

“Commercial Demonstration of the Manufactured Aggregate Processing Technology Utilizing Spray Dryer Ash”

Quarterly Technical Progress Report

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Table of Contents

<u>Subject</u>	<u>Page</u>
Abstract	i
Executive Summary	ii
I. Experimental	1
II. Results and Discussion	1
III. Conclusion	4
IV. References	4

Abstract

This quarterly report covers the period from January 1, 2005 through March 31, 2005. It covers: technical development, permitting status, engineering status, construction status, operations summary and marketing support activities for this period.

Executive Summary

Plant startup is still continuing. Testing of admixtures to enhance extrusion and SDA wetting is continuing. Efforts are underway to improve plant availability.

- I. Experimental – This section is not applicable to this project.
- II. Results and Discussions

This section is broken down into the following subsections: Technical Support, Permitting, Engineering, Construction, Marketing Support, Operations Summary and DOE activities. These subsections describe the activities that have taken place during this quarter as they pertain to this project.

(A) **Technical Support**

Hydrated lime and carbon contents in spray dryer ash (SDA) were characterized to monitor ash quality in this quarter. The average of hydrated lime contents was 21.2% with standard deviation of 1.3%, which was similar to those in last quarter. The carbon contents in SDA were mostly in the range of 3.9 to 4.5%, except that SDA had higher carbon contents (4.5 to 6.1%) from February 8 to February 22. The increase in carbon content was caused by coal pulverization malfunction at Birchwood Power Station. One coal mill (out of four) for coal pulverization was taken out of service for repair. Increase in water addition was needed to make mixed ash plastic enough for extrusion. The average moisture content of extruded products taken from February 8 to February 22 was about one percent higher than those made from SDA with carbon contents of 3.9% to 4.5%.

Mix designs with reduced fines were recommended for curing vessel feeds. A new test procedure for QA/QC was implemented to monitor qualities of reacted embedding material and recycle. Qualities monitored include moisture content and hydrated lime content, which are related to curing and crushing operation.

At the request of DOE, an abstract entitled “Commercial Demonstration of the Manufactured Aggregate Processing Technology Utilizing Spray Dryer Ash” was submitted to the Twenty Second Annual International Pittsburgh Coal Conference.

The abstract was accepted and will be presented in the session on “Clean Coal Demonstration Projects.”

(B) **Permitting**

No activity this quarter.

(C) **Engineering**

Generated a layout for heat tracing on CV inlet chutes. May outage items continues; including a new rotary chute for the inlet to the CV. We tested ultrasonic cleaning on some of the extruder parts; the initial tests were not very successful. Work continues on the truck scale data collection to improve its reliability and a format change on the tickets that it prints. Work continues on our May Outage plan.

(D) Construction

A new dust collector was installed for the tumbler & curing vessel area. Added air sweeps to K-250 recycle feeder. Installed two new conveyors at the end of L-310B to transfer startup material to the ADC stockpile. Installed new water nozzles at the pugmill inlet chute with operator controls. We've installed video cameras to help the operator keep an eye on remote locations as well as repair the main bearings on the secondary screen. A new pugmill dam was designed and installed. The local machine shop fabricated six new pugmill knives with a different design to help minimize the impact of material buildup as well as a 1.5 inch diameter extrusion die.

(E) Marketing Support

Conduct regular, weekly meetings (on site) with contract aggregate distributor/buyer regarding status of plant start-up and quality control.

Hired on one additional hauling broker, and two owner/operator hauling services to supplement the current hired hauling fleet. These services haul fixated SDA to the landfills, and will transport the lightweight aggregate to the various concrete masonry producers.

As part of Universal Aggregates' contingency plan through plant start-up; two, municipal solid waste landfills continue to beneficially utilize the fixated SDA, as "Alternate Daily Cover," on a regular basis.

As described within the last quarterly report, lightweight aggregates produced through the "commercial" extrusion process, were cured in laboratory-scale, curing vessels to examine strength development and compliance for "specification" quality. The cured extrudates were crushed and screened to meet the applicable gradation requirements for use in concrete masonry. Using the mix design of a local masonry producer (future buyer), this lightweight aggregate product was again utilized to produce concrete masonry units at the National Concrete Masonry Association (NCMA) in Herndon, Virginia. The concrete masonry units produced in this demonstration also meet and exceed the applicable ASTM quality requirements for compressive strength, absorption, unit weight, and density.

Universal Aggregates' production from January 2005 thru March 2005 has permitted the distribution of approximately 700 tons of lightweight aggregate to a future product consumer. The consumer/user (a Maryland masonry producer) successfully manufactured concrete masonry of "specification" quality using the product.

Continue to assist with plant start-up, process and product testing, admixture evaluation, contingency plans, product transportation, and promotion to potential consumers/users.

(F) **Operations Summary**

We continue to staff and operate 24 hours a day. We continue to have a weekly safety meeting and we are still looking for additional manpower to staff the plant, specifically: mechanic, electrician, and operating technicians.

The Universal Aggregates Birchwood Plant worked 24 days in December, a possible 576 hours. The plant operated for 462.82 hours, yielding 80% availability. The Birchwood power plant produced and Universal Aggregates handled 12,060 tons of SDA plus 448.5 tons of Bottom Ash. The Universal Aggregates plant processed 1591.71 tons of SDA, split between rock production and alternate daily cover to the landfill. There was approximately 150 tons in inventory on the ground at the end of the Dec. and Universal Aggregates shipped 430.5 tons of aggregate to Versalite Sales. The first week in January the plant was down for scheduled repairs and modifications to the curing vessel, recycle line, and SDA transport line. The plant resumed operation January 10th. On January 17th we went to 7/24 operation to evaluate if there is a benefit to staying up and running continuously, which there is. We are still testing the W. R. Grace and Master Builders admixtures as extrusion aids.

We are currently using two different admixtures, one for low carbon ash and one for high carbon ash. The plant was down on the 25th of January to disassemble and clean out the extruder. Work continues on improving operability of the production facility. We continue with refinements to the mix design and admixture addition rate. It appears that as the carbon in the ash changes the necessity of using an admixture, the quantity and type of admixture required must also change. We've had production problems with the tumbler because of a build up in the lining and with high moisture recycle material plugging the recycle feeder.

At the beginning of March, we were successful with continued integration of the Birchwood facility. We were producing aggregate, loading and selling aggregate from the stockpile. We developed an issue with the curing vessel inlet and curing vessel balance between the four individual sections of the vessel. An investigation was conducted in support of our operating problems and it was determined that we were short cycling C can. We were only operating on C can. We need to operate with all 4 cans and 3 feeders in service for uniform flow through the CV. Visits by Joe Marinelli (Materials Handling Group) and by Charles Whittaker (J. C. Steele).

Universal Aggregates continues with complete ash processing and disposal responsibilities.

(G) **DOE**

The Quarterly Progress Report was submitted for the first quarter of 2005.

- III.** Conclusion – The schedule has been revised for phase III. The activities described in section II will continue into the next quarter.
- IV.** References – Not applicable for this report.