	---
BHC Gamma (Lindane)	0.17	0.18	0.95	0.08	0.16	---

Technical-grade BHC was historically used as an insecticide. It is not a separate BHC isomer, but rather a mixture of BHC isomers, consisting of approximately 60–70% alpha (α), 5–12% beta (β), 10–15% gamma (γ), 6–10% delta (δ), and 3–4% epsilon (ε) forms of BHC<sup>1</sup>. The gamma isomer is the main insecticidal component to the technical mixture.

### **Key Issues**

Generally, Appendix D of 40 CFR 122 addresses federal monitoring requirements for industrial facilities and Appendix J of 40 CFR 122 addresses monitoring requirements for domestic facilities. Additionally, state water quality regulations might require monitoring for additional

<sup>1</sup> Kutz et al. 1991 and ATSDR. Toxics Substances Portal. Hexachlorocyclohexane (HCH). See: <http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=138>

pollutant parameters.

40 CFR 122, Appendix D requires certain industrial facilities to monitor their effluent for “*alpha-BHC*”, “*beta-BHC*”, “*gamma-BHC*” and “*delta-BHC*” as part of the priority pollutant scan. Note that there is not an explicit state water quality criterion for delta-BHC.

Although 40 CFR 122, Appendix J does not explicitly require domestic facilities to monitor for these pollutants, Departmental guidance does indicate that they should be monitored for and evaluated when the pollutants are:

- “known” to be present in significant concentrations in a domestic facility’s effluent or source water;
- described as part of a municipality’s pretreatment program; or
- present in the receiving water body, resulting in the water body being listed as “water quality limited” on the 303(d) list.

Analytical methods exist for the individual isomers, but there are no analytical methods specifically for Technical BHC.

### **Recommended Analytical Method**

Separate analyses for BHC alpha, BHC beta, and BHC gamma should be done to compare results against individual numeric criteria. Because there are no analytical methods specifically for Technical BHC, separate analyses for the four major isomers (alpha, beta, delta, and gamma) must be completed and then each result added together and compared to the most stringent applicable criterion for Technical BHC.

EPA methods 608 and 617 by GC-ECD and 625 by GC/MS are suitable for analysis of the BHC isomers. All are EPA approved methods listed in 40 CFR 136.

To determine the applicable quantitation limits for individual permit holders, please refer to Schedule B of the applicable permit. For older permits without quantitation limits in their Schedule B, please refer to Revision 3.0 of the [Reasonable Potential Analysis for Toxic Pollutants IMD](#) to determine applicable quantitation limits.

### **Conclusion**

In summary, there is no analytical method for Technical BHC. Instead, the four major isomers (alpha, beta, delta, and gamma) must be separately analyzed and then added together to compare to the Technical BHC criteria.