

# TABLE OF CONTENTS

	Page
LIST OF WORKING PAPERS .....	<b>ix</b>
I      INTRODUCTION .....	3
BACKGROUND.....	3
OFFICE OF TECHNOLOGY ASSESSMENT.....	4
STUDY AREA APPROACH.....	4
SELECTION OF ISSUES .....	6
DATA SOURCES.....	7
PUBLIC PARTICIPATION .....	7
II     MAJOR FINDINGS AND SUMMARY .....	11
OFFSHORE OIL AND GAS SYSTEMS:	
Summary .....	13
Findings .....	17
DEEPWATER PORTS:	
Summary .....	21
Findings .....	22
FLOATING NUCLEAR POWERPLANTS:	
Summary .....	25
Findings .....	28
ALTERNATIVES TO OFF SHORE TECHNOLOGIES:	
Summary .....	30
Findings .....	30
III    ISSUES AND OPTIONS .....	35
INTRODUCTION.....	35
COMMON ISSUE:	
1. Offshore Priorities and Planning .....	37
OFFSHORE OIL AND GAS ISSUES:	
2. Federal Management System .....	43
3. Regulation and Enforcement .....	47
4. Oil Spill Liability and Compensation.....	51
5. Oil Spill Containment and Cleanup .....	57
6. Environmental Studies .....	60
7. State Role .....	63
8. Pollution Research .....	67
9. Conflicting Ocean Uses .....	70

	PAGE
<b>DEEPWATER PORTS ISSUES:</b>	
10. Tanker Design and Operations .....	76
11. Oil Spill Containment and Cleanup at Deepwater Ports. ....	80
12. Standards in State Waters .....	83
13. Adjacent Coastal State Status .....	86
<b>FLOATING NUCLEAR PLANT ISSUES:</b>	
14. Risks From Major Accidents .....	90
15. Deployment involute.....	99
16. Technical Uncertainties .....	102
17. Siting offloading Powerplants Outside U.S. Territorial Limits	106
<b>FOOTNOTES: CHAPTER III.</b> .....	<b>112</b>
<b>DISCUSSION OF THE TECHNOLOGIES.</b> .....	<b>117</b>
INTRODUCTION .....	117
DESCRIPTION OF THE STUDY AREA .....	119
<b>DEVELOPMENT OF OFF SHORE PETROLEUM TECHNOLOGIES IN THE MID-ATLANTIC</b> .....	<b>123</b>
Background .....	123
Activities to Date.....	124
Seismic Surveys .. . . . .	124
Resource Estimates .....	125
Interior Department Preparations .....	125
Selection of the Lease Area .....	131
Environmental Impact Statements .....	131
Environmental and Other Studies .....	134
Coastal Zone Management. ....	136
State Views .....	138
Future Activities .....	140
Lease Sale. ....	140
Exploration and Its Impacts. ....	144
Development Plans.. ....	146
Production and Its Impacts .....	150
Transportation and Storage and Their Impacts .....	160
Oil Spills .....	165
Processing and Refining and Their Impacts .....	169
Effects on Regional Energy Prices .....	171
Decommissioning. ....	172
<b>THE POSSIBILITY OF DEEPWATER PORTS IN THE MID-ATLANTIC</b> .....	<b>173</b>
The Need for Deepwater Ports .....	173
Deepwater Port Proposals .....	179
Status of New Jersey and Delaware Plans .....	186
Description of Deepwater Port Technology in the Mid-Atlantic. . .	188

<b>THE PROPOSAL FOR A FLOATING NUCLEAR POWERPLANT IN THE MID-ATLANTIC . . . . .</b>		<b>197</b>
Background . . . . .	197	
Technology . . . . .	204	
Nuclear Reactor . . . . .	204	
Platform . . . . .	204	
Breakwater . . . . .	206	
Power Transmission . . . . .	207	
Deployment . . . . .	207	
Site . . . . .	207	
Licenses . . . . .	207	
Public Role in Licensing . . . . .	210	
costs . . . . .	211	
Assembly . . . . .	212	
Breakwater Construction . . . . .	213	
Transmission System . . . . .	213	
Plant Installation . . . . .	213	
Operation . . . . .	214	
Fuel Supply . . . . .	214	
Waste Handling . . . . .	215	
Decommissioning . . . . .	218	
Decommissioning Alternatives . . . . .	219	
River and Bay Sites . . . . .	222	
Conventional Nuclear Plants . . . . .	222	
Coastal Effects . . . . .	224	
Direct Benefits . . . . .	224	
Economics . . . . .	225	
Environmental and Social Effects . . . . .	226	
Risks and Safety . . . . .	230	
Accident Risks . . . . .	230	
Probability of Core-Melt Accidents . . . . .	230	
Consequences of a Core-Melt . . . . .	232	
Accident Risks in the Study Area . . . . .	236	
<b>ALTERNATIVES TO OFFSHORE TECHNOLOGIES . . . . .</b>		<b>238</b>
Constraints on Alternatives . . . . .	239	
Energy Patterns in the Mid-Atlantic States . . . . .	240	
Offshore Oil and Gas Alternatives . . . . .	240	
Insulation . . . . .	241	
Solar . . . . .	241	
Automobile Efficiency . . . . .	241	
Floating Nuclear Plant Alternatives . . . . .	242	
Interconnection . . . . .	242	
Conservation . . . . .	242	
Cogeneration . . . . .	243	

	PAGE
coal .....	243
Research .....	244
Conclusion .....	245
FOOTNOTES: CHAPTER IV .....	247
<b>v</b> PUBLIC PARTICIPATION •.....*	255
PUBLIC PARTICIPATION: A PILOT PROJECT .....	255
MAJOR FINDINGS FOR ALL TECHNOLOGIES .....	257
Background .....	257
Overall Findings .....	259
Findings by Region.....	260
Offshore Drillings for Oil and Gas .....	260
Anticipated Effects.....	260
Process of Implementing the Technologies .....	261
Preferences and Alternatives .....	264
Deepwater Ports .....	265
Anticipated Effects .....	265
Process of Implementing the Technologies .....	267
Preferences and Alternatives .....	267
Floating Nuclear Powerplants.....	268
Anticipated Effects .....	268
Process of Implementing and Managing the Technologies .....	270
Preferences and Alternatives .....	270
HOW PUBLIC PARTICIPATION AFFECTED THE OTA ASSESSMENT .....	272
SOURCES AND USES OF PUBLIC PARTICIPATION DATA .....	274
Workshops .....	274
Questionnaires .....	276
Followup .....	277
Review of Draft Documents .....	278
Summary .....	278
FOOTNOTES: CHAPTER V .....	279
<b>IV</b> GLOSSARY .....	283

## LIST OF FIGURES

<i>FIGURE NO.</i>	<i>PAGE</i>
II-1—BaltimoreCanyon Trough lease sale area .....	14
II-2—Hypothetical deepwater port site offshoreNew Jersey coast .....	20
II-3—Proposed site of the floating nuclear powerplant .....	24
III-1—Cables and ship traffic lanes .....	72
III-2—Important fisheries near lease area .....	73

IV- 1—The coastal zones of Delaware and New Jersey .....	118
IV-2-Cape Helopen, Del., Seashore.....	122
IV- 3—Baltimore Canyon development activities by phase of development and by year .....	124
IV-4—Potential energy supply provided by Baltimore Canyon oil and gas development .....	126
IV-5—Estimates of undiscovered recoverable oil and gas resources in U.S. offshore areas .....	127
IV-6—Simplified flow diagram showing operations necessary for discovery, production, and abandonment of an oil field .....	128
IV-7—Baltimore Canyon Trough lease sale area.....	132
IV-8—OCS leasing procedures: Information flow into decision points .....	140
IV-9—Proposed OCS planning schedule (June 1975).....	141
IV-10—Ongoing activities in U.S. offshore areas.....	142
IV-11—OTA assumptions for oil and gas development in Baltimore Canyon Trough .....	145
IV-12—Drilling crews at work offshore .....	147
IV-13—Three exploratory rigs for possible use in the Mid-Atlantic .....	148
IV-14—Assumed rates of exploratory drilling.....	149
IV-15—Artist's drawing of production platform similar to those which might be used in the Mid-Atlantic .....	152
IV-16—Platform construction yard outside Morgan City, La.....	154
IV-17—Potential sites and land requirements for OCS supported bases .....	154
IV-18—Total new land requirements related to OCS development during years of peak activity in New Jersey and Delaware.....	156
IV-19—Direct employment from all OCS activities under the high and median recovery assumptions .....	157
IV-20—Annual earnings of direct regional OCS workers under median and high recovery assumptions.....	158
IV-21—State-local tax revenue per OCS employee and their families compared to revenue from non-OCS workers and their families.....	160
IV-22—Typical pipelaying barges similar to those which could be used in the Mid-Atlantic .....	162
IV-23—Responsibility of Federal agencies for pipelines .....	164
IV-24—Clean Atlantic Associates initial equipment stockpiles.....	168
IV-25—Partial listing of presently available equipment in the Mid-Atlantic area .....	168
IV-26—Oil cleanup equipment at work skimming spill from Gulf of Mexico ..	169
IV-27—Oil spills in the U.S. waters ranked by operation, calendar year 1974..	170
IV-28—U.S. oil supplies 1950/74 .....	173
IV-29—Tanker capacities of major U.S. oil ports .....	174
IV-30—Major U.S. Refining Centers .....	175
IV-31—Mid-Atlantic refinery capacity as of January 1, 1973 .....	176
IV-32—Oceanborne crude petroleum to the United States—1969 .....	177

	PAGE
IV-33—Worldwide single-point mooring installation—1973. . . . .	180
IV-34—Proposed deepwater port site in Delaware Bay . . . . .	181
IV-35—Deepwater port site offshore northern New Jersey. . . . .	182
IV-36—LOOP and Seadock deepwater port sites in the Gulf of Mexico . . . . .	183
IV-37—LOOP deepwater port layout . . . . .	184
IV-38—1976 projections of petroleum supply and demand . . . . .	186
IV-39—Hypothetical deepwater port site offshore New Jersey coast . . . . .	189
IV-40—Catenary anchor leg mooring (CALM) . . . . .	190
IV-41—Single anchor leg mooring (SALM) . . . . .	191
IV-42—Hypothetical deepwater port layout including onshore facilities. . . . .	192
IV-43—Fifteen-year totals of oil spills from one, 1.6-million-barrel-per-day deepwater port compared to small tanker alternative . . . . .	194
IV-44—Size comparison of proposed Atlantic Generating Station . . . . .	198
IV-45—Visualization of a floating nuclear powerplant in comparison to the USS Franklin D. Roosevelt . . . . .	199
IV-46—Annual observed and forecast values for energy consumption and peak-hour demand, 1963– 1987, for Public Service Electric & Gas Co. service area . . . . .	200
IV-47—Cutaway diagram of a floating nuclear plant containment building . .	205
IV-48—Offshore siting rubble-mound breakwater. . . . .	206
IV-49—Proposed site of floating nuclear plant . . . . .	208
IV-50—Cost estimates of nuclear units at time of order vs. actual finished cost or estimate as of December 1975 . . . . .	211
IV-51—Floating nuclear powerplants manufacturing facility, Jacksonville, Florida . . . . .	212
IV - 52—Annual shipments of radioactive materials to and from the two-unit Atlantic Generating Station . . . . .	215
IV - 53—Probable actions to be taken in decommissioning a floating nuclear powerplant by various methods . . . . .	219
IV-54—Three siting alternatives for floating nuclear plants . . . . .	223
IV-55—Benefits from the proposed Atlantic Generating Station . . . . .	225
IV-56—Monetary costs of construction and operation of the Atlantic Generat- ing Station . . . . .	225
IV-57—Environmental costs of the proposed Atlantic Generating Station. . . .	338
V-1—Public participation questionnaire . . . . .	258
V - 2—Results of public participation questionnaire: offshore drilling for oil and gas . . . . .	262
V-3—Results of public participation questionnaire: deepwater ports. . . . .	266
V-4—Results of public participation questionnaire: floating nuclear powerplants. . . . .	269
V-5—Sites of OTA contacts during public participation program . . . . .	275

