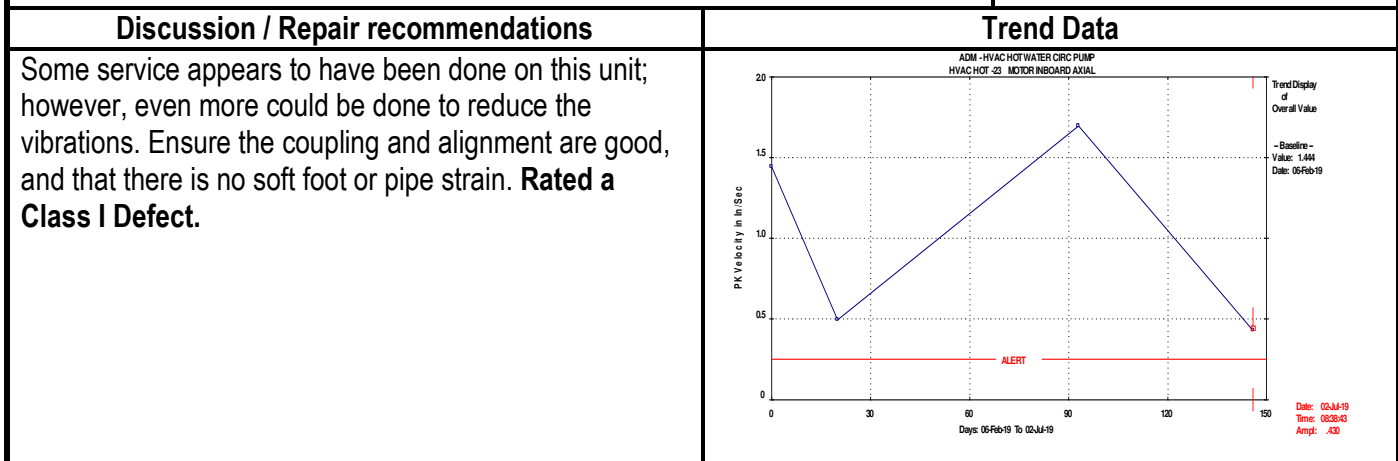
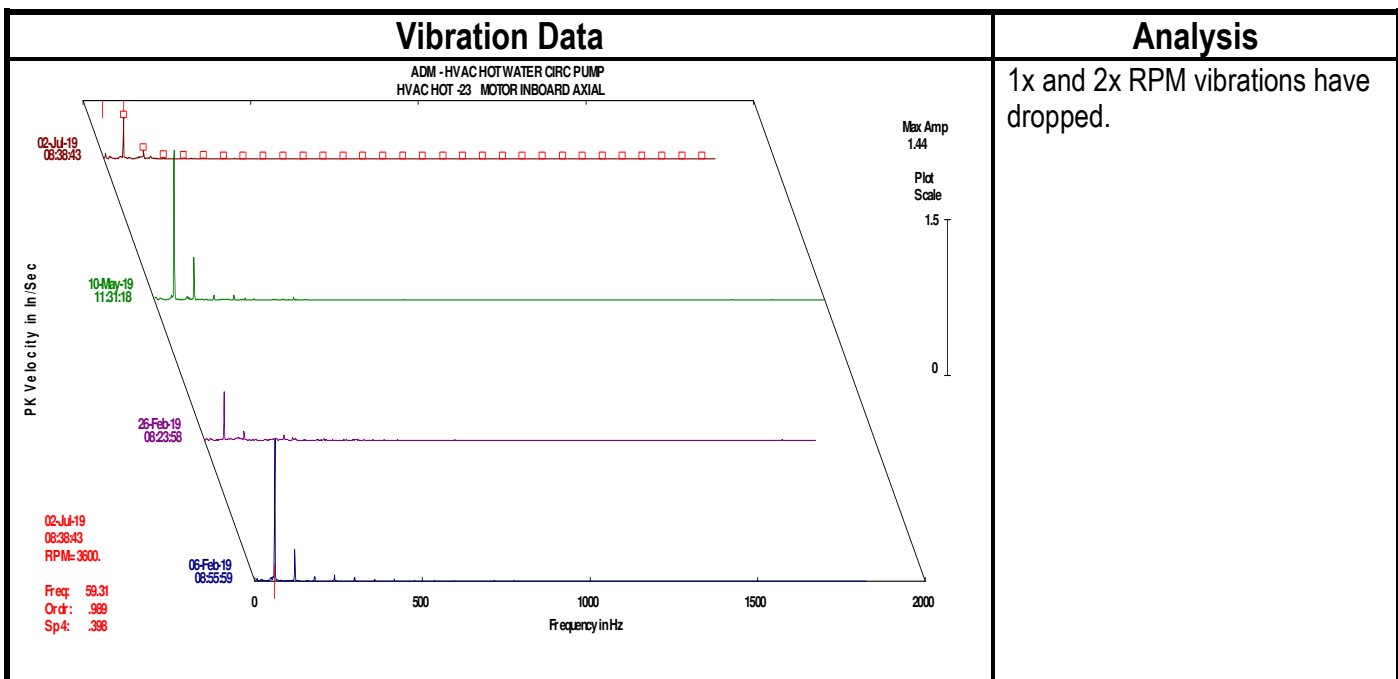




Client	Blues City Brewery	Survey Date	7-2-19
Location	Memphis, TN	Report Date	7-9-19
Machine	HVAC Hot Water Circulator Pump	QMS No.	140076
Component		Analyst	DWS

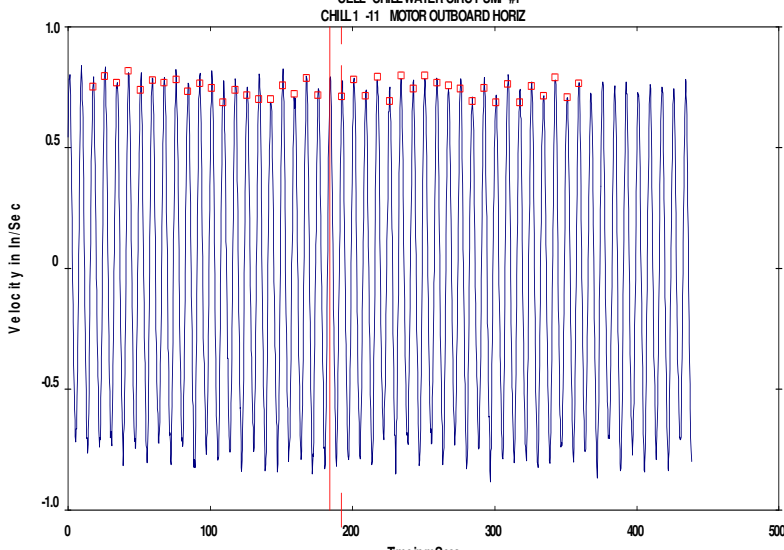
Defect Rating for this machine	CLASS I
Defect Rating System	
Class I: Defect is present, but effect on reliability is not clear; no immediate action is required. Continue normal monitoring.	Class III: Defect (s) present that may cause failure in short term (less than 2 mos.). Should be addressed as soon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

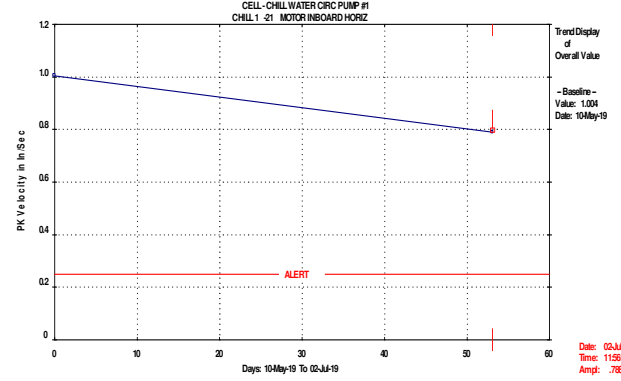




Client	Blues City Brewery	Survey Date	7-2-19
Location	Memphis, TN	Report Date	7-9-19
Machine	Chill Water Circulator Pump 1	QMS No.	140076
Component	2x line vibration in motor	Analyst	DWS

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.

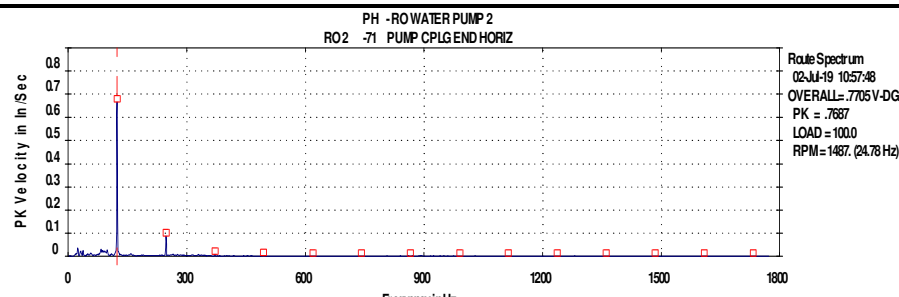
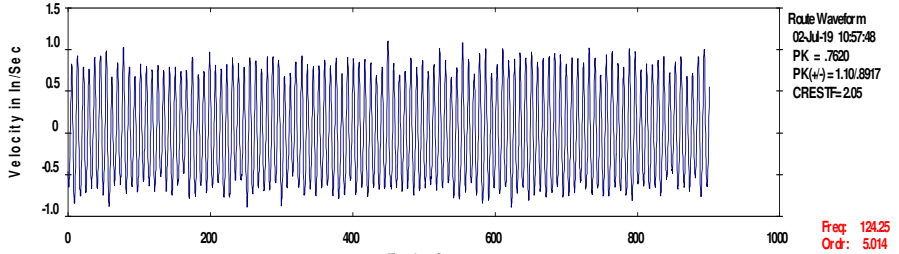
Vibration Data	Analysis
<p>CELL- CHILL WATER CIRC PUMP #1 CHILL 1 -11 MOTOR OUTBOARD HORIZ</p>  <p>Route Waveform 02-Jul-19 11:56:22</p> <p>PK = .7594 LOAD = 1000 RPM = 3600 (60.00 Hz)</p> <p>PK(+) = .6713 PK(-) = .8821 CRESTF = 1.63</p> <p>Time: 192.41 Ampl: .698 Dlrm: 8.337 Freq: 119.95</p>	<p>Dominant vibration appears to be 2x line frequency.</p>

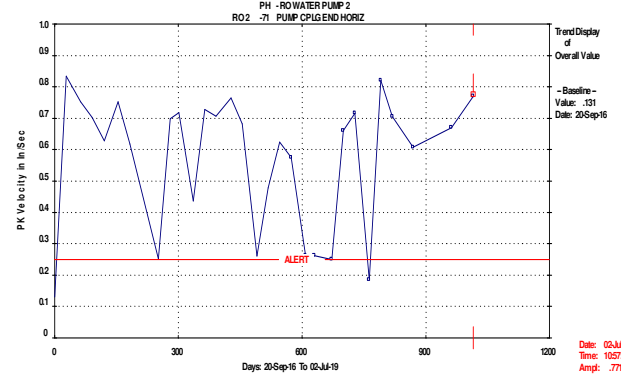
Discussion / Repair recommendations	Trend Data
<p>High vibrations near 2x line frequency could indicate an air gap issue in the motor. Air gap issues are variations in the distance between the surface of the rotor and stator. This could be caused by poor machining of the motor housing and end bells or possibly a soft foot. Unbalanced electrical phases can duplicate the vibration also. Start inspections with a precision alignment and soft foot check, followed by a motor phase and voltage analysis up to and including PDMA if necessary. Rated a Class III Defect.</p>	 <p>Trend Display of Overall Value</p> <p>- Baseline - Value: 1.004 Date: 10 May-19</p> <p>Date: 02-Jul-19 Time: 11:56:59 Ampl: .788</p>



Client	Blues City Brewery	Survey Date	7-2-19
Location	Memphis, TN	Report Date	7-9-19
Machine	RO Water Pump 2	QMS No.	140076
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.

Vibration Data	Analysis
<p>PH - RO WATER PUMP 2 RO2 -71 PUMP CPLG END HORIZ</p>  <p>Rule Spectrum 02-Jul-19 10:57:48 OVERALL=.7705V-DG PK = .7687 LOAD = 100.0 RPM = 1487. (24.78 Hz)</p>  <p>Rule Waveform 02-Jul-19 10:57:48 PK = .7620 PK(4+) = 1.1018917 CREST=2.05</p> <p>Freq: 124.25 Ord: 5.014 Spec: .666</p>	<p>Possible 5x RPM vibration.</p>

Discussion / Repair recommendations	Trend Data
<p>This unit still appears to have a vibration at vane pass. There could be wear in the pump, or there could be a flow issue. We recommend further inspection and adjustments of flow related controls, filters, screens or piping. Pump replacement might be considered to reduce the vibration. Rated a Class II Defect.</p>	 <p>Trend Display of Overall Value - Baseline Value: .131 Date: 20-Sep-16</p> <p>Date: 02-Jul-19 Time: 10:57:48 Ampl: .771</p>