Enhancing Water Quality and Environmental Sustainability in ICS Manufacturing with Zero Liquid Discharge (ZLD)

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Introduction
IMPORTANCE OF SUSTAINABILITY IN ELECTRONICS

- Rapid Growth and High Turnover
- Resource Intensive Manufacturing
- Environmental Impact
- Regulatory Compliance
- Corporate Social Responsibility
- Long-Term Viability

Source: unitar.org
Understanding “ZLD”

WHAT IS IT?

Water collection

Production

Treatment
- Concentration, Crystallization, Separation

Solid waste

Purification
- Filtration, RO, etc.

City and/or well Water

BENEFITS IN INDUSTRIAL APPLICATIONS

Water Conservation
As freshwater resources become increasingly scarce, ZLD helps industries conserve water by treating and reusing wastewater for various purposes.

Environmental Protection
By eliminating or significantly reducing liquid waste discharge, ZLD helps protecting environment from pollution and contamination.

Compliance with Regulations
In regions with stringent environmental regulations, ZLD can help industries comply with wastewater discharge limits.
Technology Solution by GreenSource – True “ZLD” with Close Loop System
**GSE Concept**

SOLUTION OPTIMIZED FOR PCB & ICS MANUFACTURING

- **Waste water complexity**
  - Metals & Metal Salts
  - Precious Metals
  - VOCs
  - Chelating Agents
  - Solder Resists
  - Plating Resists (e.g. Dry-film)

**Traditional wastewater system**

- Bulky process with liquid discharge to environment: “water saving”
- Waste + quality compromised!

**ZLD – Closed Loop System**

- Advanced treatment of all chemicals: rinsing criteria can be maintained
- ZLD Quality is guaranteed!

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**Existing Installations**

DEVELOPMENT PROGRESS

- **Gen 1**
  - Close loop concept created. Expertise gathered supports continuous improvement
  - Extra feature: retrofit to existing traditional WWT

- **Gen 2**
  - 2 installations with sequential improvements

- **Gen 3**
  - Upcoming GSF ICS Fab
Summary

Taylor Made Close Loop System
- ZLD system solution tailored for PCB and IC substrate manufacturing
- Capable of adjusting to varying production volumes, ensuring flexibility and scalability. Retrofit to existing systems is also possible.

Proven System
- Concrete data from existing installations demonstrate system effectiveness and reliability.
- Case studies highlight substantial improvements in sustainability metrics.

Economical & Environmental Benefits
- Reduces operational costs by minimizing waste disposal and water usage.
- Enhances compliance with environmental regulations.
- Eliminates wastewater, significantly reducing environmental impact and conserving valuable resources.

Future & Outlook
- Execution of the GSF2 wastewater treatment project.
- Complete the copper recovery alternative approach.

Thank you for your attention!

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