

TABLE OF CONTENTS

FOREWORD	v
PREFACE AND ACKNOWLEDGMENTS	vi
INTRODUCTION	vii
ACRONYMS	x
GLOSSARY OF TERMS	xj

Section I

COAL CONVERSION PROCESSES FOR THE PRODUCTION OF SOLID, LIQUID AND GASEOUS PRODUCTS

BERGIUS	1
CATALYTIC COAL LIQUEFACTION (C.C.L.)	1
CLEAN COKE PROCESS	2
COALCON HYDROCARBONIZATION	4
COALPLEX	5
COED	5
C.O.G. (Coal-Oil-Gas Refinery)	8
COGAS	10
CONSOL SYNTHETIC FUEL (C.S.F.) (previously known as "PROJECT GASOLINE")	12
COSTEAM	13
EXTRACTIVE-COKING PROCESS	14
EXXON LIQUEFACTION	14
FISCHER-TROPSCH SYNTHESIS	15
GARRETT'S COAL PYROLYSIS	17
GAS EXTRACTION	18
H-COAL	18
HYDRO-CRACKING PROCESS	20
INTERMEDIATE HYDROGENATION	20
LEAS LIQUEFACTION	21
LURGI-RUHRGAS	22
METHANOL SYNTHESIS	23
MOLTEN SALT CATALYSIS	24
PROJECT LIGNITE (also known as "SOLVENT REFINED LIGNITE-SRL")	25
PROJECT SEACOAL	26
PROJECT SEACOKE	26
SOLVENT EXTRACTION – C.R.E.	27
SOLVENT EXTRACTION – U.O.P.	27
SOLVOLYSIS	28
S.R.C.–C.F.C.	28
S.R.C. – COMBUSTION ENGINEERING	29

S.R.C. – MITSUI	29
S.R.C. – PAMCO	30
SYNTHOIL	34
TOSCOAL	35
UNDERGROUND LIQUEFACTION	36
UNION CARBIDE.	37
PATENTED PROCESSES NOT AT PRESENT IN A SIGNIFICANT STAGE OF DEVELOPMENT	37

Section II

HIGH BTU COAL GASIFICATION PROCESSES

AGGLOMERATING ASH.	39
AIR PRODUCTS RECYCLE PROCESS.	39
ATGAS/PATGAS	40
BIANCHI.	41
BI-GAS	41
CHEVRON GASIFICATION.	42
CO ₂ ACCEPTOR.	42
DEGASIFICATION.	43
ELECTRIC ARC GASIFICATION	44
ELECTROFLUIDIC GASIFICATION.	44
EXXON GASIFICATION	45
GARRETT'S COAL GASIFICATION	46
GEGAS	47
HYDRANE	47
HYGAS.	48
KOPPERS-TOTZEK	49
LIQUID PHASE METHANATION (L.P.M.)	50
LURGI PRESSURE GASIFICATION	51
MOLTEN-SALT	52
MULTIPLE CATALYST (also known as "WYOMING CONCEPT")	53
SOLUTION GASIFICATION	54
SUN GASIFICATION	54
SYNTHANE.	55
TEXACO GASIFICATION	56
TOTAL GASIFICATION	56
TWO STAGE FLUIDIZED GASIFICATION	57
WELLMAN GALUSHA	57
WINKLER	58
PATENTED PROCESSES NOT AT PRESENT IN A SIGNIFICANT STAGE OF DEVELOPMENT	58

Section III

LOW AND MEDIUM BTU COAL GASIFICATION PROCESSES

AGGLOMERATING ASH	59
AVCO ARC COAL PROCESS	59
BABCOCK & WILCOX – DU PONT	59
C.E. ENTRAINED FUEL PROCESS	60
“COMBINED CYCLE” B & W	60
“COMBINED CYCLE” F – W	61
CONSOL FIXED BED	61
ELECTRIC ARC	62
FIXED BED (Kellogg)	62
G.R.D. GASIFICATION	62
GEGAS	63
H.R.I. FLUIDIZED BED	63
H.R.I. GASIFICATION (SQUIRES)	63
I.C.I. MOVING BURDEN	63
I.F.E. TWO STAGE	64
I.G.I. TWO STAGE	64
“IN-SITU” GASIFICATION (also known as “UNDERGROUND GASIFICATION”)	65
KERPELY PRODUCER	67
KOPPERS TOTZEK	67
LASER IRRADIATION PYROLYSIS	67
LURGI	68
MARISCHKA	68
MOLTEN-SALT	69
MULTIPLE FLUIDIZED BED	69
OTTO RUMMEL SLAG BATH (Double Shaft)	69
PANINDCO	70
PHILADELPHIA & READING	70
PINTSCH HILLEBRAND	70
POWER GAS	71
RAPID HIGH TEMPERATURE	71
RILEY–MORGAN	71
ROCKGAS	71
RUHRGAS VORTEX	72
RUMMEL SLAG BATH (Single Shaft)	72
STIRRED FIXED BED (also known as “MORGAS”)	72
TEXACO GASIFICATION	73
THYSSEN GALOCSY	73
TWO STAGE PROCESS (also known as “SUBMERGED COAL COMBUSTION”)	73
TWO-STEP COAL PYROLYSIS GASIFICATION	74
UGAS	74

U.G.I. BLUE WATER GAS	75
WELLMAN-GALUSHA	75
WESTINGHOUSE FUEL CELL	76
WESTINGHOUSE LOW BTU PROCESS	76
WILPUTTE PRODUCER	77
WINKLER	77
REFERENCES CONSULTED	79
APPENDIX I MAJOR GOVERNMENTAL, SEMI-GOVERNMENTAL AND PRIVATE AGENCIES SPONSORING COAL CONVERSION RESEARCH PROGRAMS.	85
APPENDIX II ALPHABETICAL LISTING OF COMPANIES HOLDING MAJOR COAL CONVER- SION PATENTS	93
APPENDIX III LATE INSERTIONS (significant information received during publication).	97
APPENDIX IV COAL CONVERSION PROCESSES FOR THE PRODUCTION OF LIQUID, SOLID AND GASEOUS PRODUCTS	105
APPENDIX V COAL GASIFICATION PROCESSES FOR THE PRODUCTION OF SUBSTITUTE NATURAL GAS.	115
SUBJECT INDEX	125