



ENCOAL Mild Coal Gasification Project

**Annual Report
October 1990 - September 1991**

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INTRODUCTION

This document is the combination of the fourth quarter report (July - September 1991) and the 1991 annual report for the ENCOAL project. The following pages include the background and process description for the project, brief summaries of the accomplishments for the first three quarters, and a detailed fourth quarter report. Its purpose is to convey the accomplishments and current progress of the project.

BACKGROUND INFORMATION

ENCOAL Corporation, a wholly-owned subsidiary of Shell Mining Company, is constructing a mild gasification demonstration plant at Triton Coal Company's Buckskin Mine near Gillette, Wyoming. The process, using Liquids From Coal (LFC) technology developed by Shell and SGI International, utilizes low-sulfur Powder River Basin coal to produce two new fuels, Process Derived Fuel (PDF) and Coal Derived Liquids (CDL). The products, as alternative fuels sources, are expected to significantly reduce current sulfur emissions at industrial and utility boiler sites throughout the nation, thereby reducing pollutants causing acid rain.

ENCOAL submitted an application to the U.S. Department of Energy (DOE) in August, 1989, soliciting joint funding of the project in the third round of the Clean Coal Technology Program. The project was selected by DOE in December, 1989 and the Cooperative Agreement approved in September, 1990.

PROJECT ORGANIZATION OVERVIEW

ENCOAL has agreed to execute the ENCOAL Mild Gasification Project. ENCOAL is the signatory to the Cooperative Agreement and will continue to be owner, manager and operator of the demonstration plant. ENCOAL manages the design and construction of the project through a project manager, who is assisted by a team of technical and managerial personnel. ENCOAL is responsible for all aspects of the project, including design, permitting, construction, operation, data collection and reporting. The engineering, procurement and construction of the plant has been contracted to The M. W. Kellogg Company. Coal will be purchased from the site host, Triton Coal Company. Triton will also provide access to the site, associated facilities and infrastructure vital to the project and administrative services. Equity funding, administrative services, and product marketing services for the project will be provided by Shell Mining Company. Additional technical development support is provided by TEK-KOL, which will also have the primary responsibility for commercialization. All assets will be assigned to ENCOAL, while all technology rights will be held by TEK-KOL and licensed to ENCOAL. (Figure 1 depicts the organization of the project team.)

LOCATION

The demonstration plant site is located in Campbell County, Wyoming, approximately ten miles north of the county seat of Gillette (Figure 2). The site is within the Triton Coal Company's, (a wholly owned subsidiary of Shell Mining Company), Buckskin Mine boundary, proximal to the mine's rail transportation loop. Active coal mining and reclamation activities surround the demonstration plant site.

Figure 1. ENCOAL Project Organization

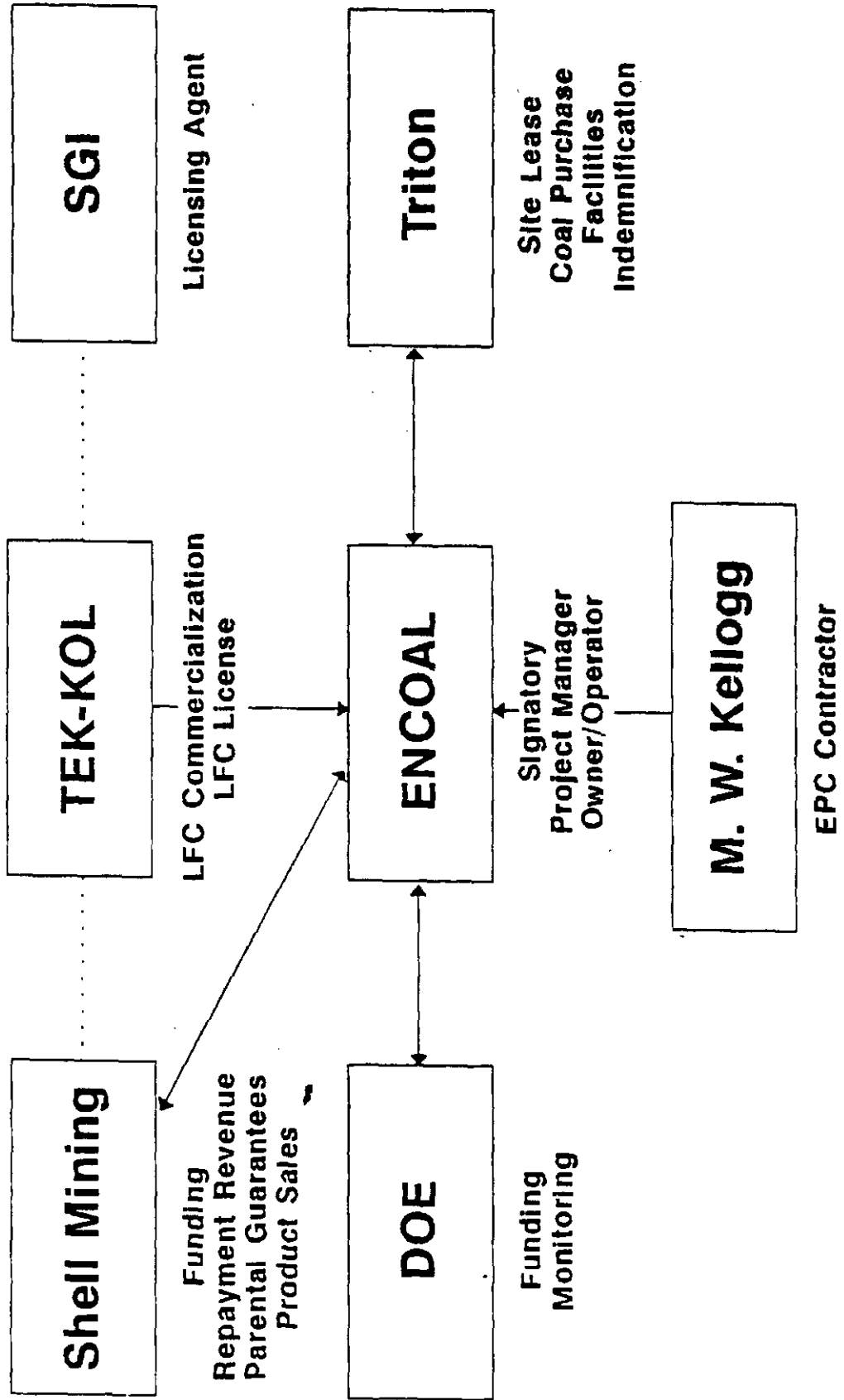
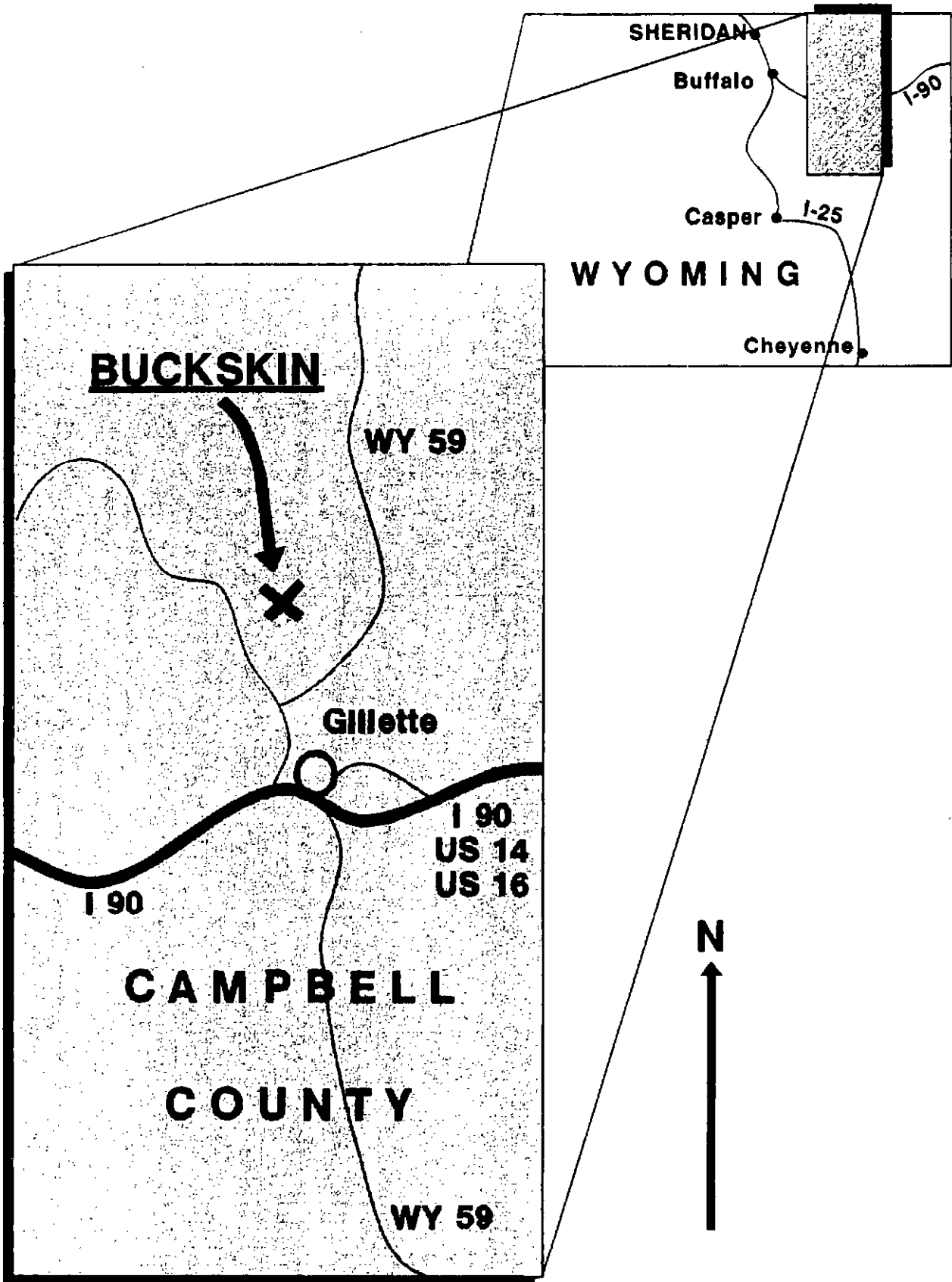


Figure 2. ENCOAL Project Location



PROCESS CONCEPT

The LFC technology uses a mild pyrolysis or mild gasification process which involves heating the coal under carefully controlled conditions. The process causes chemical changes in the feed coal in contrast to conventional drying, which leads only to physical changes. Wet subbituminous coal contains considerable water, and conventional drying processes physically remove some of this moisture, causing the heating value to increase. The deeper the coal is physically dried, the higher the heating value and the more the pore structure permanently collapses, preventing resorption of moisture. However, deeply dried Powder River Basin coals exhibit significant stability problems when dried by conventional thermal processes. The LFC process overcomes these stability problems by thermally altering the solid to create PDF and CDL. The PDF is a stable low sulfur, high BTU fuel similar in composition and handling properties to bituminous coal. CDL is a heavy, low sulfur liquid fuel similar in properties to a Number 6 fuel oil.

Briefly, in the LFC technology, coal is first deeply dried to remove water physically. The temperature is further raised in a second stage which results in decomposition reactions that form the new products. This chemical decomposition (mild gasification) creates gases by cracking reactions, leaving residual solids. The solids are cooled and further processed to make PDF. The gases are cooled, condensing liquids as CDL, and the residual gases are burned in the process for heat.

Figure 3 is a simplified flow diagram of the ENCOAL process. Run-of-mine coal is supplied to the demonstration plant from existing Buckskin Mine storage silos. The coal is transferred periodically to a new 3000-ton storage silo. Coal from this silo is sized by crushing and screening to 2" X 1/8", continuously fed (1000 ton/day) onto a conveyor belt by a vibrating feeder and lifted about 195 feet to the top of the plant building (the entry point to the dryer on Figure 3).

The coal is then fed into a rotary grate dryer where it is heated by a hot gas stream. The residence time and temperature of the inlet gas have been selected to reduce the moisture content of the coal without initiating pyrolysis or chemical changes. The solid bulk temperature is controlled so that no significant amounts of methane, carbon monoxide, or carbon dioxide are released from the coal.

The solids then report to the pyrolyzer where the temperature is further raised to about 1000 °F on another rotary grate by a hot recycled gas stream. The rate of heating of the solid and its residence time are carefully controlled as these parameters affect the properties of both products. During processing in the pyrolyzer, all remaining free water is removed and the chemical reactions occur. After leaving the pyrolyzer, the solids are quickly cooled to stop the pyrolysis reactions.

ENCOAL Mild Gasification Demonstration Project

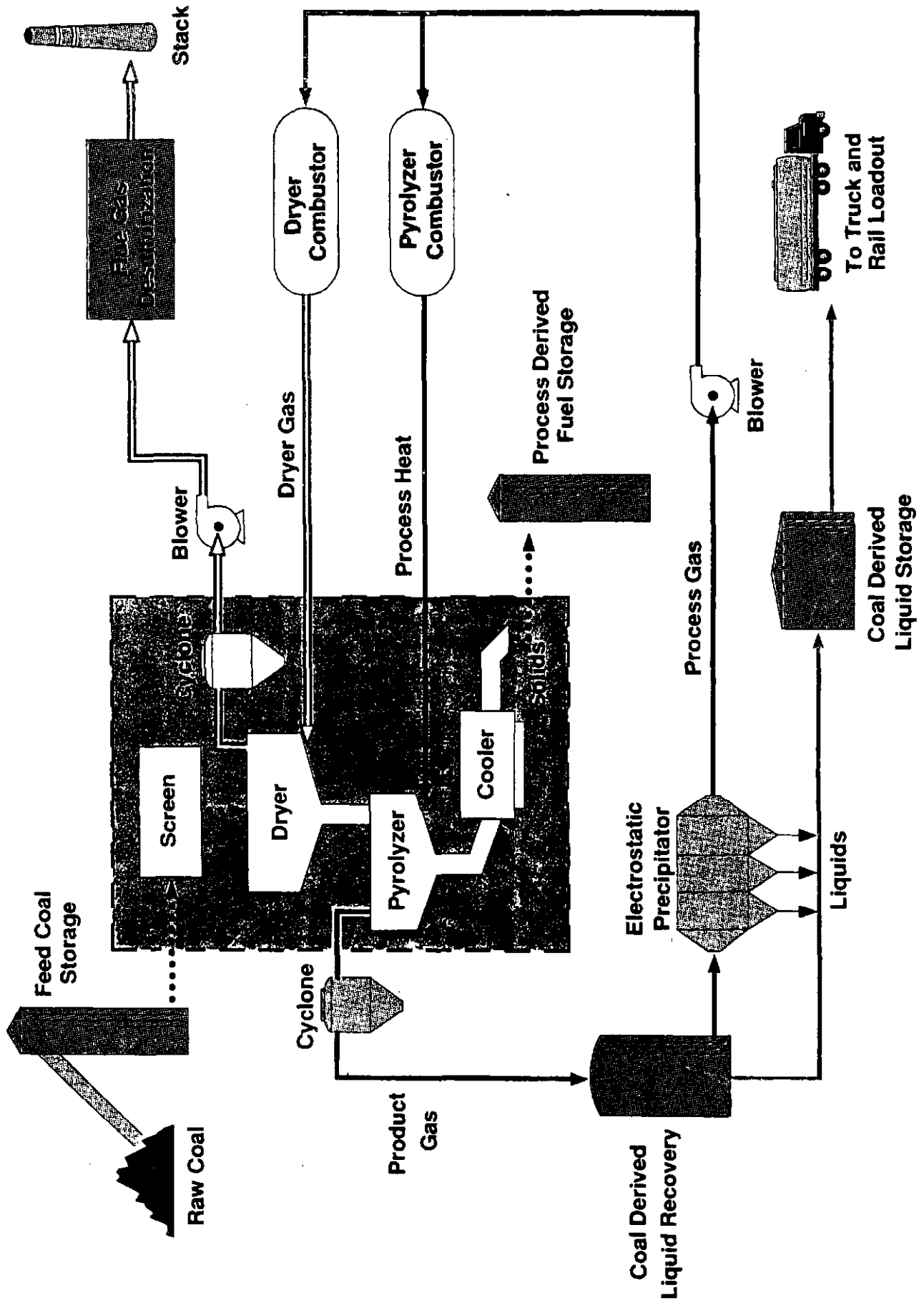


Figure 3: Simplified Process Flow Diagram.

The cooled solids are transferred to a surge bin. Since the solids will be dusty, having no surface moisture, they require dust suppression. A very effective dust suppressant patented by Shell Mining Company, called MK, will be added to the solid product as it leaves the surge bin. The resulting new fuel form is now called PDF. It is transferred to storage silos where it is held for shipment by rail through existing Buckskin loadout facilities.

In the liquids recovery section of the plant, the pyrolysis gas stream or make gas leaving the pyrolyzer is cooled in a quench tower to stop any additional pyrolysis reactions and to condense the desired hydrocarbons. The gas temperature is kept above the dew point of the water so that only CDL is condensed. This step prevents the formation of water in the process and the resulting separation and disposal problems.

Most of the residual gas from the condensation unit is recycled to the pyrolyzer by a blower. Some of this gas is burned in the pyrolyzer combustor and blended with the recycled gas which provides heat for the pyrolyzer.

The remaining gas is burned in the dryer combustor which converts all sulfur compounds to sulfur oxides. Nitrogen oxide emissions are controlled by appropriate design of the combustor, based on evaluation of NO_x control technologies for low BTU gases. The hot flue gas is blended with the recycle gas from the dryer to provide heat and gas flow necessary for drying. The off-gas from the dryer is treated first in a wet scrubber followed by a horizontal scrubber, both using a water-based sodium carbonate solution. The wet gas scrubber recovers fine particulates that escape the dryer cyclone and the horizontal scrubber removes most of the sulfur oxides from the flue gas. The spent solution discharges into a clay lined pond for evaporation.

PROJECT DESCRIPTION

The ENCOAL project involves the design, construction and operation of a 1000 ton per day mild coal gasification demonstration plant and all required support facilities. A significant reduction in work scope and cost is being realized on the project due to the existence of the host Buckskin Mine. Coal storage and handling facilities, rail loadout, access roads, utilities, office, warehouse and shop facilities are all present at the mine site and thus reduce the need for new facilities for the ENCOAL project. Operations staff, supervision, administrative services and site security are being provided under contract with Triton Coal Company. The balance of the project requirements are being provided by ENCOAL and its contractors.

The project is divided into three phases listed as follows:

Phase I -- Design and Permitting

Phase II -- Construction and Start-up

Phase III -- Operation, Data Collection, and Reporting

Two budget periods encompass the work, the first covering Phases I and II and the second covering Phase III. A typical Work Breakdown Structure has been developed for the project.

Engineering, procurement and construction management (EPC) for the project is being handled by The M. W. Kellogg Company. Kellogg's scope of work includes home office design, project coordination, field construction supervision, scheduling, project controls, procurement and project management.

ENCOAL and Triton are handling the operations planning, training, maintenance planning, staffing, plant precommissioning and start-up, data gathering and plant operation. Other than the actual plant operation, many of these activities are taking place in Phase II. Preparation of written plans and manuals is a part of these activities. All permitting requirements are being handled by ENCOAL. Both field engineering and construction support are also being handled by ENCOAL's technical team.

INTERFACE WITH BUCKSKIN MINE PLANT EXPANSION

The Buckskin Mine plant expansion project commenced construction in 1990 adjacent to the ENCOAL project site. The expansion will allow the mine to eventually increase coal production to 20 million tons per year and involves the construction of three new 12,000 ton silos, automated batch loadout facility, transfer tower, in-pit hopper and associated conveyors.

The decisions and approvals of the Buckskin Mine project were made independent of and subsequent to ENCOAL's Cooperative Agreement with the DOE. The interface and proximity of the ENCOAL project and the plant expansion have provided optimization opportunities for ENCOAL, but have also required changes in some instances from ENCOAL's original proposal and Project Management Plan. Examples are changes in grade elevations, moving conveyor supports, use of existing MCC buildings, and moving temporary construction facilities.

EXECUTIVE SUMMARY FOR QUARTERS 1, 2, AND 3

During the first three reporting quarters, ENCOAL made great strides in keeping ahead of the DOE baseline schedule. Engineering and design reached the 90% complete milestone by the end of the third quarter, and the 90% design and 20% construction reviews were held. Phase I design and permitting work was nearly complete, and the Phase II construction and start-up was well underway. The following sections provide a brief summarization of the accomplishments for each of the three reporting periods.

I. FIRST QUARTER ACCOMPLISHMENTS

1.0 PHASE I -- DESIGN AND PERMITTING

The first quarter saw the mobilization of the ENCOAL and Kellogg technical team and engineering task forces in Houston, TX. The 1988 process release was reviewed and updated versions of the piping and instrumentation diagrams (P&ID's), design basis documents and process flow diagrams were made.

The 60% design review milestone was also reached during the first quarter. All major long delivery equipment items were identified and requisitions issued for approximately twenty items on this list. Commitments for the dryer, pyrolyzer, quench chamber and associated equipment, PDF cooler and the electrostatic precipitators (ESP'S) were made. These represented the most critical major equipment items during the first quarter.

The NEPA process was completed with the issuance on an Environmental Assessment in October 1990. A Finding of No Significant Impact (FONSI) report was issued by the DOE as a part of this process. The FONSI report stated that the demonstration plant would have little or no impact on the surrounding environment. The NEPA process was necessary to fulfill Cooperative Agreement requirements to proceed to Phase II construction and start-up activities.

A services agreement was reached with Triton Coal Company for administrative support and operation of the demonstration plant. A services agreement was also executed with Shell Mining Company for technical and administrative support. The Project Management Plan was approved, and a draft of the Environmental Monitoring Plan was also submitted in accordance with the Cooperative Agreement.

2.0 PHASE II -- CONSTRUCTION AND START-UP

Construction accomplishments centered around civil projects. The PDF and screening building mat foundations and steel column pedestals were installed, and activity began on the erection of the coal feed silo. Winter weather idled other major field construction activities.

II. SECOND QUARTER ACCOMPLISHMENTS

1.0 PHASE I -- DESIGN AND PERMITTING

Engineering work peaked early in the second quarter and several disciplines completed their design work by the end of the period. The construction issue of the P&ID's was distributed for the process and off-sites. The effort to develop equipment requisitions continued and several bid packages were prepared for field subcontracts. Detailed design, bid evaluations and review of vendor drawings consumed a majority of the engineering time. Vendor meetings were held for major equipment clarifications of technical points as required to expedite the process.

Permit application preparation was completed on the disposal pond, site drainage, and the ENCOAL facilities. Three individual packages were submitted to the Wyoming Department of Environmental Quality. The state review progressed favorably; approval was received on the ENCOAL facilities allowing construction of the facility to continue. The other packages were still in the review stage with approval expected in the third quarter. In addition, the disposal pond permit application was submitted to MSHA.

Work was also initiated on the start-up and shutdown procedures for the plant. The release of the construction issue of the P&ID's allowed the HazOp team to complete its work. The HazOp review and recommendations were revised and nearly completed.

SGI completed the adaptation of their proprietary control system for the demonstration plant and submitted the needed reports. Programmable logic controller (PLC) programming of the control system, as well as the individual equipment operation, start-up, shutdown and interlocks, was in full swing. The computer stations were received along with the software required for the programming. In addition, ENCOAL and SGI executed a contract for technical services for the project.

Notices of commitments were issued for a majority of the electrical equipment including the substation, switchgear, transformers and motor control centers. The combustors, dryer off-gas blower and quench oil coolers were also committed.

2.0 PHASE II -- CONSTRUCTION AND START-UP

Construction activities intensified with the arrival of spring weather. Work on the PDF building continued with the pouring of equipment foundations and the backfilling of the large mat.

The plant coal feed silo foundation was redesigned using caissons to compensate for unanticipated subsurface conditions. The feed coal silo was poured, and the product silo piling and pile cap were set in place for the expected pouring in May. (See Figures 4 and 5 - Photographs of Second Quarter Silo Construction). Planning for the selection and training of plant operations and maintenance personnel began, with emphasis on the training plan, operations manuals and test plans. Triton also held discussions regarding the project with its mining technicians to determine the level of interest in the operation. A list of volunteers was collected and the skills available was determined. The goal was to have all new employees assigned and ready for training by October 1, 1991.

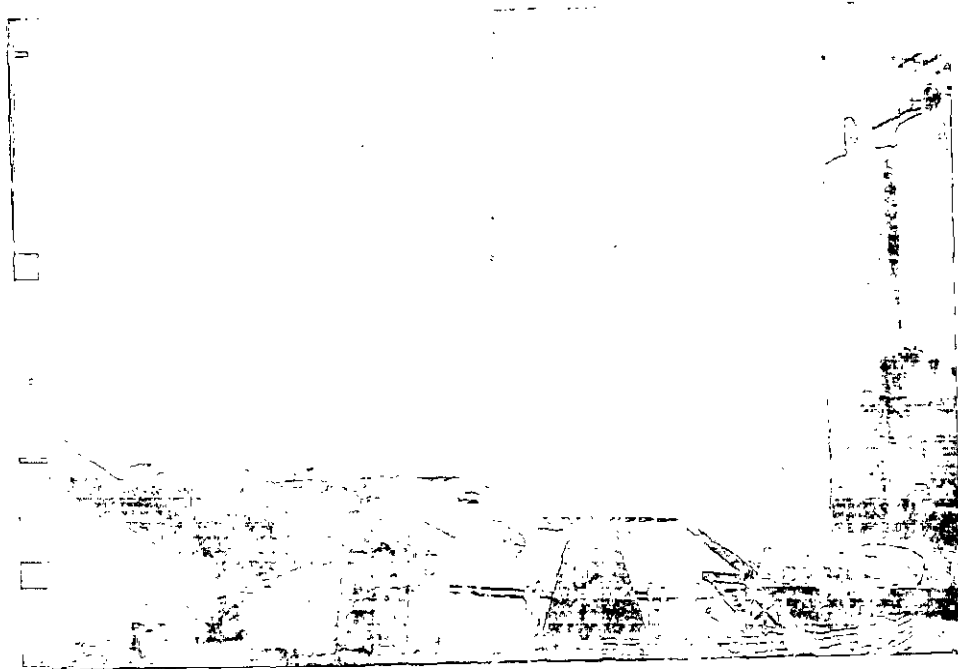


Figure 4: PDF Silo Foundation. (April 1991)

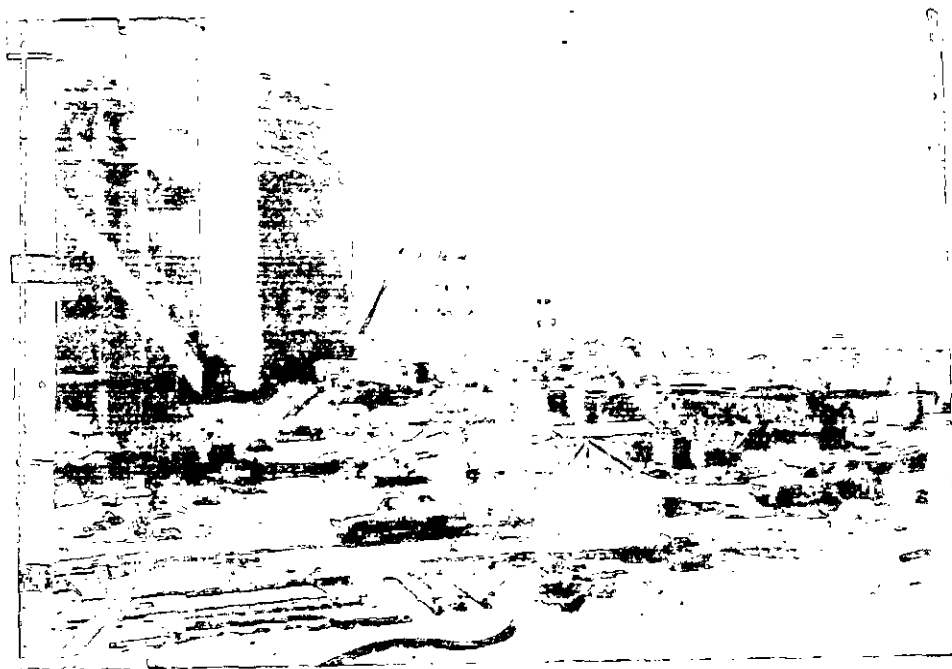


Figure 5: PDF Structure Foundation and Coal Feed Silo. (April 1991)

III. THIRD QUARTER ACCOMPLISHMENTS

1.0 PHASE I -- DESIGN AND PERMITTING

Engineering and design reached the 90% completion milestone during the third quarter. A combination 90% design / 20% construction review was held in Houston and Gillette on May 21 through 23. Meeting notes and responses to questions raised were drafted and circulated internally for review.

Kellogg's only remaining design efforts were in civil (steel details), electrical and instrumentation with all other disciplines demobilizing during the quarter. ENCOAL and KCI staff completed the move to the field. Essentially all operations in Houston were completed and all of the material to be purchased by Kellogg home office was ordered and/or issued for bid. ENCOAL and KCI field engineers assumed responsibility for vendor data review at this time.

The PLC programming for the plant control systems was approximately 50% complete. Final design equipment data sheets and electrical, instrumentation and piping material lists were issued. Civil engineering completed their work and all steel was released for fabrication.

All major materials and equipment supplied by Kellogg were committed with the purchase of the PLC system, gas analyzers, large diameter pre-fabricated pipe and flow meters. In addition, all of the major construction design packages were released for bid. These packages included the off-sites underground piping, remaining off-sites foundation concrete work, and four buildings which make up the architectural package.

A HazOp review was completed during the quarter. The purpose of the HazOp review was to identify any potential operational safety hazards. Several action items were identified and issued to the appropriate groups for implementation. Kellogg and ENCOAL completed a detailed cost estimate update. As expected, some trimming was required to offset increases in the number of pieces of equipment and the significant amount of additional engineering work necessitated by these changes. In addition, a draft of the coal purchase agreement with Triton was prepared and submitted to Triton for review during the third quarter.

An alternative permit application was submitted to the WDEQ which would allow the modification of an existing mine sediment pond to serve as a temporary storage pond with the addition of an 18" clay liner. This action was necessary since the WDEQ questioned the location of the permanent precipitate disposal pond. Without the WDEQ approval, construction would have been postponed until 1992. Approval was received from the WDEQ on the revision to the

Buckskin Mine permit for the inclusion of the ENCOAL facilities in their revised permit. This revision allowed for the construction of all facilities except the permanent disposal pond.

2.0 PHASE II -- CONSTRUCTION AND START-UP

The weather continued to be atypically wet during the first part of the third quarter. The earthwork and foundation/underground piping subcontractors made acceptable progress during the wet period. Progress significantly improved when dry weather arrived at the end of the quarter.

The major mechanical erection contract was awarded. The first major piece of equipment, the PDF cooler, was received by rail and set into place. Several other pieces of major equipment were also received, including the PDF quench chamber which was being erected prior to final placement. The equipment pedestals were completed and the floor slab was poured. This included the incorporation of the underground piping, installation of the floor sumps, drains and grounding system.

The first structural steel deliveries were received in mid June, and the first steel was set on the ENCOAL project by the end of June. The feed coal silo was completed and accepted by ENCOAL. Earthwork for the tank farm area was also initiated. (See Figures 6 and 7 - 3rd Quarter Construction Photos.)

Triton named Kirk Weber, currently the Project Manager for Triton's plant expansion and a member of ENCOAL's Design/Construction team, as the ENCOAL plant manager. Employee selection for plant operations and maintenance was completed. Triton will provide most of the personnel from the existing mine staff with new hires from the local community to backfill these vacancies. In addition to the permanent operating staff, four experienced start-up and operations technicians were temporarily assigned to the project from Shell Development Company in Houston, TX. These people will assist in the construction, training, pre-commissioning and start-up activities, providing valuable skills not available at the mine or in the Gillette area. Their assignment will end approximately six months after successful plant start-up.

Work continued to progress on the test plan, training plan, operations plan and operations manual. The operations team began meeting bi-weekly during the third quarter, working on items which lead to plant start-up and operation.

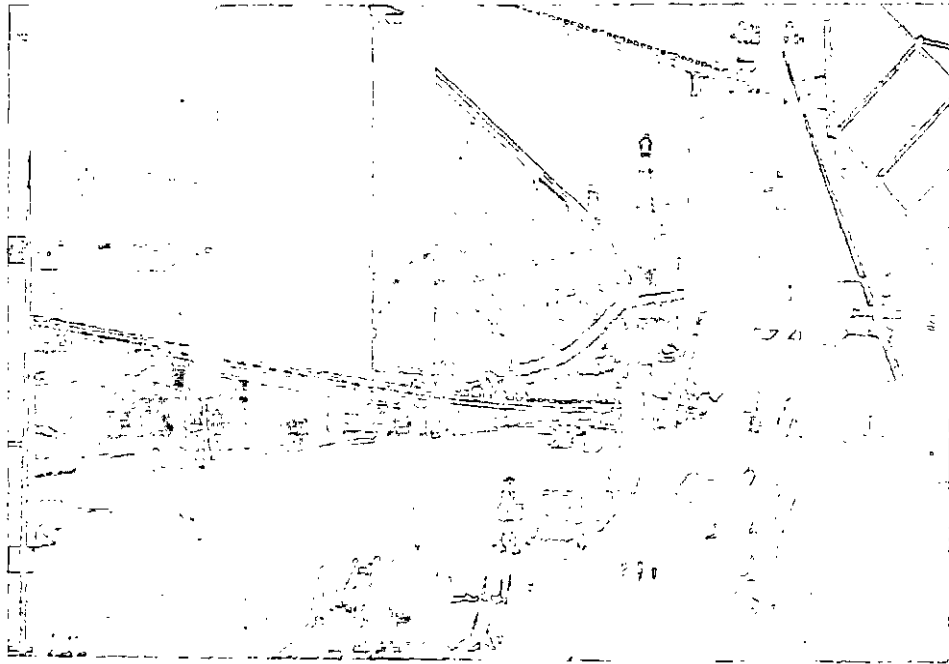


Figure 6: PDF Structure and Steel Lay-Down Yard. (July 1991)



Figure 7: Tank Farm Area and Substation. (July 1991)

EXECUTIVE SUMMARY -- FOURTH QUARTER

Kellogg completed demobilization of their home office engineering task force and responsibility for any remaining engineering was passed to ENCOAL. Kellogg consultation is available on an as needed basis. The final sections of the operations manual were also completed by Kellogg.

Construction of the project dominated the activities of both the ENCOAL and KCI field groups. The main effort was concentrated in vendor data review and in correcting interface problems between vendor and construction release drawings. Essentially all of the ENCOAL technical team staff had reported to the site. Vendor data and material deliveries were lagging in some cases, but action was taken to further expedite deliveries.

PLANNED SCOPE OF WORK

The scope of work for this period included the issuance of the remaining subcontracts including the above ground piping, electrical and instrumentation, and insulation packages. All permits to construct were to be completed and substantial progress was to be made in the erection of the plant and off-sites facilities. Most field engineering work was to be complete and vendor data incorporated.

Operations, training, and testing plans were to be well underway. The last of the remaining ENCOAL technical team members were to report to the site. A draft of the Public Design Report was to be written, and work on PLC systems programming was to be nearly concluded.

ACCOMPLISHMENTS

1.0 PHASE I -- DESIGN AND PERMITTING

Vendor delivery delays of both data and materials made the construction schedule a challenge throughout the quarter. Winterization of the project began with emphasis on obtaining siding for the PDF and off-sites buildings. The M.W. Kellogg home office engineering task force completely demobilized in July. All close out reports were issued with the remaining engineering work to be handled in the field by the ENCOAL technical team.

1.1 Process/Plant Design

The M.W. Kellogg home office engineering task force was demobilized and responsibility for all remaining engineering items was transferred to ENCOAL. As a result, a significant amount of engineering work in correcting interface problems and details is being done in the field. Late vendor information and differences in detailed connections between vendor and construction release drawings have increased the field engineering work. To help eliminate these discrepancies, P&ID's, were updated and submitted to a local drafting firm in October. In addition, a KCI/subcontractor/ENCOAL committee was formed to

study the impact of vendor delays and determine the most cost effective schedule based on expected deliveries. As a result a new mechanical completion date of February 9, 1992 was set. Most critical vendor equipment pieces had been delivered by the end of the quarter; however, vendor data continued to be slow in arrival and emphasis was placed expediting data delivery.

Due to changes and clarifications in the start-up procedures, the PLC programming for the plant control system is being revised and is now approximately 40% complete. The technical team members responsible for the programming have moved to the field. The local E&I subcontractor has also mobilized on site. Their instrumentation work has been subcontracted to a specialist in the industry.

A joint Triton/ENCOAL technical team meeting was held in September to discuss the problem of weighing solids into and out of the PDF plant. It was determined that existing conventional conveyor belt scales could be used to accurately weigh the plant feed and fines returned to the mine. In the case where trucks are used instead of conveyors for fines removal, truck scales would be utilized for fines measurement, thus avoiding the need for new scales.

1.2 Off-Sites and Utilities

A contract for ENCOAL's natural gas service was negotiated. The contract includes a significant reduction in the price of the gas delivered under the contract as well as the installation of a major portion of the line to the site at a lower price than the piping contractor's bid. The installation, ownership and maintenance of the gas line will now be the responsibility of the gas supplier.

Invitations for bid were released for the above ground piping and CDL storage tank linings. Bid packages for the insulation and top of silo conveyor revisions are nearly complete.

A modification to Triton's MSHA permit for Sedimentation Impoundment No. 1, which is the source of ENCOAL's cooling water, was approved in August. The modification allows for the construction of the inlet structure and trenching of intake and return water lines into the embankments. This work was completed during the quarter.

The silo and railroad siding subcontractors demobilized from the site upon completion of their work. The earthwork contractor also demobilized except for a minimal crew left to perform road maintenance and clean up work on an as needed basis.

Work on the architectural building package is continuing to make good progress, which is important since winterization of the project has begun. Both the MCC, (Motor Control Center), and substation buildings have been constructed and the control room/office building is progressing well. Work on the off-sites underground piping is also nearly complete.

1.3 Identify and Design Long Lead Items

All requirements under this heading were completed during the first quarter. The critical equipment list that was previously developed, however, served as the basis for the expediting efforts and continues to be updated as current vendor information is received.

1.4 Project Coordination and Environmental Permitting

Progress was made in the preparation and internal review of the Pre-Manufacturing Notice for the PDF prior to submittal to the EPA, which is expected in November, 1991. Revisions to the MSDS for the CDL and PDF will be made by the end of 1991.

The coal purchase agreement with Triton was delayed until a final decision regarding weight measurement of the solids and handling of the fines portion of the feed coal stream could be reached.

Work is still on going on the list of facilities proposed as Contributions In-Kind and currently in use or projected to be used by ENCOAL. No significant progress was made on this issue as Triton has not yet completed their plant expansion project due to silo design problems. The revised plant expansion start-up date is not yet clear; this will impact the facilities available for ENCOAL's use.

2.0 PHASE II -- CONSTRUCTION AND START-UP

Weather conditions were excellent during most of the quarter. Vendor delivery delays did hamper production efforts, but good progress was made in both the plant and off-sites facilities. Field progress is estimated to be 50% complete as of the end of the quarter.

2.1 Construct Mild Coal Gasification Facilities

Erection of the PDF structure and equipment is proceeding well. Steel work has progressed to the 100 foot level, and the pyrolyzer, ESP's, and FGD scrubber were placed. Siding for the PDF structure was expedited for winterization purposes. ENCOAL and operations personnel began packing the inside of the quench tower. The interior work for the ESP's is nearing completion.

Application of refractory material for the pyrolyzer, dryer equipment and large diameter pipe began. Good weather aided the progress of the refractory application. Curing procedures are being followed to ensure that the refractory is properly freeze protected.

2.2 Construct Off-Sites Facilities and Utilities

The PDF product silo was completed and accepted in July. The railroad siding was also completed during the quarter. The fines bin was also installed in the screening building. (See Figures 8 through 15 - Photographs of Fourth Quarter Construction Activities.)

The electrical subcontractor mobilized on site and started work on installation of the major electrical components. Work is estimated to be 11% complete after the first month on site.

Invitations for bid were released for the above ground piping and storage tank lining packages. Bid packages for the insulation and top of silo conveyor revisions are nearly complete.

2.3 Plant commissioning and Start-Up

The final sections of the operations manual were completed by Kellogg. Any required field revisions and updates to this document will be done next quarter. The training schedules were developed and instructors/authors for the various topics assigned. Several meetings for safety and training planning were held.

2.4 Plant Modifications

Minor modifications to the plant have been incorporated as field changes prior to construction both by Kellogg's Houston office and now largely by ENCOAL technical team members. It is believed these modifications will avoid major changes during initial start-up and operation.

2.5 Project Coordination

There were three MSHA reportable and no lost time accidents during the fourth quarter. Much effort has been made to emphasize the importance of safety on the project. KCI's Kelway program has proved to be an effective safety tool, and will continue to be implemented. Visits from both State and MSHA officials were made during this period. The primary focus of their visit was the Buckskin Mine and plant expansion project, but the ENCOAL project was also reviewed. A safety training and observation program (STOP) was initiated on site. The first meeting for this program is scheduled for October.

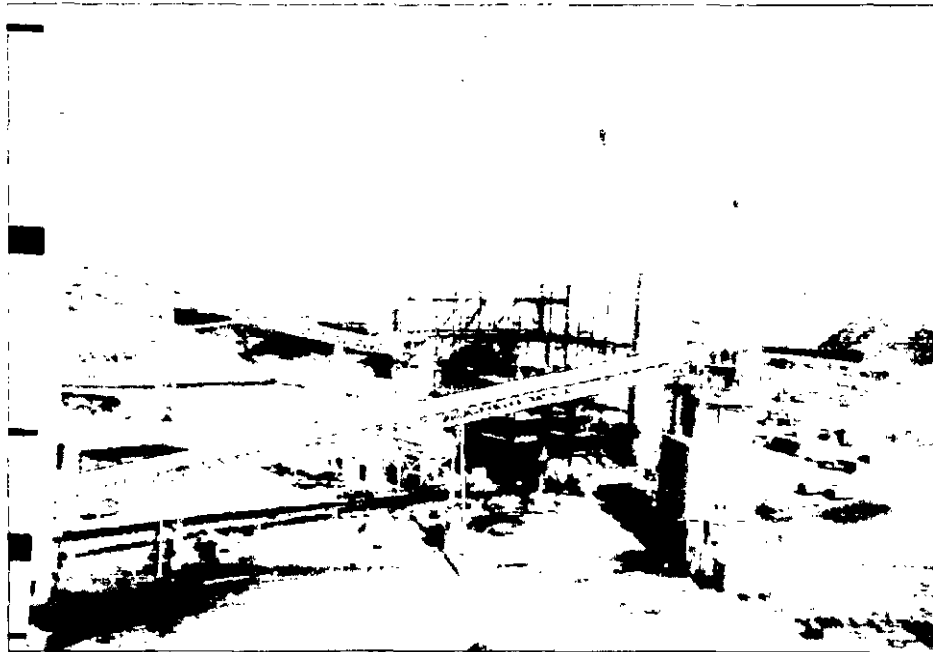


Figure 8: Overall Site. (September 30, 1991)

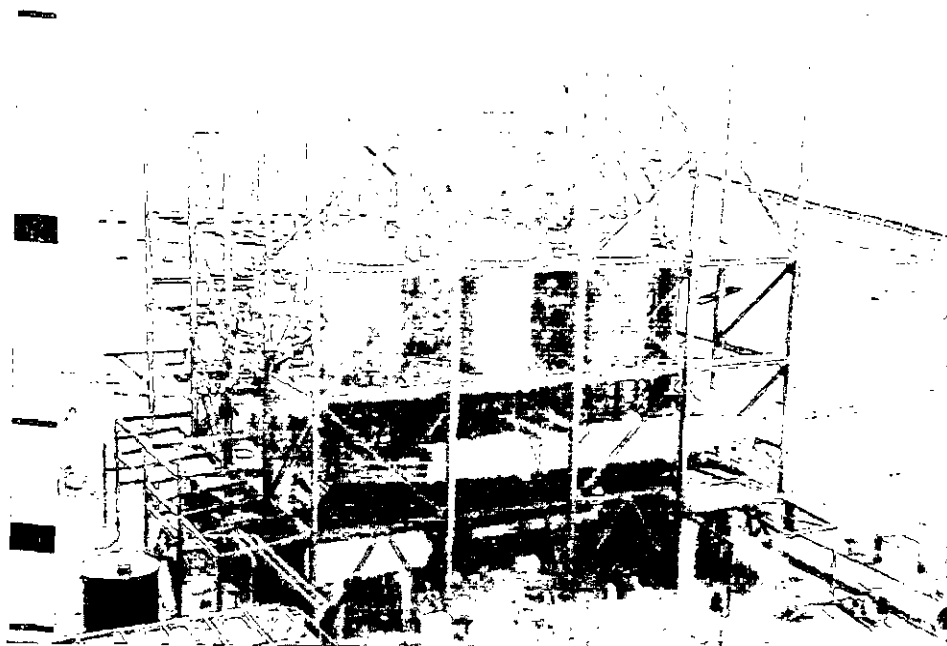


Figure 9: PDF Structure. (September 30, 1991)

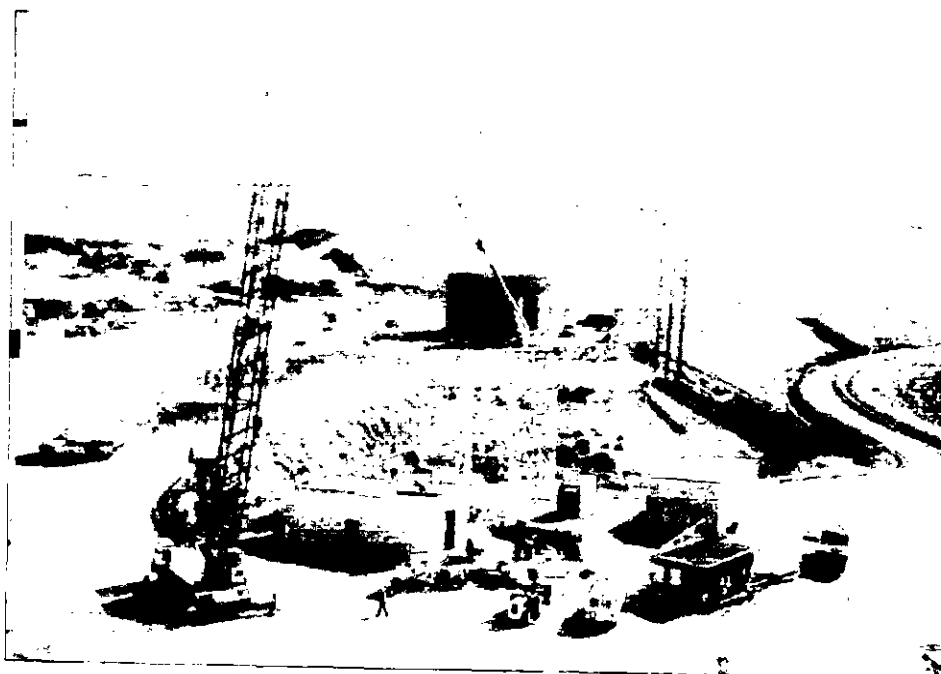


Figure 10: Substation and Tank Farm Area. (September 30, 1991)

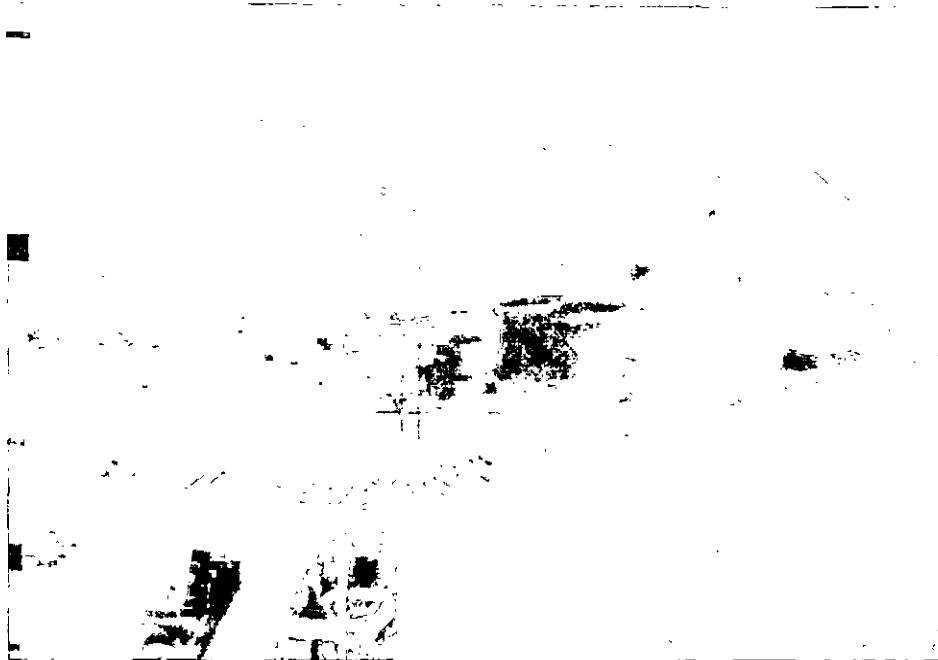


Figure 11: Tank farm area looking north. The large tank is complete, and the smaller tank is nearing completion. (September 30, 1991)

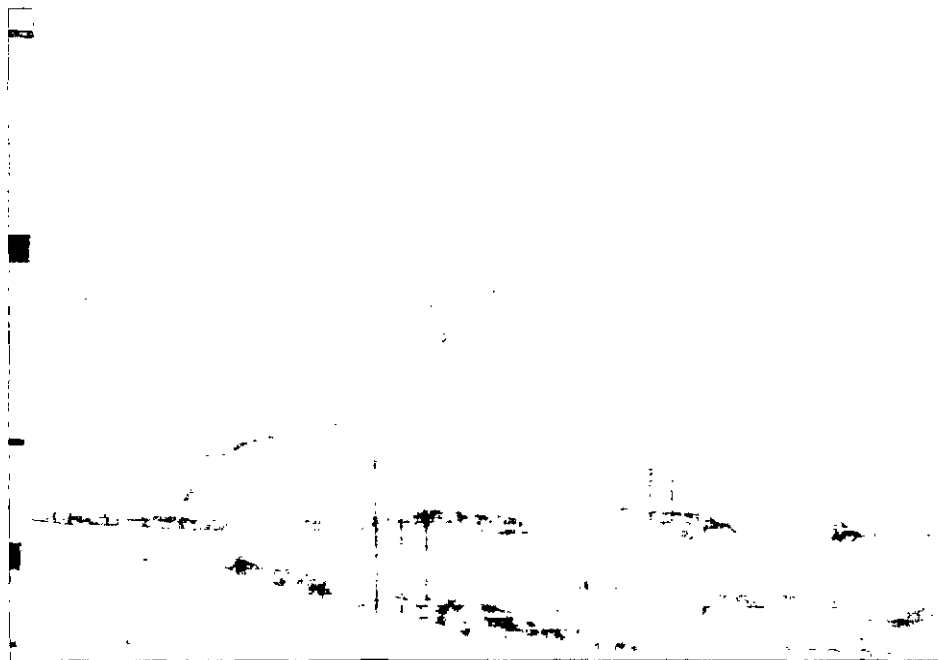


Figure 12: Pump Station Location.

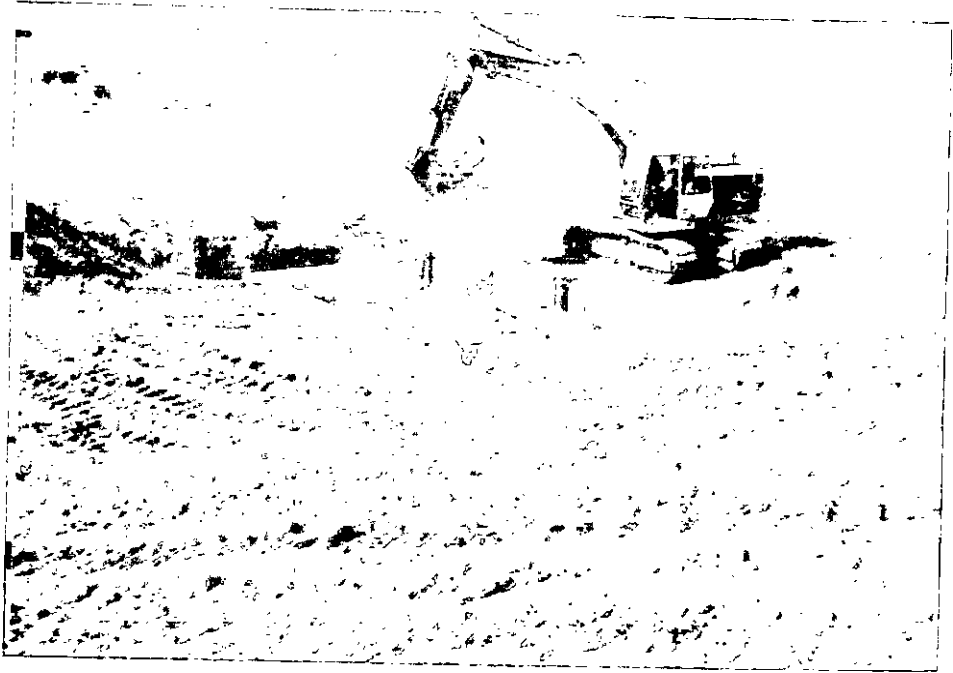


Figure 13: Pump House Foundation. (September 30, 1991)

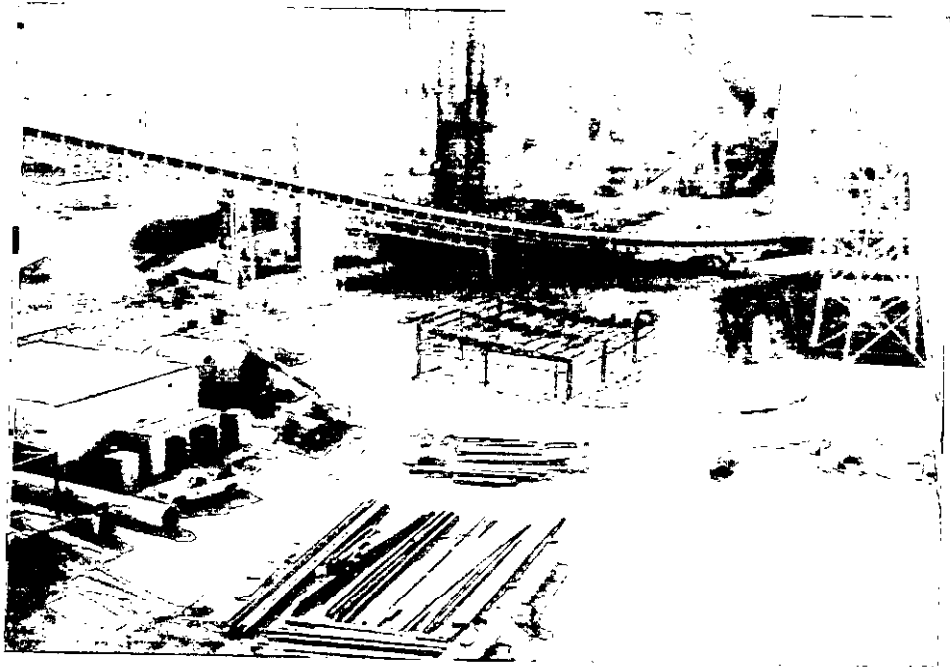


Figure 14: Control Room Building. (September 30, 1991)



Figure 15: Precipitation Pond and Wildlife. (July 1991)

TECHNICAL IMPACTS ON SCHEDULE AND MILESTONES

Despite delays in the receipt of vendor data and materials, construction progress has continued to stay ahead of the DOE baseline schedule. Slippage in material delivery has caused some portions of the project construction to be delayed into the winter, therefore winterization of the project has been initiated.

Milestones reached during the fourth quarter included the completion of engineering design by Kellogg. (See Table 1 - Milestone Log)

CONCLUSIONS AND LOOK AHEAD

Engineering work from Kellogg's Houston office was limited to minor civil engineering support while ENCOAL assumed the responsibility of all of the remaining engineering and design work. The resulting work load was heavier than expected but is now under control. Receipt of vendor information continued to lag, but some improvement was made in expediting vendor material deliveries. A March 1992 start of precommissioning is still projected. (See Figures 16 through 19 for a Pictorial Progress View of the PDF Structure.)

The next quarter activities will concentrate on further construction of the project. Design activities should be completed and bid packages for the insulation and top-of-silo conveyor revisions awarded. Completion of the final design report is scheduled for December. Engineering activities should continue to focus on field modifications to accommodate vendor design. With operator training scheduled to begin in January 1992, completion of training, testing, and maintenance plans will also be required. The PDF building should be completely enclosed and all off-sites subcontract work completed. Completion of these activities will aid ENCOAL's goal of start-up prior to the September 1992 schedule as stated in the Cooperative Agreement.

ENCOAL Mild Gasification Demonstration Project

MILESTONE LOG

Table 1

ID. No	Description	Planned Completion Date	Actual Completion Date	Comments
1	Mobilize Team/Subcontractors	17-Sep-90	17-Sep-90	
2	Complete NEPA	01-Nov-90	01-Oct-90	
3	Project Management Plan	01-Dec-90	31-Dec-90	
4	Design Review - 60%	14-Dec-90	13-Dec-90	
5	Conduct 90% Design Review	15-May-91	22-May-91	
6	Begin Plant Erection	15-May-91	11-Mar-91	
7	Complete Engineering	15-Jul-91	15-Jul-91	
8	Complete Plant Construction	31-May-92		
9	Environmental Monitoring Plan	14-Nov-90	31-Oct-90	
10	Construction Review - 20%	16-May-91	23-May-91	
11	Design Completion Report	16-Sep-91		Expect Compl. by 16-Dec-91
12	Construction Review	16-Dec-91		New review date 15-Mar-92
13	Construction Report	16-Jul-91		
14	Complete Commissioning	16-Sep-92		

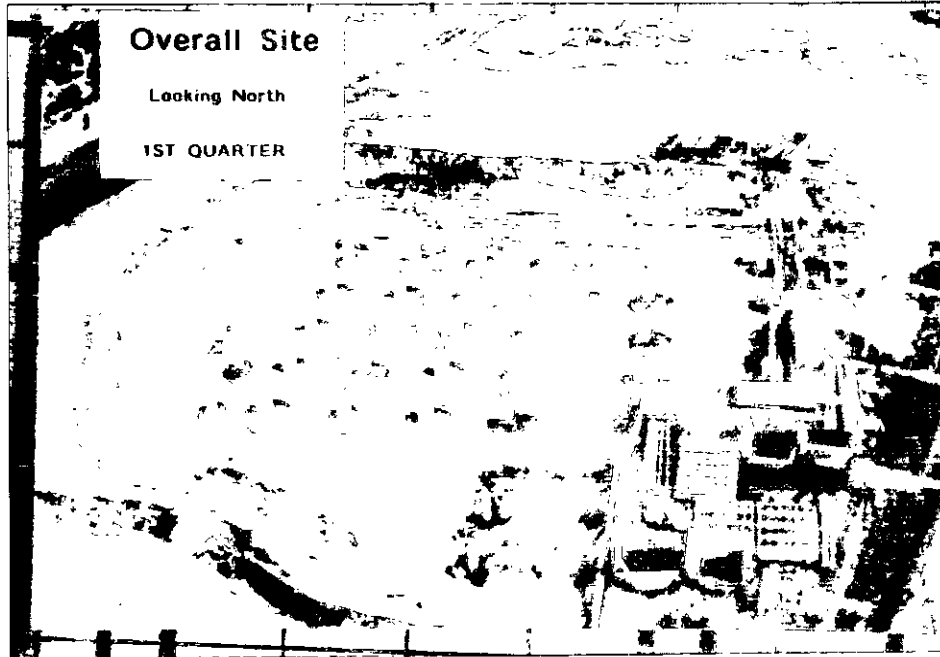


Figure 16: PDF Structure Looking North. (January 1991)

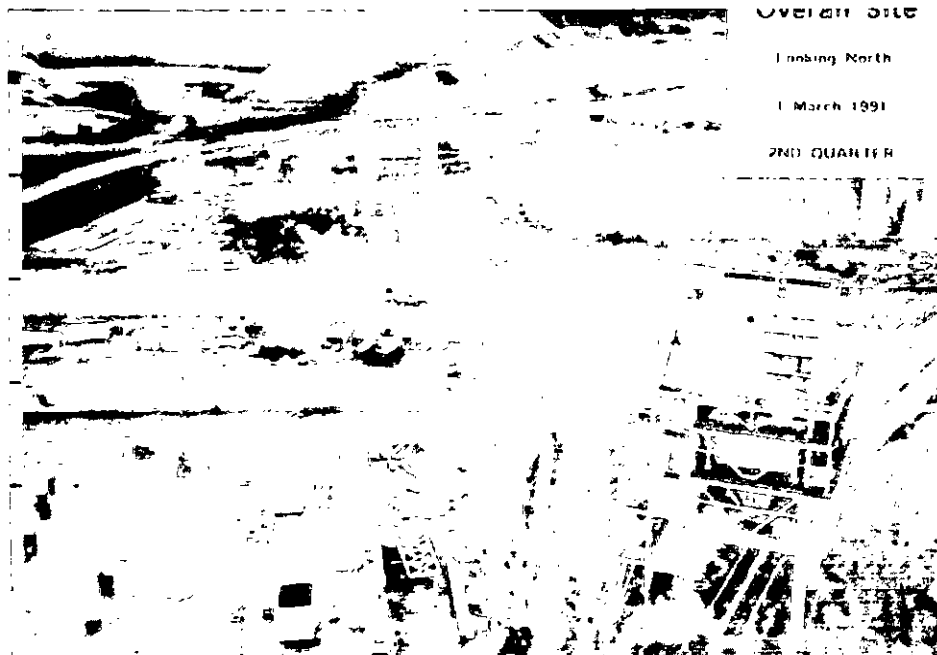


Figure 17: PDF Structure Looking North. (April 1991)



Figure 18: PDF Structure Looking North. (June 28, 1991)

Overall Site

Looking North
09/30/91

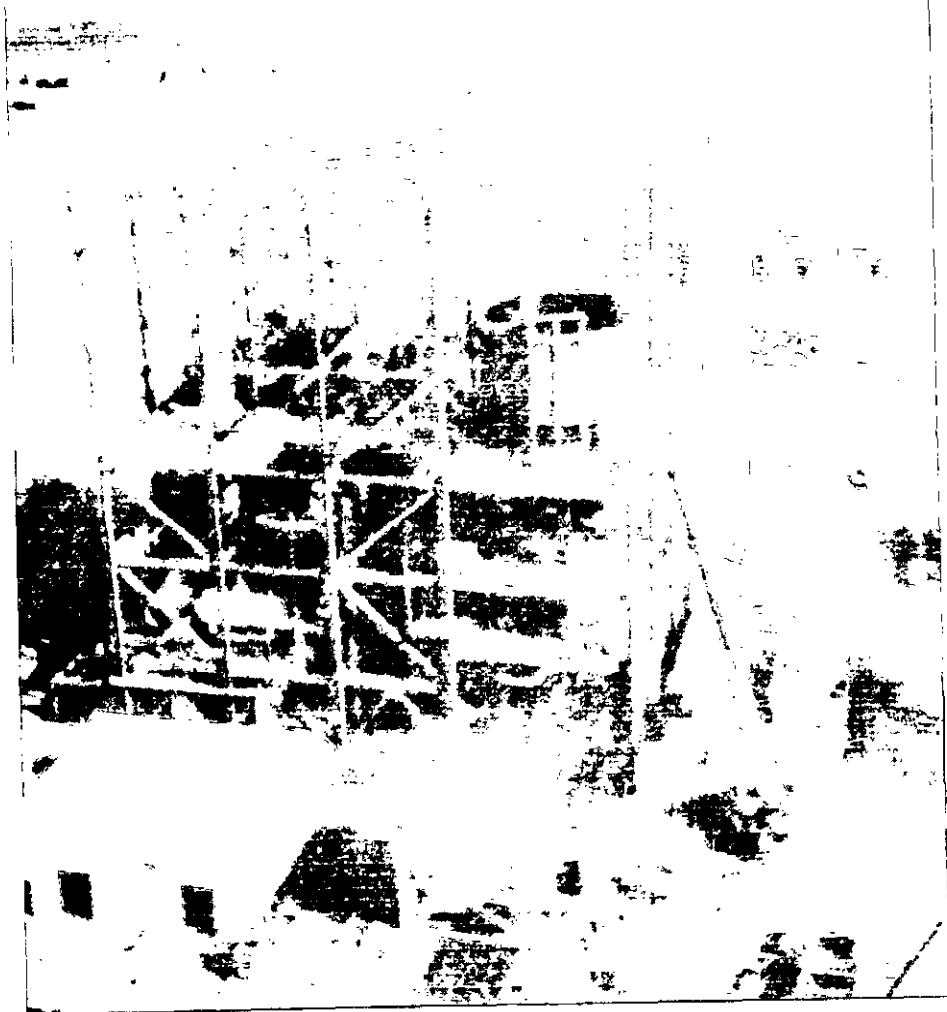


Figure 19: PDF Structure Looking North. (September 30, 1991)

GLOSSARY

BACT	Best Available Control Technology
CDL	Coal Derived Liquid
DOE	U.S. Department of Energy
EMP	Environmental Monitoring Plan
ENCOAL	ENCOAL Corporation, a wholly-owned subsidiary of Shell Mining Company
EPA	U.S. Environmental Protection Agency
ESP	Electrostatic Precipitator
FGD	Flue Gas Desulfurization
HazOp	Hazardous Operation
KCI	Kellogg Constructors INC.
Kellogg	The M.W. Kellogg Company
LFC	Liquids From Coal
MCC	Master Control Center
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
NEPA	National Environmental Policy Act
PDF	Process Derived Fuel
PLC	Programmable Logic Controller
PMN	Pre-Manufacturing Notice
P&ID	Piping and Instrumentation Diagram
QA/QC	Quality Assurance / Quality Control
SGI	SGI International
WDEQ	Wyoming Department of Environmental Quality

