

ABSTRACT

Independent Power Plants (IPPs) are the major suppliers of almost all the electricity generated and consumed all over the Pakistan. They all employ only Heavy Furnace Oil (HFO) as fuel. The spills of heavy furnace oil during its transport-on-to the oil-containers, boilers etc., are a source of its spillage which when mixed with effluents, as a result of run on and run off, increase emulsification of wastewater. Oil-in-water emulsions can be subjected to chemical demulsification using induced air flotation technique (IAF).

The present research work was aimed at an effort to demulsify such oily effluents from Thermal Power Generation Plants. The analyses of the oily wastewater samples, both from Japan Power Generation Limited (JPGL) and Kohinoor Energy Limited (KEL) have revealed the contents of emulsified 'oil and grease' to be as high as 2200 ppm and 1500 ppm, respectively. Above 100 samples in all, from the two industrial facilities, were subjected to demulsification treatment using coagulants and flocculants, alone as well as in combination. 'Jar Test Procedure' was the method used to serve the purpose, for its reliability and due convenience to operate for lab. level testing.

Ferrous sulphate, Ferric Chloride, Ferric alum and Aluminium sulphate were selected as primary coagulants. Betzdearborn KlarAid PC 2704, 2705, 2710, 2712, and KlarAid PC 4000 were used as the flocculants.

The results indicate that in case of Oily wastewater samples from Japan Power Generation Limited, the best treatment method devised is a combination of Ferric alum and KlarAid PC 4000. It has reduced the emulsified oil and grease from an initial concentration of 2200 ppm before treatment, to 350 ppm after treatment. In case of Kohinoor Energy Limited, a combination of aluminium sulphate and KlarAid PC 2704 reduces emulsified oil and grease from a concentration of 1500 ppm to as low as 280 ppm. The treatment methodology has successfully and economically reduced the time span required for treatment from 72 hrs of steam treatment at 70°C to 30 minutes of chemical treatment at room temperature, only. It has substantially increased the life period of filter sieves that eliminate the residual oil and grease to achieve the permissible limit of 10 ppm as laid down by the National Environment Quality Standards (NEQS).