

TABLE OF CONTENTS

FOREWORD	1
1. EXECUTIVE SUMMARY	4
2. IDENTITY AND PHYSICAL/CHEMICAL PROPERTIES	5
3. ANALYTICAL METHODS	7
4. SOURCES OF HUMAN AND ENVIRONMENTAL EXPOSURE	7
5. ENVIRONMENTAL TRANSPORT, DISTRIBUTION, AND TRANSFORMATION	8
6. ENVIRONMENTAL LEVELS AND HUMAN EXPOSURE	9
6.1 Environmental levels	9
6.2 Human exposure	10
7. COMPARATIVE KINETICS AND METABOLISM IN LABORATORY ANIMALS AND HUMANS	12
8. EFFECTS ON LABORATORY MAMMALS AND <i>IN VITRO</i> TEST SYSTEMS	13
8.1 Single exposure	13
8.2 Irritation and sensitization	13
8.3 Short-term exposure	13
8.4 Long-term exposure	13
8.4.1 Subchronic exposure	13
8.4.2 Chronic exposure and carcinogenicity	13
8.5 Genotoxicity and related end-points	14
8.6 Reproductive and developmental toxicity	15
8.7 Immunological and neurological effects	15
9. EFFECTS ON HUMANS	16
9.1 Case reports	18
9.2 Epidemiological studies	19
10. EFFECTS EVALUATION	21
10.1 Evaluation of health effects	21
10.1.1 Hazard identification and dose-response assessment	21
10.1.2 Criteria for setting guidance values for manganese	22
10.1.3 Sample risk characterization	23
11. PREVIOUS EVALUATIONS BY INTERNATIONAL BODIES	23
12. HUMAN HEALTH PROTECTION AND EMERGENCY ACTION	23
12.1 Human health hazards	23
12.2 Advice to physicians	23
12.3 Health surveillance programme	23
13. CURRENT REGULATIONS, GUIDELINES, AND STANDARDS	24

INTERNATIONAL CHEMICAL SAFETY CARD	25
REFERENCES	27
APPENDIX 1 — SOURCE DOCUMENTS	34
APPENDIX 2 — CICAD PEER REVIEW	34
APPENDIX 3 — CICAD FINAL REVIEW BOARD	35
APPENDIX 4 — ADDITIONAL APPROACHES FOR GUIDANCE VALUE DEVELOPMENT ..	36
RÉSUMÉ D'ORIENTATION	37
RESUMEN DE ORIENTACIÓN	40