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USED OIL MINIMIZATION BY IN PLANT METHODS

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BENEFITS:

20 years ago used oil minimization was unheard of. Why? The economic payback was just not there. When oil was $0.34 per gallon and someone paid you to take it away, why bother to make an effort to minimize used oil? Consider the economics:

In 1968	$0.34	price of new oil
	- $0.10	price received for used oil
	$0.24	cost of using oil

Even if you consider 1988 dollars at 400% of 1968 dollars, you have a cost for using oil of $0.96 per gallon.

In 1988	$1.75	price of new oil
	+ $0.50	price paid for disposed of used oil
	$2.25	cost of using oil

Not only has the cost more than doubled but the generator is potentially responsible for the waste forever, a truly priceless burden to carry forward.

Clearly, there is a large economic benefit from minimizing used oil. There are ecological and social benefits as well. It has been said that in the future people will look back on us in the 20th century and wonder why we wasted all those wonderful chemical feed stocks by burning them as fuel and throwing them away in land fills.

Given the fact that we all benefit from used oil minimization, let's look at some ways to accomplish it:

Re-Use
Downgrade and Re-Use
Extend the Life
Product Selection
Outside Management

RE-USE:

Many times some simple methods will enable you to re-use your fluid. Take the example of a screw machine shop where a significant amount of oil is used. The simple draining and collection of oil from chips can be a source of oil for re-use. The oil after collection can be readied either by settling or the use of an in-

expensive filter. More sophistication can be added to this process by the use of chip wringers and clarifiers, thus almost eliminating the disposal of cutting oil.

DOWN-GRADING:

In some cases a product can be deemed unfit for further service as it was originally intended and still have great value by using it in other applications. Take for instance a hydraulic fluid that leaks from a machine. In order to re-use this fluid as it was originally intended many steps would be necessary to insure the integrity of a product as sophisticated as high pressure hydraulics. We can re-use this fluid by simply understanding its physical and chemical properties, removal of gross contamination by rough filtration and the introduction of additives for re-use as a cutting oil. A good example of a similar down grading was an aerospace contractor using Mil H-5606 in test benches. The Mil Spec fluid must be discarded when the viscosity drops below a certain point. The fluid is perfectly good except for the viscosity. It would be impossible to bring this fluid back to its original state, however, by using an additive system designed for this purpose the fluid could be re-used as a straight cutting oil in the plant.

EXTENDING FLUID LIFE:

Under this heading there are several ways to minimize used oil. First, and not in any order, would be to simply have the fluid analyzed prior to changing. This method works with sumps that are fairly large and the cost of the analysis does not exceed the cost of the fluid. Some suppliers even provide this as a service to their customers.

The use of filters to extend fluid life works extremely well. There are many types of filters ranging from diatomaceous earth to deep bed. The fluid need not see the filter before being passed through the equipment. On injection molders, for example, an external bypass filter works well in keeping the fluid clean and extending fluid life.

In some cases the use of very fine filtration such as diatomaceous earth can remove additive packages. When this type of filtration is used a regular analysis of the fluid should be performed to insure proper additive levels are maintained. Again, many fluid suppliers will perform this service.

So far we have been talking primarily about straight oils used as lubricants or cutting fluids. It becomes appropriate when discussing extending life that we include water extendable oils.

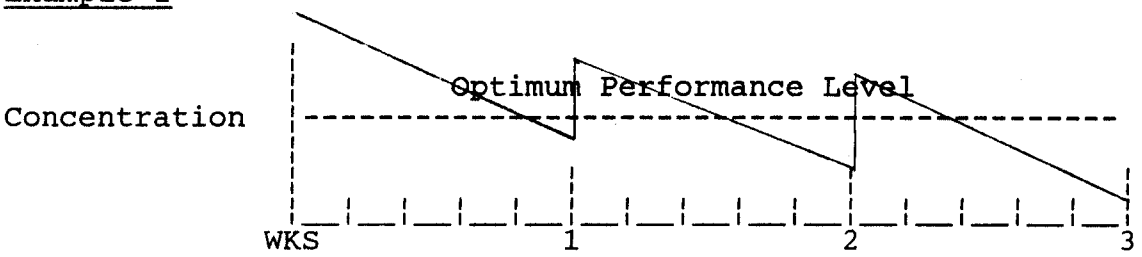
These products are affected by the same things that contaminate straight oils. In addition, many things that do not affect

straight oils do a great deal of damage to water extendable systems. Not only do we have dirt contamination affecting tool life and finishes, we have biological damage. This damage manifests itself in the Monday morning or rotten egg odor found after a system sets for a period of time.

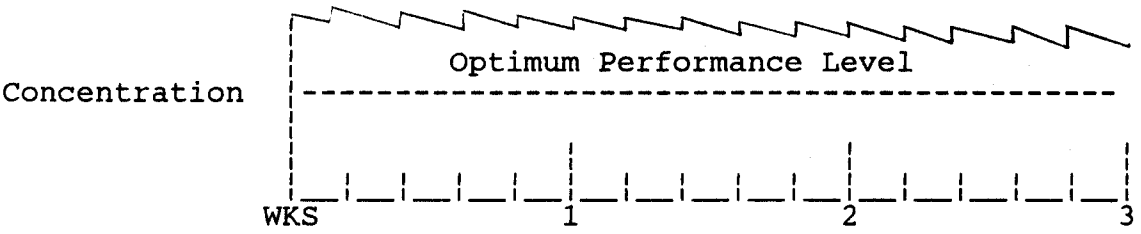
Contamination from tramp oil, such as way lubricants, and hydraulic oil from a blanket over the reservoir cutting off the oxygen supply and allowing anerobic bacteria to grow. It is this bacteria that cause the rotten egg odor. Reduction of tramp oil entering the system or skimming the oil off the surface will aid in preventing the anerobic bacteria growth. Machine operators and other employees play a large role in extending the life of these systems by keeping out things like cigarette butts, lunches and other forms of trash. It is these types of organic substances that give food for the bacteria to grow.

Concentration plays a large role in extending fluid life, also. When a system is designed to run at a concentration of 20:1 and it is allowed to lean out to 40:1 the preservative package can not keep the bacteria from growing. The frequency of addition makes a major difference also.

Example 1



Example 2



In Example 1 when we define the optimum performance level as the point at which we can begin to have system problems. You can see that with weekly additions the concentration falls below the optimum performance level and problems can occur. In addition, when the concentration is raised the system never gets back to the original level and you are heading for trouble.

In Example 2 when additions are more frequent you can see that the system stays above the optimum performance level and can be maintained there for an extended period of time.

It has been found in the management of central systems that additions of concentrate constantly by metering pumps can extend the fluid life indefinitely.

PRODUCT SELECTION:

This category can be used to extend fluid life as well as make the fluid more suitable for other methods of minimization. Extending life through product selection can take the form of more stable base oils for reduced oxidation and degradation from heat. In hydraulic applications the use of detergent dispersant packages enables filtration to be more effective by holding contamination in suspension rather than letting it deposit in the system.

Selection of products for more than one use can reduce disposal. In a screw machine application, for example, where lube oil is constantly leaking into the cutting oil, thus diluting it and reducing tool life and affecting finishes, the use of a dual purpose lube and cutting oil can reduce or eliminate the need to change the cutting oil.

In the case of water soluble products, product selection can greatly reduce disposal by moving away from conventional soluble products and toward synthetic or semi-synthetics. The exception to this is some new technology in bio stable solubles that allow utilization of the benefits of soluble oils while minimizing the drawbacks.

OUTSIDE MANAGEMENT:

The ultimate tool in minimization would be contracting with a fluid supplier to manage your fluids, thus enabling you to spend your time doing whatever it is you do best. This extension of services is logical when you consider the amount of effort put into doing whatever generates revenue for you versus the cost of non-productive tasks like managing fluids. Why not charge the fluid supplier with doing what he does best and form a partnership. This type of partnership is a true win/win situation. You win by concentrating your efforts on what you do best and leaving the management of fluids to those who do it for a living.

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