



FE248012

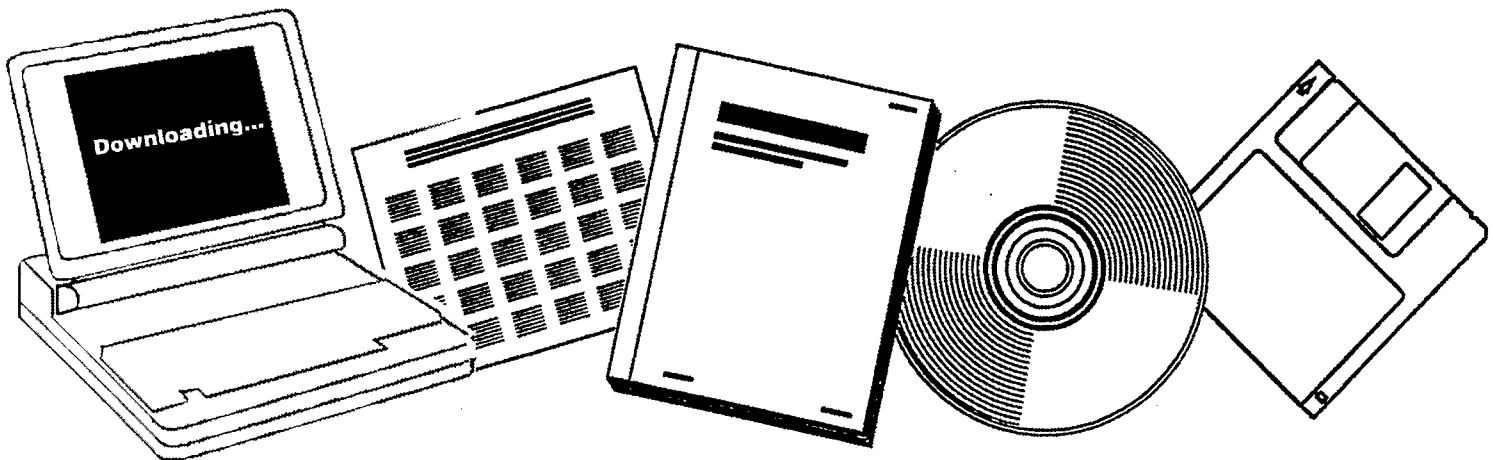
NTIS

One Source. One Search. One Solution.

**SCALE-UP REQUIREMENTS OF THE EXXON
CATALYTIC COAL GASIFICATION PROCESS.
MONTHLY REPORT, OCTOBER 1--OCTOBER 31,
1977**

**EXXON RESEARCH AND ENGINEERING CO.,
FLORHAM PARK, N.J**

MAY 1978



U.S. Department of Commerce
National Technical Information Service

One Source. One Search. One Solution.

NTIS



Providing Permanent, Easy Access to U.S. Government Information

National Technical Information Service is the nation's largest repository and disseminator of government-initiated scientific, technical, engineering, and related business information. The NTIS collection includes almost 3,000,000 information products in a variety of formats: electronic download, online access, CD-ROM, magnetic tape, diskette, multimedia, microfiche and paper.



Search the NTIS Database from 1990 forward

NTIS has upgraded its bibliographic database system and has made all entries since 1990 searchable on **www.ntis.gov**. You now have access to information on more than 600,000 government research information products from this web site.

Link to Full Text Documents at Government Web Sites

Because many Government agencies have their most recent reports available on their own web site, we have added links directly to these reports. When available, you will see a link on the right side of the bibliographic screen.

Download Publications (1997 - Present)

NTIS can now provides the full text of reports as downloadable PDF files. This means that when an agency stops maintaining a report on the web, NTIS will offer a downloadable version. There is a nominal fee for each download for most publications.

For more information visit our website:

www.ntis.gov



U.S. DEPARTMENT OF COMMERCE
Technology Administration
National Technical Information Service
Springfield, VA 22161

FE248012



FE-2480-12

Dist. Category UC-90

SCALE-UP REQUIREMENTS OF THE
EXXON CATALYTIC COAL GASIFICATION PROCESS

Monthly Report for the Period

October 1 - October 31, 1977

S. J. Cohen - Project Manager

Exxon Research and Engineering Company
P. O. Box 101
Florham Park, New Jersey 07932

May, 1978

PREPARED FOR THE UNITED STATES
DEPARTMENT OF ENERGY

Under Contract No. EX-76-C-01-2480

NOTICE

This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States Department of Energy, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights.

REPRODUCED BY:
NTIS
U.S. Department of Commerce
National Technical Information Service
Springfield, Virginia 22161

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

REA

This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States DOE, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights.

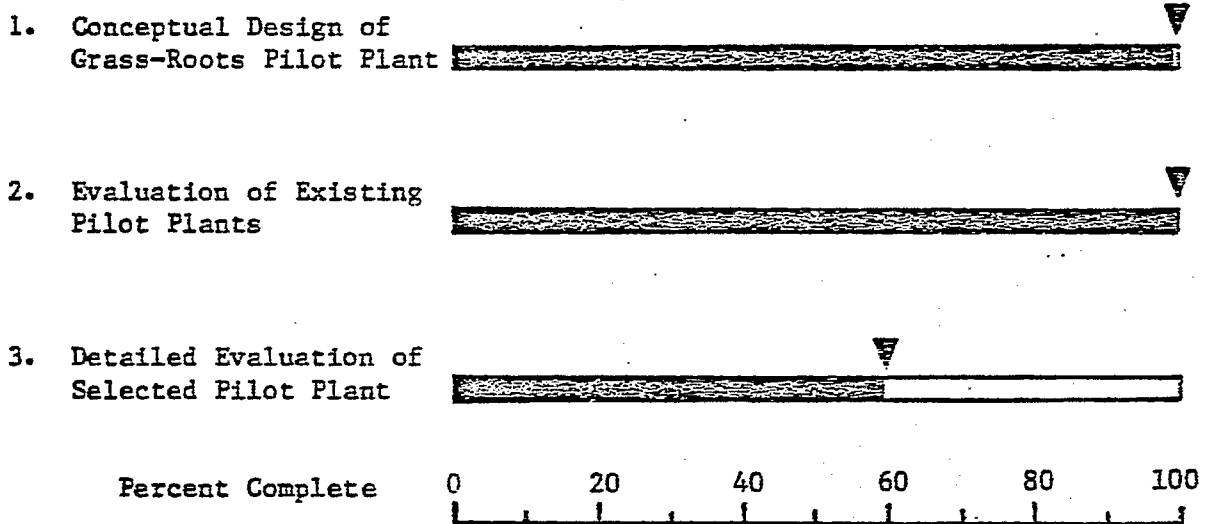
ABSTRACT

The operating cost for the 92 T/D grass roots Catalytic Coal Gasification large pilot plant (LPP) was estimated to be 73 M\$. This estimate is based on escalated costs for LPP operation over a 2 1/2 year period from January 1, 1983 to July 1, 1985.

The direct costs for modifications to the Synthane pilot plant have been completed and the total construction cost estimate is in progress.

SUMMARY OF PROGRESS THROUGH OCTOBER, 1977
FOR THE STUDY OF SCALE-UP REQUIREMENTS
OF THE EXXON CATALYTIC COAL GASIFICATION PROCESS

Technical Reporting
Category



Legend

Shaded area = percentage of activity actually completed

▼ = percentage of activity scheduled for completion

DISCUSSION

STUDY DESIGN OF GRASS ROOTS LARGE PILOT PLANT - (Reporting Category 1)

As reported in the September monthly summary, the investment for the grass roots Catalytic Coal Gasification large pilot plant (LPP) was estimated to be 130 M\$. The operating costs have now been estimated to be 73 M\$. This is based on escalated costs for LPP operation over a two and one-half year period from January 1, 1983 to July 1, 1985.

A year-by-year breakdown of the operating cost components is presented in Table 1. Variable costs such as raw materials, transportation and utilities are based on an overall LPP service factor of 50%. Details of the service factor basis are presented in Table 2. Table 3 presents a summary of the items included in each category and the bases that were used in preparing the estimate.

TABLE 1
OPERATING COST SUMMARY
GRASS ROOTS LARGE PILOT PLANT

	2nd Half			1st Half			<u>Total</u>
	1980	1981	1982	1983	1984	1985	
	k\$						
<u>Raw Materials</u>							
- Coal (Illinois)	-	-	-	368	617	419	
- Catalvst (K ₂ CO ₃ Sol'n)	-	-	-	550	426	164	
<u>Total Raw Materials</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>918</u>	<u>1043</u>	<u>583</u>	<u>2544</u>
<u>Transportation</u>							
- Coal (Illinois to Baytown unit train)	-	-	-	532	890	604	
- Catalvst (spot-shipments)	-	-	-	67	52	20	
<u>Total Transportation</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>599</u>	<u>942</u>	<u>624</u>	<u>2165</u>
<u>Salaries, Wages, Benefits, and Support Services</u>							
	<u>259</u>	<u>709</u>	<u>3441</u>	<u>7611</u>	<u>7941</u>	<u>4217</u>	
<u>Total S,W,B, and S.S.</u>	<u>259</u>	<u>709</u>	<u>3441</u>	<u>7611</u>	<u>7941</u>	<u>4217</u>	<u>24178</u>
<u>Administrative</u>							
- Taxes	0	2	293	845	2145	2145	
- Land Leasing Charges	20	40	40	40	40	20	
- Miscellaneous -	<u>10</u>	<u>130</u>	<u>200</u>	<u>210</u>	<u>220</u>	<u>110</u>	
<u>Total Administrative</u>	<u>30</u>	<u>172</u>	<u>533</u>	<u>1095</u>	<u>2405</u>	<u>2275</u>	<u>6510</u>
<u>Technical</u>							
- Miscellaneous Services and Supplies	-	-	100	225	200	100	
<u>Total Technical</u>	<u>0</u>	<u>0</u>	<u>100</u>	<u>225</u>	<u>200</u>	<u>100</u>	<u>625</u>
<u>Process Operations</u>							
- Catalyst and Chemicals	0	0	0	157	264	179	
- Utilities	0	0	0	3638	4851	2528	
- Process Services	0	0	10	34	35	34	
- Miscellaneous Supplies	<u>0</u>	<u>0</u>	<u>50</u>	<u>20</u>	<u>20</u>	<u>20</u>	
<u>Total Process Operations</u>	<u>0</u>	<u>0</u>	<u>60</u>	<u>3849</u>	<u>5170</u>	<u>2761</u>	<u>11840</u>
<u>Mechanical</u>							
- Contract (Labor and Supervision)	0	0	0	4346	4177	1859	
- Material	0	0	1000	5306	5110	2261	
- Miscellaneous	<u>0</u>	<u>0</u>	<u>450</u>	<u>425</u>	<u>375</u>	<u>180</u>	
<u>Total Mechanical</u>	<u>0</u>	<u>0</u>	<u>1450</u>	<u>10077</u>	<u>9662</u>	<u>4300</u>	<u>25489</u>
 <u>GRAND TOTAL</u>	 <u>289</u>	 <u>881</u>	 <u>5584</u>	 <u>24374</u>	 <u>27363</u>	 <u>14860</u>	 <u>73351</u>

TABLE 2
SERVICE FACTOR BASIS

<u>Year</u>	<u>Operating Days</u>	
	<u>Coal Feed</u>	<u>Catalyst Recovery</u>
1983	128	0
1984	200	100
1985 (first half)	128	128

TABLE 3
OPERATING COST ESTIMATING BASIS FOR
GRASS ROOTS LARGE PILOT PLANT

Raw Materials

- Coal
 - Illinois No. 6 Bituminous
 - 1980 price of \$22.50/ST
 - 15% contingency on annual requirements
 - escalated at 6.6% per year

- Catalyst
 - 47 wt% K₂CO₃ solution
 - 1976 price of \$152/ST
 - 15% contingency on annual requirements
 - escalated at 6.6% per year

Transportation

- Coal
 - spot-shipment by rail from St. Louis to Gulf Coast
 - 1977 cost of \$26.80/ST
 - escalated at 6.6% per year

- Catalyst
 - spot-shipment by rail to Gulf Coast
 - 1976 cost of \$18.50/ST
 - escalated at 6.6% per year

Salaries, Wages, Benefits, and Support Services

- Salaries, Wages, and Benefits
 - staff composed of 29 professionals and 55 technicians/operators during the 2-1/2 year operating period
 - increasing portion of staff deployed onsite during the 2-1/2 year construction period
 - salaries, wages, and benefits based on projected rates through 1982 and escalated at 5% per year through 1985

- Process and Technical Consultation
 - staff composed of 6 professionals during the 2 1/2 year operating period
 - costs based on projected engineering billing rates

- Relocation Costs
 - relocate 13 professionals to pilot plant and return to home office

Administrative

- Taxes
 - tax paid on land and plant value
 - tax rate: 0.65% during construction
1.65% after completion of construction
 - no escalation
- Land Leasing Charges
 - 9% of land market value per year
 - land market value of \$450,000
 - no escalation
- Miscellaneous
 - office furniture leasing
 - office supplies
 - telephone service
 - plant security
 - travel

Technical

- Miscellaneous
 - laboratory equipment
 - laboratory technician salaries
 - supplies and services

Process Operations

- Catalysts and Chemicals
 - current costs obtained from Chemical Marketing Reporter
 - 15% contingency on annual requirements
 - escalation at 6.6% per year
- Utilities
 - electric power purchased at a 1982 unit cost of 3.03 ¢/kWh
 - natural gas purchased from an industrial gas supplier at a 1982 unit cost of 3.51 \$/MBtu
 - potable water purchased at a 1982 unit cost of 0.44 \$/k gal.

- steam
 - industrial water
 - nitrogen
 - 15% contingency on annual requirements
 - escalation at 6.6% per year
- } purchased from Refinery

- Process Services

- char disposal
- fire fighting service

- Miscellaneous

- radio system installation and maintenance
- safety equipment
- tools
- supplies

Mechanical

- Contract Labor and Supervision

- direct labor was based on an average of 150 contract mechanical men during operating period
- one supervisor required for every ten direct labor men
- wage rates based on current data from maintenance contractors in the Gulf Coast
- escalation at 6.6% per year

- Maintenance Material

- based on 150% of direct maintenance labor costs

- Miscellaneous

- equipment rentals
- vehicles
- tools
- supplies

SELECTION OF PREFERRED EXISTING LARGE PILOT PLANT - (Reporting Category 2)

No work scheduled in this category.

MODIFICATION OF THE SYNTHANE PILOT PLANT - (Reporting Category 3)

Cost Estimating

Direct Material, Labor and Subcontract costs for the Synthane Revamp have been determined. Estimation of the indirect costs and the total construction cost is in progress.

SATISFACTION GUARANTEED

NTIS strives to provide quality products, reliable service, and fast delivery. Please contact us for a replacement within 30 days if the item you receive is defective or if we have made an error in filling your order.

▶ **E-mail: info@ntis.gov**

▶ **Phone: 1-888-584-8332 or (703)605-6050**

Reproduced by NTIS

National Technical Information Service
Springfield, VA 22161

This report was printed specifically for your order from nearly 3 million titles available in our collection.

For economy and efficiency, NTIS does not maintain stock of its vast collection of technical reports. Rather, most documents are custom reproduced for each order. Documents that are not in electronic format are reproduced from master archival copies and are the best possible reproductions available.

Occasionally, older master materials may reproduce portions of documents that are not fully legible. If you have questions concerning this document or any order you have placed with NTIS, please call our Customer Service Department at (703) 605-6050.

About NTIS

NTIS collects scientific, technical, engineering, and related business information – then organizes, maintains, and disseminates that information in a variety of formats – including electronic download, online access, CD-ROM, magnetic tape, diskette, multimedia, microfiche and paper.

The NTIS collection of nearly 3 million titles includes reports describing research conducted or sponsored by federal agencies and their contractors; statistical and business information; U.S. military publications; multimedia training products; computer software and electronic databases developed by federal agencies; and technical reports prepared by research organizations worldwide.

For more information about NTIS, visit our Web site at <http://www.ntis.gov>.

NTIS

**Ensuring Permanent, Easy Access to
U.S. Government Information Assets**



U.S. DEPARTMENT OF COMMERCE
Technology Administration
National Technical Information Service
Springfield, VA 22161 (703) 605-6000
