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BARNHART

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COVER STORY

THE POWER OF POWER

Providing Innovative Solutions for Industry Challenges

In an age of energy challenges in which demand often outpaces supply, and at a time when our economy seems to have more downs than ups, the power market remains a bright spot. Through it all, Barnhart has remained a key solution provider to this market with a broad spectrum of work that includes new construction, critical path outage work, heavy transportation, uprate projects, major component replacement, and environmental retrofits. As a result of this extensive experience, our team has gained significant knowledge, and the "lessons learned" from our work in the power industry are brought to bear on all other markets we serve.

For instance, meeting a nuclear power plant's **critical path outage** schedule involves completing work on a tight, predetermined schedule and requires significant planning, coordination, and experience. The vital knowledge gained from meeting critical paths in the nuclear market helps us meet any project's time-sensitive objectives whether we are setting large air conditioning units or hauling massive components across the country.

Few projects offer more challenges or complications than **new construction** of power plants. These massive projects involve hundreds of contractors and sub-contractors working in a highly regulated, time-sensitive environment. Each phase of the project is contingent on completing the preceding phase on schedule, safely and on budget. Barnhart's experience in meeting and exceeding these objectives can be applied to any new construction project, regardless of industry.

While each project yields valuable lessons, Barnhart has gained some of its most useful knowledge en route to power plants. The remote geography of some plants makes equipment **transportation** a challenge and offers unique opportunities to employ Barnhart's innovative techniques. Whether it's moving a 400-ton generator hundreds of miles to a rural power plant, or hauling and erecting wind turbines in challenging,

"The transport of the generator was over 120 miles, and the weight combined with the trailer was over one million pounds. The transport involved six utilities and multiple state agencies."

Across the country, Barnhart creates innovative solutions for complex challenges in the power market and applies experiences and lessons learned to customers in a variety of industries.

windy mountainous terrain, the ability to work in remote environments – sometimes requiring coordination of multiple municipalities and utilities – is an attribute many customers need and appreciate.

Uprate work is performed to increase the maximum power levels at existing power plants. Experience gained in these projects also can be applied to any plant expansions in any industrial setting. Likewise, the **removal** of large plant components in confined spaces and the **replacement** of those components are relevant in most industrial settings.

Major **environmental retrofits** often require modular techniques to build large components in extremely tight areas while a plant is operating. Barnhart can apply the equipment and experience needed for complicated modularization projects to any size construction project and in any industry. Barnhart's modularization motto is "Build it big, move it once." When needed, that slogan works anywhere it's applied.

Barnhart's extensive experience in the power industry includes the rigging on more than 325 new turbine generator sets. Our experience yields obvious benefits for our customers. Our ability to reduce risk, conserve resources, reduce project costs and increase profits has been enhanced by knowledge of this market. While Barnhart plans to continue to grow alongside the power industry, our commitment to fairness, quality service, innovation, safety and continuous improvement goes well beyond that sector to every customer we serve.

"Barnhart provided great solutions for a Florida customer and installed new components in tight conditions while the plant was online – down ending heat exchangers and removing and replacing the largest components 10 days ahead of schedule."

HEAVY HAUL: 400 Ton Generator

Following six months of planning, Barnhart Crane & Rigging transported a massive 400-ton generator – a 'stator' – 170 miles overland from a river port in Knoxville, TN to St. Paul, VA. With its 1,000-foot convoy, the 803,000-pound steam turbine required a special hauling rig powered by two monster trucks – "Big Daddy" at 700 horsepower and "Big John" at 600 horsepower.

Barnhart's hauling rig was a 23-foot wide, 225-foot long heavy lift trailer with two 1000-plus horsepower semi-tractors to push and pull the rig. The transport rig alone weighed 240 tons and weighed a total 640 tons with the 400-ton steam turbine nestled in the carrier cradle. Its weight was distributed over 24 dollies, with 56 axles and 224 tires tied together with a proportionally-controlled hydraulic steering system.

Barnhart's project manager described the unusual sight – four semi-trucks pushing and pulling the 803,000-pound generator – as "tractor-trailer rigs on steroids." Although the schedule restricted the convoy to move only between 10 p.m. and 6 a.m., the slow-moving 1,000-foot convoy transporting the equipment drew crowds of onlookers along the way.

Barnhart's standard operating procedure for movement of the generator was a maximum speed of 15 miles an hour. According to the project manager, the convoy had to go up a significant grade of 6 or 7 percent and the procession was literally down to a walk speed. The convoy traveled up and down some of the hills along the route through Tennessee into Virginia at 2 and-a-half or 3 miles an hour with an average 3 mph and a top speed of about 10 mph.

Motorists were warned to expect delays. However, a Tennessee highway patrol sergeant commented, "It's actually drawn more spectators than complainers. It's been like a parade with people bringing out their children and lawn chairs."

According to the project manager for the Virginia power plant, the effort required tremendous teamwork, planning and coordination from numerous resources including local and state agencies in Virginia and Tennessee. An army of support staff – state police units, utility bucket trucks and Barnhart's escort vehicles – accompanied the rig on its journey.

"It's actually drawn more spectators than complainers. It's been like a parade with people bringing out their children and lawn chairs."

Law enforcement cleared the road while utility trucks and electrical crews went ahead of the transport convoy to raise and lower power lines and traffic lights and to move signs in the path of the gigantic rig. Bridge and road inspectors with the state departments of transportation also accompanied the transport to ensure the heavy load did not damage state roads or bridges.

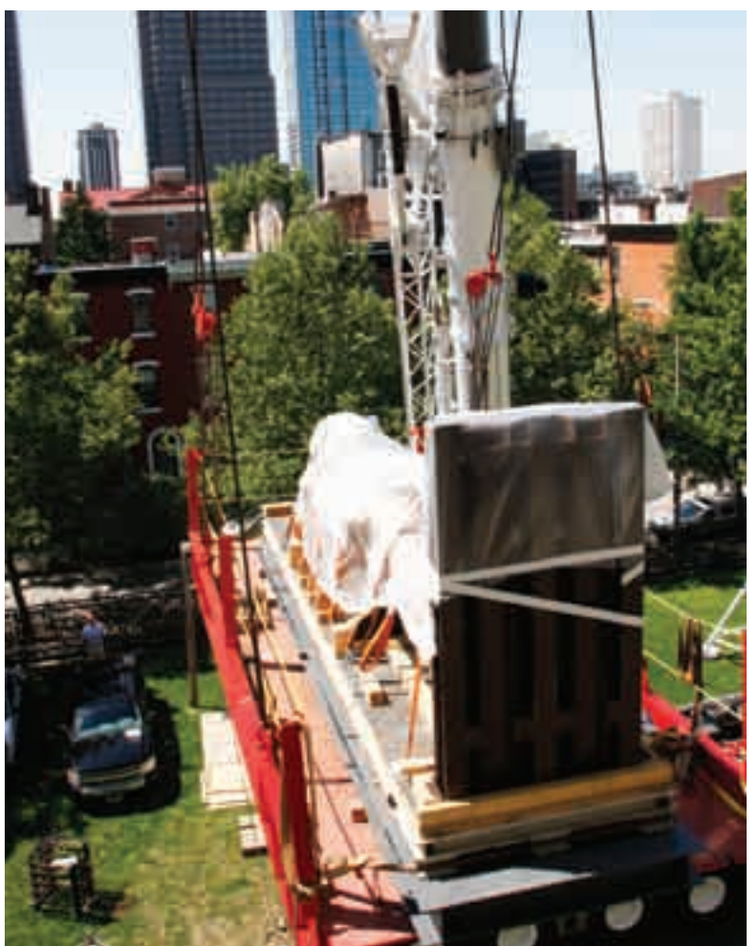
"The utility crews had their act together," Barnhart's project manager said. It was one of the best orchestrated moves through a municipality that he had seen and he noted that it went "picture perfect." The Knoxville, TN to Wise County, VA haul was the longest of the weight category in Barnhart's 41-year history of the company. According to the department of transportation, the rig and generator component were also one of the largest loads ever to travel Virginia highways.

HEAVY RIGGING: Egyptian Statue

Thanks, in large part, to Hake Rigging's expertise and efforts, visitors to a Philadelphia, PA museum exhibit were transported to the world of Cleopatra and never-before-seen artifacts that had been lost to the sea and sand for nearly 2,000 years. Two 16-foot tall colossal figures of a Ptolemaic king and queen, shipped to Philadelphia from Egypt, had to be installed in the museum for the exhibit that opened in June.

One complication the team faced was that the floor loading requirements were extremely low requiring the use of rollers to distribute the weight while moving the statues from the window into place. The team also installed two six-inch hollow structural section (HSS) beams on the floor and spanned the two W24 beams in the floor beneath.

The team only had about two feet of head room to erect the statues and the Hake crew had to install an overhead hoist beam between two W24 roof beams in order to get enough room to lift the statues' heads. They used a small gantry to tail their feet. The irony of using "old school" rigging gear – rollers, chain falls, etc. – to move 2,000-year-old artifacts was not lost on anyone. In fact, the old school gear served the team's purpose well and Hake will reverse the process to dismantle the exhibit in January 2011.



NUCLEAR POWER: Peachbottom Tandem Load Haul

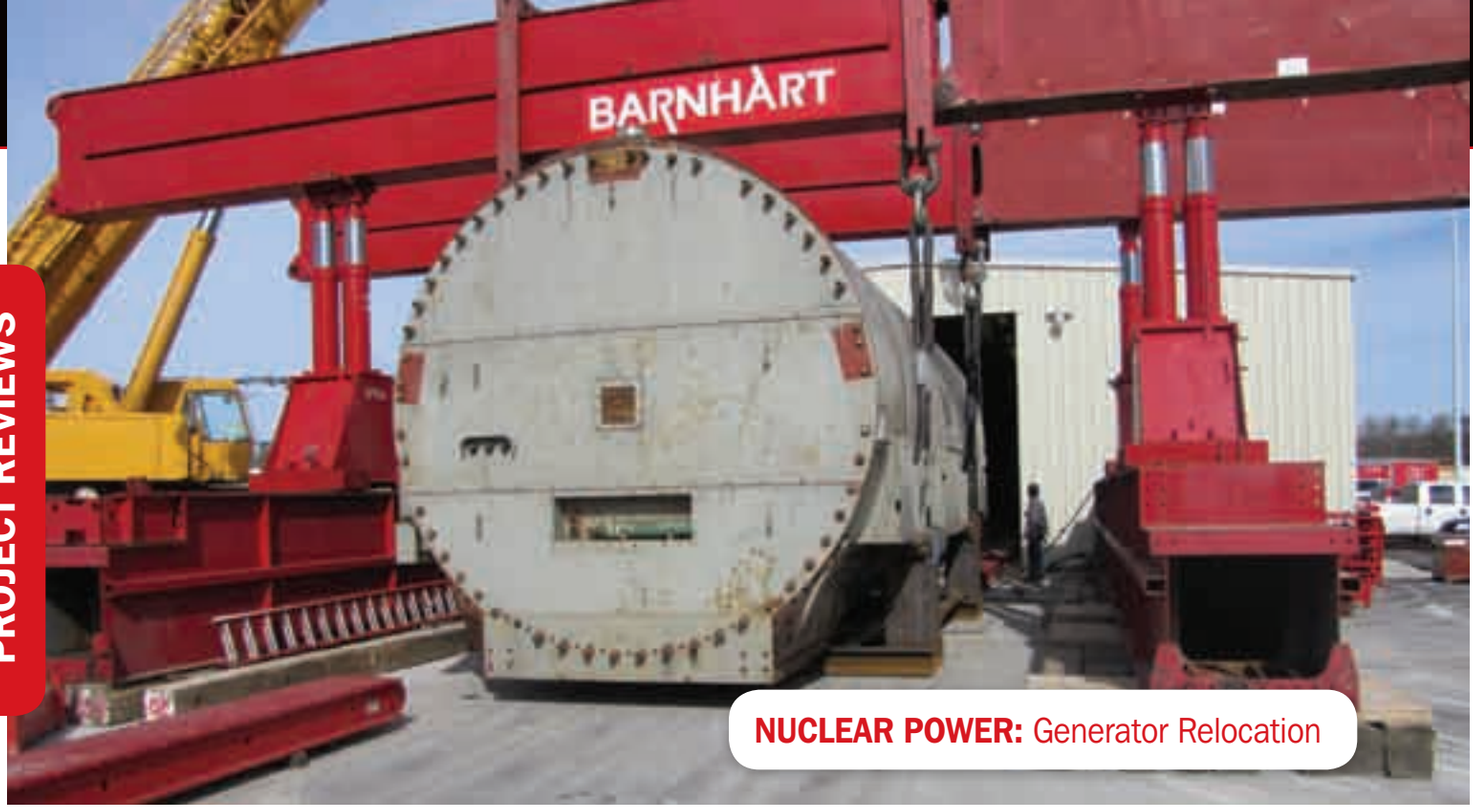
Hake Rigging successfully completed a major haul of three transformers over 30 miles of public highway through Maryland and Pennsylvania – closing I-95 and crossing a newly constructed median. One transformer was moved from a heavy cargo ship onto a barge using the PST Goldhofer. The crew loaded two additional transformers onto the Goldhofer on a barge using a 500-ton floating barge crane. They rolled all three transformers off the barges and transported them with 1.5 wide, 12-axle Goldholfers.

The convoy crossed two 105' creeks using two Barnhart 114' bridge jumpers. The crews used 30' bridge jumpers at five other locations and laid 12 road plates to protect underground utilities. A combined team of Hake, Marino and Barnhart personnel completed the transport work safely and on time in this extremely well coordinated job.

HEAVY CIVIL: Cofferdam Lift

The first big job for Barnhart's year-old Long Beach branch was to erect, lift, set and hold a cofferdam for a reservoir expansion project. The fully-assembled cofferdam weighed approximately 402,000 lbs. and needed to be held suspended in the water for 7-14 days while divers attached it to the dam wall.

The crew worked with the customer's heavy equipment – front end loaders and excavators – on site to transport Barnhart's equipment. Thinking out of the box, they engineered a cantilever system on top of the water dam and performed multiple lifts of the six cofferdam sections from flexi-floats using strand jacks. The job was on an incline, which made the work more challenging than normal. The major equipment used in this project included strand jacks, a slide system and 5' girders with rockers.



NUCLEAR POWER: Generator Relocation

Barnhart was engaged to relocate an 840,000 lb. stator from its original on-site location to an indoor storage facility at a Mississippi nuclear power station. The team began the work by lifting the stator using an 800-ton gantry system with a 5' girder. The stator had to clear a large amount of old dunnage and a support frame and also had to avoid a vault. So the team side-shifted the stator when they began the haul.

The crew used 15 lines of one-and-a-half wide Goldhofer trailer to transport the stator to the new Rotor Storage Building (RSB). During the haul, they incorporated several bridge jumpers to span critical electrical raceways and vaults. In addition, they had to improve the haul route because of soft ground and buried lines.

At the RSB, the team reset the 800-ton gantry system and used the new 2' slide track to insert the stator in the building – the wider footprint and upgraded pushers provide a nominal capacity of over 1,000 tons on two tracks. The door dimensions in the new storage facility allowed only 2 1/2" of clearance at the top – a very tight fit to enter the building. The new slide track and gantry system performed flawlessly, and the stator is in a location where it may be inspected and prepared for potential service. According to the Mississippi nuclear station, plans for a plant upgrade to increase the plant's production capacity will be completed by 2012 and will make the plant the largest single-unit nuclear power producer of its type in the world.

NUCLEAR POWER: Transformer Swap

This past April, Barnhart was contracted by a power company to swap out a transformer at a nuclear facility in Arkansas. The general scope of the project was to receive the new Unit Auxiliary Transformer (UAT) and stage it on stands and beams. The team used Barnhart's light slide system to jack and slide out the old unit and move the new UAT into place.

Six lines of THP Goldhofer trailer transported the UAT, and the light slide system performed very well and without issue. Barnhart's Little Rock branch – including several of their crew members – provided crane support with their 300-ton crane.

Since the nuclear power plant had to work through some off-site power concerns, the outage was delayed several shifts of removal time. Thanks to the great coordination between Barnhart, the power company and their transformer subcontractor, the team was able to make up almost 42 hours of the outage time when they finally were given the green light. During the delay, the team demonstrated ways in which they were able to continue work on related aspects of the project's scope as well as to refine preparation for the jack and slide operations.

POWER GENERATION: Stator Replacement

Barnhart was contracted to furnish a heavy lift crane to facilitate the exchange of a 700,000-lb. stator. The team used a Manitowoc 21000, a 1000-ton crane to lift the stator that was on top of a 42' turbine deck inside an enclosure with very limited space. As a result of job site obstructions on the west side of the pedestal, the engineering team worked closely with the customer's engineers to develop an overall layout plan that included the lay down area for the existing stator as well as the new stator. They used the 18' cheese bar with two two-part 2 ½" x 5' endless slings above the bar and four 200-kip x 6' endless Kevlar's to lift the old stator out of the enclosure and position it adjacent to the new stator so that the customer's stator contractor could prepare the new stator to swap it out.

HYDROELECTRIC POWER: Breaker Removal

Barnhart Crane & Rigging was engaged to remove the obsolete oil breakers on top of a dam in Counce, TN. (The oil breaker is basically an oil-filled tank with isolators sticking out.) The primary concern for the client was not to point load the roof. The team devised a plan to place pipe stands directly over the trusses and columns below.

Since they had to reduce the crane size and load to a maximum of 17K per outrigger loading, the team chose an 8-½-ton Broderson deck crane and reduced the tanks to a maximum of 5,000 lb. sections. The run across the dam required over 1000' of track. Barnhart fabricated a lightweight track for the power rollers to travel on.

The Broderson crane traveled on a platform atop the power rollers, and the breaker sections traveled on a second platform. The crew would pick up two sections of the tank, swing them behind the crane and set them on the platform.

The platform with Multi-Purpose Pumps (MPP) on top of it traveled to the overhead crane. Then the crew had to slide the platform sideways to get it under the overhead crane because it did not reach the downstream side of the dam. At first glance, the project appeared to be a very simple job. However, it required a lot of white board sessions and detail work after the client's restrictions were put in place.

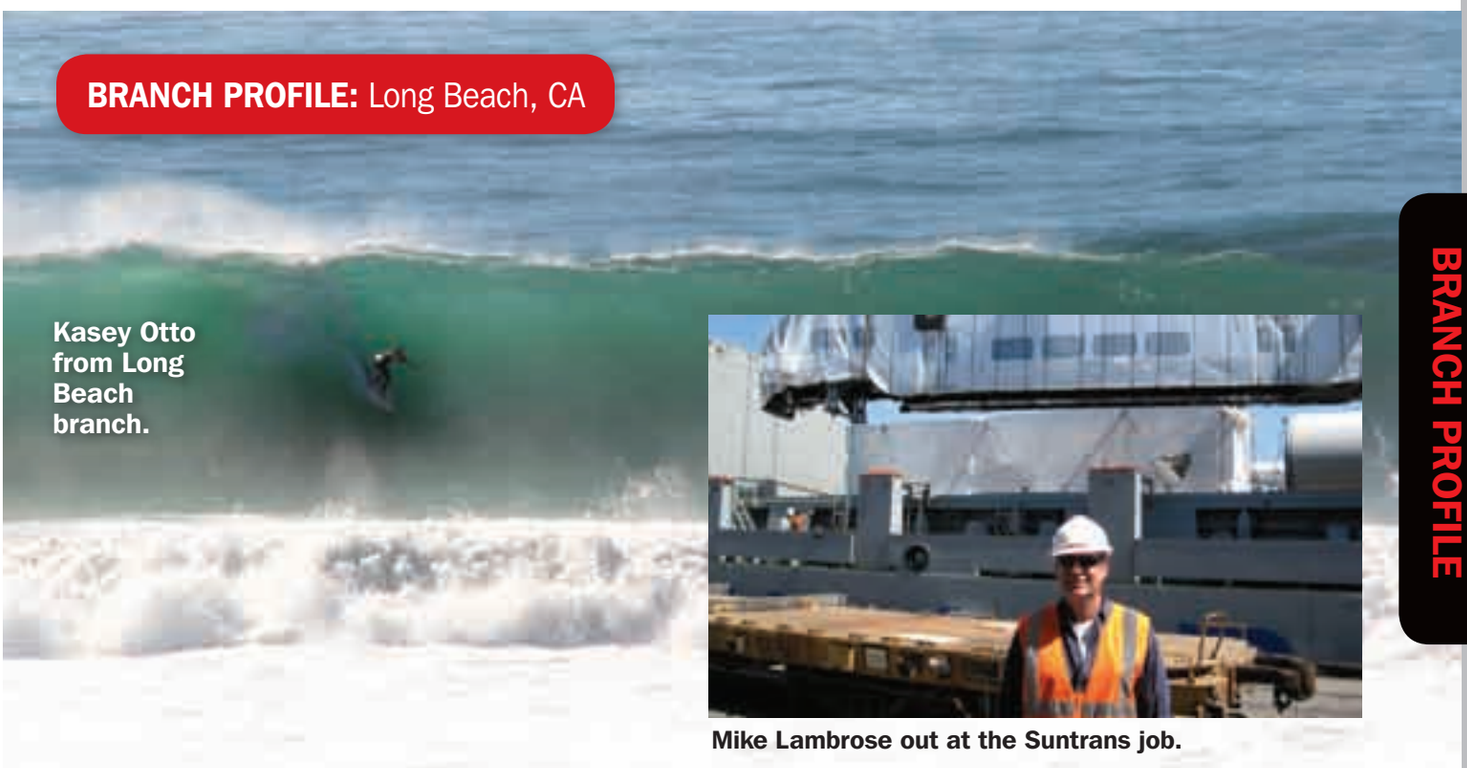
POWER GENERATION: FWH Removal

Crew members from Barnhart's Mobile, Decatur and Memphis branches worked together to remove and replace feedwater heaters (FWHs) at a nuclear power plant in South Carolina. During the first phase of the project, the new FWH was shipped by rail from Charlotte, NC to Hartselle, SC. The team offloaded the new FWH from a rail spur using the 44A Gantry system and transported it to the crane bay with no issues.

However, when the crew attempted to load the old FWH onto the 9-line trailer for transport to storage, the overhead crane stalled at an elevation of approximately nine feet off the ground. After receiving engineering approval, the crew was able to load crane mats (five high) on the trailer and safely rescue the old unit from the inoperable crane – offloading the old FWH to a storage pad, thus completing the scope phase one as heroes for the day.

During scope phase two, removing the FWHs posed engineering challenges as well. One FWH was under a floor and required using a light slide to remove it. Both FWHs had to be inverted to clear existing obstructions. The crew used the new basketing devices on their maiden voyage and found they were easy to use and served their purpose well. In order to install the new feedwater heaters, they had to be inverted to clear plant obstructions. They traveled a designed path through the legs of the gantry crane, between the moisture separator reheaters (MSRs), down a low risk path on the turbine deck and down to the crane bay.

BRANCH PROFILE: Long Beach, CA



Kasey Otto from Long Beach branch.

Mike Lambrose out at the Suntrans job.

Barnhart's Long Beach Branch will celebrate its first anniversary this October, 2010. With 12 employees, the branch serves as the Southern California project office as well as a Western U.S. operations center, according to Jim Harris, Vice President – Western Region. The branch's first big job was a cofferdam at the San Vincente Dam just northeast of San Diego. *(See Project Profiles, page 7)*

Front row: Miguel Diaz, Tammy Kronz and Sigmund Tengesdal; Back row: Rawls Steinbach, Russ Jones and Charles Johnson.

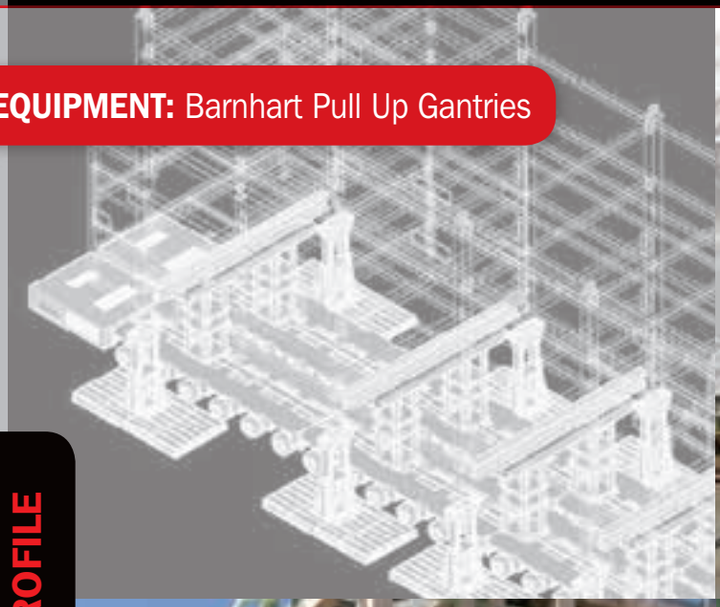
The branch focus is to sell and develop the market – with a concentration of customers in Southern California, Arizona and Nevada. The branch is unique, in part, because projects in California take a very long time to be permitted. There are stringent government regulations, air quality issues, and legislative mandates for environmentally friendly power as the state strives to become less fuel dependent.

Several large oil refineries are near the Long Beach office. There are initiatives for repowering fossil fuel power plants. The area's green energy development includes solar projects, hydroelectric and geothermal power. In fact, Southern California and Nevada have the most geothermal power plants in the U.S. and the Salton Sea in California's Imperial Valley is the state's primary source of renewable energy.

"We feel very positive about the future of our Western Region office as well as about the California economy -- ranked among the top ten largest global economies," Harris concluded.

Left to right Jorge Raygoza, Michael Barry and Guillermo (Memo) Madrigal at Diablo Canyon.

EQUIPMENT: Barnhart Pull Up Gantries



Barnhart Crane designed and fabricated pull up gantries that can replace conventional methods for lifting heavy units. The pull up gantries can load and unload components to and from rail cars as well as Goldhofers. They can be used instead of cranes to lift or lower heavy units and they are not as slow a process as jack and packs. Pull up gantries also eliminate the need for headroom above the unit to be lifted and provide an alternative to the traditional gantry system. Crews using pull up gantries can lower heavy units directly onto a barge deck and reduce the amount of tie downs.

Four legs of pull-up gantries have a rated capacity of 1000 tons up the 36” stroke and 700 tons up to 60” stroke. With the optional second stage inserts they are capable of lifting 500 tons up to 17 ft. For standard configuration, beams are inserted directly under the load and need 6” cribbing under them in order to release the gantries when lowered all the way down. They may also be configured using beam hooks as well as without lifting beams from the top of the gantries – push up.

Pull up gantries can be used in refineries, nuclear and fossil power plants as well as for barge logistics. Barnhart currently owns 16 legs of pull up gantry and is building three or four additional sets. These gantries mobilize on one truckload and crews can combine more than four gantries for a heavy lift project.

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