Technical Bulletin 48

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BORAL RESOURCES

# Fly Ash Reclaimed From Landfill

## RETAINS POZZOLANIC PROPERTIES OF PLANT-PRODUCED ASH

**Recovered Fly Ash**

Boral Resources has performed extensive testing to evaluate the performance and consistency of recovered fly ash. This research strongly indicates that fly ash conserves its pozzolanic properties and retains other beneficial properties known to improve concrete durability. Pozzolanic reactions occur in highly alkaline environments/conditions; landfills and surface impoundments do not provide alkaline conditions. For this reason, fly ash stored in landfills, in the absence of highly alkaline conditions, remains pozzolanic.

**Washingtonville Case Study**

Boral Resources is reclaiming and making available for beneficial use approximately 2 million tons of high-grade fly ash from its Washingtonville monofill. The fly ash was produced by coal-fueled generating stations and infilled in the 1980s and 1990s.

Comprehensive testing of the fly ash, which has been stored in a covered 30-acre site above natural grade, has determined it to be of consistent high quality, making it suitable for beneficial uses including high-strength/durability

concrete applications. Washingtonville's on-site fly ash drying plant will be utilized to ready the fly ash for commercial applications.

In preparation for making the fly ash commercially available, Boral Resources sampled and tested the monofill materials comprehensively. Samples for testing were drawn from 12 boring locations at depths ranging from 15 to 50 feet and collected at five-foot intervals.

Boring samples were evaluated using x-ray fluorescence to determine the consistency of

**For more information or answers to questions about the use of fly ash in specific applications, contact your nearest Boral Resources Technical Sales Representative or call 1-770-684-0102**

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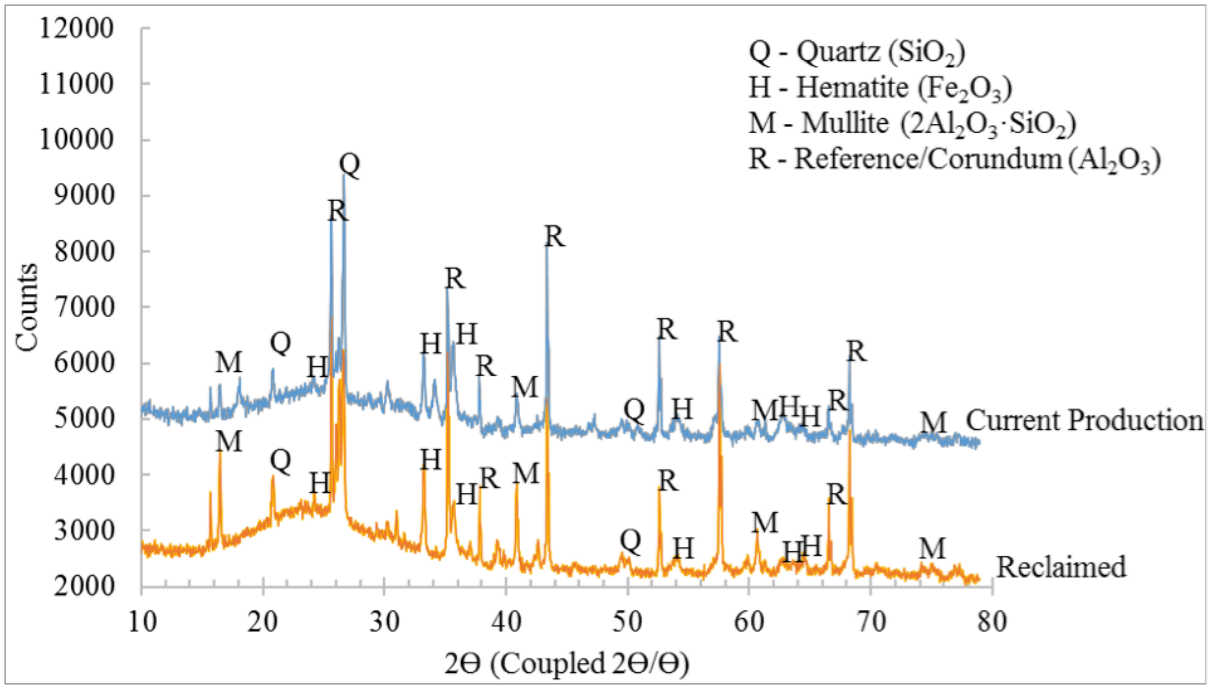
their chemical properties. Carbon content, loss on ignition, particle size distribution and fineness, organic impurities (ASTM C40), foam index, and adsorption were also determined to ensure the quality and consistency of the material. Samples taken from all depths—0-5', 5-10', 10-15', 15-20', and 20-25'—also tested negative for organic contaminants. Composites and 14-ton samples were used to assess the fly ash for concrete and durability testing per the requirements of ASTM C618, as well as for compressive strength development, alkali-silica reaction (ASR) mitigation, and sulfate resistance.

Washingtonville reclaimed fly ash exceeds all the chemical and physical requirements of ASTM C618 and AASHTO M295 specifications for the use of fly ash in concrete.

As shown in the chart below, comparative analysis of the reclaimed fly ash samples against plant-produced fly ash across all phases—amorphous, quartz, hematite, magnetite, periclase, diopside, and mullite—confirms that the Washingtonville fly ash has retained the qualitative amorphous content and the quantitative composition of plant-produced fly ash.




The reclaimed low-calcium fly ash retained its chemical and mineralogical characteristics, as well as the pozzolan performance attributes, of plant-produced fly ash, including its ability to react with $Ca(OH)_2$ to form additional hydrates, mitigate ASR, and contribute to strength gain in cementitious mixtures.