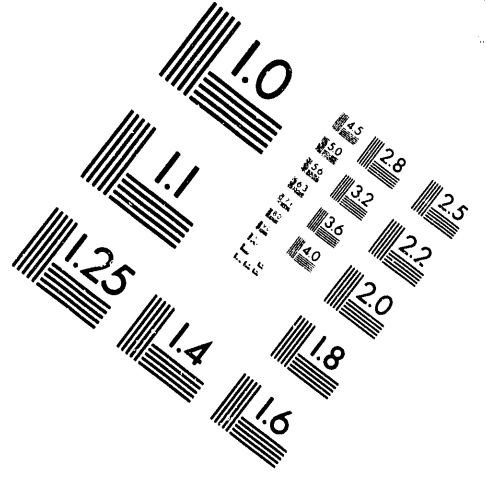
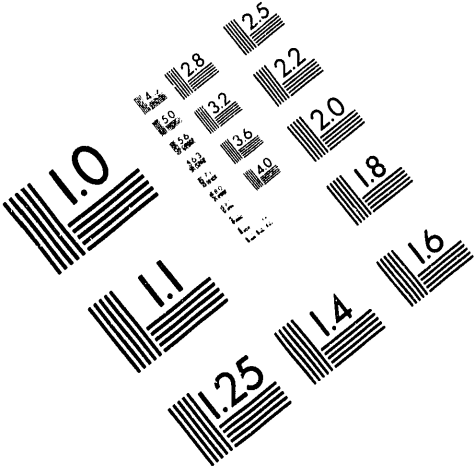




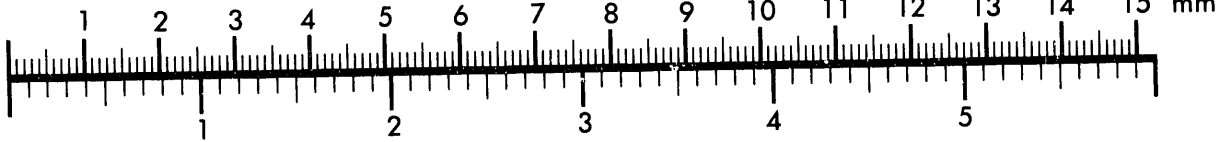
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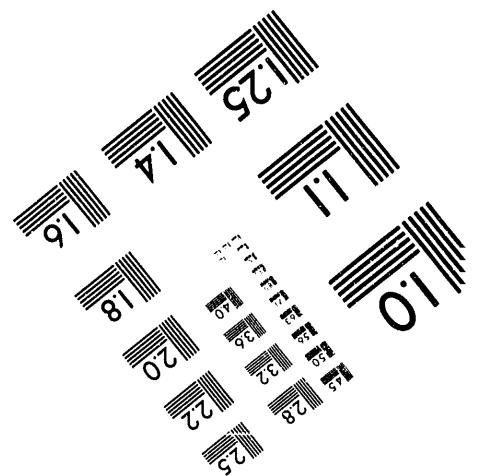
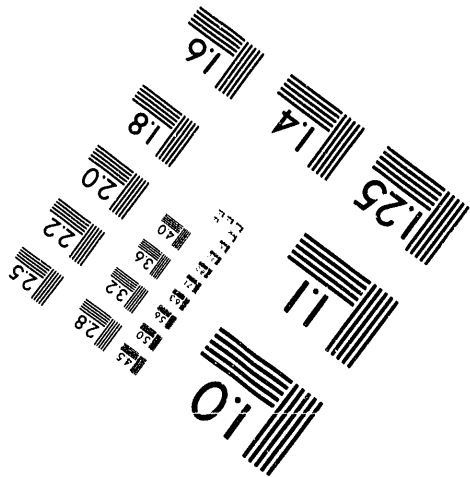
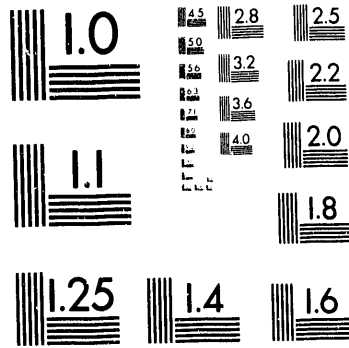
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ACKNOWLEDGMENT

Contributors to this report include: Raymond M. Henry, Russell C. Maxwell and Ronald W. Genser of Energy International, Inc.

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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
May 1, 1988 to July 31, 1988

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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 a 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 seventh quarter of this contract (May 1, 1988 through July 31, 1988) 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 seventh quarter of this contract (May 1, 1988 through July 31, 1988) the primary activities were involved with:

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

A brief summary of these activities follows:

During the quarter 141 tons of Upper Elkhorn #3 coal containing nominally from 2.5 to 2.8% ash was purchased from Westmoreland Coal Co.'s Wentz mine and cleaning plant in Wise County, Virginia for processing into fuels. From these purchases 98,570 lbs. (49.3 tons) of micronized coal (37 micron topsize, 10 micron mean particle size), 18,000 gallons (~58.5 tons coal) of micronized coal-water slurry (37 micron topsize, 10 micron mean particle size) and 18,300 gallons (~58.5 tons coal) of a standard grind coal-water slurry (149 micron topsize, 30 micron mean particle size) were prepared and delivered to the combustor contractors.

Difficulty is still being encountered in obtaining the low ash lignite fuel requested by Avco. After considerable delay Amax resumed delivery of the physically and chemically cleaned lignite coal (heavy media cleaning followed by treatment with an acid) to the University of North Dakota Energy and Materials Research Center (UNDEMRC) for processing and shipment to Avco. However it was learned that the acid used for the ash removal was nitric acid. Based on the considerable experience of Energy International in the treatment of lignite and subbituminous coals with nitric acid it is known that the alteration of the coal is so significant that a "representative" fuel was not being prepared. Therefore, the work on the preparation of low ash lignite coal by nitric acid washing was discontinued. Other alternatives for the preparation of low ash lignite coal are being pursued .

4.0 TASK 1 - ANALYSIS OF FUEL NEEDS

4.1 Subtask 1.1 - Project Management, Administration, & Reporting

There have been long delays in obtaining the 1,000 lbs. of low ash, micronized lignite coal for testing by Avco. Up to now only about 135 pounds of a 2% ash micronized lignite has been sent from the University of North Dakota Energy and Minerals Research Center (UNDEMRC) to Avco. Although the ash content was higher than the requested 1.0% or less, Avco was willing to accept it for test purposes. Finally Amax, with whom UNDEMRC had contracted for the coal cleaning operation resumed the work and began sending batches of the clean coal to UNDEMRC. The cleaning process is a heavy media separation at 1.3 specific gravity followed by an acid wash. UNDEMRC found that the subsequent batches were also not at the required ash level but were even somewhat higher (2.6-3.6%). However, UNDEMRC found that if the cleaned coal was washed with deionized water the ash content could be lowered to 1.6% or that if a second acid wash was employed an ash content of 0.6% could be obtained. Discussions between UNDEMRC and Amax began as to how to best obtain the desired ash level within the budgetary limitations.

It was at this time, while monitoring the preparation of this fuel, that Energy International discovered that the acid being used for the chemical cleaning step was nitric acid. EI has had in depth experience with treatment of lignite and subbituminous coals with nitric acid and knew that the alteration of the coal was so significant that a "representative" fuel was not being prepared. In fact this treatment generally enhances the fuel qualities of the coal. Therefore, work on the preparation of a low ash lignite fuel by nitric acid washing was discontinued. Both UNDEMRC and Avco were notified of our concern about the nature of the fuel and why the current approach was being discontinued.

Alternate methods of chemical de-ashing will be investigated by both EI and UNDEMRC. Other mineral and/or organic acids will be tested.

5.0 TASK 3 - FUEL SUPPLY

5.1 Fuel Production

5.1.1 Coal-Water Slurry Fuel

The preparation of 36,300 gallons of coal-water fuel in four lots for delivery to Combustion Engineering was completed this quarter. The slurry was prepared by OXCE Fuel Company from washed run-of-mine Upper Elkhorn #3 coal which contained 2.5 to 2.8% ash. Upon combusting the initial 18,000 gallons (UE3-184-MCW-F) of micronized grind coal water fuel, CE requested a utility (or standard) grind slurry (i.e. 80% <200 Mesh). So, 18,300 gallons were prepared and delivered according to CE's specifications. In order to study the effects of stabilizer upon the slurry performance, the amount of stabilizer in the slurry was gradually changed. CE burned the slurry soon after preparation in order to avoid sedimentation.

A small portion of lightly stabilized slurry was delivered to Catholic University (UE3-199-CWF-F) in July, along with stirring instructions in order to ensure consistency prior to removal of any slurry from the drums.

5.1.2 Dry Pulverized/Micronized Coal

Jacobson Inc. (Schutz-O'Neill Division) has completed the processing of 46 tons Upper Elkhorn #3 coal (UE3-190, -191, -193-WRM-A) for its shipment to the University of Tennessee Space Institute. This coal contained nominally 2.6% ash. Jacobson dried some of the coal prior to micronizing it for UTSI to ten micron mean size, 100% passing 44 microns. Micronized coal was delivered in July in two lots (identified as UE3-194-MCO-S and UE3-195-MCO-S). Prior to shipment, Energy International measured the particle size by Microtrac (R).

In order to accommodate the processing at Jacobson, Energy International received the parent coal (UE3-192-WRM-A) and packaged it in 55 gallon drums (UE3-193-WRM-E), because Jacobson cannot handle bulk lots of coal. They feed coal from drums into their crushers. The same drums are used to contain the product coal.

Jacobson completed the micronizing of 1400 pounds of deep cleaned Upper Elkhorn #3 (UE3-153-DCC-D) in two equal lots for delivery to Energy & Environmental Research Corporation (as UE3-183-MCO-S). It was shipped in seven drums to EER on June 2, 1988. Reprocessing of over size coal was necessary for the first lot. Jacobson adjusted their processing equipment so that only single pass processing of the second lot was necessary.

Work was still underway this quarter at the University of North Dakota Energy and Materials Research Center (UNDEMRC) for the purpose of supplying to Avco Research Laboratory a dry, ultrafine lignite powder. The coal was to be cleaned by Amax Laboratories in Golden, CO and shipped to UNDEMRC for drying and micronizing. Thus far only 135 lbs. of the needed 1000 lbs. have been sent to Avco. There have been serious delays in the fuel cleaning step at Amax. (See Task 1 discussion).

5.2 Shipments

During this quarter the following bulk coal shipments were made to OXCE Fuel Company:

UE3-182-WRM-A -- 46 tons washed run-of-mine Upper Elkhorn #3 coal with nominal 2.5% ash was shipped from the Wentz was plant of Westmoreland Coal Company in Big Stone Gap, Virginia to OXCE Fuel Company for the production of slurry for Combustion Engineering.

UE3-189-WRM-A -- 24 tons washed run-of-mine UE3 coal was shipped to OXCE Fuel Co. for production of slurry for CE.

UE3-192-WRM-A -- 25 tons washed run-of-mine UE3 coal (nominal 2") was shipped to Energy International for production of micronized coal for University of Tennessee Space Institute (UTSI).

UE3-187-WRM-A -- 46 tons of washed run-of-mine Upper Elkhorn #3 coal from Westmoreland Coal Co.'s Wentz Plant, Virginia, to OXCE Fuel Co. for slurry preparation for Combustion Engineering.

During this quarter the following coal shipments were made from Energy International's leased storage facilities (at the Logans Ferry Works warehouse in New Kensington, PA) to fuel producers, either OXCE Fuel Company or Schutz-O'Neill Division of Jacobson, Inc.

UE3-190-PCO-E -- 2 tons (in 18 drums) Upper Elkhorn #3 washed run-of-mine coal, nominal 1/8 inch topsize was shipped to Jacobson for micronizing for UTSI. (This coal had been reduced in size last November from 2" to 1/8" and stored under nitrogen in drums.)

UE3-191-WRM-E -- 23 tons (in 145 drums) Upper Elkhorn #3 washed run-of-mine coal was shipped to Jacobson for micronizing for UTSI. (This coal had been reduced in size last November from 2" to 1/8" and stored under nitrogen in drums.)

UE3-193-WRM-E -- 24 tons (in 136 drums) in Upper Elkhorn #3 washed run-of-mine coal was shipped to Jacobson for micronizing for UTSI. (EI had packaged coal into drums for ease of handling by Jacobson.)

During this quarter the following coal-based fuels were shipped as described:

UE3-184-MCW-F -- 18,000 gallons micronized coal-water slurry fuel was produced by OXCE Fuel Company and delivered to Combustion Engineering.

UE3-183-MCO-S -- 1,400 lbs. (in 3 drums) dry micronized coal prepared by Jacobson from UE3-153-DCC-D for delivery to Energy & Environmental Research (EER).

UE3-188-CWF-F -- 3,500 gallons utility grind slurry was made by OXCE and delivered to Combustion Engineering.

UE3-194-MCO-S -- 43,185 lbs. micronized, 10 micron mean particle size, prepared by Jacobson and delivered to UTSI and Catholic University.

UE3-195-MCO-S -- 42,761 lbs. micronized, 10 micron mean particle size, prepared by Jacobson and delivered to UTSI.

UE3-196-CWF-F -- 13,800 gallons utility grind unstabilized slurry, made by OXCE for Combustion Engineering.

UE3-197-MCO-S -- 1,600 lbs. (in 8 drums) dry micronized coal (10 micron mean size) made from UE3-194 by Jacobson for Catholic University.

UE3-198-CWF-F -- 700 gallons to Combustion Engineering and 15 gallons to Tecogen, utility grind slurry, lightly stabilized.

UE3-199-CWF-F -- 300 gallons to Catholic University of utility grind slurry, lightly stabilized.

The current fuel delivery schedule and sample shipment log are given in Appendices 7.1 and 7.2 respectively. The shipment log enables tracking the history of coal from the mine to the fuel.

6.0 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.

7.0 APPENDIX

7.1 Revised Fuel Delivery Schedule

SCHEDULE OF DELIVERIES OF C O A L
(Including quantity and properties as of August 22, 1988)

RW6/8-23-88
file:coal0822

-----FYs 87 & 88-----> <-----FY 89----->

COMBUSTION CONTRACTOR (Application)	COAL PROPERTIES	Notes	Actual deliveries	August 1988	September 1988	1st Qtr FY89	2nd Qtr FY89	2nd HALF FY89	CONTRACTOR
AVCO Research Lab (Residential)	lignite < 0.5% ash 0.3 S 10,000 Btu/lb 35 micron topsize 12u meansize		UE3-169-MCO-S Dec 23, 400 lbs. in 2 drums 1987 above / 1988 below		865 lbs. lignite via UNO ENRCC (chea. cleaned therm. dried & micronized) depend on successful cleaning		none	none	AVCO Jeevan Abichandani
	subbituminous MCO same specs	deleted on Nov 13, 1987	BZP-176-DCC-M Apr 88 135 lbs. lignite 1.8% ash						
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 MHD		none	none	70 tons UE3, same coal as CMF about Oct 1 delivery	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	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.	none	none	none	none	none	EER Yui Kuan
MTCI (residential) & industrial)	< 1% ash dry micronized 30u topsz, 10u meansz		UE3-123-MCO-C July 22, 5412 lbs. 1987 above / 1988 below none yet in '88	none	EITHER Holton or Wentz in order to recy on Sept. 20 delivery to CA		Same as Sept delivery delivery to CA by Oct 27		MTCI DuraiSwamy
	< 1% ash dry pulverized 149 topsz, 30u meansz		UE3-113-PCO-C May 12, 2000 lbs. UE3-135-PCO-C July 16, 4000 lbs. 1987 above / 1988 below none yet in '88	none	2000 lb pulv. grd 30u meansz, 149u topsz 5 to 10 I ash, 0.5 to 2.0 I S They need analysis of coal too. 1250 temp.		4000 lb pulv grd 30u meansz, 149u topsz 5 to 10 I ash 0.5 to 2.0 I S Can deliver it all in Sept		
NAVY at NCEL in CA (commercial) (combustor development)	bituminous (18 ash/M Btu < 0.58 S/M Btu, 22600° AFT 40u topsize; 100% -400 mesh 14000 Btu/lb	2 to 4 M Btu/hr none yet in 1987 none yet in 1988					7.5 ton Jan 1, 1989 UE3-DCC-PCO 1.5% ash Destination may change.		NCEL Tim Fu
CATHOLIC UNIV. at Wash. D.C. bituminous 1-10% ash (commercial) (modeling)		see ltr. 11-30-87	1987 above / 1988 below UE3-172-DCC-P Jan 26, 500 Lbs.		9000 lbs. 1.5 ash @100% (44u UE3-DCC-MCO Wants 1500lbs/month late Oct. thru March 89 All in early Nov. 88 is OK, not prefer. ed.		UE3-MCO-DCC 1.5% Apr 89 thru Aug 89 9,000 lbs total @1500/month same specs		CU Senthiah

SCHEDULE OF DELIVERIES of C O A L
(Including quantity and properties as of August 22, 1988)

RMG/8-23-88
file:coal-0822

-----FY 89----->

<-----FY88----->

<-----FYs 87 & 88----->

COMBUSTION CONTRACTOR (Application)	COAL PROPERTIES	Notes	Actual deliveries	August 1988	September 1988	1st Qtr FY89	2nd Qtr FY89	2nd HALF FY89	CONTRACTOR
PETC IN-HOUSE (GILBERT/CONROHEALTH) (industrial boiler)	low % ash micronized bituminous	UE2 acceptable. Sept. want same coal used by UE3-143-MCO-C 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, 10135 lbs	none	none	none	none	none	PETC
Science Applications IC (wet oxidation)	lignite+subbituminous PC (80% <200 mesh) M2 inerted in bags in drums	2 coals BZF-147-PCO-M Aug 19, 1 ton KMR-160-PCO-M Nov 11, 1 ton 1987 above / 1988 below none del'd in 1988; retrieve 41 drums August		none	none	none	none	none	SATC
Tecogen (residential)	bitum's (<1.5% ash 40 u topsize, 20u seasize)	UE3-154-MCO-S Sept 23, 240 lbs. UE3-170-MCO-S Dec 23, 400lbs. 1987 above / 1988 below none in '88 yet		none	none	none	none	none	TECOGEN
TRM (Industrial) (sorbent injection)	eastern bituminous, 2.5 to 3% S, 1250-22700 to 2800 degrees, low to high slagers two coals pulverized	awaiting written specs & schedule TRM insists on special delivery, per 8-10-88 Kuenzly.					40 to 50 tons over 5 months Only in pneumatic discharge trucks, John W.S.Hatch & Co. from Utah March 1989 is earliest need date.		TRM Kuenzly
Univ. Tenn. Space Institute (commercial) (fire-tube boiler)	subbitum's low ash 74u tpszz & bituminous (<1% ash AFT >2600 non-slagger	UE3-158-MCO-S Oct 5, 2 tons coal for shakedown run 85% -72u 1987 above / 1988 below UE3-194-MCO-S July 18, 43185 lbs. coal UE3-195-MCO-S Aug 2, 50441 lbs. coal							UTSI Richard Attig
Vortec (sub BCRL) (industrial) (glass melting)	1 to 8% ash, pulverized 1 bitum. coals, 5-10% iron 70% -200mesh; probably PA coal not deep cleaned						4 tons bituminous 62 ash MCO (use blend went-holton coals) similar to Wentz's VM, P50, moisture, AFT	10 tons March 89 is earliest.	VORTEC Dick Deapsey
Atlantic Research	ARC to make own slurry fuel			10 tons UE3 5.5% ash					

SCHEDULE OF DELIVERIES of S L U R R I E S
(Including quantity and properties as of 8-22-88)

RMG 8-23-88
fil:slr/y0822

COMBUSTION CONTRACTOR (Application)	COAL WATER SLURRY PROPERTIES	Notes	ACTUAL DELIVERIES	FY 88			FY 89		CONTRACTOR
				August 1988	September 1988	1st Qtr FY89	2nd Qtr FY89	2nd HALF FY89	
PETC IN-HOUSE (GILBERT/COMMONWEALTH) (Industrial & commercial boilers) 100% -100 mesh	eastern bituminous <0.6% S, >50% solids 500-700cp		ELC-108-CWF-F, April 16, 350 gal fr/HRM UE3-117-CWF-F, May 27, 2000 gal fr/HRM UE3-120-CWF-F, July 27, 110 gal fr/DCC UE3-137-CWF-F, Aug 19, 2000 gal fr/DCC 1987 above & 1988 below						PETC/BC
TECOGEN (residential)	>55% solids, <1% ash <125, 50 meansz, 20u topsz >2350 AFT	letter 4-29-87 1987 above & 1988 below	UE3-116-MCM-F, Jun 18, 55gal used at 1 gal/hr 1987 above & 1988 below UE3-174-MCM-F Feb 22, 220 gal.	200 gal 1.5% ash micronized	500 gal??	500 gal??	500 gal ???		Tecogen Balsavich
IRW (Industrial)		NO SLURRY							IRW Kuenzly
Vortec (sub BCRL) (Industrial)	1 to 8% ash iron is concern	slurry next year needs coal specs now	1987 above & 1988 below UE3-174-MCM-F Feb 22, 55 gal. (didn't rec'y it)	55 gal. same as Tecogen ???			1000 gallons mid 1989		Vortec Daski
Atlantic Research (residential)									ARC Heaton

SCHEDULE OF DELIVERIES of S L U R R I E S
(Including quantity and properties as of 8-22-88)

RWG 8-23-88
fil:slry0822

COMBUSTION CONTRACTOR (Application)	COAL WATER SLURRY PROPERTIES	Notes	ACTUAL DELIVERIES	FY 89			CONTRACTOR
				August 1988	September 1988	1st Qtr FY89	
AVCO Research Lab (residential) (pulse combustor)	lignite, VM55%, 304H2O <1% ash, 0.325, hi AFT 10000 Btu, FC451, 70% solids, low vis, top 10u Jun88	specs & schedule per letter Feb 9 revised Jun 23, Nov 18 Jun88	none in 1987 1987 above & 1988 below none yet in '88				AVCO Abichandani
COMBUSTION ENGINEERING (Industrial retro)	3 to 6% ash, 150u 2600 AFT, .7% S, >13500Btu/ >44% solids >30%VM	revised schedule & spec June 22 MI 99% -5u topsize UE3-138-CWF-F Oct 27, 1200 gal to be used at MI standard grind (<149u) CWF ---- 1987 above & 1988 below ---- UE3-188-CWF-F July 8, 3500 gallons stabilized UE3-196-CWF-F July 11, 13800 gallons unstabilized UE3-184-CWF-F July 19, 18000 gallons lightly stabilized UE3-198-CWF-F July 26, 700 gallons stabilized	UE3-137-NCH-F Sept 11, 7500 gallons to be used at MI 99% -5u topsize UE3-138-CWF-F Oct 27, 1200 gal to be used at MI standard grind (<149u) CWF ---- 1987 above & 1988 below ---- UE3-188-CWF-F July 8, 3500 gallons stabilized UE3-196-CWF-F July 11, 13800 gallons unstabilized UE3-184-CWF-F July 19, 18000 gallons lightly stabilized UE3-198-CWF-F July 26, 700 gallons stabilized				CE Rini
ENERGY & ENVIRONMENTAL RESEARCH, Inc. (residential)	70% solids, 5u MPD 40u top, vis 1000cp 1% ash, 0.5 S, 45% VM	per ltr Apr 3	UE3-116-UCH-F, Jun 18, 55 gal UE3-120-CWF-F (MFCI) Nov 11, 1 drum UE3-121-UCH-F (MFCI) Nov 11, 1 drum ---- 1987 above & 1988 below ----	2 drums similar to UE3-120 low ash low S, coarse grind Desired early Sept.		200gal MCM maybe	EER Kwan
MICI (residential)	<1% ash micronized 10u meansz, 30u topsz	65-70% solids 1987 above & 1988 below	UE3-116-UCH-F, Jun 18, 220 gal 1987 above & 1988 below	none		none	MICI DuraiSwamy
(Industrial)	<1% ash, micronized 10u meansz, 30u topsz	65-70% solids slagging combustor 1987 above & 1988 below	UE3-121-UCH-F, Jun 29, 600 gal slagging combustor 1987 above & 1988 below	none		none	
(residential)	<1% ash, pulverized 30u meansz, 149u topsz	65-70% solids 1987 above & 1988 below	UE3-120-CWF-F, July 27, 600 gal 1987 above & 1988 below	none		none	
NAVY at NCEL in CA (commercial) (combustor develop.)	70% solids, <2000cps #350 recip sec (combustor develop.) ultrafine coal	awaiting written specs & schedule FY89 delivery	none in 1987 1987 above & 1988 below			15 tons (~3000 gal) MCF ~Jan 1, topsz 100% -149u 1.5% ash & ~0.5% S/MHbtu	NCEL Tim Fu
CATHOLIC UNIVERSITY/NAVY (commercial) (modeling)	low ash low sulfur	Wash.D.C drum quantities 64.4% solids std grnd	none in 1987 1987 above & 1988 below UE3-199-CWF-F July 29, 300 gallons	none		1500gal MCM-DEC total over 9 months Nov89 to Aug89-----> specs low ash, low S, micronized	CU Sen Kieh

7.2 Sample Shipment Log

SAMPLE SHIPMENT LOG

Serial Numbers 000 thru 110

Updates: 16-Aug-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	UES-011-WRM-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	UES-012-WRM-A	parent	Westmoreland Coal Co.	EPRI	~20 tons	cleaned coal from Wentz prep plant	EI-282	10/20/87	Five Star
013	UES-013-WRM-H	parent	EPRI	Dravo	small soap.	for analytical check			
014	UES-014-WRM-H	parent	EPRI	EI	small soap.	for analytical check			
015-088 unassigned									
089	UEZ-089-WRM-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-WRM-A	parent	MAPCO	Dravo	2 drums	Pond Creek Coal, Pontiki plant			
091	LEL-091-WRM-D	LEL-090-WRM-A	Dravo	E.I.	5 gal	Pond Creek Coal, Pontiki plant, 1/8x0 for washability studies			
092	CB0-092-WRM-A	parent	Westmoreland Coal	Dravo	2 drums	Colarado, Coal Bed D			
093	CB0-093-WRM-D	CB0-092-WRM-A	Dravo	E.I.	5 gal	Colarado, Coal Bed D, 1/8x0 for washability studies			
094	UEZ-094-WRM-A	parent	Central Coal Co.	Dravo	11 ton	2Z ash, Lower Cedar Grove, Virginia Energy mine #1085			
095-099 Unassigned									
100	UES-100-WRM-A	parent	Westmoreland Coal	Dravo	2 drums	Taggart Seam			
101	UES-101-WRM-D	UES-100-WRM-A	Dravo	E.I.	5 gal	Taggart Seam, 1/8x0 for washability studies			
102	UEI-102-WRM-A	parent	Old Ben Coal Co.	Dravo	2 drums	Alma Seam			
103	UEI-103-WRM-D	UEI-102-WRM-A	Dravo	E.I.	5 gal	Alma Seam, 1/8x0 for washability studies			
104	UEZ-104-WRM-A	parent	Beth Energy Coal Co.	Dravo	2 drums	Lower Cedar Grove			
105	UEZ-105-WRM-D	UEZ-104-WRM-A	Dravo	E.I.	5 gal	Lower Cedar Grove, 1/8x0 for washability studies			
106	UES-106-WRM-A	parent	Westmoreland Coal	Dravo	20 ton	3.5Z ash coal, Wentz plant, Taggart seam (1st shipment)	EI-148	4/13/87	
107	ELC-107-WRM-F	parent				Elk Creek Coal from DICE			
108	ELC-108-CWF-F	ELC-107-WRM-F	DICE	PEIC	350 gal	Std. grind slurry	EI-151	4/16/87	
109	UES-109-WRM-A	parent	Westmoreland Coal	Dravo	23 tons	~3.5Z ash, Taggart Seam, Wentz Plant	EI-162	5/1/87	
110	UES-110-WRM-A	parent	Westmoreland Coal	Dravo	26 tons	6Z ash, Taggart Seam, Holton Plant	EI-167	5/7/87	

SAMPLE SHIPMENT LOG

Serial Numbers 111 thru 134

Update: 16-Aug-88

file:11st4a

Serial No.	Sample I.D.	Previous Sample I.D.	From	To	Quantity	Description	P.O.#	Date Shipped	Hauler
111	UE3-111-WRM-D	UE3-110-WRM-D	Dravo	OICE	26 tons	From UE3-110-WRM-A	E1-168	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	E1-176	5/8/87	
114	UE2-114-MCO-C	UE2-094-WRM-A	PRS	PETC	5 ton	Micronized UE2-094-WRM-A	E1-158	5/4/87	
115	UE3-115-DCC-D	UE3-106-WRM-A	Dravo	OICE	28 drums/5040 lbs	Filter cake from deep cleaned UE3-109-WRM-A	E1-179	5/13/87	
116	UE3-116-UCM-F	UE3-115-DCC-D	OICE	EER,MICI,Tec	6 drums	Ultrafine slurry from filter cake UE3-115-DCC-D	E1-175	6/22/87	
117	UE3-117-CMF-F	UE3-111-WRM-D	OICE	PETC	2000 gal	Std grind slurry from UE3-111-WRM-D	E1-171	5/27/87	
118	UE3-118-WRM-A	parent	Westmoreland Coal	Dravo	23 tons	*3.5Z ash, Taggart Seam, Wentz Plant	E1-182	5/22/87	
119	UE3-119-DCC-D	UE3-109-WRM-A	Dravo	OICE	56 drums/10865 lbs	From UE3-109-WRM-A, 1.3-1.5Z ash	E1-190	5/28/87	
120	UE3-120-CMF-F	UE3-119-DCC-D	OICE	MICI/PETC	600 gal/110 gal	Std. grind slurry, 1.2Z ash, from UE3-119-DCC-D	E1-191	7/27/87	
121	UE3-121-UCM-F	UE3-119-DCC-D	OICE	MICI	600 gal/11 drums	Ultrafine slurry, 1.2Z ash, from UE3-119-DCC-D	E1-192	6/23/87	
122	UE3-122-DCC-D	UE3-118-WRM-A	Dravo	PRS	15 drums	Cleaned to 1.75 to 2.25Z ash, from UE3-118-WRM-A	E1-202	6/11/87	
123	UE3-123-MCO-C	UE3-122-DCC-D	PRS	MICI	24 drs/5412 lbs	From UE3-122-DCC-D	E1-231	7/22/87	Preston
124	UE2-124-WRM-D	UE2-089-WRM-A	Dravo	PRS	70 drums	From UE2-089-WRM-A	E1-194	6/1/87	
125	UE2-125-MCO-C	UE2-124-WRM-D	PRS	PETC	5 tons	From UE2-124-WRM-D	E1-211	6/24/87	Carlucci
126	UE2-126-MCO-C	UE2-094-WRM-A	PRS	PETC	39 drums/9615 lbs	From UE2-094-WRM-A	E1-205	6/11/87	Carlucci
127	UE3-127-WRM-A	parent	Westmoreland Coal	Dravo	25 tons	Stober Coal, Taggart seam, 3.5Z ash, Wentz plant	E1-195	6/3/87	Five Star
128	UE2-128-MCO-C	UE2-089-WRM-D	PRS	EER	55 gal drum	Air freighted (from UE2-089-WRM-D) same as UE2-126-MCO-C	Dravo	6/8/87	
129	UE3-129-DCC-D	UE3-118 & 127	Dravo	PRS	13 drums	Blend of deep cleaned UE3-118 & UE3-127	E1-211	6/22/87	Carlucci
130	UE3-130-DCC-D	UE3-129-DCC-D	Dravo	OICE	47 drums/8640 lbs	1.3-1.5Z ash - same as UE3-129	E1-226	7/10/87	Preston
131	UE3-131-WRM-A	parent	Westmoreland Coal	OICE	44 tons	Taggart Seam, Wentz plant	E1-212	6/26/87	Five Star
132	UE3-132-WRM-A	parent	Westmoreland Coal	Dravo	22 tons	Taggart Seam, Wentz plant	E1-212	6/25/87	Five Star
133	UE3-133-MCO-C	UE3-122-DCC-D	PRS	EER	55 gal drum	Micronized from UE3-122	Dravo	6/24/87	Aeer Air
134	UE3-134-DCC-D	UE3-127/132	Dravo	Penn Rilliton	20 drums	Deep cleaned coal	E1-229	7/15/87	Carlucci

SAMPLE SHIPMENT LOG

Serial numbers 135 thru 157

Update: 16-Aug-88

filelist4b

Serial No.	Sample I.D.	Previous Sample I.D.	From	To	Quantity	Description	P.O.#	Date Shipped	Hauler
135	UE3-135-PCO-C	UE3-134-DCC-D	Penn Rilton	MICI	20 drums/2 tons	Pulverized coal	EI-232	7/16/87	Preston
136	UE3-136-WRR-A	parent	Westmoreland Coal Co.	Bravo	23 tons	Stoker Coal (*3.5% ash), Taggart Seam, Wentz Plant	EI-233	7/20/87	Five Star
137	UE3-137-CMF-F	UE3-130-DCC-D	OICE	PETC	1870 gal	same spec as UE3-120-CMF-F, 600gal from UE3-144	EI-240	8/19/87	Leaman
138	UE3-138-CMF-F	UE3-131-WRR-A	OICE	C-E	1200 gal	heatable to 150 deg. C	EI-238	9/11/87	
139	UE3-139-MCF-F	UE3-131-WRR-A	OICE	C-E	7500 gal	heatable to 150 deg. C	EI-241	10/27/87	
140	LEL-140-MCO-E	LEL-091-WRR-A	EI	United Tech	one pound	Micronized *as received* Lower Elkhorn	--	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 flotat.on)	--	8/3/87	US Mail
142	UE3-142-DCC-D	UE3-132-WRR-A	Bravo	Schutz/DNeil	46 drums/4.6 tons	Deep cleaned	EI 246	7/31/87	Smith
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 288	9/9/87	Smith
144	UE3-144-DCC-D	UE3-132-WRR-A	Bravo	OICE	21 drums	made 600 gal CMF & blended with UE3-137	EI-248	8/5/87	Smith
145	UE3-145-DCC-D	UE3-132/136	Bravo	Schutz/DNeil	70 drums/7 tons	Deep cleaned dried filter cake	EI-251	8/24/87	Preston
146	B2P-146-WRR-H	parent	UNDERC	EI	10 gal	Western lignite coal	UNDERC	8/6/87	RPS
147	B2P-147-PCO-W	B2P-146-WRR-H	UNDERC	SAIC/EI	1 ton/5 gal	Pulverized Buelah Zap lignite coal	UNDERC	8/3/87	RPS
148	UE3-148-DCC-D	UE3-149-WRR-A	Bravo	Schutz/DNeil	75 drums/7.5 tons	for 25 ton shipment of micronized coal for PETC	EI-267	9/8/87	Smith
149	UE3-149-WRR-A	parent	Westmoreland Coal Co.	Dravo	23 tons	Taggart Seam, Wentz plant stoker coal	EI-261	8/24/87	Five Star
150	B2P-150-ROH-N	parent	UNDERC	ANAX	*2000 lbs	Buelah-Zap lignite coal	EI 278		RPS
151	B2P-151-DCC-H	B2P-150-ROH-N	ANAX	UNDERC	*2000 lbs	Deep cleaned lignite coal	EI 278		RPS
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-397	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
156	UE3-156-WRR-A	parent	Westmoreland Coal Co.	Dravo	23 tons	Dravo began using Oct 8, 1987	EI-272	9/25/87	Five Star
157	B2P-157-CMF-H	B2P-176-MCO-S	UNDERC	Avco/EI	1000 lbs/5 gal	Coal-aethanol-water slurry prepared from lignite coal	EI-278	2/15/88 est.	

SAMPLE SHIPMENT LOG

Serial Numbers 158 thru 180

Update: 16-Aug-88

file:11st4c

Serial No.	Sample I.D.	Previous Sample I.D.	From	To	Quantity	Description	P.O.#	Date Shipped	Hauler
158	UE3-158-MCO-S	UE3-148-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-262	11/16/87	
160	KMR-160-PCD-N	KMR-159-RDM-N	UNDERC	SAITZ/EI	1 ton/5 gal	pulverized to 80% minus 200 mesh	EI-262	11/16/87	
161	UE3-161-WRN-A	parent	Westoreland Coal Co.	Dravo	24 ton	Wentz plant stoker coal 3.5% ash	EI-281	10/20/87	Five Star
162	UE3-162-DCC-D	UE3-161/164-WRN	Dravo	EI	90 drums	Residential grade coal held in storage for slurry	EI-397	3/2/88	Carlucci
163	UE3-163-DCC-D	UE3-161/164-WRN	Dravo	EI	53 drums	Residential grade coal held in storage for micronizing	EI-397	3/2/88	Carlucci
164	UE3-164-WRN-A	parent	Westoreland Coal Co.	Dravo	25 ton	Wentz plant stoker coal 3.5% ash	EI-285	10/27/87	Five Star
165	UE3-165-WRN-A	parent	Westoreland Coal Co.	Dravo	25 ton	Wentz plant stoker coal 3.5% ash	EI-297	11/3/87	Five Star
166	UE3-166-WRN-D	UE3-165-WRN-A	Dravo	ANAI	2 drums	for cleaning trials	EI-303	11/6/87	Saith
167	UE3-167-DCC-D	UE3-161/164-WRN	Dravo	Schutz/O	2 drums	for particle size reduction for AVCO	EI-312	11/17/87	Saith
168	UE3-168-DCC-D	UE3-161/164-WRN	Dravo	Schutz/O	2 drums	for particle size reduction for TECOGEN	EI-312	11/18/87	Saith
169	UE3-169-MCO-S	UE3-167-DCC-D	Schutz/O'Neill	Arco	2 drums	residential grade micronized coal	Dravo	12/18/87	Yellow
170	UE3-170-MCO-S	UE3-168-DCC-D	Schutz/O'Neill	Tecogen	2 drums	residential grade micronized coal	Dravo	12/18/87	Yellow
171	unassigned number								
172	UE3-172-DCC-D	UE3-164-WRN-A	Dravo	Cath. U.	3 drums	modeling studies for Navy	EI-368	1/25/88	AMR
173	UE3-173-DCC-D	UE3-164-WRN-A	Dravo	DICE	11 drums	for slurry prep for Tecogen	EI-374	1/9/88	Yellow
174	UE3-174-MCO-F	UE3-173-DCC-D	DICE	Tecogen/ARC	4/1 drums		EI-375	2/22/88	
175	BIP-175-DCC-N	BIP-151-DCC-N	UNDERC	Schutz/O	2000 lbs	for micronizing for AVCO			
176	BIP-176-MCO-S	BIP-175-DCC-N	Schutz/O'Neill	UNDERC/AVCO		UNDERC methanol-water slurry prep/AVCO combustion testing	EI-278		
177	UE3-177-PCD-D	UE3-164-WRN-A	Dravo	EI	4300 lbs	ground to 1/8" topsize, stored in drums (approx. 20)	EI-387	3/1/88	Carlucci
178	UE3-178-PCD-D	UE3-165-WRN-A	Dravo	EI	23 tons	ground to 1/8" topsize inerted under nitrogen	EI-387	3/2/88	Carlucci
179	UE3-179-DCC-D	UE3-153-DCC-D	Dravo	DICE	53 drums	for slurry for MCI	EI-397	3/1/88	Yellow
180	UE3-180-DCC-D	UE3-162-DCC-D	Dravo	DICE	28 drums	for slurry for Tecogen	EI-397	3/1/88	Yellow

SAMPLE SHIPMENT LOG

Serial Numbers 181 thru 203

Update: 16-Aug-88

filerlist4d

Serial No.	Sample I.D.	Previous Sample I.D.	From	To	Quantity	Description	P.O.#	Date Shipped	Hauler
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.	OICE	46 tons	Washed ROM coal, Wenz plant, ~2.5% ash	EI-416	3/25/88	Five Star
183	UE3-183-MCO-S	UE3-153-QCC-D	Shultz/D'Neill	EER	3 drums/600 lbs	micronized COAL	EI-420	6/2/88	Conso/ Frt.
184	UE3-184-MCM-F	UE3-182/187	OICE	CE	18,000 gal	micronized coal-water fuel	EI-427	6/20/88	in house
185	UE3-185-MCM-F	UE3-179-QCC-D	OICE	MTCI/EI	750/5 gal	micronized coal-water slurry	EI-437	Cancelled	
186	UE3-186-CMF-F	UE3-179-QCC-D	OICE	MTCI/EI	750/5 gal	standard grind coal-water slurry	EI-438	Cancelled	
187	UE3-187-WRM-A	Parent	Westmoreland Coal Co.	OICE	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	OICE	CE	3,500 gallons	standard grind slurry	EI-473	7/8/88	in house
189	UE3-189-WRM-A	Parent	Westmoreland Coal Co.	OICE	24 tons	washed run-of-mine nominal 2.5% ash coal	EI-487	6/13/88	Five Star
190	UE3-190-PCO-E	UE3-PCO-177-0	Energy International	S/O	2 tons (18 drums)	nominal 1/8" topsize from inventory	EI-501	6/22/88	Carlucci
191	UE3-191-PCO-E	UE3-PCO-178-0	Energy International	S/O	23 tons (145 drums)	nominal 1/8" topsize from inventory	EI-501	6/22/88	Carlucci
192	UE3-192-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-D'Neill	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-D'Neill	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	OICE	CE	13800 gallons	standard grind, unstabilized slurry	EI-473	7/11/88	in house
197	UE3-197-MCO-S	UE3-194-MCO-S	Schutz-D'Neill	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	OICE	CE	700 gal	standard grind, lightly stabilized coal-water slurry	EI-473	7/26/88	in house
199	UE3-199-CMF-F	UE3-189-WRM-A	OICE	Catholic U.	300 gal	standard grind, lightly stabilized coal-water slurry	EI-473	7/26/88	truck(?)
200	87P-200-QCC-N	87P-151-QCC-M	UNDEMRG	AVCO	125 lbs	2% ash lignite coal (chemically cleaned)			

201

202

203

**DATE
FILMED**

8 / 6 / 93

END