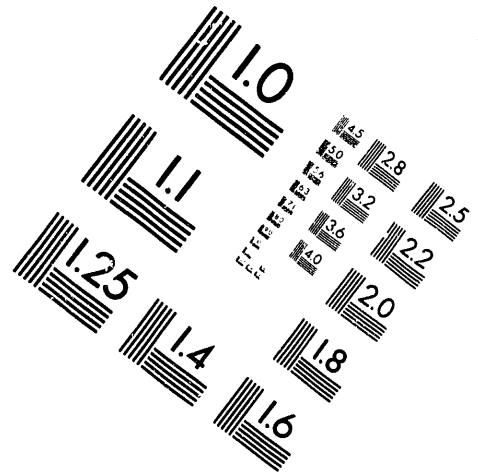
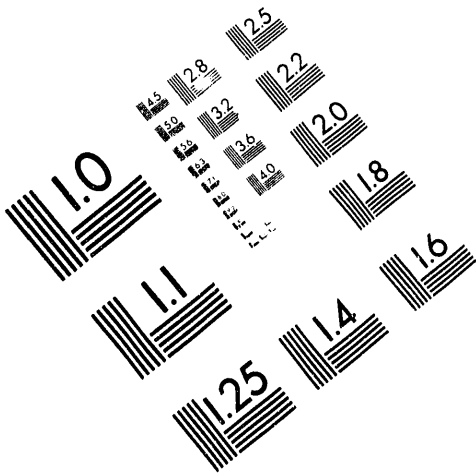




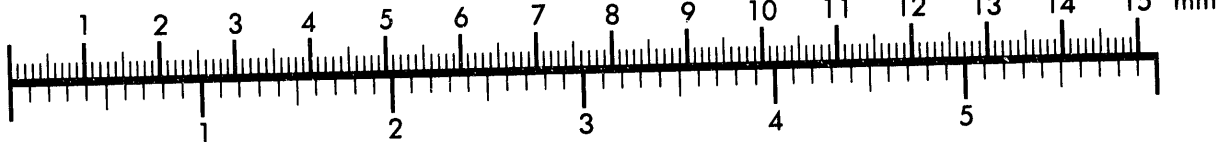
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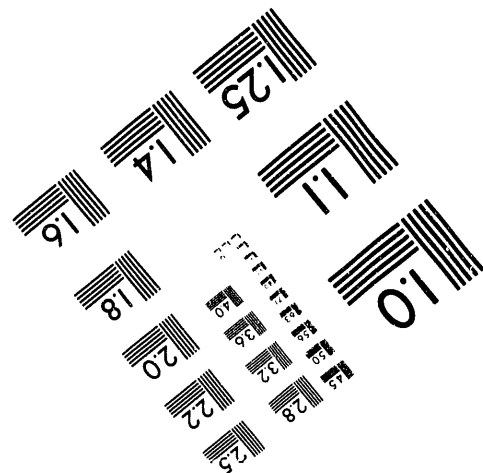
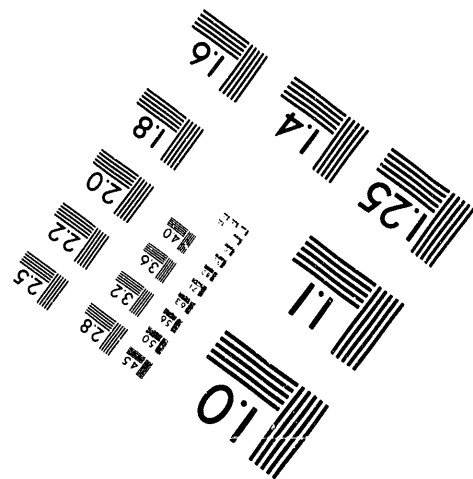
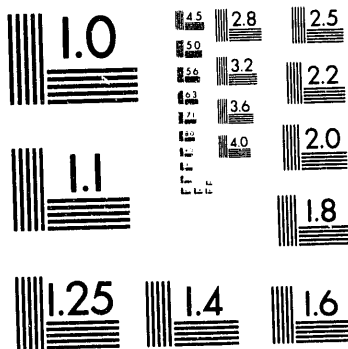
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**CHARACTERIZATION & SUPPLY OF COAL-BASED FUELS**

Quarterly Report for the Period  
November 1, 1988 to January 31, 1989

Energy International, Inc.  
135 William Pitt Way  
Pittsburgh, PA 15238

March, 1989

Prepared For:

U.S. Department of Energy  
Pittsburgh Energy Technology Center

Under Contract No. DE-AC22-86 PC90258

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#### PATENT STATUS

This technical report is being transmitted in advance of DOE patent clearance and no further dissemination or publication shall be made of the report without prior approval of the DOE Patent Counsel.

#### TECHNICAL STATUS

This technical report is being transmitted in advance of DOE review, and no further dissemination or publication shall be made of the report without prior approval from the DOE Program/Project Manager.

CHARACTERIZATION AND SUPPLY OF COAL-BASED FUELS

Quarterly Technical Report  
for the Period  
November 1, 1988 to January 31, 1989

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## 1.0 INTRODUCTION & BACKGROUND

Under the Department of Energy's Advanced Combustor Technology Program, approximately 11 combustor contractors are developing combustion systems (during 1987-1989) for use in residential, commercial, light industrial and industrial retrofit markets. Sufficient quantities of well-characterized, coal-based fuels possessing specific, appropriate specifications are required by the contractors for their developmental test programs. Fuels may be dry pulverized coal or coal liquid fuels. In support of these equipment development efforts, Energy International, Inc. is providing such fuels (under DOE Contract DE-AC22-86PC90258 within the PETC Alternate Energy Program).

Nearly a third of the total energy use in the U.S. is in the residential, commercial, and light industrial sectors. Of this, about half of the energy is supplied by the direct consumption (not including electricity) of conventional oil and gas resources. Thus, there is a significant energy use component for which coal is not currently a viable user option.

For coal to significantly penetrate this important market sector, it must be demonstrated that:

- Premium coal-based fuels can be made, combusted, and used in low maintenance, automatic use systems to which such users are accustomed, i.e., by a direct replacement for conventional fuels and require only simple installation changes.
- Advanced coal fuel combustion systems can effectively combust coal based fuels while meeting economic, environmental, and performance standards.
- Coal fuels, combustion systems and service support are well matched, reliable, cost effective, and are anticipated to be available over the projected lifetime of the installation.

The key to the development of fuel and combustor technologies for future application to the use of premium coal-based fuels in these market sectors is to make representative coal fuels available for developmental testing. Current coal cleaning and processing technologies in early development stages offer the promise to meet the market, the performance and the environmental acceptability that are expected to be required. They are not economically competitive now and production facilities are presently limited to experimental and pilot-scale operations which do not offer the economy of scale to reduce costs to the minimum. This is not likely to change with the current plentiful supplies of relatively low cost fuels.

The developmental testing of advanced combustion equipment systems requires fuels for testing. Test experience and performance measures are needed to identify cost competitiveness in the market and specific market niches for early commercialization; and, commercial market opportunities are needed to justify and specify the development and installation of advanced fuels facilities for supplying the developmental testing needs.

The capability to produce significant quantities of coal based fuels cannot be supported in the current economic and energy use situation. Once these pieces of experience and information begin to fall into place, the market driven needs will more clearly identify the suite of coals that will satisfy the markets and the performance requirements (i.e., cost, maintenance, energy efficiency, environmental). For now, it is important to provide sufficient quantities of surrogate fuels to enable development testing to proceed. To serve as surrogate fuels, the fuels should have chemical and physical characteristics (ash, sulfur, volatiles, fusion temperature, heat content, particle size distribution, slurry formulation, etc.) that are consistent with projected performance and environmental standards. In addition, these surrogates are to be produced using readily available conventional types of cleaning and processing so as to not promote a particular fuel technology or create a reliability on an uncertain fuel technology.

While the definitions of the market and performance are not finalized nor quantitatively fixed and the eventual, economically acceptable fuel processes are not yet determined, it is possible to make use of current understanding of coal resources, markets, combustor and environmental requirements and specific available coal properties and characteristics to make reasonable selections of coals for fuels representative of future advanced fuels. With selected coals, conventional beneficiation methods can be used to prepare current versions of advanced premium coal-based fuels. The associated excessive grinding, special processing, low energy recoveries, and process economics are not expected to be acceptable for eventual commercial operations. However, these current advanced premium fuels can at this time meet the needs of developmental testing with acceptable costs.

The analysis of fuel needs, the selection of candidate coals, the characterization and supply in this contract are to be accomplished with the above in mind. The best choices of those available have been made based upon the available information, coal and processes. This will at least provide the developmental test fuels that will enable the DOE-PETC advanced combustion and fuels program to move forward. Following the fuels and combustor development activities that this supply contract will support, it is expected that additional optional candidate coals will become evident based on the new experience. In the meantime, these coal fuels will enable the program to proceed.

During the ninth quarter of this contract (November 1, 1988 through January 31, 1989) the primary activities were involved with:

- Continuation of the coal procurement, fuel preparation and delivery activities.
- Continuation of interaction with combustion contractors to update their fuel specifications, fuel requirements and delivery schedules.

## 2.0 OBJECTIVES AND SCOPE OF WORK

### 2.1 Contract Objectives

Contract objectives are as follows:

- Develop fuel specifications to serve combustor requirements.
- Select coals having appropriate compositional and quality characteristics as well as an economically attractive reserve base.
- Provide quality assurance for both the parent coals and the fuel forms.
- Deliver premium coal-based fuels to combustor developers as needed for their contract work.

### 2.2 Contract Scope of Work

Energy International, Inc. will perform the following:

- From information obtained both from the combustor PRDA and from the combustor contractors, develop fuel specifications and schedule.
- Using published reports and databases, perform a market assessment and a resource assessment in order to identify acceptable coals within reasonable proximity to markets. In other words, determine the availability and applicability of a wide range of coals in order to produce premium coal-based fuels for specific markets.
- From all coal ranks and all domestic resources select coals which satisfy the requirements of combustion systems being developed.
- Procure premium coals having the ability to be processed to contain <0.8 lb ash per million Btu and <0.5 lbs sulfur per million Btu.
- Procure coals and produce coal liquid mixtures or dry pulverized coal and deliver these premium fuels to combustor contractors.

### 2.3 Task 1 Objectives

The objectives of Task 1, "Analysis of Fuel Needs", are as follows:

- To provide analyses, information and evaluation of coal resources, coal properties, and market opportunities to support the selection of coals for characterization, processing and supply.
- To assure that coals used in developmental testing are representative of future potential coal used in those applications and are:



- Available as U.S. domestic resource in sufficient quantity.
  - Geographically proximate to the regional markets.
  - Capable of being processed into premium coal-based fuels that have the properties to satisfy the combustor needs and market constraints (such as environmental).
- To evaluate, interpret and assess the available information on coal reserves, market opportunities, performance requirements, environmental acceptability, coal properties and specific characteristics to provide guidance in the selection of candidate coals for characterization and supply for developmental testing of advanced combustors for residential, commercial and light industrial applications.
  - To collect, review and evaluate information about specific, currently available coals that can be procured from existing mining operations to provide contracted quantities of development test fuels that satisfy the reserves, market, geographic, property, performance and environmental criteria.
  - To recommend candidate coals and then select specific coals to be purchased, processed into coal-based premium fuels, and supplied to DOE selected users.
  - To coordinate the performance requirements of combustor developers under DOE-PETC contract and in-house efforts with the selection and supply of coals.

#### 2.4 Task 2 Objectives

The objectives of Task 2, "Characterization of Coal Based Fuels", are as follows:

- To procure representative samples of the coals selected in Task 1 and prepare them for characterization studies.
- To obtain baseline analytical data for each of the parent coals.
- To carry out bench-scale froth flotation cleaning test on each of the candidate coals to determine the yield of specification coal attainable from each.
- To carry out detailed washability studies for each coal to determine the effect of particle size reduction on mineral matter liberation as well as the coal yield as a function of the specific gravity of the separation.
- Using the available results of the characterization studies, to select a coal or suit of coals suitable for the preparation of the fuels to meet the specifications of the combustor contractors.

## 2.5 Task 3 Objectives

The objectives of Task 3, "Fuel Supply", are as follows:

- To arrange for the capability, availability, and operation of suitable deep-cleaning coal wash circuit, coal/water slurry preparation plant, and micronizing/grinding facilities.
- To purchase and arrange for the delivery of the appropriate coals for fuel preparation.
- To clean the coals to meet the specifications necessary for the specific fuel needs, i.e., quality categories, such as slagging, non-slagging, industrial retrofit, residential/commercial.
- To prepare the coal based fuels according to the specifications of the PRDA and as modified or requested by the combustor contractors.
- To deliver the fuel to the combustor contractor on schedule.
- To characterize each fuel prior to shipment to assure that the specifications are being met.

### 3.0 EXECUTIVE SUMMARY

Under the Department of Energy's Combustor Technology Program, approximately 11 combustor contractors are developing combustor systems (during 1987-1989) for use in residential, commercial, light industrial and industrial retrofit markets. Sufficient quantities of well-characterized coal based fuels possessing appropriate specifications are required by the contractors for their developmental test programs. Fuels may be dry pulverized coal or coal-liquid fuels. In support of these equipment development efforts, Energy International is providing such fuels under DOE Contract No. DE-AC22-86PC90258.

During the ninth quarter of this contract (November 1, 1988 through January 31, 1989) the primary activities were involved with:

- Continuation of the procurement, preparation and delivery of coal-based fuels for the combustor contractors.
- Continuation of the interaction with combustor contractors in order to update their fuel specifications, fuel requirements and delivery schedules.
- Supplying samples of the Upper Elkhorn #3 coal for cleaning trials by different coal cleaning operators to determine if they could prepare the next quantities of deep-cleaned coal for this fuel supply contract.
- Preparing an updated inventory of the coal in storage.
- Updating the fuel delivery schedule for 1989 so as to be able to arrange a more accurate schedule with the fuel makers.
- Continuation of the quality control activities to insure that fuel specifications are being met and to determine the cause of any problems which may occur.

A brief summary of these activities follows:

Based on a survey of the combustor contractors made last quarter it appeared that an additional 15-20 tons of deep-cleaned coal would be required in order to satisfy and to complete the contract fuel requirements. Work with several coal cleaning operators had begun when the fuel requirements for Catholic University/Navy contract were so drastically reduced that it now appears that there is sufficient deep-cleaned coal in inventory to satisfy all remaining fuel requirements.

A thorough inventory of the coal being stored by Energy International at its Logans Ferry storage facility and at the fuel supplier's location confirmed that, except for some direct coal shipments from the Wentz mine and/or cleaning plant, there is sufficient coal available to complete the known fuel requirements.

Two combustor contractor complaints about fuel quality are being investigated. Both concern oversize material being present. One complaint was from the University of Tennessee Space Institute (UTSI) concerning a

micronized coal and the other was from MTCI concerning a standard grind slurry. Both complained of nozzle plugging. The causes are still under investigation. Remedial action will be taken to prevent this from happening once the cause is known.

#### 4.0 TASK 1 - ANALYSIS OF FUEL NEEDS

##### 4.1 Subtask 1.1 - Project Management, Administration, & Analysis of Fuel Needs

Based on a survey of the combustor contractors conducted last quarter, it appeared as though an additional 15-20 tons deep-cleaned (~1.3-1.5% ash) coal would be required during fiscal year 1989. For this reason contacts were made with companies and institutions possessing coal cleaning facilities in order to determine their interest and ability to provide the needed coal. Accordingly, samples of the Upper Elkhorn #3 coal (UE3-210-WRM-E) were sent to Battelle Institute, to the University of Pittsburgh, to Coaliquids, Inc. and to Process Technology, Inc. for cleaning trials which would be carried out at no cost to the contract (see Quarterly Report for August-October, 1988). In November, however, we were informed of a major reduction in the fuel requirements by the Catholic University/Navy contract as they are sharing fuels, in a sense; all the test work is to be performed at the facilities of Catholic University. (Until then, Navy had requested 7.5 tons micronized deep-cleaned coal fuel plus 3,000 gallons micronized coal water slurry fuel.) As a result this alleviates the apparent need for deep-cleaning of coal at this time. We informed those to whom we had submitted samples that the probability of our purchasing any additional clean coal was low at this time. They have decided to discontinue their trial cleaning until such time as the specific needs for deep-cleaning coal are certain.

In response to a request from Tecogen, an estimate of the cost of preparing and delivering 24,000 gallons of a coal-water slurry was prepared and submitted to them. Half of the slurry was to be prepared from deeply cleaned coal (<1.5% ash) and the other half from a nominal 3-4% ash for an expanded testing program in their combustor development project.

In order to meet the demands and schedules of the various combustor contractors almost monthly contacts have been made maintained with contractors still requiring fuel deliveries. These contacts have led to the tentative list of future fuel deliveries in Section 7.0, Future Plans. Even though these requirements are all subject to change, they will serve as a guide for future scheduling with the fuel suppliers.

## 5.0 TASK 2 - FUEL CHARACTERIZATION

### 5.1 Preparation of Deep-Cleaned Coal

As discussed under Task 1 it was thought at the beginning of the quarter that an additional 15-20 tons of deep-cleaned coal would be required for completion of the fuel supply contract. As a result potential suppliers of clean coal were contacted and samples of the Upper Elkhorn #3 coal sent to them for cleaning trials. However, when the fuel requirements for the Catholic University/Navy contract were drastically reduced, efforts to seek a supplier of deep-cleaned coal were abandoned.

## 6.0 TASK 3 - FUEL SUPPLY

### 6.1 Coal Inventory

Upper Elkhorn #3 coals with various ash levels (as a result of cleaning) are being stored within plastic-lined steel drums at three locations. While the primary storage is maintained by Energy International at Logans Ferry, Pennsylvania, small quantities of coal are being stored temporarily at the two fuel processors' facilities. Coal deliveries for specific orders had been made, then the orders were cancelled for one reason or another. The coals at the two fuel processors' facilities will be used to fill future fuel orders.

The total coal inventory is listed here in ascending order of ash level:

- 8,152 lbs. DCC residential grade ash level at OXCE in 40 drums, which includes "X" drums UE3-180-DCC-D (1.22% ash) and "40-X" drums UE3-179-DCC-D (1.38%). Quantities are to be verified by OXCE.
- 4,000 lbs. UE3-153-DCC-D with residential level ash content 1.3 to 1.5% and low moisture in 20 drums at Logans Ferry. (To be used for dry fine coal for Catholic University.)
- 9,600 lbs. UE3-163-DCC-D deep-cleaned coal at residential grade ash level of <1.5% and low moisture in 48 drums at Logans Ferry. (To be used for dry fine coal.)
- 12,400 lbs. UE3-162-DCC-D deep-cleaned coal at residential grade ash level of <1.5% and high moisture in 62 drums at Logans Ferry. (To be used for slurry or could be dried and ground for fine coal fuel.)
- 5,300 lbs. UE3-000-DCC-D with commercial level ash content (~1.5%) and 6 to 12% moisture in 31 drums at Logans Ferry.
- 14.6 tons UE3-210-WRM-A (2.8% ash) in 86 drums at Logans Ferry.
- 3,800 lbs. UE3-201-WRM-E (4.6% ash) at OXCE in 12 drums.
- 5,300 lbs. UE3-201-WRM-E (4.6% ash) at Jacobson in 15 drums.
- 16,380 lbs. UE3-201-WRM-E (4.6% ash) in 52 drums at Logans Ferry.
- 1,000 lbs. UE3-206-WRM-A at nominal 6.3% ash and 1 1/4" x 1/4" stoker size coal in 3 drums at Logans Ferry.
- Approximately 7.6 tons of coal from EPRI cleaning trials. Fifteen drums (1.6 tons) UE3-015-DCC-H, (1.98% ash, 0.68% S) and 58 drums (6.0 tons) of UE3-016-DCC-H (1.83% ash, 0.64% S).

In summary, there are:

8,152 lbs. deep-cleaned coal at OXCE.  
3,800 lbs. washed run-of-mine at OXCE.  
5,300 lbs. washed run-of-mine at Jacobson.  
61,400 lbs. deep-cleaned coal at Logans Ferry.  
56,580 lbs. washed run-of-mine coal at Logans Ferry.

## 6.2 Fuel Deliveries

During the ninth quarter of this contract (November 1, 1988 to January 31, 1989) two coal shipments to processors and ten fuel deliveries to users were made. These movements of coal and fuel are described below:

- UE3-205-CWF-F -- coal water slurry fuel made by OXCE Fuel Company from residential grade (1.3% ash) deep-cleaned coal (DCC), and shipped to:
  - Atlantic Research Corporation 5 gals.
  - Tecogen 200 gals.
  - Energy & Environmental Research Corp. 200 gals.
  - Energy International, Inc. 5 gals.
- UE3-208-MCO-S -- micronized (10 micron mean size) washed run-of-mine coal containing 6.8% ash, ground by Jacobson and shipped 9,098 lbs. to University of Tennessee Space Institute.
- UE3-209-PCO-S -- pulverized (30 micron mean size) washed run-of-mine containing 6.8% ash, ground by Jacobson and shipped to Manufacturing & Technology Conversion International (MTCI).
- UE3-210-WRM-E -- From Energy International's storage 315 lbs. was shipped to Process Tech for their coal cleaning studies.
- UE3-211-WRM-E -- From storage Energy International shipped 20 lbs. to Battelle for their cleaning studies.
- UE3-212-PCO-E -- From storage Energy International reduced its particle size to -200 mesh while blanketed with Argon, then shipped 5 lbs. to University of Pittsburgh/Westinghouse for their cleaning studies (by Licado process).
- UE-213-MCO-S -- Jacobson micronized 5,465 lbs. (25 drums) and shipped it to Catholic University of America for their combustion tests.
- UE3-214-MCW-F -- OXCE prepared and shipped 300 gallons to Catholic University for their combustion tests.
- UE3-215-DCC-E -- From its storage Energy International shipped 1,150 lbs. deep-cleaned coal (1.2% ash) to Nol-Tec for calibration of the coal feed system for Vortec. (Nol-Tec is sub to Vortec.)
- UE3-216-PCO-S -- Jacobson ground 1,000 lbs. washed run-of-mine coal (containing 4% ash) for Nol-Tec's calibration of Vortec's furnace feed system.



## 7.0 FUTURE PLANS

Energy International will continue to respond to the fuel preparation and fuel delivery needs of the combustor contractors. Close contact with PETC and the contractors will be maintained in order to implement any changes in the fuel quantities, delivery schedules or specifications. Additionally, investigations will continue in an effort to better understand the relationship between fuel quality (i.e., coal analyses and fuel specifications) and combustion performance and/or combustion needs.

Currently, requested fuel deliveries have been matched with existing coal inventories to determine the need for further deep-cleaning. There is adequate DCC available to meet the needs currently known. Therefore, no further deep-cleaning is necessary. Nevertheless, an effort is being made to be aware of existing conventional facilities/processes in the event of unanticipated or sudden requirement.

The planned future fuel deliveries are as follows:

1. Delivery in February of 800 gallons utility grind (100% <149 microns) coal-water slurry fuel from washed run-of-mine coal with 4.6% ash to Manufacturing & Technology Conversion International; and 150 gallons to Purdue University.
2. Delivery in March of 200 gallons micronized grind coal-water slurry fuel from deep-cleaned coal with 1.3% ash to Energy & Environmental Research Corporation; 700 gallons to Catholic University of America; and 600 gallons to Tecogen.
3. Delivery in March of 70 tons Upper Elkhorn #3 coal to Combustion Engineering for their own processing.
4. Delivery in April to Catholic University 13,400 lbs. dry micronized deep-cleaned coal.
5. Delivery in May to Catholic University 1,700 gallons micronized grind coal-water slurry fuel from deep-cleaned coal; and 500 gallons to Tecogen; then in August 500 gallons to Tecogen.
6. Deliveries of fuels that are tentative and not specified yet (i.e. Vortec, UTSI, Tecogen, MTCI, TRW).

8.0 APPENDIX

8.1 Revised Fuel Delivery Schedule

SCHEDULE OF DELIVERIES of C O A L  
(Including quantity and properties as of February 7, 1989)

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-----FYs 87, 88 & 89-----> (-----FY 89----->)

COMBUSTION CONTRACTOR (Application)	COAL PROPERTIES	notes	Actual deliveries	February 1989	March 1989	3rd quarter	4th quarter	CONTRACTOR
AVCO Research Lab (residential)	lignite < 0.5% ash 0.5 S 10,000 Btu/lb 35 micron topsize 12u meansize subbituminous MCO same specs	deleted on Nov 13, 1987  cleaned lignite was deleted Oct 6	UE3-169-MCO-S Dec 23, 400 lbs. in 2 drums 1987 above / 1988 below  BZP-176-DCC-M Apr 88 135 lbs. lignite 1.8% ash No more deliveries; contract was terminated.	none	none	none	none	AVCO Jeevan Abichandani
COMBUSTION ENGINEERING (industrial) (Sorbent add'n 1.8t/hr during injection).	dry micronized <6% ash (UE3 Coal)	same coal as for slurry; CE to grind it at their expense to 18u MMD	UE2-128-MCO-C June 8, 220 lbs. UE3-133-MCO-C June UE3-143-MCO-S Sept 9, 220 lbs. UE3-155-MCO-S Sept 23, 650 lbs. 90% -20u 1987 above / 1988 below UE3-183-MCO-S June 2, 600 lbs. On Oct 28 we learned that no more coal is req'd for this contract.	none	68-72 tons UE3-MRM w/3.5% ash, about late Feb. delivery. direct fr/Wentz plant	none	none	CE Mike Rini
ENERGY & ENVIRONMENTAL RESEARCH, Inc. (residential)	high volatile A bituminous 40u topsize 10u meansize +2700 ash fus. temp. S <0.5% (2% ash	UE3 & UE2 are acceptable	UE3-125-MCO-C July 22, 5412 lbs. 1987 above / 1988 below none yet in '88  UE3-113-PCO-C May 12, 2000 lbs. UE3-135-PCO-C July 16, 4000 lbs. 1987 above / 1988 below UE3-209-PCO-S Nov 09, 6000 lbs.	none	none	none	none	EER Yul Kwan
MTCI (residential) & industrial)	< 1% ash dry micronized 30u topsz, 10u meansz			none	none	none	none	MTCI DuraiSunny
(residential & industrial)	<1% ash dry pulverized 149 topsz, 30u meansz			none	none	none	none	
NAVY at NCEL in CA (commercial) (combustor development)	bituminous (1% ash/MH Btu <0.5% S/MHbtu, 2600 AFT 40u topsize; 100% -400 mesh 14000 Btu/lb	2 to 4 MH Btu/hr none in 1987 none yet in 1988 On Nov 22 we learned that no coal is needed by Navy. and that their need is included with Catholic Univ.'s thus eliminating 7.5 tons DCC.		none	none	none	none	NCEL Tim Fu
CATHOLIC UNIV. at Wash.D.C. (commercial) (modeling)		see ltr. 11-30-87	1987 above / 1988 below UE3-172-DCC-D Jan 26, 500 lbs. UE3-213-MCO-S Nov 10, 5465 lbs.	none	none	13400 lbs. 1.5 ash @100% <44u UE3-DCC-MCO by April 24, maybe Argon blanket because long time storage. Possible source: 48 drums UE3-163 + plus 20 drums UE3-153. Deliver all at one time or within a 1 week as their usage rate is high.	none	CU SemiTeh

SCHEDULE OF DELIVERIES of C O A L  
(Including quantity and properties as of February 7, 1989)

COMBUSTION CONTRACTOR (Application)	COAL PROPERTIES	notes	Actual deliveries			CONTRACTOR
			February 1989	March 1989	3rd quarter	
PETC IN-HOUSE (GILBERT/COMMONWEALTH) (indust'l boiler)	low % ash micronized bituminous	UE2 acceptable. Sept. want same coal used by combust. contrac. UE2-114-MCO-C May 4, 5 tons UE2-126-MCO-C June 11, 5 tons UE2-125-MCO-C June 24, 5 tons UE3-143-MCO-C Sept 2, 8.8 tons UE3-143-MCO-C Sept 9, 4.4 tons 1987 above / 1988 below UE3-152-MCO-S Jan 12, 10/135 lbs	none	none	none	PETC
Science Applications IC (wet oxidation)	lignite-subbituminous PC (80% <200 mesh) M2 inerted in bags in drums	87P-147-PCO-M Aug 19, 1 ton KRR-160-PCO-M Nov 11, 1 ton 1987 above / 1988 below none del'd in 1988; plan to retrieve 41 drums Aug88	none	none	none	SAIC
Tecogen (residential)	bitum'n's (1.5% ash 40 u topsize, 20u meansize)	UE3-154-MCO-S Sept 23, 240 lbs. UE3-170-MCO-S Dec 23, 400 lbs. 1987 above / 1988 below none in '88 yet	none	none	none	TECOGEN
TRW (industrial) (sorbet injection)	eastern bituminous, 2.5 to 3% S, 1250 #2700 to 2800 degrees, low to high sleggers two coals pulverized	awaiting written specs & schedule TRW insists on special delivery, per 8-10-88 Kuenzly.	none	none	none	TRW John Kuenzly
Univ. Tenn. Space Institute (commercial) (fire-tube boiler)	subbitum's low ash 74u tps & bituminous (1% ash AFT >2600 non-slagger)	UE3-158-MCO-S Oct 5, 2 tons coal for shakedown run 85% -22u 1987 above / 1988 below UE3-194-MCO-S July 18, 43185 lbs. coal UE3-195-MCO-S Aug 2, 50441 lbs. coal UE3-203-MCO-S Sept 23, 13733 lbs. coal UE3-208-MCO-S Nov 10, 9098 lbs. coal	none	Recommend western/low rank coals probably western bituminous <4% ash <0.8% S	none	UTSI Richard Attig
Vortec (sub is BCRL) (industrial) (glass melting)	1 to 8% ash, pulverized 1 bitum. coals, 5-10% iron 70% -200mesh; probably PA coal not deep cleaned	1987 above / 1988 below UE3-215-DCC-E Nov 16, 1150 lbs. coal UE3-216-PCO-S Nov 29, 1000 lbs. coal	none	10 tons 3rd Q 89 is earliest. probably late as September	20 tons later	VORTEC Dick Dempski
Noltec ( a sub to Vortec)	Studying coal feeding equipment.		none	none	none	
Atlantic Research	ARC to make own slurry fuel; not chargeable to DOE	UE3-210-MRM-A Oct 6, 7.65 tons	none	none	none	

(-----FYs 87, 88 & 89-----)

(-----FY89-----)

(-----FY 89-----)

SCHEDULE OF DELIVERIES of S L U R T E S  
(Including quantity and properties as of 02-07-89 )

RWG 02-7-89  
fil:sltry0207

----- FY87 & FY88 ----- (----- FY89 -----) ----- FY 89 -----

COMBUSTION CONTRACTOR (Application)	COAL WATER SLURRY PROPERTIES	Notes	ACTUAL DELIVERIES	February 1989	March 1989	3rd Q 89	4th Q 89	CONTRACTOR
AYCO Research Lab (residential) (pulse combustor)	Lignite, VM55K, 30KH2O (1% ash, 0.36S, hi AFT 10000 Btu, FC45K, 70% solids, low vis, top 10u Jumb8 deleted lignite slurry Oct 6	soacs & schedule per letter Feb 9 none revised Jun 23, Nov 18 none yet in '88	none in 1987 1987 above & 1988 below	none! confirmed by Rini 6-31-88 None thru FY89.	none	none	none	AYCO Abichandani
IBUSTION ENGINEERING (industrial retro)	3 to 6% ash, 150u 2500 AFT, .7% S, >13500Btu; >64% solids >30%VM	UE3-139-MCV-F Sept 11, 7500 gallons to be used at MIT 95K -5u topsize UE3-138-CMF-F Oct 27, 1200 gal to be used at MIT standard grind ((149u) CMF ---- 1987 above & 1988 below ---- UE3-188-CMF-F July 8, 3500 gallons stabilized UE3-196-CMF-F July 11, 13800 gallons unstabilized UE3-184-MCV-F July 19, 18000 gallons lightly stabilized UE3-198-CMF-F July 26, 700 gallons stabilized	none	none	200 gallons MCV similar to UE3-116-MCV. (per Oct 28 & Dec 10 telecons.) Requires 1,300 lbs. DCC; let's use 6 drums either UE3-179, -180-DCC already at OXCE. Wants 62% solids; Oxce to make 65%. EER to dilute per Oxce instructions--confirm this.	none	none	EER Yui Kwan
ENERGY & ENVIRONMENTAL RESEARCH, Inc. (residential)	70% solids, 5u MPD 40u top, vis 1000cp 1% ash, 0.5 S, 45% VM	UE3-116-UCM-F, Jun 18, 55 gal UE3-120-CMF-F(MTCT) Nov 11, 1 drum UE3-121-UCM-F(MTCT) Nov 11, 1 drum ---- 1987 above & 1988 below ---- UE3-204-MCV-F Sept 26, 200 gal w/1.3% ash	none	none	none	none	none	MTCI DuraiSwamy PeterStumpf
MTCI (residential & industrial)	(1% ash micronized 10u meansz, 30u topsz	65-70% solids 1987 above & 1988 below	800 gallons WRM-CMF 100% ( 149 u 62 to 65% solids, Feb 28 ship date by AMAX using UE3-201-WRM	none	none	none	none	MTCI DuraiSwamy PeterStumpf
MAYY at NCEL in CA (commercial) (combustor develop.)	(1% ash, pulverized 30u meansz, 149u topsz	65-70% solids 1987 above & 1988 below UE3-205-CMF-F, Nov 14, 600 gal w/6.3% ash	none	none	none	none	none	NCEL Tim Fu
CATHOLIC UNIVERSITY (commercial) (cold flow modeling)	70% solids, (200)cps (.50 recip sec combustor develop.) ultrafine coal	none in 1987 1987 above & 1988 below On 11-22-88 we learned that no slurry is needed by Navy; their tests are combined with Catholic Univ's	none	none	700 gal DCC-MCV requiring 4550 lbs. coal. Delivery March 20, 1989. Let's use 23 drums (8-200lbs/drum) UE3-179-DCC, UE3-180-DCC already at OXCE. These two quantities totaling 2,400 gallons require 15,600 lbs. DCC.	1,700 gal DCC-MCV requiring 11,050 lbs DCC. delv May 22 (OXCE) use 56 drums @ 200/drum i.e. 11 of UE3-179, -180-DCC & 31 of UE3-0-DCC & 14 of UE3-162-DCC	none	CU Sen Niah & Zhao

SCHEDULE OF DELIVERIES of S L U R R I E S  
(Including quantity and properties as of 02-07-89 )

RWG 02-7-89  
fil:slry0207

----- FY87 & FY88 ----- FY 89 -----  
(----- FY89 -----)

COMBUSTION CONTRACTOR (Application)	COAL WATER SLURRY PROPERTIES	Notes	ACTUAL DELIVERIES	February 1989	March 1989	3rd Q 89	4th Q 89	CONTRACTOR
PETC IR-HOUSE (GILBERT/COMMONWEALTH) (Industrial & commercial boilers)	eastern bituminous <0.6% S, >50% solids 500-700cp 100% -100 mesh		ELC-108-CWF-F, April 16, 350 gal fr/WRM UE3-117-CWF-F, May 27, 2000 gal fr/WRM UE3-120-CWF-F, July 27, 110 gal fr/DCC UE3-137-CWF-F, Aug 19, 2000 gal fr/DCC 1987 above & 1988 below	none	none	none	none	PETC/SC
TECOGEN (residential)	>55% solids, <1% ash <1% S, 5u meansz, 20u topsz >2350 AFT		UE3-116-UCW-F, Jun 18, 55gal used at 1 gal/hr 1987 above & 1988 below UE3-174-MCW-F Feb 22, 220 gal. UE3-198-CWF-F Aug 2, 15 gallons UE3-204-MCW-F, Sept 26, 200 gal w/1.32% ash UE3-205-CWF-F Oct 31, 55 gal w/6.3% ash	none	800 gal requiring 3,900 lbs DCC DCC to make it let's use UE3-162-DCC which is at Logans Ferry These three quantities totaling 1,600 gallons require 10,400 lbs. DCC.	500 gal req's 3,250 lbs coal let's use UE3-162	500 gal req's 3,250 lbs coal let's use UE3-162	Tecogen Balsavich
TRW (industrial)	NO SLURRY at all			none	none	none	none	TRW Kuenzly
Vortec (sub BCRL) (industrial)	1 to 8% ash iron is concern			none	none	none	1000 gallons mid 1989	Vortec Denski
Atlantic Research (residential)			UE3-174-MCW-F Feb 22 '88, 55 gal. (didn't rec'y it); UE3-204-MCW-F, Sept 26 '88, 5 gal w/1.32% ash	none	none	none	none	ARC Heaton
J. Bucek Co., Inc.	slurry same as Tecogen's		UE3-204-MCW-E Oct 25 '88, 2 gal with 1.32% ash	none	none	none	none	Bucek Hruby
Purdue University	pulverized same as WTCI's			none	150 gallons requiring 975 lbs WRM			Sojka

SAMPLE NUMBER CODE Explained  
( UE3 = Upper Elkhorn #3  
coal ) --- ( ELC = Elk Creek coal  
( UE2 = Upper Elkhorn coal  
( WRN = washed run-of-mine  
( DCC = deep-cleaned coal  
( MCO = micronized coal  
( pulverized coal = PCO  
coal or fuel form --- ( WRM is serial number for successive deliveries. Source of fuel or coal ---  
( A = mine or wash plant  
( C = coal grinder  
( D = Dravo Research Lab  
( E = Energy International  
( F = OICE Fuel Co.  
( G = Amax RFD in Golden  
( H = EPRI at Homer City  
( M = Univ. Mo. Dakota  
( S = Schutz-O'Neill now Jacobson

8.2 Sample Shipment Log

SAMPLE SHIPMENT LOG

Serial Numbers 000 thru 108

Update: 17-Nov-88

file:list4

Serial No.	Sample I.D.	Previous Sample I.D.	From	To	Quantity	Description	P.O.#	Date Shipped	Hauler
000-010	unassigned								
011	UE3-011-RM-A	ROM coal	Westmoreland Coal Co.	EPRI	20 tons	high ash ROM coal for cleaning trials at Homer City	EI-282	10/20/87	Five Star
012	UE3-012-WRH-A	parent	Westmoreland Coal Co.	EPRI	20 tons	cleaned coal from Wentz prep plant for cleaning trial.	EI-292	10/20/87	Five Star
013	UE3-013-WRH-H	UE3-012-WRH-A	EPRI	Dravo	small samp.	for analytical check			
014	UE3-014-WRH-H	UE3-012-WRH-A	EPRI	EI	small samp.	for analytical check			
015	UE3-015-DCC-D	UE3-011-RM-A	EPRI	EI	18 drums	cleaned coal from EPRI (stored at Logans Ferry)			
016	UE3-016-DCC-D	UE3-012-WRH-A	EPRI	EI	58 drums	cleaned coal from EPRI (stored at Logans Ferry)			
017-088	unassigned								
089	UE2-089-WRH-A	parent	Central Coal Co.	Dravo	11 tons	Off-spec, Lower Cedar Grove, Virginia Energy mine #1085	EI-125	2/19/87	
090	LEL-090-WRH-A	parent	MAPCO	Dravo	2 drums	Pond Creek Coal, Pontiki plant			
091	LEL-091-WRH-D	LEL-090-WRH-A	Dravo	E.I.	5 gal	Pond Creek Coal, Pontiki plant, 1/8x0 for washability studies			
092	CB0-092-WRH-A	parent	Westmoreland Coal	Dravo	2 drums	Colorado, Coal Bed D			
093	CB0-093-WRH-D	CB0-092-WRH-A	Dravo	E.I.	5 gal	Colorado, Coal Bed D, 1/8x0 for washability studies			
094	UE2-094-WRH-A	parent	Central Coal Co.	Dravo	11 ton	2x ash, Lower Cedar Grove, Virginia Energy mine #1085			
095-099	Unassigned								
100	UE3-100-WRH-A	parent	Westmoreland Coal	Dravo	2 drums	Taggart Seam			
101	UE3-101-WRH-D	UE3-100-WRH-A	Dravo	E.I.	5 gal	Taggart Seam, 1/8x0 for washability studies			
102	UE1-102-WRH-A	parent	Old Ben Coal Co.	Dravo	2 drums	Alas Seam			
103	UE1-103-WRH-D	UE1-102-WRH-A	Dravo	E.I.	5 gal	Alas Seam, 1/8x0 for washability studies			
104	UE2-104-WRH-A	parent	Beth Energy Coal Co.	Dravo	2 drums	Lower Cedar Grove			
105	UE2-105-WRH-D	UE2-104-WRH-A	Dravo	E.I.	5 gal	Lower Cedar Grove, 1/8x0 for washability studies			
106	UE3-106-WRH-A	parent	Westmoreland Coal	Dravo	20 ton	3.5x ash coal, Wentz plant, Taggart seam (1st shipment)	EI-145	4/13/87	
107	ELC-107-WRH-F	parent				Elk Creek Coal from DICE			
108	ELC-108-CRF-F	ELC-107-WRH-F	DICE	PETC	350 gal	Std. grind slurry	EI-155	4/16/87	



SAMPLE SHIPMENT LOG

Serial Numbers 109 thru 132

Update: 17-Nov-88

file:ljst6a

Serial No.	Sample I.D.	Previous Sample I.D.	From	To	Quantity	Description	P.O.#	Date Shipped	Hauler
109	UE3-109-WRM-A	parent	Westmoreland Coal	Dravo	23 tons	3.5% ash, Taggart Seam, Wentz plant	EI-162	5/1/87	
110	UE3-110-WRM-A	parent	Westmoreland Coal	Dravo	26 tons	6% ash, Taggart Seam, Holton Plant	EI-157	5/7/87	
111	UE3-111-WRM-D	UE3-110-WRM-D	Dravo	DIKE	26 tons	From UE3-110-WRM-A	EI-168	5/11/87	
112	UE3-112-DCC-D	UE3-106-WRM-A	Dravo	Penn Rilliton	2000 lbs	Deep cleaned UE3-106-WRM-A	Dravo	5/6/87	
113	UE3-113-PCD-C	UE3-112-DCC-D	Penn Rilliton	MICI	2000 lbs	Pulverized UE3-112-DCC-D	EI-176	5/9/87	
114	UE2-114-MCD-C	UE2-094-WRM-A	PRS	PETC	5 ton	Micronized UE2-094-WRM-A	EI-158	5/4/87	
115	UE3-115-DCC-D	UE3-106-WRM-A	Dravo	DIKE	28 drums/5040 lbs	Filter cake from deep cleaned UE3-109-WRM-A	EI-179	5/13/87	
116	UE3-116-UCF-F	UE3-115-DCC-D	DIKE	EER, MICI, Tec	6 drums	Ultrafine slurry from filter cake UE3-115-DCC-D	EI-175	6/22/87	
117	UE3-117-UCF-F	UE3-111-WRM-D	DIKE	PETC	2000 gal	Std grind slurry from UE3-111-WRM-D	EI-171	5/27/87	Lesman
118	UE3-118-WRM-A	parent	Westmoreland Coal	Dravo	23 tons	3.5% ash, Taggart Seam, Wentz Plant	EI-182	5/22/87	
119	UE3-119-DCC-D	UE3-109-WRM-A	Dravo	DIKE	56 drums/10865 lbs	From UE3-109-WRM-A, 1.3-1.5% ash	EI-190	5/28/87	
120	UE3-120-UCF-F	UE3-119-DCC-D	DIKE	MICI/PETC	600 gal/110 gal	Std. grind slurry, 1.2% ash, from UE3-119-DCC-D	EI-191	7/27/87	
121	UE3-121-UCF-F	UE3-119-DCC-D	DIKE	MICI	600 gal/11 drums	Ultrafine slurry, 1.2% ash, from UE3-119-DCC-D	EI-192	6/23/87	
122	UE3-122-DCC-D	UE3-118-WRM-A	Dravo	PRS	15 drums	Cleaned to 1.75 to 2.25% ash, from UE3-118-WRM-A	EI-202	6/11/87	
123	UE3-123-MCD-C	UE3-122-DCC-D	PRS	MICI	24 drs/5412 lbs	From UE3-122-DCC-D	EI-231	7/22/87	Preston
124	UE2-124-WRM-D	UE2-089-WRM-A	Dravo	PRS	70 drums	From UE2-089-WRM-A	EI-194	6/1/87	
125	UE2-125-MCD-C	UE2-124-WRM-D	PRS	PETC	5 tons	From UE2-124-WRM-D	EI-211	6/24/87	Carlucci
126	UE3-126-MCD-C	UE3-094-WRM-A	PRS	PETC	39 drums/9615 lbs	From UE2-094-WRM-A	EI-205	6/11/87	Carlucci
127	UE3-127-WRM-A	parent	Westmoreland Coal	Dravo	25 tons	Stoker coal, Taggart seam, 3.5% ash, Wentz plant	EI-195	6/3/87	Five Star
128	UE2-129-MCD-C	UE2-089-WRM-D	PRS	EER	55 gal drum	Air freighted (from UE2-089-WRM-D) same as UE2-126-MCD-C	Dravo	6/9/87	
129	UE3-129-DCC-D	UE3-118 & 127	Dravo	PRS	13 drums	Blend of deep cleaned UE3-118 & UE3-127	EI-211	6/22/87	Carlucci
130	UE3-130-DCC-D	UE3-129-DCC-D	Dravo	DIKE	47 drums/9640 lbs	1.3-1.5% ash - same as UE3-129	EI-235	7/10/87	Preston
131	UE3-131-WRM-A	parent	Westmoreland Coal	DIKE	44 tons	Taggart Seam, Wentz plant	EI-212	6/26/87	Five Star
132	UE3-132-WRM-A	parent	Westmoreland Coal	Dravo	22 tons	Taggart Seam, Wentz plant	EI-212	6/25/87	Five Star

SAMPLE SHIPMENT LOG

Serial numbers 133 thru 155

Update: 17-Nov-88

file: list4b

Serial No.	Sample I.D.	Previous Sample I.D.	From	To	Quantity	Description	P.O.#	Date Shipped	Hauler
133	UE3-133-MCO-C	UE3-122-DCC-D	PRS	EER	55 gal drum	Micronized from UE3-122	Dravo	6/24/87	Maer Air
134	UE3-134-DCC-D	UE3-127/132	Dravo	Penn Rilton	20 drums	Deep cleaned coal	EI-229	7/15/87	Carlucci
135	UE3-135-MCO-C	UE3-134-DCC-D	Penn Rilton	MTCI	20 drums/2 tons	Pulverized coal	EI-232	7/16/87	Preston
136	UE3-136-WRN-A	parent	Westoreland Coal Co.	Dravo	23 tons	Stoker Coal (~3.5% ash), Taggart Seam, Wentz Plant	EI-235	7/20/87	Five Star
137	UE3-137-CHF-F	UE3-130-DCC-D	OICE	PETC	1870 gal	same spec as UE3-120-CHF-F, 600gal from UE3-144	EI-240	8/19/87	Leaan
138	UE3-138-CHF-F	UE3-131-WRN-A	OICE	C-E	1200 gal	heatable to 150 deg. C	EI-239	9/11/87	
139	UE3-139-MCO-F	UE3-131-WRN-A	OICE	C-E	7500 gal	heatable to 150 deg. C	EI-241	10/27/87	
140	LEL-140-MCO-E	LEL-091-WRN-A	EI	United Tech	one pound	Micronized "as received" Lower Elthorn	--	8/3/87	US Mail
141	LEL-141-MCO-E	LEL-140-MCO-E	EI	United Tech	one pound	Deep Cleaned LEL-140-MCO-E (froth flotation)	--	8/3/87	US Mail
142	UE3-142-DCC-D	UE3-132-WRN-A	Dravo	Schutz/DNeil	46 drums/4.6 tons	Deep Cleaned	EI 246	7/31/87	Saith
143(1)	UE3-143-MCO-C	UE3-142/145	Schutz/D'Neil	PETC	88 drums	Deep cleaned micronized coal	EI 265	9/1/87	Inway
143(2)	UE3-143-MCO-C	UE3-142/145	Schutz/D'Neil	PETC/EER	44 drums/1 drum	Deep cleaned micronized coal	EI 269	9/9/87	Saith
144	UE3-144-DCC-D	UE3-132-WRN-A	Dravo	OICE	21 drums	made 600 gal CHF & blended with UE3-137	EI-248	8/5/87	Saith
145	UE3-145-9CC-D	UE3-132/136	Dravo	Schutz/DNeil	70 drums/7 tons	Deep cleaned dried filter cake	EI-251	8/24/87	Preston
146	B7P-146-WRN-N	parent	UNDERC	EI	10 gal	Western lignite coal	UNDERC	8/6/87	RFS
147	B7P-147-MCO-N	B7P-146-WRN-N	UNDERC	SAIC/EI	1 ton/5 gal	Pulverized Buelah Zap lignite coal	UNDERC	8/3/87	RFS
148	UE3-148-DCC-D	UE3-149-WRN-A	Dravo	Schutz/DNeil	75 drums/7.5 tons	for 25 ton shipment of micronized coal for PETC	EI-267	9/8/87	Saith
149	UE3-149-WRN-A	parent	Westoreland Coal Co.	Dravo	23 tons	Taggart Seam, Wentz plant stoker coal	EI-261	8/24/87	Five Star
150	B7P-150-RON-N	parent	UNDERC	AMAX	~2000 lbs	Buelah-Zap lignite coal	EI 279		RFS
151	B7P-151-DCC-N	B7P-150-RON-N	AMAX	UNDERC	~2000 lbs	Deep cleaned lignite coal	EI 279		RFS
152	UE3-152-MCO-C	UE3-148-DCC-D	Schutz/D'Neil	PETC	10,135 lbs		EI 352	1/12/88	Yellow
153	UE3-153-DCC-D	UE3-149/156	Dravo	EI	~95 drums	Light industrial grade held in storage (for micronizing)	EI-357	3/1/88	Carlucci
154	UE3-154-MCO-S	UE3-153-DCC-D	Schutz/D'Neil	Tecogen	1 drum		Dravo	9/23/87	Yellow
155	UE3-155-MCO-S	UE3-153-DCC-D	Schutz/D'Neil	EER	3 drums		Dravo	9/23/87	Yellow

SAMPLE SHIPMENT LOG

Serial Numbers 156 thru 179

Update: 17-Nov-88

file:lst4c

Serial No.	Sample I.D.	Previous Sample I.D.	Fros	To	Quantity	Description	P.O.#	Date Shipped	Hauler
156	UES-156-WRM-A	parent	Westaoreland Coal Co.	Dravo	23 tons	Dravo began using Oct 8, 1987	EI-272	9/25/87	Five Star
157	BZP-157-CMF-N	BZP-176-RCD-S	UNDEWRC	Avco/EI	1000 lbs/5 gal	Coal-methanol-water slurry prepared from lignite coal	EI-278	8CANCELED	
158	UES-158-MCO-S	UES-148-DCC-D	Schutz/O'Neill	UTSI	2 tons	85% minus 22 microns	EI-279	10/5/87	Yellow
159	KMR-159-RDM-N	parent	UNDERC	EI	10 gallons	western subbituminous coal	EI-282	11/16/87	
160	KMR-160-PCD-N	KMR-159-RDM-N	UNDERC	SAIC/EI	1 ton/5 gal	pulverized to 80% minus 200 mesh	EI-282	11/16/87	
161	UES-161-WRM-A	parent	Westaoreland Coal Co.	Dravo	24 ton	Wentz plant stoker coal ~3.5% ash	EI-291	10/20/87	Five Star
162	UES-162-DCC-D	UES-161/164-WRM	Dravo	EI	90 drums	Residential grade coal held in storage for slurry	EI-297	3/2/88	Carlucci
163	UES-163-DCC-D	UES-161/164-WRM	Dravo	EI	53 drums	Residential grade coal held in storage for micronizing	EI-297	3/2/88	Carlucci
164	UES-164-WRM-A	parent	Westaoreland Coal Co.	Dravo	25 ton	Wentz plant stoker coal ~3.5% ash	EI-298	10/27/87	Five Star
165	UES-165-WRM-A	parent	Westaoreland Coal Co.	Dravo	25 ton	Wentz plant stoker coal ~3.5% ash	EI-297	11/3/87	Five Star
166	UES-166-WRM-D	UES-165-WRM-A	Dravo	ANAI	2 drums	for cleaning trials	EI-293	11/6/87	Smith
167	UES-167-DCC-D	UES-161/164-WRM	Dravo	Schutz/O	2 drums	for particle size reduction for AVCO	EI-312	11/17/87	Smith
168	UES-168-DCC-D	UES-161/164-WRM	Dravo	Schutz/O	2 drums	for particle size reduction for TECOGEN	EI-312	11/18/87	Smith
169	UES-169-MCO-S	UES-167-DCC-D	Schutz/O'Neill	Avco	2 drums	residential grade micronized coal	Dravo	12/18/87	Yellow
170	UES-170-MCO-S	UES-168-DCC-D	Schutz/O'Neill	Tecogen	2 drums	residential grade micronized coal	Dravo	12/18/87	Yellow
171	unassigned number								
172	UES-172-DCC-D	UES-164-WRM-A	Dravo	Cath. U.	3 drums	modeling studies for Navy	EI-363	1/25/88	AMR
173	UES-173-DCC-D	UES-164-WRM-A	Dravo	DICE	11 drums	for slurry prep for Tecogen	EI-374	1/9/88	Yellow
174	UES-174-MCO-F	UES-173-DCC-D	DICE	Tecogen/ARC	4/1 drums		EI 375	2/22/88	
175	BZP-175-DCC-N	BZP-151-DCC-M	UNDEWRC	Schutz/O	~2000 lbs	for micronizing for AVCO			
176	BZP-176-MCO-S	BZP-175-DCC-M	Schutz/O'Neill	UNDEWRC/AVCO		UNDERC methanol-water slurry prep/AVCO combustion testing	EI 379		
177	UES-177-PCD-D	UES-164-WRM-A	Dravo	EI	~4300 lbs	ground to 1/8" topsize, stored in drums (approx. 20)	EI-333	3/1/89	Carlucci
178	UES-178-PCD-D	UES-165-WRM-A	Dravo	EI	23 tons	ground to 1/8" topsize under nitrogen	EI-337	3/2/89	Carlucci

SAMPLE SHIPMENT LOG

Serial Numbers 179 thru 201

Update: 21-Feb-89

file: list4d

Serial No.	Sample I.D.	Previous Sample I.D.	From	To	Quantity	Description	P.O.#	Date	
								Shipped	Hauler
179	UE3-179-DCC-D	UE3-153-DCC-D	Dravo	OYCE	11,270 lbs	OCC coal for slurry for MCI, 1.38% ash, residential grade	EI-397	3/1/88	Yellow
180	UE3-180-DCC-D	UE3-162-DCC-D	Dravo	OYCE	28 drums/5738 lbs.	OCC coal for slurry for Tecogen, 1.22% ash, residential grade	EI-397	3/1/88	Yellow
181	UE2-181-WRM-D	UE2-089-WRM-A	Dravo	EI	7 drums	minus 1/4"	EI-387	3/2/88	Carlucci
182	UE3-182-WRM-A	parent	Westmoreland Coal Co.	OYCE	46 tons	Washed ROM coal, Wentz plant, ~2.5% ash	EI-416	3/25/88	Five Star
183	UE3-183-MCO-S	UE3-153-DCC-D	Schutz-0'Neil	EER	7 drums/1400 lbs	micronized coal	EI-420	6/2/88	Consol Frt.
184	UE3-184-MCM-F	UE3-182/187	OYCE	CE	18,000 gal	micronized coal-water fuel	EI-427	6/20/88	in house
185/186						185 and 186 were for 750 gallons each of micronized and standard grind slurry for MCI. Both were cancelled.	EI-437	Cancelled	
187	UE3-187-WRM-A	Parent	Westmoreland Coal Co.	uYCE	46 tons	washed run-of-mine nominal 2.5% ash coal	EI-470	5/20/88	Five Star
188	UE3-188-CMF-F	UE3-187-WRM-A	OYCE	CE	3,500 gallons	standard grind slurry (CIE analyzed coal)	EI-473	7/8/88	in house
189	UE3-189-WRM-A	Parent	Westmoreland Coal Co.	OYCE	24 tons	washed run-of-mine nominal 2.5% ash coal	EI-487	6/13/88	Five Star
190	UE3-190-PCD-E	UE3-177-PCD-D	Energy International	S/O	2 tons (18 drums)	nominal 1/8" topsize from inventory	EI-501	6/22/88	Carlucci
191	UE3-191-PCD-E	UE3-178-PCD-D	Energy International	S/O	23 tons (145 drums)	nominal 1/8" topsize from inventory	EI-501	6/22/88	Carlucci
192	U-192-WRM-A	Parent	Westmoreland Coal Co.	EI	25 tons	washed run-of-mine nominal 2.5% ash coal	EI-500	6/27/88	Five Star
193	UE3-193-WRM-E	UE3-192-WRM-A	Energy International	S/O	24 tons in drums	for micronization for UTSI	EI-507	6/29/87	Carlucci
194	UE3-194-MCO-S	UE3-190/191	Schutz-0'Neil	UTSI	43,185 lbs	micronized coal, 10 micron mean particle size	EI-503	7/18/88	Yellow
195	UE3-195-MCO-S	UE3-193-WRM-E	Schutz-0'Neil	UTSI	42,761 lbs	micronized coal, 10 micron mean particle size	EI-503	7/29/88	Yellow
196	UE3-196-CMF-F	UE3-189-WRM-A	OYCE	CE	13800 gallons	standard grind, unstabilized slurry	EI-473	7/11/88	in house
197	UE3-197-MCO-S	UE3-194-MCO-S	Schutz-0'Neil	Catholic U.	1600 lbs (8 drums)	nominal 10 micron mean particle size	EI-514	7/15/88	Yellow
198	UE3-198-CMF-F	UE3-189-WRM-A	OYCE	CE/Tecogen	700 gal/15 gal	standard grind, lightly stabilized coal-water slurry	EI-473	7/26/88	in house
199	UE3-199-CMF-F	UE3-189-WRM-A	OYCE	Catholic U.	300 gal	standard grind, lightly stabilized coal-water slurry	EI-473	7/26/88	truck(?)
200	RIP-200-DEC-M	RIP-151-DCC-M	UNDERRC	AVCO	125 lbs	23 ash lignite coal (chemically cleaned)	EI-278	4/4/88	AMR
201	UE3-201-WRM-A	Parent	Westmoreland Coal Co.	EI	24 tons	4.6% ash (CIE & EI analysis) washed run-of-mine	EI-528	8/26/88	Five Star
201A	UE3-201-WRM-E	UE3-201-WRM-A	EI	OYCE/S-O	12 drums/40 drums	12 drums being stored at OYCE - did not make into slurry	EI-538	8/2/89	Yellow
201B	UE3-201-WRM-E	UE3-201-WRM-E	EI	S/O	18 drums	for micronizing for MCI	EI-550	9/21/88	Yellow

SAMPLE SHIPMENT LOG

Serial Numbers 202 thru 222

Update: 21-Feb-89

file:list4

Serial No.	Sample I.D.	Previous Sample I.D.	From	To	Quantity	Description	P.O.#	Date Shipped	Hauler
202	EI-202-PCO-S	UE3-201-WRM-E	Shutz-O'Neill	MTCI	8 # CANCELED	100 LHM ASH VALUE FOR MTCI # # (see UE3-209)	EI-539		
203	EI-203-MCO-S	UE3-201-WRM-E	Shutz-O'Neill	UTSI	13,733 lbs	4.6% ash coal (all 40 drums micronized for UTSI)	EI-539	9/23/88	Yellow
204	UE3-204-MCO-F	UE3-180-DCC-D	DXCE	ARC/TEC./EER/EI	5/200/200/5 gal	slurry prepared from residential grade (1.3% ash) coal	EI-542	9/26/88	Yellow
205	UE3-205-CWF-F	UE3-206-WRM-E	DXCE	MTCI/TEC./EI	600/55/5 gal	std grind slurry from high ash (6.8%) coal	EI-543	11/14/88	Yellow
206	UE3-206-WRM-A	parent	Westmoreland Coal Co.	EI	11.24 tons	high ash coal, 6.8% ash	EI-560	9/30/88	Five Star
206A	UE3-206-WRM-E	UE3-206-WRM-A	EI	S-O/DYCE	44/16 drums	for processing into fuel for MTCI, Tecogen and UTSI	EI-558	10/3/88	Yellow
207	unassigned number								
208	UE3-208-MCO-S	UE3-206-WRM-E	Shutz-O'Neill	UTSI	9098 lbs	micronized ( 10u mean particle size) high ash (6.8%) coal	EI 563	11/10/88	Yellow
209	UE3-209-PCO-S	UE3-206-WRM-E	Shutz-O'Neill	MTCI	6,000 lbs	pulverized (30u mean particle size) high ash (6.8%) coal	EI-563	11/10/88	Yellow
210	UE3-210-WRM-A	parent	Westmoreland Coal Co.	ARC/EI	7.65/14.7 tons	nominal 2.5% ash washed R-0-M coal delivered direct from mine	EI-561	10/4/88	Seaway
210A	UE3-210-WRM-E	UE3-210-WRM-A	EI	Storage	14.7 tons	nominal 2.5% ash washed R-0-M coal delivered direct from mine			
210B	UE3-210-WRM-E	UE3-210-WRM-A	EI	Process Tech	1 drum/315 lbs	for coal cleaning studies	EI-585	11/3/88	Yellow
211	UE3-211-WRM-E	UE3-210-WRM-A	EI	Battelle	20 lbs	as received WRM UE3 for cleaning studies	none	10/17/88	Emery
212	UE3-212-PCO-E	UE3-210-WRM-A	EI	Pitt/West.	5 lbs	-200 mesh coal, ground and stored under Argon	none	10/21/88	Pitt Van
213	UE3-213-MCO-S	UE3-153-DCC-E	Jacobson	Cath. U.	5465 lbs	micronized fuel (25 drums UE3-153 shipped to Jacobson 11/1/88)	EI-581	11/10/88	Yellow
214	UE3-214-MCO-F	UE3-179-DCC-D	DXCE Fuel Co.	Cath. U.	300 gal	micronized slurry	EI-583	11/30/88	?
215	UE3-215-DCC-E	UE3-163-DCC-D	EI	MOL-TEC	5 drums/1150 lbs	For calibration of Vortec furnace feed system (1.2% ash)	EI-591	11/15/88	Yellow
216	UE3-216-PCO-S	UE3-201-WRM-E	Jacobson	MOL-TEC	1000 lbs	For calibration of Vortec furnace feed system (4% ash)	EI-592		
217									
218									
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**DATE  
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8 / 5 / 93

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