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Internal Dose Studies

NO REPORT.

AEC Activity Number 6440
October 1953

Internal Dose Studies

No report.

AEC Security Number [illegible]
August 1953

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ROUTE SLIP

To: K3m

Address:

- [ ] *Your information*
- [ ] *Note and return*
- [ ] *Per conversation*
- [ ] *Your files*
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- [ ] *Please handle*
- [x] *Please Advise*
- [ ] *See remarks*

Remarks: Bi-monthly Reports are due Oct 27, - Do we have anything to contribute?

Have Jerry check this with Smythe & Ford K3m

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From: Sally

Address:

1148172

Bi-monthly report
K. Z. Morgan
4/24/58

April, 1958

INTERNAL DOSE STUDIES

The report of the Internal Dose Committees of the National Committee on Radiation Protection, NCRP, and the International Commission on Radiological Protection, ICRP, have been revised and will be submitted for publication in June, 1958. At the present time it is very probable that the Internal Dose Reports of the NCRP and ICRP will be combined into a single publication. The basic principals and fundamental philosophy of radiation protection are unchanged in these new publications, but a number of revisions are made. The most important of these is the reduction of maximum permissible concentration, MPC, of radionuclides in air, water, and food so that the average RBE dose rate to the total body of the occupational worker will be one-third of that formerly permitted. This reduction is intended to reduce the probability of chronic damage, e.g. leukemia and premature aging.

The MPC values for bone-seeking radionuclides continue to be based on an accumulation in the bone that is estimated to deliver a RBE dose rate equal to that received from 0.1 μg of Ra^{226} and its daughter products. These values were reduced by 32% because recent data indicate that only 30% (rather than 55%) of the daughter products of Ra^{226} is retained in the body. The new MPC values correspond to a RBE dose rate of 0.56 rem per week to the bone, 0.6 rem per week to the thyroid or skin, 0.1 rem per week to the total body or gonads, and 0.3 rem per week to all other organs of the body.

A major objective in the revision of the ICRP Handbook has been to obtain reliable values for the distribution of radioelements in the human body following many years of exposure. One of the best sources of such data is the normal distribution of stable isotopes of these elements in the human body. For the past six years a study of human tissue has been conducted by the Oak Ridge National Laboratory in cooperation with the University of Tennessee. This study includes a spectrographic analysis for 37 elements in 35 body organs, from over 300 autopsies that were supplied from 15 countries. For elements such as Ca, Fe, Zn, Cu, Mn, etc., which are known to have a role in the body economy, the geographical variation is not large--reflecting the state of nutrition of the population. For other elements such as Sr, Cd, Pb, Al, and Cr which may compete with necessary elements in their normal roles, the geographical variations are striking. Some elements such as Cu and Zn in liver, Al in lung, and Cd in kidney, show marked variation with age of subject. Such data are useful not only in calculating the MPC values for the standard man but may serve also as a guide in making refinements to the MPC values when applying them to individuals of a given age, weight, eating habits, etc.

MPC values are given for 86 radionuclides in the 1955 ICRP Handbook and for about 250 radionuclides in the 1958 edition. Also, MPC values are given for insoluble as well as soluble radioactive materials and for several critical body organs resulting in a seven-fold increase in the number of MPC values. In a few cases (where sufficient data are available) the MPC values are based on a power function rather than an exponential function of the time of exposure.

AEC Activity 6440

Internal Dose Studies
by K. Z. Morgan
April 22, 1958

The report of the Internal Dose Committees of the National Committee on Radiation Protection, NCRP, and the International Commission on Radiological Protection, ICRP, have been revised and will be submitted for publication in June, 1958. At the present time it is very probable that the Internal Dose Reports of the NCRP and the ICRP will be combined into a single publication. The basic principles and fundamental philosophy of radiation protection are unchanged in these new publications, but a number of revisions are made. The most important of these is the reduction of maximum permissible concentration, MPC, of radionuclides in air, water, and food so that the average RBE dose rate to the total body of the occupational worker will be one-third of that formerly permitted. This reduction is intended to reduce the probability of chronic damage, e.g., leukemia and premature aging.

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MPC values are given for 86 radionuclides in the 1955 ICRP Handbook and for [redacted] radionuclides in the 1958 edition. Also, MPC values are given for insoluble as well as soluble radioactive materials and for several critical body organs resulting in a seven-fold increase in the number of MPC values. In a few cases (where sufficient data are available) the MPC values are based on a power function rather than an exponential function of the time of exposure.

A SUMMARY OF DATA THAT WAS USED IN THE REVISION OF THE INTERNAL DOSE RECOMMENDATIONS OF THE INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION

Prepared by

K. Z. Morgan, I. H. Tipton* and M. J. Cook
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operated by
Union Carbide Nuclear Company
for the
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Oak Ridge, Tennessee

Abstract

The report of the Internal Dose Committee[1] of the International Commission on Radiological Protection has been revised and released for publication ~~(expected date August 1958)~~. The basic principles and fundamental philosophy of radiation protection are unchanged in this new publication; but a number of revisions are made. The most important of these is the reduction of maximum permissible concentration, MPC, of radionuclides in air, water, and food so that the average RBE dose rate to the total body of the occupational worker will be one-third of that formerly permitted. This reduction is intended to reduce the probability of chronic damage, e.g., leukemia and premature aging.

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*I. H. Tipton, The University of Tennessee, Knoxville, Tennessee.

[1]The membership of the Internal Dose Committee of ICRP is K. Z. Morgan of U.S. (Chairman), W. Binks of G.B., A. M. Brues of U.S., W. H. Langham of U.S., L. D. Marinelli of U.S., W. G. Marley of G.B., G. S. Neary of G.B., M. K. Nakaidzumi of Japan, B. E. Pochin of G.B., M. N. Pobedinski of USSR, and C. G. Stewart of Canada.

study includes a spectrographic analysis for 37 elements in 35 body organs, from over 300 autopsies that were supplied from 15 countries. For elements such as Ca, Fe, Zn, Cu, Mn, etc., which are known to have a role in the body economy, the geographical variation is not large--reflecting the state of nutrition of the population. For other elements such as Sr, Cd, Pb, Al, and Cr which may compete with necessary elements in their normal roles, the geographical variation is striking. Some elements such as Cu and Zn in liver, Al in lung, and Cd in kidney, show marked variation with age of subject. Such data are useful not only in calculating the MPC values for the standard man but may serve also as a guide in making refinements to the MPC values when applying them to individuals of a given age, weight, eating habits, etc.

MPC values are given for 86 radionuclides in the 1955 ICRP Handbook and for 227 radionuclides in the 1958 edition. Also, MPC values are given for insoluble as well as soluble radioactive materials and for several critical body organs resulting in a seven-fold increase in the number of MPC values. In a few cases (where sufficient data are available) the MPC values are based on a power function rather than an exponential function of the time of exposure.

Internal Dose Studies
by K. Z. Morgan
April 22, 1958

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