APPENDIX B

Assumptions and Data for Computer Analyses

Most of the assumptions used in the computer simulation analyses are embodied in the input data displayed in table B-1. All cost and price data in the exhibit are in constant 1979 dollars.

Table B-1 .–Data Used for Quantitative Analysis[a]

Data item	Value used	Explanation
costs		
Capital cost distribution		
Maximum capital cost,	$2.0 billion	The capital cost data apply to all the capital equipment needed to mine and retort shale and hydro-
Most probable capital cost:	$1.7 billion	treat the raw shale oil product, the costs do not Include land acquisition or interest charges, Data
Minimum capital cost	$1.4 billion	were based on recent industry cost estimates,
Operating and maintenance (O&M) cost distribution.		
Maximum O&M cost.	$17/bbl	Operating costs include hydrotreating costs. Data were based on recent industry cost estimates
Most probable O&M cost :	$12/bbl	
Minimum O&M cost	$ 9/bbl	
Operating cost Increase	4 percent/year	Operating costs were assumed to increase 4 percent per year in real terms (i.e., net of inflation) to account for probable Increases in labor costs due to expansion of shale Industries in sparsely populated areas Assumption was based on expectations expressed to OTA by industry sources
Construction period	6 years	A 6-year construction period (i. e , a l-year delay between the fourth and fifth years) decreased expected profits by $117 million for the no-incentive, 12-percent discount rate case.
Fraction of costs occurring each year during construction		
Year 1 .,	10	
Year 2	25	
Year 3 ., : : : : :	30	
Year 4 .,	25	
Y e a r 5	00	
Year 6 .,	10	
Prices		
Initial oil price (1979) ., .,	$35/bbl	Based on the price of imported oil, which at the time of the analysis ranged from $33 to $37/bbl.
Mean annual 011 price increase	3 percent	The assumed 3-percent real increase in oil prices accounts for increasing scarcity as cheap do- mestic supplies are exhausted, and is midway in the range (2-4 percent) used by DOE planners
Standard deviation of annual oil price change distribution	3 percent	Based on historical trends from the American Petroleum Institute, Basic Petroleum *Data Book,* 1976.
Taxes and transfers		
Federal corporate tax, .,	46 percent	Current Federal corporate income tax rate,
State corporate tax	3 percent	Colorado corporate income tax rate.
State severance tax .,	4 percent	Colorado severance tax on 011 shale reserves,
Investment tax credit,	10 percent	Investment tax credit of 10 percent applies to all investments, an existing additional 10-percent credit for energy-related Investments was ignored because it is to expire in 1982,
Depletion allowance	15 percent	Depletion allowance computed on 011 shale revenues and deducted from taxable income.
Royalty .,	1 percent	Current royalty is 12.5 cents per ton of mined shale; this is equivalent to a royalty on 011 revenues of less than 1 percent.
Depreciation lifetime	12 years	Based on discussions with industry sources.
Annual rent .,	$2,600	Based on a 50-cent-per-acre rent on Federal shale leases of 5,200 acres,
Depreciation method	Sum-of -years digits with switch-over to straight line	Provides the most rapid tax writeoff,
Production		
Maximum output of facility .,	50,000 bbl/d	Size of typical commercial facility,
Production lifetime ., ., .,	22 years	Based on production lifetime of 20 to 30 years in industry cost estimates.
Annual output		
Y e a r 1	15,000 bbl/d	2-year buildup accounts for probable startup difficulties.
Year 2 ..., : 35,000	bbl/d	
Years 3 to 22, ., ., .,	50,000 bbl/d	

[a]All monetary values in constant 1979 dollars

SOURCE :Office of Technology Assessment