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

Quarterly Technical Progress Report

Reporting Period:	04/01/05 through 06/30/05
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Table of Contents

Abstract

This quarterly report covers the period from April 1, 2005 through June 30, 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 mixing modifications 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

A parametric test was conducted to evaluate the effects of additional mix components, operating conditions, embedding material addition, and retention time on stiffness development of green extrudants. The objective is to maximize the stiffness of extrudants before charging to curing vessel. Previous integration runs indicated that soft extrudants can cause problems in curing vessel operation. Additional mix components evaluated included cement, sand (silica or mason), bottom ash, hydrated lime, admixture and a combination of two components. Operating conditions evaluated included SDA throughput, extruder speed and vacuum. It was identified that relatively strong extrudants can be produced at high SDA throughput and high extruder vacuum with addition of embedding material in approximately 4 min. for charge of curing vessel. These conditions will be implemented in the next integration run in August.

Hydrated lime and carbon contents in spray dryer ash (SDA) were monitored for ash quality in this quarter. The average of hydrated lime contents decreased from April (16.1±5.6%), to May (13.2±2.1%) and to June (10.8±1.9%). In comparison, the average of hydrated lime contents was 21.2 ±1.3% from January to March. The decrease in hydrated lime content from March to June is related to the improvement of lime utilization in spray dryer operation at BPP. The carbon contents in SDA were mostly in the range of 3.9 to 4.5%.

At the request of DOE, a paper, entitled "Commercial Demonstration of the Manufactured Aggregate Processing Technology Utilizing Spray Dryer Ash", was drafted for presentation at the Twenty-Second Annual International Pittsburgh Coal Conference. The paper will be presented in Session 30 "Advanced Energy System Demonstration 2" on September 14, 2005.

(B) Permitting

No activity this quarter.

(C) Engineering

Work for the outage including contractor meetings and procurement of necessary items continued for the month. Engineering drawings were prepared and the contractors were mobilized at the end of April. Design work continues on the installation of a new SDA feeder bottom. Once the delivery is confirmed, a 3-day outage will be scheduled. An additional pugmill dam is being fabricated & will be installed when the opportunity permits. A new 1"diameter dye was ordered for the extruder.

(D) Construction

Modifications completed during the outage:

(1) Pugsealer dam and two new knives.

(2) Extruder liner, single-wing gap point auger.

(3) Pugmill, four new knives and water injection system.

(4) Curing vessel rotary chute installed (electric, controls, heat trace, and insulation to be completed.

(5) Replaced product oversize chute.

(6) Replaced recycle chute.

(7) Water filtration.

(8) SDA silo valves and vent line tune-up.

(9) Instrument replacement and upgrade in several locations and PLC program modifications.

(10) Acrison SDA feeder VFD on intromitter drive and re-direct. Only achieved a slight speed reduction.

(11) Complete list of maintenance items.

(E) Marketing Support

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

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.

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.

Early in April, we attempted to send extrudates back into the curing vessel, operating only on the East side of the vessel, the B & D cans. We tried that unsuccessfully for two days. The levels in B & D were fluctuating radically. Visual inspection showed we were developing a rat hole through both cans down to the feeders at the bottom. We operated like this in March with poor results, so we terminated that activity. The decision was made to go ahead and completely drain the vessel. During that activity, for about a week, the level in C can did not change at all. Precision Blasting Inc., Flatwoods Kentucky was brought in to inspect the situation and subsequently contracted to set off charges inside the curing vessel to drop the level in C can. This activity took about a day and a half at the end of the month followed by clean up of the remaining aggregate in the curing vessel. Dr. Jerry Johanson inspected the empty curing vessel on April 26th; his report is pending. During the month we saw swings in the carbon content of the ash as well as a lower hydrated lime value in the ash. A preliminary operating manual (front half of the plant) was drafted & circulated for review.

We are still testing the W. R. Grace and Master Builders admixtures as extrusion aids.

Birchwood completed their outage work & re-started on May 13th. It wasn't until Tuesday the 17th that the UA plant had SDA to process. The UA plant did a cold start & equipment check on Tuesday the 17th. We started processing ash on Wed the 18th.

The modifications worked very well. The only thing that was not a major improvement was the 2 new knives downstream of the pugsealer dam. They bent over & one eventually broke off. They were replaced. The 4 in the pugmill are not turned & appear to be OK.

The plant started in under an hour extruding at 12,000 lb./hr. SDA & ramped up to 18,000 lb./hr. SDA. On May 19th the plant went to 20,000 & 24,000 lb./hr. SDA. The SDA feeder became unstable at 24,000 (66% cap) otherwise we continued to extrude that whole time. The bump in feed rate that occurs after a refill is not a result of flushing, but the way the feeder restarts out of volumetric. Acrison made a site visit on May 25th and corrected this.

The unit continued extruding until the 28th. The extrudates were soft and crumbly, but the moisture has been down as low as 27.5%. The modifications appear to allow us to operate in a wider extrudable band.

On the 28th, the plant changed liners out; the one-piece S/S liner was polished to a mirror finish & lost its grip for forward push. The replacement parts went in without the pins & using a continuous wing point auger. Carbon levels in the ash went up at the end of the month. SDA processing rate dropped to 10-12,000 lb/hr in order to prevent the extruder from backing up.

The majority of the month of June was dedicated to parametric testing of different admixtures fed into the pugmill to produce a stiffer extrudate in order to survive the trip to the Curing Vessel (CV). The most significant findings were; a deep vacuum produces the stiffest extrudate, & covering green extrudates in embedding material produces a very stiff extrudate in approximately 4 minutes. The current travel time to the CV is 3.25 minutes. The belt is driven by a variable frequency drive & a slight speed reduction is planned in order to achieve a 4-minute travel time. We produced some of our best extrudates at 22,000 lb/hr SDA feed into the pugmill & 20 in Hg vacuum. A spiral liner from J. C. Steele was used for most of the month in the extruder. A new, single piece liner has arrived & will be tested for fit. A new shredding dye for the pugsealer was designed & fabricated. The UA plant kept up with Birchwood SDA production for the majority of the month, operating at 18,000-22,000 lb/hr. of SDA feed into the pugmill. There were still a few days that Birchwood silo material went to the King George landfill.

Work on the CV continues. It will be refilled & circulation tested in July. Our current plans anticipate going to the CV in the beginning of August.

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.