**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 lonnet® system. A serious recovery system without the bells and whistles. Just pure recovery power in an elegantly simple design, inexpensively priced.

**How does it work?**

As the metal bearing stream enters the lonnet® 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 lonnet® cathode can hold up to thirty pounds of metal (150 lbs. for the whole cell). The system is designed for easy access to all electrodes.
What are some of the applications for the Ionnet®?

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

1) On a batch basis from a spent plating bath or other metal-bearing solution
2) On a continuous basis from a primary drag-out rinse in order to ameliorate or completely preclude precipitation or ion-exchange
3) On a batch basis to recycle ion-exchange regenerant

What are some of the various solution types for typical applications?

Copper sulfate, copper cyanide, cadmium cyanide, gold cyanide (stripper solutions), various nickel solutions, palladium, palladium nickel, silver cyanide, electro-less copper
Where are my cost savings using the Ionnet® system as opposed to sludging?

Waste disposal costs are rising due to limited landfill sites, administrative costs, transportation costs, etc. Any metal that can be electrolyzed as opposed to sludged, immediately turns a liability into an asset. The metal-laden electrodes are saleable as scrap metal. Also important is the reduced possible future liability associated with shipping to a landfill.

How low can you go?

Dependent upon solution, treatment time, solution volume, and current; concentrations below .5 ppm are attainable.
Is the concentration of cyanide affected by use of the Ionnet®?

Yes, it has been reported that 99+% of the total cyanide in a 500 gallon solution was destroyed in 96 hours of operation at 400 amps. In fact, some of our customers have reported that the "external economy" of cyanide destruction is more important to them than the metals recovery aspect. Any cyanide destruction is helpful to the ultimate disposal of the solution.

What about safety?

There are two risk factors associated with electrolytic systems: The possibility of a fire resulting from short-circuiting of the electrodes and the possibility of explosion from the combustible gases that can sometimes accumulate. Every individual cell in the Ionnet® system is fused. In addition to this, the rectifiers that we can provide have a DC overload relay circuit that we consider important. With regard to explosion, our system is designed to eliminate any confined area where gases can accumulate. As a result, this risk is minimal.

**Operating Information**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Requirements</td>
<td>220 V, AC 3 Phase</td>
</tr>
<tr>
<td>Maximum Output Current</td>
<td>500 AMPS, DC</td>
</tr>
<tr>
<td>Maximum Output Voltage</td>
<td>9 V.</td>
</tr>
<tr>
<td>Total Cathode Surface Area</td>
<td>Approx. 100 ft²</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>Room Temp to 135° F</td>
</tr>
<tr>
<td>Dimensions</td>
<td>24&quot; x 22&quot; x 28&quot;</td>
</tr>
<tr>
<td>Recovery Capacity</td>
<td>&gt; 150 lbs.</td>
</tr>
<tr>
<td>Shipping Weight</td>
<td>Approx. - 170 lbs.</td>
</tr>
</tbody>
</table>

**Conclusion**

Wherever possible, the first line of attack should be electrolysis. Even if electrolysis can not completely solve the problem, any reduction of sludge attained through electrolysis will mean a large cost saving. The Ionnet® system is by far, the least expensive alternative to attain this goal. Even though the price of our system is less than half that of competitive systems, do not let the price fool you. Call us to arrange a trial unit for a nominal rental charge.

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Letters From A Few Of Our Customers

Central Metal Finishing, Inc.

Central Metal Finishing, Inc. is an AS9100 and Nadcap approved metal finishing facility. We operate in a very fast paced business environment and cannot afford to have down time that can impact delivery to our customers. We have been using your Ionex system on our cadmium barrel for approximately 8 months now to reduce levels of cadmium drag outs to sub ppm levels. Our cyanide levels is reduced nearly an 8x low.

As a result our labor costs and down time for changing tanks has significantly reduced. Waste treatment costs have also dropped substantially and we are using less water. We are also using your "Gold Bug" technology as part of our water reclaim process with equally satisfied results, and plan to purchase additional Gold Bugs. Both systems are low maintenance and highly reliable.

Sincerely,

Peter Cox
CHT Technical Director

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Precious Metals Processing Consultants, Inc.

Dear Randy,

At American Electro Products, Inc., we do a very significant volume of silver plating. As a result, we need to change our silver dragout frequently. Because they contain a relatively low concentration of silver for which we had no effective process to recover, we were unable to recover all of the silver. When we heard about your Ionex system, we were sure that it would be cost effective. But since you offered to let us try it with no obligations, we did.

We're glad we did! The Ionex unit works very quickly and efficiently. We batch treat 300 gallons of silver dragout at a time containing about 1000ppm. It takes about 2 hours to reduce the concentration to <10ppm. We are recovering far more silver than we expected and the unit paid for itself within several months. Because the expanded surface area cathodes you provide work well, our refiner is able to easily recover the silver.

As a bonus, it takes very little labor. We pump in the solution, turn the unit on, and we're done. When we come back, the silver is removed. The Ionex unit has definitely been a product well worth our investment.

Best regards,

[Signature]

American Electro Products, Inc. 1000 New Haven Avenue, Branford, CT 06405

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High Performance Conductors, Inc.

Dear Randy,

In the spring of 2006 we were looking for a better way to recover our silver from our spent plating baths. The current practice was to send the baths out for reclamation. There were associated costs associated with both the processing and the transportation of this practice.

After viewing several units we made the decision to try the Ionex system made by Precious Metals Processing Consultants, Inc. Once the Ionex was set up and running on a production environment it literally paid for itself within a few months. We started buying the idea of purchasing multiple units but then we came to the realization that this one unit was capable of handling all of our needs. Thanks Randy for inventing a product that far exceeded our expectations.

Sincerely,

[Signature]

James G. Chandler

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EPNER TECHNOLOGY INC

April 22, 2016

Dear Randy,

I know. I know! It took me 3 years to finally try your Ionex system on our electroless copper barrel. After using it for years in our silver lines, and of course, your Gold Bugs, everywhere.

Yeah... I should have done it 30 years ago, but every you did not know how until it would work back then. So let me tell you just how well it works.

In the past, we had been meeting this contract with our standard methods, with all the conventional labor, chemicals, and other costs. Now, we do not have to do that. Just put the barrel system in a tank, put in a switch, and within 24 hours the solution is 100% clear and the concentration of copper is down below 5 ppm. If we needed to add anything it would be 5 ppm in one batch. With just the ionex system, we could nearly double this pH, double the activity, and dispense directly to the barrel if we had a acid. That is how well this system works. It is so simple, efficient, and of course, no maintenance. This has changed everything! Kudos to you.

Best Regards,

[Signature]