

7 APPENDIX

UOP Memorandum

Date: November 20, 1995
To: Ben Spehlmann
From: Cost Engineering
Subject:

DOE PROJECT

RECEIVED
OCT 14 1997
OSTI

Proposed Isobutanol Synthesis
Approximate Capital Cost No. 95125
Re: Your Memo Dated October 25, 1995
728008-15

We are noting the preliminary curve-type Capital Costs (based on U.S.A. Gulf Coast erection to UOP Standards) for the units as described below, exclusive of offsites. The estimated costs given below are on an open shop (non-union) labor basis.

Unit

Penex Unit

Fresh Feed, BPSD	5300
Combined Feed, BPSD	20,300
Sep. Press. PSIG	450
H ₂ /Hr	1.0
Makeup Gas Compressor	Not Included
Makeup Gas Driers	Not Included
Feed Driers	Not Included
Stabilizer	Included
Off Gas Scrubber	Not Included

Approximate Capital Cost - Class C ($\pm 30\%$)

Penex Unit, M+L - \$MM	84.4
DE+CE \$MM	<u>1.5</u>
Estimated Erected Cost	\$5.9MM

D.L. Oak

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Please find below a list of items not included in our curve cost estimates along with a list of our assumptions regarding economic conditions. It is important that these lists be given to the recipient of this estimate. The recipient could then understand UOP's scope and basis, as well as those project specific costs not addressed by our curves. This knowledge enables the recipient to select from, and make allowances for, those additional items that are applicable to this specific project. Cost Estimating is available to provide support for both the cost numbers and the estimate's scope and basis.

ITEMS NOT INCLUDED IN UOP COST ESTIMATES OF BATTERY LIMIT COSTS, UNLESS SPECIFIED AS INCLUDED:

1. Cost of land, site preparation, and soil investigation
2. Piling or any unusual foundation requirements
3. Docks, marine terminals, or jetties
4. Access roads to site
5. Home Office Administration Building
6. Worker's transportation allowance, employee housing, worker's barracks, canteens, and recreation facilities
7. Overtime pay during construction
8. Know-how fees and royalties on licensed processes
9. Owner's expenses in developing the project
10. Local permits, taxes and fees, or specific costs of doing business in the area
11. Items concerned with export shipments, such as ocean freight, export crating, marine insurances, import taxes and customs
12. Operating capital and investment in goods in the process
13. Escalation on materials and labor due to price fluctuation or economic conditions
14. Contingencies
15. Cost of startup including testing, manpower, utilities, operating manuals and training programs
16. Spare parts, special tools or maintenance equipment
17. Catalyst, chemicals and raw materials including initial fills or inventories
18. Customer or national standards or codes
19. Special pollution or noise control facilities
20. Electrical main substations
21. Power generation
22. Water or hydrocarbon pipelines
23. Additions or extension to utilities systems or offsites
24. Laboratory facilities or supplies
25. Special communications or computer systems

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**THE FOLLOWING ASSUMPTIONS ARE NORMALLY MADE REGARDING
ECONOMIC CONDITIONS AT THE TIME THE JOB IS BID:**

1. There will be an adequate supply of skilled labor available for construction.
2. There will be a reimbursable contract with a fixed cost for Home Office services.
3. The plant will be constructed in the U.S. Gulf Coast.
4. There is no lost time due to climatic conditions.
5. Material and labor prices are based on the date of the estimate.