Mercury Control Technologies
Cost Effective Solutions to Reduce Mercury in Air Emissions and Wastewater Concentrations
MerControl® 7895 —
Mercury Oxidation Catalyst

MerControl 7895 technology augments oxidation of mercury released during the combustion of coal and can remove over 90% of mercury when used in conjunction with a w-FGD or SDA/FF. When applied with activated carbon injection, the addition of MerControl 7895 technology significantly reduces total mercury control costs while maintaining fly ash resale value.

MerControl® 8034 —
w-FGD Mercury Re-emission Control

While w-FGDs will capture the oxidized form of mercury, some w-FGDs convert oxidized mercury back to its elemental form (known as Mercury Re-emission) resulting in reduced capture efficiency and increased stack emissions. MerControl 8034 technology can reduce up to 100% of mercury re-emissions in w-FGD scrubbers while preserving gypsum quality and decreasing emission rates.

Nalco Predict Hg —
Mercury Removal in the FGD Wastewater

Nalco helps customers improve the performance of their Flue Gas Desulfurization (FGD) wastewater systems using innovative products and services. We model our customers’ waste treatment plants, allowing us to accurately predict the results of various mechanical, operational and chemical changes. We quantify potential gains in financial terms, allowing our customers to make decisions based on data, not guesswork.
Enables Regulatory Compliance

The Nalco suite of mercury control solutions enables over 95% mercury reduction, providing platform technologies to meet current and future mercury emission requirements.

Low Capital Cost

Application of Nalco MerControl technologies requires minimal capital expenditures for installation and works with existing Air Quality Control Devices (AQCDs) to reduce annual O&M costs.

Minimal Impact on Plant Operation

Our goal at Nalco is to maximize the co-benefits of existing AQCDs to reduce overall reagent usage rates and to reduce balance of plant impacts.

Preserve By-Product Utilization

The application of Nalco MerControl technology does not result in any negative effects on resale value of coal combustion by-products. MerControl 7895 technology can eliminate/reduce the negative effects of activated carbon on fly ash resale value for concrete applications. MerControl 8034 technology has been shown to completely eliminate mercury re-emissions without impact to gypsum quality.

Demonstrations

Contact our mercury specialists today to schedule a demonstration of our chemistries on your at your facility. Nalco provides equipment, measurement, and on-site support to examine any of our mercury removal technologies, as well as any competitive technologies in the market place, to find the lowest cost solution while meeting your specific constraints and goals.
Product Description
Nalco owns the exclusive patent rights for the application of **MerControl 7895 technology**, a simple emissions control strategy that allows the user to rapidly and cost effectively respond to changes in operations and fuel quality that drive mercury emissions. **MerControl 7895 technology** is a stable, water-based solution that releases molecular halogen to promote the oxidation of mercury released during the combustion of coal. Increased mercury oxidation improves the mercury capture efficiency of existing air quality control devices such as electrostatic precipitators, fabric filters, and wet flue gas desulfurization (w-FGD) units.

Reduce Activated Carbon Costs and Impacts
**MerControl 7895 technology** can also be used in conjunction with powdered activated carbon injection (ACI), to significantly reduce the required dosages of ACI used for mercury emission compliance. The results of reducing carbon usage include improved fly ash quality, reduced operational burdens on electrostatic precipitators, fabric filters, and lower disposal and operational costs. In many cases, the combination of ACI and **MerControl 7895 technology** delivers the lowest cost solution with negligible impact to fly ash quality. Through previous experience and on-site demonstrations, Nalco can assess the optimum mixture of ACI and **MerControl 7895 technology** to minimize both operating cost and detrimental effects to fly ash.

Advantages of MerControl 7895 Technology
- Low capital feed systems with a small footprint
- Improves mercury capture efficiency of existing air quality control devices (electrostatic precipitators, fabric filters, spray dryer adsorbers and w-FGD units) without adverse effects
- Provides a flexible and rapid response to fluctuations in operations and fuel quality that impact mercury emissions
- Can be used in conjunction with activated carbon injection (ACI) to lower carbon usage and thereby improve fly ash quality
- Liquid additive simplifies application, distribution and control
- Multiple potential application points yield flexibility in retrofit design

MerControl 7895 technology demonstrates significant reduction in ACI usage rates, while maintaining high mercury capture rates.
What is Mercury Re-Emission?
It is known that oxidized mercury is soluble in water and therefore can be removed from the flue gas by the presence of a w-FGD. However, for certain w-FGDs, when oxidized mercury enters the scrubber it is reduced to elemental mercury which is not soluble, resulting in lower mercury capture efficiency and increased stack emissions. This phenomenon has been coined Mercury Re-emission and is defined as an increase in elemental mercury across the w-FGD scrubber.

The application of MerControl 8034 reduces up to 100% of mercury re-emission in the w-FGD, offering a low cost solution to reducing mercury emissions.

Product Description
MerControl 8034 technology is a polymeric, organic additive that specifically binds with mercury to reduce mercury re-emission across w-FGDs. MerControl 8034 technology is a liquid application used to enhance mercury removal in w-FGD scrubbers resulting in reduced stack emissions. MerControl 8034 technology has been shown to lower overall mercury emissions at the stack as well as remove mercury from the w-FGD liquor, all without affecting the w-FGD gypsum by-product.

Advantages of MerControl 8034 Technology
- Low capital cost with a small footprint
- Has consistently outperformed competitive technologies
- Improves efficiency of mercury removal via the w-FGD without compromising unit operation
- Provides flexibility to fluctuations in operations and fuel quality that impact meeting mercury emission regulations
- Liquid additive simplifies application, distribution, and control
- Depending on site conditions, can eliminate the need for additional control technologies

With the addition of MerControl 8034 technology, mercury re-emission was significantly reduced in the w-FGD.
Challenges
Meeting ever-more-stringent regulatory and environmental requirements imposes new capital and operating costs on coal-fired power plants. Questions and concerns about the future are common.

- Can we optimize our current process?
- Are there mechanical operational or chemical changes that could further reduce mercury discharges?
- In terms of dollars per thousand gallons of wastewater, what will those options cost?

Nalco Predict Hg
Nalco Predict Hg delivers the information customers need to make good business decisions.

We offer world-class analytical services to characterize a waste treatment stream. Low-level mercury analysis of FGD wastewater is performed by highly-skilled technicians, using state-of-the-art equipment, in accordance with EPA Method 1631.

Jar tests, performed again by skilled technicians optimize chemical product and dosage selection. They also compare various treatments for cost effectiveness.

Finally, the efficacy of various mechanical options — multimedia filtration, membrane filtration, etc. — is evaluated, both in terms of mercury removal and cost.

The last point is key. A Nalco Predict Hg analysis reports not only the technical performance of various options. It also evaluates each option in terms of dollars spent to achieve each result. Nalco customers know how much it will cost – in whatever metric they prefer – to obtain different mercury discharge concentrations.

Nalco essential expertise results in a concise cost-benefit analysis on your current and potential optimized mercury control strategy.
Your Global Partner in Sustainable Performance Improvements

Nalco is a global leader in providing essential expertise to over 70,000 customers to meet their water, energy and air quality goals in a sustainable manner.

Nalco has more than eight decades of serving customer needs, which synergize with the two decades of experience in combustion optimization, air quality improvement, and emissions reduction that the Air Protection Technologies division has earned. Since its founding, Nalco Air Protection Technologies has remained on the forefront of technology, helping businesses meet environmental challenges. These include the global tightening of air quality regulations, and the need to reduce critical pollutants such as: nitrogen and sulfur oxides (NO\textsubscript{X} and SO\textsubscript{X}), mercury, hydrogen chloride, CO\textsubscript{2}, acid gases and particulates, among others.

The Nalco Air Protection Technologies multi-pollutant control approach maximizes the utilization and return on investment of air pollution control systems that reduce pollutant emissions. Most solutions require only minimal modification of existing furnaces and associated systems, and can be implemented at a fraction of the cost of installing alternative air pollution control equipment.

Nalco Air Protection Technologies is uniquely positioned to help a diverse range of industries achieve both their environmental and financial goals. Nalco delivers substantial benefits to customers and the planet by enhancing air quality, reducing greenhouse gases, minimizing environmental releases, and improving productivity and end products. In facilitating these environmental benefits, Nalco provides superior return on investment and enables customers operate more cost effectively.
Economic Perspective of Mercury Emission Reduction

A 580 MW thermal electric supercritical boiler was using halogenated activated carbon (HPAC) to meet state mercury regulations. With the use of MerControl 7895 technology, HPAC usage rate was reduced 85%, while maintaining required mercury emissions rates. The Nalco optimized engineered solution reduced the customer’s annual mercury compliance costs by over $1.1 million per year.

Ash Compatible, 90% Mercury Reduction

On a 600 MW boiler, Nalco demonstrated greater than 90% mercury capture while preserving the fly ash quality for concrete applications. Nalco used MerControl 7895 oxidation catalyst to maintain activated carbon injection rates low enough to continue to produce suitable fly ash for concrete manufacture. The lowered carbon injection rates enabled the plant to use multiple sorbents that were once not feasible for the specific application. The MerControl 7895 technology was a low cost solution that enabled the plant to reduce their total O&M costs while maintaining fly ash quality and meeting mercury emissions limits.

Mercury Control for Both Emissions and Waste Water Discharge

Pre-Nalco treatment, a 195 MW customer was achieving a 67% mercury capture via w-FGD. The application of MerControl 7895 technology to promote oxidation of mercury to improve the efficiency of the w-FGD, enabled the w-FGD to be 95% efficient in mercury capture. As mercury concentration in the w-FGD liquor increased, coagulants and flocculants applied to the wastewater treatment process reduced effluent mercury concentrations below permitted levels.

Mercury Re-Emissions Control in a w-FGD

A demonstration of MerControl 8034 technology, a w-FGD mercury re-emission suppressant, was performed on a combined 140 MWe electric generating unit fueled by high chlorine bituminous coal. The application of MerControl 8034 technology reduced the baseline mercury emissions from ~8 ug/dscm to below 0.8 ug/dscm, resulting in over 90% reduction in mercury emissions. The application of MerControl 8034 allowed the plant to utilize their w-FGD as the primary mechanism for mercury removal, avoiding over $1 million in annual sorbent injection costs and reduced capital expenditures for mercury removal.

For more information go to www.nalcomobotec.com or call (800) 305-1000.