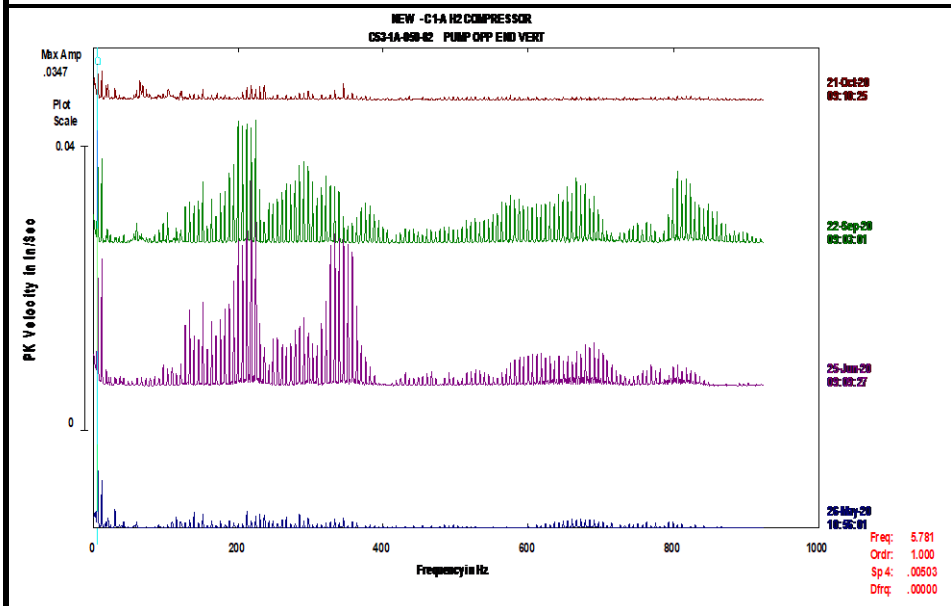
HI-SPEED PREDICTIVE MAINTENANCE

Machinery Vibration Report

Client	PennAKem	**Survey Date**	10-21-20
Location	Memphis, TN	**Report Date**	10-23-20
Machine	C53-1A Hydrogen Compressor	**QMS No.**	143630
Component	Outboard bearing	**Analyst**	DWS

Defect Rating for this machine	**CLASS I**
Defect Rating System	
Class I: Defect is present, but effect on reliability is not clear; no immediate action is required. Continue normal monitoring.	**Class III;** Defect (s) present that may cause failure in short term (less than 2 mos.). Should be addressed as soon as practical, with a high maintenance priority. Increase monitoring frequency.
Class II: Defect (s) present that may cause problem in long term (2-6 mos.). Repair during normal maintenance scheduling. Continue to monitor.	**Class IV;** Defect (s) present that makes continued reliability unpredictable, and possibility of secondary damage is high. ***Repairs should be made ASAP. An unscheduled shutdown should be considered for repairs.***

Vibration Data



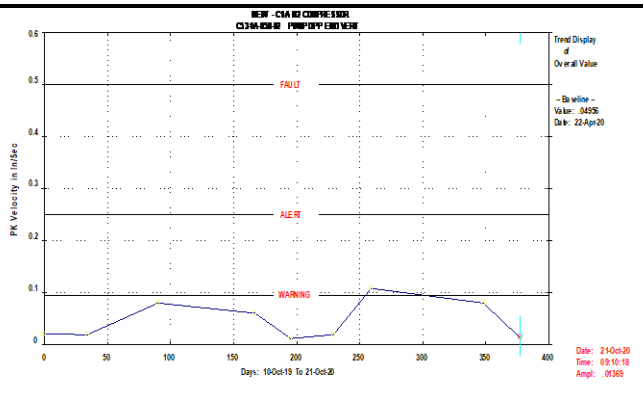
Analysis

Vibrations appear to be close to harmonic and can vary greatly over time.

Discussion / Repair recommendations

Loading could have an enormous effect on the unit vibrations. Recent waterfall vibration data for the outboard end of the compressor main shaft shows drastic changes over time up and down. Inspect as time allows. **Rated a Class I Defect.**

Trend Data



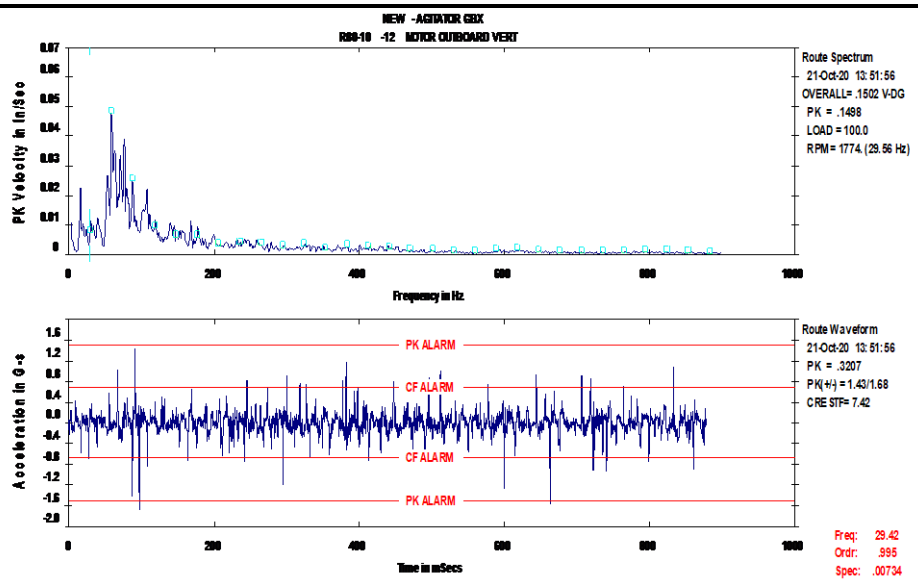
HI-SPEED PREDICTIVE MAINTENANCE

Machinery Vibration Report

Client	PennAKem	**Survey Date**	10-21-20
Location	Memphis, TN	**Report Date**	10-23-20
Machine	**R80-10 Reactor Agitator Motor/Gearbox**	**QMS No.**	143630
Component	Motor Bearings	**Analyst**	DWS

Defect Rating for this machine	**CLASS III**
Defect Rating System	
Class I: Defect is present, but effect on reliability is not clear; no immediate action is required. Continue normal monitoring.	**Class III;** Defect (s) present that may cause failure in short term (less than 2 mos.). Should be addressed as soon as practical, with a high maintenance priority. Increase monitoring frequency.
Class II: Defect (s) present that may cause problem in long term (2-6 mos.). Repair during normal maintenance scheduling. Continue to monitor.	**Class IV;** Defect (s) present that makes continued reliability unpredictable, and possibility of secondary damage is high. ***Repairs should be made ASAP. An unscheduled shutdown should be considered for repairs.***

Vibration Data



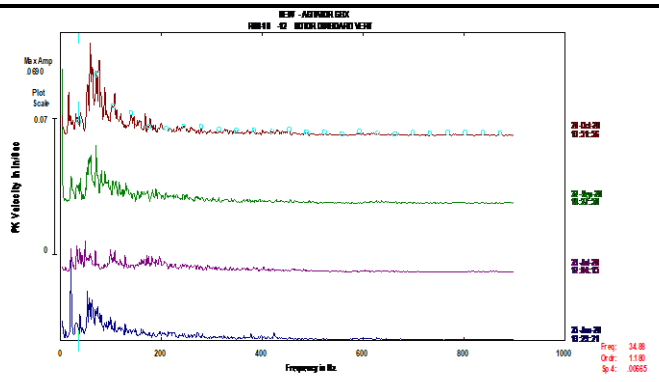
Analysis

Crest factor over 7 now.

Discussion / Repair recommendations

The unit motor vibrations are relatively low, but we believe the bearings are in distress due to the elevated crest factor of 7.4 for the outboard bearing. We recommend replacing the motor before years' end.
Rated a Class III Defect.

Trend Data



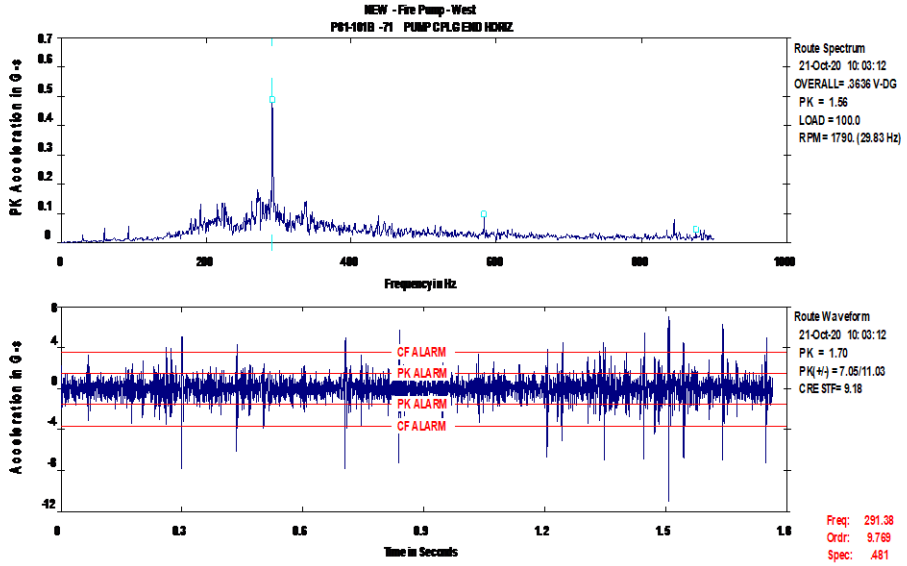
HI-SPEED PREDICTIVE MAINTENANCE

Machinery Vibration Report

Client	PennAKem	**Survey Date**	10-21-20
Location	Memphis, TN	**Report Date**	10-23-20
Machine	P81101B West Fire Pump	**QMS No.**	143630
Component	Pump Bearings	**Analyst**	DWS

Defect Rating for this machine	**CLASS III**
Defect Rating System	
Class I: Defect is present, but effect on reliability is not clear; no immediate action is required. Continue normal monitoring.	**Class III;** Defect (s) present that may cause failure in short term (less than 2 mos.). Should be addressed as soon as practical, with a high maintenance priority. Increase monitoring frequency.
Class II: Defect (s) present that may cause problem in long term (2-6 mos.). Repair during normal maintenance scheduling. Continue to monitor.	**Class IV;** Defect (s) present that makes continued reliability unpredictable, and possibility of secondary damage is high. ***Repairs should be made ASAP. An unscheduled shutdown should be considered for repairs.***

Vibration Data



Analysis

Crest Factor over 9.76. Sharp impacting.

Discussion / Repair recommendations

The Pump Bearings are in distress. Impacting is easily Identified with a Crest factor over 9. Recommend replacing the pump bearings and a complete internal inspection of wear parts and rotating elements. Have the motor inspected and serviced also. **Rated a Class III Defect.**

Trend Data