

# LIFTING LETTER

**2 THE VALUE OF  
SAFETY**  
One of Barnhart's Core Values

**12** DEPARTMENT  
OF ENERGY:  
Specialty Rigging



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**5** Project  
Reviews

**14** Equipment  
Profile:  
Tailing Frame

# THE VALUE OF

COVER STORY

# SAFETY

**C**ompliance alone to a set of rules or laws will not cause a job to be done safely. Safety is a process that must be integrated as a value in a company. For safety to be real it must be a continuous process that empowers people to manage the hazards they are exposed to, and simultaneously must allow the company to continuously improve by learning from its mistakes. One of Barnhart's Core Values, safety has long been integrated in the company culture. Barnhart's safety measures and safety processes have been in place for years.



## OSHA's New Law 29 CFR 1926 Subpart CC

Because Barnhart has a dynamic safety process and had been following the ASME standard B30.5 for years, OSHA's new law – 29 CFR 1926 Subpart CC: Cranes and Derricks in Construction – didn't come as a shock. Barnhart already had the systems in place to readily implement the new law. Not just as a list of laws that needed to be

followed, but by slightly modifying processes and tools that we were already using and through training.

Safety and training programs go hand-in-hand and cannot be separated; you cannot have one without the other. At Barnhart, the documentation of successful training is the Qualification Card or 'Qual-Card'.





In 2008, direct workers' compensation costs averaged more than one billion dollars per week.

Source: 2010 Liberty Mutual Workplace Safety Index



## IN REGARD TO 1926 SUBPART CC, BARNHART'S TRAINING PROGRAM ADDRESSES SEVEN SPECIFIC AREAS:

**1. CRANE OPERATOR:** The new law requires that a crane operator be both certified and qualified. Barnhart has always supported third party crane operator certification, and was one of the founding companies to utilize NCCCO. For many years, all of Barnhart's crane operators have been NCCCO certified and they hold Barnhart Qual-Cards to ensure they know how to safely operate our cranes.

**2. SIGNAL PERSON:** According to the new law, the signal person must be qualified. While Barnhart has had a signalman Qual-Card in place for some time, there is now a documented signal person training curriculum with a written and practical exam.

**3. RIGGER:** The law requires that a rigger be qualified by an employer. Barnhart already had a Qual-Card program and is developing Journeymen and Master Rigger training courses.

**4. ASSEMBLY/DISASSEMBLY DIRECTOR:** This new job title came about as a result of the new law. The A/D Director understands how to safely assemble a crane because of experience and knowledge. Barnhart already had crane technicians; an A/D Qual-Card and an A/D risk assessment check list are now in place. There is always one qualified person on the job.

**5. MECHANICS:** All Barnhart crane mechanics have a Qual-Card to allow them to work on cranes.

**6. DISPATCH/MAINTENANCE DEPARTMENT:** The law requires that certain safety devices and/or operational aids on cranes must function properly. Barnhart's methodical system includes an annual third party inspection; monthly inspections of every piece of equipment; and, daily crane inspections.

**7. GENERAL TRAINING:** Barnhart also has non-operator training. Any employee who works near or around cranes takes part in this training, knows the risks and hazards, and learns to avoid those risks.

The Qual-Card documents basic knowledge and demonstrated proficiency on a piece of equipment and is Barnhart's stamp of approval that a person is qualified to safely operate a piece of equipment. The individual knows and can identify the hazards and is trained to manage those hazards.

Barnhart crews perform a pre-job hazard analysis. There's a simple tool like a check list to help look at sites and potential hazards and implement systems to deal with hazards. Any Barnhart employee on a job site can stop a job without fear of reprisal. This is vitally important to our internal clients (our employees) as well as our customers. In conclusion, safety is a part of Barnhart's culture. Bottom line, Barnhart values safety practices simply because it's the right thing to do.

# BARNHART SAFETY TRAINING

**C**omprehensive safety training results in good service and safe jobs. Barnhart regularly develops safety training classes and conducts hands-on equipment training at its Memphis, TN Training Center – a dedicated 10,000 sq. ft. state-of-the-art training facility. This is not just in response to new OSHA regulations; it is part of Barnhart's ongoing commitment to safety. The two-year-old Training Center provides field and technical classes, management training, as well as leadership development, employee orientations, sales training, crane operator conferences, and an emerging leaders' training series.

Even though 100% of Barnhart's crane operators are required to be NCCCO certified, there is an immediate need for technical training to comply with OSHA's new, more stringent, regulations. Riggers and signal persons have to be specially trained to meet new certification requirements. As a result, Barnhart developed a new Signal person training curriculum with written and practical tests for all field employees. Journeyman and Master Rigger courses are also key elements. Additionally, Industrial Training International (ITI), recently joined Barnhart as a third-party training partner and offers a wide variety of specialized crane and rigging classes for general industry.

Following each course, Barnhart issues a Qualification or "Qual Card", which indicates the employee is qualified to operate the specified equipment or is technically proficient in that specific technique. Barnhart training is rigorous and offers quality that is equal to or greater than many third-party training programs. With 1,000 employees in 23 different branch locations, Barnhart plans to conduct more regional training and uses its Train-the-Trainer program to train staff at the different branches. Currently, 27 new Barnhart Trainers conduct the new signal person class.

Barnhart also provides engineered solutions for the nuclear power industry. Since nuclear plants pose specific hazards, workers require additional training. The Institute of Nuclear Power (INPO) promotes the highest safety levels and funds the National Academy for Nuclear Training eLearning (NANTEL), which has several online compliance courses. Barnhart is an authorized administrator and facilitates all of NANTEL's online training classes.

Barnhart maintains a comprehensive database of employee training records, certificates, and Qual Cards that demonstrate compliance with state, local and national regulations. Employee certifications, qualifications and pre-work training records, as well as safety performance measures are becoming key criteria for customers to award construction projects. Barnhart believes that everyone benefits from rigorous safety training – the company, employees and their families, and customers.

**"EVERYONE BENEFITS FROM RIGOROUS SAFETY TRAINING – THE COMPANY, EMPLOYEES AND THEIR FAMILIES, AND CUSTOMERS."**







**HYDRO POWER:** Heavy Rigging

Many California hydro plants, built for power as well as crop irrigation, are 50 or 60 years old. Parts at aging hydro facilities have degraded and must be replaced. Lock gates and trash gates must be inspected or repaired. Typically dams are in remote locations making it difficult to transport equipment to the dams and lift it on top of the dams. Barnhart's innovative transporters and rigging meet the challenge.

Barnhart won a two-month project at Arizona's Roosevelt Dam which has an old vertical generator with a 90-ton stator that needed to be rewound. The stator was sitting on top of the dam and access to the dam was limited. The scope was to jack the stator frame approximately 10' to clear the rotor so workmen could get in and rewind the stator.

Barnhart used pull up gantries and designed lifting lugs to grab the stator and lift it. Next the team jacked the stator eight feet in the air to simulate the sole plates that ensure the stator is level; they removed the windings and machined the inside surface as well as the sole plates. After the stator was repaired, they jacked it back down onto the sole plates that rest on top of concrete.





**Phase One:**

Heavy deck barge receiving vessels from ship's gear.

**REFINING:** Heavy Rigging

**Phase Two:**

Barge receipt and offloading for 12 barge loads.



**Barnhart performed a major heavy lift and haul project for a refinery in Michigan. The five-phase scope was to provide engineering, project management, supervision, craft and equipment to transport and set more than 90 pieces of equipment weighing from 60,000 to 1,500,000 lbs.**

**Phase One**

Barnhart provided a 260' by 72' wide heavy deck barge and tugs to receive 11 vessels from ship's gear at Nicholson Dock on the Detroit River. Engineering designed stowage and securement plans

for barge transport from Nicholson Dock to Dix Street Dock on the Rouge River.

**Phase Two**

Barnhart secured and rolled off 12 barge loads of 51 heavy process and pipe modules in addition to the 11 vessels. The team designed a matting and ramping system to jump the dock's bulkhead and spread ground loadings to meet the refinery's rigorous maximum limits. The 260' barge was positioned perpendicular to the bulkhead for offloading, almost blocking the 290' wide Rouge River; permitting and close coordination with the US Coast

Guard were needed. Barge receipt and offloading was staggered over five months and repeated for the 12 barge loads – blocking the river each load.

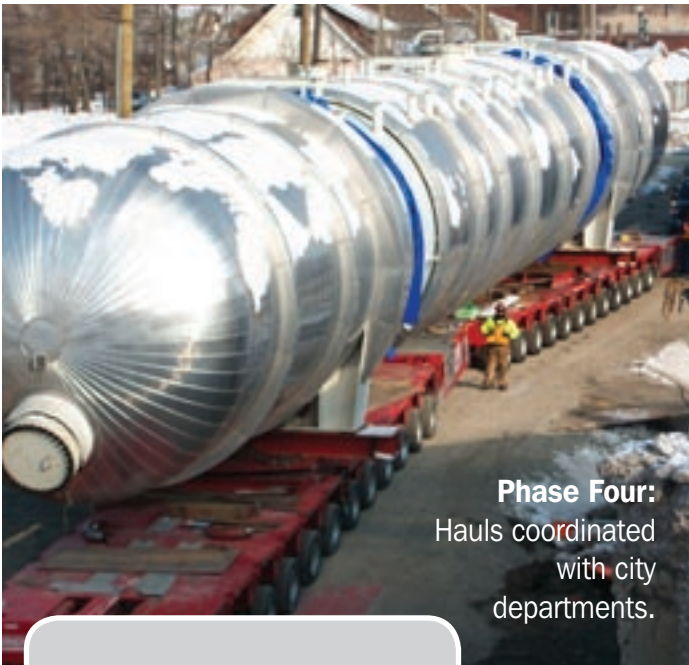
**Phases Three and Four**

Barnhart added 32 additional vessels to the original contract that called for staging, transporting and setting 60 pieces of equipment. Phase four hauls to hook required extensive coordination with city departments and utilities. Specific equipment had to be hauled on specific dates, complicating coordination. Barnhart met every haul date.





**Phase Three:**  
Site staging  
of equipment.



**Phase Four:**  
Hauls coordinated  
with city  
departments.

**Over the course of this massive project, Barnhart transported and set over 25MM lbs. of refinery equipment.**

One unexpected challenge involved hauling a 750 ton reactor from Dix Dock, across an operating railway, and into an existing unit inside the refinery. The total weight of vessel and rig exceeded 1.8MM lbs. A day before the haul, a sub-surface water main burst; conditions under the road were

unknown. Barnhart determined an alternate route, plans were approved, and the reactor was guided through the refinery's new Coker Unit with less than 3" clearances. The reactor made the railroad crossing on schedule and staged below hook for final setting.

#### **Phase Five**

During the heavy lift portion of the project, the team mobilized 330 ton, 600 ton, and 825 ton crawler cranes to set vessels and modules. Barnhart's versatile Modular Lift Tower (MLT), 850 ton Strand Jack and Modular Tailing Tower (MTT) were used to set the

**Phase Five:**  
Modular Lift  
Tower was  
used to set  
largest vessel.



largest vessel – the 750 ton Reactor.

Barnhart engineered and executed three critical lifts to erect the top sections of the 360' tall Coker Drill Tower known as the "crown jewel" of the refinery. The team used an M18000 with Max-ER, 300' main and 110' luffer to set the top piece. Over the course of this massive project, Barnhart transported and set over 25MM lbs. of refinery equipment with only two minor first aids. The most effective tools for managing risk were daily Job Hazard Analysis as well as a two-minute haul meeting just prior to work.





### FOSSIL POWER: Heavy Rigging

Many power entities are converting coal plants to natural gas, or are shutting down coal plants and building new combustion natural gas plants, for economic reasons as well as to meet stringent EPA emission regulations. Barnhart was awarded a project with a combined cycle energy plant in Salisbury, NC.

Another company, contracted for the job, had received the heavy equipment (STG and HP/IP) from rail and transported it to the job site, staging it in a temporary building. Barnhart won the bid to handle the rest of the job from the staging area. The scope included on-site transport of the STG

HP/IP and generator. Fifteen tractor trailer loads of Barnhart mobilization lift equipment were on site. Goldhofer hydraulic platform trailers loaded and transported 24 HRSG modules 24 times from the staging area to the lift equipment.

Barnhart also won the job to set the STGs 30' above ground; engineering developed a Stator Frame Configuration – “standard 2-bent end-set” configuration – for the combustion equipment. The steam turbine generator, weighing roughly 800,000 lbs. was set on the stator frame 30' in the air with gantries and then was moved 60' across the slider system to

set it on the pedestal. Although the track was 5' short, they took track off the front end to compensate. Engineering designed an adaptor plate to pin one top track to another track.

The team worked safely and efficiently through wet, extremely cold weather and in a congested area the customer called the “Power Block”; there were 700 employees on site, adding to the job's difficulty. Engineering had a very small window from awarding bid to mobilization and played a major role in the project's success. This job was a great example of Barnhart equipment group and three branches working together to make it happen.





**DEPARTMENT OF ENERGY: Specialty Rigging**

Barnhart Crane and Rigging was awarded a decommissioning project in Piketon, OH. The scope of work was to relocate ten 270 ton condensers in a tight set-up area while working under stringent Department of Energy quality control and safety.

The team used the Demag CC2600 with superlift, 12 lines of THP Goldhofer platform trailer and Barnhart-designed 1000 ton pull-up gantries to relocate the equipment from elevated mounting pedestals

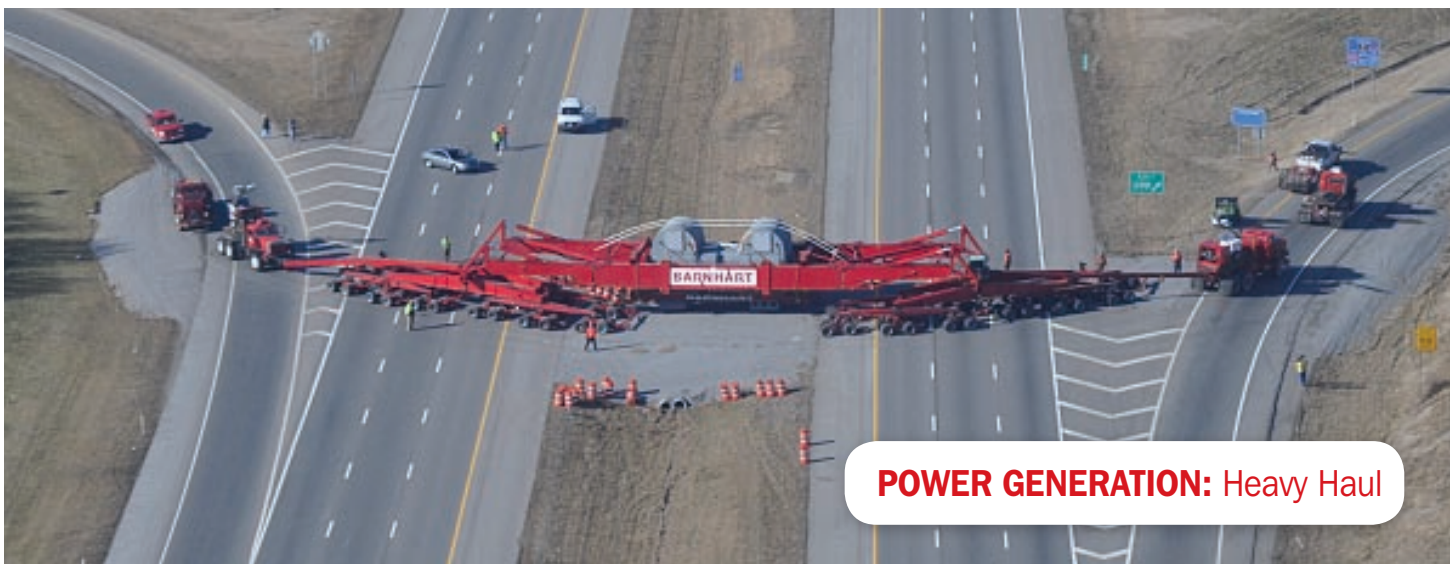
to the demolition area. The 600 ton heavy lift crane operated at a path parallel to the installed condensers in order to remove the ten condensers from an elevated position to grade. Some of the lifts had to be made over a bank of transformers scheduled for demolition at a later date. The condensers were hauled and discharged with pull-up gantries in a staging area for demolition.

The project required an extraordinary amount of engineering support.

Extensive geological surveys were conducted to locate underground obstructions so the ground didn't collapse when the crane crossed old transfer line and sewer lines while transporting pieces to the lay down yard. Surveyors drilled to determine the soil compaction, and engineers looked at records from the 1930s to determine the sub-surface infrastructure that might not have shown up in more recent plans.





**POWER GENERATION:** Heavy Haul

Barnhart Crane and Rigging didn't initially win the TVA contract to haul six combustion units – a competitor bid 50% less and was awarded the job, but couldn't get the necessary permits. TVA called Barnhart: whoever got the permit first would get the job. Barnhart had developed excellent working relationships with Tennessee DOT after a successful large heavy haul from Tennessee to Virginia. Barnhart phoned DOT and got a verbal agreement for the permit within 24 hours.

The scope of work was to haul three combustion turbines and three combustion generators. Each turbine weighed 377,000 lbs. and each haul with its 16-dolly transporter and push and pull tractors weighed 780,740 lbs. Each generator weighed 520,000 lbs. and each haul with push and pull tractors and 20-dolly transporter weighed 937,040 lbs.

The transporter was so large it had to be disassembled and

reassembled six times: 16 truckloads of equipment had to travel back and forth from the staging area to the job site for each haul. There were bridges on the haul route, but the Barnhart-designed dolly transporter evenly distributed the weight of the load avoiding problems. Barnhart leased property (a former gas station) and made civil improvements: removing an old car wash on the property and laying gravel to smooth the surface and accommodate the transporter's turning radius. The haul travelled on narrow roads, 18' to 19' wide, and the load was almost 18' wide. Barnhart devised and installed remote controlled steering for the operators to steer the transporters safely.

Barnhart performed the job at the eleventh hour. Although the scope was for 10-day delivery per component, our team turned the transport around every seven days, completing the job just before Christmas.





**PORT LOGISTICS:** Heavy Rigging

Barnhart was recently asked to receive a 198K lb. regenerator head (32'OD, 21'H, 199 kips) from stands and beams at the Tulsa, OK port yard, haul it to overhead crane, trans-load the head to the deck barge Barnhart provided, and secure it. The regenerator head was staged at elevations, so cranes weren't needed to lift it. The team backed the Goldhofer under it, self-loaded it with the trailer's hydraulics and transported it from the yard to the stevedore's overhead crane.

Since the lifting dimensions of the overhead crane hooks were 14' apart, Barnhart provided a specialized spreader beam with links that allowed the crew to use both crane hooks on the overhead crane even though the span was only 29'. The stevedoring company provided the additional necessary rigging. Barnhart completed the job two days after reaching the job site while also adhering to the port schedule. Once the head reaches its destination – the Port of Houston, Barnhart will provide a crew to cut the head loose and it will be off-loaded by ships gear.

Barnhart's outstanding turnaround and job performance impressed the customer, and the Port of Catoosa has given Barnhart space to store the Goldhofer and other equipment. Many US ports have fabricators located on-site to take advantage of waterway shipping. That provides countless opportunities for Barnhart's port logistics services.







Barnhart was asked by a customer to remove a containment dome and to transport a polar crane at an aging nuclear facility in Washington. The dome which had an 80' diameter and weighed 145,000 lbs. was made of carbon steel a little more than a quarter-inch thick and stood on top of concrete and steel circular walls.

The team conducted a shell analysis on the dome and found it had very thin walls that caused the dome to flex and bend during its removal, making the project very difficult to complete. The Barnhart team engineered temporary hold-down and tightening brackets to stabilize and remove the dome. The shell analysis also enabled the engineering team to locate the best rigging attachment points.

### DEPARTMENT OF ENERGY: Specialty Rigging



Barnhart's subcontractor cut the dome using a large wall saw. As cuts were made in the 80-foot-diameter dome, clips were installed and held with pins to secure the dome. Then Barnhart used a 440 ton capacity CC1800 SSL crawler crane with 200-foot boom to lift the dome off in a single piece and lower it to the ground.

The team lifted the polar crane to Goldhofer THP transporter for shipment, and the customer left the dome on the ground where it could be cut into pieces for easier shipment. Although the project lasted several months, Barnhart's expert engineering and well-trained staff finished the project ahead of schedule with no injuries.





**BRANCH PROFILE**

**M2 Transformer Replacement**

Barnhart's Portland, OR branch, established in July 2005 with three employees, now has 19 on staff including structural engineers; a nuclear engineer; salespeople with extensive experience in module installation, wind energy, and refineries; project managers with extensive nuclear industry and barge transport experience; and an operations group. According to Branch Manager Jim Paulsen, there are distinct advantages to being on the West Coast.

Paulsen noted, "There are vast opportunities in the Pacific Northwest. Our customers recognize Barnhart's capabilities and innovation, and as a result, we serve diverse industries ranging from nuclear power, refining, wind energy maintenance and High Tech." The Portland branch also works on DOE decommissioning projects; one recent project at a research facility just north of Richland, WA involved removing and transporting Cold War-era hot cells.

The team works on numerous refinery projects in N.W Washington. Barnhart's Portland branch also serves customers in the wind energy marketplace and recently developed a strategic partnership with a major wind energy company. In addition, the branch does "clean room" work for high tech companies; workers must wear special protective clothing known as "bunny suits" in an almost sterile environment with no dust and dirt and follow exacting procedures to move equipment.



**Screen Removal at Hanford 100N Reactor**



## EQUIPMENT: Barnhart Tailing Frame

### EQUIPMENT PROFILE

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arnhart engineers worked directly with Nooter engineers to improve the erection methods associated with Nooter HRSG modules and to develop: The Barnhart Tailing Frame. The traditional method for module erection requires three cranes – a primary heavy lift crane, a heavy lift tail crane and a small assist machine. In addition, use of the traditional tailing system creates congestion in front of the HRSG area slowing down other work in the area.

The Barnhart Tailing Frame eliminates the need for the 400 ton tailing crane and allows module preparation work in the staging yard instead of in front of the HRSG unit. Using the Barnhart Tailing Frame mounted on Goldhofer trailer, the module is loaded into the frame and transported to the erection site where only one heavy lift crane and an assist crane are utilized for erection.

Once it is in the lift area, the module is lifted to vertical using the main lift crane and the Goldhofer mounted frame as the tailing system. Once vertical, the module is lifted from the frame and the empty tailing frame is lowered to the Goldhofer for the return trip to the staging yard for the next boiler module. Not only does the tilting frame save time and reduce equipment needs, it contributes to job safety and productivity.





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## Crane & Rigging Training

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24-26	Rigging Gear Inspector Level I & II
July	
19-21	Rigging Gear Inspector Level III
September	
19-20	Journeyman Rigger
21	Lift Director/Site Supervisor
22-23	Critical Lift Planning
October	
24-27	Master Rigger
28	CIC Qualified Signalperson & Qualified Rigger - Basic
28	CIC Qualified Rigger-Advanced
10/31-11/2	Rigging Gear Inspector Level I & II
November	
3-4	Journeyman Rigger

ITI provides interactive, problem-solving instructional programs covering all elements of rigging activities which are invaluable for the inspector, rigger and lift planner. Training is in accordance with OSHA and ASME requirements.

Visit [iti.com](http://iti.com) to view all crane and rigging programs offered by ITI.





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- We have offices throughout the country, which allows us to provide you truly personal, hands-on service throughout the process.

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