Land Application Uses of Dry FGD By-Products

**Quarterly Report
October - December 1994**

Joel H. Beeghly
Warren A. Dick
Ralph J. Haefner

February 1995

Work Performed Under Contract No.: DE-FC21-91MC28060

For
U.S. Department of Energy
Office of Fossil Energy
Morgantown Energy Technology Center
Morgantown, West Virginia

By
Dravo Lime Company
Pittsburgh, Pennsylvania

MASTER

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3600 Neville Road
Pittsburgh, Pennsylvania 15225

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1.0 Progress Report

1.1 Finances

OSU's September invoice was submitted to OCDO. The DOE quarterly financial report for the third quarter was submitted. Phase 3 financial status as of September, 1994 is attached.

The expenses that Dravo has paid but needs compensated for are listed below. (In other words, DLC is not a contributor.) The DOE portion was requisitioned. An invoice for the OCDO portion was submitted except for Item B that will be deferred to December.

Item A	Trucking ash directly to Fleming AML site (Fleming)	\$20,052.37
Item B	Trucking ash:compost mix to AML site	12,201.39
Item C	Trucking Tidd ash to ODOT	
	State Route 83 Project	45,662.76
Item D	Ohio EPA permit	400.00
Item E	Mast concrete	13,600.00
	Total	\$91,916.52

It was hopeful that some of this Item B delivery would be covered by the ODNr Division of Reclamation.. However, it will have to be covered by the project. A sum of \$66,916.52 will be accounted for in OSU's overall budget since they did not perform the work or buy it. This sum does not include the extra \$25,000 that DOE contributed to help pay for the trucking. Item C is not finished in that there are a few special truck loads to be delivered in December.

Warren Dick is working on getting OSURF to reallocate certain paid Phase 3 expenses for supplies changed to equipment in order to avoid an overhead charge. These items pertain to the construction of the six watershed monitoring sheds at the Fleming AML site.

1.2 Meetings, Presentations

1.2.1 Warren Dick and Rick Stehouwer both made presentations at the Agronomy Society of America meeting. Bill Wolfe spoke at the joint ODOT and OSU sponsored annual conference on road construction. Sam Traina spoke at the DOE sponsored workshop on ettringite formation. Mary Beth Ashbaugh of DOE-METC spoke at the University of Kentucky Coal Ash Utilization meeting.

1.2.2 Warren Dick met with Tom Machamer who is installing a small fluidized bed burner in a greenhouse near Orrville, Ohio. This project is partially supported by Ohio Department of Development funds. The meeting was to present Tom with beneficial reuse options of the combustion by-products produced.

1.3 Demonstration Sites

1.3.1 Fleming AML

Vegetation is starting to be established. Baseline soil profile samples were collected. Initial runoff and seep samples are being hand collected at this time to provide some preliminary results. Perforated pipe was installed for collection of sub-surface drainage at the base of each test pad.

The water testing certification program to become "USGS certified" at the OSU Wooster lab was started. USGS installed some of the shallow lysimeters (1 - 4 ft. deep). See their attached report. Photographs have been taken.

1.3.2 S. R. 83 Road Embankment and Base Construction

Approximately 60 - 70% of the 5,100 ton of Tidd PFBC ash has been placed as planned. The landfill mixed material arrived at about 8 -10% moisture and unloaded easily from the conventional aluminum truck trailers. A large quantity of water had to be mixed on site to achieve maximum compaction. One test section is 100% ash, and another is 50% ash mixed with 50% on-site clay-like soil. The compaction effort is not slow or difficult using a vibratory roller. Photographs have been taken.

1.3.3 LIMB Ash Stockpile - use as a soil conditioner

LIMB ash and cover soil samples on adjacent coal refuse disposal site were sampled to determine the "soil amendment" application rate. Central Fuel Company has tentatively agreed to support this plan for utilization of the LIMB ash stockpile material. (The greenhouse study tested the LIMB ash.)

2.0 Contract Problems

The Phase 3 statement of work needs to be revised to reflect changes and/or additions since late 1993, i.e., dioxin testing and trucking expenses.

3.0 Work Schedule

- 3.1 Continue installation of equipment at the Fleming site.
- 3.2 Complete certification of the laboratory in Wooster by the USGS team from Boulder, Colorado.
- 3.3 Begin process of securing long-term access to the Fleming site. This will involve signing some sort of lease for the portion where sampling is to continue.
- 3.4 Advise and assist ODOT in construction of State Route 83.
- 3.5 Monitor State Route 541 inclinometers.
- 3.6 Work on Phase 2 report.
- 3.7 Work on acid-base accounting of FGD-coal refuse mixtures.

OSU Phase 3 Financial Summary Update

Task	Total Budget	Expenses thru Sept. '94	Balance
3.1.1.1. Fleming AML Site	\$349,783	\$160,099	\$189,684
3.1.1.2 USGS Groundwater	365,683	14,563	351,120
3.1.2 Agronomic Liming	201,980	100,638	101,341
3.1.3 Cattle Feedlot	86,274	63,645	22,629
3.1.4 Coal Refuse Stabilization	204,798	99,647	105,151
3.2.1 Environmental Modeling	117,846	68,398	49,448
3.2.2 Road Embankment	143,320	100,345	42,975
3.2.3 Economic Modeling	204,932	121,858	83,074
3.3 Phase 3 Report	26,854	--0--	26,854
Total	\$1,701,470	\$729,195	\$972,275

Note: The total budget of \$1,701,470 shown above does not include \$65,285 of carryover monies from Phase 1, 2, & 3 plus the \$25,000 extra from DOE. These funds will be used mostly for trucking expenses of about \$78,500 that was not in the original budget for Phase 3. The overall OSU budget was not increased.

November 28, 1994

DRY FGD BY-PRODUCT PROJECT

Information Sheet for Monthly Project Status Report to Dravo Lime/OCDO

Investigator: Ralph J. Haefner

Please supply brief, narrative responses to the following items (no data). Information given on this sheet should only apply to the indicated task number.

I. Describe the work performed and results obtained during the reporting period. Make reference to applicable sections of the Statement of Work as well as Section III of your previous report.

Contracting procedures are finalized with Cross Drilling Services for well drilling services and work will begin December 5, 1994. The contract with the Ohio Department of Natural Resources is also almost complete, with work beginning sometime in December, 1994.

As of this reporting date 12 of 36 lysimeters have been installed. The lysimeters were installed in an area due east of the OSU test watersheds. This area was almost totally devoid of spoils, as shown by drilling into the surficial materials which were entirely underclay. Additional lysimeters will be installed to the south of the test watersheds, in an area that the site reclamation contractor (Ellis Bennel) claims to hold a thicker spoil horizon.

A wet/dry precipitation collector will be established at the nearby Dover Water Supply Well field this week (11/28/94). The precipitation collector is designed to measure and collect all precipitation that falls on the site and is measured in 5-minute increments. Samples of precipitation will subsequently be submitted to the laboratory for chemical analysis.

Project workers attended a two-day training course on a new sampling protocol designed to limit contamination of samples analyzed at the parts-per-billion level. The course helped strengthen our need to be prepared in advance and be extremely cautious when sampling groundwaters.

Provide your best estimate of the percentage of the task which has been completed through the period.

As of this reporting date, approximately 10 percent of the task is complete.

II. Cite any problems or circumstances which have or will impede or accelerate timely progress and anticipated results.

Work by reclamation contractor has proceeded slower than planned. Due to these delays, well drilling and sampling of ground water can only begin next January or February.

III. Outline the work to this task which will be performed over the next Reporting Period. Include, as appropriate, anticipated meetings with project advisory groups, planned test matrices, etc.

Additional lysimeters will be installed in the buffer areas to the south of the OSU test watersheds. A cluster of lysimeters will also be installed in an untreated area to serve as control. Rock coring and drilling will be initiated, and this work is projected (by the contractors) to take up to two months to complete. As soon as the wells are completed, water levels will be taken and the wells will be instrumented with transducers (for hourly water-level measurements) and probes to measure specific conductance and temperature. Within the next month we will continue to prepare for sampling of ground-water (from lysimeters, ground-water wells on-site, and nearby domestic wells), surface water, and precipitation.

Land Applications Uses of Dry FGD By-Products

J. H. Beeghly and Warren A. Dick

1.0 Monthly Progress Report

1.1 Finances

OSU was paid for April and May 1994. Their June and July invoices were reportedly approved by OCDO. August was submitted. A contract extension was requested from OCDO to December 31, 1995. An attached final detailed OSU budget for Phase 3 (by task and line item) was submitted to OCDO. OSU's budget will be reduced to reflect some expenses, i.e., trucking, paid through Dravo using project funds (to avoid overhead charges). A summary of the sources of "carry over" monies used to pay for the trucking expenses is also seen in the attachment. A review of phase 3 expenses to date and budget will be included in the next monthly report.

1.2 Meetings

1.2.1 - A display booth was shown by OSU at the "Resource Ohio" convention and trade show at Akron, Ohio, focusing on solid waste recycling issues and marketing for recovered materials. American Electric Power and Dravo Lime assisted in providing display materials and support.

1.2.2 - Warren Dick presented a paper at the "Ohioans for Abandoned Mineland Reclamation" meeting held in Nelsonville, Ohio on October 24 and 25. Jackie Bird volunteered to serve on a planning committee for next year and project personnel will also be involved. Possibly next year's meeting could involve a tour of the Fleming AML site.

1.2.3 - Bill Wolfe spoke for the project at a workshop on coal ash utilization sponsored by ODCO and the Ohio Chapter of American Coal Ash Association.

1.2.4 - A meeting of people from the Ohio Department of Development (both from the agricultural division and OCDO), Ohio EPA, Ohio DNR, USDA Soil Conservation Service, Ohio State University, Dravo Lime, and other interested parties was held at the EORDC and Cambridge to discuss plans for conducting a study of using fixated wet FGD as a liner for water storage and manure storage ponds. This work is being planned in anticipation of developing large animal feeding units in southeast Ohio.

1.3 Demonstration Sites

1.3.1 Fleming AML - Final chisel plowing and disking were accomplished so that seeding was made on October 29 and 30. The delay was partly due to confusion over the need to chisel plow and the default of the seeding contractor necessitating another being hired. The ODNR has strict rules over changes in contractor that must be adhered to.

Ohio State University will install perforated pipe for collection of leachate water. USGS has begun their background data analyses. Water samples were received from the USGS lab in Denver and analyses have begun so that the Ohio State University labs in Wooster and Columbus can become USGS certified.

1.3.2 Coal Refuse/Spoil Acid Base Accounting - Spoil and coal refuse samples were collected from five active coal mine cooperators. These samples will be used for "acid-base accounting" for the "alkaline addition" beneficial use of dry FGD by-products.

1.3.3 Aglime Plots - All agronomic plots have been harvested. Yields of corn were very good but unlike alfalfa, yield increases with corn were not

obtained by addition of the FGD by-product. This is not surprising since corn is not as sensitive to low pH as alfalfa.

1.3.4 State Rt. 83 - About 5,200 tons shipment was completed before the Tidd plant went down for scheduled outage. Only a few test loads remain to be shipped which will be experimental directly from the silos in plastic lined truck beds.. Construction by Central Ohio Coal Company (AEP) and ODOT began October 27.

1.3.5 OSU Cattle Feedlots - At the meeting discussed in 1.2.4, this group of State of Ohio officials reviewed these one year old demonstrations sites. The Tidd PFBC and Conesville FGD material continue to perform satisfactorily.

2.0 Contract Problems

None

3.0 Work Schedule

- 3.1 Collect samples from the Fleming site for final dioxin analyses.
- 3.2 Collect soil profile samples from the Fleming site for beginning time data analyses.
- 3.3 Complete installation of monitoring equipment at the Fleming site.
- 3.4 Monitor the Route 83 construction site.
- 3.5 Analyze samples for acid-base accounting collected from active coal mine facilities
- 3.6 Finalize plans for use of LIMB ash storage pile material
- 3.7 Rick Stehouwer and Warren Dick are to each present papers at the American Society of Agronomy meeting.

OSU Budget - Phase 3

Phase 3

Budget Summary	AML Site	USGS	Aglime	Rebank- ment	A/B Acc't	Envir. Model	Civ Eng Model	Ag Econ	Final Report	Total Budget
Task	3.1.1.1	3.1.1.2	3.1.2	3.1.3	3.1.4	3.2.1	3.2.2	3.2.3	3.3	
Personnel	182376.00	71885.00	89050.00	42840.00	93799.00	56011.00	81053.00	119962.00	14841.00	751817.00
Fringe	34167.00	9540.00	17468.00	4798.00	22605.00	13690.00	5410.00	8570.00	3552.00	119800.00
Travel	3305.00	6380.00	6120.00	2448.00	5508.00	3672.00	3672.00	4896.00	0.00	36001.00
Equipment	2000.00	33930.00	0.00	6000.00	0.00	0.00	1000.00	0.00	0.00	42930.00
Supplies	18360.00	5675.00	25704.00	4896.00	18360.00	7344.00	7344.00	4896.00	0.00	92579.00
Contractual	0.00	10847.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10847.00
Other	0.00	67257.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	67257.00
Tot. Direct	240208.00	205514.00	138342.00	60982.00	140272.00	80717.00	98479.00	140364.00	18393.00	1123271.00
Indirect	<u>109575.00</u>	<u>160169.00</u>	<u>63637.00</u>	<u>25292.00</u>	<u>64525.00</u>	<u>37130.00</u>	<u>44841.00</u>	<u>64568.00</u>	<u>8461.00</u>	<u>578198.00</u>
Total -OSU	349783.00	365683.00	201980.00	86274.00	204798.00	117846.00	143320.00	204932.00	26854.00	1701470.00

Land Application Uses Summary

(PreAward, Phase1, Phase 2, Phase 3)

<u>Phase</u>	<u>Budgeted</u>	<u>Expenditures</u>	<u>Carryover</u>
PreAward	\$ 148,717	\$ 149,717	\$ 00.
Phase I	552,132	536,220	15,912
Phase 2	1,739,480	1,716,507	22,973
Phase 3	<u>1,727,870</u>	<u>1,701,470</u>	<u>26,400</u>
TOTAL	\$4,169,199	\$4,103,914	\$ 65,285