

VALUE(S) ADDED 7-24-85
FACT SHEET REVISED 9-13-85
VALUE(S) REMOVED -----

SURFACE WATER QUALITY
STANDARD DOCUMENTATION

Linear alkyl benzene sulfonates (LAS)

The promulgated standard for this substance contains a qualifying remark that is not included on the attached fact sheet. The remark was added to the standard during the rulemaking process to more accurately reflect the original development of this standard.

Date: August 8, 1984

Surface Water Quality
Standard Documentation

Chemical: Linear alkyl benzene sulfonates (LAS)

C.A.S. No.(s): NA

Basis (Human/Aquatic): Aquatic

Standard by Water Classification:

	<u>ug/l</u>	<u>Notes</u>
Classes AA,AA-s;A;A-s;B;C	40	J
Class D		
Classes SA;SB;SC;I		
Class SD		

Remarks:

Summary of Information

1. LAS with a chain length of 11.2 was acutely toxic to fathead minnows at 12.3 mg/l; the estimated maximum allowable toxicant concentration (MATC) over 270 days was 5.1-8.4 mg/l (Reif, B. et al. 1979).
2. An undegraded LAS was acutely toxic to bluegill at 0.72 mg/l (Dolan and Hendricks 1976).
3. LAS with a chain length of 14 was acutely toxic to fathead minnow at 0.4 mg/l (Kimerle and Swisher 1977).
4. McKin et al. (1975) studied the effects of LAS (with an undetermined chain length) on the larval stages of northern pike, white sucker, smallmouth bass and fathead minnow. The acute toxicity ranged from 3.4-4.0 mg/l. Significant reductions in standing crop over a 30 day period was also determined; white sucker was most sensitive exhibiting a significant reduction at greater than 0.3 mg/l.
5. LAS with a mean chain length of 13.3 was acutely toxic to fathead minnow at 0.86 mg/l; the 270 d MATC was determined to occur at 0.11-0.25 mg/l (Holman and Macek 1980).

6. Holman and Macek (1980) found the ratio between the MATC and acute toxicity of two LAS mixtures to be about 0.1.

Standard Derivation

It is clear from the above information that the longer the alkyl side chain the more toxic the LAS will be.

Application of the Holman & Macek (1980) 0.1 factor to the Kimerle and Swisher (1977) data above would result in an estimated MATC for a 14 carbon LAS of 40 ug/l which should be adopted as the standard.

Criteria greater than 40 ug/l may be justified for LAS with less than 14 carbon side chains. However, the specific form of LAS in wastewater effluents is seldom defined. Therefore, it is recommended that 40 ug/l be applied as the criterion for all LAS.

References

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- Holman, W.F. and K.J. Macek. 1980. An aquatic safety assessment of linear alkylbenzene sulfonate (LAS): chronic effects on fathead minnows. Trans. Amer. Fish Soc. 109: 122-131.
- Kimerle, R.A. and R.D. Swisher. 1977. Reduction of aquatic toxicity of linear alkylbenzene sulfonate (LAS) by biodegradation. Water Res (G.B.) 11:31. In: J. Wat. Poll Contr. Fed. 50:1612.
- McKim, J.M., J.W. Arthur, and T.W. Thorslund. 1975. Toxicity of linear alkylate sulfonate detergent to larvae of four species of freshwater fish. Bull. Envir. Cont. Tox. 14(1): 1-7.
- Reif, B. et al. 1979. The acute toxicity of eleven detergents to fish: results of an interlaboratory exercise. Water Research (G.B.) 13:207. In: J. Wat.