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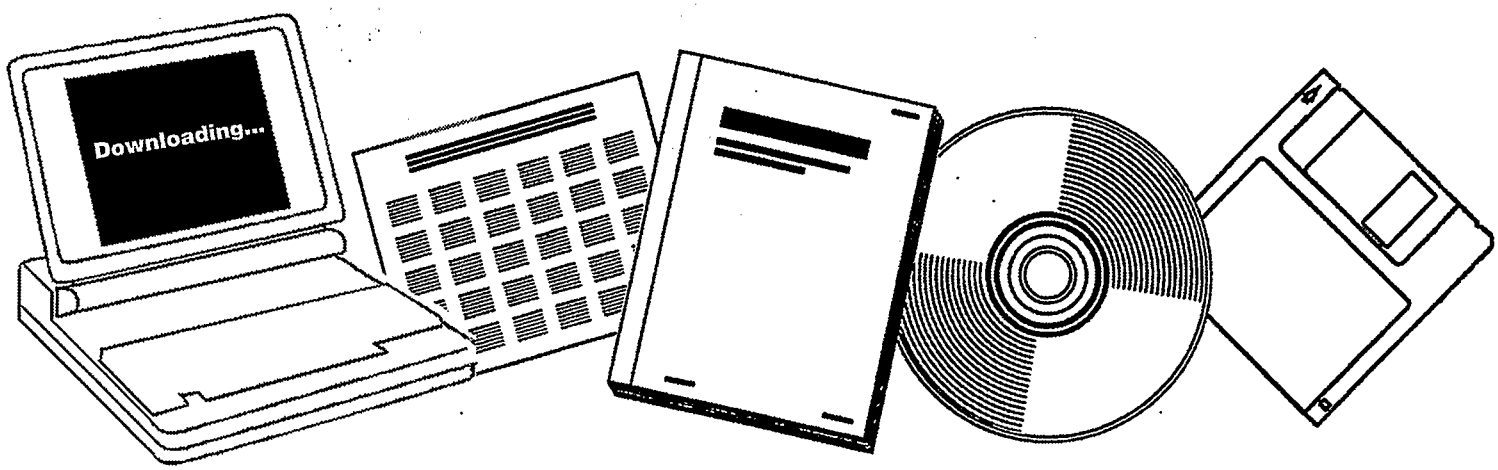

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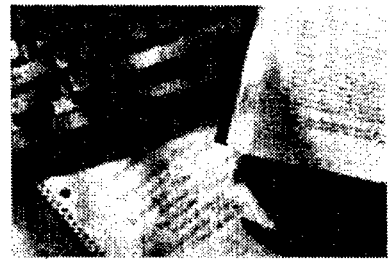

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OIL/GAS COMPLEX CONCEPTUAL DESIGN/ECONOMIC ANALYSIS

OIL AND SNG PRODUCTION

R & D REPORT NO. 114 - INTERIM REPORT NO. 4

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FLOW DIAGRAMS
(Section 6)

ABBREVIATIONS

ABS	absolute
atm	atmosphere
av	average
bbl	barrel
BCR	Bituminous Coal Research, Inc.
BCY	bank cubic yard
BFW	boiler feedwater
bhp	brake horsepower
BOD	biological oxygen demand
bp	boiling point
BPD	barrel per day
BPCD	barrel per calendar day
BPSD	barrel per stream day
Btu	British thermal unit
Btu/hr	Btu per hour
CA	corrosion allowance
Chan.	channel
CI	cast iron
COD	chemical oxygen demand
CS	carbon steel (material)
CS	centistokes (viscosity)
DCF	discounted cash flow
DE	diatomaceous earth
DTPH	dry ton per hour
eff	efficiency

ABBREVIATIONS (Contd)

EP	end point
EUAC	equivalent uniform annual cost
FOE	fuel oil equivalent
gpm	gallon per minute
Gr	grade
HC	hot condensate
Hdr	header
Hg	mercury
HHV	higher heating value
HP	high pressure
hp	horsepower
IBP	initial boiling point
ID	inside diameter
K.O.	knockout
kV	kilovolt (1,000 volt)
kW	kilowatt (1,000 watt)
lb/hr	pound per hour
LP	low pressure
LPG	liquefied petroleum gas
LT	Long ton (2,240 lb)
M	thousand
MAF	moisture and ash free (coal)
MF	moisture free (coal)
MM	million
MM SCFD	million standard cubic foot per day

ABBREVIATIONS (Contd)

mo	moly
MW	megawatt
MWe	megawatt electricity
OCR	Office of Coal Research
O/G	Oil/Gas
PF	power factor
P&M	Pittsburgh & Midway Coal Mining Company
ppm	part per million
psia	pound per square inch absolute
psig	pound per square inch gauge
RAR	required annual revenue
R&D	research and development
ROM	run-of-mine (raw coal from mine, unbroken and not cleaned)
SA	ASME quality material
scf	standard cubic foot
scfd	standard cubic foot per day
scfh	standard cubic foot per hour
SH	shell
SLTC	steel lathe turnings catalyst
SNG	substitute natural gas
sp gr and S.G.	specific gravity
SRC	solvent refined coal
SS	stainless steel
SSF	Saybolt

ABBREVIATIONS (Contd)

stp	standard temperature and pressure
T	tubes
TPD	ton per day (2,000 lb/ton)
TPH	ton per hour (2,000 lb/ton)
TPSD	ton per stream day
TPY	ton per year (2,000 lb/ton)
TT	tangent to tangent
TWR	tube wall reactor
USAEDH	U.S. Army Engineer Division, Huntsville
wt	weight
wt %	weight percent