

Exxon Means 50 MMSCFD Case

C3 RECOVERY = 25%, CO2 LEAKAGE = 2%

Recovery BBL/day	Value \$/BBL	Comp. Cost \$/Day	Heater Cost \$/Day	Op Cost \$/Day	Misc Cost \$/Day	Net \$/Year
923	\$18	\$880	\$549		\$685	\$110 \$5,180,573

Capital Sensitivity

	Capital	Interest	Term Years	Payment	Net
	\$4,000,000	5.00%	4	(\$1,128,047)	\$4,052,525
	\$4,500,000	5.00%	4	(\$1,269,053)	\$3,911,519
	\$5,000,000	5.00%	4	(\$1,410,059)	\$3,770,513
	\$5,500,000	5.00%	4	(\$1,551,065)	\$3,629,508
HERE!!!!	\$6,000,000	5.00%	4	(\$1,692,071)	\$3,488,502
	\$6,500,000	5.00%	4	(\$1,833,077)	\$3,347,496
	\$7,000,000	5.00%	4	(\$1,974,083)	\$3,206,490
	\$7,500,000	5.00%	4	(\$2,115,089)	\$3,065,484
	\$8,000,000	5.00%	4	(\$2,256,095)	\$2,924,478
	\$8,500,000	5.00%	4	(\$2,397,101)	\$2,783,472

Exxon Means Optimization 11/17/02

Inlet Flow = 25MMSCFD

Set CO2 Leakage at 2%

Water = 10#/MMSCF = 10.4167 Lb/hr

C3 Recovery	Cond. Duty	Ref HP	Prod. BBL	Ovhd Temp	Est Capital	Est Rev	Gross Return
40.9	6.656	951	549	41.8	\$5,706,000	\$3,366,468	59.00%
35	5.26	752	524	42	\$4,512,000	\$3,213,168	71.21%
30	4.23	602	496	42.3	\$3,612,000	\$3,041,472	84.20%
25	3.342	479	462	42.7	\$2,874,000	\$2,832,984	98.57%
20	2.579	366	418	43.3	\$2,196,000	\$2,563,176	116.72%
17	2.163	309	387	43.8	\$1,854,000	\$2,373,084	128.00%

Inlet Flow = 50MMSCFD

Set CO2 Leakage at 2%

Water = 10#/MMSCF = 20.8333 Lb/hr

C3 Recovery	Cond. Duty	Ref HP	Prod. BBL	Ovhd Temp	Est Capital	Est Rev	Gross Return
17	4.325	620	774	43.8	\$3,720,000	\$4,746,168	127.59%
20	5.135	690	836	43.3	\$4,140,000	\$5,126,352	123.82%
25	6.668	953	923	42.7	\$5,718,000	\$5,659,836	98.98% PICK HERE!!!!!!!!!!!!!!
30	8.46	1204	992	42.3	\$7,224,000	\$6,082,944	84.20%
35	10.52	1504	1048	42	\$9,024,000	\$6,426,336	71.21%
40.9	13.312	1902	1098	41.8	\$11,412,000	\$6,732,936	59.00%

Optimized Economics

Flow = 50 MMscf/day

CO2 Leakage = 2%

Propane Recovery = 25%

0.80568

11040

Recovery BBL/day	Value \$/BBL	Comp. Cost \$/Day	Heater Cost \$/Day	Op Cost \$/Day	Misc Cost \$/Day	Net \$/Year
920	\$12	\$760	\$549	\$685	\$110	\$3,217,133
		277400	200385	250000	40000	767785

Year	Gross Rev	Op Cost	Comp Rent	Est TIC	Interest	Payment	Net \$
1	\$3,974,400	\$767,785	\$120,000	\$7,000,000	6.50%	(\$2,043,319)	\$1,043,296
2	\$4,053,888	\$798,496	\$120,000	\$7,000,000	6.50%	(\$2,043,319)	\$1,092,072
3	\$4,134,966	\$830,436	\$120,000	\$7,000,000	6.50%	(\$2,043,319)	\$1,141,210
4	\$4,217,665	\$863,654	\$120,000	\$7,000,000	6.50%	(\$2,043,319)	\$1,190,692
5	\$4,302,018	\$898,200	\$120,000				\$3,283,819
6	\$4,388,059	\$934,128	\$132,000				\$3,321,931
7	\$4,475,820	\$971,493	\$132,000				\$3,372,327
8	\$4,565,336	\$1,010,353	\$132,000				\$3,422,984
9	\$4,656,643	\$1,050,767	\$132,000				\$3,473,876
10	\$4,749,776	\$1,092,797	\$132,000				\$3,524,978

Economics for Exxon

Year	Gross Rev	Op Cost	Comp Rent	Est TIC	Interest	Payment	Net \$
1	\$3,974,400	\$921,342	\$120,000	\$7,000,000	6.50%	(\$2,043,319)	\$889,739
2	\$4,053,888	\$958,196	\$120,000	\$7,000,000	6.50%	(\$2,043,319)	\$932,373
3	\$4,134,966	\$996,524	\$120,000	\$7,000,000	6.50%	(\$2,043,319)	\$975,123

4	\$4,217,665	\$1,036,384	\$120,000	\$7,000,000	6.50%	(\$2,043,319)	\$1,017,961
5	\$4,302,018	\$1,077,840	\$120,000				\$3,104,179
6	\$4,388,059	\$1,120,953	\$132,000				\$3,135,105
7	\$4,475,820	\$1,165,792	\$132,000				\$3,178,028
8	\$4,565,336	\$1,212,423	\$132,000				\$3,220,913
9	\$4,656,643	\$1,260,920	\$132,000				\$3,263,723
10	\$4,749,776	\$1,311,357	\$132,000				\$3,306,419

Economic Limits

	BPO	APO
Flow	37	18
Capital Cost		
Composition		

Year	Flow
1	60
2	57
3	54.15
4	51.4425
5	48.870375
6	46.4268563
7	44.1055134
8	41.9002378
9	39.8052259
10	37.8149646
11	35.9242164
12	34.1280055
13	32.4216053
14	30.800525
15	29.2604987
16	27.7974738
17	26.4076001

Specifications

Flow = 50 MMscf/day

CO2 Leakage = 2%

Propane Recovery = 25%

1) Refrigeration Compressor - 2 Stage, Apx 1000 Hp - Lease

	Temperature Deg F	Pressure PSIA	Flow MMSCFD	Comp
Suction		19	55	11.5 C3
Discharge	150 Est		250	11.5 C3

2) Inlet Separator

Size	7.5 X 22	S/S Vertical
Pressure	740	PSIG
Temp	-20 to 200	Degrees

3) Gas to Gas Exchanger

Pressure	740	PSIG
Temp	-20 to 200	Degrees
Duty	3,600,000	Btu/hr
UA	162,000	Btu/F-Hr
A est	2500	Sq Ft

4) NGL Recovery Column

Pressure	740	PSIG
Temp	-20 to 200	Degrees
Diameter	72	Inches ID
Height	55	Ft S/S

5) Overhead Condenser

Pressure	740	PSIG	Tubes
Pressure	270	PSIG	Shell
Temp	-20 to 200	Degrees	
Duty	6,683,000	Btu/hr	

UA 479,000 Btu/F-Hr
A est 4000 Sq Ft

6) Reboiler

Pressure 740 PSIG Tubes
Pressure 150 PSIG Shell
Temp -20 to 450 Degrees
Duty 6,200,000 Btu/hr
UA est 440,000 Btu/F-Hr
A est 3,667 Sq Ft

7) Amine Treating - Lease

CO2 2.44 Moles/hr
H2S 9 Moles/hr
CO2 15.4126667 SCFM
H2S 56.85 SCFM
Total 72.2626667 SCFM

Assume DEA @ 25% = 4 SCF/GPM

Amine = 18.0656667 GPM
Design = 20 GPM

8) Propane Discharge Condenser - Air Exchanger

Pressure 350 PSIG
Temp -20 to 350 Degrees
Duty 9,100,000 Btu/hr
UA 326,100 Btu/F-Hr
A est 5435 Sq Ft

9) Acid Gas Compression Apx 40 Hp

Suction 16 PSIA
 100 Deg F
 115,200 Cu Ft/Day

Disc 60 PSIA
 115,200 Cu Ft/Day
 250 Deg F Est

Note: All Stainless System

10) NGL Storage

4- storage tanks
250 PSI design @ 30,000 Gal

11) Refrigeration Receiver

 60 Inch ID
 50 Ft S/S
 270 PSIG Design
Temp -20 to 350 Degrees

12) NGL Product Cooler - Air Cooler

Pressure 350 PSIG
Temp -20 to 350 Degrees
Duty 1,360,000 Btu/hr
UA 12,030 Btu/F-Hr
A est 200.5 Sq Ft

Set limit at .5#/100 ft

Description	From	To	Size	DP100
Inlet	GCF	Inlet Scrubber	10	0.5
G/G Inlet	Inlet Scrubber	G/G Inlet	10	0.5
Column Inlet	G/G Outlet	Column Inlet	10	0.5
Ref Suction	Condenser	Ref Suct	10	0.3
Comp Disc	Econ	Expan Valve	4	0.5
Reboiler	Reboiler	Column	8	0.1
Reboiler	Reboiler	Prod Cooler	3	0.1
Reboiler Feed	Colomn	Reboiler	6	0.2
Hot Oil	Heater	Reboiler	6	0.8 Velocity Set
Hot Oil	Reboiler	Heater	6	0.8 Velocity Set
2nd Stage	1st Disc	2nd Suct	8	0.5
Econ	Econ	2nd Suct	3	0.1
2nd Disc	2nd Disc	Condenser	8	0.3
Econ	Econ	JT Valve	4	0.5

11/02 Analysis Economics

Flow = 50 MMscf/day

CO2 Leakage = 2%

Propane Recovery = 25%

0.80568

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Recovery BBL/day	Value \$/BBL	Comp. Cost \$/Day	Heater Cost \$/Day	Op Cost \$/Day	Misc Co \$/Day	Net \$/Year	TIC Return Down Pmt	\$ 5,000,000	15%
802	\$13	\$760	\$549	\$685	\$110	\$2,996,093			
		277400	200385	250000	40000	767785		\$ 1,000,000	\$ 150,000

Year	Gross Rev	Op Cost	Comp Rent	Est TIC - DP	Interest	Payment	Net \$	1/2 Net	% Ownership
1	\$3,753,360	\$767,785	\$120,000	\$4,000,000	6.50%	(\$1,167,611)	\$1,697,964	\$ 848,982	0.18
2	\$3,828,427	\$798,496	\$120,000	\$4,000,000	6.50%	(\$1,167,611)	\$1,742,320	\$ 871,160	0.17
3	\$3,904,996	\$830,436	\$120,000	\$4,000,000	6.50%	(\$1,167,611)	\$1,786,949	\$ 893,474	0.17
4	\$3,983,096	\$863,654	\$120,000	\$4,000,000	6.50%	(\$1,167,611)	\$1,831,831	\$ 915,915	0.16
5	\$4,062,758	\$898,200	\$120,000				\$3,044,558	\$ 1,522,279	0.10
6	\$4,144,013	\$934,128	\$132,000				\$3,077,885	\$ 1,538,942	0.10
7	\$4,226,893	\$971,493	\$132,000				\$3,123,400	\$ 1,561,700	0.10
8	\$4,311,431	\$1,010,353	\$132,000				\$3,169,078	\$ 1,584,539	0.09
9	\$4,397,659	\$1,050,767	\$132,000				\$3,214,893	\$ 1,607,446	0.09
10	\$4,485,613	\$1,092,797	\$132,000				\$3,260,815	\$ 1,630,408	0.09

Economics for Exxon

Year	Gross Rev	Op Cost	Comp Rent	Est TIC	Interest	Payment	Net \$
1	\$3,753,360	\$921,342	\$120,000	\$7,000,000	6.50%	(\$2,043,319)	\$668,699
2	\$3,828,427	\$958,196	\$120,000	\$7,000,000	6.50%	(\$2,043,319)	\$706,912
3	\$3,904,996	\$996,524	\$120,000	\$7,000,000	6.50%	(\$2,043,319)	\$745,153
4	\$3,983,096	\$1,036,384	\$120,000	\$7,000,000	6.50%	(\$2,043,319)	\$783,392
5	\$4,062,758	\$1,077,840	\$120,000				\$2,864,918
6	\$4,144,013	\$1,120,953	\$132,000				\$2,891,059
7	\$4,226,893	\$1,165,792	\$132,000				\$2,929,101

8	\$4,311,431	\$1,212,423	\$132,000	\$2,967,008
9	\$4,397,659	\$1,260,920	\$132,000	\$3,004,739
10	\$4,485,613	\$1,311,357	\$132,000	\$3,042,256

Recoveries

Component	Inlet Moles	Product Moles	Recovery
Ethane	148.14	0.07	0.05%
Propane	69.13	17.28	25.00%
I-Butane	21.37	13.5	63.17%
N-Butane	31.46	25.46	80.93%
I-Pentane	18.63	18.41	98.82%
N-Pentane	6.58	6.55	99.54%
Hexane +	16.44	16.44	100.00%

Operations Proposal

I) Operator Cost

Salary	\$45,000
Benefits	\$15,750
OT Coverage	\$3,600
	\$64,350

II) Vehicles

Payments	\$7,800
Gas	\$3,120
Repairs	\$800
	\$11,720

III) Misc.

Training/Travel	\$2,000
Safety Equip	\$1,000
Tools	\$500
	\$3,500

Totals

Operators	\$64,350
Vehicles	\$11,720
Misc	\$3,500
	\$79,570

Total Estimate for 3 Operators	\$238,710
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Profit	35%	\$83,549
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Total	\$322,259
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