

### CONSORTIUM TACKLE WATER MIX METAL WORKING FLUID DISPOSAL

*The dual approach of novel formulatory techniques and advanced waste separation processes is currently under development in a 2 year project to address the environmental, ecological and technical issues of the disposal of water mix metal working fluids (MWFs). Tony Lesowiec of the project co-ordinator, Pera, reports.*

Manufacturers of MWFs are often rightly focussed on formulating products to meet the ever-increasing demands of machining processes imposed by the end user engineering sector. The cost of additives and base oils also play a part in the final fluid make up. But how many formulators consider the disposal of the fluid as a primary consideration?

With tightening environmental legislation and rising disposal costs, the waste treatment of spent fluids is becoming increasingly important. One only has to take a look at the current situation in Germany where end users are under pressure to clean up their act by recycling their wastes on site or face expensive disposal costs. The principle of polluter pays is the name of the game. The following strategy advocated by European legislative bodies is becoming increasingly evident.

- First priority - Prevention/reduction of waste at source.
- Second priority - Promotion of recycling recovered materials at end user sites.
- Next - Promotion of recycling waste materials as a secondary fuel energy source. Last resort - disposal to environment.

In order to provide some scale of the waste disposal problem in Western Europe, the UK, which is in the top five users of water mix MWFs in the region, produces around 20,000 tonnes of product per annum. If the most commonly used fluid preparation level is applied to this figure i.e. five parts MWF to 95 parts water, on a simplified level this equates to 400,000 tonnes of waste fluid per annum.

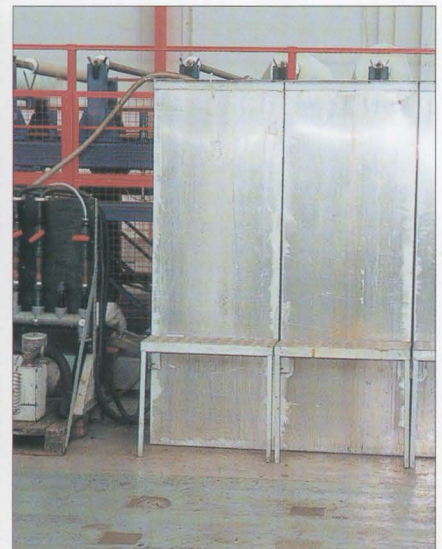
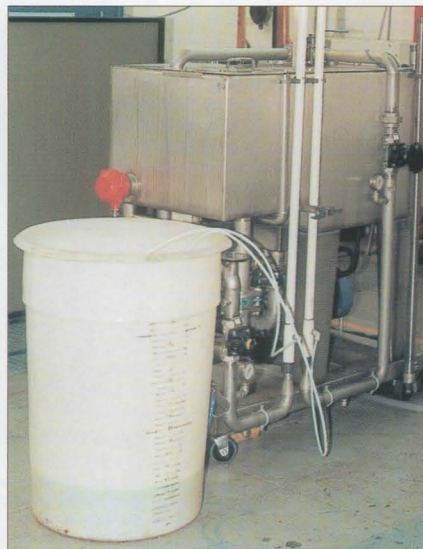
#### DISPOSAL

Traditional waste treatment methodologies such as ultrafiltration and chemical separation are limited in their capabilities as stand

alone technologies, and almost completely ineffective for the fully synthetic fluids where there is no emulsified oil to separate. Evaporation technology however, which is commonly used by our European partners is largely capable of treating these fluids. Biotechnology is a promising alternative treatment option for spent fluids, unlike the others it is based on destruction of the pollutants rather than separation and concentration. Its biggest drawback is its slow treatment rate. The key to optimising this technology is to identify an effective method to neutralise the toxicity in the fluids.

The recovered water from these primary treatment processes is usually suitable for sewer disposal and this is policed by the Environment Agency. One of the main cost influencing factors for sewer discharge (based on the Mogden formula) is the chemical oxygen demand (COD). It is therefore important to target COD reduction in any treatment systems. This means providing effective technology for dealing with the dissolved organic components such as corrosion inhibitors, coupling agents, biocides and dyes. Other parameters that need targeting are the oils and grease levels in the water phase and of course the total volume of waste. One of the primary aims of the Pera project is to polish further this recovered water to a suitable quality to enable reuse on site e.g. for preparing new fluid mixtures, for washings or cooling etc. thereby preventing/reducing sewer discharge. This has the double benefit of reduced disposal costs and saving purchasing fresh mains water. If ultimately the water is sewer discharged it would cost less to do so because of the reduction to COD.

One must not lose sight of the disposal of by-products from any treatment system. Both an oil phase and solid phase are also likely to be produced. The solid phase may consist of dirt, grit, sludge, particulates or flocculants and these are usually disposed of to landfill. This is becoming increasingly unattractive due to rising costs and tightening legislation. In some cases the recovered solid phase is incinerated although this is more expensive than landfill. The recovered oil phase can contain a high percentage of water and other contaminants. This phase is normally collected by waste treatment companies for low level processing involving dehydration and filtration to produce a burner fuel product or is used without processing as a support fuel in kilns in the cement manufacturing industry.



Two primary treatment options, ultrafiltrators and bioremediation.

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