LRC V-23

Energy & Environmental Research Center

Fuels & Process Chemistry Research Institute
ND Mining & Mineral Resources Research Institute
Combustion & Environmental Systems Research Institute

Box 8213, University Station / Grand Forks, North Dakota 58202 / Phone: (701) 777-5000 / Fax: 777-5181

March 30, 1990

Mr. Tim Kingstad
North Dakota Lignite Research Council
North Dakota State Land Department
Capitol Building
Bismarck, ND 58505

Dear Tim:

The Energy and Environmental Research Center (EERC) is very pleased to submit a proposal for a "Lignite Char Filtration Development Program." This proposal represents advanced work based on the findings of the report, "Evaluation of Formed Coke Products," completed under a prior Lignite Research Council project.

Preliminary indications are that select North Dakota lignites may be candidates for producing char products that can serve as SO_x, NO_x, and metal and organic vapor adsorption filters in refuse-fired combustion systems. This project will allow a more complete understanding of the lignite properties necessary to yield an adsorptive char, assess the impact of char production parameters on adsorptivity, and evaluate economics of char filtration technology and production costs versus other flue-gas treatment technologies.

EERC requests $50,000 from the Lignite Research Council to support this effort. EERC has requested and has received preliminary approval as per the enclosed letter from DOE for the other half of the project.

The proposal is also being reviewed at the present time by the Westinghouse Company, the 3M Company, the Stadtwerke Company of Dusseldorf (FRG), and other private entities.

I look forward to the favorable consideration of the North Dakota Lignite Research Council in determining if char filtration represents a market for potential new value-added product from North Dakota lignite.

Sincerely,

for Gerald H. Groenewold
Director, Energy & Environ. Res. Center
Assoc. Dean, School of Eng. & Mines

GHG/krd
Enclosures

LIGNITE CHAR FILTRATION DEVELOPMENT PROGRAM

Co principal Investigators

Dr. Curtis Knudson
Dr. Everett Sondreal
Mr. Dan Daly

Project Coordinator

Mr. Don Mathsen

Submitted By:

University of North Dakota
Energy and Environmental Research Center
Box 8213, University Station
Grand Forks, ND 58202

Total Project Cost: $100,000

Requested of ND Lignite Research Council: $50,000

March 30, 1990

Principal Investigator

Alex Kotch, Director
Office of Research & Program
Development

ABSTRACT

This project will conduct the background analytical, process, and economic studies necessary for a go/no go decision on a North Dakota business venture that would produce, package, and market lignite-derived char as a filter medium for flue gas treatment in refuse-fired incineration/combustion processes.

Char filtration technology is gaining acceptance in Europe as one of the most effective final state flue gas treatment technologies available, primarily for refuse-fired combustion systems. However, since the char properties required for this application appear to be unique, selective source identification steps must be taken. Application of this char filtration technology in the U.S. for refuse-fired systems depends on the availability of a source of char and the economics of the technology, compared to existing dry scrubber, electrostatic precipitation, fabric filtration technology.

Preliminary tests indicate that select North Dakota lignites can yield chars with excellent adsorptivity characteristics for the removal of SO_x. The removal mechanism, however, is not well understood, and the properties necessary in a lignite feedstock need to be better defined. This study will investigate a broader base of North Dakota lignite and char samples to characterize the required properties and determine if a consistent quality source of lignite exists to supply a char production plant in North Dakota.

The study will also investigate the application economics of the technology versus existing flue gas treatment systems on refuse-fired power plants. Assuming the char filtration technology is economically competitive with existing technology, an initial assessment of production costs for this application will be conducted to determine if an adequate return on investment could be expected from a North Dakota-based char production facility.

The project will be conducted over a six-month period. The total baseline cost of the project is $100,000. One-half of the funds have been preliminarily approved by the Department of Energy. The project may be expanded subject to additional private sponsors.

Char filtration technology could represent a significant new market for North Dakota lignite, both within the United States and internationally. The study is expected to demonstrate the appropriate lignite source and marketing/production scenario for addressing the growing environmental control industry.

The proposal is presently under review by several private companies. An expanded budget up to $160,000 would allow additional char samples to be evaluated, if additional funds are secured during the course of the study.

Gave money Back

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OBJECTIVE:

To conduct the background analytical, process, and economic studies necessary for a go/no go decision on a North Dakota business venture that would produce, package, and market lignite-derived char as a filter medium for flue gas treatment in refuse-fired incineration/combustion processes.

GOAL:

This proposal outlines a multitask program that will investigate coal selection criteria, char preparation procedures, NO_x and SO_x adsorption levels, and production and application cost scenarios of charcoal filter technology in refuse-fired combustion systems.

BACKGROUND:

The use of char as a formed coke product for stack gas emission cleanup was first introduced on a commercial scale in West Germany. A paper entitled "Use of Lignite Coke for Reduction of NO_x After Flue Gas Desulfurization," presented at the Fourteenth Biennial Lignite Symposium, was one of the first presentations of the technology.

The North Dakota Energy Delegation traveled to West Germany, sponsored by the North Dakota Lignite Research Council and hosted by the University of North Dakota (UND)/North Dakota State University (NDSU) Technology Transfer Office in Europe (TTO), and toured the Stadtwerke facility, on which the above article was based, in May 1988. In October 1988, the North Dakota Lignite Research Council approved funding for preliminary tests to determine if chars from North Dakota lignites displayed similar chemical behavior in a stack gas environment. One of the two North Dakota lignite char samples studied demonstrated greater adsorption capacity than the German product, while another North Dakota lignite produced no effect (Figure 1).

The preliminary comparison of the two North Dakota chars and the German char suggests a possible significance in the (Ca+Mg)/S ratio in predicting the effectiveness of a coal char for SO_x removal; the higher the value above 1.0, the greater the adsorption capability for sulfur. Additional screening work is necessary, however, to determine which North Dakota lignites are candidates for char production and to verify the chemical characteristics that yield the necessary adsorption properties for NO_x and organic vapors.

The critical issues, from the perspective of the potential industrial customer, are the availability of char in the United States and the relative economic benefits of char filtration compared to other flue gas treatment technologies for refuse-fired combustion systems. Presently, a combination of spray dryers and fabric filtration is the principal competing technology; however, this technology does not effectively address the removal of heavy metal and organic vapors.

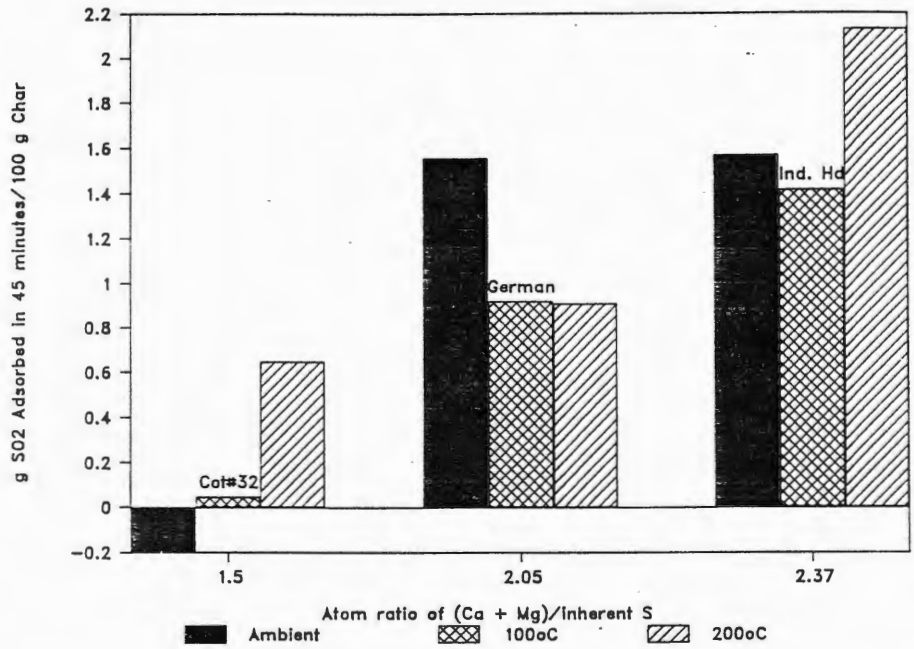

Figure 1. Adsorption of SO_2 as a function of the molar (Ca+Mg)/S ratio in the char.

TASKS:

The overall development scenario for this technology is an eight-step process. Task 1 was completed under the prior grant from the North Dakota Industrial Commission to the UND School of Engineering and Mines Foundation for the "Evaluation of Formed Coke Products."

Task 1 - Preliminary Evaluation: An initial assessment of formed coke products made from German brown coal and select North Dakota lignites will be conducted to verify similar behavior under stack gas conditions.

Task 2 - Coal Selection and Sampling: Ten selected coals will be sampled to define the necessary chemical characteristics of a feedstock coal that will yield the most effective char adsorption properties at a 750°C production temperature.

Task 3 - Char Preparation and Characterization: A survey of five char production temperatures will be conducted using the most effective lignite coal sample identified in Task 2, to determine the impact of production technique on adsorption effectiveness.

Task 4 - Economic Assessment: An economic comparison of char filtration technology as a flue gas treatment system will be made against more conventional dry scrubber, electrostatic precipitation, fabri-filtration technology in refuse-fired combustion facilities.

Task 5 - Production Cost Estimate: An estimate of the production facilities capital and operating costs will be assembled to determine if an adequate return on investment can be achieved to produce char on a competitive basis with other flue gas technologies.

Task 6 - Bench-Scale Demonstration: A bench-scale demonstration program would be developed to determine the adsorption capacity of a North Dakota char for various pollutants based on an experimental matrix to study gas flow rates, char particle size, and pollutant concentration versus temperature.

Task 7 - Pilot-Scale Demonstration: Char would be produced in sufficient quantity to use as a replacement material at an existing site where char filtration is currently used to evaluate a North Dakota char versus existing products.

Task 8 - Commercialization Package: A refined marketing and business operations plan for a char production facility in North Dakota serving regional and national markets would be prepared to facilitate an appropriate mechanism of technology transfer to a private developer.

TASK 2 - COAL SELECTION AND SAMPLING:

The adsorption behavior of lignite char is not fully understood. Consequently, fundamental questions that need to be answered are: (1) Does North Dakota have a lignite with the properties necessary to produce a highly adsorptive char for flue gas treatment applications? and (2) What resource characteristics will assure selection of a reliable feedstock for a char production facility?

Definition of a suitable resource and mine site must take into account lignite's compositional variability. Lignite is mined from the upper portion of the Paleocene Fort Union Group at more than a dozen surface mines in western North Dakota. Mined seams in the Bullion Creek Formation include the Harmon in southwestern North Dakota; mined seams in the younger Sentinel Butte Formation include the Hagel, Kinneman Creek, Antelope Creek, Spaer or Spaer/Beulah-Zap, Beulah-Zap, and Schoolhouse, all in west-central North Dakota.

Overall, the lignites of this region are typically low in sulfur and ash, but chemical and physical character can vary considerably within a single seam. Understanding these variations, even within a given mine, will be critical to the selection of an adsorptive char feedstock. Leonardite (weathered lignite) has many of the attributes necessary to make a good char and occurs in the west-central section of the state in significant volumes. Its candidacy as a feedstock also will be studied.

At present, insufficient information exists to evaluate a lignite char resource. The determination of the character and the occurrence and distribution of a suitable lignite, areally and stratigraphically for the region, would require the collection of at least 150 samples for laboratory analysis from several sites within each mine. Even this number may not reflect adequately the total geological, chemical, and physical variability.

Funding limitations restrict the number of samples possible under this study. Task 2 will provide information on: (1) char derived from two widely mined lignites, the Beulah-Zap and the Kinneman Creek seams, and, (2) leonardite. The initial study indicated that char derived from the Beulah-Zap seam at the Indian Head mine showed desirable traits; consequently, it will be an appropriate target for sampling.

A group of 8-10 lignite samples will be initially selected. Two sites will be sampled at each of two mines, and at least two stratigraphic horizons will be sampled at each site for a minimum of eight samples. Sampling sites will be selected following consideration of the geological, chemical, and physical variations in the seams at each mine. In addition, at least one sample of a leonardite will be obtained.

TASK 3 - CHAR PREPARATION AND CHARACTERIZATION:

This task relates the properties of the selected lignites and their chars to their ability to remove sulfur dioxide and nitric oxide from gas streams. This task will determine which lignites are capable of serving as char feedstocks.

Eight samples from Task 2, including lignites and leonardites, will be pulverized and screened to recover a -12 x +30-mesh fraction, charred at 750°C under argon gas, and tested for SO_2 and NO_2 adsorption. Two gaseous mixtures, one containing 1000 ppm SO_2 and one containing 1000 ppm NO_2 in argon will be used to determine the uptake of SO_2 and NO_2 by the char samples.

The two mine samples showing the most rapid uptake of SO_2 and NO_2 will be used to prepare eight additional chars (four from each) at three temperatures (400, 600, and 850°C) in (1) an inert atmosphere, (2) the presence of a trace amount of oxygen, and (3) the presence of steam. Tests with SO_2 and NO_2 will document preparation effects on adsorptivity.

The chemical composition of the lignites and chars will be analyzed to relate the char's ability to adsorb SO_2 and NO_2. Lignites contain varied amounts of functionalities (carboxyl and methoxyl) that can decompose during charring to provide reactive sites (R*) in the char as shown below.

1) $\left(R-C(=O)-O^-\right)_2 Ca^{2+}$ + Heat >330°C ---> $2R^* + 2CO_2 + Ca^{2+}$

2) $R-O-CH_3$ + RH + Heat ---> $2R^* + CH_4$

In addition, if calcium ions are present, they can react with sulfur dioxide to form stable calcium sulfate. The reactive sites are stabilized by the complex structure of solid char and are available to cause reactions with and/or allow adsorption of gases. The lignites and chars will be analyzed to determine the initial properties of the lignite and the changes occurring during the charring process.

Proximate and ultimate data will provide the moisture, volatile matter (VM), fixed carbon (FC), ash, carbon, hydrogen, nitrogen, and sulfur contents of the coals and chars. X-ray fluorescence analysis of the ash will provide the total metals content (Na, Ca, Mg, etc.) of the coal and char. Sulfur analysis of the ash will indicate the amount of sulfur inherently retained in the ash during the ashing.

Ion exchange of the coals and flame photometric analysis for Na^+, Ca^{2+}, and K^+ will indicate the amount of carboxyl groups in the original lignite that are in the salt form. Solid-state, C-13 NMR analyses will provide data on the carbon structures present in the lignites and chars. This data base will enable correlating the lignite and char properties with SO_2 and NO_2 uptake from gas streams.

TASK 4 - ECONOMIC ASSESSMENT:

This task will provide a generic assessment of the economic viability of char filter technology for use in refuse-fired incineration/power plants.

Dry scrubbers used in conjunction with electrostatic precipitators (ESPs) and fabric filters are common means of controlling SO_x and NO_x emissions and metal and organic vapors. Wet scrubbers also are used in some installations. The char filter technology typically employs an ESP, followed by a quasi-dry scrubbing process using hydrated lime, followed by electrostatic precipitation of the desulfurized products and residual desulfurization and denitrification by lignite coke.

While current dry scrubber ESP fabric filter technology is capable of meeting current emission regulations, the char filter approach allows essentially complete removal of mercury, SO_2, HCl, and more effective NO_x removal. Char filter systems also are very effective in controlling the toxic, complex organic vapors that result from the combustion of plastics. The fundamental questions become: (1) How does the cost of the char filter bed compare with fabric filtration technology as a final cleaning stage? (2) What is the cost per unit weight of captured emissions on a life cycle analysis of ownership and operating costs? and (3) What is the value of the greater cleaning capacity that the char filter technology apparently demonstrates?

The char filter technology, as applied in West Germany, has been estimated to cost approximately 0.91 pfenning/kWhr, or in the range of .45-.50 cents/kWhr, using a char costing 226 DM/tonne.

The economic assessment study will select a refuse-fired combustion facility in the Upper Midwest for which operating data and capital cost figures exist. The cost of gas cleanup will be compared to the gas cleanup cost at an operational German installation, accounting for differences in emission requirements and operating costs in the United States.

The comparative economic evaluation of char filter technology will be coordinated with Task 5 - the evaluation of char production costs. A projected value of $100/ton for char from a mild gasification facility is a starting point from which to conduct the economic assessment.

The potential of char filtration becoming the "best available technology" for mercury and dioxin control in waste-fired incineration and power plants will be carefully addressed. European standards have recently lowered mercury emissions to 0.5% of the most stringent U.S. standards, such as those for the Hennepin County Incinerator (Minneapolis).

TASK 5 - CHAR PRODUCTION COST ESTIMATE:

This task will provide a preliminary assessment of the viability of producing char from North Dakota lignite from a production economics perspective. The economic assessment of Task 4 will determine the price at which char must be available at an application site for char filtration. Assuming this is some reasonable positive value, a production-feasibility study and cost estimate will be conducted to determine if an acceptable return on investment can be anticipated from a North Dakota-based char production facility.

Char is currently produced for briquetting purposes at Husky Industries. Estimates of char production from a mild gasification facility operating in the Northern Plains region have been conducted by J.E. Sinor Consultants, Inc. The potential acceptance of char filter technology as a flue gas cleanup system could create a significant new market for lignite char.

One installation in West Germany consumes 50,000 tons/year of char. Should char filtration qualify as a "Best Available Technology" (BAT) from an environmental perspective, the initial demand could be several hundred thousand tons per year.

The economics of char production must be considered in light of any necessary selective mining operations, the necessary process parameters that yield the specific char characteristics required (the focus of Task 3), and marketing cost considerations. Once the char production parameters are established, several char production techniques will be evaluated that yield the necessary product parameters. Transportation costs for a North Dakota-derived char will be projected for select application sites throughout the United States and internationally.

The efforts on this task will be conducted in cooperation with ongoing production cost estimates for char production as part of the Energy and Environmental Research Center mild gasification development program.

TIMETABLE:

The tasks will be conducted in the following sequence:

Month	1	2	3	4	5	6
Task 2	*********					
Task 3		************************				
Task 4			**********************			
Task 5				**************		
Final Report					*******	

PERSONNEL AND QUALIFICATIONS OF APPLICANT:

The proposal is submitted by the University of North Dakota Energy and Environmental Research Center. Mr. Don Mathsen will serve as the overall Project Coordinator and will be responsible for gathering technical and marketing information from European users of char filtration technology in support of all the individual tasks. A multidisciplinary team will conduct the remaining tasks.

Task 2 will be performed under the direction of Mr. Dan Daly, geologist in the Mining and Mineral Resource Research Institute (MMRRI). Selection of the initial sample sites will be expedited based on the North Dakota MMRRI's extensive background of prior lignite characterization studies.

Task 3 will be supervised by Dr. Curt Knudson, principal scientist in the Fuels and Process Chemistry Research Institute. The same laboratory techniques developed in Task 1 under the prior contract will be used to evaluate the ten coal samples initially selected for the study. The evaluation of alternate char production parameters will be conducted by a team of scientists with expertise in char production and analysis.

Tasks 4 and 5 will be coordinated with the mild gasification development program within EERC by Dr. Everett Sondreal. A consultant has conducted market surveys and production estimates for numerous lignite synfuel by-products, chemicals, and specific products of mild gasification including char. A section emphasizing char use in filtration will be prepared.

Mr. Daly has been associated with the MMRRI's lignite resource characterization program in North Dakota and is knowledgeable of the state's lignite properties. Dr. Knudson has an extensive background in char processes and carbon chemistry associated with coal conversion technologies. Dr. Sondreal is a past Director of the EERC during its time as a DOE facility and is an expert in coal conversion systems and a consultant to the EERC's mild gasification program.

Mr. Mathsen has worked with the technology owners, Stadtwerke, via Dr. Peter Hombach, Director of the TTO in Europe, in developing this project. Dr. Homback is the former Chair of Coal Science at the Max-Planck Institute of West Germany and will facilitate the procurement of marketing and technical information from operating German facilities.

Budget:

Task 2	$ 12,861	
Task 3	50,000	(DOE Cost Share)
Tasks 4 and 5	37,139	
Total Project	$100,000	

Baseline Project Funding by Sponsor:

DOE Request	$ 50,000	(See Exhibit A)
North Dakota Lignite Research Council	50,000	
Total	$100,000	

A detailed budget is attached.

Companies Currently Reviewing the Proposal:

Stadtwerke-Düsseldorf
3M Company
Westinghouse

Maximum Project Funding by Sponsor: (Subject to Available Funds)

DOE Request	$ 80,000
Private Support	30,000
ND Lignite Research Council	50,000
Total	$160,000

LIGNITE CHAR FILTRATION DEVELOPMENT PROGRAM

LABOR	LABOR CATEGORY	HOURLY RATE	NDLRC TASK 2 HOURS	NDLRC TASK 2 $ COST	FEDERAL TASK 3 HOURS	FEDERAL TASK 3 $ COST	NDLRC TASK 4&5 HOURS	NDLRC TASK 4&5 $ COST
D. MATHSEN	PRINCIPAL SCIENTIST	$27.00	48	$1,296	0	$0	65	$1,755
D. DALY	GEOLOGIST II	$16.35	90	$1,472	0	$0	0	$0
E. SONDREAL	PRINCIPAL SCIENTIST	$31.25	0	$0	0	$0	56	$1,750
W. WILLSON	PRINCIPAL SCIENTIST	$31.25	0	$0	16	$500	0	$0
C. KNUDSON	RES. SCIENTIST III	$24.52	0	$0	162	$3,972	0	$0
A. RUUD	RES. SCIENTIST II	$17.16	0	$0	148	$2,540	0	$0
R. KULAS	CHEMIST I	$12.30	0	$0	36	$443	0	$0
D. RINDT	RES. SCIENTIST I	$12.32	0	$0	54	$665	0	$0
----------	WORD PROC/GRAPHICS	$8.00	36	$288	73	$584	30	$240
----------	STUDENT ASSISTANTS	$6.25	80	$500	0	$0	0	$0
			254	$3,556	489	$8,704	151	$3,745
ESCALATION ABOVE CURRENT BASE			7.0%	$249	7.0%	$609	7.0%	$262
				$3,805		$9,313		$4,007
FRINGE BENS. - % OF DIRECT LABOR*		45%		$1,712		$4,191		$1,803
TOTAL LABOR BASED CHARGES				$5,517		$13,504		$5,810
OTHER DIRECT COSTS								
TRAVEL				$2,000		$0		$1,500
GENERAL SUPPLIES				$1,000		$450		$486
OTHER								
COMMUNICATIONS - PHONES AND POSTAGE				$0		$288		$0
PROCESS CHEMISTRY				$0		$16,400		$0
COAL LAB				$0		$3,724		$0
INORGANIC				$0		$1,348		$0
CONSULTANT - FEASIBILITY ASSESSMENT				$0		$0		$9,800
CONSULTANT - EUROPEAN MARKET				$0		$0		$7,000
				$0		$21,760		$16,800
TOTAL OTHER DIRECT COST				$3,000		$22,210		$18,786
TOTAL DIRECT COST = LABOR BASED + OTHER DIRECT				$8,517		$35,714		$24,596
INDIRECT COST - % OF MTDC*			51.0%	$4,344	40.0%	$14,286	51.0%	$12,543
TOTAL ESTIMATED PROJECT COST				$12,861		$50,000		$37,139
* SEE BUDGET NOTES IN THE PROPOSAL						GRAND TOTAL		$100,000

COAL LAB CHARGE SUMMARY -	COST PER	#	$ COST	#	$ COST	#	$ COST
GRIND (SPECIAL BULK)	$28		$0		$0		$0
SPECIAL HANDLING	$15		$0		$0		$0
ASH DETERMINATION	$13		$0		$0		$0
ASH FUSION	$67		$0		$0		$0
BULK DENSITY	$20		$0		$0		$0
BTU (HEATING VALUE)	$28		$0		$0		$0
CARBON, HYDROGEN, NITROGEN	$43		$0		$0		$0
COULTER COUNTER	$33		$0		$0		$0
EQUILIBRIUM MOISTURE	$28		$0		$0		$0
HELIUM AIR PYCNOMETER	$33		$0		$0		$0
LOSS ON IGNITION	$13		$0		$0		$0
LOW TEMPERATURE ASH	$56		$0		$0		$0
MALVERN PARTICLE SIZE	$37		$0				
MOISTURE	$13		$0		$0		$0
PROXIMATE	$31		$0		$0		$0
PROXIMATE/ULTIMATE	$103		$0	30	$3,090		$0
ULTIMATE	$87		$0		$0		$0
SIEVE - DRY	$19		$0		$0		$0
SIEVE - WET	$28		$0		$0		$0
SULFUR	$28		$0		$0		$0
SULFUR FORMS	$80		$0		$0		$0
SURFACE AREA DETERMINATION	$43		$0		$0		$0
XRD PREP	$5		$0		$0		$0
XRFA PREP	$13		$0	30	$390		$0
XRFM PREP	$13		$0		$0		$0
XRFC PREP	$13		$0		$0		$0
			$0		$3,480		$0
	ESCALATION	7.0%	$0		$244		$0
			$0		$3,724		$0

SUMMARY OF CHARGES - INORGANIC ANALYSIS	$ PER HOUR	HOURS	$ COST	HOURS	$ COST
XRD - INSTRUMENT ONLY	$21		$0		$0
XRD - OPERATOR ONLY	$24		$0		
XRD - INSTRUMENT AND OPERATOR	$45		$0		$0
XRF - INSTRUMENT ONLY	$17		$0		$0
XRF - OPERATOR ONLY	$25		$0		
XRF - INSTRUMENT AND OPERATOR	$42		$0	30	$1,260
SEM - INSTRUMENT ONLY	$31		$0		$0
SEM - OPERATOR ONLY	$19		$0		
SEM - INSTRUMENT AND OPERATOR	$50		$0		$0

AUGER, ESCA, SIMS - INST. ONLY	$78		$0	$0
AUGER, ESCA, SIMS - OPER. ONLY	$32		$0	
AUGER, ESCA, SIMS - W/ OPERATOR	$110		$0	$0
			$0	$1,260
	ESCALATION	7.0%	$0	$88
			$0	$1,348

BUDGET NOTES - ENERGY AND ENVIRONMENTAL RESEARCH CENTER

The proposed work would be done on a fixed cost basis.

FRINGE BENEFITS

Fringe benefits are estimated based on historical data. The fringe benefits which will actually be charged consist of two components. The first component covers average vacation, holiday, and sick leave for the EERC. This component will be charged as a percentage of direct labor. The second component covers actual expenses for items such as health and life insurance, social security, UND retirement, unemployment insurance, and workman's compensation.

INDIRECT COST

The indirect cost rate included in this proposal is the rate which became effective July 1, 1989.

EXHIBIT A

Department of Energy
Washington, DC 20585

DEC 21 1989

Mr. Gerald H. Groenewold
Director, Energy & Environmental
Research Center (EERC)
Associate Dean, School of Energy & Mines
Box 8213, University Station
Grand Forks, ND 58202

Dear Mr. Groenewold:

The Review Committee for the Joint Sponsored Research Program (JSRP) Proposals met on November 13, 1989, to review your proposals against the guidance and strategy provided in the FE memoranda to you dated June 8 and September 6, 1989.

The proposed program is consistent with the FE programs and I would ask that you proceed to develop detailed proposals for each area and work directly with the appropriate Energy Technology Center so that the individual projects can be initiated. It is our intent that these projects should be structured in such a manner that the maximum benefits accrue to the EERC in terms of building capabilities and enhancing the business base for the center. We expect that at least 50 percent cost sharing will be provided by other parties in each activity.

Government funding for the proposals has been provided to the Morgantown Energy Technology Center and the distribution of these funds will occur after negotiations are completed.

Because of our intent and the further requirement placed on DOE in the House Appropriations Committee to develop a report describing the success of this new program, I would appreciate your providing an analysis of the program from your perspective along with the long term benefits to the EERC. I would appreciate receiving this analysis by March 15 so that it can be included in our report on May 1, 1990.

A summary listing of your projects and the assigned Energy Technology Center is enclosed.

Any questions should be addressed to Chuck Roy at 202-586-6660.

Sincerely,

Michael R. McElwrath
Acting Assistant Secretary
Fossil Energy