FINAL

TECHNICAL PROGRESS REPORT

For the period:

April 1, 1994, through June 30, 1994

Prepared for:

Rosebud SynCoal Partnership
Advanced Coal Conversion Process Demonstration
Colstrip, Montana

DOE Contract
DE-FC22-90PC89664

Prepared by:

MSM Technical Consulting, Inc.
Butte, Montana

February 1996

For submittal to:

United States Department of Energy
Pittsburgh Energy Technology Center

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1.0 INTRODUCTION AND PURPOSE

This report describes the technical progress made on the Advanced Coal Conversion Process (ACCP) Demonstration Project from April 1, 1994, through June 30, 1994.

The ACCP Demonstration Project is a U.S. Department of Energy (DOE) Clean Coal Technology Project. The Cooperative Agreement defining this project is between DOE and the Rosebud SynCoal Partnership. In brief, Western Energy Company, which is a coal mining subsidiary of Entech, Inc., Montana Power Company's (MPC's) non-utility group in Colstrip, Montana, was the original proposer for the ACCP Demonstration Project and Cooperative Agreement participant. To further develop the ACCP technology, Entech created Western SynCoal Company. After the formation of the Rosebud SynCoal Partnership, Western Energy Company formally novated the Cooperative Agreement to the Rosebud SynCoal Partnership to facilitate continued participation in the Cooperative Agreement. The Rosebud SynCoal Partnership is a partnership between Western SynCoal Company and Scoria, Inc., a subsidiary of NRG Energy, Inc., Northern States Power's non-utility group.

This project demonstrates an advanced, thermal, coal drying process, coupled with physical cleaning techniques, that is designed to upgrade high-moisture, low-rank coals to a high-quality, low-sulfur fuel, registered as the SynCoal® process. The coal is processed through three stages (two heating stages followed by an inert cooling stage) of vibrating fluidized bed reactors that remove chemically bound water, carboxyl groups, and volatile sulfur compounds. After drying, the coal is put through a deep-bed stratifier cleaning process to separate the pyrite-rich ash from the coal.

The SynCoal® process enhances low-rank, western coals, usually with a moisture content of 25 to 55 percent, sulfur content of 0.5 to 1.5 percent, and heating value of 5,500 to 9,000 British thermal units per pound (Btu/lb), by producing a stable, upgraded, coal product with a moisture content as low as 1 percent, sulfur content as low as 0.3 percent, and heating value up to 12,000 Btu/lb.

The 45-ton-per-hour unit is located adjacent to a unit train loadout facility at Western Energy Company's Rosebud coal mine near Colstrip, Montana. The demonstration plant is sized at about one-tenth the projected throughput of a multiple processing train commercial facility. The demonstration drying and cooling equipment is currently near commercial size.

2.0 PROJECT PROGRESS

2.1 SIGNIFICANT ACCOMPLISHMENTS

Rosebud SynCoal Partnership's ACCP Demonstration Facility entered Phase III, Demonstration Operation, in April 1992 and operated in an extended startup mode through August 10, 1993, when the facility became commercial. The Rosebud SynCoal Partnership instituted an aggressive program to overcome startup obstacles and now focuses on supplying product coal to customers. Significant accomplishments in the history of the SynCoal® process development are shown in Appendix A. Table 2.1 lists the significant accomplishments for the year to date.

Table 2.1. Significant Accomplishments for 1994

Period	Significant Accomplishments
January 1994	• The plant had a 73 percent operating availability. • Shipped 18,754 tons of SynCoal® to various customers.
February 1994	• Project engineering was completed on a potential plant modification to add a stability enhancement process step at either 48 tons per hour (tph) or 8 tph. • The plant had a 67 percent operating availability. • A SynCoal® blend testburn was scheduled with Montana Power Company's (MPC's) J.E. Corette plant.
March 1994	• Completed a 50/50 SynCoal® blend testburn at MPC's J.E. Corette plant. • The plant had an 82 percent operating availability. • Continued process testing to reduce spontaneous combustion tendency and dustiness.
April 1994	• **Completed 75/25 SynCoal® blend followup testburn at MPC's J.E. Corette plant.**
May 1994	• **Began regular shipments of SynCoal® fines to industrial customers.** • **Exceeded proforma average monthly sales levels for the first time since startup.** • **Successfully processed about 681 tons of subbituminus coal from the Gillette, Wyoming, area.** • **Stack testing was completed.** • **A mass and energy balance around the system was completed.**

Table 2.1. Significant Accomplishments for 1994 (cont'd.)

June 1994	• **Concluded 30 day, 1,000 mile covered hopper rail car test shipment.** • **Increased industrial sales to 39 percent of total (7,350 tons of 18,633).** • **Successfully processed about 9,000 tons of Rosebud Area D coal.**

2.2 PROJECT PROGRESS SUMMARY

The ACCP Demonstration facility continued to operate well during April, running steady from March 29 until April 11 when fines conveyor problems caused limited operation until April 14. Additional difficulties also caused limited operations from April 14-20 and from April 26-30. During May, the plant also ran steady until May 11 when the plant was shut down for scheduled maintenance. Minor problems, such as a furnace trip, a series of blown expansion joints, a lightening strike (which caused a 13-hour outage), an electrical fault, a crack in the heat exchanger, a broken seal on the storage bin, problems with the fines conveyor, a broken jumper on the first-stage fan, and a failed rotary airlock were experienced during the Second Quarter of 1994. During this reporting period, the plant has processed over 109,066 tons of raw coal, and the facility's operating availability has increased to about 75 percent. The raw coal feed rate has held at nearly 66 percent of nominal design capacity for the quarter. Year to date, about 401,290 tons of raw coal have been fed to the process. For 1994, about 215,183 tons of raw coal have been fed to the process, producing about 79,456 tons of course product and 6,147 tons of fines. Year to date 171,639 tons have been test shipped to date with over 108,545 tons being shipped in 1994.

Marketing SynCoal® for testburns has been difficult due to the product issue of spontaneous combustion and dustiness. However, June concluded the longest covered hopper rail car test to date with the delivery of 459 tons of untreated granular SynCoal® to Fremont Utilities. Some of this product had been stored for more than a month in the covered rail cars.

During the Second Quarter of 1994, modifications and maintenance work focused on:

- repaired the fines conveyor;
- repaired a series of two blown expansion joints and a furnace trip;
- restored power after a lightening strike caused a 13-hour outage;
- repaired an electrical fault;
- repaired a crack in the heat exchanger;
- repaired RTD jumper on K-45 first stage fan;

- repaired failed rotary airlocks; and
- repaired a seal on T-90 fines storage bin.

During the First Quarter of 1994, modifications and maintenance work focused on:

- repaired frozen flame scanner which tripped the furnace twice;
- repaired two broken rotary airlocks;
- repaired S-1-20 screens and motor mount;
- repaired a failed motor and bearing vibration;
- repaired stoners and separators;
- repaired process fan bearings;
- replaced miscellaneous furnace control capacitors;
- replaced blown expansion joints; and
- repaired drag conveyors C-26 and C-28.

The product produced to date has been exceptionally close to the design basis product from a chemical standpoint. The typical product analyses are shown in Table 2.3, and the typical fines analyses are represented in Table 2.4.

Table 2.2. ACCP Quarterly Product Analyses Summary

	TM	PA	PS	HHV	SO_2
Second Quarter Bentonite Product					
Average	3.48	9.07	0.62	11,652	1.06
Standard Deviation	1.21	0.54	0.09	156	0.16
Min.	1.86	8.00	0.49	11,249	0.83
Max.	6.69	10.85	0.94	11,953	1.61
Second Quarter Continental Lime Product					
Average	2.25	9.29	0.57	11,815	0.96
Standard Deviation	0.48	0.69	0.09	122	0.16
Min.	0.91	7.95	0.41	11,194	0.69
Max.	3.78	11.09	0.88	12,086	1.49
Second Quarter Standard Product - Dairyland Power Product					
One sample	3.96	8.59	0.55	11,640	0.95
Second Quarter Standard Product - Empire Product					
Average	2.60	9.24	0.61	11,784	1.03
Standard Deviation	0.69	0.49	0.09	95	0.15
Min.	1.79	8.70	0.49	11,612	0.83
Max.	3.86	10.21	0.77	11,924	1.30
Second Quarter Standard Product - Fremont Power Product					
One sample	2.22	8.88	0.57	11,827	0.96
Second Quarter Standard Product - Hand Sampled Product					
Average	4.59	8.99	0.62	11,507	1.07
Standard Deviation	1.02	0.00	0.04	98	0.05
Min.	3.57	8.99	0.58	11,410	1.02
Max.	5.60	8.99	0.65	11,605	1.12

TM - % Total Moisture PS - % Sulfur SO_2 - lbs. of SO_2/MMBtu
PA - % Ash HHV - Btu/lb.

Table 2.2. ACCP Quarterly Product Analyses Summary (cont'd.)

	TM	PA	PS	HHV	SO_2
Second Quarter Standard Product - MPC Product					
Average	5.98	8.81	0.59	11,290	1.05
Standard Deviation	1.51	0.70	0.11	198	0.19
Min.	1.90	7.88	0.50	10,718	0.90
Max.	10.90	10.64	0.91	11,867	1.63
Second Quarter Standard Product					
Average	2.63	9.66	0.53	11,753	0.91
Standard Deviation	0.74	0.89	0.06	133	0.11
Min.	1.63	7.49	0.42	11,316	0.71
Max.	5.46	12.51	0.75	12,082	1.29

TM - % Total Moisture PS - % Sulfur SO_2 - lbs. of SO_2/MMBtu
PA - % Ash HHV - Btu/lb.

Table 2.3. ACCP Quarterly Fines Analyses Summary

	TM	PA	PS	HHV	SO_2
Second Quarter Bentonite Fines					
Average	5.42	9.56	0.63	11,455	1.10
Standard Deviation	2.15	0.64	0.07	313	0.11
Min.	2.03	8.84	0.54	11,013	0.98
Max.	7.96	10.56	0.71	11,811	1.22
Second Quarter Continental Lime Fines					
Average	5.64	9.60	0.81	11,188	1.45
Standard Deviation	1.18	0.52	0.14	210	0.25
Min.	3.89	8.46	0.48	10,488	0.83
Max.	9.09	11.24	1.15	11,611	2.05
Second Quarter Ash Grove Fines					
Average	5.59	11.76	0.88	11,137	1.57
Standard Deviation	1.30	3.51	0.08	187	0.14
Min.	4.42	9.33	0.75	10.811	1.33
Max.	8.11	19.52	0.99	11,287	1.77
Second Quarter Empire Sand Fines					
Average	5.01	8.72	0.59	11,453	1.03
Standard Deviation	1.17	0.41	0.07	155	0.14
Min.	3.04	8.27	0.50	11,196	0.87
Max.	6.62	9.50	0.78	11,687	1.39

TM - % Total Moisture PS - % Sulfur SO_2 - lbs. of SO_2/MMBtu
PA - % Ash HHV - Btu/lb.

Table 2.3. ACCP Quarterly Fines Analyses Summary (cont'd.)

Second Quarter Hand Sampled Fines					
Average	5.30	9.68	0.82	11,235	1.45
Standard Deviation	0.83	0.74	0.14	184	0.25
Min.	3.73	8.32	0.00	10,680	0.00
Max.	6.94	11.62	0.98	11,620	1.75
Second Quarter Fines					
Average	5.14	9.24	0.81	11,303	1.43
Standard Deviation	0.64	1.23	0.15	166	0.29
Min.	4.28	5.58	0.47	11,046	0.81
Max.	6.15	10.40	0.96	11,669	1.74
TM - % Total Moisture PA - % Ash		PS - % Sulfur HHV - Btu/lb.		SO_2 - lbs. of SO_2/MMBtu	

During the next reporting period, the focus will continue on operating the ACCP Demonstration plant to support follow-up Corette testburning, including a 90 percent blend for several days; serving nearby end users the SynCoal® product and establishing more industrial customers; scheduling additional testburns for 1994; continuing regular truck deliveries of SynCoal® fines to Ash Grove Cement to allow alternative testing with their railroad cars; and attempting to secure additional covered hopper cars to accelerate our testing and market/distribution developments.

3.0 PROCESS DESCRIPTION

In general, the ACCP is a thermal conversion process that uses combustion products and superheated steam as fluidizing gas in vibrating fluidized bed reactors. Two fluidized stages are used to thermally and chemically alter the coal, and one water spray stage followed by one fluidized stage is used to cool the coal. Other systems that service and assist the coal conversion system include:

- Coal Conversion;
- Coal Cleaning;
- Product Handling;
- Raw Coal Handling;
- Emission Control;
- Heat Plant;
- Heat Rejection; and
- Utility and Ancillary.

3.1 ORIGINAL DESIGN PROCESS DESCRIPTION

The designed central processes are depicted in Figure 3.1 on the proceeding page. The following discusses plant design aspects and expected results. Modifications and operating results are summarized in Section 3.2.

Coal Conversion

The coal conversion is performed in two parallel processing trains. Each train consists of two, 5-feet-wide by 30-feet-long vibratory fluidized bed thermal reactors in series, followed by a water spray section, and a 5-feet-wide by 25-feet-long vibratory cooler. Each processing train is fed up to 1,139 pounds per minute of 2-by-½ inch coal.

In the first-stage dryer/reactors, the coal is heated by direct contact with hot combustion gases mixed with recirculated dryer makegas, removing primarily surface water from the coal. The coal exits the first-stage dryer/reactors at a temperature slightly above that required to evaporate water. After the coal exits the first-stage dryer/reactor, it is gravity fed to the second-stage thermal reactors, which further heats the coal using a recirculating gas stream, removing water trapped in the pore structure of the coal and promoting chemical dehydration, decarbonylation, and decarboxylation. The water, which makes up the superheated steam used in the second stage, is actually produced from the coal itself. Particle shrinkage that occurs in the second stage liberates ash minerals and passes on a unique cleaning characteristic to the coal.

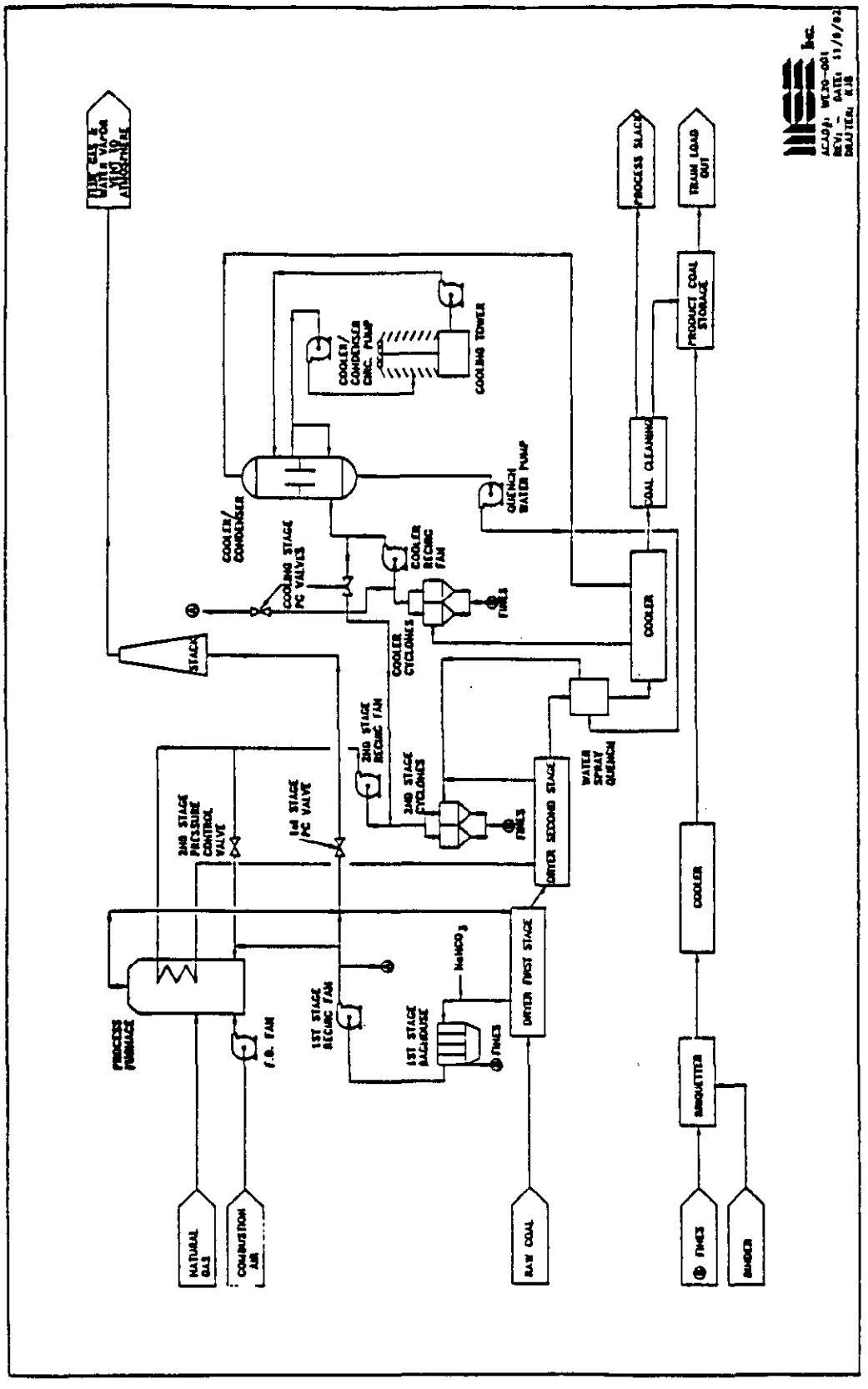

Figure 3.1 Central Processes

As the coal exits the second-stage thermal reactors, it falls through vertical quench coolers where process water is sprayed onto the coal to reduce the temperature. The water vaporized during this operation is drawn back into the second-stage thermal reactors. After water quenching, the coal enters the vibratory coolers where the coal is contacted by cool inert gas. The coal exits the vibratory cooler(s) at less than 150°F and enters the coal cleaning system. The gas that exits the vibratory coolers is dedusted in a twin cyclone and cooled by water sprays in direct contact coolers prior to returning to the vibratory coolers. Particulates are removed from the first-stage process gas by a pair of baghouses in parallel. The second-stage process gas is treated by a quad cyclone arrangement, and the cooler-stage process gas is treated by a twin cyclone arrangement.

Three interrelated recirculating gas streams are used in the coal conversion system; one each for the thermal reactor stages and one for the vibratory coolers.

Gases enter the process from either the natural gas-fired process furnace or from the coal itself. Combustion gases from the furnace are mixed with recirculated makegas in the first-stage dryer/reactors after indirectly exchanging some heat to the second-stage gas stream. The second-stage gas stream is composed mainly of superheated steam, which is heated by the furnace combustion gases in the heat exchanger. The cooler gas stream is made up of cooled furnace combustion gases that have been routed through the cooler loop.

A gas route is available from the cooler gas loop to the second-stage thermal reactor loop to allow system inerting. Gas may also enter the first-stage dryer/reactor loop from the second-stage loop (termed makegas) but without directly entering the first-stage dryer/reactor loop; rather, the makegas is used as an additional fuel source in the process furnace. The second-stage makegas contains various hydrocarbon gases that result from the thermal conversions associated with the mild pyrolysis and devolatilization. The final gas route follows the exhaust stream from the first-stage loop to the atmosphere.

Gas exchange from one loop to another is governed by pressure control on each loop, and after startup, will be minimal from the first-stage loop to the cooler loop and from the cooler loop to the second-stage loop. Gas exchange from the second-stage loop to first-stage loop (through the process furnace) may be substantial since the water vapor and hydrocarbons driven from the coal in the second-stage thermal reactors must leave the loop to maintain a steady state.

In each gas loop, particulate collection devices that remove dust from the gas streams protect the fans and, in the case of the first-stage baghouses, prevent any fugitive particulate discharge. Particulates are removed from the first-stage

process gas by a pair of baghouses in parallel. The second-stage process gas is treated by a quad cyclone arrangement, and the cooler-stage process gas is treated by a twin cyclone arrangement.

Coal Cleaning

The coal entering the cleaning system is screened into four size fractions: plus ½ inch, ½ by ¼ inch, ¼ inch by 8 mesh, and minus 8 mesh. These streams are fed in parallel to four, deep-bed stratifiers (stoners) where a rough specific gravity separation is made using fluidizing air and a vibratory conveying action. The light streams from the stoners are sent to the product conveyor, and the heavy streams from all but the minus 8 mesh stream are sent to fluidized bed separators. The heavy fraction of the minus 8 mesh stream goes directly to the waste conveyor. The fluidized bed separators, again using air and vibration to effect a gravity separation, each split the coal into light and heavy fractions. The light stream is considered product, and the heavy or waste stream is sent to a 300-ton, storage bin to await transport to an off-site user or alternately back to a mined out pit disposal site. The converted, cooled, and cleaned SynCoal® product from coal cleaning enters the product handling system.

Product Handling

Product handling consists of the equipment necessary to convey the clean, granular SynCoal product coal into two, 6,000-ton, concrete silos and to allow train loading with the existing loadout system. Additionally, the SynCoal® fines collected in the various stage particulate collection system are combined, cooled, and transferred to a 300-ton storage silo designed for truck loadout to make an alternative product.

Raw Coal Handling

Raw coal from the existing stockpile is screened to provide 1½-by-⅜ inch feed for the ACCP process. Coal rejected by the screening operation is conveyed back to the active stockpile. Properly sized coal is conveyed to a 1000-ton, raw coal, storage bin which feeds the process facility.

Emission Control

Sulfur dioxide emission control philosophy is based on injecting dry sorbents into the ductwork to minimize the release of sulfur dioxide to the atmosphere. Sorbents, such as trona or sodium bicarbonate, are injected into the first-stage gas stream as it leaves the first-stage dryers/reactors to maximize the potential for sulfur dioxide removal while minimizing reagent usage. The sorbents, having reacted with sulfur dioxide, are removed from the gas streams in the particulate removal systems. A 60-percent reduction in sulfur dioxide emissions should be realized.

The coal cleaning area fugitive dust is controlled by placing hoods over the sources of fugitive dust conveying the dust laden air to fabric filter(s). The bag filters can remove 99.99 percent of the coal dust from the air before discharge. All SynCoal® fines will report to the fines handling system and ultimately the SynCoal® fines product stream.

Heat Plant

The heat required to process the coal is provided by a natural gas-fired process furnace, which uses process makegas from the second-stage coal conversion as a supplemental fuel. This system is sized to provide a heat release rate of 74 MM Btu/hr. Process gas enters the furnace and is heated by radiation and convection from the burning fuel.

Heat Rejection

Most heat rejection from the ACCP is accomplished by releasing water and flue gas into the atmosphere through an exhaust stack. The stack design allows for vapor release at an elevation great enough that, when coupled with the vertical velocity resulting from a forced draft fan, dissipation of the gases will be maximized. Heat removed from the coal in the coolers is rejected using an atmospheric-induced, draft cooling tower.

Utility and Ancillary Systems

The coal fines that are collected in the conversion, cleaning, and material handling systems are gathered and conveyed to a surge bin. The coal fines are then agglomerated and returned to the product stream.

Inert gas is drawn off the cooler loop for other uses. This gas, primarily nitrogen and carbon dioxide, is used for other baghouse pulse. The makeup gas to the cooler loop is combustion flue gas from the stack. The cooling system effectively dehumidifies and cools the stack gas making the inert gas for the system. The cooler gas still has a relatively high dew point (about 90°F). Due to the thermal load this puts on the cooling system, no additional inert gas requirements can be met by this approach.

The common facilities for the ACCP Demonstration include a plant and instrument air system, a fire protection system, and a fuel gas distribution system.

The power distribution system includes a 15 kV service; a 15 kV/5 kV transformer; a 5 kV motor control center; two, 5 kV/480 V transformers; a 480 V load distribution center; and a 480 V motor control center.

The process is semi-automated, including dual control stations, dual programmable logic controllers, and distributed plant control and data acquisition hardware. Operator interface is necessary to set basic system parameters, and the control system adjusts to changes in the process measurements.

3.1.1 ORIGINAL EQUIPMENT

The originally designed and installed major equipment for the ACCP Demonstration Facility is shown in Table 3.1 on the following page.

Table 3.1. Advanced Coal Conversion Process Major Plant Equipment - As Constructed

System Description	Equipment Vendor	Type
Thermal Coal Reactors/Coolers	Carrier Vibrating Equipment, Inc.	PE
Belt Conveyors	Willis & Paul Group	MH
Bucket Elevators	FMC Corporation	MH
Coal Cleaning Equipment	Triple S Dynamics, Inc.	CC
Coal Screens	Hewitt Robbins Corporation	MH
Loading Spouts	Midwest International	MH
Dust Agglomerator	Royal Oak Enterprises, Inc.	DH
Silo Mass Flow Gates	SEI Engineers, Inc.	MH
Vibrating Bin Dischargers	Carman Industries, Inc.	MH
Vibrating Feeder	Kinergy Corporation	MH
Drag Conveyor	Dynamet	DH
Process Gas Heater	G.C. Broach Company	PE
Direct Contact Cooler	CMI-Schneible Company	PE
Particulate Removal System	Air-Cure Howden	EC
Dust Collectors	Air Cure Environmental, Inc.	EC
Air Compressors/Dryers	Colorado Compressor, Inc.	CF
Diesel Fire Pumps	Peerless Pump Company	CF
Forced Draft Fans	Buffalo Forge Company	PE
Pumps	Dresser Pump Division Dresser Industries, Inc.	PE
Electrical Equipment-4160	Toshiba/Houston International Corporation	CF
Electrical Equipment-LDC	Powell Electric Manufacturing Company	CF
Electrical Equipment-480v MCC	Siemens Energy & Automation, Inc.	CF
Main Transformer	ABB Power T&D Company	CF
Control Panels	Utility Control & Equipment Corporation	CF
Control Valves	Applied Control Equipment	CF
Plant Control System	General Electric Supply Company	CF
Cooling Tower	The Marley Cooling Tower Company	PE
Dampers	Effox, Inc.	PE
Dry Sorbent Injec. System	Natech Resources, Inc.	EC
Expansion Joints	Flexonics, Inc.	PE

MH - Materials Handling PE - Process Equipment EC - Emissions Control
CF - Common Facilities CC - Coal Cleaning DH - Dust Handling

3.2 AS-BUILT PROCESS DESCRIPTION

The ACCP facility has been modified as necessary during start-up and operation of the ACCP Demonstration Project. Equipment has been improved; additional equipment installed; and new systems designed, installed, and operated to improve the overall plant performance. Those adjustments are listed below and on the following pages.

Coal Conversion System

In 1992, several modifications were made to the vibratory fluidized bed reactors and processing trains to improve plant performance. An internal process gas bypass was eliminated, and the seams were welded out to reduce system leaks. Also, the reactor bed deck holes were bored out in both the first-stage dryer/reactors and the vibratory coolers to increase process gas flows.

The originally designed, two-train, fines conveying system could not keep up with the fines production. To operate closer to design conditions on thermal coal reactors and coolers, obtain tighter control over operating conditions, and minimize product dustiness, the ACCP plant was converted to single-train operation to reduce the overall fines loading before modifying the fines handling system during the outage of the summer 1993. One of the two process trains was removed from service by physically welding plates inside all common ducts at the point of divergence between the two process trains. This forced process gases to flow only through the one open operating process train.

In addition to the process train removal, the processed fines conveying equipment was simultaneously modified to reduce required throughput on drag conveyors. This was accomplished by adding a first-stage screw conveyor and straightening and shortening the tubular drag conveyors.

The ACCP design included a briquetter for agglomeration of the process fines. However, initial shakedown of the plant required the briquetting system be completely operational. Since the briquetting operation was delayed to focus on successfully operating the plant, the process design changes included fines disposal by slurrying them to an existing pit in the mine. During the Third Quarter of 1992, a temporary fines slurry disposal system was installed. The redesigned process fines conveying and handling system was commissioned. Design of a replacement fines conveying system is now complete and is delivering to a trust loadout slurry or the briquetter.

The main rotary airlocks were required to shear the pyrite and "bone" or rock that is interspersed with the coal; however, the design of the rotary airlocks was insufficient to convey this non-coal material. Therefore, the drive motors were retrofitted from 2 to 5 horse power for all eight process rotary airlocks. Also, an electrical current sensing circuit that reverses the rotary lock rotation was designed, tested, and applied to the rotary airlocks. This circuitry is able to sense a rotor stall and reverse the motor to clear the obstruction before tripping the motor circuit breaker.

The original plant startup tests also revealed explosion vent discrepancies in all areas, thus, preventing extended operation of the plant. The design development for the vents was a cooperative effort between an explosion vent manufacturing company and the ACCP personnel and resulted in a unique explosion vent sealing system which was completed during the Second Quarter of 1993. The new explosion vent design was implemented during the Third Quarter of 1993 and has been performing well since.

Coal Cleaning

The coal entering the cleaning system is screened into four size fractions: plus ½ inch, ½ by ¼ inch, ¼ inch by 8 mesh, and minus 8 mesh. These streams are fed in parallel to four, deep-bed stratifiers (stoners) where a rough, specific, gravity separation is made using fluidizing air and a vibratory conveying action. The light streams from the stoners are sent to the product conveyor, and the heavy streams from all but the minus 8 mesh stream are sent to fluidized bed separators. The heavy fraction of the minus 8 mesh stream goes directly to the waste conveyor. The fluidized bed separators, again using air and vibration to effect a gravity separation, each split the coal into light and heavy fractions. The light stream is considered product, and the heavy or waste stream is sent to a 300-ton, storage bin to await transport back to the mined out pit disposal site. The dried, cooled, and cleaned product from coal cleaning enters the product handling system. Modifications were made in the Third Quarter of 1992 that allows product to be sent to the waste bin with minimal reconfiguration.

Product Handling

Work is continuing on testing and evaluating technologies to enhance product stabilization and reduce fugitive dustiness. During the Fourth Quarter of 1992, a liquid carbon dioxide storage and vaporization system was installed for testing product stability and providing inert gas for storage and plant startup/shutdown. During the Fourth Quarter of 1993, an additional inert gas system was installed.

The clean product coal is conveyed into two, 5,000-ton capacity, concrete silos which allow train loading with the existing loadout system. This capacity is due to the relatively low SynCoal® density.

Raw Coal Handling

Raw coal from the existing stockpile is screened to provide 1¼-by-½ inch feed for the ACCP process. Coal rejected by the screening operation is conveyed back to the active stockpile. Properly sized coal is conveyed to a 1,000-ton, raw coal, storage bin which feeds the process facility.

Emission Control

It was originally assumed that sulfur dioxide emissions would have to be controlled by injecting chemical sorbents into the ductwork. Preliminary data indicated that the addition of chemical injection sorbent would not be necessary to control sulfur dioxide emissions under the operating conditions. A mass spectrometer was installed during the Second Quarter to monitor emissions and process chemistry; however, the injection system is in place should a higher sulfur coal be processed or if process modifications are made and sulfur dioxide emissions need to be reduced.

The coal-cleaning area's fugitive dust is controlled by placing hoods over the fugitive dust sources conveying the dust laden air to fabric filter(s). The bag filters appear to be effectively removing coal dust from the air before discharge. The Department of Health and Environmental Sciences completed stack tests on the east and west baghouse outlet ducts and the first-stage drying gas baghouse stack during the Second Quarter of 1993. The emission rates of 0.0013 and 0.0027 (limit units of 0.018 grains/dry standard cubic feet) (gr/dscf) and 0.015 gr/dscf (limit of 0.031), respectively, are well within the limits stated in the air quality permit.

A stack emissions survey was conducted in May 1994. The survey determined the emissions of particulates, sulfur dioxide, oxides of nitrogen, carbon monoxide, total hydrocarbons, and hydrogen sulfide from the coal dryer stack. The principal conclusions based on averages are:

- The emissions of particulate matter from the dryer stack were 0.0259 gr/dscf (2.563 pounds per hour). (Limit: 0.031 gr/dscf.)

- The emissions of nitrogen oxides (reported as NO_2) were 4.50 pounds per hour (54.5 parts per million). (Limit: Current permit does not address gaseous pollutants.)

- The emissions of carbon monoxide were 9.61 pounds per hour (191.5 parts per million). (Limit: Current permit does not address gaseous pollutants.)

- The emissions of total hydrocarbons as propane (less methane and ethane) were 2.93 pounds per hour (37.1 parts per million).

- The emissions of sulfur dioxide were 0.227 pounds per hour (2.0 parts per million). (Limit: Current permit does not address gaseous pollutants.)

- The emissions of hydrogen sulfide were 0.007 pounds per hour (0.12 parts per million). (Limit: Current permit does not address gaseous pollutants.)

Heat Plant

The heat required to process the coal is provided by a natural gas-fired process furnace, which uses process makegas from coal conversion as fuel. The vibration problems and conversion system problems discussed previously initiated removing and redesigning the process gas fans shaft seals to limit oxygen infiltration into the process gas. This system provides a maximum heat release rate of up to 74 MM Btu/hr depending on the feed rate.

Heat Rejection

Heat removed from the coal in the coolers is rejected indirectly through cooling water circulation using an atmospheric-induced, draft-cooling tower. A substantial amount of the heat added to the system is actually lost by releasing water vapor and flue gas into the atmosphere through an exhaust stack. The stack allows for vapor release at an elevation great enough that, when coupled with the vertical velocity resulting from a forced draft fan, maximized dissipation of the gases. The evaluation from the Second Quarter indicated the problem could be resolved by producing additional makeup water to the system. A 2-inch valve was installed on the cooling water line to the cooling tower to provide the necessary makeup water.

Utility and Ancillary Systems

The coal fines that are collected in the conversion, cleaning, and material handling systems are gathered in the slurry system as produced. A replacement fines conveying system is in the process of being designed.

Inert gas is drawn off the cooler loop for other uses. This gas, primarily nitrogen and carbon dioxide, is used only for baghouse pulse. The makeup gas to the cooler loop is combustion flue gas from the stack. The cooling system effectively dehumidifies and cools the stack gas making the inert gas for the system. The cooler gas still has a relatively high dew point (about 90°F). Due to the thermal load this puts on the cooling system, no additional inert gas requirements can be met by this approach.

The common facilities for the ACCP include a plant and instrument air system, a fire protection system, and a fuel gas distribution system.

The power distribution system was upgraded by installing an uninterruptible power supply (UPS) during the Second Quarter. The UPS system does not keep the plant running if there is a problem; however, it does keep the control system, emergency systems, and office lights operating.

The process is semi-automated including dual control stations, dual programmable logic controllers, and distributed plant control and data acquisition hardware. Graphic interface programs are continually being modified and upgraded to improve the operator interface and provide more reliable information to the operators and engineers.

3.2.1 MODIFIED OR REPLACED EQUIPMENT

Facility modifications and maintenance work to date have been dedicated to obtaining an operational facility.

The modifications to the original system performed for the year to date (with modifications during this reporting period shown in bold print) are listed on the following page.

Second Quarter of 1994:

Processed Fines Handling System:
- **repaired the fines conveyor,**
- **repaired a seal on T-90 fines storage bin, and**
- **repaired failed rotary airlocks;**

Forced Draft Fans:
- **repaired fault RTD jumper on K-45 first-stage fan;**

Process Gas Heater:
- **replaced a series of blown expansion joints, and**
- **repaired a furnace trip;**

Heat Exchanger:
- **repaired a crack in the heat exchanger; and**

General:
- **restored electricity after a lightening strike caused a 13-hour outage.**

First Quarter of 1994:

Processed Fines Handling System:
- Modifications, except for the processed fines cooler performance testing which is not yet scheduled, have been completed.
- Repaired S-1-20 screens and motor mount.

Particulate Removal System:
- Repaired two broken rotary airlocks.
- Repaired stoners and separators.

Forced Draft Fans:
- Repaired motor/bearing vibration.
- Replaced process fan bearings.

Process Gas Heater:
- Replaced blown expansion joints.
- Repaired frozen flame scanner which tripped the furnace twice.

Drag Conveyor:
- Repaired drag conveyors C-26 and C-28.

General:
- Replaced miscellaneous furnace control capacitors.

Table 3.2 shows the equipment that has either been modified or replaced from plant startup. If replacement was required, the new equipment is listed.

Table 3.2. Advanced Coal Conversion Process Modified Major Plant Equipment

System Description	Equipment Vendor	Type	Modified No/Yes	Replaced With
Thermal Coal Reactors/Coolers	Carrier Vibrating Equipment, Inc.	PE	/✓	
Belt Conveyors	Willis & Paul Group	MH	/	
Bucket Elevators	FMC Corporation	MH	/	
Coal Cleaning Equipment	Triple S Dynamics, Inc.	CC	/	
Coal Screens	Hewitt Robbins Corporation	MH	/✓	
Loading Spouts	Midwest International	MH	/	
Dust Agglomerator	Royal Oak Enterprises, Inc.	DH	/	
Silo Mass Flow Gates	SEI Engineers, Inc.	MH	/	
Vibrating Bin Dischargers	Carman Industries, Inc.	MH	/	
Vibrating Feeder	Kinergy Corporation	MH	/	
Processed Fines Handling System Bucket Elevators Screw Conveyors Drag Conveyors Processed Fines Cooler Slurry Tank Agitator Slurry Tank Slurry and Pit Pumps Processed Fines Load Out Bin	 Continental Screw Conveyor Corp. Continental Screw Conveyor Corp. AshTech Corporation Cominco Engineering Services, Ltd. Chemineer, Inc. Empire Steel Manufacturing Co. Goulds Pumps/Able Technical P & S Fabricators	 DH DH DH DH DH DH DH DH DH	 Added Added Added Added Added Added Added Added Added	
Process Gas Heater	G.C. Broach Company	PE	/	
Direct Contact Cooler	CMI-Schneible Company	PE	/✓	
Particulate Removal System	Air-Cure Howden	EC	/✓	
Dust Collectors	Air Cure Environmental	EC	/	
Air Compressors/Dryers	Colorado Compressor, Inc.	CF	/✓	
Diesel Fire Pumps	Peerless Pump Company	CF	/	
Forced Draft Fans	Buffalo Forge Company	PE	/✓	
Pumps	Dresser Pump Division Dresser Industries, Inc.	PE	/	
Electrical Equipment-4160	Toshiba/Houston International Corp.	CF	/	
Electrical Equipment-LDC	Powell Electric Manufacturing Corp.	CF	/	
Electrical Equipment-480v MCC	Siemens Energy & Automation, Inc.	CF	/	
Uninterruptible Power Supply	Best Power Technologies Company	CF	Added	
Main Transformer	ABB Power T&D Company	CF	/	
Control Panels	Utility Control & Equipment Corp.	CF	/	

Table 3.2. Advanced Coal Conversion Process Modified Major Plant Equipment (cont'd.)

Control Valves	Applied Control Equipment	CF	/	
Plant Control System	General Electric Supply Company	CF	/✔	
Cooling Tower	The Marley Cooling Tower Company	PE	/✔	
Dampers	Effox, Inc.	PE	/	
Dry Sorbent Injec. System	Natech Resources, Inc.	EC	/	
Expansion Joints	Flexonics, Inc.	PE	/✔	

MH - Materials Handling PE - Process Equipment EC - Emissions Control
CF - Common Facilities CC - Coal Cleaning DH - Dust Handling

4.0 TECHNICAL PROGRESS

4.1 FACILITY OPERATIONS/PLANT PRODUCTION

Table 4.1 summarizes the ACCP Demonstration Facility's operations and plant production levels that have been achieved throughout this reporting period and the facility's lifetime to date. Table 4.2 lists the ACCP Demonstration Facility's monthly shipments of the SynCoal® product.

The following calculations were used in Table 4.1:

- Period Hours = Days in Reporting Period x 24 Hours/Day
- Operating Availability = Operating Hours/Period Hours x 100
- Average Feed Rate = Tons Fed/Operating Hours
- Monthly Capacity Factor = Tons Processed/Rated Design Capacity (37,500 tons/month)
- Forced Outage Rate = Forced Outage Hours/(Forced Outage Hours + Operating Hours) x 100

The difference between the feed coal and the amount of clean coal produced is due to water loss; samples removed for analysis; and processed fines, which are captured in the dust handling system and returned to the mine for disposal. Very little dust is actually lost to the atmosphere. Conditioned SynCoal® product analysis is based on silo average and conditioner mathematical adjustment.

Approximately 22,818 tons of conditioned product coal were shipped to MPC's Corette Power Plant in Billings, Montana; 18,924 tons of untreated product coal were shipped to MPC's Colstrip Project, Units 3 and 4; 2,855 tons of product and 40 tons of fines were shipped to a speciality carbon market at Bentonite Corporation; 6,115 tons of conditioned product coal and 2,618 tons of fines were shipped to Ash Grove Cement in Montana City; 2,711 tons of product and 3,315 tons of fines were sent to Continental Lime; and a total of 1,676 tons of product were shipped to several miscellaneous sites, such as NSP Sherburne, Empire Sand and Gravel, Fremont, and Dairyland Power.

4.2 FACILITY TESTING

The facility testing to date has focused on controlling spontaneous combustion of the cleaned coal product. The seven tests that have been performed during the reporting period are summarized in Table 4.3. No tests were completed during the First Quarter of 1994; therefore, the tests described in Table 4.3 are for the Second Quarter of 1994 only.

Table 4.1. ACCP Demonstration Project Monthly Operating Statistics

Month	Operating Hours	Availability Rate	Non-Scheduled Hours	Forced Outage Hours	Forced Outage Factor	Feed Tons	Ave. Feed Rate	Feed Capacity Factor	Total Shipments	Ending Silo Inventory
Jan. '94	543	73.0%	88	113	17.2%	34,979	64.40	91.5%	18,755	2,300
Feb. '94	448	67.0%	54	170	27.5%	29,247	65.30	84.7%	7,369	7,200
Mar. '94	608	82.0%	39	97	14.0%	41,891	68.90	109.6%	24,351	3,550
1st Quarter 1994 Summary	1,599	74.0%	181	380	5.12%	106,117	66.40	95.6%	50,475	3,550
LTD Totals	7,048		6,351			292,224	41.50		113,569	
April '94	515	72.0%	18	187	27%	33,686	65.40	91.1%	15,022	6,700
May '94	568	76.0%	127	49	8%	38,723	68.17	101.3%	25,561	4,325
June '94	557	77.0%	0	163	23%	36,657	65.81	99.1%	17,487	9,800
2nd Quarter 1994 *Totals*	1,640	75.0%	145	399	20%	109,066	66.50	97.0%	58,070	9,800
LTD Totals	8,688		6,496			401,290	46.19		171,639	

Table 4.2. ACCP Demonstration Project Monthly Shipments

Month	Total Shipments	Industrial (in tons)		Specialty (in tons)		Utility (in tons)	
		Total Granular	Total Fines	Total Granular	Total Fines	Total Granular	Total Fines
Jan. '94	by rail/truck	2,537	0	640	0	15,916	0
Feb. '94	by rail/truck	3,677	0	546	0	3,686	0
Mar. '94	by rail/truck	2,047	42	743	45	21,750	0
1st Quarter 1994 Summary		8,261	42	1,929	45	41,352	0
LTD Totals		8,261	42	1,929	45	41,352	0
April '94	by rail/truck	4,226	959	735	40	9,662	0
May '94	by rail/truck	1,602	2,424	921	0	21,467	0
June '94	by rail/truck	3,841	2,550	1,198	0	11,446	0
2nd Quarter 1994 Summary		9,669	5,933	2,855	40	42,575	0
LTD Totals		17,930	5,975	4,784	85	83,927	0

Table 4.3. ACCP Demonstration Plant Testing Summary

Test Number	Test Description	Test Dates
9401	Test cancelled.	
9402	Determined the effectiveness of the ACCP Demonstration plant on subbituminus coal, produced sufficient quantities of processed coal for analysis, determined an overall mass balance for coal in the ACCP process, and gathered stack emission data for permitting support.	5/17/94
9403	Determined the amount of energy required for each stage of processing at the Colstrip ACCP facility; established a repeatable method of determining the mass and energy balance of the facility; and determined the rate of discharge of carbon monoxide, sulfur dioxide, particulate, and nitrogen oxides from the process stack.	5/9/94-5/11/94
9404	Investigated liquid additives as possible solutions for obtaining a more stable SynCoal® product.	5/9/94
9405	Conducted tests using ammonium nitrate for stability enhancement.	5/19/94
9406	Conducted an Area D coal test to determine the sulfur content of product as compared to Area A product.	6/16/94
9407	Determined the screening efficiency of S-1-20, determined if a sulfur concentration is occurring in either output stream of S-1-20 while processing Area D and Area A coal, and approximated the overall size distribution of the unscreened Area D and Area A raw coal.	6/21/94

4.3 PRODUCT TESTING

The product produced to date has been exceptionally close to the design basis product from a chemical standpoint but has not been acceptable from a physical standpoint due to instability (spontaneous heating) and dustiness. The typical product analyses are shown in Table 4.4 beginning on page 34. No slurry sampling and analysis were conducted during this quarter. The following tests and online product trials were conducted at the ACCP site during the First Quarter of 1994:

- Treatment of SynCoal® with carbon dioxide and shipment to users.
- Bench testing to characterize SynCoal® oxidation.
- Treatment of SynCoal® with a variety of pore blocking compounds and shipment to users.
- Blending of SynCoal® with raw coal and shipment to users.
- Rehydration of SynCoal® and shipment to users.
- Full-scale testing of pile management and farming practices.

During the Second Quarter of 1994, the following tests and online product trials were conducted :

- Investigated liquid additives as possible solutions for obtaining a more stable SynCoal® product.
- Conducted tests on ammonium nitrate stability.

In addition, in May 1994, 681 tons at 60.2 tons per hour of subbituminus coal from Gillette, Wyoming, were processed without interruption, and 73 percent was recovered as clean product and fines. The demonstrated upgraded results are as follows in Table 4.5. The results indicate 98 percent energy recovery. Approximately 139 tons were shipped to Dairyland Power as DSE conditioned product.

Table 4.5 Demonstrated Upgraded Results

	Feed	Product	Fines[1]
TPH	60.2	34.8	9.5
% Moisture	28.1	4.5	6.2
% Ash	4.9	6.6	6.3
% Sulfur	0.34	0.45	0.48
Btu/lb	8,727	11,805	11,339
SO_2/MMBtu	0.78	0.76	0.84

[1]Unaccounted weight included as fines.

The test results indicated that a conceptual design of a stabilization process step should be developed to evaluate budgets and technical risks for incorporation into the existing ACCP Demonstration Facility.

4.4 TESTBURN PRODUCT

First Quarter of 1994

MPC's J.E. Corette plant completed a combustion test with a 50 percent DSE conditioned SynCoal®/50 percent raw Rosebud coal blend and the plant operating at 160 MW gross. The 50/50 blend test began March 1, 1994, and ended on March 28, 1994. The J.E. Corette plant's CEM-measured SO_2 emissions dropped from the normal 1.45 lbs. of SO_2/MMBtu to less than 1.15 lbs. of SO_2/MMBtu.

Second Quarter of 1994

The SynCoal testburn at MPC's J.E. Corette plant in Billings, Montana, was conducted intermittently from March 1, 1994, through May 31, 1994. The testburn was to determine what reduction in sulfur dioxide emissions could be achieved by burning blends of DSE Conditioned SynCoal and Area D raw coal. In addition, the effects on boiler performance were also observed, modeled, and analyzed to determine the benefits of burning a SynCoal blend.

The test consisted of a baseline case of 100 percent Area D raw coal, a 50 percent DSE Conditioned SynCoal/50 percent Area D raw coal, and a 75 percent DSE Conditioned SynCoal/25 percent Area D coal.

The results of the testburn indicate that the level of sulfur dioxide emissions is decreased when firing a SynCoal blend as expected based on the reduction of SO_2 in the blends versus Area D coal. While burning Area D raw coal, typical SO_2 emissions were 1.48 lbs/MBtu. The CEM-measured SO_2 levels were reduced by 12 percent when burning the 50/50 blend and 23 percent while burning the 75/25 blend. The 75/25 blend was actually a 79 percent DSE Conditioned SynCoal, 21 percent Area D raw coal blend.

In all cases, the boiler efficiency did improve when firing a SynCoal blend versus 100 percent Area D raw coal as determined in the modeling studies. While burning the 50/50 blend, the boiler efficiency increased by nearly 1 percent and more than 1½ percent during the 75/25 blend.

During the testburn of the 75 percent blend, the plant did not reduce load to de-slag and was able to maintain a load of 170 MW gross for a 24-hour period. The duration of the 75 blend test was relatively short, and it was not determined whether these trends would continue during a longer test.

One shipment of a 95 percent SynCoal blend was delivered to the plant and a testburn of this blend was scheduled to run for two weeks. The 95 percent SynCoal blend test was stopped after the first shipment due to a problem with mill skidding. The mills were not adjusted to correct this problem while the test was running and, thus, very little, if any, data is available from this blend test.

During the testburn, the dust levels of the blended product were acceptable and no product instability was reported.

Table 4.4 ACCP Quality Analyses for 1994 Second Quarterly Report

RAW COAL

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
RAW COAL	3428	05/09/94	24.06	8.72	0.70	8,914	1.57	9403 91 W-76
	3445	05/10/94	24.64	8.38	0.66	8,860	1.49	9403-91 W-76
	3472	05/11/94	24.16	8.92	1.04	8,780	2.37	9403-91 W-76
	3540	05/17/94	26.54	4.78	0.35	8,674	0.81	9402 W76 GRAB
	3851	06/16/94	23.89	8.30	0.60	8,949	1.34	W76 AREA "D" RAW COAL
	3892	06/17/94	24.35	7.52	0.69	9,101	1.52	W-17 RAW COAL
	3862	06/18/94	23.65	8.35	0.56	8,677	1.29	RAW COAL W-76 "D" COAL
	3864	06/19/94	23.38	9.22	0.60	8,944	1.34	RAW COAL W-76 "D" COAL
	3916	06/20/94	23.07	8.63	0.52	8,998	1.16	W-76
	3934	06/21/94	24.23	8.29	0.72	8,892	1.62	W-76
	3956	06/23/94	24.92	7.02	0.66	8,995	1.47	W-76
	3969	06/25/94	23.72	8.29	0.61	8,894	1.37	9407 C-1-02
	3970	06/25/94	22.67	8.00	0.62	9,144	1.36	9407 C-1-03
	4038	06/29/94	23.44	9.94	0.80	8,849	1.81	9407 C-1-02 "A COAL"
	4039	06/29/94	23.83	8.73	0.69	8,945	1.54	9407 C-1-03 "A COAL"
	AVERAGE		24.17	8.21	0.65	8,908	1.47	
	STANDARD DEVIATION		1.30	1.13	0.14	127	0.33	
	MIN		22.67	4.78	0.35	8,674	0.81	
	MAX		26.54	9.94	1.04	9,144	2.37	

LEGEND	
TM	% Total Moisture
PA	% Ash
PS	% Sulfur
HHV	Btu/lb
SO2	lbs. of SO2/MMBtu

Table 4.4 ACCP Quality Analyses for 1994 Second Quarterly Report (*cont'd.*).

BENTONITE PRODUCT

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
BENTONITE PRODUCT	3030	04/04/94	3.29	9.10	0.58	11,741	0.99	BENTONITE
	3061	04/06/94	2.81	10.85	0.55	11,636	0.95	BENTONITE
	3088	04/07/94	2.55	9.94	0.52	11,769	0.88	BENTONITE
	3094	04/08/94	3.58	9.02	0.65	11,660	1.11	BENTONITE
	3118	04/11/94	3.81	9.14	0.73	11,555	1.26	BENTONITE
	3129	04/12/94	3.78	9.57	0.85	11,552	1.47	BENTONITE
	3145	04/13/94	3.65	8.59	0.53	11,718	0.90	BENTONITE
	3155	04/14/94	3.25	9.00	0.62	11,713	1.06	BENTONITE
	3167	04/15/94	3.73	9.05	0.64	11,643	1.10	BENTONITE
	3180	04/18/94	5.64	9.37	0.79	11,274	1.40	BENTONITE
	3203	04/20/94	4.81	8.61	0.59	11,507	1.03	BENTONITE
	3227	04/24/94	3.32	8.64	0.57	11,713	0.97	BENTONITE
	3251	04/25/94	3.72	8.95	0.70	11,603	1.21	BENTONITE
	3265	04/27/94	3.81	8.61	0.57	11,585	0.98	BENTONITE
	3289	04/28/94	3.34	8.91	0.61	11,705	1.04	BENTONITE
	3299	04/29/94	3.92	8.89	0.69	11,562	1.19	BENTONITE
	3300	04/29/94	3.15	8.81	0.60	11,680	1.03	BENTONITE
	3324	05/02/94	3.34	8.75	0.55	11,656	0.94	BENTONITE
	3353	05/04/94	2.98	9.64	0.49	11,711	0.84	BENTONITE
	3363	05/05/94	3.54	8.74	0.63	11,665	1.08	BENTONITE HAND SAMPLE
	3375	05/06/94	3.20	9.19	0.80	11,614	1.38	BENTONITE
	3423	05/10/94	2.23	9.38	0.73	11,786	1.24	BENTONITE
	3456	05/11/94	2.32	9.01	0.64	11,777	1.09	BENTONITE
	3473	05/12/94	2.67	9.68	0.75	11,596	1.29	BENTONITE FIRST TRUCK
	3474	05/12/94	2.21	9.49	0.68	11,700	1.16	BENTONITE SECOND TRUCK
	3493	05/13/94	3.29	9.10	0.57	11,684	0.98	BENTONITE
	3494	05/16/94	2.32	9.00	0.58	11,811	0.98	BENTONITE
	3526	05/17/94	3.31	8.84	0.61	11,713	1.04	BENTONITE
	3545	05/18/94	3.51	9.03	0.73	11,588	1.26	BENTONITE
	3562	05/20/94	3.74	8.80	0.64	11,648	1.10	BENTIONTE
	3581	05/23/94	3.68	9.03	0.70	11,634	1.20	BENTINONTE
	3592	05/24/94	5.96	8.44	0.66	11,359	1.16	BENTONITE
	3604	05/25/94	6.69	8.49	0.60	11,249	1.07	BENTONITE
	3614	05/26/94	6.41	8.31	0.49	11,321	0.87	BENTONITE
	3620	05/26/94	6.24	8.00	0.52	11,335	0.92	BENTONITE
	3628	05/27/94	5.94	8.75	0.65	11,328	1.15	BENTONITE
	3655	05/31/94	5.88	8.43	0.58	11,342	1.02	BENTONITE

Table 4.4 ACCP Quality Analyses for 1994 Second Quarterly Report (cont'd.).

BENTONITE PRODUCT (cont'd)

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
BENTONITE PRODUCT	3660	06/01/94	5.68	8.28	0.56	11,420	0.98	BENTONITE
	2746	06/02/94	5.48	8.78	0.56	11,453	0.98	BENTONITE
	3676	06/02/94	4.04	9.14	0.53	11,569	0.92	BENTONITE
	3702	06/03/94	4.31	8.79	0.50	11,552	0.87	BENTONITE
	3699	06/06/94	3.93	8.89	0.60	11,591	1.04	BENTONITE
	3724	06/07/94	3.73	9.01	0.56	11,668	0.96	BENTONITE TRUCK 1
	3725	06/07/94	3.56	8.75	0.55	11,666	0.94	BENTONITE TRUCK 2
	3735	06/08/94	3.47	8.74	0.54	11,695	0.92	BENTONITE
	3754	06/09/94	3.34	9.02	0.55	11,648	0.94	BENTONITE
	3755	06/09/94	4.49	8.91	0.52	11,571	0.90	BENTONITE
	3765	06/10/94	3.10	9.29	0.67	11,681	1.15	BENTONITE
	3813	06/14/94	2.33	9.68	0.73	11,720	1.25	BENTONITE
	3816	06/14/94	2.33	9.52	0.69	11,761	1.17	BENTONITE
	3839	06/15/94	2.45	9.02	0.64	11,775	1.09	BETONITE
	3843	06/16/94	1.99	9.04	0.54	11,893	0.91	BENTONITE
	3844	06/16/94	2.07	8.95	0.53	11,893	0.89	BENTONITE
	3853	06/17/94	1.93	8.73	0.52	11,953	0.87	BENTONITE
	3857	06/17/94	1.89	9.02	0.55	11,895	0.92	BENTONITE
	3893	06/20/94	2.50	9.86	0.57	11,772	0.97	BENTONITE
	3919	06/21/94	2.68	9.15	0.49	11,768	0.83	BENTONITE
	3920	06/21/94	2.71	8.80	0.54	11,776	0.92	BENTONITE
	3937	06/22/94	3.34	8.61	0.53	11,706	0.91	BENTONITE
	3951	06/23/94	2.98	8.73	0.71	11,776	1.21	BENTONITE AREA "A" COAL
	3958	06/24/94	2.67	8.54	0.60	11,827	1.01	BENTONITE
	3988	06/27/94	2.58	10.05	0.75	11,669	1.29	BENTONITE
	3997	06/28/94	2.21	10.80	0.94	11,697	1.61	BENTONITE
	4011	06/29/94	2.20	10.51	0.69	11,763	1.17	BENTONITE
	4029	06/30/94	1.86	9.62	0.57	11,896	0.96	BENTONITE
	4030	06/30/94	1.94	9.24	0.62	11,877	1.04	BENTONITE
	AVERAGE		3.48	9.07	0.62	11,652	1.06	
	STANDARD DEVIATION		1.21	0.54	0.09	156	0.16	
	MIN		1.86	8.00	0.49	11,249	0.83	
	MAX		6.69	10.85	0.94	11,953	1.61	

LEGEND	
TM	% Total Moisture
PA	% Ash
PS	% Sulfur
HHV	Btu/lb
SO2	lbs of SO2/MMBtu

Table 4.4 ACCP Quality Analyses for 1994 Second Quarterly Report (cont'd.)

CONTINENTAL LIME PRODUCT

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
CONTINENTAL LIME PRODUCT	3286	04/28/94	2.40	9.54	0.49	11,808	0.83	CONTINENTAL LIME
	3301	04/29/94	3.34	8.67	0.63	11,639	1.08	CONTINENTAL LIME
	3303	05/01/94	3.78	9.57	0.51	11,549	0.88	CONTINENTAL LIME
	3360	05/03/94	2.40	8.95	0.58	11,831	0.98	CONTINENTAL LIME
	3385	05/06/94	1.71	9.30	0.41	11,916	0.69	CONTINENTAL LIME TRUCK 358
	3388	05/06/94	1.78	9.29	0.48	11,938	0.80	CONTINENTAL LIME TRUCK 9119
	3383	05/07/94	2.02	8.30	0.50	11,942	0.84	CONTINENTAL LIME TRUCK 358
	3384	05/07/94	1.77	8.44	0.49	12,026	0.81	CONTINENTAL LIME TRUCK 9127
	3381	05/08/94	1.91	9.62	0.50	11,856	0.84	CONTINENTAL LIME TRUCK 9127
	3492	05/12/94	2.91	8.49	0.58	11,808	0.98	CONTINENTAL LIME
	3495	05/13/94	2.47	8.71	0.55	11,825	0.93	CONTINENTAL LIME TRUCK 9123
	3496	05/13/94	2.50	8.81	0.55	11,790	0.93	CONTINENTAL LIME TRUCK 9127
	3497	05/13/94	2.58	8.71	0.55	11,787	0.93	CONTINENTAL LIME TRUCK 9131
	3498	05/13/94	2.45	8.79	0.53	11,820	0.90	CONTINENTAL LIME TRUCK 9127
	3499	05/14/94	2.46	8.78	0.50	11,818	0.85	CONTINENTAL LIME TRUCK 9127
	3503	05/14/94	2.45	8.76	0.51	11,781	0.87	CONTINENTAL LIME TRUCK 9119
	3504	05/14/94	2.35	9.00	0.56	11,771	0.95	CONTINENTAL LIME TRUCK 9123
	3502	05/15/94	2.30	8.94	0.53	11,825	0.90	CONTINENTAL LIME TRUCK 9127
	3506	05/15/94	2.58	8.58	0.58	11,796	0.98	CONTINENTAL LIME TRUCK 9123
	3507	05/15/94	2.54	8.91	0.53	11,800	0.90	CONTINENTAL LIME TRUCK 9119
	3500	05/16/94	2.15	9.45	0.48	11,793	0.81	CONTINENTAL LIME TRUCK 9127
	3505	05/16/94	2.33	8.99	0.62	11,765	1.05	CONTINENTAL LIME TRUCK 9119
	3543	05/17/94	2.77	8.49	0.54	11,802	0.92	CONTINENTAL LIME
	3723	06/06/94	3.67	8.70	0.54	11,682	0.92	CONTINENTAL LIME TRUCK 9119
	3771	06/09/94	3.03	8.73	0.50	11,727	0.85	CONTINENTAL LIME TRUCK 9119
	3769	06/10/94	2.25	9.66	0.66	11,755	1.12	CONTINENTAL LIME TRUCK 9119
	3762	06/11/94	1.87	9.62	0.53	11,864	0.89	CONTINENTAL LIME TRUCK 9119
	3770	06/11/94	1.77	9.80	0.54	11,841	0.91	CONTINENTAL LIME TRUCK 3
	3766	06/12/94	1.50	10.74	0.49	11,859	0.83	CONTINENTAL LIME TRUCK 9127
	3772	06/12/94	1.98	10.40	0.53	11,750	0.90	CONTINENTAL LIME TRUCK 9127
	3774	06/12/94	1.43	10.06	0.51	11,913	0.86	CONTINENTAL LIME TRUCK 9119
	3815	06/13/94	2.33	11.09	0.50	11,707	0.85	CONTINENTAL LIME TRUCK 9127
	3828	06/14/94	2.41	9.27	0.71	11,778	1.21	CONTINENTAL LIME TRUCK 9127
	3829	06/14/94	2.85	9.21	0.70	11,742	1.19	CONTINENTAL LIME TRUCK 9141
	3830	06/14/94	2.43	9.05	0.63	11,779	1.07	CONTINENTAL LIME TRUCK 9119
	3838	06/15/94	2.22	8.82	0.56	11,867	0.94	CONTINENTAL LIME
	3841	06/15/94	1.93	8.93	0.53	11,906	0.89	CONTINENTAL LIME TRUCK 9123

Table 4.4 ACCP Quality Analyses for 1994 Second Quarterly Report (cont'd.)

CONTINENTAL LIME PRODUCT (cont'd)

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
CONTINENTAL LIME PRODUCT	3842	06/15/94	2.10	8.95	0.52	11,881	0.88	CONTINENTAL LIME
	3856	06/16/94	1.98	9.08	0.54	11,868	0.91	CONTINENTAL LIME TRUCK 338
	3858	06/16/94	1.99	8.89	0.53	11,916	0.89	CONTINENTAL LIME TRUCK 9119
	3859	06/16/94	2.01	9.07	0.51	11,915	0.86	CONTINENTAL LIME TRUCK 9127
	3873	06/17/94	1.93	9.25	0.52	11,897	0.87	CONTINENTAL LIME WHW 11
	3874	06/17/94	1.93	9.20	0.52	11,894	0.87	CONTINENTAL LIME TRUCK 9127
	3875	06/17/94	1.96	9.12	0.53	11,933	0.89	CONTINENTAL LIME TRUCK 9119
	3867	06/18/94	2.19	7.95	0.56	12,086	0.93	CONTINENTAL LIME TRUCK 9127
	3868	06/18/94	2.62	8.02	0.58	12,005	0.97	CONTINENTAL LIME TRUCK 9119
	3870	06/19/94	2.11	9.28	0.52	11,854	0.88	CONTINENTAL LIME TRUCK 9119
	3871	06/19/94	1.97	10.44	0.49	11,833	0.83	CONTINENTAL LIME TRUCK 9127
	3872	06/19/94	2.07	9.54	0.52	11,841	0.88	CONTINENTAL LIME WHW 11
	3917	06/20/94	2.54	10.38	0.48	11,729	0.82	CONTINENTAL LIME TRUCK 358
	3918	06/20/94	2.53	10.56	0.45	11,650	0.77	CONTINENTAL LIME TRUCK 9129
	3921	06/20/94	2.33	10.70	0.50	11,720	0.85	CONTINENTAL LIME TRUCK 9119
	3998	06/28/94	1.89	9.43	0.81	11,760	1.38	CONTINENTAL LIME TRUCK 9123
	3999	06/28/94	0.91	10.27	0.88	11,775	1.49	CONTINENTAL LIME TRUCK 9119
	4001	06/28/94	2.07	9.11	0.75	11,856	1.27	CONTINENTAL LIME TRUCK 9131
	4013	06/28/94	2.09	9.13	0.60	11,927	1.01	CONT LIME TK#9127
	4014	06/28/94	1.98	9.55	0.62	11,194	1.11	CONT LIME TK#9119
	4012	06/29/94	2.09	9.08	0.62	11,913	1.04	CONT LIME TK#9131
	4028	06/29/94	1.97	10.66	0.68	11,727	1.16	CONTINENTAL LIME TRUCK 9127
	4031	06/30/94	2.15	9.09	0.62	11,884	1.04	CONT LIME #3
	4040	06/30/94	2.33	10.02	0.75	11,751	1.28	CONTINENTAL LIME TRUCK 9127
	4041	06/30/94	1.80	10.15	0.85	11,843	1.44	CONTINENTAL LIME TRUCK 9119
	AVERAGE		2.25	9.29	0.57	11,815	0.96	
	STANDARD DEVIATION		0.48	0.69	0.09	122	0.16	
	MIN		0.91	7.95	0.41	11,194	0.69	
	MAX		3.78	11.09	0.88	12,086	1.49	

LEGEND	
TM	% Total Moisture
PA	% Ash
PS	% Sulfur
HHV	Btu/lb
SO2	lbs. of SO2/MMBtu

Table 4.4 ACCP Quality Analyses for 1994 Second Quarterly Report (cont'd.)

STANDARD PRODUCT - DAIRYLAND POWER

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
STND PRODUCT - Dairyland Power	3700	06/05/94	3.96	8.59	0.55	11,640	0.95	DAIRYLAND POWER

STANDARD PRODUCT - EMPIRE

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
STND PRODUCT - Empire	3501	05/16/94	2.52	9.30	0.49	11,786	0.83	EMPIRE SAND
	3593	05/23/94	3.86	9.05	0.70	11,612	1.21	EMPIRE SAND
	3726	06/06/94	3.83	8.73	0.54	11,648	0.93	EMPIRE SAND
	3827	06/14/94	2.52	9.16	0.61	11,790	1.03	EMPIRE SAND
	3840	06/15/94	2.41	9.05	0.60	11,800	1.02	EMPIRE SAND
	3855	06/16/94	1.97	8.70	0.54	11,924	0.91	EMPIRE SAND TRUCK 223
	3852	06/17/94	2.41	8.80	0.52	11,869	0.88	EMPIRE SAND
	3869	06/18/94	2.03	9.10	0.55	11,895	0.92	EMPIRE SAND
	4000	06/27/94	2.07	10.21	0.74	11,805	1.25	EMPIRE SAND
	4027	06/29/94	3.21	9.46	0.62	11,684	1.06	EMPIRE SAND AND GRAVEL
	4042	06/30/94	1.79	10.13	0.77	11,809	1.30	EMPIRE SAND
	AVERAGE		2.60	9.24	0.61	11,784	1.03	
	STANDARD DEVIATION		0.69	0.49	0.09	95	0.15	
	MIN		1.79	8.70	0.49	11,612	0.83	
	MAX		3.86	10.21	0.77	11,924	1.30	

STANDARD PRODUCT - FREEMONT POWER

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
STND PRODUCT - Freemont Power	3845	06/15/94	2.22	8.88	0.57	11,827	0.96	FREMONT POWER

LEGEND	
TM	% Total Moisture
PA	% Ash
PS	% Sulfur
HHV	Btu/lb
SO2	lbs. of SO2/MMBtu

Table 4.4 ACCP Quality Analyses for 1994 Second Quarterly Report (cont'd.)

STANDARD PRODUCT - MONTANA POWER COMPANY

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
STND PRODUCT - MPC	3605	05/24/94	4.23	10.64	0.56	11,384	0.98	STD PROD FROM I-94 TO MPC
	3613	05/25/94	5.80	9.90	0.54	11,211	0.96	STD PROD TO MPC
	3626	05/26/94	5.67	9.32	0.52	11,315	0.92	STD PROD TO MPC
	3625	05/27/94	5.56	8.82	0.57	11,379	1.00	STD PROD TO MPC
	3622	05/28/94	6.11	8.35	0.58	11,261	1.03	STD PROD TO MPC
	3630	05/28/94	5.71	8.20	0.56	11,386	0.98	
	3642	05/28/94	5.70	9.54	0.91	11,193	1.63	
	3640	05/29/94	5.90	9.42	0.82	11,178	1.47	
	3624	05/29/94	6.47	8.37	0.50	11,105	0.90	STD PROD TO MPC
	3637	05/29/94	6.25	9.37	0.79	11,160	1.42	
	3623	05/30/94	6.56	8.16	0.55	11,302	0.97	STD PROD TO MPC
	3670	05/31/94	5.89	7.88	0.54	11,370	0.95	STD PROD TO MPC
	3672	06/01/94	6.37	8.22	0.52	11,302	0.92	STD PROD TO MPC
	3679	06/02/94	5.96	8.06	0.53	11,366	0.93	STD PROD TO MPC
	3681	06/03/94	5.36	8.79	0.56	11,397	0.98	STD PROD TO MPC
	3680	06/04/94	5.60	8.19	0.59	11,410	1.03	STD PROD TO MPC
	3721	06/05/94	7.00	8.32	0.53	11,233	0.94	STD PROD TO MPC
	3720	06/06/94	7.02	8.32	0.54	11,197	0.96	STD PROD TO MPC
	3736	06/07/94	5.60	8.75	0.60	11,352	1.06	STAND PROD TO MPC
	4032	06/29/94	1.90	9.45	0.60	11,867	1.01	STD PROD TO MPC
	4092	06/30/94	10.90	8.93	0.56	10,718	1.05	STAND PROD TO MPC
	AVERAGE		5.98	8.81	0.59	11,290	1.05	
	STANDARD DEVIATION		1.51	0.70	0.11	198	0.19	
	MIN		1.90	7.88	0.50	10,718	0.90	
	MAX		10.90	10.64	0.91	11,867	1.63	

STANDARD PRODUCT - HAND SAMPLED - CORRETTE

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
STND PRODUCT - Hand sampled	3086	04/06/94	3.57	8.99	0.65	11,605	1.12	CORRETE T-95 C-12 HAND SAMPLE
	3087	04/06/94	5.60	8.99	0.58	11,410	1.02	CORRETE T-95 C-12 HAND SAMPLE
	AVERAGE		4.59	8.99	0.62	11,507	1.07	
	STANDARD DEVIATION		1.02	0.00	0.04	98	0.05	
	MIN		3.57	8.99	0.58	11,410	1.02	
	MAX		5.60	8.99	0.65	11,605	1.12	

LEGEND	
TM	% Total Moisture
PA	% Ash
PS	% Sulfur
HHV	Btu/lb
SO2	lbs of SO2/MMBtu

Table 4.4 ACCP Quality Analyses for 1994 Second Quarterly Report (cont'd.)

STANDARD PRODUCT - Silo's (Mostly to Corette prior to conditioning)

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	IM	PA	PS	IMV	SQ2	COMMENTS
STND PRODUCT	3004	04/01/94	2.34	9.12	0.53	11,890	0.88	STD PROD TO T-95
	3003	04/02/94	2.86	9.56	0.57	11,782	0.97	STD PROD TO T-95
	3002	04/03/94	2.66	9.09	0.56	11,869	0.94	STD PROD TO T-95
	3042	04/04/94	3.06	9.99	0.50	11,680	0.86	STD PROD TO T-95
	3062	04/04/94	3.14	12.51	0.58	11,722	0.99	STD PROD TO T-95
	3064	04/05/94	3.46	8.38	0.53	11,696	0.91	STD PROD TO T-95
	3065	04/05/94	2.80	11.37	0.48	11,859	0.85	STD PROD TO T-95
	3089	04/06/94	3.73	10.40	0.62	11,663	0.98	STD PROD TO T-95
	3092	04/08/94	3.76	10.06	0.61	11,737	0.97	STD PROD TO T-95
	3095	04/09/94	2.48	10.85	0.54	11,705	0.94	STD PROD TO T-95
	3096	04/09/94	2.83	10.81	0.54	11,687	0.93	STD PROD TO T-95
	3093	04/10/94	2.35	9.66	0.52	11,849	0.86	STD PROD TO T-95
	3130	04/11/94	2.70	10.35	0.55	11,687	0.94	STD PROD TO T-95
	3154	04/13/94	2.73	10.69	0.58	11,614	1.00	STD PROD TO T-95
	3164	04/14/94	2.44	10.96	0.55	11,684	0.94	STD PROD TO T-95
	3165	04/15/94	3.55	10.14	0.51	11,651	0.88	STD PROD TO T-95
	3204	04/19/94	2.69	10.09	0.53	11,741	0.90	STD PROD TO T-95
	3215	04/20/94	3.24	9.35	0.75	11,659	1.29	STD PROD TO T-95
	3221	04/21/94	2.51	10.08	0.50	11,707	0.85	STD PROD TO T-95
	3222	04/22/94	2.62	10.18	0.46	11,678	0.79	STD PROD TO T-95
	3223	04/23/94	2.70	10.76	0.45	11,611	0.78	STD PROD TO T-95
	3224	04/24/94	2.49	9.38	0.48	11,799	0.81	STD PROD TO T-95
	3225	04/24/94	2.11	9.78	0.45	11,822	0.76	STD PROD TO T-96
	3263	04/25/94	2.66	10.18	0.47	11,688	0.80	STD PROD TO T-96
	3287	04/27/94	3.39	9.07	0.47	11,673	0.81	STD PROD TO T-96
	3296	04/28/94	2.45	9.07	0.50	11,817	0.85	STD PROD TO T-96
	3298	04/30/94	3.48	6.84	0.50	11,675	0.86	STD PROD TO T-96
	3294	05/01/94	3.76	9.25	0.48	11,574	0.83	STD PROD TO T-96
	3334	05/02/94	2.65	9.84	0.48	11,607	0.83	STD PROD TO T-96
	3352	05/03/94	2.14	9.80	0.47	11,777	0.80	STD PROD TO T-96
	3361	05/04/94	2.27	9.90	0.50	11,732	0.85	STD PROD TO T-96
	3362	05/04/94	1.88	9.49	0.50	11,864	0.84	STD PROD TO T-95
	3374	05/05/94	2.67	9.14	0.55	11,743	0.94	STD PROD TO T-95
	3389	05/06/94	1.87	8.88	0.47	11,921	0.79	STD PROD TO T-95
	3386	05/07/94	1.90	8.98	0.46	11,933	0.77	STD PROD TO T-95
	3387	05/08/94	1.73	10.20	0.42	11,842	0.71	STD PROD TO T-95
	3422	05/09/94	1.70	9.22	0.46	11,864	0.78	STD PROD TO T-95
	3457	05/10/94	1.92	8.78	0.52	11,897	0.87	STD PROD TO T-96
	3458	05/10/94	1.77	9.98	0.49	11,808	0.83	STD PROD TO T-96
		05/11/94	1.80	9.03	0.57	11,798	0.97	STAD PROD TO T-95

Table 4.4 ACCP Quality Analyses for 1994 Second Quarterly Report (cont'd.)

STANDARD PRODUCT (cont'd)

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
STND PRODUCT	3555	05/18/94	3.86	8.65	0.49	11,632	0.84	STAD PROD TO T-95
	3561	05/19/94	3.12	9.16	0.49	11,703	0.84	STAD PROD TO T 95
	3590	05/21/94	2.68	9.19	0.51	11,782	0.87	
	3560	05/22/94	3.57	9.97	0.51	11,573	0.88	STAD PROD TO T-95
	3591	05/23/94	4.90	9.07	0.50	11,403	0.88	STD PROD TO T-95
	3603	05/24/94	5.46	9.43	0.50	11,316	0.88	STD PROD TO T 95
	3753	06/08/94	2.52	9.92	0.75	11,672	1.29	STD PROD TO MPC
	3768	06/09/94	2.01	9.63	0.63	11,780	1.07	STD PROD TO MPC
	3761	06/10/94	1.91	10.42	0.56	11,792	0.95	STD PROD TO T-95
	3767	06/12/94	1.63	9.74	0.52	11,906	0.87	STD PROD TO T-95
	3812	06/13/94	2.39	9.39	0.54	11,788	0.92	STD PROD TO T-95
	3854	06/16/94	2.09	8.00	0.56	12,026	0.93	STD PROD TO T-96
	3865	06/17/94	2.65	7.93	0.58	11,964	0.97	STD PROD TO T-96 (AREA D COAL)
	3863	06/18/94	2.29	8.46	0.56	11,922	0.94	STD PROD TO T-96 (8 BELT)
	3866	06/19/94	2.29	8.17	0.60	11,904	1.01	STD PROD TO T-96 (C-O 8)
	3915	06/20/94	2.19	9.64	0.62	11,890	1.04	C-8 BELT
	3935	06/21/94	3.84	8.16	0.65	11,803	1.10	STD PROD TO T-95
	3959	06/23/94	2.05	7.49	0.59	12,082	0.98	STD PROD TO T-96
	3961	06/24/94	1.88	9.95	0.59	11,863	0.99	STD PROD TO T-96
	3962	06/25/94	1.94	11.19	0.56	11,736	0.95	STD PROD TO T-95
	4010	06/28/94	1.89	10.18	0.61	11,754	1.04	STAND PROD TO T-95
	4025	06/29/94	1.98	11.07	0.60	11,694	1.03	STD TO PROD TO T-95
	AVERAGE		2.63	9.66	0.53	11,753	0.91	
	STANDARD DEVIATION		0.74	0.89	0.06	133	0.11	
	MIN		1.63	7.49	0.42	11,316	0.71	
	MAX		5.46	12.51	0.75	12,082	1.29	

LEGEND	
TM	% Total Moisture
PA	% Ash
PS	% Sulfur
HHV	Btu/lb
SO2	lbs. of SO2/MMBtu

Table 4.4 ACCP Quality Analyses for 1994 Second Quarterly Report (cont'd.)

ASHGROVE FINES

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
ASHGROVE FINES	3366	05/04/94	5.06	19.52	0.92	11,280	1.63	ASHGROVE TRUCK #9123
	3367	05/04/94	5.05	9.33	0.75	11,276	1.33	ASHGROVE TRUCK #9131
	3741	06/07/94	6.39	10.35	0.91	10,951	1.66	ASHGROVE T-90 (TRUCK#9131
	3743	06/07/94	8.11	9.99	0.84	10,811	1.55	ASHGROVE TRUCK#9123
	4033	06/29/94	4.42	11.07	0.99	11,216	1.77	ASHGROVE
	4034	06/29/94	4.48	10.27	0.84	11,287	1.49	ASHGROVE TRUCK# 9131
	AVERAGE		5.59	11.76	0.88	11,137	1.57	
	STANDARD DEVIATION		1.30	3.51	0.08	187	0.14	
	MIN		4.42	9.33	0.75	10,811	1.33	
	MAX		8.11	19.52	0.99	11,287	1.77	

BENTONITE FINES

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
BENTONITE FINES	3009	04/01/94	5.60	8.84	0.68	11,315	1.20	BENTONITE DUST
	3066	04/06/94	7.96	10.56	0.71	11,679	1.22	BENTONITE (T-90 FINES)
	3335	05/03/94	2.03	9.20	0.59	11,811	1.00	BENTONITE
	3556	05/19/94	6.10	9.62	0.54	11,013	0.98	BENTONITE TRUCK
	AVERAGE		5.42	9.56	0.63	11,455	1.10	
	STANDARD DEVIATION		2.15	0.64	0.07	313	0.11	
	MIN		2.03	8.84	0.54	11,013	0.98	
	MAX		7.96	10.56	0.71	11,811	1.22	

LEGEND	
TM	% Total Moisture
PA	% Ash
PS	% Sulfur
HHV	Btu/lb
SO2	lbs. of SO2/MMBtu

Table 4.4 ACCP Quality Analyses for 1994 Second Quarterly Report (cont'd.)

CONTINENTAL LIME FINES

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
CONTINENTAL LIME FINES	3181	04/18/94	7.66	9.28	0.88	10,973	1.60	CONTINENTAL LIME
	3218	04/20/94	5.39	9.68	0.91	11,230	1.62	CONTINENTAL LIME
	3219	04/20/94	5.24	9.13	0.81	11,307	1.43	CONTINENTAL LIME
	3233	04/21/94	4.77	9.75	0.94	11,313	1.66	CONTINENTAL LIME
	3228	04/22/94	4.37	9.54	0.72	11,364	1.27	CONTINENTAL LIME
	3234	04/22/94	4.21	9.75	0.85	11,389	1.49	CONTINENTAL LIME
	3237	04/22/94	5.19	9.74	0.92	11,272	1.63	CONTINENTAL LIME
	3239	04/22/94	5.19	9.40	0.84	11,304	1.49	CONTINENTAL LIME
	3229	04/23/94	4.61	9.33	0.80	11,361	1.41	CONTINENTAL LIME
	3231	04/23/94	4.70	9.29	0.77	11,369	1.35	CONTINENTAL LIME
	3235	04/23/94	4.61	9.61	0.69	11,260	1.23	CONTINENTAL LIME
	3232	04/24/94	4.61	9.55	0.76	11,322	1.34	CONTINENTAL LIME
	3236	04/24/94	5.40	9.43	0.78	11,254	1.39	CONTINENTAL LIME
	3238	04/24/94	4.76	8.86	0.82	11,308	1.45	CONTINENTAL LIME
	3265	04/25/94	7.41	9.26	0.78	11,030	1.41	CONTINENTAL LIME(T 90 FINES)
	3273	04/26/94	5.39	8.77	0.67	11,328	1.18	CONTINENTAL LIME
	3274	04/26/94	6.38	8.76	0.73	11,185	1.31	CONTINENTAL LIME
	3290	04/27/94	4.07	8.80	0.59	11,611	1.02	CONTINENTAL LIME
	3307	04/28/94	6.57	9.24	0.81	11,124	1.46	CONTINENTAL LIME
	3308	04/29/94	9.09	11.09	0.77	10,488	1.47	CONTINENTAL LIME
	3302	04/30/94	4.63	8.71	0.62	11,468	1.08	CONTINENTAL LIME
	3304	04/30/94	6.15	9.43	0.75	11,104	1.35	CONTINENTAL LIME
	3305	04/30/94	5.87	9.64	0.83	11,117	1.49	CONTINENTAL LIME
	3295	05/01/94	6.29	9.16	0.81	11,124	1.46	HAND SAMPLED SHIPPED BY TRUCK
	3351	05/03/94	6.14	9.34	0.80	11,160	1.43	CONTINENTAL LIME
	3350	05/04/94	5.03	10.01	1.02	11,268	1.81	CONTINENTAL LIME
	3364	05/04/94	5.01	10.37	1.15	11,235	2.05	CONTINENTAL LIME TRUCK #358
	3365	05/04/94	4.24	9.14	0.84	11,428	1.47	CONTINENTAL LIME TRUCK #9127
	3368	05/04/94	4.65	10.07	1.05	11,312	1.86	CONTINENTAL LIME TRUCK#9119
	3376	05/05/94	5.17	9.83	0.94	11,197	1.68	CONTINENTAL LIME TRUCK 358
	3379	05/05/94	5.23	9.80	1.04	11,191	1.86	CONTINENTAL LIME
	3380	05/05/94	5.60	10.42	1.13	11,116	2.03	CONTINENTAL LIME TRUCK 9127
	3391	05/07/94	4.58	8.97	0.75	11,424	1.31	CONTINENTAL LIME TRUCK 9107
	3392	05/08/94	4.35	10.19	1.02	11,331	1.80	CONTINENTAL LIME TRUCK 9119
	3393	05/08/94	4.35	10.01	0.97	11,341	1.71	CONTINENTAL LIME TRUCK 26
	3429	05/09/94	4.80	9.73	0.86	11,303	1.52	CONTINENTAL LIME TRUCK 9119
	3430	05/09/94	4.96	9.71	0.69	11,240	1.23	CONTINENTAL LIME TRUCK 9131
	3431	05/09/94	5.13	9.66	0.81	11,257	1.44	CONTINENTAL LIME TRUCK 9123

Table 4.4 ACCP Quality Analyses for 1994 Second Quarterly Report (cont'd.)

CONTINENTAL LIME FINES (cont'd)

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
CONTINENTAL LIME FINES	3480	05/10/94	4.42	9.92	0.93	11,323	1.64	CONTINENTAL LIME TRUCK 9127
	3482	05/10/94	4.60	10.04	1.04	11,257	1.85	CONTINENTAL LIME TRUCK 9123
	3481	05/11/94	4.58	9.56	0.82	11,325	1.45	CONTINENTAL LIME TRUCK 9119
	3483	05/11/94	4.58	10.56	1.01	11,240	1.80	CONTINENTIAL LIME TRUCK#9123
	3485	05/11/94	4.70	9.91	0.73	11,257	1.30	CONTINENTIAL LIME T-90 TRUCK#9127
	3508	05/12/94	5.13	10.03	0.74	11,187	1.32	CONTINENTAL LIME TRUCK 9123
	3544	05/17/94	5.69	9.33	0.81	11,180	1.45	CONTINENTAL LIME TRUCK 9119
	3564	05/19/94	6.68	9.11	0.76	11,131	1.37	CONTINONTIAL LIME
	3565	05/19/94	7.37	10.11	1.03	10,940	1.88	CONTINONTILA LIME
	3607	05/24/94	6.85	9.34	0.83	11,043	1.50	CONTINENTAL LIME TRUCK 9123
	3608	05/24/94	6.92	9.34	0.82	11,053	1.48	CONTINENTAL LIME TRUCK 9131
	3606	05/25/94	6.85	9.29	0.84	11,044	1.52	CONTINENTAL LIME TRUCK 9128
	3609	05/25/94	7.11	8.94	0.73	11,075	1.32	CONTINENTAL LIME TRUCK 9119
	3615	05/26/94	6.88	9.40	0.82	11,052	1.48	CONTINENTAL LIME TRUCK 9127
	3619	05/26/94	6.52	9.59	0.88	11,069	1.59	CONTINENTAL LIME NO TRUCK # LISTED
	3635	05/27/94	7.25	10.33	0.72	10,697	1.35	CONTINENTAL LIME TRUCK 9127
	3639	05/27/94	7.53	9.83	0.79	10,872	1.45	CONTINENTAL LIME TRUCK 9119
	3633	05/30/94	6.26	9.79	0.89	11,037	1.61	CONTINENTAL LIME TRUCK 9123
	3636	05/30/94	6.42	9.71	0.71	11,019	1.29	CONTINENTAL LIME TRUCK 9119
	3645	05/30/94	6.82	9.62	0.77	10,978	1.40	CONTINENTAL LIME TRUCK 9127
	3666	05/31/94	8.94	9.15	0.78	10,797	1.44	CONTINENTAL LIME TRUCK 9119
	3662	06/01/94	5.58	8.46	0.56	11,390	0.98	CONTINENTAL LIME TRUCK 9127
	3671	06/01/94	4.90	8.50	0.50	11,498	0.87	CONTINENTAL LIME
	3673	06/01/94	5.01	8.66	0.52	11,474	0.91	CONTINENTAL LIME
	3683	06/02/94	7.32	9.90	0.99	10,858	1.82	CONTINENTAL LIME TRUCK 9127
	3707	06/02/94	7.78	9.57	0.81	10,898	1.49	CONTINENTAL LIME TRUCK 9119
	3682	06/03/94	6.36	10.05	0.96	11,045	1.74	CONTINENTAL LIME TRUCK 9119
	3685	06/03/94	6.02	9.35	0.74	11,130	1.33	CONTINENTAL LIME TRUCK 9127
	3687	06/04/94	5.40	9.48	0.78	11,225	1.39	CONTINENTAL LIME TRUCK 9127
	3689	06/04/94	4.93	9.76	0.83	11,247	1.48	CONTINENTAL LIME TRUCK 9119
	3686	06/05/94	6.65	10.19	0.77	10,935	1.41	CONTINENTAL LIME TRUCK 9127
	3688	06/05/94	5.97	9.68	0.96	11,143	1.72	CONTINENTAL LIME TRUCK
	3690	06/05/94	6.04	9.56	0.89	11,168	1.59	CONTINENTAL LIME TRUCK 9119
	3722	06/06/94	4.08	9.03	0.48	11,610	0.83	CONTINENTAL LIME TRUCK 9127
	3734	06/07/94	4.89	9.70	0.51	11,412	0.89	CONTINENTIAL LIME TRUCK#9119
	3742	06/07/94	6.57	9.45	0.85	10,569	1.61	CONTINENTAL LIME TRUCK#9127
	3756	06/08/94	5.19	9.63	0.86	11,243	1.53	CONTINENTAL LIME TRUCK 9119
	3759	06/08/94	5.33	9.77	0.80	11,201	1.43	CONTINENTAL LIME TRUCK 9127
	3773	06/09/94	8.78	9.12	0.57	10,823	1.05	CONTINENTAL LIME TRUCK 3

Table 4.4 ACCP Quality Analyses for 1994 Second Quarterly Report (cont'd.)

CONTINENTAL LIME FINES (cont'd)

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
CONTINENTAL LIME FINES	3778	06/09/94	4.95	10.06	0.76	11,260	1.35	CONTINENTAL LIME TRUCK 9127
	3764	06/10/94	4.24	9.32	0.55	11,514	0.96	CONTINENTAL LIME
	3781	06/11/94	6.15	11.24	0.71	10,832	1.31	CONTINENTAL LIME TRUCK 9127
	3817	06/13/94	4.46	10.48	0.96	11,267	1.70	CONTINENTAL LIME
	3898	06/18/94	5.26	9.28	0.67	11,281	1.19	WHW CONT LIME TRUCK 358
	4035	06/29/94	4.24	10.51	0.87	11,296	1.54	CONT LIME TRUCK# 9119
	4046	06/30/94	3.89	9.96	0.82	11,447	1.43	CONTINENTAL LIME TRUCK 26
	AVERAGE		5.64	9.60	0.81	11,188	1.45	
	STANDARD DEVIATION		1.18	0.52	0.14	210	0.25	
	MIN		3.89	8.46	0.48	10,488	0.83	
	MAX		9.09	11.24	1.15	11,611	2.05	

LEGEND	
TM	% Total Moisture
PA	% Ash
PS	% Sulfur
HHV	Btu/lb
SO2	lbs. of SO2/MMBtu

Table 4.4 ACCP Quality Analyses for 1994 Second Quarterly Report (cont'd.)

HAND SAMPLED FINES

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
HAND SAMPLED FINES	3039	04/04/94	4.12	8.71	0.63	11,620	1.08	12 BELT HAND SAMPLED (34CC011)
	3306	05/01/94	5.80	9.11	0.70	11,223	1.25	HAND SAMPLED SHIPPED BY TRUCK
	3336	05/02/94	6.24	9.04	0.73	11,185	1.31	HAND SAMPLED SHIPPED BY TRUCK
	3337	05/02/94	5.55	8.96	0.78	11,310	1.38	HAND SAMPLED SHIPPED BY TRUCK
	3348	05/03/94	5.28	9.33	0.87	11,270	1.54	HAND SAMPLED SHIPPED BY TRUCK 9131
	3349	05/03/94	5.19	9.51	0.93	11,298	1.65	HAND SAMPLED SHIPPED BY TRUCK 9123
	3616	05/25/94	6.53	9.60	0.91	11,060	1.65	HAND SAMPLED TRUCK 9131
	3617	05/26/94	6.76	9.65	0.92	11,073	1.66	HAND SAMPLED TRUCK 9123
	3638	05/26/94	6.71	9.40	0.96	11,051	1.74	HAND SAMPLED TRUCK 9131
	3634	05/27/94	6.76	9.47	0.80	11,046	1.45	HAND SAMPLED TRUCK 9123
	3644	05/30/94	6.17	9.35	0.71	11,108	1.28	HAND SAMPLED TRUCK 9131
	3691	06/03/94	6.13	9.94	0.89	11,080	1.61	HAND SAMPLED TRUCK 9123
	3705	06/03/94	6.17	9.52	0.80	10,841	1.48	HAND SAMPLED TRUCK 9131
	3693	06/04/94	5.30	9.93	0.91	11,212	1.62	HAND SAMPLED TRUCK 9131
	3708	06/04/94	6.35	9.84	0.85	11,049	1.54	HAND SAMPLED TRUCK 9123
	3684	06/05/94	6.30	9.75	0.83	11,067	1.50	HAND SAMPLED TRUCK 9123
	3727	06/06/94	6.16	9.44	0.74	11,106	1.33	HAND SAMPLED TRUCK 9131
	3728	06/06/94	6.02	9.81	0.91	11,139	1.63	HAND SAMPLED TRUCK 9123
	3757	06/08/94	6.94	11.62	0.79	10,680	1.48	HAND SAMPLED TRUCK 9131
	3758	06/08/94	5.23	10.23	0.98	11,177	1.75	HAND SAMPLED TRUCK 9135
	3775	06/09/94	5.05	10.35	0.89	11,183	1.59	HAND SAMPLED TRUCK 9123
	3783	06/09/94	5.52	10.32	0.69	11,118	1.24	HAND SAMPLED TRUCK 9131
	3777	06/10/94	5.19	10.50	0.87	11,128	1.56	HAND SAMPLED TRUCK 9123
	3779	06/10/94	5.23	9.95	0.76	11,219	1.35	HAND SAMPLED TRUCK 9131
	3776	06/11/94	6.24	10.70	0.78	10,927	1.43	HAND SAMPLED TRUCK 9123
	3780	06/12/94	4.68	10.64	0.93	11,211	1.66	HAND SAMPLED TRUCK 9123
	3782	06/12/94	4.40	10.63	0.88	11,247	1.56	HAND SAMPLED TRUCK 9131
	3818	06/13/94	4.32	10.13	0.90	11,282	1.60	HAND SAMPLED
	3819	06/13/94	4.78	10.19	0.83	11,239	1.48	HAND SAMPLED
	3831	06/14/94	4.73	10.42	0.96	11,245	1.71	HAND SAMPLED TRUCK 9131
	3832	06/14/94	5.44	11.46	0.76	10,923	1.39	HAND SAMPLED TRUCK 9123
	3860	06/16/94	5.26	8.41	0.77	11,447	1.35	HAND SAMPLED TRUCK 9123
	3861	06/16/94	5.44	8.32	0.76	11,430	1.33	HAND SAMPLED TRUCK 9131
	3896	06/17/94	5.50	8.44	0.85	11,412	1.49	HAND SAMPLED TRUCK 9123
	3899	06/17/94	5.19	8.76	0.74	11,443	1.29	HAND SAMPLED TRUCK 9131
	3894	06/18/94	5.10	8.65	0.75	11,429	1.31	HAND SAMPLED TRUCK 9123
	3895	06/19/94	4.84	9.04	0.83	11,425	1.45	HAND SAMPLED TRUCK 9123
	3897	06/19/94	5.06	9.14	0.78	11,383	1.37	HAND SAMPLED TRUCK 9131
	3912	06/20/94	4.79	8.96	0.79	11,457	1.38	HAND SAMPLED TRUCK 9123
	3913	06/20/94	4.34	9.07	0.80	11,529	1.39	HAND SAMPLED TRUCK 9123

Table 4.4 ACCP Quality Analyses for 1994 Second Quarterly Report (cont'd.)

HAND SAMPLED FINES (cont'd)

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
HAND SAMPLED FINES	3938	06/21/94	4.72	9.02	0.92	11,353	1.62	HAND SAMPLED TRUCK 9119
	3939	06/21/94	4.49	8.87	0.79	11,468	1.38	HAND SAMPLED TRUCK 9123
	3952	06/22/94	4.83	9.12	0.88	11,341	1.55	HAND SAMPLED TRUCK 9131
	3953	06/22/94	4.96	9.76	0.84	11,177	1.50	HAND SAMPLED (dust)
	3964	06/24/94	5.19	9.83	0.87	11,256	1.55	HAND SAMPLED TRUCK 9131
	3966	06/24/94	3.82	10.07	0.85	11,443	1.49	HAND SAMPLED TRUCK 9123
	3965	06/25/94	3.87	10.06	0.85	11,408	1.49	HAND SAMPLED TRUCK 9127
	4044	06/30/94	3.80	10.63	0.96	11,336	1.69	HAND SAMPLED TRUCK 9131
	4045	06/30/94	3.73	10.48	0.90	11,388	1.58	HAND SAMPLED TRUCK 9123
	AVERAGE		5.31	9.68	0.83	11,234	1.48	
	STANDARD DEVIATION		0.84	0.75	0.08	185	0.15	
	MIN		3.73	8.32	0.63	10,680	1.08	
	MAX		6.94	11.62	0.98	11,620	1.75	

LEGEND	
TM	% Total Moisture
PA	% Ash
PS	% Sulfur
HHV	Btu/lb
SO2	lbs. of SO2/MMBtu

Table 4.4 ACCP Quality Analyses for 1994 Second Quarterly Report (cont'd.)

UNCLEANED

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
UNCLEANED	3737	06/07/94	4.48	10.27	0.80	11,378	1.41	R-72 QUENCH COOLER AT 200
	3740	06/07/94	8.17	8.37	0.65	11,061	1.18	R-71 QUENCH COOLER AT 200
	3738	06/08/94	5.23	12.64	0.92	11,578	1.59	R-72 QUNCH COOLER AT 240
	3739	06/08/94	1.92	10.58	0.80	11,785	1.36	R-71 QUENCH COOLER AT 240
	AVERAGE		4.95	10.47	0.79	11,451	1.38	
	STANDARD DEVIATION		2.23	1.51	0.10	267	0.15	
	MIN		1.92	8.37	0.65	11,061	1.18	
	MAX		8.17	12.64	0.92	11,785	1.59	

WASTE

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
WASTE	3214	04/19/94	3.21	14.30	4.75	10,966	8.66	TEST -6 M WASTE (14)
	3260	04/25/94	2.22	27.87	3.63	9,308	7.80	C-8-09 WASTE COAL
	3470	05/11/94	2.39	34.35	0.74	8,362	1.77	9403-WC C-8-09
	AVERAGE		2.61	25.51	3.04	9,545	6.08	
	STANDARD DEVIATION		0.43	8.35	1.69	1,076	3.07	
	MIN		2.22	14.30	0.74	8,362	1.77	
	MAX		3.21	34.35	4.75	10,966	8.66	

LEGEND	
TM	% Total Moisture
PA	% Ash
PS	% Sulfur
HHV	Btu/lb
SO2	lbs. of SO2/MMBtu

Table 4.4 ACCP Quality Analyses for 1994 Second Quarterly Report (cont'd.)

EMPIRE

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
EMPIRE SAND	3557	05/18/94	4.64	8.28	0.66	11,516	1.15	EMPIRE SAND
	3601	05/24/94	6.29	9.19	0.78	11,196	1.39	EMPIRE SAND
	3618	05/25/94	6.62	8.30	0.61	11,269	1.08	EMPIRE SAND
	3631	05/26/94	6.26	8.50	0.61	11,283	1.08	EMPIRE SAND
	3629	05/27/94	6.09	8.50	0.59	11,324	1.04	EMPIRE SAND
	3661	06/01/94	5.63	8.45	0.58	11,392	1.02	EMPIRE SAND
	3663	06/01/94	5.60	8.27	0.52	11,422	0.91	EMPIRE SAND
	3675	06/02/94	4.37	9.20	0.50	11,511	0.87	EMPIRE SAND
	3701	06/02/94	4.30	8.71	0.52	11,606	0.90	EMPIRE SAND
	3814	06/13/94	3.38	9.14	0.56	11,687	0.96	EMPIRE SAND
	3914	06/21/94	3.04	9.50	0.55	11,619	0.95	EMPIRE SAND
	3957	06/23/94	3.91	8.61	0.57	11,611	0.98	EMPIRE SAND
	AVERAGE		5.01	8.72	0.59	11,453	1.03	
	STANDARD DEVIATION		1.17	0.41	0.07	155	0.14	
	MIN		3.04	8.27	0.50	11,196	0.87	
	MAX		6.62	9.50	0.78	11,687	1.39	

FINES

SECOND QUARTER, 1994	SAMPLE ID	SAMPLE DATE	TM	PA	PS	HHV	SO2	COMMENTS
FINES	3377	05/05/94	5.37	10.40	0.96	11,046	1.74	SHIPPED BY TRUCK 9119
	3378	05/05/94	5.87	9.89	0.91	11,086	1.64	SHIPPED BY TRUCK 9131
	3390	05/06/94	4.64	9.72	0.90	11,313	1.59	SHIPPED BY TRUCK 9121
	3396	05/06/94	4.59	9.26	0.84	11,391	1.47	SHIPPED BY TRUCK 9125
	3395	05/07/94	4.46	9.35	0.79	11,374	1.39	SHIPPED BY TRUCK 9125
	3397	05/07/94	4.37	9.57	0.82	11,347	1.45	SHIPPED BY TRUCK 9131
	3394	05/08/94	4.28	9.74	0.88	11,399	1.54	SHIPPED BY TRUCK 9131
	3595	05/20/94	5.84	5.58	0.47	11,669	0.81	SAMPLE #1 SHERCO C-12 BELT
	3627	05/27/94	5.68	8.19	0.48	11,427	0.84	
	3632	05/27/94	6.15	9.57	0.90	11,127	1.62	
	3643	05/27/94	5.51	9.23	0.88	11,246	1.56	
	3784	06/12/94	4.92	10.39	0.84	11,211	1.50	"NIGHTS"
	AVERAGE		5.14	9.24	0.81	11,303	1.43	
	STANDARD DEVIATION		0.64	1.23	0.15	166	0.29	
	MIN		4.28	5.58	0.47	11,046	0.81	
	MAX		6.15	10.40	0.96	11,669	1.74	

LEGEND	
TM	% Total Moisture
PA	% Ash
PS	% Sulfur
HHV	Btu/lb
SO2	lbs. of SO2/MMBtu

5.0 FUTURE WORK AREAS

Work continues on improving product stability and dustiness. Several unforeseen product issues, which were only identified by the demonstration project operation, have changed the required activities for the ACCP Demonstration Project. Budget modifications will have be made to the existing contract so as to include the following tasks:

- identifying efficient and effective handling techniques;
- demonstrating the benefits of SynCoal® in the smaller, more constrained industrial boilers and older, smaller utility boilers;
- developing additional methods to reduce the product's spontaneous combustion potential; and
- demonstrating abilities to reduce the production costs.

In the First Quarter of 1994, preliminary system modifications to incorporate a stabilization process step were identified with the associated cost estimates to determine if a conceptual design should be completed. Rosebud SynCoal Management is continuing to review the information before giving a notice to proceed on this issue.

Improvements in maintenance scheduling are also being developed. The 1994 annual major maintenance outage is scheduled to begin in late August in conjunction with the addition of inert gas generation equipment at the plant. The specific tasks that are to be performed during the outage are listed in Table 5.1.

Table 5.1. Scheduled Maintenance During Outage

MR #	System Code	Est. Hours	Job Description	Parts
		4D	Inspect and repair other plant belts	
		2W	Relocate bypass damper	
		1W	Install inert gas system	Bill R.
		12H	Modify 6" cooler loop to baghouses piping to isolate from inert gas system	
	3311	16H	C/O Top crossmembers near counterweight drive on S-1-20	Ordered
	3311	2H	Inspect #4 belt splice	
	3311	12H	C/O S-1-20 Motor base with new heavy duty base	Ordered
	3311	4H	C/O existing driven sheave with new 20' P.D. on S-1-20	Ordered
	3311	12H	Install new seal, v-ring, and seal sleeve spacer on S-1-20	Ordered
1684	3311	2D	Modify W-76 scale, skirt boards and C/O belt	
	3311	2D	Install wear plates on head of #1, 4, 10 belts	
	3311	12H	C/O inlet and outlet rubber boots on V-1-71	Received
	3311	2D	Repair infeed dust systems, holes in piping and gates	
1498	3311	3D	Replace all the filter bags in D-1-51	Ordered
	3311	2D	Rebuild diverter gate @ #2-#3 belt off of S-1-20	

Table 5.1. Scheduled Maintenance During Outage (cont'd.)

MR #	System Code	Est. Hours	Job Description	Parts
	3312	10H	Service Gardiner-Denver air compressors: contractor	
	3312	1D	Install air compressor/dryer bypass piping	Parts do
1681	3312	4H	Replace check valve on jockey pump, P-2-33	
	3314	2D	Repair furnace refractory, burner throat & gas exit	
	3314	1D	Inspect heat exchanger - North Atlantic Rep.	
	3314	1D	Install new gas valve for furnace	Received
	3314	2D	Repair backwall refractory in furnace F-4-10	
	3315	1D	Install new double row ball bearings with triple/tect seals in K-5-76	Received
	3315	2W	Modify D-581 duct	
	3315	1W	Inspect/weld repair 1st & 2nd stage dryer bed false bottoms	Sowles
	3315	8H	Inspect all fan wheels for buildup, erosion, cracks & clean	
	3315	2D	Inspect/weld repair duct near XV-580 between R-41 & R-42	
1471	3315	1W	C/O springs in all 12" rotary air locks and adjust shoe/rotor clearance	Ordered
	3315	1D	Install new double row ball bearings with triple/-tect seals in K-5-45	Received
1502	3315	2D	Install ½" round stk @ R-5-52 hood and body seam	
1801	3315	2H	C/O #4 explosion door on R-52	
1803	3315	1D	Repair deluge piping on R-42, #3 hose into dryer has leak	

Table 5.1. Scheduled Maintenance During Outage (cont'd.)

MR #	System Code	Est. Hours	Job Description	Parts
1685	3315	4H	C/O #3 & #4 explosion doors on outlet of R-5-71	
1501	3316	2D	C/O fill in marley cooling tower with new CPVC, int'l cooling tower	Ordered
	3316	2H	Check P-6-16 impeller dia.-trim or C/O to 5.9"	Stock
	3316	4H	Inspect interior on X-6-21/22 contact coolers	
	3316	2H	C/O impeller on P-6-26, 5.9" diameter	Received
	3316	2H	C/O impeller on P-6-25, 5.9" diameter	Received
	3317	14H	Inspect/clean/repair D-7-41 baghouse cones, upper section	
	3317	1D	Inspect/clean all cyclone inlets	
	3317	12H	Inspect/repair fire system components in cyclones	
1682	3317	2H	C/O 1st explosion door on R-42 coming out of outlet on common	
	3317	2W	C/O PRS RAL's with Plattco double flap gate valves	Ordered
	3317	4H	Inspect/clean/repair D-7-42 baghouse cones, upper section	
	3318	2D	Inspect and C/O if required the screens in S-8-21	Ordered
	3318	8H	Inspect/clean upper and lower sections of D-8-56	
	3318	10H	Install motor base supports on S-8-21	

Table 5.1. Scheduled Maintenance During Outage (cont'd.)

MR #	System Code	Est. Hours	Job Description	Parts
1667	3318	10H	Install AR plate extensions on discharge end of S-8-21 to chute	
	3318	1.5W	Repair cleaning system piping, elbows, transitions, and chutes	
	3318	12H	Install new seal, V-ring, and seal sleeve spacer on S-8-21	Ordered
	3318	1D	C/O D-8-56 RAL with rubber obturator	Received
	3319	8H	Patch holes in #12 belt	
	3319	1D	Install mechanical splice in #10 belt	
	3320	1D	C/O connectors in C-0-26: inspect other components, sprockets	
	3320	1D	Replace viton seals in gates G-0-82 & 85	Received
	3320	1D	Inspect and C/O transition & tail idlers in C-0-26 if required	Ordered
	3320	2D	Modify chute & grizzley on C-0-28 to Cominco	
	3320	1D	C/O all connectors on C-0-26	Ordered
	3320	8H	C/O traction rings and seals in sumitomo drives on C-0-14/16/18/20/22	Stock
	3320	1D	C/O drive sprockets in C-0-28	Ordered
	3320	1D	C/O drive sprockets on C-0-26	Ordered
	3320	3D	C/O chain and connectors in C-0-28	Ordered
	3320	1D	Inspect and C/O transition & tail idlers in C-0-28 if required	Ordered
	3320	2D	C/O hanger bearings in C-0-14/16/18/20/22	

Table 5.1. Scheduled Maintenance During Outage (cont'd.)

MR #	System Code	Est. Hours	Job Description	Parts
	SP-0	2D	C/O SP-0 expansion joint	
1667	SP-18	2D	C/O SP-18 expansion joint, outlet of R-42	
	SP-27	3D	C/O SP-27 expansion joint, common duct to 2nd stage dryers	
	SP-28	2D	C/O SP-28 expansion joint, inlet of R-52	
1522	SP-30	2D	C/O SP-30 expansion joint at outlet of R-5-52	
	SP-31	2D	C/O SP-31 expansion joint, outlet of R-51	
1672	SP-34	2D	C/O SP-34 expansion joint, 2nd stage cyclones	

APPENDIX A

Significant Accomplishments from Origination of Project to Date

SIGNIFICANT ACCOMPLISHMENTS
(SINCE CONCEPT INCEPTION)

September	**1981**	Western Energy contracts Mountain States Energy to review LRC upgrading concept called the Greene process.
June	**1982**	Mountain States Energy built and tested a small batch processor in Butte, Montana.
December	**1984**	Initial patent application filed for the Greene process, December 1984.
November	**1984**	Initial operation of a 150 lb/hr continuous pilot plant modeling the Greene drying process at Montana Tech's Mineral Research Center in Butte, Montana.
November	**1985**	Added product cooling and cleaning capability to the pilot plant.
January	**1986**	Initiated process engineering for a demonstration-size Advanced Coal Conversion Process (ACCP) facility.
October	**1986**	Completed six month continuous operating test at the pilot plant with over 3,000 operating hours producing approximately 200 tons of SynCoal®.
October	**1986**	Western Energy submitted a Clean Coal I proposal to DOE for the ACCP Demonstration Project in Colstrip, Montana, October 18, 1986.
December	**1986**	Western Energy's Clean Coal proposal identified as an alternate selection by DOE.
November	**1987**	Internal Revenue Service issued a private letter ruling designating the ACCP product as a "qualified fuel" under Section 29 of the IRS code, November 6, 1987.
February	**1988**	First U.S. patent issued February 16, 1988, No. 4, 725,337.
May	**1988**	Western Energy submitted an updated proposal to DOE in response to the Clean Coal II solicitation, May 23, 1988.
December	**1988**	Western Energy was selected by DOE to negotiate a Cooperative Agreement under the Clean Coal I program.
May	**1989**	Second U.S. patent issued March 7, 1989, No. 4, 810,258.
June	**1990**	Reach a negotiated agreement with DOE on the Cooperative Agreement, June 13, 1990.

SIGNIFICANT ACCOMPLISHMENTS (cont'd.)
(SINCE CONCEPT INCEPTION)

September 1990 Signed Cooperative Agreement, after Congressional approval, September 13, 1990.

September 1990 Contracted project engineering with Stone & Webster Engineering Corporation, September 17, 1990.

December 1990 Formed Rosebud SynCoal Partnership, December 5, 1990.

December 1990 Started construction on the Colstrip site.

March 1991 Novated the Cooperative Agreement to the Rosebud SynCoal Partnership, March 25, 1991.

March 1991 Formal ground breaking ceremony in Colstrip, Montana, March 28, 1991.

December 1991 Initiated commissioning of the ACCP Demonstration Facility.

April 1992 Completed construction of the ACCP Demonstration Facility and entered Phase III, Demonstration Operation.

June 1992 Formal dedication ceremony for the ACCP Demonstration Project in Colstrip, Montana, June 25, 1992.

August 1992 Successfully tested product handling by shipping 40 tons of SynCoal® product to MPC's Unit #3 by truck.

October 1992 Completed 81 hour continuous coal run 10/2/92.

November 1992 Converted to a single process train operation.

December 1992 Produced a passivated product with a two-week storage life.

January 1993 Produced 200 tons of passivated product that lasted 13 days in the open storage pile.

February 1993 The plant had a 62 percent operating availability between January 1 and February 15.

March 1993 Identified an environmentally compatible dust suppressant that inhibits fugitive dust from the SynCoal® product. Completed annual Mine Safety and Health Administration safety training.

September 1993 Tested nearly 700 tons of BNI lignite as a potential process feedstock achieving approximately 11,000 Btu/lb heating value and substantially reducing the sulfur in the resultant product.

SIGNIFICANT ACCOMPLISHMENTS (cont'd.)
(SINCE CONCEPT INCEPTION)

September 1993 Tested over 500 tons of BNI lignite.

June 1993 Initiated deliveries of SynCoal® under long-term contracts with industrial customer.

July 1993 Identified a conditioned method that inhibits spontaneous combustion and dust.

August 1993 State evaluated emissions, and the ACCP process is in compliance with air quality permit. ACCP Demonstration Facility went commercial on August 10, 1993.

September 1993 Stored approximately 9,000 tons of SynCoal® in inerted product silos and stabilized 2,000 to 3,000 tons in a managed open stockpile.

September 1993 Operated at an 84 percent operating availability and a 62 percent capacity factor for the month.

September **1993** Tested nearly 700 tons of BNI lignite as a potential process feedstock achieving approximately 11,000 Btu/lb heating value and substantially reducing the sulfur in the resultant product.

September 1993 Tested over 500 tons of BNI lignite.

October 1993 Processed more coal since resuming operation in August than during the entire time from initial startup with the summer's maintenance outage (approximately 15 months).

October 1993 Tested North Dakota lignite as a potential process feedstock, achieving nearly 11,000 Btu/lb heating value and substantially reducing the sulfur content in the resultant product.

November 1993 Operated at an 88 percent operating availability and a 74 percent capacity factor for the month.

December 1993 Shipped 16,951 tons of SynCoal® to various customers.

January 1994 Shipped 18,754 tons of SynCoal® to various customers.

February 1994 The plant had a 67 percent operating availability.

March 1994 Completed a 50/50 SynCoal® blend testburn at MPC's J.E. Corette plant.

SIGNIFICANT ACCOMPLISHMENTS (cont'd.)
(SINCE CONCEPT INCEPTION)

April	**1994**	Completed 75/25 SynCoal® blend followup testburn at MPC's J.E. Corette plant.
May	**1994**	Began regular shipments of SynCoal® fines to industrial customers.
May	**1994**	Exceeded proforma average monthly sales levels for the first time since startup.
June	**1994**	Concluded 30 day, 1,000 mile covered hopper rail car test shipment.
June	**1994**	Increased industrial sales to 39 percent of total (7,350 tons of 18,633).