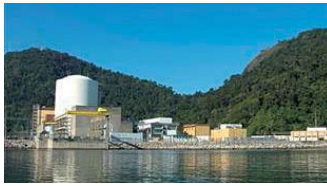


CONDITION MONITORING HELPED ELETRONUCLEAR PRIORITIZE STEAM TURBINE MAINTENANCE



Our customer Eletronuclear (Eletronuclear) presented their first experience with OPENpredictor™ at a condition monitoring conference in Brazil in November, hosted by Electrobrás/Eletronorte.

April 2008 Eletronuclear installed OPENpredictor™ on the steam turbine generator line at their 657 MW nuclear power plant Angra 1 south of Rio de Janeiro - the first nuclear power plant in Brazil and operating since 1982.

Advanced monitoring needed Nuclear Power Engineer Márcio Rezende Siniscalchi from Eletronuclear explained at the conference why they decided to install an advanced condition monitoring system:

- The original over 20 year old analogue vibration monitoring system had become obsolete as it was difficult to find spare parts.
- Eletronuclear needed a digital system, able to process huge amounts of real time data and present information in easy to understand graphics – and to provide automatic warning and prediction of developing faults.

As explained in DynamicNews September 2007, the overall objective of Eletronuclear is to increase the reliability of the steam turbine generator, and

minimize the operational risk at the nuclear plant.

Easy-to-use predictive maintenance tool

According to Mr. Siniscalchi “the installation and commissioning of OPENpredictor™ did not present any great difficulties. The software is uncomplicated, and the operators who collect information from it on a daily basis have not encountered any difficulties.”

“OPENpredictor™ boasts predictive maintenance opportunities, and the predictive maintenance group is already using it for their analyses,” said Mr. Siniscalchi. “A remote connection allowed Roving Dynamics to assist us with diagnostic support from Denmark during the first months of operation and knowledge transfer.”

Direct value during the implementation phase

Already during the initial implementation valuable conclusions could be made for several issues such as misalignment, bearing tolerances and imbalance. The system actually proved that a

perceived machine problem did not exist in reality. To correct that ‘problem’ a downtime of 1 week would have been necessary.

Autodiagnosis™ warning about a short rub of a journal bearing during a coast down. The machine is designed to deal with these types of rub,



The system implementation team at Angra 1, from left: Marcio Rezende Siniscalchi, Rodrigo Afonso de Araujo, Patricio Junqueira, Carlos Prates, Raymundo Teles de Araujo, Marcos das Candeias da Silva, Michael Riber.

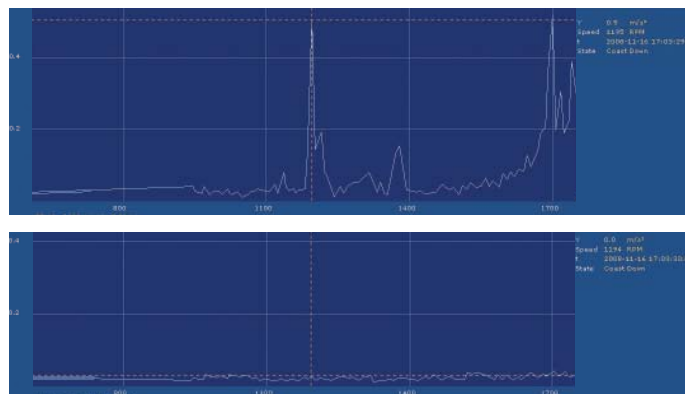
Using OPENpredictor’s diagnostic tools, Roving Dynamics remotely diagnosed the real problem and recommended inspection of the exciter. The OPENpredictor™ information directs inspections to those parts of the machine that really need it and avoids inspections where it is not required. This typically minimizes scheduled downtime for maintenance work.

Proactive maintenance

In November 2008 OPENpredictor™ issued an

but they shall not happen repeatedly. The organisation has to know about these rubs in order to conduct further analysis to determine the seriousness for future maintenance activities.

Traditional protection systems based on vibration and temperature monitoring do not identify this type of fault which normally results in surprises at regular bearing inspections. Both the over-all vibration and temperature did not increase at the moment of the rub.



OPENpredictor™ will now inform Eletronuclear’s staff whether any rubs occur, enabling them to judge whether they need to make an inspection at the next planned outage – in other words: pro-active maintenance instead of re-active.

OPENpredictor™ graphs showing rub (above) and no rub.