It's *Your* Nickel – So, Save It!
Compliance and Waste Minimization for Today and Beyond

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In today's economy, the bottom line for plating operations can be affected greatly by process layout, bath life extension, waste minimization practices, and pollution prevention strategies. Some simple process changes and time spent on training can make a great difference in how a facility weathers the current "storm" of high priced process supplies and low paying customers. Reducing unnecessary scrap, rework, and waste and raising awareness of process control strategies can help a company counter inflating nickel prices and material costs. As regulations tighten on nickel air emissions and loosen on waste disposal, some thoughtful planning can help insure your company's survival. Integrating these concepts into your nickel-plating operation now can make the greatest of differences tomorrow! This paper explores ways to set up for compliance, conserve your chemicals, lower your scrap rate, and keep your nickels in *your* pocket.

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Can life as we know it continue on $8.00 a pound Nickel?
The price of Nickel is in orbit somewhere out past Pluto, and may not be returning to Earth any time soon – so – what can we do to stay in business? If ever there was a time to eliminate scrap, rework and waste, that time is right now!

We can't *all* move overseas to cut labor costs, nor do we want to! However, we *do* have to compete with offshore competition and outsourcing.

As I visit shop after shop, I see metal finishers rising to the challenge. By stopping the waste of materials and cleaning up our processes, we can reduce our consumption of nickel and other costly materials and increase our bottom line.

First things first! Or- The Prep Line. The two most common causes of Nickel Plating rejects are poor surface preparation (cleaning, pickling and de-smutting,) and loss of contact during plating.

Cleaners: At the beginning of the line, we must determine whether or not the soak cleaner is appropriate. Perhaps a pre-soak tank or a parts washer should be added for more efficient oil removal. Specialty cleaners formulated to address complex process requirements to get you the best throughput are available. By showing your chemical vendor sample parts, and communicating with your customers about the substrates they are sending your facility to process, you will be able to select cleaners that will make a big difference in your processes.

Filtration: Filter upstream tanks to be sure that every step possible to lower rejects has been taken. Used in conjunction with an oil separator, filtration can extend cleaner bath life dramatically. Filtration of your cleaner tanks can extend the life of the cleaner by 50-65%, saving money and lowering rejects as well.

Filtration of *any* finishing solution improves operation, but in Nickel Plating it is *essential*, as suspended particulate matter is the primary cause of rough deposits.

Quality Control: Analytical process control is another important necessity. Poor bath performance is often traced to chemical imbalance. Regular analysis of the process tanks creates stability and predictability a facility. Working with the manufacturer's lab staff to ensure that tanks operate within the manufacturer's parameters goes a long way toward keeping the reject rate low.

Oil Removal: Oil contamination of the acid dip tanks should be prevented. Metal removal treatment products are also available that can extend the life of a pickle tank through precipitation of metals from the acid.

Rinsing: Is the work being rinsed properly? Spray rinsing dramatically lowers water usage- a Pollution Prevention Plan strategy that always pays off! Direct drag-out recovery returns chemical drag-out to upstream tanks, lowering chemical costs. Train employees not to "share" rinse tanks or drag-out recovery becomes a highway for contamination to travel.

Physical Layout: Are the tanks arranged properly, so that chemicals are not carried from tank to tank? Is the work moving back and forth above the tank line, dripping chemicals from the racks and work and causing contamination? Segregating waste-streams is pointless if cross contamination is occurring in the process line. Remember-it only takes 5p.p.m. chrome to turn your nickel bearing filter cake into hazardous waste!

Save your chemicals as well as time by sequencing the tank line to avoid backtracking and wasted motion. Keep the work moving smoothly between tanks to avoid oxidation of the nickel surface, and keep it progressing straight along without wasted motion or opportunity for cross-contamination.

The Nickel Plating Tank-Top Producer or Money Pit?

The same practices that allow us to produce a good nickel coating on a work-piece save money and reduce waste production!

An efficiently operating tank uses materials more efficiently, causing less rework than a poorly maintained tank. Taking time to check the anode bags for porosity, proper placement, contact and loading of nickel rounds will help assure a good finish, and therefore less waste, rework, and lost time and materials.

Should anode bags become loaded with particulates, change them out! Take care to wash the sizing out of the new bags prior to installation. Make sure bags are properly installed with the open tops well above the surface of the nickel bath so they can do their job effectively and keep particulates from traveling to the surface of the work-piece.

Proper additions of wetting agents, carriers, levelers, and other important bath components are essential. This is NOT the place to cut corners. Efforts to save money by skimping on brighteners will cost more in rework than it could ever hope to save.

Educate employees about drag-out! Years ago, I was contracted to help an older facility. On the first tour through the shop I discovered that the plater was habitually dragging out so much nickel sulfate solution when pulling bumpers from the tank that the catwalk was covered by a hill of nickel salts 12”-18” thick and several feet long!

Work practices that waste chemicals or metals are a thing of the past! The facility with those problems had to pay for a remediation, along with staying in business. You don’t want to go *there*!

Solution can be dragged out and wasted by more subtle means. Position parts on racks so the solution does not pool in hollows, deep grooves, or other pockets and carry into rinses and other process tanks, creating contamination problems and wasting chemical through drag-out loss.

Examine your racking techniques, and correct troublesome parts positioning by using racks that can hold the work for optimum processing and minimal solution retention.

Maintain rack coatings to prevent buildup on areas that serve only to rob your tank and load the rack with unnecessary weight. Repair cracked or missing masking. Allowing nickel to load up on hooks and then cracking it loose with a hammer wastes your nickel! Wherever possible, coat the fixture with stop off to keep the nickel on the work-piece instead of the rack!

Fume scrubbers may be required in the future as a compliance necessity! Ducting your nickel tank into a mechanical exhaust system has become a Fire Code compliance issue as well. Planning of a new shop, or the upgrade of an existing facility should include compliance controls and equipment.

Be sure to check with your local regulators. I know of one facility in California that has to surface tension test it's Nickel Plate tank as though it were a MACT regulated chrome tank!

If you are operating an electroless nickel tank, it is imperative that bath operation parameters are met to avoid trouble. If you are having process problems- don't be afraid to search for better products. Some manufacturers provide recycling services as part of their overall customer care package.

Communicate with your vendors! Some companies are cutting back on tech support. If you are no longer getting what you need from your chemical supplier to get the parts out the door, you may need to look for a new supplier. Choose the vendor who gives you the best performing product with good technical support!

Contact! Avoid loss of adhesion between layers of nickel by keeping bus bars clean and free of buildup, and contacts and connectors clean. Protect rectifiers from corrosive fumes by location or other physical protections. When contact is lost the reject rate goes up, waste is generated from stripping and reworking the parts, and the bottom line suffers.

Are you throwing your cash into the landfill? As hazardous waste regulations concerning recycling and recovery change and restrictions are eased, there are opportunities to sell materials that used to be classified as hazardous waste as feedstock for other processes and industries.

By keeping your waste-streams segregated, nickel-bearing waste does not become contaminated with chrome, lead, cyanide or other undesirable materials that would cause it to be classified as hazardous waste. That nickel containing material can be recycled or refined and the metals reclaimed for reuse!

We can all agree that getting paid for nickel cake is better than paying for its disposal. It really pays to segregate your waste!

Our hazardous waste landfill disposal sites are filled with nickel! Laws meant to protect our resources from waste became causes of waste problems themselves. Fortunately, those regulations have been modified and clarified to allow for recycling and reclamation, so that we no longer send our resources to the landfill.

Talk to your hazardous waste disposal service about nickel disposal options. Changes you make to segregate your waste-streams count on Pollution Prevention Plans and other government approved waste minimization efforts, giving you double value for every dollar spent!

Nickel makes bulky sludge! By keeping waste streams separate, only hazardous waste is shipped as such, while the majority of waste generated is shipped for reclamation! It is against the law to load our hazardous waste landfills with non-hazardous materials.

In Summary: Stopping wasteful practices, researching and implementing new waste disposal practices, maintaining and upgrading equipment, training employees and involving them in Pollution Prevention, Waste Minimization, Analytical Process Control, and fine tuning all aspects of a nickel plating process, the bottom line can be greatly improved. Communicate with your suppliers, communicate with your workers, and don't be afraid to make changes. By practicing thrift and care, and managing nickel as a resource rather than a waste, it may not only be possible to survive in this expensive atmosphere; it might be possible to succeed! The bottom line is that it is up to you! It's *your* nickel. Save it!