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PIPELINE GAS DEMONSTRATION PLANT PHASE I

QUARTERLY TECHNICAL PROGRESS REPORT FOR DECEMBER 1980 - FEBRUARY 1981

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LIST OF ACRONYMS

CCP	-	Cost Change Proposal
CDC	-	COGAS Development Company
CE	-	U.S. Army Corps of Engineers
CURL	-	Coal Utilisation Research Laboratory (Leatherhead, England)
DOE	-	U.S. Department of Energy
DPPD	-	Demonstration Plant Process Design Report
EA	-	Econergy Associates
EAR	-	Environmental Analysis Report
ECP	-	Engineering Change Proposal
EIS	-	Environmental Impact Statement
EPA	-	Environmental Protection Agency
EVT	-	Energie-und Verfahrenstechnik GmbH
FGO	-	Flue Gas Oxidizer
FMC	-	FMC Corporation
FMEA	-	Failure Mode and Effects Analysis
G&H	-	Gibbs & Hill
HRI	-	Hydrocarbon Research, Inc.
HVAC	-	Heating, Ventilating and Air Conditioning
ICGG	-	Illinois Coal Gasification Group
METC	-	Morgantown Energy Technology Center
MSS/DSS	-	Material Status System/Document Status System
Parsons	-	The Ralph M. Parsons Company
PFD	-	Process Flow Diagram
P&ID	-	Piping and Instrumentation Diagram
PRC	-	Power Recovery Corporation
P&T	-	Pressure and Temperature
PSD	-	Prevention of Significant Deterioration
R/QA	-	Reliability and Quality Assurance
RCRA	-	Resources Conservation & Recovery Act
RQC	-	Reliability/Quality Classification
SARS	-	Safety Analysis and Review System
TSCA	-	Toxic Substances Control Act
UOP/SDC	-	Universal Oil Products/System Development Corporation

DEMONSTRATION PLANT AREAS

PLANT AREA

DESCRIPTION

201	Coal Unloading and Handling
202	Coal Preparation
203	Pyrolysis and Gasification
204A	Oil Recovery
204B	Oil Treatment
205	Gas Purification
206	Hydrogen Generation
207	Shift and Methanation
208	Bulk CO ₂ Removal and Gas Compression
209	Gas Dehydration
210	Flue Gas Power Recovery
211	SO ₂ Removal
212	Sulfur Recovery
213	Ammonia Recovery
214	Thermal Oxidizer and Flare
215	Utilities
216	Water Supply
217	Water Treatment Systems
218	Waste Treatment and Disposal
219	Fire Protection System
220	Facilities

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ABSTRACT

In the past quarter work was performed in the following tasks in Phase I of the Pipeline Gas Demonstration Plant Program:

- Task III - Site Evaluation and Selection
- Task IV - Demonstration Plant Environmental Analysis
- Task V - Feedstock Plans, Licenses, Permits and Easements
- Task VI - Demonstration Plant Definitive Design
- Task VII - Construction Planning
- Task VIII - Economic Reassessment
- Task IX - Technical Support
- Task X - Long Lead Procurement List
- Task XI - Project Management

Major work activity continued to be the effort in Task VI, Demonstration Plant Definitive Design. Final 30% Design Review meetings were held December 15-17, 1980 and the comments generated were incorporated into design drawings and specifications.

A Construction Readiness Audit was held on January 14-16, 1981 by a Government/Procon team to review the ICGG Pipeline Coal Gasification Project and assess the readiness of the project to proceed into the construction phase.

Documents for the 60% Design Review were prepared for ICGG review and submitted to the Contracting Officer's authorized representative prior to transmittal to the Corps of Engineers for review.

The Corps of Engineers conducted a design audit to determine the percent of completion of the engineering design for the Demonstration Plant. The primary objective of the audit was to prepare an independent estimate of the work remaining to complete Phase I of the project.

Work continued on the production of a single bid package for the Demonstration Plant, suitable for release to a single constructor, and organized so it can be easily broken down into subpackages by construction specialty.

A formal audit of the ICGG R/QA Plan and implementation thereof was performed February 11-12, 1981 by the Corps of Engineers.

The Contract Deliverable "Final Feedstock-Product-Waste Disposal Plan" was delivered to the Government on February 25, 1981.

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PIPELINE GAS DEMONSTRATION PLANT
PHASE I
QUARTERLY TECHNICAL PROGRESS REPORT
FOR
DECEMBER 1980 - FEBRUARY 1981

OBJECTIVE AND SCOPE OF WORK

The major objective of the ICGG Pipeline Gas Demonstration Plant Program is to demonstrate the commercial feasibility and economic attractiveness of a chemical process for conversion of high sulfur coal to clean pipeline gas. The comprehensive program includes the following specific objectives:

- To engineer, design, construct, operate and manage an integrated synthetic pipeline gas demonstration plant.
- To confirm design criteria, demonstrate technology and obtain experience which will yield those characteristics required to establish and/or define plant investment and operating costs for future clean pipeline gas commercial production plants.
- To project plant investment, operating and end-product costs for full-scale commercial production plants.
- To provide technology, performance, reliability and maintenance characteristics which will permit the design of a full-scale clean pipeline gas commercial production facility.
- To investigate the general applicability and limits of the selected process and plant design for a variety of coal types.
- To determine scaling parameters (with respect to the commercial production of the primary product) and sizing of major process components, such as those for gasification, hydrogenation, etc.
- To provide finished marketable clean pipeline gas in quantities sufficient for end-use evaluations.

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- To determine the general characteristics, composition and quality of the end-product(s).
- To assess and/or evaluate characteristics and suitability of the product in actual representative end-use applications.
- To establish guidelines for by-product use and/or disposal.
- To obtain data which will permit design of an environmentally acceptable commercial plant.
- To establish the design compatibility with Occupational Safety and Health Administration requirements.

ICGG will supply personnel, equipment, facilities, material and other services necessary to perform the work which has been divided into three distinct Phases. These are:

Phase I - Development and Engineering

- Stage 1 Conceptual Design
- Stage 2 Final Engineering Design

Phase II - Demonstration Plant Construction

Phase III - Demonstration Plant Test, Evaluation and Operation

The following provides a brief description, by Phase, of the total program.

Phase I - Development and Engineering

Stage 1 - Conceptual Design

A conceptual design for a Commercial Plant has been prepared. The design is based on the maximum use of proven, commercially-available components and equipment. The capital and operating cost estimates, as well as the economic analysis, have considered various process trade-off and design studies. Based upon this conceptual design for a Commercial Plant, a conceptual process design for the Demonstration Plant was developed. A site evaluation study and an environmental analysis, as well as preliminary plans for resources (coal, water, etc.) and water pipeline right-of-way acquisition, were also prepared. A design analysis for the Demonstration Plant was also submitted to DOE at the end of Stage 1.

Stage 2 - Final Engineering Design

During Stage 2, bid packages, construction plans and an economic reassessment will be prepared. In addition to the possible procurement of long lead time equipment, plans for procuring raw materials, permits and easements will be finalized.

Before proceeding with Phase II, DOE and ICGG must mutually agree that the program should continue.

Phase II - Demonstration Plant Construction

Phase II encompasses the actual construction of the Demonstration Plant. ICGG will finalize the site acquisition and agreements related to feedstocks, product transportation, by-products sale, wastes, permits, licenses, easements and rights-of-way. After competitive bidding, the construction sub-contract(s) will be awarded. ICGG will be responsible for procurement of equipment and facilities, preparation of the site, inspection of the work, and construction management.

Operation, training and maintenance manuals required for the start-up, testing and operating during Phase III will be developed. Training programs will be implemented with the specific objective of developing the necessary skills required for the operation and maintenance of the Demonstration Plant. The training program will emphasize both the safety features and the hazards of the equipment. A final economic reassessment of the investment and the operating costs of both the Demonstration Plant and a Commercial Plant will be performed.

Updated "as-built" drawings will be submitted to DOE. After the approval by DOE of a check-out and acceptance plan, ICGG will perform necessary mechanical testing of the plant prior to start-up.

Phase III - Demonstration Plant Test, Evaluation and Operation

A plant shakedown test plan will be submitted to DOE for approval before ICGG tests the plant components. A detailed report summarizing the six months of testing will be submitted to DOE. Two months are planned for establishing the operating conditions and operating variables for the primary coal type, after which the plant will be operated for twelve months to demonstrate the long term operating characteristics of the plant. At the conclusion of the testing of

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the primary coal type, DOE may direct ICGG to test one or both of the alternate coals for a period of six months each. At the end of Phase III, DOE has the option to extend the period of performance for a period not to exceed eighteen months in accordance with terms and conditions mutually agreed upon by ICGG and DOE.

As a result of the experience gained from constructing and operating the Demonstration Plant, ICGG will conduct process trade-off studies and an economic reanalysis for the optimization of the design, construction and operation of a commercial plant.

DETAILED DESCRIPTION OF TECHNICAL PROGRESS

1.3 Site Evaluation and Selection

Work Accomplished

Dravo A&H Engineering, Inc. initiated fieldwork for the (G&H) geotechnical investigation at the river water intake on December 1, 1980. Drilling operations were completed, and soil samples and rock core borings were sent for laboratory testing and analysis.

A representative from the Dravo G&H office monitored the fieldwork and forwarded a report of the field activities to ICGG and the Dravo Pittsburgh office.

Following laboratory testing and analysis, A&H Engineering submitted a draft of its report "Subsurface Exploration and Foundation Recommendations" to Dravo. Copies were subsequently transmitted by Dravo to ICGG and the G&H office for review. Comments were issued to A&H Engineering for inclusion into the report.

Work Forecast

Dravo Continue to monitor A&H Engineering, Inc. investigations for the design of the River Water Lift Station and Raw Water Booster Pump House, and for the design of the railroad spur connecting the Demonstration Plant with the existing Illinois Central Gulf Railroad line.

Review A&H Engineering's draft of its report "Subsurface Exploration and Foundation Recommendations" in preparation for final issue.

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1.4 Demonstration Plant Environmental Analysis

Work Accomplished

Dravo Reviewed the January 1981 groundwater level and
(G&H) precipitation data, and subsequently updated the ground-
water and surface water level records.

Continued assembling data and preparing draft texts,
tables and graphics to be published as an addendum to
the Record EAR (FE-2012-077, September 1979).

Work Forecast

Dravo Continue monitoring site groundwater level and
(G&H) precipitation data.

Continue assembling data and preparing draft sections
to update information presented in the Record EAR.

1.5 Feedstock Plans, Licenses, Permits and Easements

Work Accomplished

Dravo Final Feedstock-Product-Waste Plan Report
(G&H)

Reviewed and commented on this report prepared by ICGG.

TSCA and RCRA

TSCA and RCRA regulations are being reviewed for
application to the ICGG Pipeline Gas Demonstration
Plant Project.

Completed U.S. EPA form "Notification of Hazardous
Waste Activity", and submitted it to ICGG for transmittal
to the U.S. EPA Region V office in Chicago, IL.

Permits

Updated the Permits and Licenses Schedule to reflect
the status of all permits required for the Project.
(Refer to Figure 1.5-1, see pages 7 and 8.)

Illinois EPA Coordinated Permit Review

● Project Plan

The purpose of the Project Plan is to describe all
pollution control measures being incorporated into
the Demonstration Plant design, including air and
water pollution control systems, and solid waste
disposal systems. Representatives from ICGG met

**ICGG Pipeline Gas Demonstration Plant
Permits and Licenses
Status as of 2/27/81**

Sheet 1 of 2
2/28/81

Permit	Agency Action	Gathering Required Data	Preparation of Application	Submittal of Application	Agency Review	Response to Agency Comment and/or Resubmittal	Estimated Approval Date	Remarks
PRECONSTRUCTION								
FEDERAL								
RCRA	AS			11-16-80 			5/81	
CE	AC						9/81	
FAA	AC						9/81	
USDOI - Archaeological	AG			-/-/- 			---	Approved 9/16/80
STATE OF ILLINOIS								
PSD/Air Pollution Control	AS			7-14-80 			3/81	Responded To IEPA 2/24/81
Project Plan	AS			1-15-81 			2/81	
Water Pollution Control	AP						5/81	1st Phase.
Solid Waste Disposal	AP						5/81	
Division of Water Resources								
Intake Structures	AC						9/81	
Division of Highways								
Pipeline Highway Crossings	AC						9/81	
Water Intake Access Road	AC						9/81	
IDMM Permit	AC						9/81	
Open Burning Permit	AC						9/81	
Perry County & Local								
Building Permit	AC						9/81	
Mo. Pacific RR Crossing	AC						9/81	
IL Central Gulf RR Crossing	AC						9/81	
Kaskaskia Regional Port Dist.	AC						9/81	

Figure 1.5-1

**ICGG Pipeline Gas Demonstration Plant
Permits and Licenses
Status as of 2/27/81**

Sheet 2 of 2
2/28/81

Permit	Agency Action	Gathering Required Data	Preparation of Application	Submittal of Application	Agency Review	Response to Agency Comment and/or Resubmittal	Estimated Approval Date	Remarks
PRECONSTRUCTION								
PERRY COUNTY & LOCAL								
Pipeline County Hwy. Crossings	AC	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	9/81	
Pipeline Township Rd. Crossings	AC	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	9/81	
Access to County Roads	AC	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	9/81	
PREOPERATIONAL								
FEDERAL								
TSCA - PMN	AC	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	9/81	Draft discussed Awaiting test results
EPA Oil Spill Prevention Plan	AC	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	9/83	Submittal not required
STATE OF ILLINOIS								
Air Pollution Control	AC	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	9/83	
Water Pollution Control	AC	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	9/83	
Solid Waste Disposal	AC	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	9/83	
NPDES	AC	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	9/83	May not be required

Legend

AC - Agency Contacted

AG - Approval Granted

AS - Application Submitted

AP - Application in Preparation

Action Underway

Action Completed

Figure 1.5-1

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with Dravo at the G&H office in New York to review various drafts of this plan. The resulting comments were then incorporated by Dravo, and the finalized Project Plan was submitted to ICGG for transmittal to the Illinois EPA. A copy of the Record EAR was also forwarded to the Illinois EPA for use in reviewing the Project Plan.

● PSD Permit

The Dravo Pittsburgh office furnished G&H with information supplied by FMC relative to changes in emissions from criteria pollutants. G&H subsequently conducted computer reruns of the CRYSTER air quality dispersion model, based on FMC's new emissions data, and determined that there are no significant changes to previous worst case model findings.

ICGG representatives visited the G&H office to review the status and drafts of the letter prepared in response to the Illinois EPA comments on the PSD Permit Application. The formal letter of response was then completed and forwarded to ICGG for transmittal to the Illinois EPA.

● Solid Waste Development Permit Application

Reviewed with ICGG drafts of the report outline and format for the Solid Waste Development Permit Application. Work is in progress on the completion of data and preparation of texts and tables for this document. This includes the preparation of all boring logs and test holes in the monitoring wells; soils classifications; groundwater quality data sheets; legal description of the site; and site hydrogeological characteristics.

Reviewed Illinois EPA regulatory documents pertaining to the development and operation of a solid waste facility.

Work Forecast

Dravo Continue review of TSCA and RCRA regulations as they relate to the Demonstration Plant, update the Permits and Licenses Schedule, and develop the Solid Waste Development Permit Application.

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1.9 Technical Support

Work Accomplished

CDC The Fuller-Kinyon pump test report is under final internal review. A Fuller Company proposal for additional tests with Illinois No. 5&6 coal has been evaluated internally. A program for additional tests was drafted and is under internal review.

The Carrier Company completed the 1200°F particulate erosion tests with char dust. The tests were conducted in a nitrogen atmosphere to prevent combustion of carbon. Preliminary findings indicate that erosion by the char is low. The char test results are clouded by some indications that deposition occurred during the char tests. Samples of target specimens containing catalyst and char deposits were received from Carrier Corporation and examined by microscope. Tests with fly ash at 1200°F and room temperature were completed. These tests concluded the experimental program by Carrier. The weight loss of the target specimens tested at room temperature was significantly less than the weight loss of the target specimens tested at 1200°F. Carrier is sending CDC these target specimens for examination. The final report from Carrier is expected in late March.

All oil samples for the Toxicological Screening Program were received and sent out to the four laboratories for testing. The samples will be tested for acute and mutagenic response. Three of the laboratories began their test programs and a CDC representative visited two of them. Work is proceeding on schedule.

Work Forecast

CDC Begin the toxicological testing program at the fourth laboratory. Complete acute toxicity, acute inhalation toxicity, mitotic gene conversion and Ames tests. Prepare the subchronic test program work statement and send out solicitations for proposals to conduct the program.

Examine the erosion test target blade specimens for deposition. Review the Carrier final report. Issue CDC's final report on the Particulate Erosion Test Program.

Issue the Fuller-Kinyon Pump Test Report. Participate in a meeting with the Fuller Company and finalize a program for additional tests.

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1.10 Long Lead Procurement List

Work Accomplished

Dravo After ICGG, CDC and Dravo representatives reviewed the Power Recovery Unit specification prepared by PRC, a meeting was held at the PRC office in Burbank, CA on January 26, 1981 to finalize the specification.

Work Forecast

Dravo Assist ICGG in the FGO solicitation negotiations.

2.6 Demonstration Plant Definitive Design

Work Accomplished

ICGG HRI reviewed the Area 204B Piping Model in Pittsburgh on December 9, 1980, and subsequently met with ICGG and Dravo representatives to discuss their comments, which were mainly precautionary in nature. Based on Commercial H-Oil® and H-Coal® operating experience, HRI identified equipment requiring good access for maintenance or manual operation. Other minor technical details of Task VI design work were also discussed by ICGG, Dravo and HRI.

HRI responded to Dravo Task VI questions on instrumentation details for the H-Oil® Reactor and prepared revised detail drawings for support of H-Oil® Reactor internals, based on refinements recently made to commercial H-Oil® unit design.

HRI revised the Area 204B Pittsburgh Coal Case Material Balances, incorporating the cracking and heteroatom removal data obtained by HRI in the Bench Scale H-Oil® Test Program, conducted during July-December 1980, at the HRI Research and Development Center in Lawrenceville, NJ. Revised PFD's and Equipment Data Sheets for HRI's Task II Detailed Process Design Report were prepared, consistent with the new material balance. Because the Illinois and Western Coal Cases did not change, and the Illinois Case produces the most oil, equipment design capacities did not change, except for a small decrease in the capacity of the Vacuum Tower. The revised PFD's and data sheets were received on March 6, 1981, and copies are being distributed to all recipients of HRI's Task II Detailed Process Design Report.

During January and February 1981, HRI reviewed and commented on Revision 3 of the Area 204B P&ID's and the latest Layout Drawings.

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In a meeting with ICGG and Dravo representatives on December 4, 1980, Benfield reviewed the Area 206 Piping Model and the latest Revision of the P&ID's. Benfield's comments were very few and minor in nature. At this meeting, Benfield was given Area 206 Equipment Specifications as revised in Task VI, which they reviewed under Segment II of their subcontract with ICGG. Benfield presented minor comments on the specifications in a letter to ICGG.

ICGG met with Parsons, Dravo and UOP/SDC representatives on December 2, 1980, in Pittsburgh, to discuss Parsons' final decisions on insulation and materials of construction for Area 207 Bulk Methanators. Parsons' conclusion is that the design they presented in their Task II Detailed Process Design Report, which has external insulation over refractory lined low-alloy steel methanator vessels, is still the optimal design. Commercially available temperature sensors, such as the continuous thermistor wire system manufactured by Kidde, will be used, along with infrared scanning, to detect hot spots should they occur. Methanator vessel size is small enough to make a continuous thermistor detection system practical.

Representatives of ICGG, Parsons and Dravo met in Pittsburgh on February 6, 1981, to discuss alternative designs for high-temperature Area 207 piping to reduce piping heat loss. A high alloy pipe design with internal refractory and external insulation has been proposed by Dravo.

Benfield reviewed revised Area 208 P&ID's, PFD's and Equipment Specifications transmitted by ICGG during December 1980. Benfield presented minor comments in a letter to ICGG.

FMC calculated revised compositions for the Area 211 Stack flue gas, based on the new flue gas feed compositions which resulted from the incorporation of the Williams Impact Dryer Mill into Area 202. The new compositions were well within allowable limits for the criteria pollutants (SO₂ and particulates). This information was used by ICGG to update PSD Permit Application data, and to supplement EAR emission data.

FMC prepared specifications for a slightly larger venturi scrubber and separator unit which is required to handle the greater flue gas volume resulting from incorporation of the Williams Impact Dryer Mill into Area 202. Details of the larger unit and other process effects of the change were discussed in a meeting of FMC, ICGG and Dravo representatives on February 13,

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1981, at FMC in Itasca, IL. Most Area 211 process equipment handles liquids and solids, not flue gas, and was not affected, because the total amount of SO₂ collected did not change significantly.

On December 3, 1980, Parsons reviewed the preliminary Area 212 Piping Model with no major comments. Other Task VI technical items pertaining to Area 212 were also discussed, including government comments from the 30% Design Review Meeting.

Parsons again reviewed the Area 212 Detailed Piping Model on February 6, 1981 in Pittsburgh and submitted minor comments to ICGG and Dravo for their consideration.

Dravo Development of definitive design documents by Dravo's engineering disciplines continued. The third session of the 30% Design Review was held December 16-18, 1980, at the Dravo Pittsburgh office with representatives from the Government team, ICGG and CDC. The purpose of this session was to review and discuss the 30% design document packages for Areas 202, 203, 204, 213, 214, 215, 217, 218 and 220. This session concluded the CE 30% Design Review of all Demonstration Plant areas. Documents for the 60% Design Review were compiled and issued to ICGG, on an area by area basis, by February 23, 1981, for submittal to the Government team. A typical issue of a document package contained the following items, varying in degree of development and quantity of drawings, requisitions, etc., in accordance with the particular area design parameters: (1) the materials of construction design basis and related drawings, (2) process description; (3) PFD's, (4) P&ID's with revision sheets, (5) P&T diagrams; (6) utility summary, (7) utility flow diagrams, (8) specifications for material take-off (including piping and plumbing specifications), (9) vessel, mechanical, HVAC, instrument and electrical requisitions and (10) layout, HVAC, piping orthographic, architectural, civil, structural and electrical drawings.

Continued to update and revise, on an area by area basis, the design basis, process description, P&ID's, material balance calculations, energy balances, equipment specifications, process control descriptions, utility and reagent requirements, and utility routing diagrams. The CE 30% Design Review comments were not incorporated into the PFD's because extensive revision will be required upon finalization of the material and energy balances. These quantities will be finalized by Dravo upon receipt of the CDC Task VI material and energy balances.

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Final piping models for Areas 202, 204, 205, 207, 208, 209 (included with Areas 207 and 208), 211 and 213 were submitted to ICGG for approval, and were subsequently released as "Approved for Engineering". Also issued to ICGG, and subsequently approved, were layout drawings for Areas 201, 210 and 218; piping orthographic drawings for Areas 201, 205 and 219; and piping requisitions for Areas 203 and 214. Development of remaining drawings, including piping fabrication drawings, and construction of final piping models was in various stages of preparation and checking. Enlarged Plot Plan drawings were completed, with coordinates being set for each area.

A number of vessel requisitions for Areas 204, 206 and 208, and all of the requisitions prepared for Areas 205 and 207, were issued to ICGG and subsequently released as "Approved for Engineering".

Mechanical requisitions for Areas 205, 206, 208, 210, 211, 214 and 219 were also issued to ICGG and released as "Approved for Engineering". Remaining requisitions for Areas 202, 203, 204 and 218 were revised, checked and submitted to ICGG for approval.

HVAC calculations and drawings for the Control Room, Personnel Building, as well as calculations for the Electrical Room were completed. Work on the sulfur dust collector system was also completed. Preparation and checking of HVAC drawings for Areas 202, 203, 210 and 220 is nearing completion while those for Areas 206 and 208 were submitted to ICGG and subsequently released as "Approved for Engineering". HVAC equipment requisitions remain in various stages of preparation, checking and issue for approval.

Development of structural framing design and drafting and architectural design continued. All structural design drawings for Areas 204, 205, 206, 207, 208, 209, 211, 213, 215, 216 and 219 have been submitted to ICGG and released as "Approved for Engineering". All architectural design drawings for Areas 201, 204, 206, 211 and 216 were issued and have been "Approved for Engineering", as well. Work continued on preparation, checking and issue of the remaining applicable drawings. Development of the Block Plans (final site development) continued. Plan and profile drawings of the routing of the water pipeline from the Mississippi River to the plant site and drawings of the river water intake systems were submitted to ICGG and "Approved for Engineering". Architectural detail designs for the Administration Building, Personnel Building, Garage and Warehouse were submitted to ICGG and approved.

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Designs for the remaining non-process buildings were issued to ICGG, but are still undergoing review. These designs included the Guard House, Weigh Stations I & II, Control Building and Laboratory. Design of the railroad spur connecting the plant site to the Illinois Central Gulf Railroad line was completed. Work is now in progress on the development of the in-plant railroad, pipe rack and sewer system designs. Rough grading drawings, showing construction site drainage, are being revised in accordance with CE review comments. Work continued on underground pressure piping and yard service rack designs.

Preparation of instrument requisitions and P&T diagrams continued. Work also continues on development of requisitions for special thermal elements and control valves for equipment items in Areas 203 and 204, and on the design of the utilities control panel in Area 217. Instrumentation in Areas 217 and 218 is being reviewed to coordinate it with process changes and with package units. Local control panels and logic diagrams for programmable controllers were issued to ICGG and released as "Approved for Engineering". A preliminary Instrument Index was issued for each of the Demonstration Plant areas. Instrument calculations

for control valves and relief valves are being checked for those areas which have been completed, and are in preparation for the remaining areas. Work was initiated on the Instrument Hardware Estimate. Issued the revised Hazard Specification (Revision C).

Preparation and checking of one line diagrams, elementary diagrams, lighting and grounding layouts, and power and control conduit layouts continued. All electrical layouts and diagrams for Areas 201, 205, 206, 211 and 216 were subsequently issued to ICGG and released as "Approved for Engineering". Many of the equipment locations, short circuit and load study calculations, and major electrical equipment requisitions, prepared as a function of Area 215, Utilities, were submitted to ICGG. Electrical room layouts, fire alarm/communication system plans, an equipment list and lighting fixture schedule are also being prepared.

Categorical equipment lists, i.e., field erected vessels, shop erected vessels, pumps, compressors, etc. were prepared by the Estimating Group, and all items are ready for pricing. Continued preparing structural, concrete, piping and electrical material take-offs for pricing.

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The following subsections highlight design development, meetings and discussions, and definitive engineering functions pertaining to work accomplishments of particular significance for areas within the Demonstration Plant.

Coal Preparation

Recalculated material balances resulting from the addition of the Williams Impact Dryer Mill System into the design of this area. Other applicable design documents, being prepared by Dravo's respective engineering disciplines, are also being revised to incorporate the Williams System.

Reviewed and commented on CDC's Design Basis for the revised Task VI material and energy balance.

A representative from Everlasting Valve Company visited the Dravo office on February 3, 1981, to discuss lock hopper valves.

Pyrolysis and Gasification

Refractory design developments were discussed during the Biweekly Review/Coordination Meetings with ICGG and CDC. Refractory Design Review Meetings were also held at the Dravo office in Pittsburgh, PA, with representatives from ICGG, CDC, and CDC's design consultant. Discussions at these meetings included topics such as the enclosure of the Area 203 structure to control ambient conditions and the development of the "zebra" refractory design by Dravo's Refractory Services. Both of these were studied as possible alternatives to reduce the heat loss in the gasification process. The scheme to enclose the structure was subsequently rejected. The "Zebra" refractory design was submitted to ICGG and CDC for review. Work is now in progress on making minor modifications to the design.

A program to test the stability of the refractories proposed for Area 203, under the specific conditions which exist in the operating atmosphere of the COGAS Process, was developed with the University of Missouri at Rolla and the U.S. Bureau of Mines Research Center in Tuscaloosa, AL. Test work for this program was initiated by the university and U.S. Bureau of Mines on February 1, 1981.

Evaluated Buell's design information on cyclones for Pyrolyzers A, B, C, D & E and the Make Gas Cyclones.

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Work is in progress on developing designs for the Gasifier Debris Removal System and the Mixing Section Debris Removal System.

Process and Mechanical Disciplines defined the water flush system for the cleaning of pyrolysis vessels.

The development of a vacuum cleaning system, Reactor Cleaning System (203-47903), for the cleaning of vessels during plant shutdown proceeded. The Mechanical Discipline is working with vendors to implement the design.

The detailed development of the Solids Removal System (203-47101) was completed.

Discussed expansion joints in Area 203 with a member of PCF Sales Corp., representing Zellea Bros. Inc., and initiated steps to secure a secrecy agreement between Zellea and CDC.

Met with representatives of Pielkenroad Separator Company to discuss plate separator applications for decanting oils in Areas 203 and 204A.

Met with a representative of Craig Equipment Company to discuss and develop details for the Char Dump System (203-47902) using United Conveyor equipment.

Reviewed Pyrolyzer instrument nozzle elevations with a CDC representative.

In a response sent to ICGG, Dravo proposed the rejection of CDC's ECP-C-012 for air injection into Pyrolyzer E, and recommended instead that this be handled as a piping change.

Responded to a CDC Memo concerning differences between the DPPD and Task VI material and energy balances, thereby fulfilling CDC's request for a written response.

Technical information, i.e., relief valve and ignitor data, and design requirements for earthquake protection, was furnished as required to EVT, the Combustor design subcontractor, to assist in the development of the Combustor specifications.

Oil Recovery and Treatment

Developed winterization standards for equipment, vessels and piping.

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Incorporated changes requested in ECP-C-008 into the process specification for the Oil Dehydrator (204-35939).

Estimated purging requirements for instrumentation in Area 204A, Oil Recovery.

Completed design of the Solids Blowdown System. The Process Discipline prepared the process specification for the Solids Blowdown Knock Out Drum to determine the cost and impact of ECP-D-069, which proposes the addition of a blowdown tank and pump in Area 204B, Oil Treatment. This design is presently being circulated in-house, prior to being submitted to ICGG for approval, to gather information for use in preparing an impact statement.

Shift and Methanation

Dravo began an economic analysis of two proposed system designs. These design alternates are the installation of uninsulated pipes, thereby accepting high heat loss and increasing the capacity of the start-up heater, vs. the installation of pipes which are externally insulated with a more expensive alloy.

Flue Gas Power Recovery

Prepared a process specification for the Desuperheater (210-48102) which is required to temper the steam for the FGO soot blowers.

A discussion of the cold test requirements of the Power Recovery Unit specification was held with representatives from CDC. Dravo subsequently reissued the specification so that the turbine motor-generator will provide sufficient horsepower to supply 90% of the air required for combustion in the Illinois No. 5 & 6 coal case. CDC provided a new quantity for the Compressor discharge pressure, based on the existing material balance.

Discussed the impacts of a Demonstration Plant shutdown resulting from a total lack of power, particularly the impacts to the EVT Combustor design in Area 203 if circulating flow water is stopped. Dravo sent a telex to EVT requesting how long the Combustor can be operated without circulation before the tubes are damaged. EVT responded, providing the requested information.

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Met with representatives from CE, METC, UOP/SDC, ICGG and CDC to review the status of the emergency power supply and to set priorities for future operating committee work.

Provided information to CDC for use in writing the operating procedures.

SO₂ Removal

Proceeded with the development of a scrubbed duct system design.

Water Supply

In compliance with a Government 30% Design Review comment, Dravo investigated the use of hydrocyclones as a possible substitute for the grit chamber. The result of this investigation was the conclusion that hydrocyclones could be included as an acceptable alternative; however, they do not have the years of proven reliability and widespread acceptance for this application that the grit chamber has.

Waste Treatment and Disposal

Continued to investigate State of Illinois and federal government requirements for Demonstration Plant landfills.

Systems

Representatives from ICGG and Dravo visited the Office of the Illinois State Fire Marshall in Springfield, IL, on February 10, 1981, to review layout drawings for Areas 201, 204B, 205, 206, 212 and 213. These drawings were subsequently approved, and a formal letter of confirmation was sent by the Fire Marshall to Dravo.

Continued work on the ICARUS computerized cost estimate for the 60% Design Review by CE.

CDC

Coal Preparation

All Williams design proposals were received for the Area 202 Impact Dryer Mill. A memorandum will be prepared on the evaluation of the proposals. Reviews of the Area 202 PFD's, P&ID's, preliminary layout drawings and model, which includes the Williams System, were completed. Comments on the P&ID's are under internal review and comments on the model are being drafted. Comments from the review of the PFD's and preliminary layout drawings were transmitted verbally

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to Dravo. Input-output data for the Williams system were estimated for use in the Task VI Material and Energy balances.

Recommendations were issued for using isolation valves between individual lockhoppers to permit replacement of the individual lockhopper valves without plant shutdown. After a review of the Ducon proposal for the Area 202 lockhopper system, CDC recommended against Ducon's use of butterfly valves for shut-off in their lockhopper design.

Representatives attended the 30% design review meeting at Dravo on December 16-18, 1980, and provided technical back-up for questions and comments made by DOE, CE, and UOP/SDC.

Pyrolysis and Gasification

Representatives participated in the 30% design review meeting for the Area 203 in December 1980, providing technical back-up for questions and comments made by DOE, CE and UOP/SDC. Comments from the meeting requiring further CDC action have been resolved, and preparations for the 60% design reviews have proceeded.

Remaining CDC work items which arose from meetings held last quarter with EVT, the Combustor design subcontractor, were completed. Revisions to the Combustor fuel fines transport gas system were made, by ECP-C-011, to satisfy EVT Combustor burner specifications. An alternative source of transport gas was recommended. Other questions which were resolved concerned the design of various components of the Mixing Section and the emergency cooling water supply for the water wall. CURL Consultancy Report Order No. 8, "Mixing Section Design Package", was issued. In addition, CDC and Dravo have agreed to use the CURL design for the Combustor oxygen probes. Contacts were made to find a potential fabricator for the probe; one fabricator that indicated interest was suggested to Dravo.

At Dravo's request, CURL was authorized to obtain a core sample of refractory and steel shell from a pilot plant transfer line for examination and analysis. Several core specimens along with still photographs and a video tape were received from CURL late in February. These are being reviewed by CDC before being forwarded to Dravo.

The scope, benefits, costs, and schedule for the detailed design of gas distributors in the Gasifier, Pyrolyzer E, and the Strippers to be done by CDC's consultant were presented to ICGG. Upon approval of the program, the required design inputs and instructions

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to proceed with the designs were sent to CDC's consultant. The design has been initiated and CDC is monitoring the progress of the work. Contacts with Exxon were made regarding the possible future use of their all-welded distributor grid design in Pyrolysis. A letter was sent to Exxon in January summarizing CDC technical and project requirements for the grid. However, Exxon replied that they would not be in a position to discuss their technology with CDC for several months.

Intensive effort continued on the review of current drawings and specifications by Dravo for all CDC areas to insure technical accuracy and consistency. A series of reviews of the Area 203 P&ID's to resolve remaining questions by Dravo, and to see that all equipment piping and instrumentation required for start-up and shutdown, as well as normal operation, is provided, are nearing completion. Equipment drawings for Pyrolysis and Gasification, to be included in the 60% design reviews, were reviewed as quickly as they were received from Dravo. Numerous comment memoranda

were issued on these documents, so that Dravo could correct any omissions or inconsistencies prior to the 60% design review meetings.

Reviews of the detailed piping model of Area 203 were initiated. Various instrument nozzle and valve locations, certain piping layouts, and personnel shelter locations in the structure were recommended from the model reviews. Representatives attended a meeting at Dravo with the process and layout groups in February to give general guidelines for orientation of nozzles. Reviews of the piping model continued as it was being constructed. Comments were prepared and issued as the reviews were made, so that inconsistencies could be found and corrected in a timely manner.

A review of the Area 203 pressure balance in conjunction with the design of vessel nozzle details indicated that a revision to the location of the Pyrolyzer A bottom coal outlet line was required, and was subsequently recommended by ECP-C-012. Minor changes to the Gasifier-Fines Feeder pressure balance were also provided. This revision resulted from the recent size change of two Gasifier nozzles.

As part of the effort directed toward developing operating procedures and insuring the adequacy of plant hardware for handling various modes of operation, a study was made to analyze the effect of the loss of coal feed to Pyrolysis in Area 203. Operating procedure recommendations in the event of a loss of coal feed were made. Work was also initiated on providing

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instrument ranges as an input to instrument specifications for Area 203, so that useful readings are obtainable from key instruments during start-up, shutdown and normal operation.

Responses to comments from EA on the matter of solids sample points in Area 203 were issued and recommendations were made that all solids sample points originally proposed by CDC be retained.

The study predicting the quantity of chlorine which can be expected to enter the Gasifier with the char was completed. It was estimated that 25-40% of the chlorine in the feed coal would remain in the char.

Oil Recovery and Treatment

A review of the Area 204A P&ID's, Revision 2, was completed. Comments from the review were drafted. A review of the P&ID's with respect to the adequacy of equipment piping and instrumentation for plant start-up was begun. The P&ID's were also checked against the Area 204A block model. A comment letter was drafted for the model review.

ECP-C-009 was issued and subsequently withdrawn for procedural reasons. However, CDC recommended that the changes to make-up water and liquor blow-down configuration suggested in ECP-C-009 still be adopted. ECP-C010 was issued recommending that one of the first stage Area 204A scrubber pumps be changed to a steam turbine drive.

The original CDC process specifications were reviewed and were found to be applicable to the Dravo recommended design using a packed cooling tower in place of the spray cooling tower associated with Venturi Scrubber II.

Dravo requested information about the particle size distribution of fines in the make gas from Area 203 entering the first stage venturi scrubber in Area 204A. This information was transmitted verbally and subsequently a memorandum was drafted documenting the information. The amount of dissolved gases in the scrub liquor streams was estimated and documented in a memorandum under internal review. The Area 204A equipment requisitions were reviewed and comments transmitted by Dravo.

Representatives attended the 30% design review meeting and provided technical back-up for questions and comments made by DOE, CE and UOP/SDC. A response to UOP/SDC comments concerning the level control scheme for an Area 204A surge tank was issued.

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Flue Gas Power Recovery

A copy was received of the Foster-Wheeler Company proposal for the FGO. A review was initiated in preparation for the proposal review meeting with Foster-Wheeler Company. The proposal contains technical considerations which need to be discussed further with Foster-Wheeler Company.

Revision 3 of Area 210 P&ID's was reviewed and comments were issued. A number of comments pertaining to piping and valve design were resolved in a subsequent conference call between Dravo, CDC and PRC.

A CDC representative attended the meeting between PRC, Dravo and ICGG on January 26 and 27, 1981. Comments from CDC, Dravo and ICGG on the Power Recovery Unit specification prepared by PRC were discussed. CDC comments on the Power Recovery Unit specification were issued.

A CDC representative reviewed the Area 210 piping model on February 18, 1981. One of the major comments was in regard to the support of the Power Recovery Unit. Other comments were noted and a handwritten copy of these comments was given to the Dravo Process Department. A memorandum is being drafted to document the comments. As a result of the model review, a study was initiated to check Dravo pressure drop calculations for piping between Area 203 Secondary Flue Gas Cyclones and the Area 210 Waste Heat Recovery Unit. CDC and Dravo pressure drops are being compared and a memorandum will be issued on the conclusions.

Minor pressure balance and energy balance revisions were issued. These revisions were necessitated by pressure balance revisions in Area 203. Responses to the 30% Design Review comments on heat loss and export electricity were issued. Only minor changes are expected in the steam and electricity outputs from Area 210.

Systems

The revised "Black-Box" and detailed overall material and energy balances for the three coals for the Demonstration Plant were completed and issued. Dravo comments on the basis for these balances were received. Major changes included in these Task VI balances were documented. The parameters for Area 202 were detailed.

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For preparation of the revised material and energy balances, particle size grade efficiencies and other cyclone design data were requested and received from Buell. Adjustments to the coal feed size to Pyrolysis due to the use of the Williams' System in Area 202 were made.

Representatives attended a meeting at Dravo on December 4, 1980, to discuss the overall plant instrument control concept and data acquisition system requirements. On December 10, 1980, CDC, ICGG and Dravo representatives attended a meeting at Princeton to hear presentations on Total Distributed Control Systems by Honeywell and FMC Automation and Instrumentation personnel. Two separate presentations on Distributed Controls were made on January 15, and February 18, 1981 by representatives of the Operations Technologies Department of Tenneco, Inc., one of CDC's partner companies. Various advantages of the Distributed Controls System for the ICGG Demonstration Plant were discussed.

Two separate meetings were held in January 1981 with FMC's Automation and Instrumentation Group in Princeton, NJ and with HRI's Data Acquisition Group in Trenton, NJ. The main purpose of these meetings was to gather input for the preparation of the functional specifications for the Data Acquisition System. The functional specifications for the Data Acquisition System were subsequently completed and transmitted to ICGG and Dravo.

Work was initiated on specifying instrument ranges on pressure and differential pressure instruments for CDC areas. A preliminary list of the ranges was prepared. Work also continued on certain other inputs to instrument specifications.

Work Forecast

ICGG ICGG, Dravo and HRI are scheduled to meet in Pittsburgh on March 11, 1981, to discuss HRI's layout comments and any questions Dravo may need answered in order to complete Task VI in Area 204B.

FMC will revise the complete Area 211 Material Balance as part of the overall Task VI Material Balance revision to be conducted at the end of Task VI.

UEC will review the Area 213 Detailed Piping Model at Dravo in Pittsburgh during March 1981, and will also respond to unresolved comments remaining from the government 30% Design Review of Area 213.

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Dravo Continue Demonstration Plant definitive design work for preparation of the Construction Bid Package(s), the Task VI deliverable.

Continue preparation of the definitive estimate.

Participate in the 60% Design Review.

Finalize the "zebra" refractory design for Area 203.

Continue the development of the Gasifier Debris Removal System, Mixing Section Debris Removal System, water flush system for the cleaning of pyrolysis vessels and vacuum cleaning system for the cleaning of vessels during plant shutdown.

Continue to investigate federal government and State of Illinois requirements for plant landfills.

Develop a scope for the study of a Distributed Control System for possible utilization in Phase II of the Project.

Continue work on the ICARUS computerized cost estimate.

CDC Participate in the 60% design Review Meeting and provide technical assistance to ICGG and Dravo.

Issue CDC memoranda pending and continue the work in progress.

Evaluate the Williams design proposals for the Western Coal Commercial Plant and the three-coal Demonstration Plant.

Forward the core samples of refractory and steel shell and supporting material from the pilot plant to Dravo.

Monitor the progress of the detailed design of gas distributors in Area 203 and provide any additional inputs as required.

Continue to review and comment promptly on the progress on the detailed piping models.

Meet with Exxon in regard to all-welded distributor grid design.

Issue the revised start-up and shut-down procedures for CDC areas. Issue the memorandum regarding the feasibility of cold circulation tests.

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2.7 Construction Planning

Work Accomplished

Dravo Completed an initial draft of the Phase II Change Order Procedures.

Began the in-house review of the Construction Planning Report.

Developed more detailed descriptions of various portions of logistic activities.

Work Forecast

Dravo Continue the development of Change Order Procedures, and refine the Construction Planning Report for issue to ICGG.

2.8 Economic Reassessment

Work Accomplished

Dravo Completed work on the PFD's for Areas 101 and 102, and continued the preparation of those in other areas.

The Demonstration Plant Process Design Report analogous drawings were modified to commercial nomenclature, i.e., area markings were designated as 101 instead of 201, etc.

Began the preparation of equipment specifications for Areas 104 and 105, and completed those for Area 103.

Process descriptions were drafted for Areas 104, 105 and 111.

Prepared item lists for Areas 106, 107, 108, 109, 110, 111, 113, 114 and 120.

Completed calculations confirming the gas heating value estimated earlier.

A meeting was held December 9, 1980, at the Dravo office in Pittsburgh, PA, with representatives from CDC to discuss discrepancies in the CDC material balances for the Commercial Plant reassessment. Dravo completed checking the CDC material balances for the three coal cases in all areas, and generated the material balances for waste streams leaving Area 111.

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A meeting was held January 8, 1981, at the Dravo office to review equipment costs which have dramatically increased as compared to earlier estimates. During this meeting, Dravo representatives indicated in general terms how they are going to evaluate the Commercial Plant.

CDC Minor revisions to the Task VIII PFD's and material and energy balances were made after reviewing comments on the balances by Dravo. The steam rate to the Strippers was increased slightly to improve stripping efficiency, thereby insuring a final SPG heating value of 950 BTU/scf.

CDC met with Dravo in January to discuss apparent commercial plant capital cost increases resulting from a CDC scaling up the DPPD cost estimate. Dravo indicated that the design basis for doing the Commercial Plant economic reassessment was not finalized and that CDC would be informed before it is.

Work Forecast

Dravo Continue the preparation of PFD's, equipment specifications, process descriptions, item lists and material balances.

CDC Follow Dravo's progress on the Commercial Plant economic reassessment.

2.11 Project Management

Work Accomplished

ICGG Three Project Engineers were in residence in Pittsburgh, PA, monitoring the work of Dravo on the Task VI design effort, coordinating the work of the Process Licensors with the Dravo effort, and maintaining liaison with representatives of CE, METC and UOP/SDC, also in residence at Dravo.

Project Engineers in Pittsburgh and Chicago reviewed, commented on, made changes where required, and approved Task VI instrument requisitions, vessel drawings, mechanical equipment requisitions, revised issues of P&ID's, utility routing diagrams, structural drawings, foundation drawings, control center plans, instrument logic diagrams and HVAC system drawings submitted by Dravo for approval.

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A Project Engineer monitored Dravo's progress in incorporating government comments accepted by ICGG at the 30% Design Review Meetings into Demonstration Plant Design Documents, to assure that the comments were incorporated before the 60% Design Review issue.

Biweekly Review/Coordination Meetings were held by ICGG, Dravo, CDC and EA representatives on December 3, 1980, January 7 and 21, 1981, and February 4 and 18, 1981, in Pittsburgh, PA. Current project status, work accomplishments, technical items of concern and future work coordination were the main subjects of the discussions. Government representatives from DOE, CE, METC and UOP/SDC also attended these meetings.

The ICGG Operating Procedures Committee met in Pittsburgh on December 4, 1980, and addressed the problems of plant safety in the event of a total electrical failure. No unusual safety problems exist. Provision of dual electric feeders, plus the usual practices of placing critical rotating equipment on steam drivers, assuring instrument operation through use of an Uninterruptible Power Source (battery pack), and proper selection of valve failure positions, will assure personnel and equipment safety. Also addressed at the meeting was the status of the revised Demonstration Plant start-up procedure, being developed jointly by ICGG, Dravo and CDC.

Throughout the quarter, the ICGG, CDC and Dravo representatives to the Operating Procedures Committee conducted a review for operability of the Demonstration Plant, looking especially for possible omissions of valves, vents, or equipment required for safe and smooth start-up and shutdown. This included reviewing newly expanded start-up and shutdown procedures for Areas 203 and 210, developed by CDC. Changes suggested by the Committee to improve operability or maintainability are input to the head of the Dravo Process Department for dissemination to the Area Process Engineers for incorporation into the design, as appropriate.

On December 12, 1980, ICGG representatives attended a briefing held by DOE and Procon employees regarding the "Construction Readiness Audit" conducted by Procon in January 1981. The briefing, held at the Pittsburgh Airport Hilton, was primarily for informing the ICGG and CONOCO site teams about the content and format of the Audit.

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On December 15, 1980, ICGG, Dravo and Government representatives met in Pittsburgh, PA to discuss the contents of the Demonstration Plant Construction Bid, the final Task VI contract deliverable. The government took the position that all comments accepted by ICGG at the 30%, 60% and Final Design Review Meetings must be incorporated into the Construction Bid Package.

On December 16-18, 1980, the final session of the 30% Design Review Meeting, covering Demonstration Plant Areas 202, 203, 204A, 204B, 213, 214, 215, 217, 218 and 220 took place at Dravo in Pittsburgh, PA. Representatives of CE, DOE, METC, UOP/SDC, ICGG and Dravo participated. The Design Review Meeting was held to discuss Government comments on documents submitted to CE by ICGG. Minutes of this meeting, containing all action responses agreed to by Government and Contractor representatives, were prepared by ICGG and were transmitted to CE on January 9, 1981.

The Project Plan was completed and was delivered to the Illinois EPA on December 30, 1980. The Project Plan represents a composite application for various air and water quality and solid waste disposal permits required under the Illinois EPA's Coordinated Permit Review Procedure.

At the Illinois EPA's request, ICGG agreed to waive the response deadline for the PSD Permit Application from January 11, 1981, to March 26, 1981. Because the PSD Permit now falls under the Coordinated Permit Review Procedure, the Illinois EPA was not prepared to issue the PSD Permit to ICGG until the solid and liquid waste control information in the Project Plan was reviewed. The Illinois EPA stated that the new March 26, 1981 date will allow sufficient time for review and approval of the Project Plan, a public hearing on the PSD Permit Application, and issuance of the PSD Permit.

Documents for the 60% Design Review were sent to the government by ICGG on January 9, 1981 (Area 205), January 13, 1981 (Areas 209 and 216) and January 24, 1981 (Areas 206, 207, 208 and 212).

On January 14-16, 1981, a Construction Readiness Audit Meeting took place at Dravo in Pittsburgh. Representatives of ICGG and Dravo, as well as government representatives, met with the DOE appointed Construction Readiness Audit Panel from PROCON,

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supplying information on the status of various documents, permits and plans required to initiate construction of the Demonstration Plant. The Panel's work included inspection of various construction-oriented materials, including the Detailed Piping Models, structural drawings, civil drawings, etc. This inspection was conducted under ICGG's supervision.

By January 30, 1981, document packages for Areas 201, 210, 211, 214, 219, 220 and 221 (Systems) were also completed, but were not sent, at CE's directive. On January 29, 1981, ICGG initiated work on making an accounting of all project documents listed in the MSS/DSS but not included in the packages of 60% Design Review documents sent out during January 1981. ICGG was instructed by CE that this accounting must be completed before packages for other areas would be accepted by CE.

During February 1981, ICGG produced additional sets of documents for the 60% Design Review, along with a complete accounting of all documents listed in the MSS/DSS, and submitted these by area to the CE site representatives for acceptance prior to transmittal in accordance with CE directives in letter HI-106. By February 27, 1981, all documents and accountings had been submitted to the CE site representative for checking and acceptance. Document sets for Areas 200, 201, 202, 205, 206, 207, 208, 209, 212, 214, 215, 216, 219 and 221 were accepted and shipped to CE, DOE, METC and UOP/SDC by February 27, 1981.

On January 26-27, 1981, representatives of ICGG, Dravo, CDC and PRC met in PRC's office in Burbank, CA, to discuss the detailed Power Recovery Unit specification developed by Power Recovery Unit in ICGG's effort to approach procurement of the Power Recovery Unit as a Task X Long Lead Time Item. The specification for this unit is now being finalized.

On February 5-6, 1981, representatives of ICGG, Dravo, CDC and CDC consultant met to review specific Area 203 piping, vessel, nozzle and gas distributor design details.

Representatives of ICGG, Dravo and CDC attended vendor presentations on the application of control signal multiplexing, distributed control, and computerized distributed control to large chemical production facilities such as the ICGG Demonstration Plant. The presentations took place on February 10, 1981, with

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Eagle Signal in Davenport, IA, and on February 18, 1981, with Tenneco and FMC Corp. in Pittsburgh. ICGG concluded that a multiplexed distributed control system is now a commercialized, viable, desirable alternative for Demonstration Plant instrumentation. However, the impact of changing the pertinent design documents, i.e., panel drawings, P&ID's, electrical drawings, etc., is too large for ICGG to consider redesign for distributed control prior to completion of the Phase I Bid Package. The change proposal will be retained as an ECP for consideration early in Phase II.

Representatives of ICGG, Dravo, METC and UOP/SDC met in Pittsburgh on February 10, 1981, to resolve all remaining comments from the three sessions of the 30% Design Review for which UOP/SDC or METC was the agency responsible for followup action. All such comments were resolved to the satisfaction of METC and ICGG, and the resolutions were recorded in an ICGG Memorandum.

Representatives of ICGG and Dravo met with CE in Huntsville, AL on February 10-11, 1981, to discuss and resolve the format and organization to be used for the Demonstration Plant Bid Package(s), as well as details of the "boiler plate" sections. It was agreed that a single bid package will be produced, suitable for release to a single constructor. The bid package will be organized so that it can easily be broken down into sub-packages by construction specialty, i.e., site grading, undergrounds, concrete work, structural steel, etc., for subcontracting purposes. The bid package will not be organized such that one subcontractor could perform all work on one plant area while a different subcontractor performs all work on another area, although it will be possible to subdivide the bid package in this way, if additional effort is expended.

On February 12, 1981, CE, METC and DOE representatives met with ICGG and Dravo in Pittsburgh to discuss the practicalities of using the MSS/DSS to check on the current status of the Demonstration Plant Design, and estimate the remaining effort required to complete the final Bid Package and other Phase I deliverables. CE and DOE representatives returned to Pittsburgh on February 24-25, 1981, and performed a percent complete evaluation of documents randomly selected from the MSS/DSS.

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Two instrumentation specialists from CE met with ICGG, Dravo, CDC, METC and UOP/SDC representatives in Pittsburgh on February 19, 1981, to discuss instrumentation concepts, the types of instrumentation specifications being prepared in Task VI, data acquisitions being prepared in Task VI, data acquisition system capabilities, and the possibility of using distributed control hardware in the Demonstration Plant. This meeting provided a more solid basis for CE's review of instrumentation specifications, instrument lists and P&ID's during the 60% Design Review.

During the week of February 23-27, 1981, representatives of ICGG, Dravo, CDC, METC and UOP/SDC met with EVT in Stuttgart, W. Germany, to review the status of EVT detailed mechanical design work on the Combustor and Mixing Section under Segment II of EVT's subcontract with ICGG.

Audited Direct Costs of CDC at their Princeton, NJ office and of HRI for contracts Nos. 25 and 30 at their McLean, VA office.

Dravo A Vice President of Dravo Engineers and Constructors, has been assigned as Dravo's Project Director for the ICGG Project.

The conceptual draft of the Preliminary SARS Report was completed and reviewed with Government representatives during the 30% Design Review on December 16 & 17, 1980.

Work was initiated on preparation of the Level 3 FMEA portion of SARS and continued on the updating of the Level 2 FMEA's.

The Dravo Pittsburgh, PA, office continued preparation of the Form 60's for CCP G-3, and incorporated information received from the G&H office in New York. Dravo also responded to questions raised by CE relative to CCP G-2.

G&H and Dravo representatives made presentations of Project status to the Government agencies during the Monthly and Quarterly Oral Briefings.

The Quarterly Technical Progress Report, covering the period from September to November 1980, and the Monthly Technical Progress Reports for December 1980 and January and February 1981 were issued to ICGG in accordance with the ICGG/Dravo contract.

THE ILLINOIS COAL GASIFICATION GROUP

Quarterly Technical Progress Report

FE/2012/Q/81/01
March 23, 1981

A study is in progress to establish the design basis for the emergency power system. Work proceeded on the investigation of emergency shutdown requirements, critical equipment required to remain functional during emergency shutdown, i.e., valves, rotating equipment, etc., and proper sizing of the battery pack.

Completed the area by area safety and health hazard analysis, which included categories such as chronic respiratory, dermal and carcinogenesis, radiation, noise, and heat and cold extremes. The conceptual Occupational Safety and Health Analysis is currently being prepared, based on the findings of the safety and health hazard study.

Dravo's R/QA Group received the Government team 30% Design Review comments and subsequently conducted item-by-item inquiries among the engineering disciplines relative to these comments. Pursuant to a request from ICGG's Director - Product Assurance, plans have been made for a surveillance of the 60% CE Design Review submittal for a specific CDC area. Concurrently with the reviews of the CE comments, the R/QA Group conducted routine surveillances among the engineering disciplines.

A summary of R/QA surveillances performed during the months from June 1980 through January 1981 was undertaken upon ICGG request. A total of 404 surveillances were reviewed, this comprising the surveillances of eight individual engineering disciplines and of the documents generated by those disciplines during the recorded period. The results of the summary were charted in matrix form, and subsequently forwarded to ICGG.

The first formal Audit of the ICGG-Dravo R/QA Plan, Program and implementation thereof was performed February 11 & 12, 1981. The meeting was chaired by CE and was attended by representatives of the CE, DOE, UOP and Dravo. Emphasis was placed upon specific information as to the numbers of personnel, names of personnel, and details of activities performed in R/QA activities. The surveillances performed during the period of June 1980 through January 1981 were discussed. DOE and CE representatives in the Audit stressed the need for a list of ICGG Procedures, to be written and fully approved, prior to issue of the Bid Package.

THE ILLINOIS COAL GASIFICATION GROUP

Quarterly Technical Progress Report

FE/2012/Q/81/01
March 23, 1981

The Draft of "ICGG Plan for Reliability/Quality Control Classifications for Equipment Items" was also discussed in the Audit meeting. A Project Management letter, dated February 9, 1981, advised of the completion of necessary guidelines for the determination of the RQC Classifications and requested a definition of specific RQC requirements suitable for insertion into the Bid Package. This compendium of specific requirements for the three RQC Classification was completed by the R/QA Group and submitted to Project Management.

The Task VI schedule was updated as required by work in progress and the Task VI DSS was expanded to define additional documents, including ECP's.

The MSS/DSS was updated to show work in progress in Tasks VII and VIII.

CDC The evaluation of bids received from candidate laboratories for the TSCA Program was completed, selections were made by CDC and subsequently approved by ICGG. Upon receipt of authorization, CDC awarded lower tier subcontracts to laboratories for the designated TSCA test studies:

- Acute Toxicity
- Acute Inhalation Toxicity
- In Vivo Cytogenic
- Mitotic Gene Conversion
- Ames, Bacterial DNA Repair and Mouse Lymphoma

Laboratory schedules as well as an overall program schedule for the "Toxicological Screening" effort were submitted to ICGG in February. Visits were made to two laboratories to review the progress on the test programs.

Toxicological Program Laboratory schedules were submitted to ICGG and the Government in accordance with ICGG's request dated February 3, 1981. A revised "Toxicological Screening Program" schedule (full program) was also submitted to ICGG.

ICGG approved amending the NCB/CURL Consultant Agreement, which had expired November 30, 1980. A copy of the executed amendment to the "Consultant Agreement" was submitted to ICGG.

The CDC recommended "Phase I Extension Work Proposal", which was requested by the Government/ICGG, was prepared and submitted to ICGG on December 15, 1980.

THE ILLINOIS COAL GASIFICATION GROUP

Quarterly Technical Progress Report

FE/2012/Q/81/01
March 23, 1981

Support assistance was provided to ICGG in January 1981 for the audit of ICGG program costs for the period April 1980 through October 1980.

The preparation of an inventory schedule for the ICGG program property located in Princeton was completed and submitted to ICGG.

ICGG approved attendance by a CDC representative at the Eighth Energy Technology Conference. The paper "The COGAS Process Demonstration Plant" to be presented at the Conference in Washington in March 1981 was submitted to ICGG for approval.

Review of CDC proprietary marking on incoming ICGG Project correspondence continues. Inadequacies continue to be found and the originating organizations advised of the corrections needed.

Written backup to the rating of FGO vendors made previously was provided to ICGG.

Work Forecast

ICGG Project Engineers will continue to monitor and coordinate the activities of all subcontractors working on the ICGG Project.

Project Engineers will participate in review and approval of Task VI documents issued to ICGG by Dravo.

Project Engineers will maintain liaison with CE, METC and UOP/SDC representatives in residence at Dravo.

Biweekly Review/Coordination Meetings will be held periodically by ICGG, Dravo, CDC and EA. Government site representatives will be invited to attend these meetings. Upcoming Meetings are tentatively scheduled for March 4 and 18, 1981, and April 1 and 15, 1981.

The transmittal of all 60% Design Review Documents to CE will be completed by March 3, 1981, along with an accounting of documents not being submitted, in accordance with CE's directives to ICGG. Comments resulting from the 60% Design Review are expected to be received from Government representatives by the end of March 1981, and the 60% Design Review Meeting will be scheduled early in April 1981.

Quarterly Technical Progress Report

FE/2012/Q/81/01
March 23, 1981

Non-technical portions of the Demonstration Plant Construction Bid Packages will be prepared and completed in time for them to undergo internal ICGG review by April 1, 1981.

Conduct an audit of Direct Costs for G&H at their New York, NY office and Dravo Chem Plants at their Pittsburgh, PA office.

Dravo Continue work in progress on Level 2 and 3 FMEA's.

Continue the development of the Environmental Safety Analysis and Occupational Health and Safety Analysis.

Prepare Form 60's for CCP G-3.

Continue development of the Bid Package.

Continue work in progress on establishing the design basis for the emergency power system.

Proceed with the preparation of the conceptual Occupational Safety and Health Analysis.

The Dravo R/QA Group will maintain its program of surveillance, both of current work in the engineering disciplines and of documents produced by same.

Continue to update and expand the MSS/DSS to show the Task VI, VII and VIII activities, and also update the DSS to show progress in preparation of the ECP's.

CDC Continue to prepare and report technical and financial information in accordance with the Subcontract reporting requirements.

Participate in the oral briefings, design reviews and coordination and technical meetings as scheduled by Dravo and ICGG.

Resolve outstanding audit questions with ICGG.

Continue supervision of program activities and administration of the lower-tier subcontracts with laboratories participating in the Toxicological Screening Program.

THE ILLINOIS COAL GASIFICATION GROUP

Quarterly Technical Progress Report

FE/2012/Q/81/01
March 23, 1981

CONCLUSIONS

Several meetings were held in the last quarter with the Corps of Engineers regarding the finalization of applicable overhead rates to be used by Gibbs and Hill in Cost Change Proposal CCP-G2. The claims to a fee for work done by Dravo's Chem Plant Division as a result of the extension of schedule also is in contention. Resolution has not yet been achieved on either of these issues.

Preliminary conclusions reported verbally to ICGG by the Corps of Engineers from the Construction Readiness Audit held January 14-16, 1981, indicated that, with the completion of construction management and procurement plans, and necessary financial arrangements, the project could proceed into the construction phase in the July-August 1981 time frame.

The purpose of the Design Audit conducted by the Corps of Engineers in February 1981 was to obtain an independent estimate of work needed to complete Phase I. Preliminary conclusions reached were that, on the basis of documents and drawings inspected by the Audit team, engineering design was as complete or more complete than indicated by Dravo's MSS/DSS system.

Transmission of documents for the 60% Design Review to the Corps of Engineers was completed by March 3, 1981. The 60% Design Review Meeting is expected to be held with the Government team early in April 1981.

Discussions to resolve the format and organization of the Construction Bid Package were held with the Corps of Engineers on February 10-11, 1981. It was agreed that a single bid package would be produced suitable for release to a single construction manager. ICGG will complete a draft of the non-technical portions of the Construction Bid Package for internal review by April 1, 1981.

Dravo's manning on the project will be significantly reduced starting at the end of March 1981.

U.S. DEPARTMENT OF ENERGY
MILESTONE SCHEDULE AND STATUS REPORT

PAGE 1 OF 1

FORM APPROVED
OAS NO. 28-9129

1. Contract Identification		PIPELINE GAS DEMONSTRATION PLANT												2. Reporting Period 2/01/81 through 2/28/81				3. Contract Number EF-77-C-01-2012								
4. Contractor (name, address)		ILLINOIS COAL GASIFICATION GROUP ROOM 3734 55 E. MONROE STREET CHICAGO, ILLINOIS 60603												5. Contract Start Date 06/07/77				6. Contract Completion Date 3/6/81								
7. Identification Number	8. Reporting Category (e.g., contract line item or work breakdown structure element)	9. Fiscal Years and Months												10. Percent Complete												
		FY 77				FY 78				FY 79				FY 80				FY 81				a) Planned	b) Actual			
		77	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	0	N	D	J	F	M	A	M	J	Q4	Q1	Q2	Q3	Q4		
1.0	Conceptual Design																							N.A.	100	
1.1	Conceptual Design and Evaluation of Comm Plt																							▲	100	
1.2	Demonstration Plant Process Design																								100	
1.3	Site Evaluation and Selection																							B	98	
1.4	Demonstration Plant Environmental Analysis																							◇	96	
1.5	Materials and Licenses																							C	80	
1.9	Technical Support																							◇	89	
1.10	Long Lead Procurement List																							◇	95	
1.11	Project Management																								100	
2.0	Final Engineering Design																							◇	69	
2.6	Demonstration Plant Definitive Design																							D	71	
2.7	Construction Planning																							A	46	
2.8	Economic Reassessment																							A	30	
2.11	Project Management																							◇	N.A.	63
11. Remarks																										
12. Signature of Contractor's Project Manager and Date R. J. Eby 3-19-81													13. Signature of Government Technical Representative and Date M. S. Sowell, Jr., Col., USAE													

MILESTONE SCHEDULE AND STATUS REPORT

PURPOSE

A dual-purpose format to establish a baseline schedule and indicate status for performing each reporting category identified in the contract/agreement.

INSTRUCTIONS

- Item 1 — Enter the contract/agreement title as it appears in the official document establishing the contract/agreement.*
- Item 2 — Enter the inclusive start and completion dates for the reporting period for this report.*
- Item 3 — Enter the contract/agreement number as it appears in the official establishing document and append the latest modification number.
- Item 4 — Enter the name and address of the contractor, organization, or agency, as they appear in the contract/agreement.*
- Item 5 — Enter the official start date of the original contract/agreement.*
- Item 6 — Enter the official completion date, as of the latest official modification to the contract/agreement.*
- Item 7 — Enter the identification numbers relating to the contract line items, task, products, or work breakdown structure elements reported in Item 8.
- Item 8 — Enter the same contractually specified reporting categories that are on the associated Cost Plan and Manpower Plan.
- Item 9 — In the lower portion of the space for the item heading, enter the first letter of the month for the first report in the extreme left block. Enter successive months as required. Enter fiscal years in upper portion of the heading space as appropriate for months. Separate fiscal years by extending vertical line between the months of September and October. Enter schedule data below the fiscal year and month headings and to the right of each reporting category listed in Item 8. Use charting information shown at end of these instructions.
- Item 10 — Based on the contractor's best judgment, enter an assessment of actual percent complete toward meeting the objective of each reporting category listed in Item 8. The planned percent complete column is required only for construction contracts.
- Item 11 — Enter any explanatory notes and comments. If more space is required attach additional sheets and so indicate in this block. All schedule variances which exceed established contract thresholds must be explained in the Project Status Report.
- Item 12 — Enter signature of responsible contractor, agency, or organization project manager and date signed verifying the reasonableness of the information furnished, based upon his personal knowledge of the contract's progress and status.
- Item 13 — Signature of DOE Government Technical Representative and date indicating the GTR has reviewed the report. The signature does not constitute a certification of the accuracy of the report nor does it constitute any agreement with the contents of the report, or commit the Government in any way.

*These items need only be entered on the first page of multi-page reports.

CHARTING INFORMATION

SYMBOLS

- △ Major Milestone
- ◊ Major Milestone on the Project Critical Path
- ▽ Intermediate Event (Deliverable, Supporting Milestone, or Decision Point)
- ▲ Intermediate Event completed early or late
- Proposed Scheduled Deviation (late or early) for a Major Milestone
- ▬ Activity Bar
- Time Line
- Time Now

EXAMPLES

- A Major milestone with an activity bar
- B Time now and work done, event on critical path
- C Schedule Deviation (not yet approved)
- D First change approved (slippage)
- E Improvement, not contractually implemented
- F First change approved (improvement)
- G Activity ahead of schedule
- H Activity behind schedule
- I Late and on time completion of intermediate events A and B, respectively
- J Same as Example I above except that here a time line is used in place of an activity bar
- K Original major milestones date and four subsequent approved changes (all slippages) to that date
- L Original major milestones date and two subsequent approved changes (one slippage, one improvement to that date)
- M Intermediate event schedule deviation

CONVENTIONS

- 1 - Blacked-in figures or bars are used to show work done.
- 2 - Open figures or bars show work not done.
- 3 - △ (Major milestone) is twice as large as ▽ or ▲ (intermediate event).
- 4 - Under no condition should more than one △ (major milestone) be shown on a single horizontal line. (See Examples D and F for a method of denoting a rescheduled major milestone ◊; the number "1" indicates the first rescheduling.) Normally the original symbol △ would be shown with the latest rescheduled date (a ◊ with an associated number). In certain cases, where it is desired to show a complete history of rescheduling, a series of ◊'s with associated frequency numbers might be shown as in Example K. If it is not desirable to retain the rescheduling history DOE may request that only the current approved major milestone be shown.
- 5 - Symbols for milestones may be used alone, with an activity bar, or with a time line as the preparer judges best.
- 6 - Intermediate events may be shown only in association with an activity bar or a time line. These event symbols are placed above the bar or line and each is labeled for identification. A description of each intermediate event should be provided in an attachment to the Milestone Schedule and Status Report. One of the two methods is used to show when intermediate events are completed.
 - a - If the event is completed on time, it is blacked-in as shown above (see Example G Event A).
 - b - If the event is completed early or late, the symbol for the intermediate event is inverted (▲) and shown below the line or activity, identified in the same way as the original. The originally planned completion date above the line is left open (not blacked-in) and the deviation to it (below the line) is blacked-in (see Example M, Event A).

MILESTONE LOG**EF-77-C-01-2012****CONTRACT NUMBER**

IDENTIFICATION NUMBER	DESCRIPTION	PLANNED COMPLETION DATE	CURRENT ESTIMATE OF DELIVERY DATE	ACTUAL COMPLETION DATE	COMMENTS
1.1A	Conceptual Commercial Plt Baseline (Flowsheets)	8-Aug-77		3-Aug-77	
1.1B	Drawings/Diagram (Flowsheet) Documentation	8-Aug-77		3-Aug-77	
	Key				
1.1C	Tabulation of Trade-Off Evaluation	8-Aug-77		3-Aug-77	
1.1D	Design Data Tabulation	8-Aug-77		3-Aug-77	
1.1E	Process Evaluation Report	18-Nov-77		25-Jun-78	
1.1F	Revised Conceptual Commercial Plant Baseline (Flowsheets)	18-Dec-77		28-Aug-78	
1.1G	Conceptual Commercial Plant Design Report	7-Jun-78		28-Sep-78	
1.2A	Demonstration Plant Process Design Tentative Baseline (Flowsheets)	18-Jan-78		28-Dec-78	
1.2B	Demonstration Plant Process Design Report (Baseline Design)	7-Jun-78		3-Jun-80	
1.2C	Demonstration Plant Design Analysis Report	7-Jun-78		8-May-80	
1.2D	Demonstration Plt Economic Considerations Report	7-Jun-78		8-May-80	
1.3A	Initial Real Estate Report	8-Aug-77		3-Aug-77	
1.3B	Comprehensive Real Estate Report	7-Jun-78	Uncertain		Pending Final Decision on Site Acquisition Method
1.3C	Site Master Plan	7-Jun-78		21-Jul-80	
1.3D	Climatological and Meteorological Report	7-Jun-78		26-Sep-78	
1.3E	Preliminary Foundation Investigation and Soil Analysis Report	7-Jun-78		27-Sep-78	
1.3F	Site Survey Report	7-Jun-78		22-Sep-78	
1.3G	Local Resources Survey Report	7-Jun-78		11-Aug-78	
1.3H	Site Transportation Study Report	7-Jun-80		22-Sep-78	
1.3I	Site Water Resources Report	7-Jun-78		26-Sep-78	

MILESTONE LOG

EF-77-C-01-2012

CONTRACT NUMBER

IDENTIFICATION NUMBER	DESCRIPTION	PLANNED COMPLETION DATE	CURRENT ESTIMATE OF DELIVERY DATE	ACTUAL COMPLETION DATE	COMMENTS
1.3J	Site Environmental Survey Report	7-Jun-78		27-Sep-78	
1.4A	Base Environmental Analysis Report	8-May-78		29-Jun-79	
1.4B	Record Environmental Analysis Report	19-Jun-78		28-Sep-79	
1.5A	Permits and Licenses Plan	TBS		30-Nov-79	
1.5B	PSD Documentation	TBS		18-Jul-80	
1.5C	Final Feedstock-Product-Waste Plan	TBS		25-Feb-81	
1.9A	Tentative Technical Support Plan	8-Aug-77		3-Aug-77	
1.10A	Tentative Long Lead Time Procurement List	18-Jan-78		21-Aug-79	
1.10B	Long Lead Time Equipment Listing (Update)	7-Jun-78		31-Dec-80	
1.11A	Management Plan	8-Aug-77		4-Aug-77	
1.11B	Management Plan Annex (Documentation Change Control)	8-Aug-77		3-Aug-77	
1.11C	Network Analysis Document	7-Apr-78		23-May-78 (Partial)	Update issued 14-Sep-79 Addendum 1 on 1-Oct-79, Addendum 2 on 30-Nov-79 and Addendum 3 on 28-Dec-79
1.11D	R & QA Plan	7-Apr-78		1-Jun-79	Revision 3 issued 10-Jun-80
1.11E	Configuration Management Plan	7-Apr-78		12-Apr-79	Revision 5 issued 20-Jun-80
2.6A	30% Plant Design Review	TBS		17-Dec-80	
2.6B	60% Plant Design Review	TBS	6-Apr-81		
2.6C	Final Plant Design Review	TBS	22-Jun-81		
2.6D	Plant Design and Construction Bid Packages	TBS	31-Aug-81		
2.7A	Construction Plans	TBS	30-Jun-81		
2.8A	Reassessment of Investment Operating and Product Costs of a Commercial Plant	TBS	31-Aug-81		
2.11A	Summary Network Analysis Document	As Req.		15-May-80	

PROGRAM PROGRESS SUMMARY (SCHEDULE UPDATE)

STATUS ON	MO.	DAY	YR.
	2	28	81

PAGE 1 OF 2

Subcontractor		DATES FOR BOTH PLANNED AND ACTUAL ACTIVITY					
ACTIVITY		Master Schedule		Actual Dates (for Past Activities)		Current Outlook (for Future Activity)	
CWBS No.	Name	Start	Complete	Start	Complete	Start	Complete
1.0-x	Conceptual Design	6-7-77	5-31-78	6-7-77	4-30-80		
1.1-x	Conceptual Design and Evaluation of Commercial Plant	6-7-77	5-22-78	6-7-77	9-30-78		
1.2-x	Process Design - Demonstration Plant	11-18-77	5-22-78	12-1-77	7-31-80		
1.2.1-x	Coal Unloading and Handling	11-18-77	5-7-78	9-4-78	5-30-80		
1.2.2-x	Coal Preparation	11-18-77	5-22-78	12-1-77	6-2-80		
1.2.3-x	Pyrolysis and Gasification	11-18-77	5-22-78	12-1-77	5-30-80		
1.2.4-x	Oil Recovery and Treatment	11-18-77	5-22-78	12-1-77	6-17-80		
1.2.5-x	Gas Purification	11-18-77	5-7-78	9-4-78	5-30-80		
1.2.6-x	Hydrogen Generation	11-18-77	5-7-78	8-28-78	5-30-80		
1.2.7-x	Shift and Methanation	11-18-77	5-7-78	9-1-78	5-30-80		
1.2.8-x	Bulk CO ₂ Removal and Gas Compression	11-18-77	5-7-78	9-4-78	5-30-80		
1.2.9-x	Gas Dehydration	11-18-77	5-7-78	9-4-78	4-30-80		
1.2.10-x	Flue Gas Power Recovery	11-18-77	5-22-78	12-1-77	5-30-80		
1.2.11-x	SO ₂ Removal	11-18-77	5-7-78	9-14-78	5-30-80		
1.2.12-x	Sulfur Recovery	11-18-77	5-7-78	9-14-78	5-30-80		
1.2.13-x	Ammonia Recovery	11-18-77	5-7-78	9-14-78	7-31-80		
1.2.14-x	Thermal Oxidizer and Flare	2-7-78	5-22-78	10-2-78	5-30-80		
1.2.15-x	Utilities	11-18-77	5-22-78	9-14-78	5-30-80		
1.2.16-x	Water Supply	1-7-78	4-7-78	9-18-78	4-30-80		
1.2.17-x	Water Treatment Systems	1-7-78	5-7-78	9-18-78	5-30-80		
1.2.18-x	Waste Treatment and Disposal	1-7-78	5-22-78	9-18-78	5-30-80		
1.2.19-x	Fire Protection System	2-7-78	4-7-78	10-9-78	3-31-80		
1.2.20-x	Facilities	2-7-78	5-22-78	9-18-78	5-30-80		
1.2.21-x	Systems	11-18-77	5-22-78	12-1-77	6-30-80		
1.2.22-x	Economic Assessment	11-18-77	5-22-78	3-2-79	4-30-80		
1.2.23-x	Demonstration Plant Design Analysis	11-18-77	5-22-78	9-18-78	5-30-80		
1.3-x	Site Selection and Evaluation	6-7-77	5-22-78	6-7-77			
1.4-x	Environmental Analysis	6-7-77	2-7-79	6-7-77			
1.5-x	Feedstock Plans, Licenses, Permits and Easements	6-7-77	2-7-79	7-5-77			
1.9-x	Technical Support	6-7-77	5-7-78	6-7-77			
1.10-x	Long Lead Procurement List	6-7-77	2-7-79	6-18-79			
1.11-x	Project Management	6-7-77	6-6-78	6-7-77	4-30-80		
2.0-p	Final Engineering Design	6-1-78	3-7-79	5-1-80			

PROGRAM PROGRESS SUMMARY (SCHEDULE UPDATE)

STATUS ON	MO.	DAY	YR.
	2	28	81

PAGE 2 OF 2

Subcontractor		DATES FOR BOTH PLANNED AND ACTUAL ACTIVITY					
ACTIVITY		Master Schedule		Actual Dates (for Past Activities)		Current Outlook (for Future Activity)	
CWBS No.	Name	Start	Complete	Start	Complete	Start	Complete
2.6-p	Definitive Design - Demonstration Plant	3-7-78	2-7-79	9-4-79			
2.6.1-p	Coal Unloading and Handling	3-7-78	2-7-79	9-17-79			
2.6.2-p	Coal Preparation	3-7-78	2-7-79	6-2-80			
2.6.3-p	Pyrolysis and Gasification	3-7-78	2-7-79	5-7-80			
2.6.4-p	Oil Recovery and Treatment	3-7-78	2-7-79	5-1-80			
2.6.5-p	Gas Purification	3-7-78	2-7-79	4-2-80			
2.6.6-p	Hydrogen Generation	3-7-78	2-7-79	4-2-80			
2.6.7-p	Shift and Methanation	3-7-78	2-7-79	4-7-80			
2.6.8-p	Bulk CO ₂ Removal and Gas Compression	3-7-78	2-7-79	4-2-80			
2.6.9-p	Gas Dehydration	3-7-78	2-7-79	4-7-80			
2.6.10-p	Flue Gas Power Recovery	3-7-78	2-7-79	5-7-80			
2.6.11-p	SO ₂ Removal	3-7-78	2-7-79	6-2-80			
2.6.12-p	Sulfur Recovery	3-7-78	2-7-79	6-2-80			
2.6.13-p	Ammonia Recovery	3-7-78	2-7-79	7-14-80			
2.6.14-p	Thermal Oxidizer and Flare	3-7-78	2-7-79	6-2-80			
2.6.15-p	Utilities	3-7-78	2-7-79	3-3-80			
2.6.16-p	Water Supply	3-7-78	2-7-79	9-4-79			
2.6.17-p	Water Treatment Systems	3-7-78	2-7-79	3-3-80			
2.6.18-p	Waste Treatment and Disposal	3-7-78	2-7-79	6-2-80			
2.6.19-p	Fire Protection System	3-7-78	2-7-79	10-1-79			
2.6.20-p	Facilities	3-7-78	2-7-79	9-4-79			
2.6.21-p	Systems	3-7-78	2-7-79	9-24-79			
2.7-p	Construction Planning	8-7-78	2-7-79	8-25-80			
2.8-x	Economic Reassessment	10-7-78	2-7-79	8-1-80			
2.9-p	Technical Support (As Required)	-	-				
2.10-p	Long Lead Procurement (As Required)	-	-				
2.11-p	Project Management	6-7-78	3-7-79	5-1-80			

3-31-81

ENGINEERING CHANGE PROPOSAL (ECP) SUMMARY FORM

Page 1 of 1

Illinois Coal Gasification Group

Pipeline Gas Demonstration Plant Program

STATUS ON Feb. 28, 1981

ECP NO.	TITLE	Area	STATUS*	DATE SUBMITTED	DATE APPROVED	CONTRACT AMENDMENT		IMPACT		SWBS ELEMENTS AFFECTED
						DATE	NO.	ΔCOST	ΔCOMPLETION DATE FOR LEVEL 1	
D001**	Gas Purification	205	A	2-21-80	3-05-80	-	-	-	-	1.2.5
D002**	Oil Treatment	204B	A	2-28-80	3-21-80	-	-	-	-	1.2.4
D003**	Coal Preparation	202	A	6-19-80	6-25-80	-	-	-	-	1.2.2
D004**	Hydrogen Generation	206	A	2-26-80	3-05-80	-	-	-	-	1.2.6
D005**	Bulk CO ₂ Removal and Gas Compression	208	A	2-21-80	3-05-80	-	-	-	-	1.2.8
D006**	Gas Dehydration	209	A	2-21-80	3-05-80	-	-	-	-	1.2.9
D007**	Shift and Methanation	207	A	2-26-80	3-05-80	-	-	-	-	1.2.7
D008**	Pyrolysis and Gasification	203	A	3-21-80	3-21-80	-	-	-	-	1.2.3
D009**	Oil Recovery	204A	A	6-19-80	6-25-80	-	-	-	-	1.2.4
D010**	Flue Gas Power Recovery	210	A	3-21-80	3-21-80	-	-	-	-	1.2.10
D011**	SO ₂ Removal	211	A	6-19-80	6-25-80	-	-	-	-	1.2.11
D012**	Sulfur Recovery	212	A	6-19-80	6-25-80	-	-	-	-	1.2.12
D013**	Ammonia Recovery	213	A	7-09-80	8-05-80	-	-	-	-	1.2.13
D014**	Thermal Oxidizer and Flare	214	A	6-19-80	6-25-80	-	-	-	-	1.2.14
D015**	Waste Treatment & Disposal	218	A	6-19-80	6-25-80	-	-	-	-	1.2.18
D016**	Coal Unloading & Handling	201	A	1-14-81	1-26-81	-	-	-	-	1.2.1
D017**	Utilities	215	P			-	-	-	-	1.2.15
D018**	Water Supply	216	A	1-14-81	1-26-81	-	-	-	-	1.2.16
D019**	Water Treatment Systems	217	P			-	-	-	-	1.2.17
D020**	Fire Protection System	219	A	1-14-81	1-26-81	-	-	-	-	1.2.19
D021**	Facilities	220	A	1-14-81	1-26-81	-	-	-	-	1.2.20

*STATUS - ENTER ONE LETTER

(I) INCORPORATED BY A
CONTRACT AMENDMENT

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(P) PLANNED

CUMULATIVE COST IMPACTS

-	TOTAL OF ALL ECP'S INCORPORATED
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ENGINEERING CHANGE PROPOSAL (ECP) SUMMARY FORM

Page 2 of 2

Illinois Coal Gasification Group

Pipeline Gas Demonstration Plant Program

STATUS ON Feb. 28, 1981

ECP NO.	TITLE	Class	STATUS*	DATE SUBMITTED	DATE APPROVED	CONTRACT AMENDMENT		IMPACT		SWBS ELEMENTS AFFECTED
						DATE	NO.	ΔCOST	ΔCOMPLETION DATE FOR LEVEL 1	
D022	Hydrogen Gen	II	A	6-06-80	6-06-80	NA	NA	(20,000		2.6.6
D023	Regeneration Reboiler	II	A	6-17-80	6-21-80	NA	NA	12,840		2.6.8
D024	Lean Solution Flash Tank	II	A	6-17-80	6-21-80	NA	NA	2,640		2.6.8
D025	Remove Coal Prep Bin	II	A	10-01-80	10-07-80	NA	NA	(27,000		2.6.2
D026	Clarifications and Corrections Area 205	II	A	7-10-80	7-18-80	NA	NA	--		2.6.5
D027	Clarifications and Corrections Area 205	II	A	7-10-80	7-18-80	NA	NA	1,500		2.6.5
D028	Change Pyrolyser Mat'l	II	P							2.6.3
D029	Fractionator Feeder	II	A	10-03-80	10-23-80	NA	NA			2.6.4
D030	Add Coal Hopper Convey	II	A	10-01-80	10-07-80	NA	NA	22,400		2.6.2
D031	P & ID Revisions	II	A	7-10-80	7-18-80	NA	NA	--		2.6.9
D032	Coal Handling	I	A	8-18-80	11-06-80	NA	NA	5,894,000		2.6.2
I001	Relief Valves	I	D	7-18-80	8-05-80	NA	NA	1,800,000		All
I002	Eliminate Desulfurizer	I	A	8-11-80	11-06-80	NA	NA	(342,000		2.6.6
D033	Waste Treatment	I	A	8-19-80	11-12-80	NA	NA	(65,200		2.6.18
D034	Lime Soda Softening	I	A	8-19-80	11-06-80	NA	NA	(143,000		2.6.18
C001	Water Wash Pyrolyzer	I	A	8-25-80	11-06-80	NA	NA	215,400		2.6.3
C002	Pyrolyzer D Mat'l	I	D	8-12-80	8-12-80	NA	NA	-		2.6.3
C003	Oil Decanter IV	II	A	8-12-80	8-22-80	NA	NA	40,800		2.6.4
C004	Gasifier Bed	II	A	10-14-80	11-03-80	NA	NA	2,000		2.6.3
C005	Disc & Donut Baffle	II	P			NA	NA			2.6.4
C006	Rev. to Fines Line Sizes	II	P			NA	NA			2.6.3
C008	Rev. oil Dehydra. Proc.	II	P			NA	NA			2.6.4
C010	Scrubber Pump Conver.	II	P			NA	NA			2.6.4
C011	Rev. Combust. Trans. Gas	II	P			NA	NA			2.6.3

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ENGINEERING CHANGE PROPOSAL (ECP) SUMMARY FORM

Illinois Coal Gasification Group

Pipeline Gas Demonstration Plant Program

STATUS ON Feb. 28, 1981

ECP NO.	TITLE	CLASS	STATUS*	DATE SUBMITTED	DATE APPROVED	CONTRACT AMENDMENT		IMPACT		SWBS ELEMENTS AFFECTED
						DATE	NO.	ΔCOST	ΔCOMPLETION DATE FOR LEVEL 1	
C012	Pyrolyzer "A" Outlet	II	P			NA	NA			2.6.3
C013	Pyrolyzer "E" Start up	II	P			NA	NA			2.6.3
D028	Pyrolyzer "E" Mat'l	I	P			NA	NA			2.6.3
D035	P & ID Revisions	II	A	9-22-80	9-22-80	NA	NA	--		2.6.6
D036	P & ID Revisions	II	A	9-22-80	9-22-80	NA	NA	--		2.6.6
D037	P & ID Revisions	II	A	9-29-80	10-01-80	NA	NA	--		2.6.8
D038	Delete Inline Static Mixer	II	A	9-29-80	10-27-80	NA	NA	(5,500)		2.6.18
D040	Add System Lift-Back Wash Pump	II	A	9-29-80	10-27-80	NA	NA	4,800		2.6.18
D041	Delete Sludge Mixer	II	A	9-29-80	10-27-80	NA	NA	(23,400)		2.6.18
D042	Delete Polymer Drum Pump	II	A	9-29-80	10-27-80	NA	NA	--		2.6.18
D043	Slaked Line Feed Modification	II	A	9-29-80	10-27-80	NA	NA	30,000		2.6.18
D044	Exchange Sulfuric Storage Mod	II	A	9-29-80	10-27-80	NA	NA	--		2.6.18
D045	Delete Leachage Pump	II	A	9-29-80	10-27-80	NA	NA	(10,800)		2.6.18
D046	Process Flow Dia. Rev.	II	A	9-29-80	10-27-80	NA	NA	--		2.6.18
D026R	P & ID Add & Corr.	II	A	10-02-80	10-24-80	NA	NA	--		2.6.5
D047	P & ID	II	A	10-29-80	10-29-80	NA	NA			2.6.18
D048	P & ID	II	A	10-20-80	10-29-80	NA	NA	--		2.6.11
D049	P & ID	II	A	10-30-80	11-12-80	NA	NA	--		2.6.4
D050	P & ID	II	A	10-28-80	12-08-80	NA	NA	--		2.6.7
D051	Storm Water Collection	II	A	10-28-80	12-18-80	NA	NA	(44,100)		2.6.18
D052	PFD Rev.	II	A	11-10-80	11-21-80	NA	NA	--		2.6.3
D053	Rev. Heat Exchangers.	I	S	1-26-81		NA	NA	107,000		2.6.5
D054	Rev. Const Mat'l	II	A	1-26-81	2-05-81	NA	NA	21,700		2.6.6
D055	Add 2 Mixers	II	A	2-19-81	2-20-81			14,100		2.6.6
D056	P & ID Rev. 2		A	2-02-81	2-09-81	NA	NA	--		2.6.4
D057	P & ID	II	A	12-30-80	1-26-81	NA	NA	--		2.6.5

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ENGINEERING CHANGE PROPOSAL (ECP) SUMMARY FORM

Illinois Coal Gasification Group

Pipeline Gas Demonstration Plant Program

STATUS ON Feb. 28, 1981

ECP NO.	TITLE	CLASS	STATUS*	DATE SUBMITTED	DATE APPROVED	CONTRACT AMENDMENT		IMPACT		SWBS ELEMENTS AFFECTED
						DATE	NO.	ΔCOST	ΔCOMPLETION DATE FOR LEVEL 1	
D058	P & ID	II	A	12-17-80	12-24-80	NA	NA	--		2.6.8
D059	P & ID	II	A	12-30-80	1-26-80	NA	NA	--		2.6.9
D060	P & ID	II	A	12-30-80	1-26-80	NA	NA	--		2.6.11
D061										
D062										
D063	P & ID	II	A	2-02-81	2-09-81	NA	NA	--		2.6.6
D064	P & ID	II	A	1-14-81	1-26-81	NA	NA			2.6.10
D065	P & ID	II	A	1-14-81	1-26-81	NA	NA			2.6.12
D066	P & ID	II	A	2-02-81	2-09-81	NA	NA			2.6.13
D067	P & ID	II	A	1-29-81	2-05-81	NA	NA			2.6.18
D068	Delete Flush Oil Booster Pump	II	D			NA	NA			2.6.4
D069	Solids Blowdown	II	P			NA	NA			2.6.4
D070	P & ID Rev. 2	II	A	1-26-81	2-05-81	NA	NA			2.6.2
D071	P & ID Rev. 2	II	A	2-19-81	2-20-81	NA	NA			2.6.14

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	TOTAL OF ALL ECP'S INCORPORATED
(5,341,020)	INCLUDING THOSE APPROVED BY CCB
(7,048,120)	INCLUDING THOSE SUBMITTED
(-0-)	INCLUDING THOSE PLANNED
1,800,000	" " Disapproved