

# THE BETA BULLETIN

**BETA**

**MACHINERY ANALYSIS LTD.**

The Machinery Performance Newsletter

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*Photo of a maintenance Time Bomb*

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*Check which of BETA Machinery's custom solutions can best help your company.*

## Launching Predictive Maintenance

### REALIZING THE SAVINGS

Predictive maintenance can greatly improve profitability for natural gas producers and all other companies running rotating and reciprocating machinery.

With maximum production at minimum cost the overall objective, what does it take to realize the full value of predictive maintenance?

### Partnership

Doug Hunter, leader of Beta Machinery Analysis Ltd.'s team of Predictive Maintenance Analysts says the key is partnership. "We want to develop a relationship with the client where we become an integral part of their operation."

This level of teamwork is demonstrated by focusing on the client's objectives. "We don't come in, analyze engine performance and leave. We want to best meet the ultimate goal of maximizing profit and reducing maintenance costs."

Beta's predictive maintenance program provides more than just technical understanding about machine parts. When Analysts visit a client site, they learn as much as they can about operating conditions and production demands so they can contribute to overall profitability.

In operations the emphasis is on optimum configuration in the load-

ing and staging of compressors. Using precise diagnostic equipment, the Analysts can fine tune the machine to extend the life of the compressor and in certain cases, substantially increase production.

Analysts also help clients assess their risk levels. A machine percentage rating comparing the unit to new condition is a useful statistic for clients faced with penalty clauses for production interruptions.

The production schedule is another important factor. "Knowing the next date a machine is planned for shutdown or when a pipeline will be down helps us determine the best time for repairs so there is the least opportunity cost," explains Hunter.

Beta Analysts offer clients a broad experience base from servicing a large number of plant sites across the industry. Oftentimes they have seen a particular problem before and can save a client valuable time by quickly recommending a proven solution.

### Results Focused

The key to this level of partnership is open communication between the Analysts and a variety of client officials: the plant superintendent, mechanics and operators.

Communication, according to Hunter, is also vital in tracking results and cost savings.

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**Predictive Maintenance - Hard Data  
To Boost Production And Cut Costs**

## Regular Inspections Payoff

### CWNG CASE STUDY

A single predictive maintenance inspection provides important immediate benefits to a natural gas producer. But the full value of an individual inspection can only be realized as part of a regular program.

*Reliable performance is vital...the plant's equipment has to run without interruption virtually year-round.*

This regular emphasis has produced impressive cost saving success in the predictive maintenance program at the Canadian Western Natural Gas (CWNG) plant in Carbon, Alberta.

The Carbon plant is a huge natural gas storage facility and is a critical component in the utility company's strategy to provide low cost gas to its residential and commercial customers across Alberta.

Throughout the summer, CWNG buys billions of cubic feet of low cost natural gas and injects it into the plant's huge subterranean storage area. In the winter when demand is substantially higher, the gas is extracted and transported throughout the province.

### Reliability Vital

Reliable performance is vital to being able to supply summer priced gas through the high demand winter months. The plant's equipment has to run without interruption virtually year-round. There is no time for breakdowns and only two short periods available each year for maintenance.

Wanting to increase reliability and reduce maintenance expenses, CWNG launched a predictive maintenance program in the spring of 1993. The company, which had been relying on preventative maintenance policies, contracted Beta Machinery Analysis Ltd. to analyze its reciprocating equipment and provide maintenance recommendations.

Beta Analysts designed a custom program based on the Carbon plant's production schedule. They performed a running and a shutdown inspection in the spring and found some significant problems: cracked cylinder heads and badly worn piston liners. CWNG mechanics performed the recommended repairs and the unit ran reliably without incident for the six month injection season.

These spring inspections detected engine deficiencies, gave CWNG officials a clear understanding of the equipment's condition without having to tear it apart, and established an important data baseline for future reference.

### Baseline Data Payoff

The Analysts returned in September to perform another two inspections and compare the spring and fall results. Based on the earlier data, the Cooper W330, which had been running fine, was showing the first signs of a significant new problem that had developed since the last inspection.

(continued on page 3)

### CLIENT INSIGHTS

*"By finding the cracked wrist pin housing, Beta saved us a breakdown that could have cost us millions in lost production."*

- Wayne Sommerville  
Supervisor Plant Operations  
Canadian Western Natural Gas Ltd.  
Carbon, Alberta

**Lost Production Is  
Too Big A Price To Pay**

## Regular Inspections Payoff (Continued from page two)

“The data showed that the wrist pin clearance had increased by more than 30 per cent since the spring. That was an obvious irregularity. It didn’t fit a normal wear pattern,” observes Beta Analyst Mike Lubich.

After analyzing the information, Beta advised Carbon plant officials to take the 3L cylinder apart for inspection and repairs on wrist pin and link pin bearings.

Wayne Sommerville, Carbon’s Supervisor of Plant Operations directed the mechanics who made the repairs. “We found a totaled wrist pin housing that had started to break away from the bottom of the piston where it bolts down.”

The cracked wrist pin housing, which is a very unusual condition, represented a time bomb heading into the winter gas extraction season. Following a preventative maintenance schedule, CWNG mechanics would have had no way of knowing there was a problem with the housing until there was a breakdown. If the problem had gone undetected, the engine damage could have been extensive.

“The master rod, the liner, and the piston, all these parts could have been severely damaged if we didn’t catch it in time,” explains Sommerville.

Sommerville estimates downtime for these repairs would have taken “a good month maybe longer,” and would have been very costly. If the machine went down CWNG would have had to buy expensive spot market gas to supply customers.

“At that time of year the cost for a month of lost production for that unit would have been in the millions of dollars,” observes Sommerville.

Mike Lubich says the program’s regular inspections made a big difference. “Predictive maintenance involves some detective work. The earlier baseline data gave us a frame of reference. It helped us pinpoint the specific problem.”

### Million Dollar Discovery



*This housing is cracked all the way through*

The cracked wrist pin housing from CWNG’s Cooper W330. Beta Machinery’s predictive maintenance service detected the problem before it caused any serious and expensive engine damage. (See story on page 2 for details.)

### CLIENT INSIGHTS

*“Beta’s B Inspection allowed us to measure wrist pin clearances without taking the machine apart. That gave us the information we needed and saved us at least two days of downtime.”*

- Dee Cochran  
Production Tech Supervisor  
Vastar Resources Inc.  
Offshore Operations, Ingleside, Texas

## Launching Predictive Maintenance (Continued from page one)


“After we do an inspection and send the client our observations and repair recommendations, we need to know when the work has been performed and if our observations were accurate.”

“We need to have confirmation to be able to analyze the worth of the program, to figure out what kind of money the client is saving.”

Input from mechanics and operators provides additional information on each unit being serviced. Each machine has its own particular idiosyncrasies based on its make, age and

operating conditions. The day to day operating observations when combined with the technical data, give the Analysts a more accurate understanding of when a machine needs repair, when efficiencies start to drop off and what corrective action to initiate.

Partnership pays off in predictive maintenance.

“Working closely with clients so we can know more about the operation helps us achieve maximum cost savings,” states Hunter. 

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## Beta Machinery's Performance Solutions

### TROUBLESHOOTING SINCE 1967


Beta Machinery Analysis Ltd. is a service and technology leader in machinery performance solutions. Since 1967, Beta has provided expert troubleshooting and predictive maintenance services.

Beta Machinery's engineering staff has researched and patented diagnostic equipment that is now used in our predictive maintenance program. We deliver the benefits of this unique and innovative technology in our service partnerships with clients.

Beta has served the oil and gas, and pulp and paper industries for close to 30 years. We have consistently provided technical insight to solve our

clients' machinery performance challenges and help them achieve maximum efficiency and profitability in their operations.

Predictive maintenance is just one part of our business. We offer expert service in all aspects of machinery performance, structural and acoustical dynamics measurement and computer modelling.

To find out how Beta can help your company implement a predictive maintenance program or assist with other machinery challenges contact us directly. 

### BETA'S ANALYSIS SERVICES

*Vibration  
Pulsation  
Torsional Vibration  
Noise*

*Trouble Shooting  
Stress  
Alignment & Balance  
Performance Analysis*

### CLIENT INSIGHTS

*“Before we contracted Beta the only machine health warning we got was an unscheduled shutdown in the middle of the night — at great expense and downtime. Now we can comfortably monitor and predict machine health.”*

- Dan Roth  
Mechanical Supervising Technician  
Dow Chemical Canada Inc.  
Fort Saskatchewan, Alberta

**Minimize Downtime  
Maximize Performance**

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