

PETROLEUM

Project Fact Sheet



A Motor Challenge Success Story

BENEFITS

- Reduced energy consumption by 1 million kWh per month
- Resulted in cost savings of more than \$700,000 annually
- Eliminated demand charge on DHT's operation
- Improved equipment reliability
- Improved process control

"We have had no mechanical failures since the drives went into service and vibration has dropped by a factor of 10," declares an obviously proud Mares. "Because of the high vibrations caused by running the pumps so inefficiently, we would typically repair a mechanical seal or bearing about once per year. Since the pumps were started in May 1997, we have had no repairs of any kind."

—Art Mares
Reliability Analyst
Chevron Corporation



MOTOR SYSTEM UPGRADES SMOOTH THE WAY TO SAVINGS OF \$700,000 AT CHEVRON REFINERY

Chevron, the largest U.S. refiner operating six gasoline-producing refineries, completed a motor system efficiency improvement project at its Richmond, California, refinery that is resulting in savings of \$700,000 annually. Of the five refineries operating in the San Francisco Bay area, Chevron's Richmond refinery is the largest single producer of petroleum fuels and lubricants. Annual electricity costs at the refinery total just over \$25 million a year.

The employees responsible for getting the project off the drawing board and into action are Mike Lubcyik and Art Mares, Operating Assistant and Reliability Analyst, respectively, in the Distillation and Reforming (D&R) Business Division at the Richmond refinery. "Nowhere else could we save over \$500,000 per year without any investment," declares Lubcyik, explaining why he and Mares put so much time and effort into pushing the refinery's diesel hydro treater (DHT) upgrade project through two levels of Chevron management. "They persevered and pushed when they didn't have to," explains Jerry Moffitt, Corporate Energy Coordinator for Chevron Corporation in San Francisco.

The Project

The D&R Business Division had been trying for years to downsize the pumps in the DHT, but had never been able to secure funding. "The pumps were grossly oversized," says Mares. Several of the pumps were operating 40% below best efficiency point, resulting in low hydraulic efficiency and excessive vibration.

The DHT receives raw diesel fuel and further refines it to produce a finished product. With a daily production of 20,000-25,000 barrels, the DHT accounts for about 10% of the Richmond refinery's total daily output.

VARIABLE SPEED DRIVE FOR FEED MOTOR



The DHT upgrades consisted of:

- installing variable speed drives (VSDs) on the 2,250-hp primary feed pump and 700-hp product pump
- replacing the internal elements on the 2,250-hp secondary feed pump and a 400-hp power recovery turbine (PRT)
- changing operating procedures for the main 5,000-hp and 4,000-hp backup pumps.

The upgrade project began when Planergy Services, Inc.—a nationwide energy services company and a Motor Challenge Allied Partner—responded to a request for proposals from Pacific Gas & Electric Company (PG&E) for energy conservation and generation projects. PG&E contracted with Planergy to reduce industrial consumption by 23 million kWh per year. In early 1995, with that goal in mind, Planergy approached Chevron's Moffitt with an offer to provide VSDs and pump upgrades at no cost to Chevron. Moffitt relayed information on Planergy's offer to Lubcyik at the Richmond refinery. After an initial candidate project was determined to be unfeasible, Mares recommended the DHT project.

"It's a 'win-win-win' situation," says Moffitt, "we save money, we save energy, and we conserve natural resources." The DHT's operators are constantly reminded of the effect the VSDs have on the plant's operating costs. A sign on the 700-hp VSD control units says, "RUNNING THIS PUMP WITH VSD SAVES \$120,000 PER YEAR IN ELECTRICAL SAVINGS." Another sign on the 2,250-hp VSD states, "RUNNING THIS PUMP WITH VSD & PRT SAVES \$220,000/YR IN ELECTRICAL SAVINGS." Appropriately, there are dollar signs at the corners of the sign.

The Results

Chevron paid no up-front capital costs for the DHT upgrade project. Instead, Planergy installed the equipment at no cost to Chevron in return for a share of the savings resulting from the project. Energy consumption was reduced by 1 million kWh a month, resulting in \$700,000 cost savings annually. In addition, Chevron is no longer levied a demand charge on the DHT's operation. Two other winning aspects of the upgrade project were improved equipment reliability and improved process control.

Project Team

To complete the project by the May 1, 1997, deadline, Lubcyik assembled a project team that included Mares; Anne Broughton, Project Engineering; Jay Lindstrom, D&R Project Operator; Bill Kane, Control Engineer; and Alroy Barker, Instrument & Electrical Shop. Lubcyik's team was joined by personnel from Allen-Bradley, manufacturer of the VSDs, and Ingersoll-Dresser, which assisted with the pump rerates.

Chevron decided to let Planergy contract out the work in an effort to minimize the labor impact on the D&R unit. In April of 1997, the project was completed.

INDUSTRY OF THE FUTURE—PETROLEUM

Petroleum is one of nine energy- and waste-intensive industries that is participating with the U.S. Department of Energy's (DOE) Office of Industrial Technologies' Industries of the Future initiative. Using an industry-defined vision of the petroleum industry in the year 2020, the industry and DOE are using this strategy to build collaborations to develop and deploy technologies crucial to the industry's future.

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Motor Challenge, administered by the Office of Industrial Technologies, is a voluntary partnership program with U.S. industry to promote the use of energy-efficient electric motor systems. Thousands of industrial partners have joined Motor Challenge and are improving their competitiveness and efficiency and, in turn, the Nation's.

Motor Challenge assists the petroleum industry and other OIT Industries of the Future by identifying near-term gains in energy efficiency these industries can achieve by adopting existing technologies.

PROJECT PARTNERS

Chevron Refinery
Richmond, CA

Planergy Services, Inc.
Richmond, CA

Allen-Bradley
Milwaukee, WI

Ingersoll-Dresser Pump Company
Liberty Corner, NJ

FOR ADDITIONAL INFORMATION, PLEASE CONTACT:

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