

Synergetic Effect of Coal Flyash as a Scrubber to Acidic Wastes of the Phosphate Fertilizers Industry

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Abstract:

Fly ash is produced in Israeli power stations via bituminous coal combustion. At present 1.5 million tons of fly ash are produced annually in 4 power stations and only ~50% of it is used as a cement additive. The rest is utilized in the construction industry. Ash is defined in Israel as a non hazardous material but the regulations impose that any potential utilization needs special permit from the EPA. Thus the ash to be used has to be in accordance with the CALWET or the improved EPA-TCLP1311 leaching methods. As the fly ash produced in Israel is very basic due to environmental regulations imposed on the coal (low sulfur content and up to 12% mineral content in the imported coals) it is a good potential chemical scrubber to acidic wastes.

The fertilizer industry in Israel produces mainly phosphate based products. The production methods rely heavily on dissolution of phosphate rock in strong acids. Thus large quantities of acidic wastes are produced. These wastes have to be treated before final storage.

We have checked the possibility to use the fly ash to neutralize the acidity and fix the heavy toxic elements contained within the wastes. The results show that the fly ash is an excellent scrubber and also that it's large surface area serves as a very efficient absorber to the toxic heavy metals from the waste. There is a synergetic effect which result in a final product which is an aggregate substitute and as it stands the CAL WET leach test it can be used as a substitute to aggregates in the concrete industry.

Initial economic calculations show that the actual economic value of the ash is in the range of 3 to 5 times better than it's present utilization as a cement additive or in the construction industry.

Thus using two wastes (fly ash and the acidic waste) can result in a green product with real economic value).

Keywords: fly ash, acidic wastes, phosphate industry, chemical scrubber, trace elements, scrubber