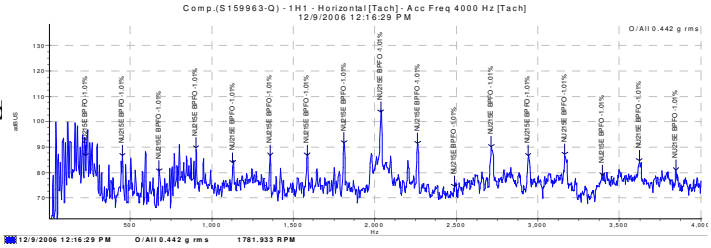
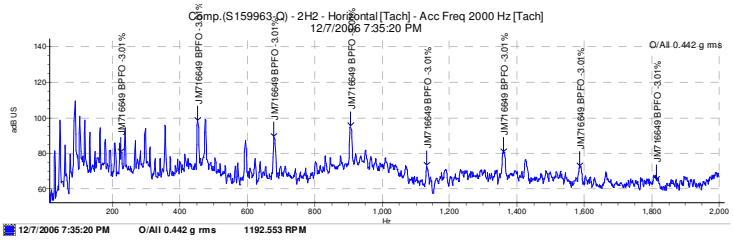
Case Study: Natural Gas Compressor
Main and Secondary Rotor Inlet & Discharge Bearings

Background
The natural gas compressor / engine system is monitored 24/7 using a Monitek supplied Online Monitoring System and hosted through Monitek's OMS Server, with monthly Client Reports. The compressor is a typical oil flooded, twin-screw design driven by a 6-cylinder natural gas engine with the system mounted on a steel skid. The compressor operates 8,700+ hours per year with a minimum production downtime cost of $250 per hour. A minor main Rotor, Input-end bearing outer race defect was first detected through vibration demodulation analysis at approximately 20,600 service hours and progressively deteriorated over the next 2600 service hours. The following charts indicate the final survey before the planned rebuild of the compressor.

Indications
The figure to the right shows a significant Main Rotor, Input shaft-end bearing (1H1) outer race defect. This bearing is a cylindrical roller designed to carry Input shaft radial loads.





The survey also indicated a potentially significant Secondary Rotor, Discharge-end (2H2) bearing outer race defect. This is a double tapered-roller thrust bearing (figure to left).

The changes in bearing defect status over a 3 ½ month period, combined with knowledge of the equipment, led analysts to conclude that overhaul was necessary before further deterioration caused catastrophic damage. A recommendation to replace bearings at the next maintenance opportunity was advised.

Strip Down Inspection
The compressor was repaired at a scheduled outage. Inspection of the components confirmed that the 1H1 (left below) bearing outer race had significant damage. The 2H2 (right below) bearing outer race had moderate pitting.

Cost Benefit Analysis

	Planned repair costs	Catastrophic failure
	The planned change out without any secondary damage is typically 24 hours with $4000 parts and labor costs.	In service failure would have resulted in compressor replacement at $20,000 with 12 hours downtime plus labor costs assuming a spare is available. Note: Typical lead-time is 12 weeks for compressor.
Direct Costs	$10,000	$24,200
ROI	426% (based on 1 event per three year period)	