



# OSWER Innovations Pilot

## ***Reusing Fly Ash to Produce a New Wastewater Treatment Chemical***

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*The Office of Solid Waste and Emergency Response (OSWER) sponsors a series of innovative pilots to test new ideas and strategies for environmental and public health protection. A small amount of money is set aside to fund creative approaches to waste minimization, energy recovery, recycling, land revitalization, and homeland security that maybe replicated across various sectors, industries, communities, and regions. We hope these pilots will pave the way for programmatic and policy recommendations by demonstrating the environmental and economic benefits of creative, innovative approaches to the difficult environmental challenges we face.*

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### BACKGROUND

Fly ash is generated as a byproduct of coal combustion. Although some uses have been found for this byproduct, a large percentage of the ash still goes unused. Landfilling has been the major method for the disposal of fly ash. Fly ash is rich in iron and aluminum. When used as a partial replacement for portland cement in concrete or an ingredient in brick, block, paving, and structural fills, iron and aluminum oxides are less desirable. Therefore, extraction of iron and aluminum oxides in fly ash benefits its utilization in construction applications.

The conventional limestone-gypsum flue gas cleaning method involves wet or dry scrubbing with lime or powdered limestone. The sulfation of these generates waste calcium sulfate often as part of the fly ash, eliminating the reuse potential of this byproduct. In addition, it releases additional carbon dioxide into the atmosphere, increasing the greenhouse gas burden.

### PROJECT APPROACH/DESIGN

The overall objective of this project is to develop a new flue gas wet scrubbing process using power plant fly ash slurry and an oxidant. This treatment process will produce a new wastewater treatment

chemical, i.e. a complex polymer comprised of polymeric ferric sulfate (PFS) and polymeric aluminum sulfate (PAS). The proposed research project will not only produce a useful chemical from solid and gas wastes but also saves land resources. It furthermore eliminates the release of pollutants associated with conventional limestone-based sulfur sorbents, including calcium sulfate sludge (a solid waste) and the greenhouse gas CO<sub>2</sub>.

### INNOVATION

The proposed project demonstrates innovation by integrating solid waste minimization and waste gas utilization. Fly ash and flue gas have not been used previously to produce a wastewater treatment chemical. The proposed project simultaneously cleans solid and gas wastes. More importantly, a high-value and widely marketed chemical is produced from these waste materials.

### BENEFITS

This proposed “green” technology offers a new approach for simultaneously scrubbing flue gases, using fly ash and recovering and producing a useful byproduct, which consequently reduces the cost of electricity

generation in coal-fired power plants and save land otherwise needed for filling waste calcium sulfate generated with conventional sulfur removal approaches. The product from the proposed fly-ash-based flue gas cleaning system is a highly effective and easily marketed wastewater treatment coagulant. Therefore, the success of the proposed fly ash utilization approach not only benefits land conservation but also air pollution control and natural resources protection.

## CONTACTS

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For additional information, visit the EPA OSWER  
Innovations web site at: [www.epa.gov/oswer/iwg](http://www.epa.gov/oswer/iwg).