

Contents

	<i>Page</i>
INTRODUCTION	1
SUMMARY AND FINDINGS	2
BACKGROUND	4
The Fate of Oil in the Marine Environment	5
Biodegradation and the Chemical Nature of Petroleum	7
Microbial Processes and the Degradation of Petroleum	9
Environmental Influences on Biodegradation	10
General Advantages and Disadvantages of bioremediation	12
ALTERNATIVE bioremediation TECHNOLOGIES	13
Nutrient Enrichment	13
Seeding With Naturally Occurring Microorganisms	14
Seeding With Genetically Engineered Microorganisms	18
ENVIRONMENTAL AND HEALTH ISSUES	18
BIOREMEDIATION IN RELATION TO OTHER RESPONSE TECHNOLOGIES	20
bioremediation ACTIVITIES IN THE PUBLIC AND PRIVATE SECTORS	23
The Environmental Protection Agency	23
NETAC and Commercialization of Innovative Technologies	26
The Private Sector	27
REGULATORY ISSUES	28
APPENDIX A: GLOSSARY	29
APPENDIX B: ACKNOWLEDGMENTS	30

Boxes

<i>Box</i>	<i>Page</i>
A. bioremediation v. Biodegradation	2
B. The Alaska bioremediation Experiments	15

Figures

<i>Figure</i>	<i>Page</i>
1. Schematic of Physical, Chemical, and Biological Processes	6
2. organization of the bioremediation Action Committee	24

Tables

<i>Table</i>	<i>Page</i>
1. Major Genera of Oil-Degrading Bacteria and Fungi	9
2. bioremediation: Potential Advantages and Disadvantages	12
3. Principal Features of Alternative bioremediation Approaches	13
4. Key Research Needs	26