

Interim Report

LEAD

Physiological Aspects

of

"Water Quality Criteria"

with regard to

Man

March, 1957

Appendix to

Report on the Recommended Physiologically Safe Limit
for Continued Human Consumption of Lead in Water
(January 28, 1953)

Prepared as part of the
Toxicity Project
of the
Ohio River Valley Water Sanitation Commission

N35512

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LEAD-ION
PLAN

SAFE RANGE

Long Period:	in water all sources	0.05 ppm 0.5 - 0.6 mg per day total intake
Short Period:	in water	2 - 4 ppm

HARMFUL RANGE

Borderline:		2.31 mg per day, short period (calc: 0.92 ppm in 2500 ml water)
	in water	2 - 4 ppm, 3 months
Toxic:		2.31 mg per day, 2 years
	in water	8 - 10 ppm, several weeks
Lethal:		no data given in report

PERCEPTIBLE RANGE

Taste:	in water	no information
Odor:	in water	does not apply
Color:	in water	does not apply
Texture:	in water	does not apply

METABOLISM

Essential Nutrient:		no
Beneficial Nutrient:		no
Daily Intake:		average 0.3 mg from food and water average 0.04 mg from inhaled air
Daily Output:	urine	average 0.03 mg/liter
	feces	average 0.3 mg

RANGES IN THE ENVIRONMENT

WATER

Drinking Water:	0.003 - 0.05 ppm
Surface Water:	0.001 - 0.004 ppm
	Ohio River: 0.12 ppm (1 analysis)
Ground Water:	0.001 - 0.06 ppm
Sea Water:	0.001 - 0.008 ppm

PLANT

Food:	traces - 1.83 ppm occasional values considerably higher
Non-food:	0.02 - 1.60 ppm

AIR

Suburban:	0.1 - 21.0 µg/cu.m.; average 2.0 µg/cu.m.
Rural:	trace - 1.3 µg/cu.m.; average 1.0 µg/cu.m.
Industrial Areas:	3.0 - 4.1 µg/cu.m.; average 2.7 µg/cu.m.

SOIL 0.6 - 25.0 ppm

ANIMAL

Food:	traces - 1.60 ppm generally; occasional values, i.e., bone and cartilage, higher
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EXPLANATORY NOTES

SAFE RANGE

Long Period:

The range of concentration or dosage within which a substance causes no recognized harm.

A defined period of exposure to a substance in months, years, or over a lifetime.

Short Period:

One day, up to a week or two, or an unknown but brief period of exposure to a substance.

HARMFUL RANGE

Borderline:

The range of concentration or dosage of a substance within which (in a specified time) recognized effects on bodily function or structure are induced.

A range of concentration or dosage of a substance which causes temporary discomfort, or which induces physiological adaptation (e.g., transient diarrhea, or increased frequency of urination which disappears even though there is continued exposure to the same concentration and dose).

Toxic:

A range of concentration or dosage of a substance which causes a harmful change in bodily function or structure that does not disappear with continued exposure to the same concentration and dose.

Lethal:

The concentration or dose of a substance which has caused death in a defined or unknown period of exposure.

PERCEPTIBLE RANGE

Taste:

The range of concentration within which certain characteristics imparted by a substance to water affect its physiological or esthetic acceptability.

The range of concentration of a substance which can be recognized by the sense of taste (bitter, sweet, salty, sour).

Odor:

The range of concentration of a substance which can be recognized by the sense of smell.

Color:

The range of concentration of a substance which can be recognized by the sense of sight.

Texture:

The range of concentration of a substance which can be recognized by the sense of touch or feeling.

METABOLISM

Essential Nutrient:

The significance and the equilibrium of a substance in the body.

Beneficial Nutrient:

A dietary substance without which the body dies.

A dietary substance which in defined amounts contributes to the optimal function of the body, but may or may not be necessary for life.

Daily Intake:

The amount of a substance which the body normally obtains daily from all sources (including food, drink and air).

Daily Output:

The amount of a substance which the body normally eliminates daily by various paths.

RANGES IN THE ENVIRONMENT

The various amounts of a substance present in the environment which may contribute to the total daily intake by the body.

This INTERIM SUMMARY is one of a series of reports devoted to the
CRITICAL EVALUATION of the PHYSIOLOGICAL ASPECTS of "Water Quality Criteria."

The basis of this summary report is a critical evaluation of available information from published and unpublished sources. The purpose is to define ranges of concentration and dosage which, for a designated substance or group of substances, are safe or unsafe, desirable or undesirable, in waters which, otherwise, are potable for man and domestic animals.

From time to time, as additional information by warrant, revisions of this summary report will be published. There can be no claim to completeness, but rather there is a need for additional source information which may not have been noted in the preparation of this report.

Information, references and critique will be gratefully received by:

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