

# ESCO NEWS

## OCCASIONAL NEWS AND INFORMATION FROM ESCO ENGINEERING

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### BALANCING ACT

Few calculations in chemical process engineering are exact. The physical properties we need are usually not accurately known, and the process operating conditions are sometimes uncertain and always variable. So it is a relief to have at least one thing to calculate that is accurate and useful - the mass balance. What goes in, must come out.

Yet it is surprising how many systems are designed without a mass balance being done, and how many problems arise as a result. The biggest problem is the assumption that, because a material is only present in low concentration, it can be ignored. This brings us to Neil Stone's law of contaminant accumulation:

(a lot) x (a little) = (quite a bit)

100 t/day of feed material containing only 0.1% of dirt causes the addition of **1 ton of dirt** in only 10 days operation. This dirt has to go somewhere - it doesn't just disappear. It is either removed with the product (not very desirable), purged through a cleaning system, or accumulates in the process, until the process liquid is too dirty to use, or until it plugs up pumps and valves.

Another source of contaminants in closed systems is 'clean' water. All natural water contains dissolved salts, so continuous make-up to replace evaporative losses can lead to accumulation of non-volatile salts in process tanks. This is a particular problem in processes where the process liquid is recovered and recycled - like cooling towers - and in tanks (for example, coating tanks) containing expensive materials, in which purging or dumping is costly.

So, do your mass balance, and make sure that everything that goes in comes out where you want it to!

### FUME EXHAUST TIPS #8

*What are the benefits?*

Having implemented all the recommendations in tips 1 through 7, what can you expect to gain?

Firstly, better working conditions in the plant for operating and maintenance personnel.

Secondly, a cleaner and more reliable plant. Acid fumes from pickle lines work insidiously at corroding buildings, cranes, electrical pick-ups

and controls in the pickle building, and, if allowed to spread through the rest of the plant, cause rusting and damage to machinery, equipment and pickled product.

Few companies break down maintenance costs in sufficient detail to separate the costs of corrosion, but those costs are real. Just note the cost next time the pickle house roof needs replacing, and consider whether that money could have been better spent in proper design and maintenance of the fume control system.

Thirdly, under the new NESHAP for HCl, you will save yourself a lot of record keeping, and monitoring costs. The new rules require proper operation, maintenance and inspection of HCl fume control systems, with records being kept and reporting of non-compliance. Consistent non-compliance can lead to more frequent reporting, and even require installation of expensive emission monitoring systems.

These are the benefits - the only question is: do you want them?

*This series of tips is now finished.*

### FREEBIES!

**Coming soon:**

Neil Stone, our chief engineer, is presenting a paper on the effect the new NESHAP for HCl will have on rod and wire picklers. This will be at the **Wire Association Convention** in Cleveland, Ohio, May 1998.

If you cannot be there, copies of the paper will be available after the Convention.

Neil already presented a paper on hydrochloric acid fume scrubbers, with special reference to the effect the new NESHAP will have on scrubber sizing, at the 1997 **AISE Annual Convention** in Cleveland, Ohio, on Sept 30. Copies of this paper are available on request.

If you want a copy of the complete NESHAP document, it can be downloaded from the website:

[www.epa.gov/fedrgstr/EPA-AIR/1997/September/Day-18/a23631.htm](http://www.epa.gov/fedrgstr/EPA-AIR/1997/September/Day-18/a23631.htm).

If you just want the 'meat' (i.e. the proposed standards), we can provide a copy on request.

It is expected that the rule will be made final by summer, 1998

### **THE VIEW FROM THE FIELD**

*(Our senior field technician, Fred Hasler, with frank observations, based on his experiences in the field.)*

#### **CHEMICAL SYSTEMS**

What, us, chemical systems? - - - whether you are processing steel, brass, copper, titanium, stainless steel, or any alloys in either strip, bar or rod form, chances are you have a chemical system of some sort.

Any time your product touches any liquid, you have a chemical system to operate. And who operates it?

In the past few months, I experienced in several industries, a malady I call 'chemical operitis neglectus'. In other words, the chemical systems are being neglected because of either no operator assigned to them or untrained personnel trying to operate them.

If you consider the hidden costs of operating a chemical system in terms of excessive chemical costs, down time caused by upsets and neglected equipment, you will find that these costs will more than justify the expense of having trained personnel take charge of the system.

The most expensive automated control systems are only as good as the operator that uses them!

### **TANK EMISSIONS - EVEN MORE USEFUL**

Our spreadsheet for calculating vapor losses from pickling tanks into the exhaust air remains much in demand and is even more useful now, we have added a page for estimating **sulfuric acid** emissions - this calculation is less rigorous than the HCl method, but will give a reasonable estimate.

If you need to do such calculations, to meet the new reporting requirements, call or fax us for a copy - it's free.

This spreadsheet was used by the EPA in developing the new NESHAP rules for HCl pickling.

The spreadsheet will calculate HCl, nitric/HF and water losses for both open and closed tanks. Sulfuric acid acid emissions are calculated for open tanks with lateral exhaust only, using a mechanical model. Be sure to read the **assumptions** before using this sheet!

The spreadsheet is available for download from our website. Go to Downloads from the main page.

### **AT LAST!**

We have been planning a 'Whys and Hows' for hydrochloric acid picklers for several years, but just never seemed to have time to complete it. Now it's done, and is available, on request

This is a practical guide to HCl pickling, written by Fred Hasler in the same informal style as his 'Whys and Hows' for sulfuric picklers. Also included are numerous graphs of physical properties relating to pickling. Request your copy by phone, fax or e-mail - it's free!

Coming next year - a 'Whys and Hows' of fume scrubbing.

### **INTERNET ADDRESSES**

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### **GOOD FOR A LAUGH**

***"Have the new chips arrived?"***

food and chemical process plant design • piping • metal pickling • fume and pollution control

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