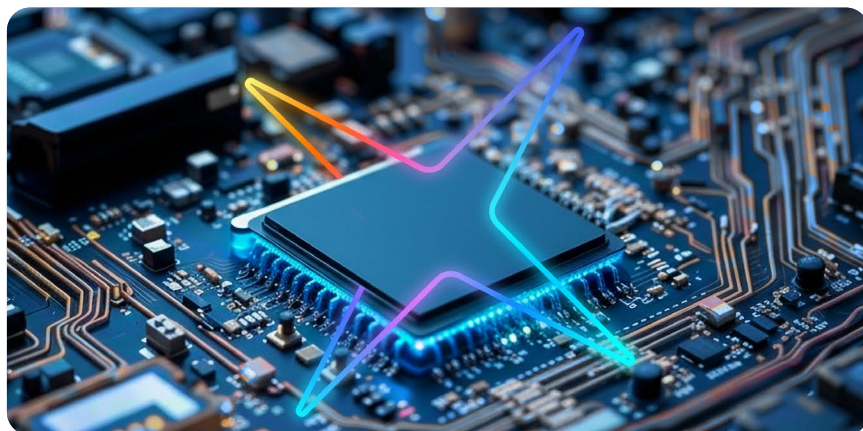




Global Analytical and Microbiological Services

CUSTOMER OPERATING CHALLENGES

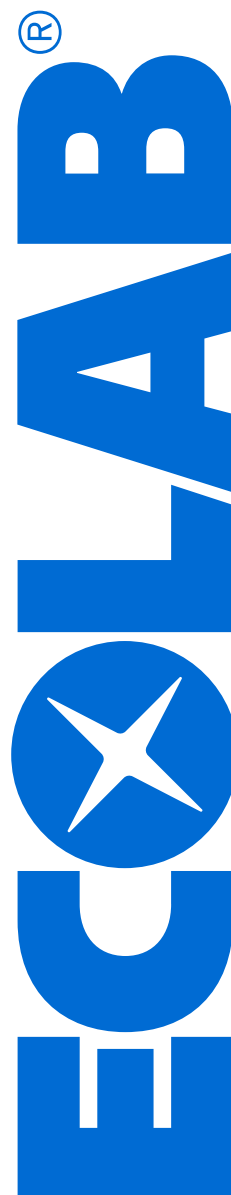
The microelectronics industry must focus on equipment reliability, continuous, uninterrupted production, and high product quality. Downtime can easily exceed \$1 million US per hour in lost production. Equipment remediation is costly. The cost to clean critical heat exchangers can reach \$500K US. With a goal of continuous business growth, factors such as water scarcity, stringent regulations, and increasing labor and material costs impose significant pressure on the operating performance at the plant level. Fab operators need comprehensive solutions to achieve assurance of product quality, operating efficiency and sustainability.

To effectively address those challenges, analytical testing is often needed to identify the root cause of plant problems and implement the correct solutions. Identifying the programs that provide optimal solutions requires specialized analytical and microbiological capabilities and application expertise.

ANALYTICAL SERVICES

Our Global Analytical and Microbiological Services experts, with laboratory capabilities in water, metallurgical, deposit and microbial analyses, interpret data trends to prevent serious problems. These capabilities, along with decades of experience in the microelectronics industry, allow recommendation of the right programs to address issues in the most timely and cost-effective method available. To effectively assist the microelectronics industry with risk management, troubleshooting, system evaluation, and measurement of program effectiveness, we provide the following critical analytical services:

TYPE OF ANALYSIS	APPLICATIONS	CUSTOMER BENEFITS
Water Analysis	Process cooling water (PCW), ultrapure water (UPW), wastewater, cooling/boiler water, raw water, filtration	Control of corrosion, scaling, fouling to increase system reliability and efficiency. Early detection of system contaminants to allow quick mitigation.
Microbial Analysis	Process water, cooling water, waste water treatment	Prevent equipment biofouling, reduce water filtration cost, and ensure effluent regulatory compliance
Deposit Analysis	Direct contact cooling water, boiler water	Extend equipment life, reduce downtime and operating costs, and improve product quality
Failure Analysis	Cooling/boiler water, PCW, fire protection, Heating Ventilation and Air Conditioning (HVAC), process vacuum (PVAC) systems	Identification of causes for equipment failure or damage, extend equipment life, reduce downtime and operating costs, and improve product quality
RO Membrane	High purity water systems (UPW, PCW)	Ensure proper operation of RO units, identify process leaks
Corrosion Coupons	Cooling Water Systems, HVAC	Ensure proper corrosion control, equipment life



Case Study



SITUATION

The pH in a process cooling water loop decreased due to what was suspected to be microbiological issues and biofilms. A sustained exposure to low pH conditions, or a further decrease in pH could significantly corrode aluminum and copper in tools and likely result in a shutdown.



ANALYTICAL SERVICES

A water sample was taken to determine if other sources were responsible for the decreased pH. It was noted during routine corrosion coupon analyses that there was a tremendous spike in corrosion rates on aluminum coupons during the upset to 12 mils per year when the normal rate is <0.2 mils per year. The water analysis revealed the presence of significant concentrations of fluoride in a loop supplied with ultrapure water where fluoride levels should be zero. This data immediately resulted in assembly of a task force to identify the source of the contamination. The task force identified and mitigated a leak source within one week.



CUSTOMER BENEFITS

Analytical results quickly identified a serious problem that helped prevent severe corrosion damage in critical equipment, saving substantial replacement costs:

- Tools can easily cost \$700,000–4 million US
- Some tools cost as much as \$350 million US
- Tool replacements typically have long lead times, at least 18 months



SERVICE ADVANTAGES

When systems or process problems occur, solutions are required quickly to restore productivity or avoid further, more severe issues. Analysis with Answers™ is Nalco Water's service, providing expedient response in a cost-efficient manner.

ADVANTAGES INCLUDE:

- Global lab network with local response to get answers quickly
- Unparalleled experience and expertise in water and process management
- Standardized, documented procedures assure accurate answers
- On-site service support for trouble shooting and program evaluation

KEY ANALYTICAL EXPERTISE

Water Analysis

- Metals, cations
- Anions, fluoride, organic acids
- Phosphates, silica, ammonia
- Particle size analysis

Microbiological Analysis

- Microbial identification
- Biocide screening
- Microbial DNA identification
- Biomass analysis

Contaminant Analysis, Unknown Identification

- Fingerprinting
- Product contaminant analysis

Deposit Analysis

- Loss on ignition
- Elemental composition
- Deposit identification / characterization

Failure Analysis

- Root cause failure analysis
- Recommendations for mitigation
- On-site inspection and consulting

Proprietary Analysis

- TRASAR™ background measurement
- Product concentration determination
- Reverse Osmosis Membrane autopsy
- Ion Exchange Resin condition assessment

Contact your local sales representative for more information.

Ecolab Global Headquarters
370 Wabasha Street North
St. Paul, MN 55102

Ecolab.com/Nalco-Water

TRASAR, Ecolab, Nalco Water and the logo are Trademarks of Ecolab USA Inc.
©2025 Ecolab USA Inc. All Rights Reserved 05/23 ADV-1784

