

### Recycled Fly Ash Eliminates Disposal Problems

Daily, immense quantities of carbon fly ash are created as a byproduct of combustion in oil-fired electric generating plants. This fly ash, although innocuous in appearance, has a high sulphur content; therefore, it presents a peril to the environment. As a very necessary safeguard, it is electrostatically precipitated from the generating flue to preclude emission to the atmosphere. This occurs at the rate of hundreds of tons per day at each facility.

This is not the final solution to the problem, but rather only the first step in the ultimate disposal of the fly ash. Fly ash disposal contains several challenging aspects which must be dealt with to ensure environmentally acceptable disposal.

Landfill, often a viable consideration for disposing of collector fines, is of dubious merit in this application. The light fluffy ash, around 200 mesh, does not readily compact, thus it is not transportable via conventional means. Of grave significance is the fact that the fly ash is hygroscopic, that is, it attracts moisture from the air. At ambient temperatures, and in the presence of water, it undergoes an exothermic reaction which converts its sulphur residue content into sulphuric acid. The result could well be a "hot" landfill with sulphuric acid emissions.

A Littleford continuous mixer can not only eliminate the need for landfill disposal, but also provide significant energy savings by enabling the recycling of the BTU-rich fly ash. The Littleford intermediate intensity continuous mixer, with its dual mix action and short retention time (often as short as 3

minutes), can agglomerate, densify and re-energize the fly ash for recycling. This is accomplished through the application of #6 fuel oil as a wetting and binding agent. The processed fly ash is not only transportable, but also readily combustible in a coal-fired generating plant.

The processing procedure lends itself well to continuous operation in a Littleford mixer. Precipitated fly ash, with a bulk density of 15#/ft.<sup>3</sup> can be agglomerated into particles 1 to 5 mm, with a final bulk density of 40#/ft.<sup>3</sup> The #6 fuel oil, with a viscosity at ambient temperature similar to refrigerated molasses, is preheated to 150°F where its viscosity becomes similar to syrup. At this point the viscosity permits the spraying of the fuel oil into the mixing fly ash through liquid injection nozzles. The fuel oil, when sprayed into the fly ash (also preheated to increase absorption), causes agglomeration of the ash into transportable particles. The oil not only re-energizes the fly ash, but also prevents the formation of corrosive sulphuric acid. As a safeguard, nitrogen purge seals on all rotating shaft areas produce an inert gas atmosphere within the mixing vessel to reduce the possibility of fire.

The Littleford mixer design has been thoroughly tested in the laboratory and proven in the application of agglomerating a wide variety of dust collector fines to facilitate handling for disposal or recycling. The mixer can be purchased in a variety of sizes to meet most all process requirements and lends itself well to automation.

#### Processing Procedure for Recycling Fly Ash

