

Plant Mitchell Moving From Coal to Biomass

Georgia Power's Plant Mitchell, which began operation in the early 1960s, is facing a challenge common to many vintage coal-fired plants. Continued use of coal may require significant capital investment to meet tightening air emissions requirements, making the 155-megawatt (MW) unit uneconomical. Georgia Power, with help from EPRI, is pursuing an option to keep Plant Mitchell economically and environmentally viable: conversion to biomass fuels.

A study by EPRI and Antares Group confirmed that Plant Mitchell is an excellent candidate for repowering to biomass. Ample space exists for the increased storage volume required for biomass fuel, and fuel delivery access options are good. Plant Mitchell's size will allow retrofit to a large-scale (96-MW) biomass power application, and most of the plant's existing equipment can continue to be used with biomass combustion.

Retrofit Planning

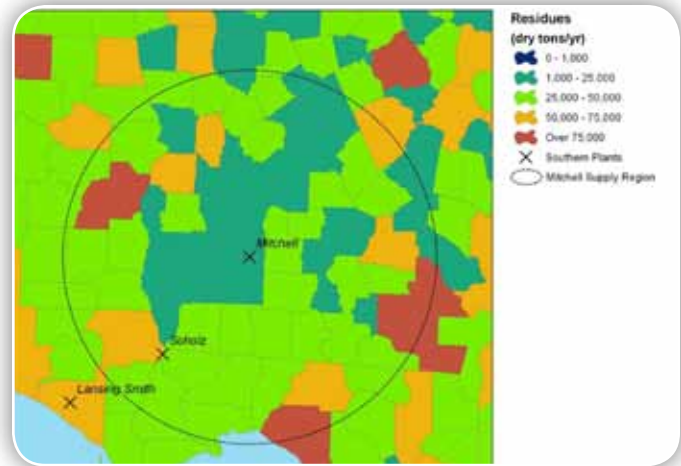
Study results indicated that retrofitting the plant's boiler for biomass operation would be significantly less costly than adding a new biomass boiler and could achieve a level of efficiency comparable to that of a new biomass plant of similar scale. Antares investigated stoker-fired and fluidized-bed options, each of which is proven and brings advantages and disadvantages. Stoker firing was selected because of its lower capital costs, reduced operational complexity, and successful operational history.

Conversion to stoker-fired operation will involve removing the bottom of the existing boiler and replacing it with a stoker grate and associated bottom ash removal equipment. Fuel conveyors, combustion air equipment, and overfire air piping and nozzles will be replaced, along with certain ductwork, controls, and wiring. With new mechanical particulate collectors upstream of the precipitator, the existing electrostatic precipitator can continue in service with minimal upgrade while maintaining or improving existing particulate emissions rates.

Fuel Supply

Plant Mitchell is expected to consume about 1.1 million tons of wood fuel per year. The primary fuel will be clean wood chips from timber harvest residues and timber considered unmerchantable because of species, form, or damage. These resources could be supplemented with wood residue by-products (sawdust, shavings, etc.) from existing local wood product manufacturers or with chipped whole trees, if necessary.

A study that assessed the wood supply within a 100-mile radius of Plant Mitchell showed that the region could sustain-



A study of unmerchantable timber and harvest residues within a 100-mile radius of Plant Mitchell confirmed that biomass fuel for the plant will be plentiful.

ably yield at least seven times more fuel than the plant will require. Even with potential competing demand from uses such as wood pellet production, cellulosic ethanol conversion, or additional biomass power plants, the region could still yield about twice the total supplies needed. Fuel costs are expected to average between \$23 and \$29 a ton.

Moving Ahead

Recommissioning Plant Mitchell for carbon-neutral biomass generation is now under way. Taking into account the EPRI/Antares studies, the Georgia Public Service Commission approved the plant's conversion from coal to wood firing earlier this year, and retrofitting is slated for completion in 2012. Additional studies across the country are expected to confirm biomass conversion/repowering as a cost-effective, low-risk way to revitalize aging coal-fired generation assets.

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Guarding Against Counterfeit Nuclear Plant Components

Spurred by enormous growth in new manufacturing capabilities around the world, counterfeit components are finding their way into alarming places—aircraft carrier and fighter jet systems, commercial airliners, pharmaceutical and petrochemical plants, and U.S. Department of Energy (DOE) facilities. In 2008, U.S. customs agencies seized \$272.7 million worth of these spurious goods, a 38% increase over such seizures in 2007. This rise, coupled with the potential for substantial new construction of

nuclear power plants, poses a significant safety challenge for the global nuclear industry. Expanding on work from the 1990s, EPRI is updating guidance to help nuclear utilities guard against increasing risks posed by counterfeit components.

Although to date there are no known incidents of counterfeit components installed in U.S. nuclear plants' safety-related systems, such components have been discovered recently in non-safety-related systems. For example, the Plant Hatch nuclear facility in Georgia discovered an installed counterfeit valve, and Duke Energy discovered that its Catawba plant in South Carolina may have purchased fraudulently labeled circuit breakers.

New Concern Over an Old Problem

The issue is not new. Responding to a 1989 Nuclear Regulatory Commission (NRC) industry directive to improve the detection of counterfeit components, EPRI produced several technical reports with industry guidance. "Since implementation of these guidelines, there have been very few such items found in U.S. nuclear power plants—particularly in the past 10 years," said Marc Tannenbaum, a senior project manager in EPRI's Nuclear Sector. "Existing facilities have seen less interest from counterfeiters because of the smaller market for the '70s-era components typically found in U.S. plants."

However, the global spread of manufacturing technology—most significantly in China—has increased the number and expertise of counterfeiters. Counterfeiters now employ quality-control measures to ensure that fake products appear genuine. The resurgence of U.S. nuclear construction, combined with the decline of U.S. manufacturers, will challenge nuclear builders to procure quality nuclear components. Particularly at risk are the thousands of high-demand, moderately priced, smaller parts and materials—including pumps, valves, fans, pipes, bolts, and state-of-the-art electronic and digital devices—supplied by global manufacturers and their sub-vendors.

A Blueprint for Prevention

The Plant Hatch and Catawba examples prompted the NRC to issue a notice in April 2008 on the renewed need for strong preventive measures against counterfeit parts. In a 2007 speech, NRC Commissioner Dale Klein asked, "Is industry doing enough to establish more rigorous safeguards and oversight in procurement? Find quality vendors and ensure that they maintain high standards? Make quality assurance a top priority?"

In response, EPRI formed a technical advisory group to update and enhance guidance on the issue. The advisory group includes members of the industry's Nuclear Procurement Issues Commit-



A counterfeit stop check valve was discovered in a non-safety-related application at Plant Hatch in 2007.

tee and has worked closely with the NRC. It has conducted benchmarking programs with the DOE, the Department of Commerce, the Government-Industry Data Exchange Program, and manufacturers recognized as anti-counterfeiting experts.

EPRI used this benchmarking to develop a report (EPRI document 1019163) that recommends immediate actions to reduce risk and outlines a blueprint for enhanced prevention. Improving qualification of and communication with suppliers is key to this process. Among the questions nuclear utilities should ask suppliers are these:

- Do you dedicate resources and staff training programs to address the problem of counterfeiting?
- Can you substantiate that you are authorized by the original manufacturers to distribute items within approved distribution networks?
- How do you handle incidents of counterfeiting, and are customers notified of such incidents?
- Do you test components and raw materials critical to the design and function of the products you distribute?

Other preventive measures include educating utility procurement staff, vigilantly inspecting purchased items, enhancing capabilities to identify suspected counterfeits, and developing industry-wide online tools to effectively gather and share information about counterfeiting incidents.

Anti-counterfeiting efforts are already yielding fruit. "In late August, a supplier to nuclear plants in the United States and Canada identified a counterfeit electronic component after implementing enhanced quality controls in response to presentations at recent EPRI and industry meetings," said Tannenbaum. "The incident was reported to EPRI, and pertinent information was shared with other members of the nuclear community."

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