

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

Quarterly Technical Progress Report

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Abstract

This quarterly report covers the period from April 1st, 2004 through June 30th, 2004. It covers: technical development, permitting status, engineering status, construction status, operations summary and marketing support activities for this period.

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Executive Summary

Plant startup, including equipment and system debugging, is underway. Minor adjustments to the SDA feed system were completed. Work on optimizing the water/SDA mixing is also in progress.

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

A program was initiated to monitor qualities of spray dryer ash from the Birchwood Power Plant and wetted ash collected at pugmill, pugsealer and extruder outlets. Monitored results were being correlated with process operating conditions. Qualities of spray dryer ash monitored include moisture content, hydrated lime content and bulk density. Qualities of wetted ash monitored include: moisture content, bulk density and temperature. Process operating conditions include ash and water feed rates, equipment power consumption and others.

A parametric test was conducted to evaluate the effects of: the pugmill dam installation, water injection nozzle configuration, and overall water addition on pugmill performance. Test results indicate that better water and ash contact can increase densification of wetted ash in the pugmill. Better water and ash contact at a constant water addition could be achieved by installing a high dam near the pugmill outlet to increase retention time and installing fine spray nozzles to reduce water droplet size. Increased water addition can also increase the densification of wetted ash in the pugmill.

B) Permitting

No activity this quarter.

C) Engineering

An emergency response plan was prepared for the safety department for use at the Birchwood Facility. We continue to make adjustments to the PLC program as well as operational set points for the mechanical equipment. In regards to our contingency plan, we specified, ordered, and installed a high intensity mixer to use to make alternate daily cover and road base material for landfill disposal.

D) Construction

The final grading and seeding was completed in April. The electrical contractor completed punch list items. The majority of the construction work was focused on modifications to the ash transport system within the process building including L-120A&B, K-120 A&B, and L-310 A. The principal focus for these modifications was to prohibit flooding of the ash through the feed system all the way down into the pug mill. Kerry Johanson is currently working on finalizing some design implements that we will make effective as we progress forward.

E) Marketing Support

Contact was established with potential product buyer/s of lightweight aggregate for manufactured stone veneer applications.

Continued personal contact with trucking companies for hauling service needs in both aggregate pick up and delivery, and contingency plan hauling. Established purchase order contracts with two trucking companies.

Tested crushing and screening equipment with conventional, coarse lightweight aggregates (3/4" nominal) used to charge curing vessel. The equipment produced an aggregate gradation passing ASTM specifications for lightweight aggregate in concrete masonry. The "reprocessed" (crushed and screened) aggregates were supplied to a local concrete masonry producer, and conventional lightweight concrete masonry block were produced.

Continued visitation and personal contact with several local landfills in evaluation of possible beneficial use contingency plans (Landfills within 100 miles of Birchwood facility). Conducted successful "demonstrations" for the beneficial use of fixated/conditioned spray dryer ash in road base course, and alternate daily cover applications with two, municipal solid waste landfills. Continue to establish plans for similar beneficial use applications with two, other municipal solid waste landfills throughout plant startup.

Continue to assist process startup, process and product testing, admixtures, and communication with potential product consumers.

F) Operations Summary

With the improvements in the ash handling system at the end of April we were able to operate at 10,000 pounds an hour of ash, roughly 13% of our capacity into the pug mill, pug sealers, and finally an attempt into the extruder. Five attempts were made at passing material through the extruder dye. Unfortunately each time we were unsuccessful in completely getting material through the dye. The dye, as assembled is a composite of about five pieces totaling about 7-8 inches thick. We would run all the way up to about an inch and a half short of the end of being able to push something out of the dye. We are now staffing and operating 24 hours a day. We are currently working through revision 3 for the extruder dye and are making preparations to integrate the plant with green extrudates into the curing vessel. We continue to have a weekly safety meeting and we are currently looking for additional manpower to staff the plant with; specifically, mechanic, electrician, and instrumentation control technician.

Through June we continued our 24-hour a day operations. Installation of the Scott Mixer for producing alternate daily cover and road base material for landfill applications was completed and started. Universal Aggregates took over complete ash processing and disposal responsibilities effective June 20th. Additional technical support has been brought on, specifically Duane McCoy, ex-process engineer at

Consol Energy; Leonard Anthony, ex-senior technician Consol Energy; Dr. David Dickey, MixTech Technologies, as a mixing consultant. Site visits were conducted by J. C. Steele in support of optimizing the pugmill/pugsealer/extruder combination. TXI (Texas Industries) paid a visit to discuss synergies. A new 2-inch diameter opening 27-hole dye was installed.

We continue to have problems with the physical properties of the ash. With the help of our mixing consultant we've gone back to look at fine spray atomization nozzles for the water and we've also tested a wetting agent for the process water to help with mixing in the pugmill. We've installed a dam in the pugmill to increase our retention time and with the fine sprays and the retention time increase it appears to set the pugmill operating at optimum conditions. With the help of J. C. Steele we've run some tests on the pugsealer to try and determine its optimum performance. We've been pulsing the pugsealer, allowing it to fill and run and fill and run. That seems to be adequate for the moment. We continue to have the same problem with the extruder that we've had in the past where the material will pack and bridge over the flights within the extruder auger barrel limiting our throughput. When the extruder is fresh and clean we are able to produce a mix that is extrudable for a short period of time using the 2-inch diameter dye. However, the extrudate is still quite soft. We have not reached an optimum dye design.

G) DOE

The Quarterly Progress Report was submitted for the second quarter of 2004.

- 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.