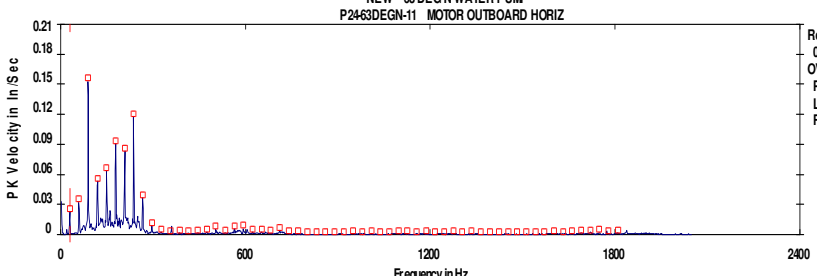
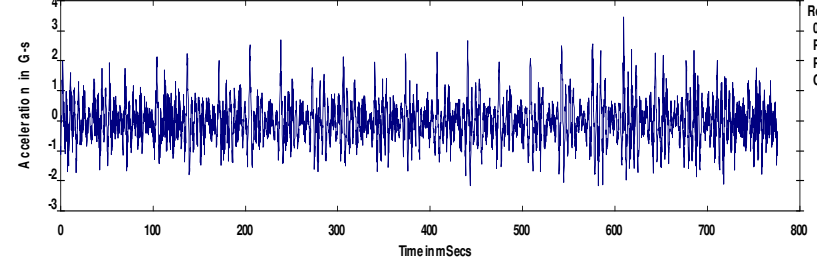
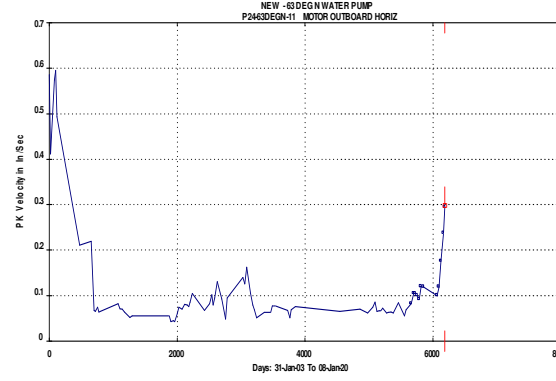




Client	Penn-A-Kem	Survey Date	1-8-2020
Location	Memphis, TN	Report Date	1-13-2020
Machine	P24-63DEGN 63 Degree North Pump	QMS No.	141533
Component	Pump Unit	Analyst	DWS

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.

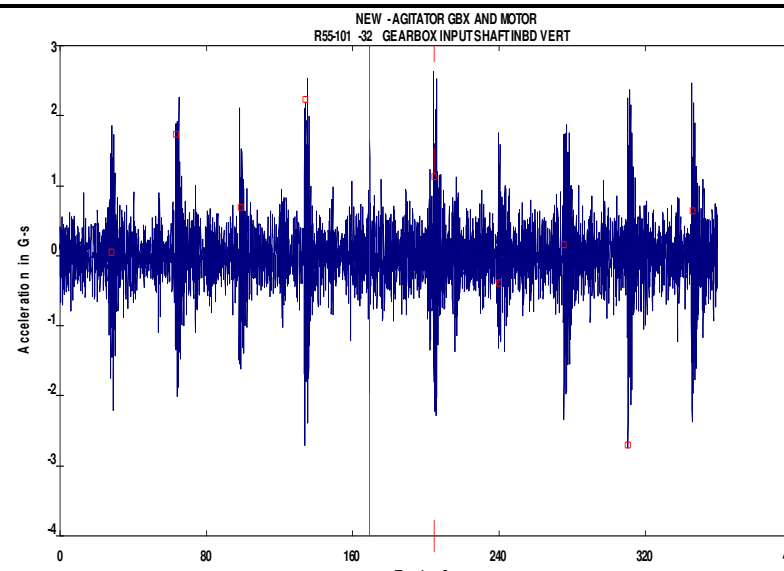
Vibration Data	Analysis
<p>NEW - 63 DEGN WATER PUMP P24-63DEGN-11 MOTOR OUTBOARD HORIZ</p>  <p>Route Spectrum 08-Jan-20 10:43:08 OVERALL= 2937 V-DG PK = 2927 LOAD = 100.0 RPM = 1779. (29.65 Hz)</p>  <p>Route Waveform 08-Jan-20 10:43:08 PK = .9763 PK(+) = 3.46215 CRESTF= 5.01</p> <p>Freq: 29.65 Ord: 1.000 Spec: .02326</p>	<p>The trends are generally higher for the unit. Multiple defect frequency vibration types are present.</p>

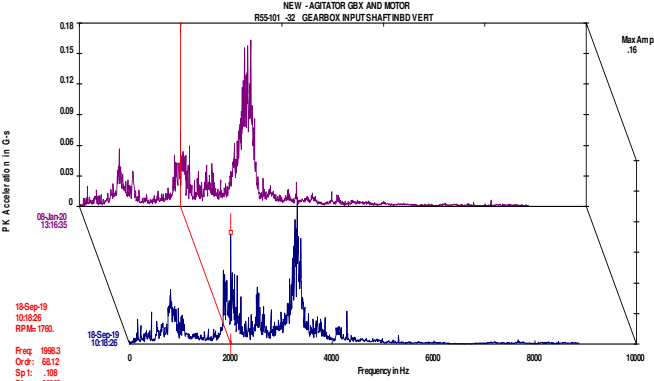
Discussion / Repair recommendations	Trend Data
<p>Both the motor and pump still have issues. The motor bearings show multiple harmonics of shaft speed indicating mechanical looseness. Random impacting in the pump data is usually a good indicator of the presence of bearing defects also. The rear pump seal is gone and spraying the bearing hard. We recommend replacing the motor and pump in the near future. Renew the coupling if needed as well. Rated a Class III Defect.</p>	 <p>Trend Display Overall Value Baseline Value: .566 Date: 31-Jan-20</p> <p>Date: 08-Jan-20 Time: 10:53:07 Ampl: .294</p>



Client	Penn-A-Kem	Survey Date	1-8-2020
Location	Memphis, TN	Report Date	1-13-2020
Machine	R55-101 Agitator Gearbox	QMS No.	141533
Component	Coupling/Gearbox	Analyst	DWS

Defect Rating for this machine	Class II
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.

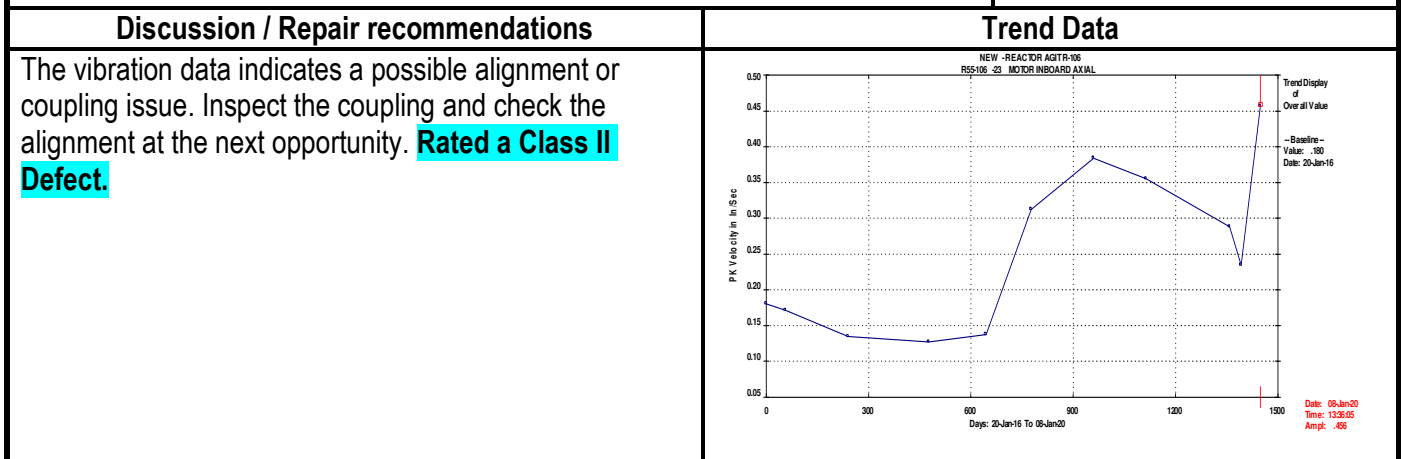
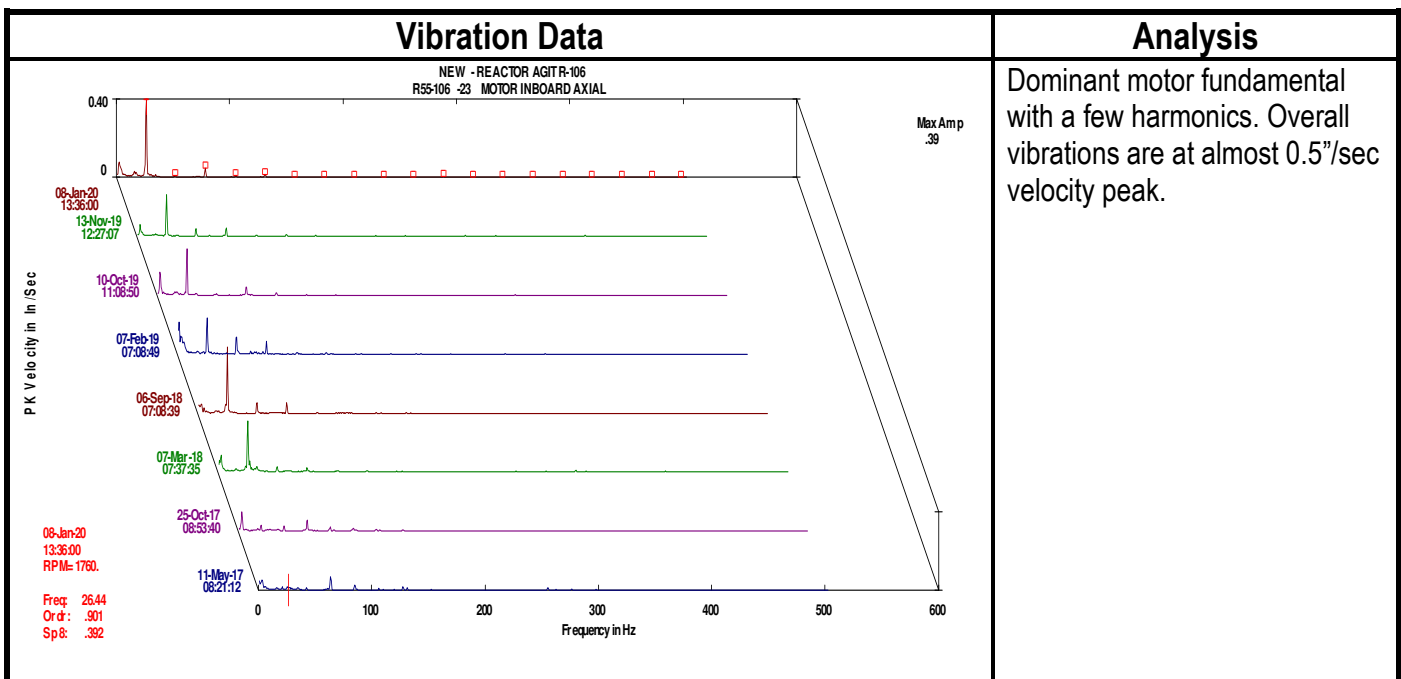
Vibration Data	Analysis
<p>NEW - AGITATOR GBX AND MOTOR R55-101 -32 GEARBOX INPUT SHAFT INBD VERT</p>  <p>Route Waveform 08-Jan-20 13:16:35</p> <p>PK = .6338 LOAD = 100.0 RPM = 1760. (29.33 Hz)</p> <p>PK(+) = 2.63 PK(-) = 2.74 CRESTF = 6.12</p> <p>Time: 204.62 Ampl: 1.089 Dlim: 35.30 Freq: 28.33</p>	<p>Waterfall shows elevated noise floor in the gearbox input data. Time domain shows impacting at shaft speed.</p>

Discussion / Repair recommendations	Trend Data
<p>The unit gearbox or input coupling could still be in distress. We recommend an inspection of the drivetrain and oil analysis of the gearbox oil to confirm. Impacting can be seen in the time domain. The gearbox seemed to be generating audible noises too; which also concerns us. Inspect as soon as practical. Rated a Class II Defect.</p>	 <p>NEW - AGITATOR GBX AND MOTOR R55-101 -32 GEARBOX INPUT SHAFT INBD VERT</p> <p>PK Acceleration in G-s</p> <p>Max Amp .16</p> <p>08-Jan-20 13:16:35</p> <p>18-Sep-19 10:18:25 RPM = 1760.</p> <p>Freq: 1996.3 Orb: .6812 Sp1: .108 Dirq: .00000</p> <p>Frequency in Hz</p>



Client	Penn-A-Kem	Survey Date	1-8-2020
Location	Memphis, TN	Report Date	1-13-2020
Machine	Reactor Agitator Motor Gearbox R55-106	QMS No.	141533
Component	Coupling/alignment.	Analyst	DWS

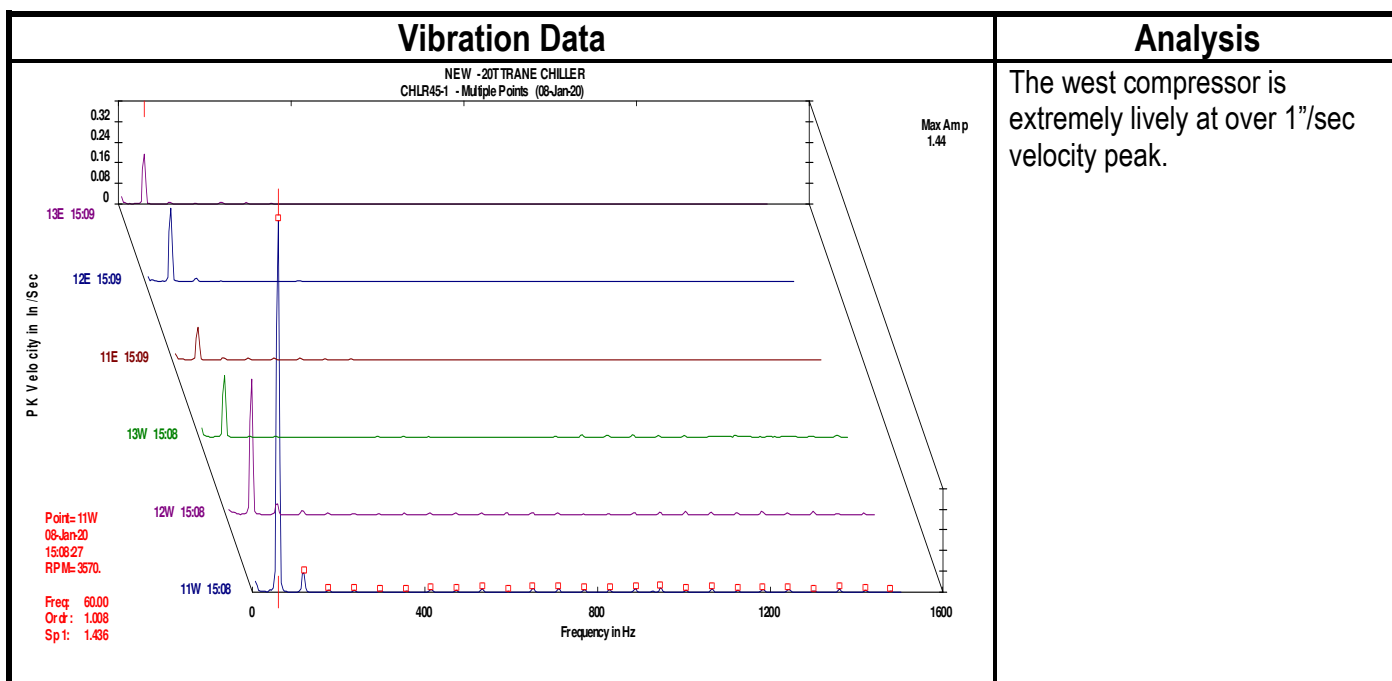
Defect Rating for this machine	Class II
Defect Rating System	
Class I: Defect is present, but effect on reliability is not clear; no immediate action is required. Continue normal monitoring.	Class III: Defect (s) present that may cause failure in short term (less than 2 mos.). Should be addressed as 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.

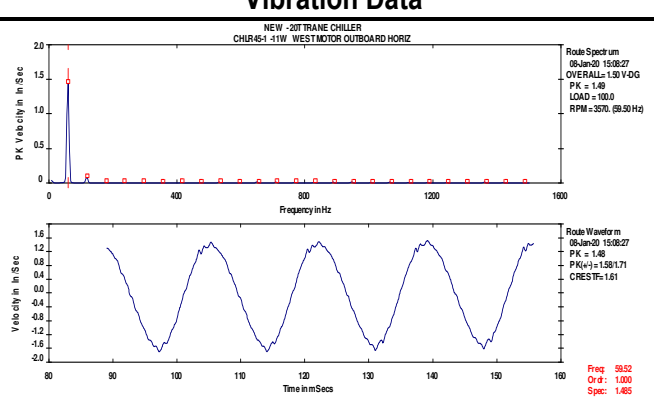




Client	Penn-A-Kem	Survey Date	1-8-2020
Location	Memphis, TN	Report Date	1-13-2020
Machine	CHLR45-1 20 Ton Trane Chiller	QMS No.	141533
Component		Analyst	DWS

Defect Rating for this machine	Class II
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.



Discussion / Repair recommendations	Vibration Data
<p>The top measurements are shown in the waterfall data, the West compressor is vibrating near 1.5"/sec velocity peak at 60 Hz shaft speed. Vibrations at these levels in the West unit will likely cause a reduced lifespan. Have the unit checked for compliance with the manufactures specification. Rated a Class II Defect for now.</p>	 <p>Route Spectrum 08-Jan-20 15:08:27 OVERALL= 1.50 V-DG PK = 1.48 LOAD = 100.0 RPM = 3570. (59.30 Hz)</p> <p>Route Waveform 08-Jan-20 15:08:27 PK = 1.48 PK(+) = 1.58/1.71 CRES TF= 1.61 Freq: 59.52 Ord: 1.000 Sp1: 1.465</p>