

CONTENTS

1. INTRODUCTION	1
1.1. Background	1
1.2. Objective	2
1.3. Scope	2
1.4. structure	3
2. BIOKINETIC MODELS FOR INTERNAL DOSIMETRY	4
2.1. Introduction	4
2.2. Routes of entry	7
2.2.1. Inhalation	7
2.2.2. Ingestion	11
2.2.3. Wounds and intact skin	11
2.3. Systemic activity	13
2.4. Excretion	14
2.5. Dose coefficients	15
2.6. Workplace specific assessments	15
3. INTERPRETATION OF DIRECT AND INDIRECT MEASUREMENTS	16
3.1. Introduction	16
3.2. Assertions about $m(t)$	17
3.3. Application to interpretation of bioassay data	18
3.3.1. Assigning the time of intake	18
3.3.2. Defining the route of intake	19
3.3.3. Intake estimate from a single bioassay result	19
3.3.4. Intake estimate from multiple bioassay data	20
3.3.4.1. Point estimates	21
3.3.4.2. Unweighted least squares fit	21
3.3.4.3. Weighted least squares fit	22
3.3.4.4. Maximum likelihood method and chi-square	22
3.3.5. Bayesian statistical inference	23
3.3.6. Intake estimates for extended exposures	23
3.3.6.1. Exposures over a time period	24
3.3.6.2. Chronic and intermittent exposures	24

3.3.7. Interferences.	24
3.3.X. Intake estimates from measurements of related nuclides.....	25
3.4. Other dose assessment methods	25
3.4.1. Interpretation of air monitoring data	25
3.4.2. Direct methods of dose calculation without estimating intakes	26
3.5. Computer codes for dose assessment.	26
3.6. Guidance for the design of monitoring programmes	27
4 UNCERTAINTIES.....	2X
4.1. Measurement results	28
4.2. Intake characteristics	29
4.3. Biokinetic and dosimetric models	30
4.3.1. Biokinetic models	30
4.3.2. Dosimetric models	32
4.4. Individual variations in biokinetic and dosimetric parameters	32
4.5. Summary	34
5 DOSE RECORD KEEPING AND REPORTING..	34
5.1. General considerations	34
5.2. Individual monitoring records	34
5.3. Reporting information to management.	35
6 QUALITY ASSURANCE.	36
6.1. General considerations	36
6.2. Document attion	36
APPENDIX I: BASIC DATA FOR INTERNAL DOSE	
A S S E S S M E N T S 39	
APPENDIX II: BIOKINETIC MODELS FOR SELECTED ELEMENTS AND RADIONUCLIDES	47
APPENDIX III: RETENTION AND EXCRETION FRACTIONS FOR INTAKES OF SELECTED RADIONUCLIDES	72

REFERENCES	75
ANNEX I: DETERMINING INTAKE FROM SINGLE AND FROM MULTIPLE DATA MEASUREMENTS FOR DOSE ASSESSMENT ..	79
ANNEX II: DETERMINING THE TIME OF INTAKE FOR DOSE ASSESSMENT ..	83
ANNEX III: DETERMINING THE ROUTE OF INTAKE FOR DOSE ASSESSMENT ..	86
ANNEX IV: ANALYSIS OF AN INTAKE OF MIXED ACTIVATION AND FISSION PRODUCTS FOR DOSE ASSESSMENT ,	90
ANNEX V: DOSE ASSESSMENT FROM AN EXPOSURE OVER A PERIOD OF TIME	94
ANNEX VI: DIRECT DOSE ASSESSMENT FOR INTAKES OF TRITIATED WATER	97
ANNEX VII: ANALYSIS OF A SINGLE INTAKE OF $^{238,239,240}\text{Pu}$ AND ^{241}Am FOR DOSE ASSESSMENT.....	101
ANNEX VIII: CHOOSING THE APPROPRIATE MONITORING PERIOD FOR DOSE ASSESSMENT	109
GLOSSARY	111
CONTRIBUTORS TO DRAFTING AND REVIEW	115