

## Bently Nevada\* Hydro Turbine/Generator Condition Monitoring and Diagnostics

application package

This is an advanced online management and diagnostics software package for hydro turbines and generators. It is designed to work with the Bently Nevada hardware protection systems, collecting both static and dynamic high resolution data including: vibration, air gap, position, speed, temperature, and more. It provides data analysis and diagnostic capabilities specifically for hydro turbines and generators.

### Reducing Operational Risk

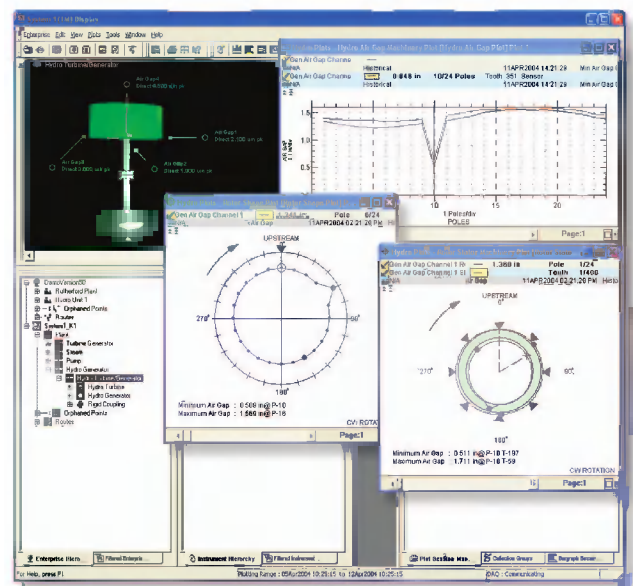
In our current world of deregulated markets and changing environmental constraints, many hydro machines are no longer operating continuously at base load. More frequent speed and load changes introduce additional thermal, mechanical and electrical stresses; often these stresses were not anticipated in the initial design. Partial load operation usually means a departure from peak efficiency, and results in the machine having a greater exposure to the effects of rough load zone and cavitation. Implementing a properly engineered condition monitoring and diagnostic solution, such as the Bently Nevada Hydro Turbine/Generator package, enables the operator to better avoid operation in load zones where cavitation or vibration can cause premature damage. Better operational management of the machine reduces the risks caused by partial load and more frequent load cycling. This risk reduction is critical to operating in today's dynamic environments.

### Benefits

- Improved operational flexibility with better risk management
- Precise monitoring of any developing problem
- Early event detection
- Real-time condition status

### Capabilities

- Specially designed GUI for hydro applications including polar display for generator rotor and stator shape
- Interface function with third party and aftermarket sensor suites like partial discharge analysis
- Can be digitally connected to any available network port for data transfer to System 1\* server
- High resolution data acquisition
- Trending
- Sophisticated alarming
- Exception reporting
- User notification function



## Improve Asset Reliability and Productivity

### Manage Partial Load Conditions

Early detection of rough load zone and cavitation conditions is critical to limiting equipment degradation and minimizing the risk of impending failure and helps to reduce maintenance costs. Changes in a machine's operating characteristics can be seen before significant damage occurs, allowing operators time to react and prevent more expensive repairs or catastrophic failure. Limiting unplanned failures or significant degradation leads to increased productivity.

### Reduce Outage Duration

A thorough understanding of equipment condition allows for more efficient outages. Unnecessary inspections and maintenance can be eliminated if an asset's operating characteristics show little or no degradation. Maintenance resources can be focused on performing work that is actually required, resulting in shorter outages and a quicker return to production.

### Continue Operation of Degraded Equipment

Advanced asset management tools like the Hydro Turbine/Generator package, allow for continued operation of damaged or degraded equipment by giving machinery engineers and others a continuous view of the operating condition. Continuous critical observation of the asset means that continued production is still possible while the necessary repairs are planned. Performing repairs at more convenient times minimizes production losses and increases profitability.

### Optimizing Asset Operation with Decision Support\*

Decision Support functionality, built into every application package, allows machinery engineers or other personnel to automate the analysis of machinery condition and configure targeted advisories of equipment degradation or malfunction. Rules derived from the experience of plant engineers and operators can be used to continuously evaluate equipment condition. Additionally, targeted RulePaks for many types of equipment are available, allowing for more rapid

implementation of this critical functionality. Utilizing Decision Support enables machinery engineers to spend more of their time resolving problems and optimizing the operation of assets.

The notification functionality delivers timely alerts of abnormal operating conditions and impending failures to operators and others. These alerts can also include recommended corrective actions (customized to plant-specific operating procedures) in response to the condition identified by Decision Support.

### Better Economic Performance – The Ultimate Goal

In today's competitive environment, understanding and optimizing equipment performance is a critical component to achieving business success – particularly in asset intensive industries. Utilizing the functionality of advanced Condition Monitoring and Diagnostic products such as the Hydro Turbine/Generator package, optimizes the availability of critical production assets, allowing owners and operators to make better, information-based operational decisions and unleashing the power of the organization to focus on improving the profitability of the enterprise.

### Levels of Support

Installation, training, and support services are recommended to help you achieve the most value from this application package. We offer 3 distinct levels of support that include the following:

<b>Bronze</b>	24/7 Tech support from our outstanding team of professionals the latest software upgrades available
<b>Silver</b>	remote software optimization and machinery diagnostics
<b>Gold</b>	onsite asset care



For complete product specifications and ordering information:

- contact your local salesperson
- call 775-782-3611 and ask for "System 1" at the prompt
- e-mail us at [system1info@ge.com](mailto:system1info@ge.com)
- visit our Web site at [www.gepower.com/system1](http://www.gepower.com/system1)

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