IonnetX™

Electrowinning Metals Recovery System

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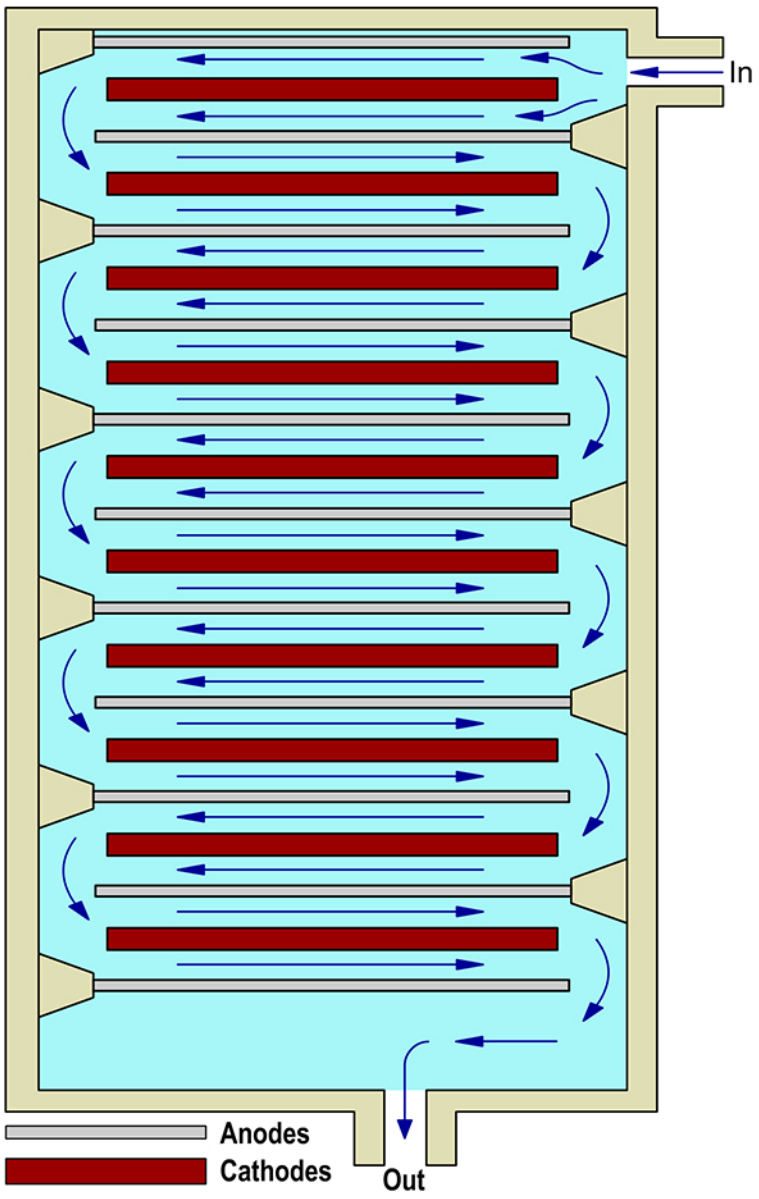
THE PROBLEM

- Removing the metal content from large volumes of solutions that contain either heavy or precious metals dissolved within them.
- Recovering these metals easily and economically for reuse or sale.

THE SOLUTION

The IonnetX™ system. It was designed after 15 years of observation of our earlier Ionnet™ system's performance. The lessons learned from that experience in the field were the driving forces to redesign what we felt could be done better. And the IonnetX™ is the result of all of those changes.

TOP VIEW



How does it work?

As the metal-bearing stream enters the IonnetX™ cell, it is channeled in a serpentine path through a series of electrolytic chambers, each containing two anodes sandwiching a cathode. The turbulence created at the cathode interface insures high plating efficiency, translating into fast plate-out to very low concentrations. The metal deposits on and within the cathode. Any non-adherent solids which tend to accumulate during the electrowinning process are swept to the cell bottom and contained for convenient draining (the electrodes are raised 3" above the cell floor to eliminate the possibility of the solids causing a short circuit). Each IonnetX™ cathode can hold up to thirty five lbs. of metal (depending upon several parameters), 350 lbs. for the whole cell. The system is designed for easy access to all electrodes.

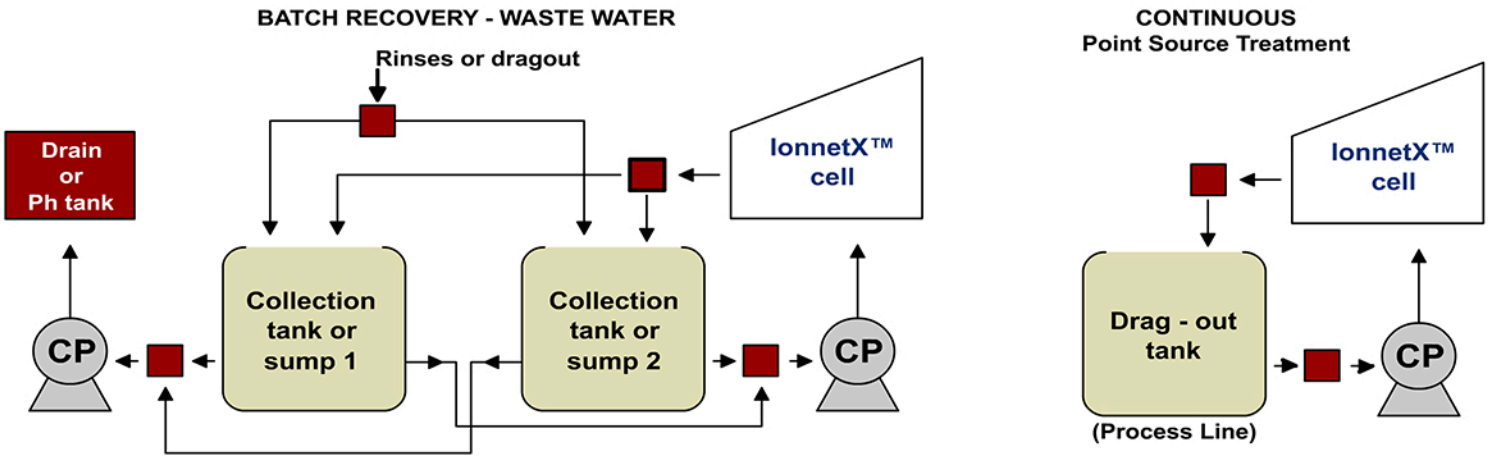
What distinguishes the IonnetX™ from other electrowinning systems?

Many things: The expanded-surface area cathodes, the unique solution flow design that creates turbulence, the improved contact system with quick disconnect user-friendly contacts, the direct current individual cell fusing system, the plastisol encased bus bars, to name a few.

What are some of the applications for the IonnetX™?

The IonnetX can be used to remove and recycle metals in the following ways:

- On a batch basis from a spent plating bath or other metal-bearing solution
- On a continuous basis from a primary drag-out rinse in order to obviate the need for precipitation or ion-exchange
- On a batch basis to recycle ion-exchange regenerant



What solutions can you successfully electrowin?

- Any copper-sulfuric acid dumps, including:
  - Copper plating bath or drag-out rinses
  - Micro-etch and sulfuric acid dumps
  - Acid cleaner dumps
  - Ion-exchange regenerations
- Silver, gold and palladium rinses and dumps
- Silver, gold and palladium cyanide stripper solutions
- Entek dumps
- Electro-less copper bailouts
- Nickel plating drag-out rinses and dumps
- Cyanide cadmium plating solutions, rinses
- Acid cadmium plating solutions, rinses
- Cyanide zinc plating solutions
- Cyanide copper plating solutions, rinses

Where are my cost savings using the IonnetX™ system?

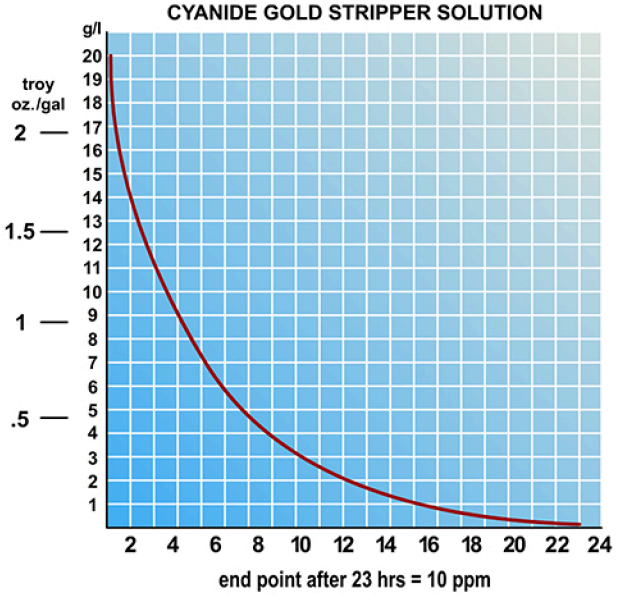
When you remove your metals directly from your drag-out tank by electrolysis, you say good bye to the purchase of caustic soda for precipitating your metals as metal-hydroxide sludge in batches. You say good-bye to the labor and energy required to take that sludge out of solution, dewater it, and pack it. You say good-bye to shipping these containers of waste out at all. You no longer have a landfill liability. What you get instead is saleable scrap metal. In many cases, the scrap more than pays for the operating costs of the IonnetX™ system.

How low can you go and how quickly?

The IonnetX system is designed to afford the best possible conditions to allow a plating rate as close to the theoretical limit as possible at various concentration levels. This theoretical limit is based on the “electrochemical equivalence” of a particular element. The point is that this system is in a class by itself in terms of speed and limits. At high amperage we are able to get full efficiency at concentrations above 1 gram/liter and at low concentrations, our efficiency while not full, is maintained so that we typically bring solution metal concentration to levels close to and often lower than 1 milligram/liter. In many cases, this is below current environmental limits of discharge.

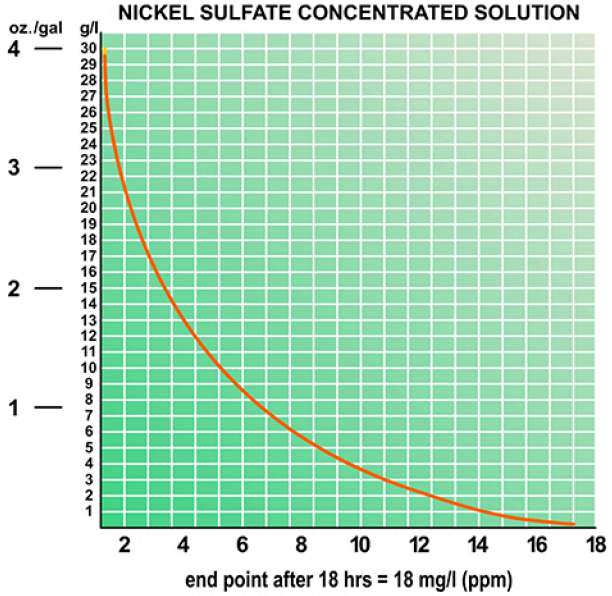
Elapsed Time Vs. Diminishing Concentration (Empirical Values)

792 Gallons - 3,000 liters @ 825 A.



An external economy is obtained with the electrolytic destruction of cyanide as the metals are removed. Over 95% of the total cyanide can be destroyed, making waste treatment much easier and cheaper.

132 Gallons - 500 liters @ 780 A.



Cathodes Easily Serviced

Quick Disconnect, User-Friendly Cathode Connection

Sealed DC Fuse Boxes for Each Individual Chamber with Plastisol Encapsulated Bus Bar

Modular construction means scalable recovery power: Four systems in parallel operation.

SPECIFICATIONS

Input Power Requirements:	As specified
Maximum Output Current:	1000 AMPS. DC
Maximum Output Voltage:	9 V.
Total Cathode Surface Area:	Approx. 200ft^2
Operating Tempature:	Room Temp to 135^o F
Footprint Dimensions:	23" x 48"
Recovery Capacity:	350 lbs.
Shipping Weight:	Approx - 400 lbs.

CONCLUSION

Wherever possible, the first line of attack should be electrowinning. Even if electrowinning cannot completely solve the problem, any reduction of sludge attained through electrowinning will mean a large cost savings. The IonnetX™ system is, by far, the least expensive alternative to attain this goal.