

# Reducing emissions, cutting costs

## Associated Electric Cooperative Inc.



A Touchstone Energy® Cooperative



### Power supply facts

## Associated pioneers lower-cost technology to reduce mercury

Associated Electric Cooperative once again is a leader in emissions reductions, removing up to 90 percent of the mercury from its coal-based cyclone units with use of a refined coal.

Just as it was one of the first to burn 100 percent low-sulfur coal in the 1990s to reduce sulfur dioxide emissions, Associated led testing of a technology to reduce mercury emissions at a lower cost. Associated was the first utility to burn refined coal produced by Clean Coal Solutions LLC as a possible low-cost environmental solution.

Now, the refined coal technology that Associated helped bring to market is reducing mercury emissions at the cooperative's coal plants. It's also a lower-cost technology that will help Associated meet the Environmental Protection Agency's new Mercury and Air Toxics Standards (MATS).

Associated and CCS completed a demonstration project in late 2009 at both of Associated's coal plants to meet a tight deadline and qualify CCS to receive a tax credit under the 2004 American Jobs Creation Act.

July 2010, Associated signed a 10-year contract with Goldman Sachs, which produces the refined coal using CCS CyClean technology, and then took advantage of an opportunity to extend the contract two more years.

CCS hired staff, added and modified equipment and began 24/7 operations at both New Madrid and Thomas Hill power plants.

In addition to mercury reductions, Associated offset its fuel expense in 2012 by \$8.3 million received through its agreement with Goldman Sachs for the refined coal facility.

Clean Coal Solutions must achieve a minimum 40 percent reduction in mercury and 20 percent reduction in nitrogen oxides (NOx) to receive the tax credit, and the IRS requires those reductions be certified every six months.

## How CyClean works

Clean Coal Solutions produces a refined coal with its two CyClean products: a solid material and a liquid proprietary chemical. The two components are applied to the coal to create a "refined coal."

When the refined coal is combusted, the liquid chemical converts the elemental mercury in the coal to the oxidized form, which can be captured. The mercury is trapped in the unburned carbon in the ash, and the ash is collected before it exits the stack. Tests have shown mercury in this state is very stable, and Associated's staff will continue to test its stability.



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*Associated Electric Cooperative's proactive investment in environmental controls and research has put it and its member systems in good position to manage compliance with the Environmental Protection Agency's long-awaited Mercury and Air Toxics Standards (MATS) rule, published Feb. 16, 2012.*

The MATS rule – formerly the Mercury and Air Toxics Rule, and before that the Electric Generating Unit Maximum Achievable Control Technology rule – replaces the Clean Air Mercury Rule (CAMR) that EPA issued in 2005. The courts struck it down in 2008, and EPA proceeded to develop a new rule.

By any name, the MATS rule requires power plants to significantly reduce mercury emissions for the first time.

Associated is a step ahead and was a good candidate for the refined coal. It had already installed systems that alter air placement to reduce NO<sub>x</sub> formation on the cyclone units at both plants. The refined coal that New Madrid and Thomas Hill burn works by using existing emission controls and unique properties of the low-sulfur coal from Wyoming (which is lower in mercury too) – in effect, tapping previously inaccessible emission control capacity.

Thomas Hill Unit 3 is a pulverized coal unit and is not burning the refined coal. Knowledge gained from burning refined coal on the cyclone units is helping Associated develop a lowest-cost mercury control strategy for Unit 3.

## What is mercury?

Mercury (Hg) is a naturally occurring metal in the Earth's crust that is released into the environment from both natural and human activities.

Natural sources include volcanoes, forest fires, oceans and soils. Human activities include gold and ore mining, medical waste incineration, municipal and hazardous waste combustion, cement manufacturing and fossil fuel combustion.

Trace amounts of mercury are present in fossil fuels, such as coal and oil. When electric utilities burn these fuels to generate electricity, mercury is released.

U.S. electric utilities emit about 40 percent of domestic man-made mercury emissions and about 1 percent of total global mercury emissions.

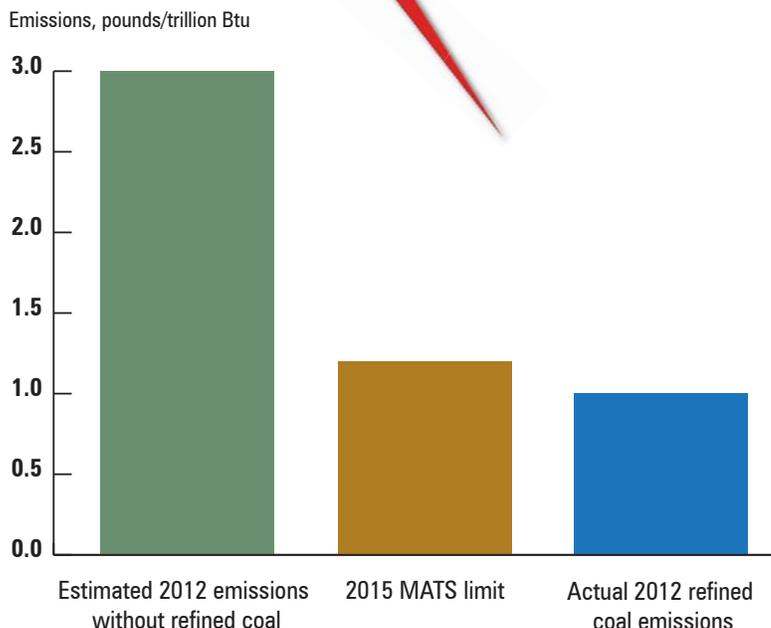
Most human intake of mercury comes from eating certain types of fish or seafood containing a form of mercury called "methylmercury." But there is disagreement among experts over the level of mercury considered safe for public health.

Still, the electric power industry is committed to reducing mercury emissions through its ongoing pollution prevention programs. Existing power plant controls reduce mercury emissions by roughly 40 percent.

Sources: EPA and Edison Electric Institute

## Associated's proactive use of refined coal technology reduces mercury at an affordable cost

### Associated reduces mercury with refined coal



*Emissions monitoring data show mercury emissions drop dramatically when CyClean refined coal is used to generate power from Associated's four cyclone units.*