

CONTENTS

CHAPTER 1: INTRODUCTION (<i>L. Farges</i>)	1
CHAPTER 2: PHYSICAL AND CHEMICAL CONSIDERATIONS	3
2.1. Mathematical and physical models of heat dissipation: Aquatic system models (<i>W. Rodi</i>)	3
2.2. Chlorine models (<i>J. Mattice</i>)	12
2.3. Heat exchange between water and atmosphere (<i>W. Schikarski,</i> <i>G. Hoffmann</i>)	26
2.4. Cooling tower plume modelling (<i>W. Schikarski</i>)	30
CHAPTER 3: BIOLOGICAL AND ECOLOGICAL CONSIDERATIONS ..	33
3.1. Gas dynamics	33
3.1.1. Oxygen production by photosynthetic activity of algae and macrophytes (<i>M. Wunderlich</i>)	33
3.1.2. Oxygen consumption by bacteria (<i>M. Wunderlich</i>)	35
3.1.3. Gas bubble disease in fish (<i>M. Schneider</i>)	38
3.2. Cooling system effects on plankton (<i>J. McMahon,</i> <i>A. Docherty, S. Gentner</i>)	49
3.3. Biological effects of thermal discharges on benthos (<i>C. Voigtlander</i>)	56
3.4. Effects of cooling water intakes on fish populations: Entrainment and impingement (<i>C. Voigtlander</i>)	60
3.5. Influence of temperature and other cooling-system factors on fish behaviour (<i>S. Spigarelli</i>)	79
3.6. Growth and energetics (<i>C. Coutant</i>)	96
3.7. Predator-prey interactions (<i>C. Coutant, P. Kamath</i>)	107
3.8. Influences of cooling systems on diseases and parasites	118
3.8.1. Diseases and parasites of aquatic organisms (<i>P. Kamath,</i> <i>S. Spigarelli</i>)	118
3.8.2. Human diseases	121
3.8.2.1. Pathogenic amoebae (<i>C. Coutant</i>)	121
3.8.2.2. Human disease organisms in aerosols from cooling towers and cooling sprays (<i>B.G. Lewis</i>)	124

3.9.	Combined effects (<i>M. Schneider</i>)	129
3.10.	Adaptation capability (<i>C. Coutant</i>)	134
3.11.	Effects of closed cycle cooling (<i>C. Coutant, F.G. Taylor</i>)	141
3.12.	Effects of chlorine on aquatic organisms (<i>J. Mattice</i>)	148
CHAPTER 4: SPECIAL TOPICS		169
4.1.	Tropics	169
4.1.1.	Biological effects of thermal discharges in tropical regions (<i>J. McMahon</i>)	169
4.1.2.	Thermal monitoring experiences in coastal waters and reservoirs (<i>P. Kamath</i>)	172
4.2.	Ecosystem stress and cooling systems (<i>S. Spigarelli, C. Coutant</i>)	175
CHAPTER 5: PERSPECTIVES		185
5.1.	Retrospective comments (<i>S. Spigarelli, C. Voigtlander, M. Schneider</i>)	185
5.2.	Critical choices for energy conservation in power plant cooling (<i>C. Coutant</i>)	188
5.3.	Beneficial uses of reject heat (<i>C. Coutant</i>)	190
5.4.	Information sources (<i>C. Coutant</i>)	192
List of participants in the programme		195

