Coal Fuels The World
COAL MOVED BY NORFOLK SOUTHERN HELPS FUEL WORLD’S GROWTH

THE PERILS AND PROMISE FOR NS’ COAL BUSINESS

NS TAPS NEW BUSINESS OPPORTUNITY WITH MARCELLUS SHALE GAS DRILLING

AT 103, CHARLOTTE ROADWAY SHOP STILL PLAYS A VITAL ROLE ON THE RAILS

RAILEDGE WILL HELP SPEED TRAINS, IMPROVE RESOURCE USE FOR BETTER SERVICE

NS PLEDGES TO REDUCE GREENHOUSE GAS EMISSIONS

TEAM SPIRIT EARN CHAIRMAN’S AWARD

RAISE ‘EM UP
Norfolk Southern Corporation
Coal moved by Norfolk Southern helps fuel world’s growth

On a sticky day in mid-June, black coal mined from the Central Appalachian mountains poured down a chute into the hold of the La Jolla, a ship docked at Norfolk Southern’s Pier 6. Within 40 hours, loaded with 67,719 tons of metallurgical coal, the Maltese-flagged bulk carrier left Lambert’s Point, steamed out to the Atlantic Ocean and headed south to Brazil.

Soon, the vessel’s cargo would be fed into huge industrial ovens and baked into coke, a key ingredient for steel, the lifeblood of Brazil’s growing economy.

For NS’ coal business, the South American country’s growth and development is a good thing. In 2009, in the midst of a global economic downturn, NS coal exports to Brazil grew nearly 37 percent, to 2.8 million tons, making it the railroad’s No. 1 point of destination by tonnage for overseas coal shipments.
“Brazil, with its proximity to shipping lanes from Lamberts Point, is a natural market for us,” said Danny Smith, NS senior vice president energy and properties and a mining engineer by training. “There’s been a lot of new steel production occurring there, and more factories are scheduled to come on line.”

After limping through nearly a year of recession, NS export coal came roaring back in the fourth quarter of 2009. While European countries long have been a mainstay for the railroad’s coal exports, new growth opportunities are emerging in South America, as well as in China and the broader Asian market including India, which in 2009 was NS’ No. 5 overseas destination point by tonnage.

Last fall, China for the first time began buying coal moved by NS and within a few months, became the railroad’s No. 8 destination by tonnage for the year. An added bonus is that China’s growing demand for coal has created openings for NS to expand exports into South America and Europe. The reason: Australia, a major coal-producing country and closer to China, has shifted production from these areas to satisfy the Asian giant.

Mark Bower, NS’ assistant vice president export, metallurgical, and industrial coal marketing, has become very bullish on growing the railroad’s coal business in Asia. Last fall, while flying over the South Korean countryside on a business trip, Bower was impressed by the development activity.

“It was like one huge construction site,” he said. “For me, that was an ‘Aha’ moment that Asia is the future. Actually, I wish I spoke Chinese because there’s no doubt in my mind that’s where the growth is.”
Bright spot for NS coal

For Norfolk Southern and all the Class 1 railroads, coal is big business. According to the Association of American Railroads, coal was the single most important commodity carried by U.S. freight railroads in 2009, accounting for 47 percent of total tonnage, 26 percent of total carloads, and 25 percent of total revenue.

As an income producer, coal has grown in importance for NS during the past decade, generating 29 percent of total revenue in 2009, compared with 23 percent in 2002. The majority of coal NS hauls, around 70 percent, is delivered to domestic coal-fired utility plants. Last year, according to the AAR, U.S. railroads moved enough coal to power every house in America, underscoring its importance as an affordable, abundant, and domestic source of energy.

Environmental issues related to greenhouse gas emissions from coal-fired utilities loom on the horizon as a challenge to the railroads’ utility coal business. Development of clean-coal technologies holds the greatest promise for long-term growth in the utility coal market. (See article on page 7 of BizNS.)

The global recession has been tough on NS’ coal business, particularly utility coal. In the first half of 2010, metallurgical coal, both for export and the domestic market, has been the bright spot. There are signs that electric utilities are burning down coal stockpiles accumulated before and during the recession, which points to increasing business later this year.

“Compared to a year ago, everything is better,” Smith said. “The utility market has picked up some with the economy, but the big difference has been coal used in steel making, both for domestic steel makers and certainly for export.”

During the first six months of 2010, NS’ coal tonnage was up nearly 5 percent over the same period in 2009, while revenue was up 19 percent.
During the first six months of 2010, NS’ overall coal tonnage was up nearly 5 percent over the same period in 2009, while revenue was up 19 percent. In the April-June quarter, NS’ coal business generated $696 million in revenue, a 36 percent year-over-year increase.

In a signal of an improving U.S. economy, NS’ shipments of metallurgical coal to domestic steel producers were up 121 percent in the second quarter. Bower described the turnaround as remarkable.

“We came out of 2009 with the U.S. steel industry running at 40 percent capacity and by June it was running at 70 percent plus,” Bower said. “The demand has been off the chart for met coal, and it turned around much more rapidly than anyone possibly could have guessed.”

In addition, steam coal, used primarily in industrial operations, was up 10 percent in the second quarter of 2010.

“Absent a double-dip recession,” Bower said, “there really isn’t any reason for us to see a significant weakening in the second half of the year.”

Driven largely by economic growth in China, India, and Brazil, NS’ metallurgical coal exports have experienced dramatic increases. As the standard of living rises in those countries, residents are buying automobiles, refrigerators, and houses, while office buildings, roads, and other construction projects are springing up.

All those things rely on steel, which means export coal moving in NS’ Top Gon gondola cars is in high demand.

Total NS coal exports through June were up 84 percent year-over-year. At midsummer, Lamberts Point was on a pace to ship around 19 million tons for the year — approaching a level not seen at Pier 6 since 20.2 million tons moved through in 1999, said Jeff Yates, superintendent Norfolk Terminal. Exports at Lamberts Point have topped 18 million tons only three times in the past dozen years, including in 2000 and 2008.

“We don’t see anything that’s going to cut it off right now,” Yates said.

“I’ve been with NS for six years, and this is about as busy as I’ve seen it,” added Larry Freeman, a piermaster who helps coordinate the flow of coal at Pier 6. “We can hold more than 5,000 cars in the yard here and we’re bursting at the seams right now.”

This year, coal bound for China is being moved by NS to the CNX Marine Terminal in Baltimore instead of Lamberts Point. The primary reason is that China’s steel industry can take a higher-sulfur coal, which NS hauls primarily from Pennsylvania mines in Northern Appalachia, Bower said. In the future, NS expects to move the bulk of coal bound for Asia, including to Korea and Japan, through Baltimore.

“For NS, it’s a better route and more economical for the supply chain to go out of Baltimore,” he said.

From atop the two coal loaders at Pier 6, the Norfolk downtown skyline, including the “Emerald Tower,” NS’ corporate headquarters, can be seen beyond the hump yard at Lamberts Point.
The quality and chemistry of various grades of coal, affecting such things as how hot and fast it burns, are a major factor shaping NS’ export business. The premium low-volatile coals mined from Virginia and West Virginia on NS’ Pocahontas Division are ideal for producing steel. That’s the main reason most of NS export coal is used in steel-making rather than by utilities. The low-volatile coals burn hotter and have a higher carbon content, ideal for making coke and carbon-steel products.

“We have a real advantage because our coal is a high-grade metallurgical coal and it’s in good demand worldwide,” said Tom Bayrer, NS coal group’s director of market resources and planning.

Most steel manufacturers order blends of several grades of coal to make their special product brand. The blends are closely held trade secrets, and NS employees use code names to identify them. The Lamberts Point yard specializes in blending, having the ability to mix as many as five different types of coal into a single blend — a major value add for customers.

“I would venture to say that Lamberts Point does better than anyplace else in the world in blending coal,” Bower said. “Basically, we’re mixing a teaspoon at a time, or about 100 tons at a time, and no one else has that capability and that kind of precision blending."

Business around the clock

With more than 32,600 coal cars, NS has one of the largest coal fleets in the industry, Bayrer said. NS operates gondolas, including the Top Gons, which can carry 105 tons of Central Appalachia coal, and hoppers.

A typical train coming into the Lamberts Point terminal could be carrying more than 18,000 tons in 180 coal cars. Most of the premium export coal offloaded at Pier 6 comes from more than 75 mines in Central Appalachia, which includes parts of Tennessee and Kentucky as well as Virginia and West Virginia.

Mines operated by Alpha Natural Resources supply the largest amount of metallurgical coal moving through Norfolk. Some of the coal is mined from property owned by NS subsidiary Pocahontas Land. Other big mining companies that NS moves export coal for are Consol Energy, one of the largest U.S. producers of high BTU bituminous coal, and Xcoal Energy & Resources, which markets and produces metallurgical and thermal coal.

On the receiving end, ArcelorMittal, a global steel producer, is one of the largest coal customers in Europe and South America served by NS.
To meet business demands, Pier 6 is a 24/7 operation. As trains arrive at the terminal, an electronic scanner identifies each car and the type of coal in it to ensure customers get the correct coal blend loaded on a waiting vessel. Coal cars then are lined up according to class and shoved to the “barney yard” to be dumped based on a specific blend order. From there, the cars roll by gravity over track and get pushed into tandem rotary dumpers by a piece of equipment called a barney mule. The tandem dumper system has the ability to dump four cars simultaneously.

As empty cars roll back to an outbound yard for return to the coal fields, the blended coal is moved by a conveyor-belt system to waiting vessels at Pier 6. Before being fed down a loading chute into a ship’s hold, the coal passes through sampling towers to ensure that the coal quality and blend meet the customers’ specifications.

The pier’s two loaders are 18 stories tall and move along the length of the 1,800 foot-long pier on 96 wheels. Seated in an operator’s cab, an NS employee maneuvers a loader’s telescopic chute above a coal vessel’s holds, ensuring coal is loaded evenly. The machine dumps more than 6,000 tons of coal an hour.

From the top floors of the loaders, employees can see the Norfolk downtown skyline, including the “Emerald Tower,” the nickname for NS’ corporate headquarters building.

“This is the top of the world up here,” said Marilyn Martin, an NS machinist whose job involves maintaining and repairing equipment at Lamberts Point.

Coal arriving at the terminal remains in rail cars until it is dumped and loaded on a ship. Choreographing the movement of cars, coal, and vessels takes a lot of work. Freeman, the piermaster, has five computer monitors on his desk for email and crew information, to track coal inventory, and to keep an eye on various yard and pier operations.

There must be open lines of communication among the piermaster and coal mine operators, trainmasters, yardmasters, vessel representatives, the NS coal business group, and agents representing the coal buyers.

“Most people don’t realize the coordination it takes to get the right coal to town for the right boats,” Yates said. “The biggest thing we worry about is having boats here and not being able to load coal on them. In a perfect world, we like to have the right coal here when the boat arrives, and we do a pretty good job of that.”

Marilyn Martin is an NS machinist who works at Lamberts Point. Her job involves maintaining and repairing equipment at the facility, including the coal loaders at Pier 6.
The perils and promise for NS’ coal business

In the future, the biggest challenge to NS’ coal business – the same faced by the entire U.S. freight rail industry – is possible regulatory or legislative changes that place new restrictions on the power utilities and companies that burn or mine coal.

The Environmental Protection Agency, for one, is considering rules to significantly curb carbon dioxide emissions from electric utilities, while Congress and statehouses nationwide are debating bills that could result in higher costs to produce electricity from coal and thus discourage its use for power.

In addition, potential restrictions on coal mining companies could affect not only the utility coal market, but metallurgical coal as well. In turn, that could have a detrimental impact on the global competitiveness of the U.S. steel industry and manufacturing in general.

Bipartisan bill for clean coal R&D

Fortunately, there are some encouraging developments under way to ensure that coal remains an important player as an affordable, domestic source of energy. In July, a bipartisan bill to advance research on clean-coal technologies was introduced in the U.S. Senate by Sen. Jay Rockefeller, D-W.Va., and Sen. George Voinovich, R-Ohio.

Their bill, known as the Carbon Capture and Storage Deployment Act of 2010 (S. 3591), for the first time would put in place a comprehensive approach by the federal government to support the development and early use of carbon capture and storage technologies by electric utilities. The legislation calls for financial incentives and a regulatory framework, including a $20 billion fund to offset the costs of developing and implementing clean-coal techniques.

The American Coalition for Clean Coal Electricity, a membership of utilities, coal producers, and Class 1 railroads, including NS, and the Association of American Railroads support the bill.

If passed, it could accelerate the availability of clean-coal technology in the marketplace, create jobs, and help keep the price of electricity affordable. NS employees are encouraged to contact their congressional representatives to support the legislation.
Virginia research shows success

In a research breakthrough this summer, the Virginia Center for Coal and Energy Research successfully completed a small-scale carbon capture and storage demonstration project in the mountains of Russell County, Va.

The project injected 1,000 tons of liquefied, food-grade carbon dioxide – the type used to carbonate soft drinks – into a coalbed methane well donated by CNX Gas Corp. The test is part of an 11-state effort called the Southeast Regional Carbon Sequestration Partnership, or SECARB, funded in large part by a U.S. Department of Energy grant. NS has provided financial support for the project, and Danny Smith, NS senior vice president energy and properties, chairs the Virginia center’s advisory board.

“The importance of our test is that before this, there hadn’t been any tests of carbon storage in the coal seams in Appalachia,” said Nino Ripepi, a research scientist at the Virginia Tech-based center. “We wanted to show that we had injectivity into the seams, and the results are promising. We were able to inject at higher than anticipated rates, so we now know we can inject carbon dioxide and use the seams as a storage reservoir.”

An expected side benefit of injecting carbon dioxide into coal bed seams will be to enhance the recovery of methane, a natural gas found in Appalachia. Carbon dioxide injection has long been used to boost oil production.

Virginia Tech researchers hope to secure funding for a commercial-scale carbon storage project, Ripepi said. Last year, a large-scale SECARB project under way in a former oil and gas production field in Southwest Mississippi became the fifth project worldwide — and the first in the U.S. — to monitor and document the retention of 1 million tons of carbon. The utility American Electric Power is working on another promising project, Ripepi said. With help from a DOE grant, the utility has plans for a commercial-scale project to capture and store up to 1.5 million metric tons of carbon dioxide per year in a deep sandstone formation at its Mountaineer utility plant in West Virginia.

“If Congress ever puts a cap on carbon emissions,” Ripepi said, “capture and storage technology, if it’s economical to do, basically could be one of the only things to keep coal viable for use in electricity production. Looking at pricing, I think the technology could be a large player.”

Coal not going away anytime soon

The federal Clean Air Act, passed by Congress in 1970 and later amended to among other things reduce emissions of sulfur dioxide from power plants, has changed the landscape of the utility coal business, said NS’ Smith.

Before those legislative changes, very little coal was produced west of the Mississippi River. Now, because of lower-cost mining and vast reserves of cleaner burning, lower sulfur coal found in such areas as the Powder River Basin in Wyoming and Montana, the west produces more coal than the East Coast.
“We serve the Powder River Basin through our connection with western carriers UP and BNSF and deliver that coal to customers in the Southeast and Northeast,” Smith said.

Many of the more than 100 utility plants NS serves are equipped with scrubbers and other technology to filter out smokestack pollutants, enabling them to use coal with higher sulfur content. NS moves most of the higher-sulfur coal from mines in Northern Appalachia in western Pennsylvania, Ohio, and the Illinois basin. Also, NS has an interchange with CN over the Mid-America Corridor for coal coming from Illinois-basin mines served by CN.

Despite a political climate in Washington that has become more hostile toward fossil fuels, the prospects for the railroad industry’s utility coal business appear solid in the near term.

“Certainly there are environmental challenges out there and there are changes in store for utilities and the industry, but we see continued opportunities in the coal business,” said Don Seale, NS executive vice president and chief marketing officer.

Some older, smaller NS-served utility plants are being closed because it’s uneconomical to upgrade them, but that is not a sign the railroad’s coal business is going away, Seale said. The fact is, he said, there’s not a more reliable, abundant, or cheaper alternative to replace coal as a source of electricity for American households and businesses.

“A lot has been written about the demise of coal for energy generation, but that is not correct,” Seale said. “Coal supplies around 45 percent of our country’s electricity, and we don’t have the ability to simply cut the switch. Coal as a source of power and as a source of business is not going to see a phase-out in the foreseeable future.”

At far left: The Virginia Center for Coal and Energy Research, based at Virginia Tech, is part of an effort in the Southeast to research and develop carbon capture and storage techniques.

Left: Coal supplies about 45 percent of U.S. electricity needs. Last year, U.S. railroads moved enough coal to power every house in America.

Above: An NS train moves coal from Central Appalachia across Smith Mountain Lake in Virginia.
NS taps new business opportunity with Marcellus Shale gas drilling

Reserves of natural gas trapped in deep underground shale deposits in Pennsylvania and West Virginia are turning into new business for Norfolk Southern and short line railroad partners.

NS is moving thousands of carloads of special “fracturing” sand from the Midwest that drilling companies use to extract gas from the Marcellus Shale deposit, a massive geological formation that extends from eastern Kentucky to upstate New York. The railroad also is hauling in cement, chemicals, and drilling pipe.

With assistance from short lines operating in the region, NS is serving well drilling sites across northern West Virginia and northeastern, central, and southwestern Pennsylvania.

Beginning as a trickle two years ago, carloads moved by NS to Marcellus Shale customers have more than doubled during 2010 and business during the next several years is projected to continue growing.

“In the first six months of 2010, we surpassed what we did in all of 2009,” said Rob Robinson, NS assistant vice president short line and commercial development.

Robinson works with an internal team formed to develop plans to grow business. A big part of the strategy involves working with short line railroads. More than 60 crisscross Pennsylvania, and many serve destinations within easy reach of drilling activity. “We have to be location agnostic, meaning we want to provide a solution to customers wherever they may be,” Robinson said. “In many cases, we’ve partnered with the short lines to do that, and that strategy has helped us to become very successful so far.”

Long-term prospects look promising

Perhaps the most significant thing for NS about Marcellus Shale is that it represents a new line of business revenue with long-term potential.

“That’s what shippers and investors want to hear — that we’re into new markets and looking for business opportunities in nontraditional areas,” Robinson said.

Scientists estimate that the shale deposits hold anywhere from 168 trillion cubic feet to 516 trillion cubic feet of natural gas reserves. For comparison, consumers in New York currently use about 1.1 trillion cubic feet of gas a year. Conservative estimates suggest there are enough recoverable reserves to support at least 30 years of gas extraction activity.
“I feel fortunate to have an opportunity to work on a project that is truly exciting,” said Frank Elder, product manager in industrial products’ industrial sand and miscellaneous construction group, and a member of NS’ Marcellus Shale team. “It offers an opportunity for new top line growth and is beneficial to the country and our energy independence.”

NS began hearing about Marcellus Shale from sand customers in late 2007 and 2008. The spherical sand being shipped is used in the vertical and horizontal drilling process known as hydraulic fracturing. Water, sand, and chemicals are injected into well bores under pressure, fracturing rock that holds gas deposits. The sand, which holds the fractures open, allows the gas to flow out.

Each well requires 3 million to 4 million pounds of sand, roughly the equivalent of 15 to 20 rail carloads. For NS, the drilling activity through June of this year translated into more than 8,400 carloads of sand and associated product.

A big part of the strategy involves working with short line railroads. More than 60 crisscross Pennsylvania, and many serve destinations within easy reach of drilling activity.

Map of Norfolk Southern’s rail network, superimposed over the Marcellus Shale deposit in Pennsylvania and New York, reveals how NS is strategically located for the business. At present, drilling is not occurring in New York.
The railroad’s Southern Tier District, part of the former Conrail territory acquired by NS in 1999, has seen many of the benefits. At terminals in New York at Horseheads and Elmira — a short distance from Pennsylvania gas wells — NS carloads this year have increased year-over-year by as much as 280 percent. Sand is moved by rail into the terminals, unloaded from the bottom of the cars onto conveyor belts, and loaded on trucks that haul it to the wells.

“In places like the Center at Horseheads, one customer who used to do five cars a month with us is now doing 100 cars a week,” said Robert Cieri, NS senior trainmaster on the Harrisburg Division. “It’s a fantastic opportunity.”

Getting it right

The uptick in business has spurred investment and development along NS’ rail network. One new customer, Prairie Transportation, built a transload facility and three receiving tracks on a vacant lot at Elmira, while the Center at Horseheads now serves more than a dozen customers, Cieri said. A warehouse there is used to store sand.

Many of NS’ short line partners are experiencing a substantial boost. Through June, the Lycoming Valley Railroad in Williamsport, Pa., picked up more than 2,400 carloads of Marcellus Shale business. The Wellsboro & Corning short line, which serves customers along a 35-mile line between Wellsboro, Pa., and Corning, N.Y., handled 704 carloads.

Compared to Class 1 railroad competitors, NS’ rail network is better situated geographically to serve the market, especially in terms of access to gas reserves in northern and eastern Pennsylvania, said Jim Wilson, NS marketing director metals and construction. The shale deposits are sandwiched between the Southern Tier and the former Pennsylvania Railroad territory, which NS acquired from Conrail.

“There’s no reason why we can’t handle 90 to 95 percent of the potential business,” said Jim Conway, NS commercial development manager for industrial products. Conway was among the first to recognize the potential and has helped NS grow the gas market since 2008. “Right now we’re seeing some great things, and we’re still in the infancy with it.”

While location is an advantage, NS’ challenge is to ensure that the rail infrastructure is in place to meet rising demand.

“We’ve grown the market, and now we are in a planning phase to make sure we have the right terminals at the right place, with the right capacity,” Elder said. “A lot of rail capacity in the former Conrail territory was stripped out to shed costs, and one of the challenges is to present a case to invest the capital to bring some of that infrastructure back on to accommodate growth in the market. This new energy business is an ongoing story for us.”

Drilling companies are using a horizontal drilling technique to tap into the natural gas reserves in the Marcellus Shale deposit.
Ask him what the Charlotte Roadway Shop does for Norfolk Southern, and Wayne Terrell, a shop supervisor, has a ready answer: “It helps keep the trains running.”

That is an apt description. The shop’s main task is to supply NS track gangs with the big machines that maintain the railroad’s 22-state network of track.

The demanding work involves repairing, rebuilding, and overhauling equipment that weighs as much as 100,000 pounds, as well as designing and building parts and new pieces of machinery for NS’ use from the frame up.

“I am really amazed at what the people in this shop can do,” said Terrell, a former welder foreman in the nuclear industry who supervises the roadway facility’s blacksmith shop. “We’re the only railroad that still makes our own parts, and a lot of people don’t realize that our warehouse supplies parts to everybody on Norfolk Southern.”

It is a one-of-kind shop among modern U.S. Class 1 railroads. The other big railroads typically buy manufactured parts and outsource heavy repair and rebuilding to suppliers.

Norfolk Southern has good reasons for keeping the roadway shop open. The shop can rebuild track maintenance equipment that costs much less and is of higher quality than new machinery available on the commercial market. It also often designs and builds machines that vendors don’t even offer. Added to that, the shop’s impressive record of innovation has made the railroad’s massive chore of track upkeep more efficient and safer.

“We provide engineering support, manufacturing capability, and just some good old know-how about how to build machinery and make things work,” said Philip Bissette, shop general superintendent. Bissette started there as a computer-assisted design technician 17 years ago after working in the aerospace industry as a design engineer.

“We can provide a whole solution at one stop,” he added.
For the beneficiaries, there’s little doubt about the shop’s value to the railroad.

“They basically can take a clunker, strip it down to the bare frame, and build it back, better than brand new,” said Jack Ray, supervisor work equipment maintenance of way and structures in Macon, Ga. “It’s an invaluable service for the money they save the company.”

**A proud tradition**

NS predecessor Southern Railway established the shop more than a century ago, in 1907, choosing Charlotte, N.C., for its central location. During the 1950s and ’60s, the story goes, Southern President Bill Brosnan, a railroad innovator who took a personal interest in improving the efficiency of track machinery, sketched designs for new equipment on the shop’s concrete floor.

These days, the facility occupies about 16 acres on the edge of “uptown” Charlotte, within sight of gleaming office towers. A cluster of metal shop buildings has a combined 176,000 square feet of work and warehouse space, roughly the size of a Wal-Mart Supercenter.

Inside and out, the shop has the look and feel of an industrial manufacturing facility. Blacksmiths fabricate metal parts behind red-tinted curtains to protect passersby from arc flash and sparks of welders and grinders. Machinists operate lathes that precisely machine cylinders and other components. Carmen work on brake systems, axles, and wheels on huge pieces of equipment.

In 2009 roadway shop employees went to new regular work weeks consisting of four 10-hour work days with some employees working Monday to Thursday and other Tuesday to Friday. For that year, the shop earned an NS safety award for zero reportable injuries and incidents, commendable given the hazards of welding, grinding, cutting, and heavy lifting that occur daily.
About 150 shop employees from seven different agreement crafts combine their skills: blacksmiths, carmen, clerks, electricians, laborers, machinists, and pipefitters. A team of engineers helps to design new machines or improve existing ones, making them easier to operate and repair in the field.

They labor over machines with utilitarian names. Among them are tampers, hulking machines used in the field to shape and compact granite ballast rocks, the foundation for track ties and rail. There are spikers and spike pullers, machines that drive and remove rail spikes. They also work on tie removers, which grab cross ties with a hydraulic clamp, slide old ties out, and insert new ones under the rail.

The shop’s success boils down to its team approach, said shop supervisor Dave Bostic, who oversees the machine and component shops.

“It’s like a production line in a sense,” said Bostic, who began working at the shop with Southern 34 years ago. “You’ve got everybody doing their own little thing to contribute.”

Machine parts, for example, are born in the blacksmith’s shop on a computer-assisted burn table, equipped with torches able to slice through 4-inch-thick steel plates. Once cut, machinists tool parts for precision fit, while blacksmiths weld and assemble them into component parts. From there, they move on down the line to be installed on machine frames or are distributed across the system to maintain track equipment.

The shop assigns a value to the spare parts it fabricates based on labor time and material costs.

“We examine every piece, and if we can make it better and stronger and more economical, we want to do that here,” Bostic said. “If we can buy it somewhere else at a better price, we’d kind of be wasting our time because we could be doing something else.”
A spirit of innovation

The shop routinely produces machines that outperform equipment built by companies that manufacture track maintenance equipment—and at a significantly lower cost. For example, Mark 3 tampers are a railroad workhorse. They not only pack and shape ballast around track ties, they also lift rail to set proper elevation around curves.

The shop regularly rebuilds Mark 3s for much less than new ones cost, and the rebuild includes a number of innovations to improve performance of the tampers. A major one was the addition of a proportional valve system that prevents the tamper’s wheels from spinning or sliding when it starts and stops—a problem with the manufacturer’s original design that added wear and tear on the wheels and drive train and slowed work.

“When you don’t spin your wheels, you can pick up production,” said Sam Stewart, heavy repair shop supervisor. “The operators and the mechanics in the field fell in love with our redesign.”

The shop also upgraded the weld head on Russian-designed flash-butt welding trucks, which grips sections of rail and welds them together. The shop’s changes tripled the number of welds a field crew can do in a day and increased the weld head’s pulling power, enabling crews to use it to stretch rail and make permanent closure welds.

The shop’s engineering group is called in when large numbers of the same type of equipment are due for scheduled maintenance.

“If we know we’re going to be overhauling 10 or more of the same machines over next few years, we’ll look to see what kind of upgrades could be made,” said Kevin Hammond, an electrical engineer and manager process improvement in the shop’s engineering group.

They focus on making them easier to operate, troubleshoot, and repair in the field. When another type of tamper, the Mark 2s, began coming in for overhauls, for example, the shop replaced a complex electrical system with small hydraulic motors to power the tampers’ ballast vibrators, eliminating the need to buy and store big electric motors and generators. The shop also added a computerized electronic control system to help field crews quickly diagnose operational problems.

The engineering group has collaborated with field crews to develop specialized machines that vendors don’t offer for sale. For example, the group designed a new cutting head for a mulching brush cutter that grinds and pulverizes tree limbs and brush, rather than throwing limbs to the side of track rights of way like standard brush cutters, making it much safer to operate.

In another innovation, the shop took a commercially manufactured spike puller that removed spikes from one side of the track and redesigned it to pull from both sides of the track simultaneously, speeding up work. The shop is building six of the dual spike pullers this year.

“We just added to it,” said Jerry Belcher, a shop supervisor who oversees heavy repairs. “The basic parts have not changed, but we’ve remodeled the whole machine to make it operate more efficiently and last longer with less trouble. We’re saving about half of what we would pay to buy new ones, if they offered them, and we know we have a better product.”
A new software system called RailEdge could increase the average network speed of trains by up to 20 percent, or 4 miles per hour, and result in big savings for Norfolk Southern.

RailEdge will be deployed on the NS network over the next two years. The system is expected to generate considerable savings in capital costs and maintenance expense. Even a 2 mph improvement in network speed would be significant, enabling trains to make faster connections and complete their trips earlier. That means fewer locomotives would be needed to move freight.

If RailEdge eliminates the need to buy 50 locomotives, NS could save nearly $100 million in capital expense, for example, and more than $40 million in long-term maintenance costs, said Dan Plonk, director transportation planning. In addition, increasing the fluidity of the network, including eliminating bottlenecks, could translate into reduced costs on rail and track infrastructure.

The RailEdge movement planner will provide NS with a standardized dispatching system across the entire network, replacing systems now used by the railroad’s 11 divisions, Plonk said. The new system’s software will analyze dozens of variables to determine the best train plan for the network.

NS transportation officials worked with GE Transportation to design the system so that data displayed on office computer monitors can be easily interpreted and acted on by train dispatchers. The interface enables dispatchers to sort and filter data displayed in tabular form as well as monitor a graphic visual display of planned train movements.
“This takes us beyond normal dispatching,” Plonk said. “It works kind of like a chess champion who thinks through a series of moves in his head and then executes them. RailEdge takes that to a computerized level, where the machine plays the chess game of dispatching trains. Today, the dispatcher determines the chess moves and executes them. In the RailEdge world, the system develops the moves and provides the signal and switch routing to the dispatcher.”

“Each dispatcher controls a territory, and they do a great job, but when it comes to deciphering how their decisions affect adjoining territories, that’s where it becomes more complicated,” said Andy Siesenop, manager dispatch planning systems. “RailEdge allows them to make decisions based on network benefits versus individual train benefits.”

The movement planner software is integrated with several NS computer systems that feed it information to make decisions, including the Crew Management System, which passes crew member information; TYES, which passes train attributes such as assigned power, tonnage, and length; and TLMS, the railroad’s locomotive assignment system. The network systems generate a massive amount of data, creating as many as 4,000 messages an hour, or around 100,000 a day.

“All that information allows RailEdge to create an integrated, real-time movement plan,” Siesenop said. NS’ deployment of RailEdge positions NS as the industry leader in train movement planning technology. “I would say the other railroads, at best, are a year behind us,” Plonk said. — BizNS
Norfolk Southern Corporation

NS pledges to reduce greenhouse gas emissions

In 2009, Norfolk Southern for the first time began publicly disclosing greenhouse gas emissions produced by its business operations, tracking everything from diesel-burning locomotives to electricity usage in office buildings and yard facilities.

Now, NS has launched an aggressive plan to lower those emissions.

The corporate goal: By 2014, reduce NS’ carbon footprint by 10 percent per revenue ton-mile.

Last year, NS’ business operations resulted in the release of nearly 4.75 million metric tons of greenhouse gases, most the result of diesel locomotives. A 10 percent reduction of emissions at those business levels would result in 475,000 fewer metric tons going into the atmosphere.

To put NS’ emissions into perspective, U.S. railroads emitted approximately 44 million metric tons of carbon dioxide equivalents in 2008 – 2.4 percent of transportation-related emissions and only 0.6 percent of total U.S. emissions of 6.9 billion metric tons, according to the U.S. Environmental Protection Agency. For comparison, the trucking industry emitted 401 million metric tons of greenhouse gases – 22 percent of all transportation-related emissions and nearly 6 percent of total U.S. emissions.

For NS, the development of an emissions-reduction goal represents a milestone and is a highlight of the company’s sustainability achievements in the past year, said Blair Wimbush, NS vice president real estate and corporate sustainability officer.

“It’s a big deal,” Wimbush said. “It signifies both internally and externally that we believe in our commitment to make a difference. It creates accountability, because everyone can see the goal and, internally, we have to pay attention to the drivers of emissions reduction even as we focus on growing and expanding our business.”
Wimbush said setting a goal to reduce greenhouse gas emissions — including carbon dioxide, nitrous oxide, and methane — is important to shareholders, employees, customers, and the general public.

“Many of our customers have their own sustainability programs and commitments,” he said, “and this is a very visible way for us to express to them that we can help them meet their goals and objectives.”

The 10 percent reduction goal is realistic, Wimbush said, but will require diligence to achieve the locomotive fuel economy required.

“It is aggressive because there are so many variables,” he said, “and because it’s something we’ve never done before.”

The emissions reduction goal is one of the headlines of NS’ 2010 Sustainability Report, being issued this fall on the company Website. It is the railroad’s third such report, detailing sustainability activity during calendar year 2009 and first half of 2010.

Another notable accomplishment in 2009 was a pilot recycling project on the Harrisburg Division that sets the stage to expand recycling bottles, paper, and other office refuse in rail facilities systemwide. That project, spearheaded by local employees and backed by corporate support, reflected Wimbush’s top goals of increasing recycling and employee involvement in sustainability.

“Recycling is a tangible way for employees to get involved,” he said. “Not everyone feels they can impact locomotive fuel efficiency, for example, but everybody who drinks a bottle of water or a soft drink can make sure the container is disposed of in a proper receptacle.”

Another major sustainability achievement was the unveiling of NS 999, a prototype electric-powered switcher locomotive that operates emissions free. It reflects NS’ use of technology and innovation to find alternative, greener ways to do business.

In 2009, diesel burning locomotives, the railroad’s workhorses, generated around 86 percent of NS’ total greenhouse gas emissions. Because of that, NS’ emissions-reduction strategy is focused heavily on ways to achieve better fuel economy.

NS, for example, plans to equip more locomotives with such technologies as LEADER®, an onboard computer system that helps engineers obtain optimum speed and handling conditions, and automatic stop-start idling reduction systems. New operating and train movement software, such as the system wide RailEdge Movement Planner, also should help reduce fuel use, as will improvements to capacity and flow of freight on the Heartland and Crescent corridors. Both corridor projects will help to reduce fuel consumption and emissions significantly.

NS plans to take additional steps to cut fuel use in vehicles and offroad equipment, and to reduce indirect emissions from energy consumption, such as from the electricity purchased to power NS office buildings and facilities. ■ BizNS
Team SPIRIT earns Chairman’s Award

Just before 1 a.m. Monday, Dec. 22, 2008, the nation’s largest spill of coal ash occurred at the Kingston Fossil Plant, a Tennessee Valley Authority generating plant about 40 miles west of Knoxville on the banks of the Emory River. More than a billion gallons of sludge breached a retaining wall, swept nearby homes off their foundations, and coated 300 acres with ash slurry 4 to 6 feet deep.

Within weeks, Norfolk Southern representatives from several departments gathered at the Kingston plant to determine possible track designs that would enable the fly ash to be removed from the site by rail.

Team members from the transportation, customer service, industrial products, coal, industrial development, and environmental departments planned and executed a process that would enable TVA to begin moving fly ash. A viable operating plan was developed, the track plan was approved, the turnout was fabricated, and the track was installed. The first 85-car fly ash train departed Kingston for Uniontown, Ala., on July 2, 2009 and that traffic continues to move today. All told, the new business will add to NS’ bottom line.

For this effort, 14 NS employees were awarded the company’s Chairman’s SPIRIT Award. The award is NS’ symbol of excellence created to recognize the most noteworthy recipients of the 2009 SPIRIT Awards, earned by employees whose outstanding, highly visible contributions have significant impact on the long-term success of the company. They were chosen from more than 300 SPIRIT Award winners as the team that most embodied NS’ core values of safety, performance, integrity, respect, innovation, and teamwork.

Team members were honored at a luncheon hosted by Wick Moorman, CEO, who told them, “Your accomplishments truly stood out among the nominees. You put together the safe and effective development and operating plan that allowed us to secure this business. Your plan allowed for rapid turnaround and efficient utilization of assets and crews. You provided the necessary leadership, technical and customer support, commercial and regulatory information, equipment, and inspection services in a professional and expedited manner.”

Winning team members are from left to right, Robby Klein, industrial development manager; Sean VanDiver from customer service; Jay Traywick, terminal superintendent; Steve Guinn, training coordinator; Neal Bates, manager coal planning and services; Eileen Roth, road foreman of engines; Tom McMahon, assistant manager fleet quality; Josh Patoka, transportation associate; Carl Wilson, manager coal transportation; Mike Critchley, Trainmaster; Mike Rimer, manager fleet planning; James Franklin, trainmaster; Suzanne Butler, commercial development manager, industrial products; Dave Ratcliff, manager fleet quality, from transportation; and Joe Oliver, engineer environmental operations, safety and environmental. 

BizNS
Raise ‘Em Up
Lawmen help raise the roof on the Heartland Corridor

The Lawmen, Norfolk Southern’s band, brought a unique touch to the celebration of the completion of the Heartland Corridor. They introduced an original song written for the occasion called “Raise ‘Em Up.” The song describes NS’ efforts to clear the route from Norfolk to Columbus, Ohio, to provide doublestack intermodal service that saves time for shippers. It also notes the company’s and the railroad industry’s importance to the future of the U.S. economy.

They didn’t stop there though. The band starred in a music video featuring the song. The video showcases not only the band, but more than 200 Atlanta area NS employees dancing to the new song. A second “making of” video also was produced.

To view the music videos, go to: http://www.youtube.com/user/norfolksoutherncorp.  ■ BizNS