Interim Report

L E A D

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

From The Kettering Laboratory in the Department of Preventive Medicine and Industrial Health, College of Medicine, University of Cincinnati, Cincinnati, Ohio.

Original report prepared by
Jules S. Cass, D.V.M.,
Assistant Professor of Industrial Health

Appendix by
Paul E. Foldes, M.D.,
Responsible Investigator
Lilli B. Lange,
Research Assistant

Approved: Robert A. Kehoe
Robert A. Kehoe, M.D., Ed
Director

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SAFE RANGE		
Long Period:	in water	0.05 ppm
	all sources	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

EXPLANATORY NOTES

SAFE RANGE	The range of concentration or dosage within which a substance causes no recognized harm.
Long Period:	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	The range of concentration or dosage of a substance within which (in a specified time) recognized effects on bodily function or structure are induced.
Borderline:	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	The range of concentration within which certain characteristics imparted by a substance to water affect its physiological or esthetic acceptability.
Taste:	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	The significance and the equilibrium of a substance in the body.
Essential Nutrient:	A dietary substance without which the body dies.
Beneficial Nutrient:	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 may 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:

The Kettering Laboratory
Department of Preventive Medicine and Industrial Health
College of Medicine
University of Cincinnati
Cincinnati, Ohio