APPENDIX E - TASK 1.5.4 - CONTINUATION APPLICATION
(2 Augsut 1996 Letter)

and

PROJECT EVALUATION REPORT - FOR BUDGET PERIOD NO. 2
(1 August 1996)

W. R Brown

Air Products Liquid Phase Conversion Company, L. P.
7201 Hamilton Boulevard
Allentown, PA 18195-1501
Telephone (610) 481-7584

August 2, 1996

Mr. Robert M. Kornosky
PETC Technical Project Manager
CT-10, Mail Stop 920-L
U.S. Department of Energy/PETC
P. O. Box 10940
Pittsburgh, PA 15236

Subject: DOE Cooperative Agreement No. DE-FC22-92PC90543
Liquid Phase Methanol Demonstration Project
Continuation Application for Final Budget Period

Dear Bob:

As required by Article VIII, paragraph B of the subject agreement, the Participant - Air Products Liquid Phase Conversion Company, L.P. (the Partnership) - requests that the U.S. Department of Energy (DOE) obligate funds and provide approval to proceed to the final Budget Period No. 3.

Justification

The Project Evaluation Report for Budget Period No. 2 provides the justification upon which this Continuation Application request is being made. During Budget Period No. 2, the Partnership subcontractors, Air Products and Chemicals, Inc. (Air Products) and Eastman Chemical Company (Eastman) have essentially completed the Phase 1 Design and Phase 2 Construction activities of the Liquid Phase Methanol (LPMEOH™) Process Demonstration Facility at Eastman's integrated coal gasification facility located in Kingsport, TN. Completion of these Budget Period No. 2 activities meets the Project Evaluation Plan's criteria: to have essentially readied the LPMEOH™ Process Demonstration Facility for commissioning, startup and operation to begin in the final Budget Period No. 3.

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The following exhibits support this request:

*The Project Evaluation Report for Budget Period No. 2.
*The updated Project Management Plan, Cost Plan, and Milestone Schedule.
*The Environmental Monitoring Plan
*The Demonstration Test Plan
*The Statement of Work and the Statement of Joint Objectives (both are unchanged).

The Project Evaluation Report for Budget Period No. 2, the updated Cost Plan, the updated Milestone Schedule, and the Notice of Energy RD & D Project are enclosed. The updated Project Management Plan will be submitted shortly. Additional supporting information, including the update on the technology's commercial potential, is being prepared. The Partnership, Air Products and Eastman appreciate the need to work with you to provide any additional information to satisfy your requirements to approve this Continuation Application for the LPMEOH™ Demonstration Project.

Budget Period No. 3 - Activities, Costs and Schedule

The Statement of Work clearly outlines the tasks and goals for the final Budget Period's Phase 3 - Operation. The primary technical objective of the Project is to demonstrate the commercial scale production of methanol using the LPMEOH™ Process. Throught a four (4)-year operating period, the commercial feasibility of the Process technology for expected commercial use with clean coal technology integrated coal gasification combined cycle (IGCC) electric power plants for both repowering and new applications will be demonstrated. The Demonstration Test Plan and the Environmental Monitoring Plan describe the overall test program goals, the strategies for achieving these goals, and the sequencing of individual tests. These two complementary plans provide for the monitoring and reporting of the engineering, the operational, the environmental and the safety data base necessary for successful commercialization. Air Products, as subcontractor to the Partnership, will supply technical and engineering support to direct the operation testing program. Eastman, as subcontractor to Air Products, will be responsible for operating the LPMEOH™ Process Demonstration Facility and will supply the synthesis gas and necessary services to operate the LPMEOH™ Process Demonstration Facility.

For this Continuation Application, the Participant requests that the DOE obligate the remaining $67,138,458 of the Government cost-share funds. The total estimated project

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cost of $213,700,000, and the Government's total cost share of $92,708,370, are unchanged. The Budget Period No. 3 dates are unchanged; starting October 1, 1996 and ending December 31, 2001. Phase 3 - Operation is projected to start January, 1997.

Project Success - Interim Report Card

Before starting the Design and Construction Phases of the Project, the three participants, (DOE/Air Products/Eastman) prepared a "Success Factors" poster (copy attached), so that all those who would work on the Project could remain focused on the essentials for success. Now that we are at the end of the Design and Construction Phases, and about to embark on the Operations Phase, an interim report card against the "Success Factors" provides these judgments:

- The relationships between the three participants are excellent. There is one team at work on this project, and we are all pitching together to meet the common goals.

- The Demonstration Test Plan and the updated Cost Plan for the Operations Phase give us confidence that we can perform the operating tests needed to successfully demonstrate the technology, in a safe and environmentally sound manner, within the budget and schedule expectations.

- The ultimate Project success will be: obtaining industry acceptance and commercializing the technology. Our economic studies confirm the commercial potential of the LPMEOH™ process technology to enhance IGCC electric power generation with coproduct methanol. The CCT Programs other demonstration projects of IGCC will confirm and enhance the commercial prospects. Air Products is very excited about realizing this potential.

The participants are eager to get on with Phase 3 - Operation, where the Projects true success can be demonstrated. We are anxious to proceed, and determined to make this Project a success. We look forward to continuing our team's work.

Sincerely,

Bill

William R. Brown
DOE/CCT Program Manager
LPMEOH™ Demonstration Project

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cc: D. P. Drown - Air Products
B. J. Halper - Air Products
W. Jones - Air Products
W. C. Jones - Eastman Chemical
W. R. Mundorf - DOE/PETC

DOE/Air Products/Eastman
SUCCESS FACTORS
LPMEOH™ DEMONSTRATION PROJECT

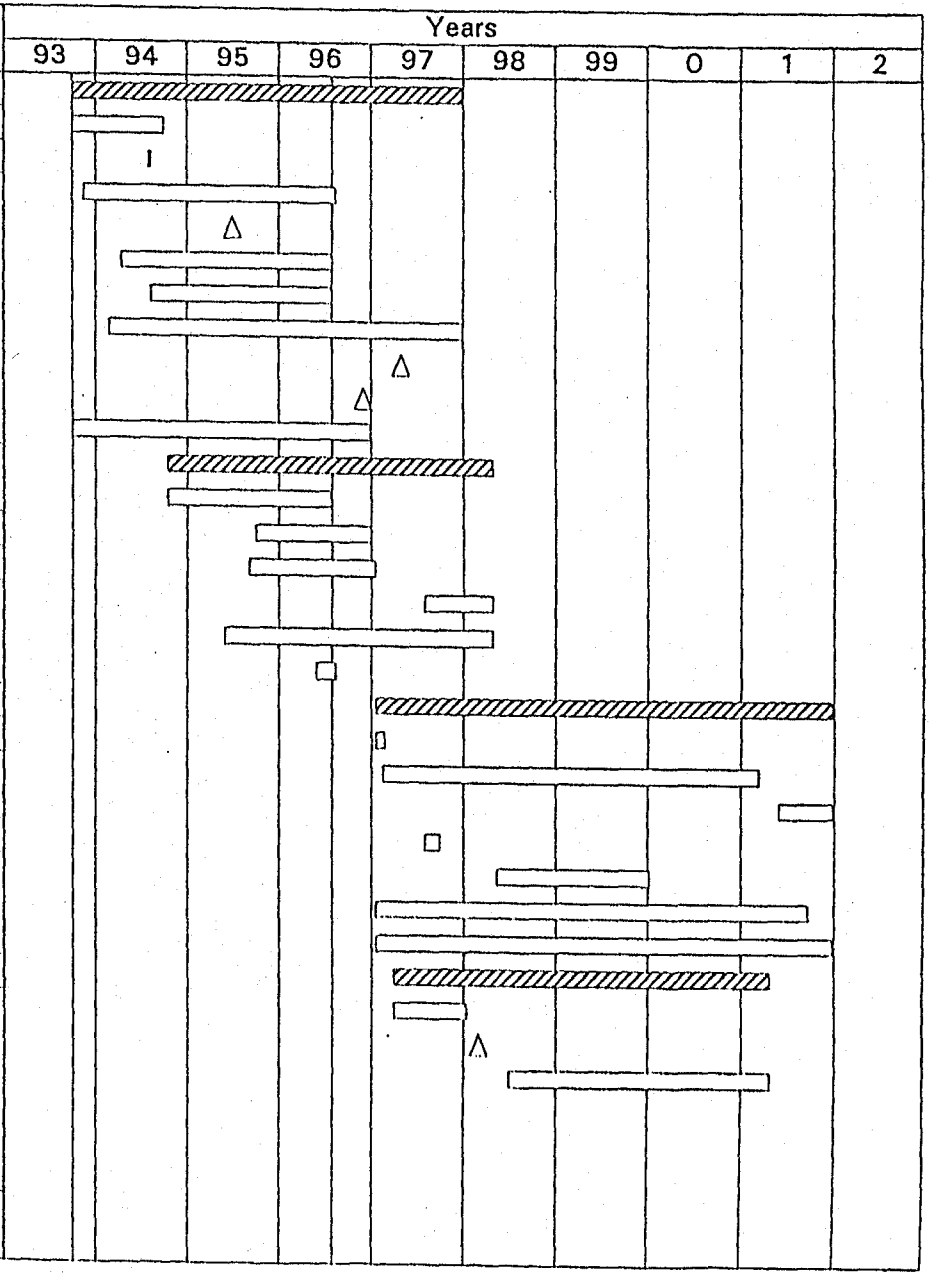
The three participants will judge the project success on the following factors:

- SAFE AND ENVIRONMENTALLY SOUND OPERATION
- DEMONSTRATE THE NEW TECHNOLOGY:
  - RESOLVE ALL TECHNICAL ISSUES
  - ACQUIRE SUFFICIENT ENGINEERING DATA FOR COMMERCIAL DESIGNS
  - OBTAIN INDUSTRY ACCEPTANCE
- FOR EASTMAN OPERATION AT KINGSPORT:
  - NO ADVERSE IMPACT DURING DEMONSTRATION
  - VALUABLE PLANT ASSET AT END
- MEET BUDGET AND SCHEDULE EXPECTATIONS
- POSITIVE WORKING RELATIONSHIPS BETWEEN THE PARTICIPANTS

Bob Karnosky Bill Brown Bill Jones

MILESTONE SCHEDULE STATUS REPORT
LIQUID PHASE METHANOL DEMONSTRATION
DE-FC22-92PC90543

Task Name	Duration	Start	End
PHASE 1: DESIGN	**51.20 m**	**Oct/01/93**	**Dec/30/97**
PROJECT DEFINITION(TASK1)	12.04 m	Oct/01/93	Sep/30/94
CONTINUATION APPLICATION	9.00 d	Aug/02/94	Aug/10/94
PERMITTING(TASK 2)	33.09 m	Nov/17/93	Aug/15/96
NEPA FONSI APPROVAL	0.00 d	Jun/30/95	Jun/30/95
DESIGN ENGINEERING(TASK 3)	27.71 m	Apr/15/94	Aug/01/96
VENDOR ENGINEERING	23.79 m	Aug/10/94	Jul/30/96
OFF-SITE TESTING(TASK 4)	46.35 m	Feb/25/94	Dec/30/97
UPDATED FUEL TEST PLAN APPROVAL	0.00 d	Apr/30/97	Apr/30/97
DECISION TO CONTINUE DME TESTING	0.00 d	Dec/01/96	Dec/01/96
PLANNING, ADMIN & DME DVT(TASK 5)	39.16 m	Oct/01/93	Dec/30/96
PHASE 2: CONSTRUCTION	**42.66 m**	**Oct/17/94**	**May/01/98**
PROCUREMENT(TASK1)	21.54 m	Oct/17/94	Jul/30/96
CONSTRUCTION(TASK2)	15.08 m	Oct/02/95	Dec/31/96
TRAINING & COMMISSIONING(TASK 3)	16.53 m	Sep/05/95	Jan/17/97
OFF-SITE TESTING(TASK 4)	9.01 m	Aug/02/97	May/01/98
PLANNING & ADMINISTRATION(TASK 5)	35.17 m	Jun/01/95	May/01/98
CONTINUATION APPLICATION(B.P. #3)	77.00 d	May/31/96	Aug/15/96
PHASE 3: OPERATION	**59.51 m**	**Jan/20/97**	**Dec/28/01**
START-UP(TASK 1)	1.22 m	Jan/20/97	Feb/25/97
METHANOL OPERATION(TASK 2.1)	49.02 m	Feb/17/97	Mar/13/01
DISMANTLE PLANT(TASK 2.3)	6.96 m	Jun/01/01	Dec/28/01
ON-SITE PRODUCT USE DEMO(TASK 3)	2.08 m	Aug/01/97	Oct/02/97
OFF-SITE PRODUCT USE DEMO(TASK 4)	20.00 m	May/15/98	Jan/11/00
DATA ANALYSIS/REPORTS(TASK 5)	56.35 m	Jan/20/97	Sep/23/01
PLANNING & ADMINISTRATIVE(TASK 6)	59.51 m	Jan/20/97	Dec/28/01
PROVISIONAL DME IMPLEMENTATION	**49.02 m**	**Apr/01/97**	**Apr/25/01**
DME DVT(PDU TESTS)(TASK 3.6)	9.57 m	Apr/01/97	Jan/15/98
DECISION TO IMPLEMENT	0.00 d	Mar/01/98	Mar/01/98
DESIGN, MODIFY & OPERATE(TASK 3.2.2)	33.98 m	Jul/01/98	Apr/25/01



COMMERCIAL SCALE DEMONSTRATION
OF THE
LIQUID PHASE METHANOL (LPMEOH™) PROCESS

COOPERATIVE AGREEMENT
NO. DE-FC22-92PC90543

PROJECT EVALUATION REPORT - FOR BUDGET PERIOD NO. 2
(1 August 1996)

This report will provide a "concise detailed description of the current status of the project." It will detail the extent to which each of the items in the Project Evaluation Plan for Budget Period No. 2 (PEP) have been completed.

The work to be performed during Budget Period No. 2 consists of Phase 1 Design and Phase 2 Construction of the LPMEOH™ Process Demonstration Facility at Eastman Chemical Company's integrated coal gasification facility located in Kingsport, TN. Completion of these Budget Period No. 2 activities will essentially ready the LPMEOH™ Process Demonstration Facility for commissioning, startup, and operation to begin in the final Budget Period No. 3.

The Statement of Work for the Project subdivides these Phase 1 and Phase 2 activities into Tasks. This Project Evaluation Report for Budget Period No. 2 will align the Project Evaluation Plan criteria into: A) those Tasks to essentially ready the LPMEOH™ Process Demonstration Facility for commissioning, startup and operation; and B) Planning and Administration Tasks. (The PEP criteria are shown in italics, and current status report is shown non-italicized):

A. Tasks to Ready the Facility

PEP #1. Phase 1 - Task 2 - Permitting

- *Issue the final Environmental Information Volume to support the U. S. Department of Energy's (DOE's) Environmental Assessment/Finding of No Significant Impact.*

The NEPA review was completed 30 June 1995 with the issuance of a Finding of No Significant Impact (FONSI). The final EIV draft was submitted, comments received and the final EIV to support the FONSI will be issued in August.

- *Obtain permits necessary for construction and operation.*

The construction permits and the operation permits have been obtained.

PEP #2. Phase 1 - Task 3 - Design Engineering

- *Complete the design engineering necessary for construction and commissioning. This includes Piping and Instrumentation Diagrams, Design Hazard Reviews, and conducting design reviews.*

The Piping and Instrumentation Diagrams, Design Hazard Reviews, and the design reviews are completed. Design engineering is 99% complete. The remaining work is to issue the final two construction bid packages: for Painting and for Final Grading & Paving, and complete the pipe loop drawings for checkout and commissioning. This work will be completed by the end of August.

- *Prepare the Environmental Monitoring Plan.*

The Environmental Monitoring Plan (EMP) has been prepared. The initial draft was submitted in October 1995, and subsequent reviews and updates have resulted in an agreed upon final plan. The final EMP will be issued in August for DOE review and approval.

Because of the complementary nature of the EMP and the Demonstration Test Plan, the same simplified consolidated flow sheets showing the sampling locations, are used in both documents. The two complementary plans provide for the monitoring and reporting of the engineering, the operational, the environmental and the safety data base necessary for successful commercialization. The EMP describes the monitoring to obtain the

environmental and health data base and experience necessary to meet the LPMEOH™ Process commercialization objectives. The environmental impacts of operating the LPMEOH™ process demonstration unit, (including the impact of process stream upset conditions), are identified and the analytical methods, and the frequency of measurements are included in the EMP.

PEP #5. Phase 2 - Task 1 - Procurement

- *Complete the bidding and procurement for all equipment and Air Products supplied construction materials.*

The bidding and procurement for all equipment and Air Products-supplied construction materials is complete. All of the equipment (except the C-120 Vent Scrubber) is at the construction site. The construction materials (steel, pre-fabricated large-bore piping) are arriving in a timely manner to meet the final construction schedule.

PEP #6. Phase 2 - Task 2 - Construction

- *Provide construction management for contractor coordination and compliance with design, construction, and quality control standards.*

Air Products' has provided an on-site construction management team; consisting of a construction site manager, a clerk, a secretary, and lead superintendents as necessary to manage compliance and coordinate the contractors work. This team is supported by a home office (Allentown) construction team.

- *Erect the major equipment and structural steel. Install the large bore piping, electrical, and insulation such that instrument checkout and equipment commissioning work can be completed during the 60-day Continuation Application approval period.*

The major piece of equipment, the reactor, was erected on July 2, 1996. The process building steel, in the reactor area, is now being erected. All of the equipment has been installed, with the exception of items to be located on the elevated floors of the process building. The piperack steel is complete. Completion of the final instrumentation and electrical work is forecast for December. Commissioning work (Physical checkout of the plant, instrument loop checks) is expected to start in October; will progress by areas, and be completed in January. Functional turnover of the Facility to operations is anticipated for early January.

- *Complete mechanical construction so that checkout and commissioning can be started in Budget Period No. 3.*

The forecast for the mechanical completion is mid-December, when the instrumentation and electrical work is completed. Checkout and commissioning will start in October and be completed in January; allowing for Phase 3, Task 1 startup in January, 1997.

PEP #7. Phase 2 - Task 3 - Training and Commissioning

- *Prepare a four (4)-year test plan for Phase 3, Task 2-Operation.*

The final draft test plan (Demonstration Test Plan) was submitted July 8, 1996, for review and approval.

The goals of the Test Plan are structured to meet the commercialization objectives for the LPMEOH™ Process. The Test Plan describes the overall test program goals, the strategies for achieving these goals, and the sequencing of individual tests. The plan provides a detail discussion of test matrices, procedures for sampling and analysis, and data manipulation methods. The demonstration tests will provide the data base and experience necessary for the detailed design, operation, control and maintenance of large-scale commercial plants for coproduction at Integrated Gasification Combined cycle power plant complexes. The Test Plan is consistent with the Statement of Work and with the technical objectives of the Project.

- *Prepare the operating manual and initiate the operator training program.*

The operator training program is being prepared, and operator training classes will start in late October. The Standard Operating Procedure (manual) is being prepared and should be finished by late August.

Completion of the above work activities will essentially ready the LPMEOH™ Process Demonstration Facility for commissioning, startup, and operation to begin in the final Budget Period No. 3.

B. Planning and Administration Tasks

PEP #3. Phase 1 - Task 4 - Off-site Testing (Definition and Design)

- *Prepare the fuel-use demonstration plan for Phase III, Task 4 Off-site Product Use Demonstration. This off-site test plan will be incorporated into the overall product-use test plan (in Phase 1, Task 5).*

The methanol Fuel-use and Product-use testing document has been prepared. Completion of the Demonstration Test Plan (PEP #7 - Phase 2, Task 3) shows that typical as produced methanol for testing will not be available until May 1998. The testing document identifies two premium methanol fuel applications which will be targeted for fuel-use testing: a) as a hydrogen source for fuel cells, for both transportation and stationary power; and b) for dispersed electric power applications.

Discussions are underway (for example - with the DOE's Energy Efficiency programs in Fuel Cells and Alternative Fuels) and specific test plans will be developed with appropriate milestones for testing in 1998 to 2000.

PEP #8. Phase 2 - Task 4 - Off-site Testing (Procurement and Construction)

- *Prepare the final off-site product-use test plan.*

The final (detailed) off-site product use test plan to meet testing from May 1998 through 2000, will not be required until late in 1997. The final detailed test plan will be submitted for approval prior to that time.

PEP #4. Phase 1 - Task 5 - Planning, Administration and DME Verification Testing; and PEP #9 Phase 2 - Task 5 - Planning and Administration

- *Prepare annually an updated plan for the remaining activities. The first annual plan will update the remaining Phase I and Phase II tasks. The second annual plan will include an updated Phase III Operating Plan, identifying specific goals and milestones for the first twelve months of operation, and a general plan for the remaining years to achieve the Project's market penetration objectives.*

The first update of the Partnership Annual Operating Plan was prepared and submitted in September 1995. The second annual plan update is being developed, and will be submitted on schedule in September 1996. The second annual update will be based on the January 1997 startup and the Demonstration Test Plan schedule, and will be consistent with the cost plan and milestone schedule submitted with the Continuation Application

- *Update the (fuel and chemical) product-use test plan, that will better meet the technical objectives of the Project and serve the needs of commercial markets.*

Eastman will perform fitness-for-use tests on the methanol product for use as a chemical feedstock and provide a summary of the results. The on-site product use test schedule establishes completion of these tests prior to October 1997. (The off-site product-use test plans are discussed in PEP #3 and #8, above).

- *Complete economic studies of the important commercial aspects of the LPMEOH™ Process to enhance Integrated Gasification Combined Cycle (IGCC) electric power generation. These studies will be performed by Air Products and Chemicals, Inc., and the Electric Power Research Institute, and used to provide input to the LPMEOH™ Process Demonstration Facility operating test plan (Phase 2, Task 5).*

Part One - "Coproduction" of the Process Economics Study has been outlined and a draft is being reviewed. The economic studies include commercialization issues, which are to be addressed in the final Project report; such as the technical objective for comparison with conventional Gas Phase Methanol technology. A final draft of Part One will be issued in August. Input was provided, and used in preparing the final operating test plan. This study will be used to prepare an update on the commercial potential of the LPMEOH™ process technology.

- *Perform initial Design Verification Testing for the production of dimethyl ether (DME) as a mixed coproduct with methanol. This activity includes laboratory R&D and market economic studies.*

The initial Design Verification Testing for the production of dimethyl ether (DME) as a mixed coproduct with methanol is being performed. Laboratory testing of the dual catalyst system containing a new aluminum based (AB) dehydration catalyst is promising. The LPDME run using AB series 05 was stopped after 934 hours on stream. Catalyst activity remained much higher thant the standard system. However, the

methanol catalyst showed increased deactivation in the latter part of the run. Efforts are being made to understand a) if this is an experiment artifact, b) if not, what the real cause is, and c) dehydration catalysts. The performance of the AB dehydration catalysts shows a strong dependence on preparation parameters. A systematic study of the catalyst preparation variables is underway.

The project milestone schedule continues to show the first decision point, on whether to continue with DME DVT, is targeted for December 1996.

- *Submit all Project status, milestone schedule, and cost management reports as required by the Cooperative Agreement.*

The monthly (the Milestone Schedule Status Report, the Project Summary Report, the Cost Management Report) reports have been issued and are up to date.

The quarterly Technical Progress Report status is:

- #3 and #4 are done final.
- #5, 6, and 7 - have been submitted for review.
- #8 is due 15 August, #9 is due 15 November
- #1 and #2 - are being revised final.

Topical Report No. 1 (Peroxide Formation) is being revised for final issue.

The Project Management Plan is being updated, and will be submitted by mid-August.

The final Technical Report - Outline is due 30 September.

APPENDIX F - TASK 1.5.4 - PROJECT REVIEW MEETING (4 & 5 September 1996)

NOTES FROM MEETING

AIR PRODUCTS

DISTRIBUTION (NAME/ORGANIZATION) *Unable to attend. **Chairman		COPIED FOR INFORMATION ONLY
Bill Brown* - APCI	Barry Street - EMN	Frank Frenduto - APCI
Bob Kornosky* - DOE	Dave Drown* - APCI	Dan Canning - APCI
Bill O'Dowd - DOE	Laurie Paulonis* - EMN	Barry Halper - APCI (FYI)
Ed Heydorn - APCI	Doug Archer - DOE	Sue Kasinecz - APCI
Van Eric Stein - APCI	Bob Moore - APCI	Bernie Toseland - APCI
		William C. Jones - EMN
* with attachments		

FROM	ORGANIZATION	EXTENSION	TODAY'S DATE
William R. Brown	APCI - Program Manager	X7584	12 September, 1996

DATE OF MEETING	WEEKDAY	TIME		LOCATION
		STARTED	ENDED	
Sept. 4 & 5, 1996	Wednesday Thursday	12:15 PM	11:30 AM	Eastman (EMN), Kingsport

SUBJECT AND/OR PURPOSE

Project Review Meeting with DOE, Eastman, and Air Products

ITEM NO.	RESPONSIBLE PERSON (INITIALS)	TARGET DATE	DISCUSSION
1			<u>Design Procurement and Construction - Status</u> The Project Status, for design procurement and construction was reviewed, per Attachments: 1 (seven pages) and 2 (two pages). The transition date for turnover of the facility from Construction to Operations, is Dec 20. <u>Action</u>:
	DPD	9/30/96	Provide a write-up on the Phase 1 and 2 cost changes, by Task, from the original plan.
2			<u>Commissioning Training & Start-up Schedule and Plans</u> These were reviewed per Attachment 3 (three pages). The main commissioning effort, on instrument loop checking and commissioning of equipment by area, will begin in mid-October. Operator training will be held in four by one-week sessions, from October 28th through November 22nd. The transition date for turnover of the facility, from Construction to Operations, is Dec 20, 1996. The final prestart-up safety review is scheduled for Jan. 7th and 8th, and Phase 3, Task 1 start-up for Jan. 13th with Carbonyl Burnout, the plant operational, Test 1 "Shakedown", is scheduled for six weeks starting on Feb 07, 1997.

ITEM NO.	RESPONSIBLE PERSON (INITIALS)	TARGET DATE	DISCUSSION
	DPD		Action: For the next issue of the Commissioning and Start-up Schedule, include the Demonstration Test Plan's Test 1 - "Shakedown" (six weeks, commencing Feb 07), as the first line item under Task 2.1 Operation.
3			Phase 3, Task 2 - Operation - Plans The plans and goals for the first year were reviewed. The first 16 months of Operation provides for Task 2.1.1 Plant Shakedown, and Catalyst Addition and Aging. Specific tests with fresh catalyst, and while catalyst is aging, will also be performed. These include determining the maximum slurry level, high space velocity and high inlet velocity tests, achieving free draining slurry return, and determining maximum catalyst loading.
	ECH	9/30/96	Action: Set up a milestone schedule plan, for use in monthly reports during the first 12 months of operation.
4			DOE Reporting Requirements The B.P. No. 2 reporting log (Attachment 4 - seven pages) was reviewed. Action:
	WRB	9/30	• The final Quarterly Technical Progress Reports will be completed by 9/30/96.
	DPD	12/96	• A fifth "Topical Report" on recommendations for future Reactor Design and Fabrication, will be prepared as an unpublished document.
	ECH/FSF	9/30/96	• The final DTP, EIV and EMP are to be distributed.
	WRB	10/15	• The Final Technical Report Outline is to be prepared.
	WRB	10/15	• The AIChE conference (Mar 97) paper should be added to the reporting log.
	WRB	9/30/96	• The updated PMP is to be issued.

ITEM NO.	RESPONSIBLE PERSON (INITIALS)	TARGET DATE	DISCUSSION
	RBM	9/30/96	• First draft of Part One of the Process Economics Study (the overall Outline is in Attachment 5), to be issued.
	BAT	11/15/96	• Draft Topical Report on Syngas Testing is to be issued; including an appendix with the Process Engineering report on the earlier tests.
5			Other Phase 1, Task 5 Subtasks a) Fuel Use Demo Plan • The updated plan is now targeted for April of 1997. The actual fuel-use testing will be conducted from May of 1998 through January of 2000. • The fuel-use test plan will be developed to meet the initial LPMEOH™ process commercialization needs. The initial needs are for central clean coal technology processing plants, making coproducts of electricity and methanol, to meet the needs of local community. One of the advantages of the LPMEOH™ process is that the as-produced, stabilized (degassed) methanol product may be suitable for many applications. Production cost savings of several (4 to 6) cents per gallon can be achieved, if the suitability of the stabilized methanol product can be demonstrated. One application, as a feedstock for MTBE production, can be confirmed by laboratory tests. Other premium methanol fuel applications; as a hydrogen source for fuel cells and for dispersed power, will require testing of the product to confirm its suitability. Attachment 5 (page 4 of the Process Economics Study-Outline) summarizes these premium fuel applications. The updated plan will utilize DOE's Office of Energy Efficiency and Renewable Energy program in these areas. • Many methanol applications require Chemical Grade product (Formaldehyde for glue for plywood; and Acetyls are the largest) off-site product testing will not be required. The Eastman application for Acetyls at Kingsport will confirm that the distillation of LPMEOH™ product is adequate. b) DME Demo Plan

ITEM NO.	RESPONSIBLE PERSON (INITIALS)	TARGET DATE	DISCUSSION
			• The first Design Verification Testing decision milestone to proceed with testing of the LaPorte AFDU is December, 1996.
	BAT, et al	11/11/96	Action: The draft Topical Report on DME (Lab and Market) is to be issued.
	WRB	11/11/96	A recommendation (probable) to proceed with testing in late FY-97 at the LaPorte AFDU will be issued. The testing at LaPorte would be in conjunction with the DOE's Alt. Fuels program.
	ALL	12/4/96	A decision on the recommendation will be made, by the participants, at the next Project Review meeting.
			• The laboratory R & D results are confirming the new LPDME catalyst system. The market application of DME for diesel engine transportation fuels is promising, either directly as DME, or indirectly by conversion to liquid additives to the diesel fuel pool.
6			The recommendation for approval of the Continuation Application is being reviewed at PETC. A draft of the recommendation ~~is to be~~ was submitted to HQ on August 30, 1996; PETC expects to formally submit the recommendation for approval to HQ by September 9, 1996. HQ approval (through 4 levels) by the ASFE is required.
7			The next meeting will be held Tues & Weds, Dec 3rd & 4th at the LPMEOH™ facility in Kingsport. The agenda will include the normal review of status and plans for the various Tasks; and will, also, inlcude the DME - DVT milestone decision.

MRB's

KINGSPORT LPMEOH DEMONSTRATION PROJECT
SEPTEMBER 4, 1996 STATUS OVERVIEW

for DOE ✓

9/4/96 DPO's sent received

DESIGN

DETAIL DESIGN ESSENTIALLY COMPLETE
PAINTING CONSTRUCTION PACKAGE TO ISSUE IN SEPTEMBER

PROCUREMENT

C-120 VENT STACK PIECES ON SITE
99% OF PREFAB PIPE ON SITE
LAST OF PROCESS BUILDING STRUCTURAL STEEL ON SITE BY 9/06/96

CONSTRUCTION

61% COMPLETE OVERALL ON CONSTRUCTION
CATALYST BUILDING STRUCTURAL STEEL BEING COMPLETED
PIPING & ELECTRICAL WORK STARTED IN REACTOR STRUCTURE

COST FORECAST

$39.3MM INCLUDING EMN & G&A FOR PHASE 1 & 2 (POST MOD 3)

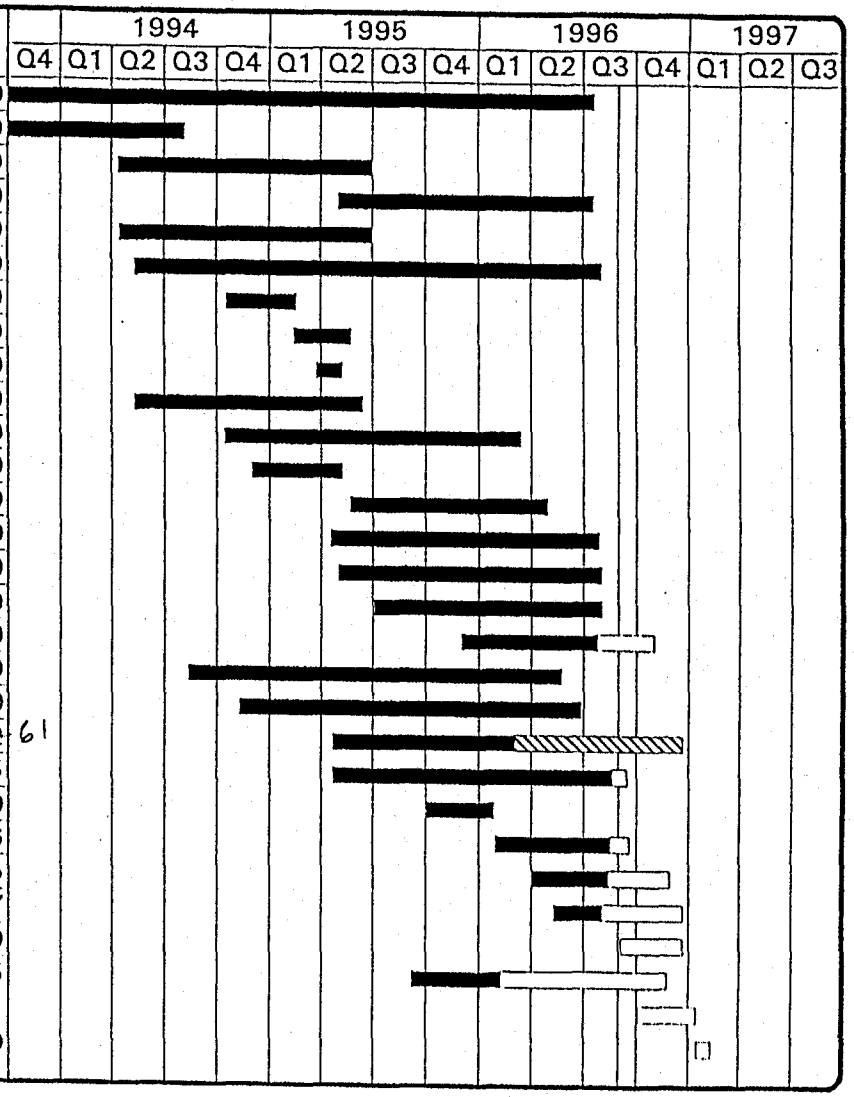
SCHEDULE

PLANT MECHANICALLY COMPLETE IN LATE DECEMBER
BEGIN CARBONYL BURNOUT MID-JANUARY

kldpo - dpd
8/30/96

LPMEOH DEMONSTRATION PROJECT
PHASE 1-2 SUMMARY SCHEDULE

Task Name	Start	End	Perce Com
PROCESS DESIGN	Oct/01/93	Jul/17/96	100
PFD/HEAT & MAT'L BALANCE	Oct/01/93	Aug/05/94	100
PROCESS EQUIPMENT SPECS	Apr/13/94	Jun/30/95	100
REVIEW DETAIL DESIGN	May/01/95	Jul/17/96	100
NEPA FONSI REVIEW	Apr/15/94	Jun/30/95	100
DETAILED DESIGN	May/11/94	Jul/31/96	100
P&ID'S, REV. PC	Oct/17/94	Feb/17/95	100
OPERABILITY/HAZARDS REVIEWS	Feb/13/95	May/24/95	100
P&ID'S, REV. P1	Mar/23/95	May/08/95	100
PROCESS EQUIP. MECH. SPECS	May/11/94	Jun/13/95	100
EQUIPMENT VENDOR PRINTS	Oct/14/94	Mar/12/96	100
EQUIPMENT ARRANGEMENTS	Dec/01/94	May/08/95	100
INSTRUMENT SPECS	May/22/95	Apr/29/96	100
CIVIL/STRUCTURAL DESIGN	Apr/17/95	Jul/26/96	100
PIPING DESIGN	May/01/95	Jul/31/96	100
INSTRUMENT/ELECTRICAL DESIGN	Jul/03/95	Jul/31/96	100
DCS PROGRAMMING	Dec/01/95	Oct/31/96	70
EQUIPMENT PROCUREMENT	Aug/12/94	May/23/96	100
REACTOR DELIVERY	Nov/08/94	Jun/24/96	100
CONSTUCTION	Apr/21/95	Dec/20/96	~~52~~ 61
EASTMAN OSBL WORK	Apr/21/95	Sep/13/96	95
CIVIL/UNDERGROUND	Oct/02/95	Jan/26/96	100
STEEL & EQUIPMENT ERECTION	Jan/29/96	Sep/17/96	86
MECHANICAL 656 LB Spools, 556 m	Apr/01/96	Nov/27/96	55
INSTRUMENT/ELECTRICAL	**May/09/96**	**Dec/20/96**	**37**
INSULATION & FIRE PROOFING	Sep/03/96	Dec/20/96	0
PROCEDURES/TRAINING	Sep/05/95	Nov/22/96	35
CHECK-OUT/COMMISSIONING	Oct/01/96	Jan/13/97	1
START-UP - Chemical introduction -	Jan/13/97	Feb/07/97	0

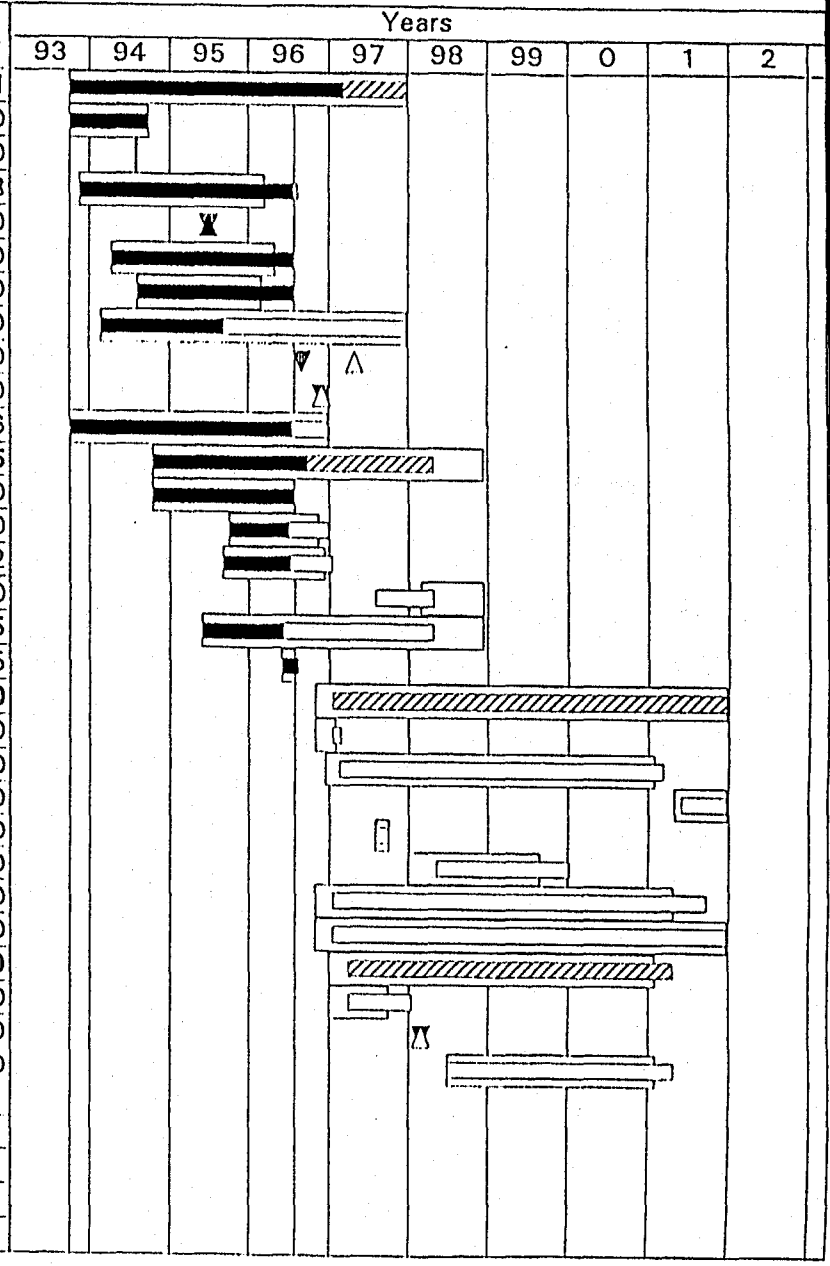


Printed: Aug/29/96
Page 1

Milestone △ Summary
Fixed Delay ----

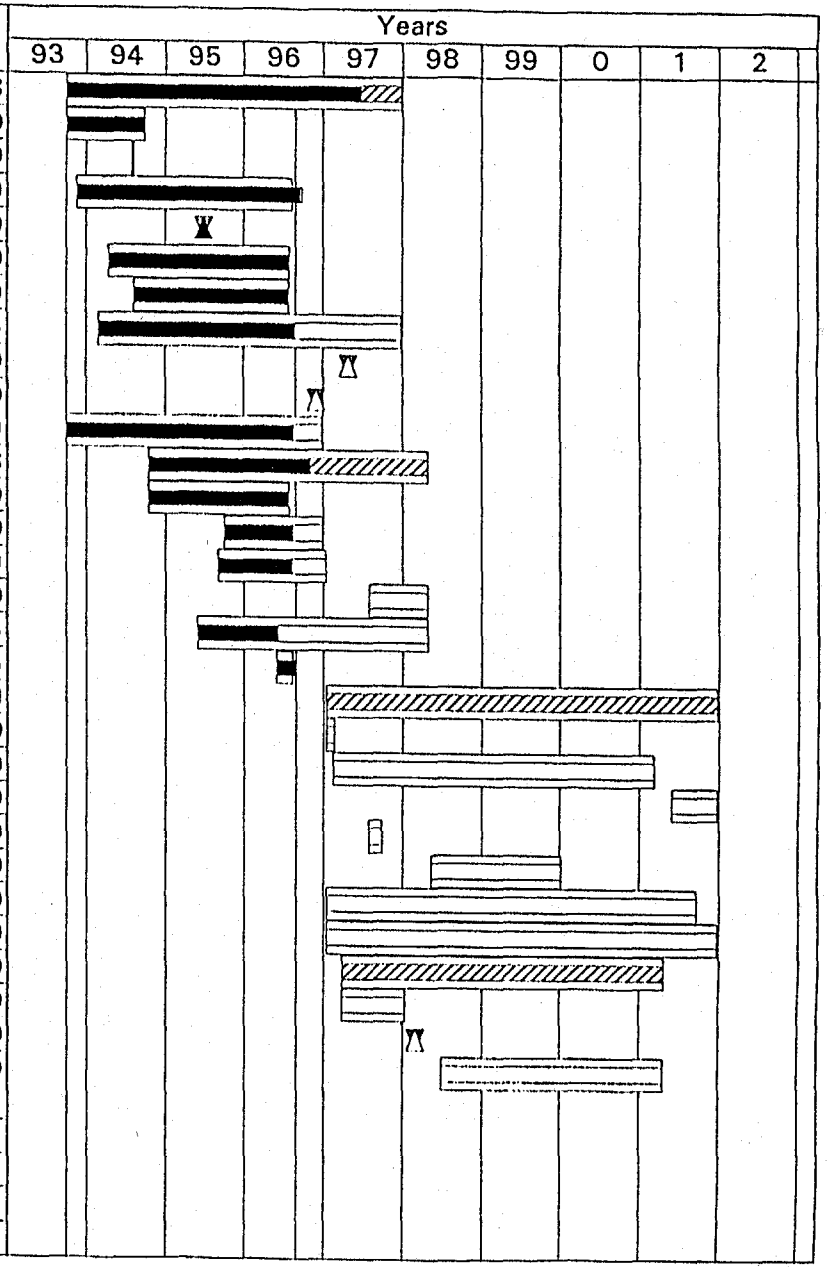
MILESTONE SCHEDULE STATUS REPORT
LIQUID PHASE METHANOL DEMONSTRATION
DE-FC22-92PC90543

Task Name	Duration	Start	End	% Comp	% Sched
PHASE 1: DESIGN	**51.20 m**	**Oct/01/93**	**Dec/30/97**	**97**	**81**
PROJECT DEFINITION(TASK1)	12.04 m	Oct/01/93	Sep/30/94	100	100
CONTINUATION APPLICATION(B.P.#2)	9.00 d	Aug/02/94	Aug/10/94	100	100
PERMITTING(TASK 2)	33.09 m	Nov/17/93	Aug/15/96	98	98
NEPA FONSI APPROVAL	0.00 d	Jun/30/95	Jun/30/95	100	100
DESIGN ENGINEERING(TASK 3)	27.71 m	Apr/15/94	Aug/01/96	99	100
VENDOR ENGINEERING	23.79 m	Aug/10/94	Jul/30/96	100	100
OFF-SITE TESTING(TASK 4)	46.35 m	Feb/25/94	Dec/30/97	10	40
UPDATED FUEL TEST PLAN APPROVAL	0.00 d	Apr/30/97	Apr/30/97	0	0
DECISION TO CONTINUE DME TESTING	0.00 d	Dec/01/96	Dec/01/96	0	0
PLANNING, ADMIN & DME DVT(TASK 5)	39.16 m	Oct/01/93	Dec/30/96	95	86
PHASE 2: CONSTRUCTION	**42.66 m**	**Oct/17/94**	**May/01/98**	**60**	**55**
PROCUREMENT(TASK1)	21.54 m	Oct/17/94	Jul/30/96	100	100
CONSTRUCTION(TASK 2)	15.08 m	Oct/02/95	Dec/31/96	51	60
TRAINING & COMMISSIONING(TASK 3)	16.53 m	Sep/05/95	Jan/17/97	28	62
OFF-SITE TESTING(TASK 4)	9.00 m	Aug/02/97	May/01/98	0	0
PLANNING & ADMINISTRATION(TASK 5)	35.17 m	Jun/01/95	May/01/98	40	35
CONTINUATION APPLICATION(B.P.#3)	2.54 m	May/31/96	Aug/15/96	95	95
PHASE 3: OPERATION	**59.51 m**	**Jan/20/97**	**Dec/28/01**	**0**	**0**
START-UP(TASK 1)	1.22 m	Jan/20/97	Feb/25/97	0	0
METHANOL OPERATION(TASK 2.1)	49.00 m	Feb/17/97	Mar/13/01	0	0
DISMANTLE PLANT(TASK 2.3)	6.96 m	Jun/01/01	Dec/28/01	0	0
ON-SITE PRODUCT USE DEMO(TASK 3)	2.08 m	Aug/01/97	Oct/02/97	0	0
OFF-SITE PRODUCT USE DEMO(TASK 4)	20.00 m	May/15/98	Jan/11/00	0	0
DATA ANALYSIS/REPORTS(TASK 5)	56.35 m	Jan/20/97	Sep/23/01	0	0
PLANNING & ADMINISTRATIVE(TASK 6)	59.51 m	Jan/20/97	Dec/28/01	0	0
PROVISIONAL DME IMPLEMENTATION	**49.02 m**	**Apr/01/97**	**Apr/25/01**	**0**	**0**
DME DVT(PDU TESTS)(TASK 3.6)	9.57 m	Apr/01/97	Jan/15/98	0	0
DECISION TO IMPLEMENT	0.00 d	Mar/01/98	Mar/01/98	0	0
DESIGN, MODIFY & OPERATE(TASK 3.2.2)	33.98 m	Jul/01/98	Apr/25/01	0	0



MILESTONE SCHEDULE STATUS REPORT
LIQUID PHASE METHANOL DEMONSTRATION
DE-FC22-92PC90543

Task Name	Duration	Start	End	% Comp	% Sched
PHASE 1: DESIGN	**51.20 m**	**Oct/01/93**	**Dec/30/97**	**97**	**88**
PROJECT DEFINITION(TASK1)	12.04 m	Oct/01/93	Sep/30/94	100	100
CONTINUATION APPLICATION(B.P.#2)	9.00 d	Aug/02/94	Aug/10/94	100	100
PERMITTING(TASK 2)	34.61 m	Nov/17/93	Sep/30/96	99	99
NEPA FONSI APPROVAL	0.00 d	Jun/30/95	Jun/30/95	100	100
DESIGN ENGINEERING(TASK 3)	27.71 m	Apr/15/94	Aug/01/96	99	100
VENDOR ENGINEERING	23.79 m	Aug/10/94	Jul/30/96	100	100
OFF-SITE TESTING(TASK 4)	46.35 m	Feb/25/94	Dec/30/97	10	65
UPDATED FUEL TEST PLAN APPROVAL	0.00 d	Apr/30/97	Apr/30/97	0	0
DECISION TO CONTINUE DME TESTING	0.00 d	Dec/01/96	Dec/01/96	0	0
PLANNING, ADMIN & DME DVT(TASK 5)	39.16 m	Oct/01/93	Dec/30/96	96	89
PHASE 2: CONSTRUCTION	**42.66 m**	**Oct/17/94**	**May/01/98**	**60**	**58**
PROCUREMENT(TASK1)	21.54 m	Oct/17/94	Jul/30/96	100	100
CONSTRUCTION(TASK 2)	15.08 m	Oct/02/95	Dec/31/96	61	70
TRAINING & COMMISSIONING(TASK 3)	16.53 m	Sep/05/95	Jan/17/97	35	69
OFF-SITE TESTING(TASK 4)	9.00 m	Aug/02/97	May/01/98	0	0
PLANNING & ADMINISTRATION(TASK 5)	35.17 m	Jun/01/95	May/01/98	40	35
CONTINUATION APPLICATION(B.P.#3)	3.20 m	May/31/96	Sep/04/96	95	95
PHASE 3: OPERATION	**59.51 m**	**Jan/20/97**	**Dec/28/01**	**0**	**0**
START-UP(TASK 1)	1.22 m	Jan/20/97	Feb/25/97	0	0
METHANOL OPERATION(TASK 2.1)	49.00 m	Feb/17/97	Mar/13/01	0	0
DISMANTLE PLANT(TASK 2.3)	6.96 m	Jun/01/01	Dec/28/01	0	0
ON-SITE PRODUCT USE DEMO(TASK 3)	2.08 m	Aug/01/97	Oct/02/97	0	0
OFF-SITE PRODUCT USE DEMO(TASK 4)	20.00 m	May/15/98	Jan/11/00	0	0
DATA ANALYSIS/REPORTS(TASK 5)	56.35 m	Jan/20/97	Sep/23/01	0	0
PLANNING & ADMINISTRATIVE(TASK 6)	59.51 m	Jan/20/97	Dec/28/01	0	0
PROVISIONAL DME IMPLEMENTATION	**49.02 m**	**Apr/01/97**	**Apr/25/01**	**0**	**0**
DME DVT(PDU TESTS)(TASK 3.6)	9.57 m	Apr/01/97	Jan/15/98	0	0
DECISION TO IMPLEMENT	0.00 d	Mar/01/98	Mar/01/98	0	0
DESIGN, MODIFY & OPERATE(TASK 3.2.2)	33.98 m	Jul/01/98	Apr/25/01	0	0



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LPMEOH DEMONSTRATION PROJECT

PHASE 1&2 CURRENT SPENDING THRU 7/30/96
POST MOD 003

Phase 1		Contract Value, $M*	Current Forecast	Spent to Date, $M**	% Spent
1.1.1	Project Definition	1021	1044	1044	100
1.1.2	Permitting	246	298	237	80
1.1.3	Design Engineering	9960	10,593	9509	90
1.1.4	Off-site Testing	320	267	12	4
1.1.5	Planning, Admin., & DME DVT	1892	2738	2486	91
	Subtotal:	13,439	14,942	13,288	89
Phase 2					
1.2.1	Procurement	9783	9,446	8,461	90
1.2.2	Construction	11,200	12,467	4,314	35
1.2.3	Training and Commissioning	1197	1110	1	0
1.2.4	Off-site Testing	261	256	0	0
1.2.5	Planning and Admin.	681	1,113	349	31
	Subtotal:	23,122	24,390	13,125	54
	Total:	36,561	39,332	26,413	67

*From 10/01/95 Cost Plan
**Actual spending and not committed.
** Thru July 31st

S076 - dpd
5/31/96

KINGSPORT LPMEOH PROJECT

REACTOR INFORMATION

TIME AND MONEY

Phase	Time, Weeks	Cost, $M
Rev. P. PFD → Process Spec	15	?
Mechanical Spec	11	75
Bid → Award	10	
Design → Fabricate → Test	84	855
Inspect & Expedite	50	50
Shipping	4	85
Erect	< 1	150
Passivate	≤ 1	40
Totals	130	1255

SIZE	Shell	Internal Heat Exchanger
Dimensions	7-1/2' i.d. x 74'	78- 1-1/2" dia. pipe 2212 sq. ft.
Materials	ss clad over c.s.	duplex 2205
Design Conditions	1000 psig 600° F	640 psig 600° F

WEIGHT 275M lbs

FABRICATOR

Detail design & fabrication by Joseph Oat Corporation of Camden, NJ

KINGSPORT LPMEOH PROJECT

PLANT SIZE

	LPMEOH
Production, TPD	260
No. Equip. Items (Includ installed spare pumps)	98
Cu. Yds. Concrete	1400
Tons of Structural Steel	315
No. L.B. Pipe Lines ≥ 2½	229
No. S. B. Pipe Lines ≤ 2"	435
No. Manual Valves	1504
No. Instruments	978
No. PSV's	59
No. P&ID Sheets	67

UPB
9/4/96
LP's handout

LPMEOH DEMONSTRATION PROJECT
Eastman Process and Services Tie-In Status

- Engineering 100% Complete
- Construction 95% Complete
- Overall 98% Complete
- Distributed Control System
  - Database 100 % Complete
  - Logic 50% Complete
  - Graphics 40% Complete
  - Data Acquisition System on Order
  - Data Highway Installed and DCS Cabinets Relocated

Mid October Power on, for loop checks

LPMEOH DEMONSTRATION PROJECT
Eastman Process and Services Tie-in
Remaining Work

- Installation and Field welding of 29C-120
- Order 2 Personnel Computers
- Install Fire Alarm Panel
- Final Tie-in of 4160v Service

MEETING NOTICE

AIR PRODUCTS

PLEASE NOTE: Security badges required for visitors in all buildings and employees in R&D buildings.

DISTRIBUTION (NAME/ORGANIZATION) *(If unable to attend, contact originator)*		COPIED FOR INFORMATION ONLY
William C. Jones - EMN	Barry Street - EMN ✓	Frank Frenduto - APCI
Bill Brown - APCI ✓	Dave Drown - APCI ✓	Dan Canning - APCI
Bob Kornosky - DOE ✓	Laurie Paulonis - EMN ✓	
Bill O'Dowd - DOE ✓	Doug Archer - DOE ✓	*Barry Halper - APCI - (FYI)*
Ed Heydorn - APCI ✓	Bob Moore - APCI ✓	
Van Eric Stein - APCI ✓	Sue Kasinecz - APCI	

FROM	ORGANIZATION	EXTENSION	TODAY'S DATE
William R. Brown WRB 8/22	APCI - Program Manager	17584	22 August 1996

DATE OF MEETING	WEEKDAY	TIME FROM	TIME TO	LOCATION
Sept. 4 & 5, 1996	Weds. & Thurs.	12:15 PM	11:30 AM	Eastman (EMN), Kingsport

SUBJECT AND/OR PURPOSE

- **Project Review Meeting with DOE, Eastman, and Air Products**

DESIRED RESULTS/OUTCOMES

Review Project status; prepare for Commissioning, Startup and Operation.

REFERENCE MATERIAL/OTHER

AGENDA

LPMEOH™ Project Review Meeting Agenda - (Draft 8/18/96)

A. Meet and Lunch. Wednesday - Sept. 4th - About 12:15 PM

(DOE flight arrives at 11:33 AM., they should arrive about 12:15 PM.)

B. Status Updates: 1:30 PM

1. Design, Procurement, Construction (Schedule/Cost F/C) — DPD/LBP

C. Visit Construction Site: 2:30 PM+. — All

D. End of (work) Day 5:30 PM.

Dinner and early to bed (?)

E. Status Updates (Cont'd.) 8:30 AM. Thursday - Sept. 5th .

2. Training, Commissioning & Startup — ECH/BTS/VES/DPD
   Plan/Schedule(see Milestone Schedule, attached)/Staffing
3. Phase 3, Task 2 - Operations 12-15 Months: Shakedown + Aging
   a. First year plans/goals (DTP), - Engineering Support needs — ECH/BTS
   Slurry Level, High Space Velocity, High inlet, Fix Drainage (No Pumps), Then Cat Loading
4. DOE Reporting Requirements -
   a. Due in B.P. No. 2: (EMP, DTP, Quarterlies #5, 6, 7, 8; Topicals) — WRB/ -
   b. Phase 3 Reports/Reporting Plan (EMP/DTP basis) — ECH/VES
6 5. Other Phase I, Task 5 Tasks - Status
   a. Fuel-use demo plan Schedule/Budget for Ph. 3 — WRB
   b. DME demo plan Schedule/Budget for Ph. 3 — ECH/WRB
5 6. Continuation Application for Budget Period No. 3
   a. Status, support needs, timing. — RMK/ -
7. Make Plans for: a). Next Project meeting — Dec 3-4th T+W 11:45 — DME too. 12:45 — All
   b). Other

F. Depart 12:30 PM. Thursday - Sept. 5th

Many of the DOE and Air Products participants have return flights departing at 2:03 PM..

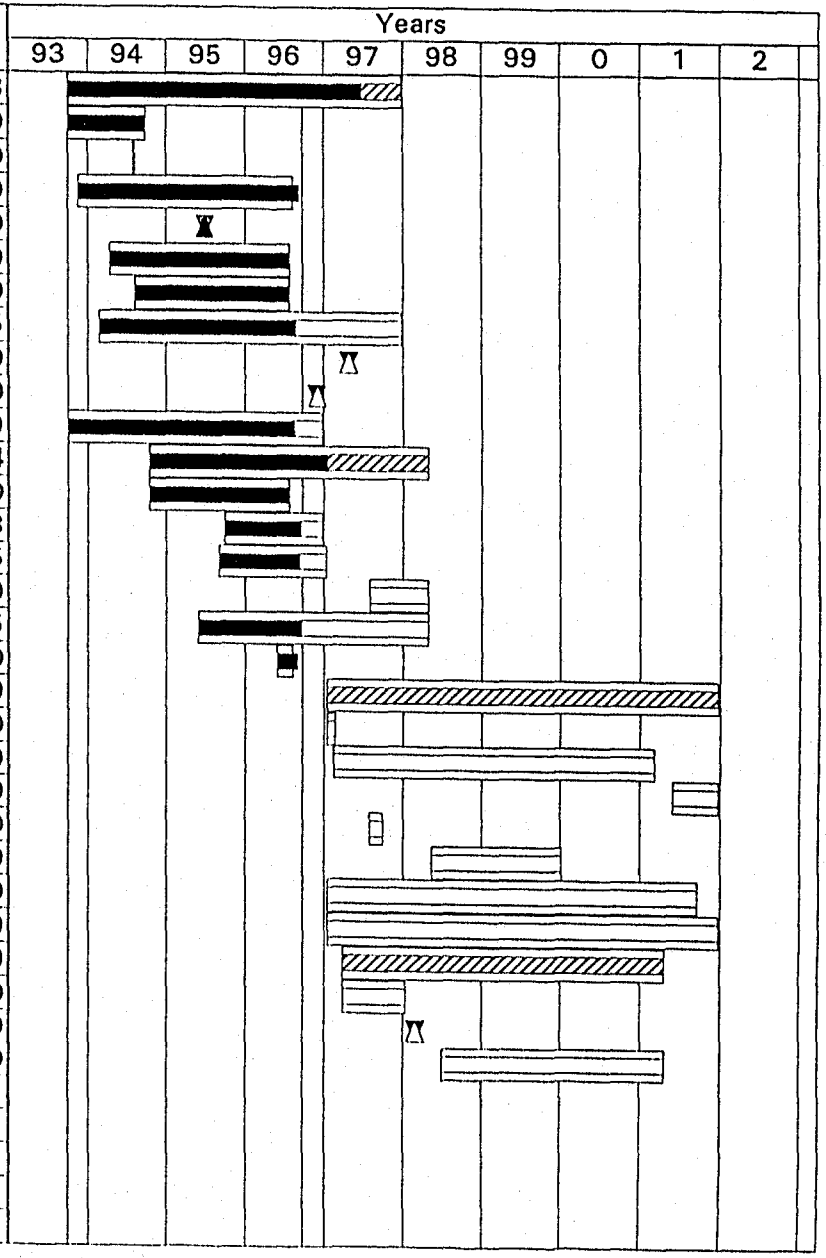
APPENDIX G - TASK 1.5.4 - MILESTONE SCHEDULE STATUS AND COST MANAGEMENT REPORTS

and

Construction Progress Photographs
(at 1 October 1996)

MILESTONE SCHEDULE STATUS REPORT
LIQUID PHASE METHANOL DEMONSTRATION
DE-FC22-92PC90543

Task Name	Duration	Start	End	% Comp	% Sched
PHASE 1: DESIGN	**51.20 m**	**Oct/01/93**	**Dec/30/97**	**97**	**88**
PROJECT DEFINITION(TASK1)	12.04 m	Oct/01/93	Sep/30/94	100	100
CONTINUATION APPLICATION(B.P.#2)	9.00 d	Aug/02/94	Aug/10/94	100	100
PERMITTING(TASK 2)	33.95 m	Nov/17/93	Sep/10/96	100	100
NEPA FONSI APPROVAL	0.00 d	Jun/30/95	Jun/30/95	100	100
DESIGN ENGINEERING(TASK 3)	27.71 m	Apr/15/94	Aug/01/96	100	100
VENDOR ENGINEERING	23.79 m	Aug/10/94	Jul/30/96	100	100
OFF-SITE TESTING(TASK 4)	46.35 m	Feb/25/94	Dec/30/97	10	65
UPDATED FUEL TEST PLAN APPROVAL	0.00 d	Apr/30/97	Apr/30/97	0	0
DECISION TO CONTINUE DME TESTING	0.00 d	Dec/05/96	Dec/05/96	0	0
PLANNING, ADMIN & DME DVT(TASK 5)	39.16 m	Oct/01/93	Dec/30/96	97	89
PHASE 2: CONSTRUCTION	**42.66 m**	**Oct/17/94**	**May/01/98**	**60**	**64**
PROCUREMENT(TASK1)	21.54 m	Oct/17/94	Jul/30/96	100	100
CONSTRUCTION(TASK 2)	15.08 m	Oct/02/95	Dec/31/96	72	78
TRAINING & COMMISSIONING(TASK 3)	16.53 m	Sep/05/95	Jan/17/97	35	75
OFF-SITE TESTING(TASK 4)	9.00 m	Aug/02/97	May/01/98	0	0
PLANNING & ADMINISTRATION(TASK 5)	35.17 m	Jun/01/95	May/01/98	65	45
CONTINUATION APPLICATION(B.P.#3)	3.20 m	May/31/96	Sep/04/96	100	100
PHASE 3: OPERATION	**59.51 m**	**Jan/20/97**	**Dec/28/01**	**0**	**0**
START-UP(TASK 1)	1.22 m	Jan/20/97	Feb/25/97	0	0
METHANOL OPERATION(TASK 2.1)	49.00 m	Feb/17/97	Mar/13/01	0	0
DISMANTLE PLANT(TASK 2.3)	6.96 m	Jun/01/01	Dec/28/01	0	0
ON-SITE PRODUCT USE DEMO(TASK 3)	2.08 m	Aug/01/97	Oct/02/97	0	0
OFF-SITE PRODUCT USE DEMO(TASK 4)	20.00 m	May/15/98	Jan/11/00	0	0
DATA ANALYSIS/REPORTS(TASK 5)	56.35 m	Jan/20/97	Sep/23/01	0	0
PLANNING & ADMINISTRATIVE(TASK 6)	59.51 m	Jan/20/97	Dec/28/01	0	0
PROVISIONAL DME IMPLEMENTATION	**49.02 m**	**Apr/01/97**	**Apr/25/01**	**0**	**0**
DME DVT(PDU TESTS)(TASK 3.6)	9.57 m	Apr/01/97	Jan/15/98	0	0
DECISION TO IMPLEMENT	0.00 d	Mar/01/98	Mar/01/98	0	0
DESIGN, MODIFY & OPERATE(TASK 3.2.2)	33.98 m	Jul/01/98	Apr/25/01	0	0



Printed: Sep/27/96

DOE F 1332.9
(11-84)

U.S. DEPARTMENT OF ENERGY
COST MANAGEMENT REPORT

FORM APPROVED
OMB 1910-1400

1. TITLE
Liquid Phase Methanol Demonstration

2. PARTICIPANT NAME AND ADDRESS
Air Products Liquid Phase Conversion Co., L.P.
7201 Hamilton Boulevard
Allentown, PA 18195-4911

2. REPORTING PERIOD
September 01, 1996 through September 30, 1996

5. COST PLAN DATE
October 01, 1995

3. IDENTIFICATION NUMBER
DE-FC22-92PC90543

6. START DATE
January 1, 1990

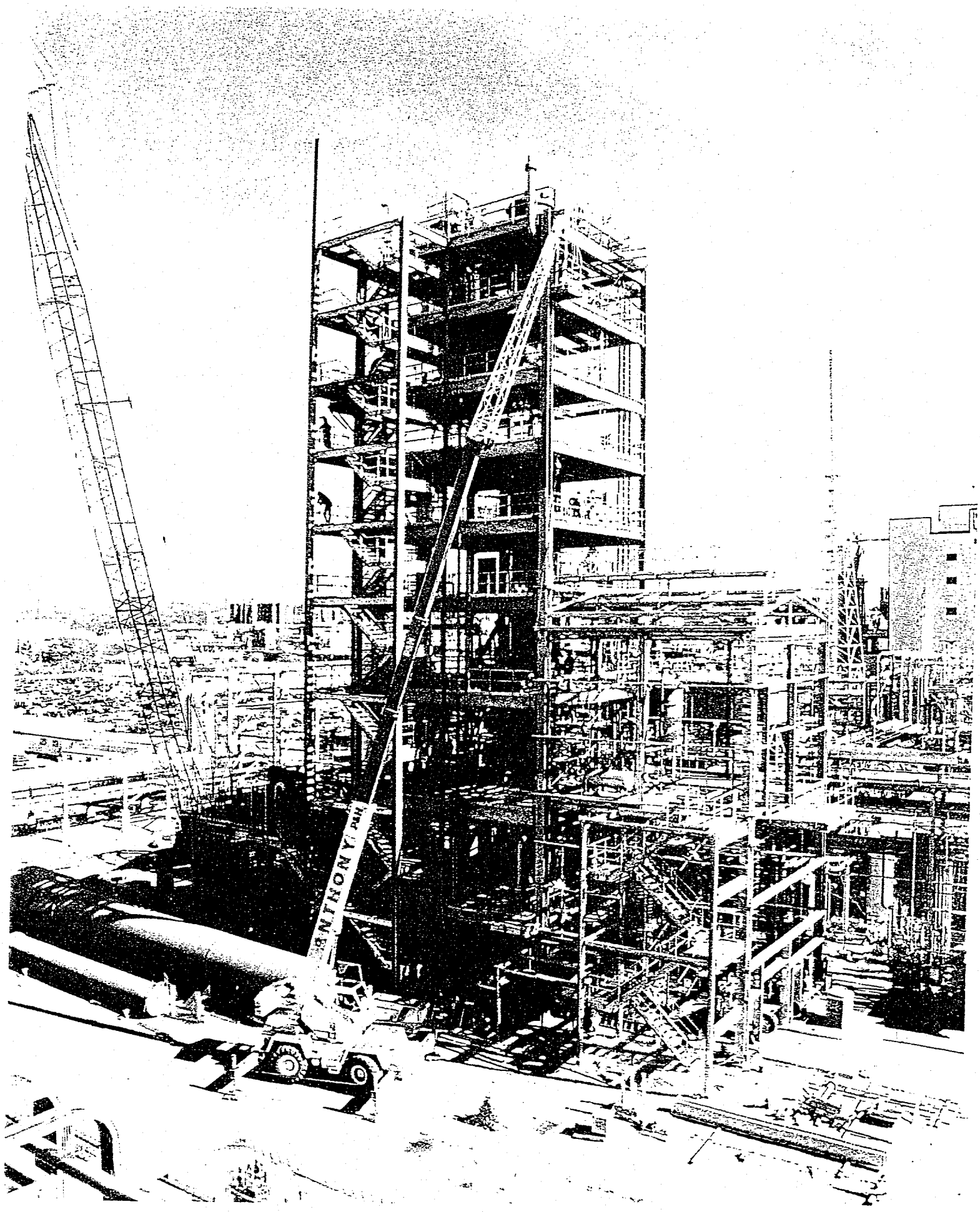
7. COMPLETION DATE
December 31, 2001

8. ELEMENT	9. REPORTING ELEMENT	10. ACCRUED COSTS				11. ESTIMATED ACCRUED COSTS							12.	13.
		Reporting Period		Cumulative to Date		a. Subsequent Reporting Period	b. Balance of Fiscal Year	c. FY 1997 (1)	FY 1998 (2)	FY 1999 (3)	d. Subsequent FY's (4)	e. Total	Total Contract Value	Variance
		a. Actual	b. Plan	c. Actual	d. Plan									
	Prior to Mod 2	0	0	16,304	16,289	0	0					16,304	16,289	15
1.1.1	Project Definition	0	0	1,051	1,021	0	0	0	0	0	0	1,051	1,021	30
1.1.2	Permitting	0	0	238	246	0	0	0	0	0	0	238	246	(8)
1.1.3	Design Engr.	229	56	10,034	9,564	0	0	1,301	0	0	0	11,335	9,960	1,375
1.1.4	Off-site Testing	0	4	12	74	0	0	175	89	0	0	276	320	(44)
1.1.5	Planning, Admin, & DME Verif. Testing	99	42	2,707	1,892	0	0	163	0	0	0	2,870	1,892	978
1.2.1	Procurement	482	276	9,220	8,517	0	0	483	0	0	0	9,703	9,783	(80)
1.2.2	Construction	1,884	368	7,444	9,413	0	0	4,106	0	0	0	11,550	11,200	350
1.2.3	Train. & Commissioning	25	149	117	1,164	0	0	998	0	0	0	1,115	1,197	(82)
1.2.4	Off-Site Test - Proc. & Constr.	0	0	0	0	0	0	120	136	0	0	256	261	(5)
1.2.5	Planning & Admin	10	46	721	613	0	0	285	9	0	0	1,015	681	334
1.3.1	Startup	0	0	0	0	0	0	680	0	0	0	680	3,435	(2,755)
1.3.2	Operations													0
1.3.2.1	Methanol Operation	0	0	0	0	0	0	20,321	34,240	38,689	53,235	146,485	147,287	(802)
1.3.2.2	DME Design, Mod., Oper.	0	0	0	0	0	0	0	0	567	1,223	1,790	2,340	(550)
1.3.2.3	LPMEOH Dismantlement	0	0	0	0	0	0	0	0	0	515	515	425	90
1.3.3	On-Site Product Use Demo	0	0	0	0	0	0	2	2	0	0	4	4	0
1.3.4	Off-Site Product Use Demo	0	0	0	0	0	0	0	1,233	1,972	246	3,451	3,840	(389)
1.3.5	Data Analysis & Reports	0	0	0	0	0	0	390	520	500	1,260	2,670	1,926	744
1.3.6	Planning & Admin.	0	0	0	0	0	0	520	800	280	792	2,392	1,593	799
14. TOTAL		2,729	941	47,848	48,793	0	0	29,544	37,029	42,008	57,271	213,700	213,700	0

15. DOLLARS EXPRESSED IN:
Thousands

16. SIGNATURE OF PARTICIPANT'S PROJECT MANAGER AND DATE
D. P. Drown — 10/22/96

17. SIGNATURE OF PARTICIPANT'S AUTHORIZED FINANCIAL REPRESENTATIVE AND DATE
S. J. Kearney — 10/22/96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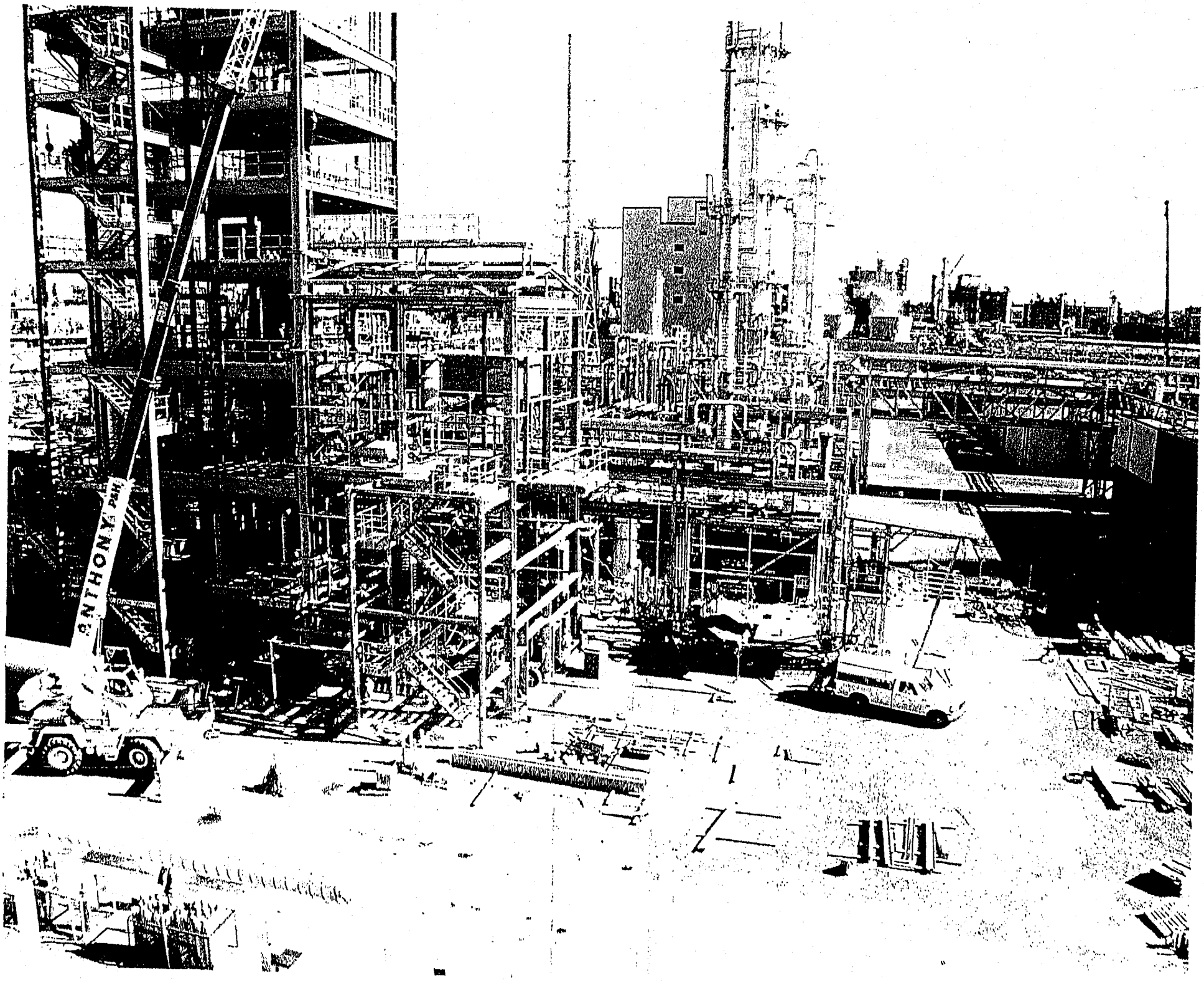
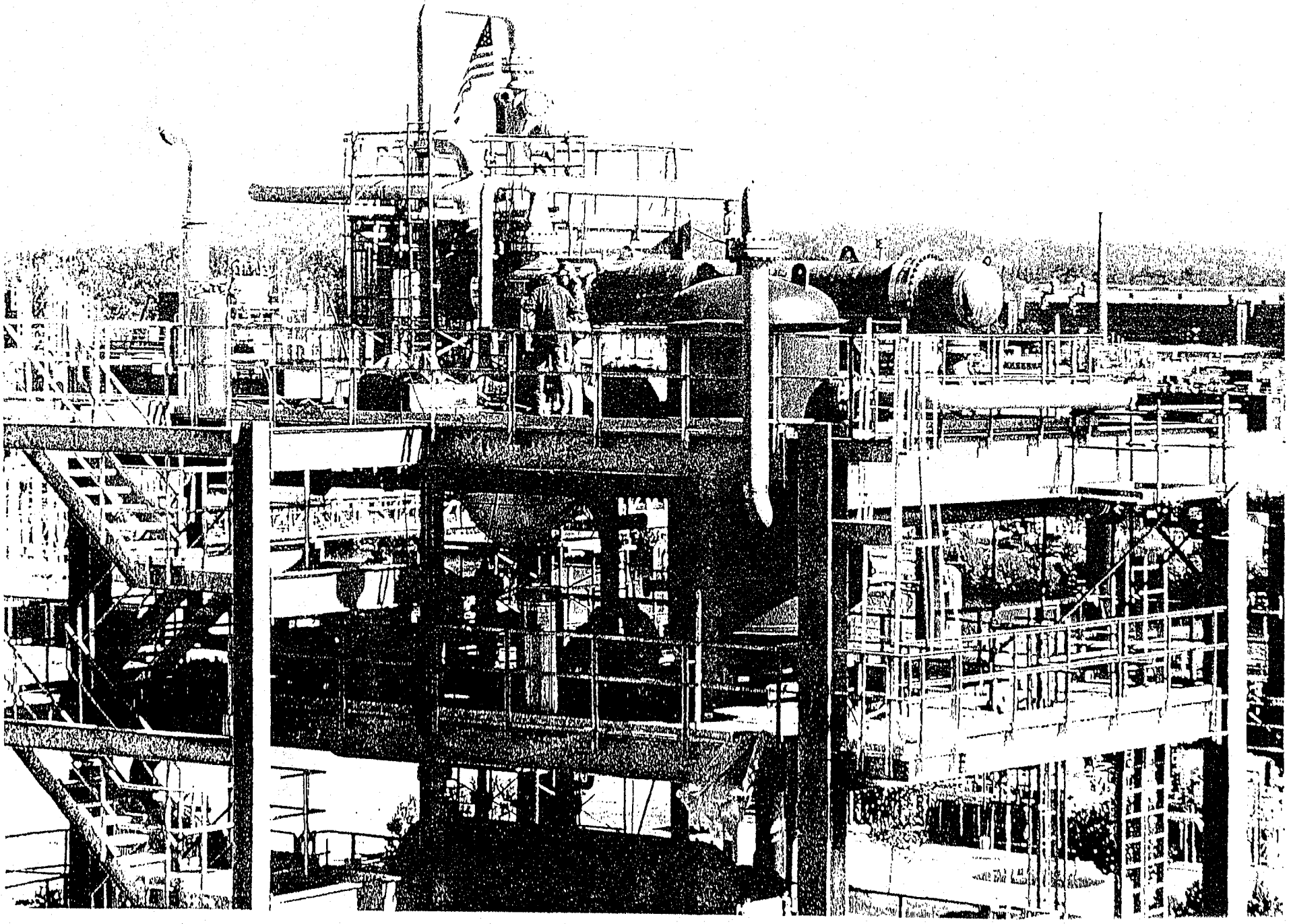

ANTHONY P&H



APPENDIX H - TASK 2.3 - DEMONSTRATION TEST PLAN

(3 September 1996 Approval Letter)

and

Table 5-1 - Demonstration Test Plan (Four Year Summary Table)

Department of Energy
Pittsburgh Energy Technology Center
P.O. Box 10940
Pittsburgh, Pennsylvania 15236-0940

September 3, 1996

Mr. Edward C. Heydorn
Air Products and Chemicals, Inc.
7201 Hamilton Boulevard
Allentown, PA 18195-1501

Subject: Cooperative Agreement No. DE-FC22-92PC90543
Draft Final Demonstration Test Plan

Dear Ed:

The Department of Energy (DOE) has reviewed the Draft Final Demonstration Test Plan (July 1996) submitted by Air Products and Chemicals, Inc. and Eastman Chemical Company for the Liquid Phase Methanol Demonstration Project. The Draft Final Demonstration Test Plan (July 1996) has been revised to reflect the comments supplied by DOE and can be issued as final. Please make the appropriate copies and distribute to the relevant parties as required by the Subject Cooperative Agreement.

Sincerely,

William O'Dowd

William O'Dowd
Office of Clean Coal Technology

cc:
W. Brown, Air Products
W. Jones, Eastman

Test Run #	Test Run Description	Temp (Deg C)	Wt% Cat	H2/CO Ratio at Inlet	Space Velocity (Sl/hr-kg)	MeOH (tpd)	Fresh Feed Balanced (KSCFH)	Fresh Feed CO Gas (KSCFH)	Fresh Feed H2 Gas (KSCFH)	Recycle Gas (KSCFH)	Inlet Sup. Velocity (ft/sec)	Time Period (weeks)	Elapsed Time (incl. outages) (weeks)	Start of Test
Task 2.1.1 - Process Shakedown and Catalyst Aging:														
1.	Initial Shakedown; and	250	28	2.42	8,000	260	900	50	40	1,800	0.64	6	6	Feb-97
	Design Production Tests						(varies, to maintain syngas utilization.)							
2.	Gassed Slurry Level	Part of other tests										Ongoing		
3.	Reactor Feed: Texaco-Type Syngas	250	28	0.67	9,240	202	650	95 (*)	0	2,612 (*)	0.77	2	9	Mar-97
4.	Early Testing @ High Superficial Velocity	250	28	2.54	10,300	TBD	1,200 (**)	50	40	2,520 (*)	0.88	2	12	Apr-97
5.	Check @ Test 1 Conditions	250	28	2.42	8,000	< 260	900	50	40	1,800	0.64	2	15	May-97
6.	Catalyst Addition and Aging	250 or less	28 - 40	2.51	Dec. from 8,000	237	765	40	45	Max (2,700)	0.79 TBD	18 6	41	May-97 to Nov-97
	(Note: Kingsport Complex Outage during this test)			2.30		260	900	50	40					
7.	Free-Drain Entrained/ Condensed Oil to Reactor	250 or less	28 - 40	2.51	Dec. from 8,000	237	765	40	45	Max	0.79	During Test 6		
8.	Operation @ Design Feed Gas Rates	250	40	2.42	4,000	260	900	50	40	1,800	0.64	2	43	Nov-97
9.	Check for Limitation on Catalyst Slurry Concentration	250	> 40	2.51	Varies	TBD	765	40	45	Max (2,700)	0.79	6	50	Dec-97
10.	Catalyst Addition to Reach Max Productivity	250 or less	Target 45	2.49	3,320	256	765	40	45	2,605	0.79	12	68	Jan-98
				2.29	3,500	293	900	50	40	2,520	0.81	2		
				TBD	TBD	TBD	1,110 (**)	50	40	2,520	0.86	2		

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Task 2.1.2 - Process Operational Test Phase:														
	Note: At this time, need to produce some "typical" product methanol for off-site fuel tests. Also need to reassess the optimum operating conditions for the remaining tests (e.g. feed gas allocation for commercial design/optimal performance).													
11.	Catalyst Addition/ Withdrawal Test	250	Target 45	2.49	3,320	256	765	40	45	2,605	0.79	6	74	May-98
12.	Test 11 Conditions with No CO Make-up	250	Target 45	4.97	3,282	229	765	0	45	2,605	0.78	2	76	Jul-98
13.	Test 11 Conditions with No H2 Make-up	250	Target 45	1.98	3,277	252	765	40	0	2,605	0.78	2	79	Jul-98
14.	Test 11 Conditions with No H2 or CO Make-up	250	Target 45	5.03	3,238	232	765	0	0	2,605	0.77	2	81	Aug-98
15.	Repeat of Test 11 Conditions	250	Target 45	2.49	3,320	256	765	40	45	2,605	0.79	2	83	Aug-98
16.	Design Fresh Feed Operation Test	250	Target 45	2.29	3,500	293	900	50	40	2,520	0.81	2	86	Sep-98
17.	Testing @ High Superficial Velocity	250	Target 45	TBD	TBD	TBD	1,110 (**)	50	40	2,520	0.86	2	88	Oct-98
18.	Turndown and Ramping	250	Target 45	3.30	1,825	151	450	25	60	1,364	0.44	4	92	Oct-98
19.	Load-Following, Cyclone, & On/Off Tests		Target 45	Balanced, CO-Rich	To be Defined							6	99	Nov-98
20.	Reactor Feed: Texaco-Type Syngas	250	Target 45	0.69	2,870	207	650	85 (**)	0	2,195	0.67	4	103	Jan-99

Test Run #	Test Run Description	Temp (Deg C)	Wt% Cat	H2/CO Ratio at Inlet	Space Velocity (Sl/hr-kg)	MeOH (tpd)	Fresh Feed Balanced (KSCFH)	Fresh Feed CO Gas (KSCFH)	Fresh Feed H2 Gas (KSCFH)	Recycle Gas (KSCFH)	Inlet Sup. Velocity (ft/sec)	Time Period (weeks)	Elapsed Time (incl. outages) (weeks)	Start of Test
21.	Reactor Feed: Destec-Type Syngas	250	Target 45	1.01	2,770	215	670	65 (***)	0	2,147	0.67	3	106	Jan-99
22.	Reactor Feed: BGL-Type Syngas	250	Target 45	0.52	2,165	137	485	200 (***)	0	1,568	0.43	3	109	Feb-99
23.	Repeat of Test 15 Conditions	250	Target 45	2.49	3,320	256	765	40	45	2,605	0.79	2	112	Mar-99
24.	Reactor Feed: Nat. Gas Reformer-Type Syngas	250	Target 45	4.98	1,978	197	765	0	30	1,264	0.48	3	115	Apr-99
25.	Reactor Feed: Shell-Type Syngas with Steam Injection and 1:1 Recycle	250	Target 45	0.53	1,471	101	238	400 (***)	50	842	0.35	3	118	Apr-99
26.	Repeat of Test 15 Conditions	250	Target 45	2.49	3,320	256	765	40	45	2,605	0.79	2	121	May-99
27.	Repeat of Test 16 Conditions	250	Target 45	2.29	3,500	293	900	50	40	2,520	0.81	2	123	Jun-99
28.	Reactor Operation @ 260 deg C	260	Target 45	2.51	3,320	248	765	40	45	2,605	0.79	2	125	Jun-99
29.	Repeat of Test 26 Conditions	250	Target 45	2.49	3,320	256	765	40	45	2,605	0.79	2	127	Jul-99
30.	Reactor Inspection - Then, Continue Operational Tests - with Alternative Catalyst):											4	131	Jul-99
31.	Plant Shakedown	240	TBD	2.42	TBD	260	900	50	40	Max(TBD)	TBD	6	137	Aug-99
32.	Reactor Feed: Texaco-Type Syngas	240	TBD	0.67	TBD	202	650	95 (*)	0	2,612 (*)	0.77	2	140	Sep-99

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33.	Catalyst Aging	240	TBD	2.50	TBD	237	765	40	45	2,605		16	162	Oct-99
				2.31	TBD	260	900	50	40	2,520	TBD	4		
34.	Catalyst Addition/	240 -	Target	Balanced	To be					Max(TBD)		6	168	Mar-00
	Withdrawal to Achieve	250	45		defined									
	Target Slurry Concentration													
35.	Reactor Feed: Texaco-	250	Target	0.69	2,870	207	650	85 (**)	0	2,195	0.67	4	173	Apr-00
	Type Syngas		45											
Task 2.1.3 - Extended Optimum Operation:														
36.	Stable Operation	250	Target	2.49	3320	256	765	40	45	2605	0.79	16	200	Jun-00
		250	45	2.29	3500	293	900	50	40	2520	0.81	6		
		250		TBD	TBD	TBD	1,110 (**)	50	40	2520	0.86	2		
37.	DME Demo (Task 2.2)		Balanced and CO-Rich									TBD		Dec-00
	or													to
	Commercial Test Run (Task 2.1.3)		Target	2.49	3320	256	765	40	45	2605	0.79	8	208	Mar-01
			45											
					Syngas Outages (5%, including Kingsport complex outage during Test 6)							10		
					Planned LPMEOH Outages (including Reactor Inspection and Fresh Catalyst Charge in Test 28)							12		
							Unplanned LPMEOH Outages (10/yr @ 8 hrs.)					2		

Notes:

(*) - 700 HP motor on 29K-01 Compressor allows higher recycle gas flow than design basis.

(**) - 1200 KSCFH of Fresh Feed Syngas can be made available for testing (per Eastman debottlenecking of gasification area). Final decision on test will depend upon carbonyl concentrations in Balanced Gas and CO Gas, since 29C-40 Carbonyl Guard Bed will have to be bypassed. For this condition, test execution is subject to availability of CO Gas.

(***) - Subject to availability of CO Gas.

APPENDIX I - TASK 2.3 - COMMISSIONING & STARTUP SCHEDULE

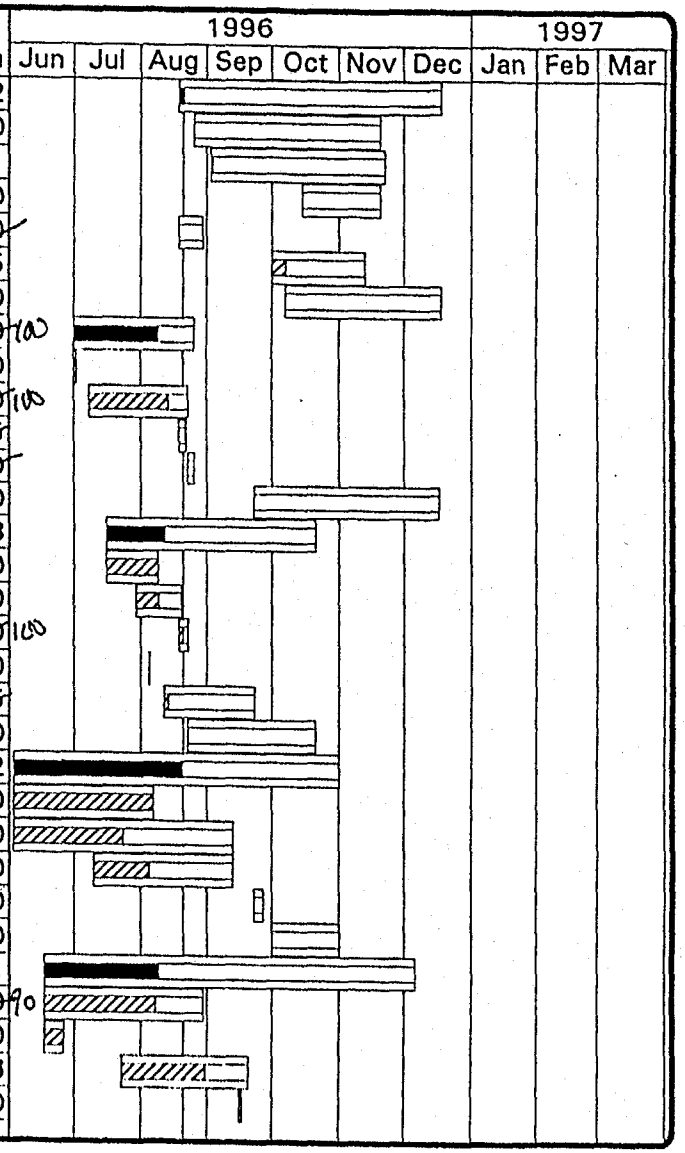
Commiss. + Startup

WRB's 9/5/96

Handout @ DOE meeting.

LPMEOH COMMISSIONING & STARTUP SCHEDULE

Task Name	Duration	Start	End	Perc Com
PRECOMMISSIONING WORK	16.80 w	Aug/19/96	Dec/18/96	2
PIPING PUNCH LISTING(EMN) start 9/9	12.00 w	Aug/26/96	Nov/20/96	0
PIPE PRESSURE TESTING FSF down	11.40 w	Sep/03/96	Nov/22/96	1
INSTRUMENTATION PUNCHLISTING(EMN)	5.20 w	Oct/15/96	Nov/20/96	0
LUBRICATION OF MACHINERY(APCI)	2.00 w	Aug/19/96	Aug/30/96	20
FINAL ALIGNMENT CHECKS(APCI)	6.00 w	Oct/01/96	Nov/13/96	15
ELECTRICAL PUNCHLISTING(EMN)	10.00 w	Oct/07/96	Dec/18/96	0
PASSIVATE REACTOR RCH/BTS	8.00 w	Jul/01/96	Aug/26/96	70 100
SET REACTOR	2.00 d	Jul/01/96	Jul/02/96	100
FINISH INSTALL REACTOR BLDG STEEL	7.00 w	Jul/08/96	Aug/23/96	80 100
SET-UP FOR PASSIVATION	0.80 w	Aug/19/96	Aug/22/96	100
PASSIVATE REACTOR ~Done.	0.40 w	Aug/23/96	Aug/26/96	100
INSTR. & ELECT. CONTINUITY CHECKS*	11.80 w	Sep/23/96	Dec/17/96	0
DCS WORK	13.60 w	Jul/16/96	Oct/21/96	28
TEMPORARY HVAC & FINISHED ROOF	3.80 w	Jul/16/96	Aug/09/96	100
INSTALL/TEST FM200 SYSTEM Fire Protection	3.20 w	Jul/30/96	Aug/20/96	50
INSTALL DATA HIGHWAY(EMN)	1.00 w	Aug/19/96	Aug/23/96	50 100
RELOCATE DCS CABINETS(EMN)	1.00 d	Aug/05/96	Aug/05/96	100
TERMINATE TO DCS	6.00 w	Aug/12/96	Sep/23/96	50
TEMPORARY POWER TO DCS - On Hold ~	8.00 w	Aug/23/96	Oct/21/96	0
DCS PROGRAMMING(EMN)	21.40 w	Jun/03/96	Nov/01/96	52
POINT CONFIGURATION/DATA BASE	9.40 w	Jun/03/96	Aug/07/96	100
LOGIC	14.60 w	Jun/03/96	Sep/13/96	50
GRAPHICS	9.40 w	Jul/10/96	Sep/13/96	40
APCI REVIEW OF LOGIC	1.00 w	Sep/23/96	Sep/27/96	0
REPORT GENERATION	4.60 w	Oct/01/96	Nov/01/96	0
INSTRUMENT CALIBRATION	24.00 w	Jun/17/96	Dec/06/96	31
CHECK PSV'S SETTING(EMN)	10.80 w	Jun/17/96	Aug/30/96	70 90
TRANSMITTERS(EMN)	1.60 w	Jun/17/96	Jun/26/96	100
TEST ABB ANALYZERS AT FACTORY	43.00 d	Jul/23/96	Sep/20/96	66
ANALYZER BLDG TEST @ SHOP	2.00 d	Sep/16/96	Sep/17/96	0



Milestone △ Summary

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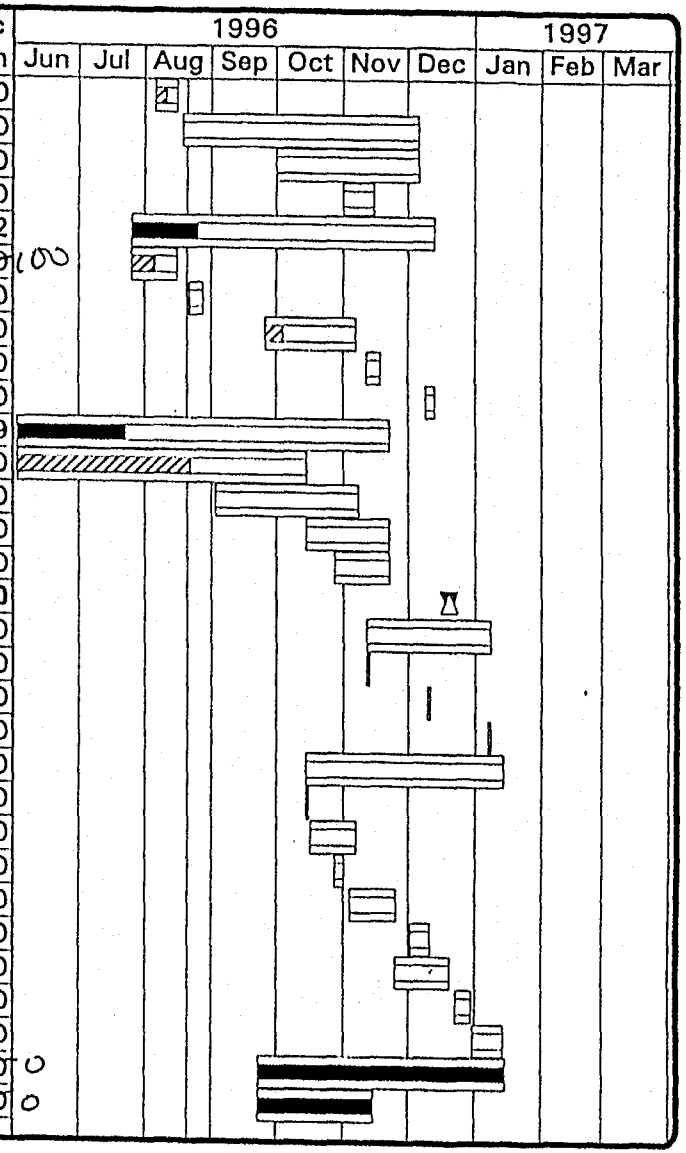
Waiting plans + Training

Done.

Attachment 3-1

LPMEOH COMMISSIONING & STARTUP SCHEDULE

Task Name	Duration	Start	End	Perc Com
TEST T-01 & T-02 @ SHOP Nielsen Heads.	1.80 w	Aug/06/96	Aug/16/96	50
LEVEL DIAPHRAM dP'S, CHECK FE'S	15.20 w	Aug/19/96	Dec/06/96	0
SKID INSTRUMENTS	9.20 w	Oct/01/96	Dec/06/96	0
NDG'S(T-01 & T-02)	2.00 w	Nov/01/96	Nov/15/96	0
AP-EMN JV OFFICE TRAILER SET-UP	19.40 w	Jul/26/96	Dec/13/96	22
ELECTRICAL & WATERHOOK-UP(EMN)	3.20 w	Jul/26/96	Aug/16/96	~~50~~ 100
FURNITURE - ORDER & INSTALL	1.00 w	Aug/22/96	Aug/28/96	0
COMPUTER H/W - ORDER & INSTALL	6.00 w	Sep/26/96	Nov/07/96	20
CHECK-OUT APCI COMMUNICATION LINK	1.00 w	Nov/12/96	Nov/18/96	0
CHECK-OUT TOTAL PLANT SYSTEM	1.00 w	Dec/09/96	Dec/13/96	0
OPERATOR TRAINING	24.20 w	Jun/03/96	Nov/22/96	29
SOP & LESSON PLANS	18.80 w	Jun/03/96	Oct/15/96	60
OPERATOR CHECK LISTS	9.60 w	Sep/03/96	Nov/08/96	0
EMN TRAINING SESSIONS Train thtrainers.	5.60 w	Oct/15/96	Nov/22/96	0
APCI INVOLVEMENT	3.80 w	Oct/28/96	Nov/22/96	0
TARGET MECHANICAL COMPLETION	**0.00 d**	**Dec/20/96**	**Dec/20/96**	**60**
SAFETY REVIEWS-ORI's	39.00 d	Nov/12/96	Jan/08/97	0
MECHANICAL/PRECOMMISSIONING	2.00 d	Nov/12/96	Nov/13/96	0
I&E/INSULATION	2.00 d	Dec/10/96	Dec/11/96	0
PRESTART-UP S.R. Final ORI	2.00 d	Jan/07/97	Jan/08/97	0
INSTRUMENT LOOP CHECKING**	12.40 w	Oct/15/96	Jan/14/97	0
ENERGIZE MCC	0.40 w	Oct/15/96	Oct/16/96	0
EAST OF COLUMN "C"	3.08 w	Oct/17/96	Nov/07/96	0
OTHER UTILITIES	1.00 w	Oct/28/96	Nov/01/96	0
DISTILLATION AREA	3.00 w	Nov/04/96	Nov/25/96	0
CATALYST PREP AREA	1.50 w	Dec/02/96	Dec/11/96	0
REACTOR AREA	3.80 w	Nov/25/96	Dec/20/96	0
FINAL FUNCTION TESTING	1.00 w	Dec/23/96	Dec/30/96	0
POUR CONDUIT SEAL OFFS Eastern - Western	2.00 w	Dec/31/96	Jan/14/97	0
COMMISSIONING(PHASE 2)	15.60 w	Sep/23/96	Jan/15/97	100
COMMISSION INSTR. AIR HEADERS	38.00 d	Sep/23/96	Nov/15/96	100



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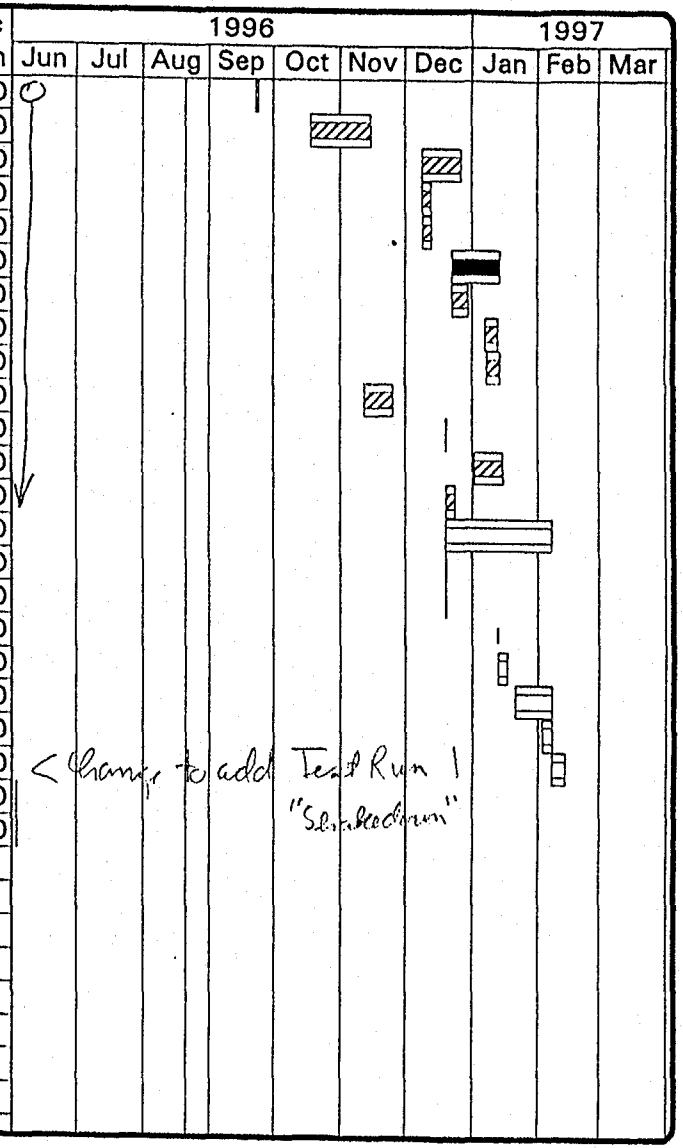
Attach 3-2

LPMEOH COMMISSIONING & STARTUP SCHEDULE

Task Name	Duration	Start	End	Perc Com
EAST OF COLUMN "C"	2.00 d	Sep/23/96	Sep/24/96	100
REMAINING PLANT AREAS	20.00 d	Oct/18/96	Nov/15/96	100
COMMISSION OTHER UTILITIES	2.80 w	Dec/09/96	Dec/27/96	100
LOAD CATALYST GUARD BED(EMN)	1.00 w	Dec/09/96	Dec/13/96	100
FILL D-30 WITH MINERAL OIL	1.00 w	Dec/09/96	Dec/13/96	100
WATER/DRAKEOL BATCHING	3.00 w	Dec/23/96	Jan/14/97	100
TRANSFER THRU SLURRY LINES	1.00 w	Dec/23/96	Dec/30/96	100
TEST RUN ID PUMPS	1.00 w	Jan/07/97	Jan/13/97	100
PUMP AROUND DISTILLATION	1.00 w	Jan/08/97	Jan/14/97	100
K-01 LUBE OIL FLUSH(EMN)	2.00 w	Nov/12/96	Nov/25/96	100
TURNOVER MCC & I/O BLDG.	1.00 d	Dec/20/96	Dec/20/96	100
ANALYZER CALIBRATION(EMN)	2.00 w	Jan/02/97	Jan/15/97	100
TEST FIRE SPRINKLER DELUGE SYSTEM	3.00 d	Dec/20/96	Dec/24/96	100
PLANT START-UP(PHASE 3-TASK 1)	6.60 w	Dec/20/96	Feb/07/97	0
OPEN-UP I.T. SEWER CONNECTION	1.00 d	Dec/20/96	Dec/20/96	0
TAKEDOWN B/L FENCE	1.00 d	Dec/20/96	Dec/20/96	0
START-UP K-01 COMPRESSOR	1.00 d	Jan/13/97	Jan/13/97	0
CARBONYL BURNOUT	1.00 w	Jan/13/97	Jan/17/97	0
REDUCE CATALYST BATCHES	2.80 w	Jan/21/97	Feb/07/97	0
START DISTILLATION	1.00 w	Feb/03/97	Feb/07/97	0
BEGIN PLANT OPERATION(TASK 2.1) Demo Test Plans Shakedown	1.00 w	Feb/07/97	Feb/13/97	0
* 340 manhour estimate	1.00 d	Jun/03/96	Jun/03/96	0
** durations based on 3 men @50 hrs/w	1.00 d	Jun/03/96	Jun/03/96	0



Transition Date: ⊛ Const → Ops. Control of Sets.

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