

I Group Members: Malacki Ginner, Luke Huguenin, Will Morgano, Levi Thomsen

PROCESS DESCRIPTION

I Tasks:

- Provide a process and economic analysis
- Addition to an oil refinery
- Use of a fixed-bed catalytic reformer
- Cracking of naphtha to produce linear alkanes and aromatics
- Separation of benzene, toluene, and xylene (BTX)

METHODOLOGY

I Process simulated in AVEVA Pro II

I Naphtha cracked via reactor train

I Recyclable hydrogen removed via flash distillation, and volatile alkanes via a distillation column

I BTX extracted from mixture using sulfolane

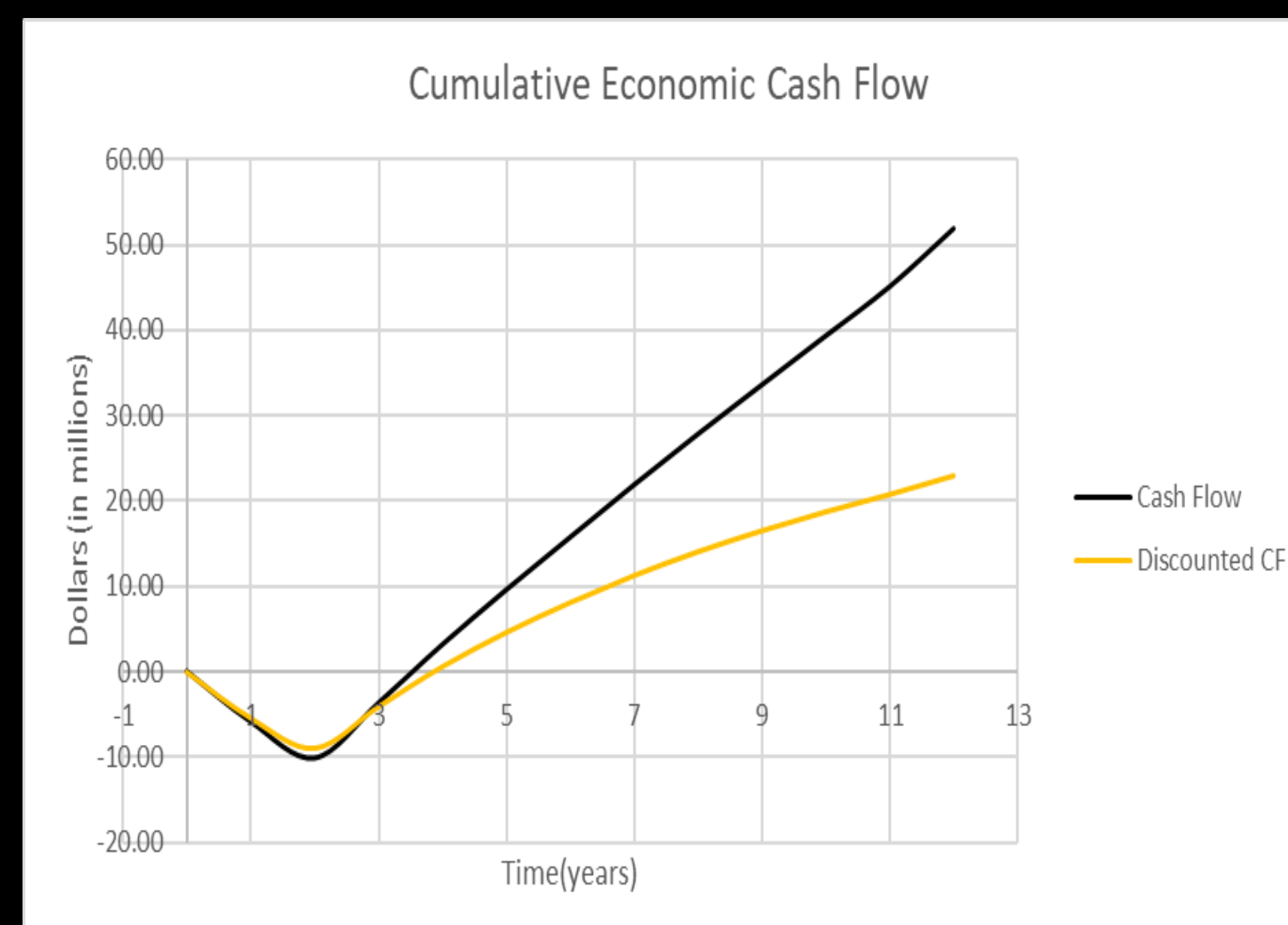
I BTX separated using distillation processes

I Sized equipment using relevant design heuristics

ECONOMIC ANALYSIS

I Assumptions:

- Two-year construction
- Ten-year operating lifetime
- Five-year MACRS depreciation
- Given 35% tax rate
- Capcost equipment pricing



Net Present Value	\$22.9 million
Revenue per year	\$223 million
Bare Module Cost	\$9.84 million
Cost of Manufacture	\$2.14 billion

SAFETY

I Considerations

- Explosion: Reducing the buildup of pressure
- Fire: Limit contact of ignition sources
- Ventilation: Use of PSVs and flare lines
- Environmental: Flare gasses are removed from the facility. Separation of salable BTX
- Operator: Proper PPE and standard guidelines

CONCLUSIONS

I Created fully converged and optimized simulation to produce benzene, toluene, and xylene at 99% purity

I \$23 million profit over the ten-year operation

I Next steps are to proceed with a detailed design and P&ID development.

PROCESS FLOW DIAGRAMS

