HI-SPEED INDUSTRIAL SERVICE

MILLINGTON, TN

September 24, 2020

Penn A Kem

Subject: September vibration service

Most of the machines surveyed were found to be in good condition, with the exception of the following:

QualiTest® uses a four-step rating system for defects.

Class I: Defect is present, but effect on reliability is not clear; no immediate action is required. Continue to normally monitor.

Class II: Defect (s) present that may cause problem in long term (2-6 months.). Repair during normal maintenance scheduling. Continue to monitor.

Class III; Defect (s) present that may cause failure in short term (less than 2 months.). This should be addressed as soon as practical, with a high maintenance priority. Increase monitoring frequency.

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

Hi-Speed **Industrial Service** tests and inspects industrial machinery and equipment and makes recommendations concerning maintenance and repairs based on its experience in the field of industrial repair and maintenance. The information contained herein is provided as an opinion only, not as a guaranty or warranty of the matters discussed herein.

This completes our assessment of your equipment for this survey. Thank you for your business and don't hesitate to call if you have any comments or questions.

Sincerely,

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Detailed Defects

C53-C1A Hydrogen Compressor
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.

R80-10 Reactor Agitator Motor/Gearbox
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.**

P81101B West Fire Pump
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.**

Observations

P24-63 Degree Pump North
The pump axial vibrations still have a slight mound of noise in the spectrum that could be either bearing natural frequencies or some cavitation. We will watch closely going forward. No action required. **Rated a Class I Defect.**

R48-2 Reactor Agitator Motor and Gearbox
The apparent bent agitator shaft is still causing distress in the drive components. Motor top bearing vibration is above 0.3"/sec velocity peak. **Rated a Class I Defect.**

R53-301 Reactor Agitator Motor and Gearbox
The motor inboard axial is still at 0.53"/sec velocity peak. Inspect the motor and coupling, and check the shaft alignment, fasteners and frame as time allows. **Rated a Class II Defect.**

Big Blue Water Pump P24-BigBlue
The pump data still indicates possible slight looseness in the bearing fits as well as wear in the pump. The motor data shows slight bearing frequency defects and harmonics, as well as vane pass: which we suspect is 5x RPM. No immediate actions are required at this time. **Rated a Class I Defect.**

CHLR45-1 20 Ton Trane Chiller
The East compressor is still vibrating near 1.2"/sec velocity peak at 60 Hz shaft speed. Vibrations at these levels in either unit will likely cause a reduced lifespan. Have the unit checked for compliance with the manufacture's specification. **Rated a Class II Defect for now.**

Not Running this Survey but reported previously as shown below:

Axial Twin Screw Compressor C67-51
Motor vibration data shows two issues. Harmonics of shaft speed could indicate looseness in the bearings or fits. The is also a non-synchronous vibration peak with multiple harmonics (these are marked). They could indicate bearing race or rolling element defects. Compressor shows harmonics of lobe pass throughout the unit. We are going to rate the **Motor A Class II Defect for now** and the **Compressor A Class I.**

R55-106 Reactor Agitator Motor Gearbox
Most of the motor vibrations have dropped; however, the gearbox vibrations seem to have increased. The dominant vibration appears to be at input speed, which we believe to be about 25 Hz. Inspect the motor, coupling, gearbox, supports and structures for defects that could cause vibrations. **Rated a Class II Defect.**

Overall vibrations

Abbreviated Last Measurement Summary
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Database: penn.rbm
Station: PENNAKEM NEW CURRENT DATABASE
Report Date: 23-Oct-20 12:14

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD
B4C101-877 - ZURN BOILER BLOWER	(21-Oct-20)	
	OVERALL LEVEL	1-20 KHZ
11 - MOTOR OUTBOARD HORIZ	.187 In/Sec	.202 G-s
12 - MOTOR OUTBOARD VERT	.134 In/Sec	.219 G-s
21 - MOTOR INBOARD HORIZ	.135 In/Sec	.669 G-s
22 - MOTOR INBOARD VERT	.132 In/Sec	1.672 G-s
23 - MOTOR INBOARD AXIAL	.111 In/Sec	.579 G-s
71 - BLOWER INBOARD HORIZ	.163 In/Sec	.697 G-s
72 - BLOWER INBOARD VERT	.119 In/Sec	.331 G-s
81 - BLOWER WHEEL END HORIZ	.148 In/Sec	.658 G-s
82 - BLOWER WHEEL END VERT	.127 In/Sec	.277 G-s
P4C-102A - BOILER FEEDWATER PUMP	(21-Oct-20)	

		OVERALL LEVEL	1-20 KHZ
11	- MOTOR OUTBOARD HORIZ	.056 In/Sec	.493 G-s
12	- MOTOR OUTBOARD VERT	.038 In/Sec	.645 G-s
21	- MOTOR INBOARD HORIZ	.050 In/Sec	.520 G-s
22	- MOTOR INBOARD VERT	.047 In/Sec	.783 G-s
23	- MOTOR INBOARD AXIAL	.244 In/Sec	.452 G-s
71	- PUMP CPLG END HORIZ	.082 In/Sec	.461 G-s
72	- PUMP CPLG END VERT	.032 In/Sec	.915 G-s
73	- PUMP CPLG END AXIAL	.071 In/Sec	1.608 G-s
81	- PUMP OPP END HORIZ	.070 In/Sec	1.090 G-s
82	- PUMP OPP END VERT	.095 In/Sec	1.174 G-s
83	- PUMP OPP END AXIAL	.083 In/Sec	.416 G-s

P24-63DEGN - 63 DEG N WATER PUMP (21-Oct-20)

		OVERALL LEVEL	1-20 KHZ
11	- MOTOR OUTBOARD HORIZ	.089 In/Sec	.338 G-s
12	- MOTOR OUTBOARD VERT	.047 In/Sec	.367 G-s
21	- MOTOR INBOARD HORIZ	.076 In/Sec	.352 G-s
22	- MOTOR INBOARD VERT	.059 In/Sec	.403 G-s
23	- MOTOR INBOARD AXIAL	.041 In/Sec	.616 G-s
71	- PUMP CPLG END HORIZ	.081 In/Sec	.607 G-s
72	- PUMP CPLG END VERT	.035 In/Sec	.902 G-s
73	- PUMP CPLG END AXIAL	.144 In/Sec	1.942 G-s
81	- PUMP OPP END HORIZ	.072 In/Sec	.592 G-s
82	- PUMP OPP END VERT	.044 In/Sec	1.434 G-s

P24-63DEGS - 63 DEG S WATER PUMP (21-Oct-20)

		OVERALL LEVEL	1-20 KHZ
11	- MOTOR OUTBOARD HORIZ	.090 In/Sec	.290 G-s
12	- MOTOR OUTBOARD VERT	.102 In/Sec	.271 G-s
21	- MOTOR INBOARD HORIZ	.103 In/Sec	.451 G-s
22	- MOTOR INBOARD VERT	.053 In/Sec	.520 G-s
23	- MOTOR INBOARD AXIAL	.141 In/Sec	.343 G-s
71	- PUMP CPLG END HORIZ	.133 In/Sec	.370 G-s
72	- PUMP CPLG END VERT	.066 In/Sec	.570 G-s
73	- PUMP CPLG END AXIAL	.090 In/Sec	1.101 G-s
81	- PUMP OPP END HORIZ	.086 In/Sec	.489 G-s
82	- PUMP OPP END VERT	.039 In/Sec	.435 G-s
83	- PUMP OPP END AXIAL	.116 In/Sec	1.038 G-s

P24-85DEGN - 85 DEG N WATER CIRC PUMP 125 (21-Oct-20)

		OVERALL LEVEL	1-20 KHZ
11	- MOTOR OUTBOARD HORIZ	.089 In/Sec	1.841 G-s
12	- MOTOR OUTBOARD VERT	.060 In/Sec	1.129 G-s
21	- MOTOR INBOARD HORIZ	.075 In/Sec	1.505 G-s
22	- MOTOR INBOARD VERT	.046 In/Sec	.558 G-s
23	- MOTOR INBOARD AXIAL	.032 In/Sec	.324 G-s
71	- PUMP CPLG END HORIZ	.115 In/Sec	.766 G-s
72	- PUMP CPLG END VERT	.175 In/Sec	.679 G-s
73	- PUMP CPLG END AXIAL	.158 In/Sec	.743 G-s
81	- PUMP OPP END HORIZ	.094 In/Sec	.804 G-s
82	- PUMP OPP END VERT	.086 In/Sec	.659 G-s
83	- PUMP OPP END AXIAL	.142 In/Sec	.882 G-s

P24BGBL876 - BIG BLUE WATER PUMP-63 DEG (21-Oct-20)

		OVERALL LEVEL	1-20 KHZ
11	- MOTOR OUTBOARD HORIZ	.200 In/Sec	1.547 G-s

12	- MOTOR OUTBOARD VERT	.061 In/Sec	1.390 G-s
21	- MOTOR INBOARD HORIZ	.238 In/Sec	1.950 G-s
22	- MOTOR INBOARD VERT	.232 In/Sec	2.311 G-s
23	- MOTOR INBOARD AXIAL	.116 In/Sec	1.749 G-s
71	- PUMP CPLG END HORIZ	.337 In/Sec	.385 G-s
72	- PUMP CPLG END VERT	.150 In/Sec	.295 G-s
73	- PUMP CPLG END AXIAL	.237 In/Sec	.171 G-s
81	- PUMP OPP END HORIZ	.311 In/Sec	.449 G-s
82	- PUMP OPP END VERT	.273 In/Sec	1.001 G-s
83	- PUMP OPP END AXIAL	.158 In/Sec	.450 G-s

P36-905C - N COOL TWR-EAST PUMP (21-Oct-20)

		OVERALL LEVEL	1-20 KHZ
11	- MOTOR OUTBOARD HORIZ	.040 In/Sec	.653 G-s
12	- MOTOR OUTBOARD VERT	.046 In/Sec	.213 G-s
21	- MOTOR INBOARD HORIZ	.037 In/Sec	.710 G-s
22	- MOTOR INBOARD VERT	.022 In/Sec	.254 G-s
23	- MOTOR INBOARD AXIAL	.027 In/Sec	.055 G-s
71	- PUMP CPLG END HORIZ	.142 In/Sec	1.194 G-s
72	- PUMP CPLG END VERT	.136 In/Sec	1.498 G-s
73	- PUMP CPLG END AXIAL	.167 In/Sec	.517 G-s
81	- PUMP OPP END HORIZ	.093 In/Sec	.848 G-s
82	- PUMP OPP END VERT	.171 In/Sec	1.420 G-s
83	- PUMP OPP END AXIAL	.149 In/Sec	1.268 G-s

C36-EAST - UTILITY AIRCOMP ROTARY 200HP (21-Oct-20)

		OVERALL LEVEL	1-20 KHZ
11	- MOTOR OUTBOARD HORIZ	.061 In/Sec	1.102 G-s
12	- MOTOR OUTBOARD VERT	.066 In/Sec	.950 G-s
21	- MOTOR INBOARD HORIZ	.103 In/Sec	.502 G-s
22	- MOTOR INBOARD VERT	.116 In/Sec	.475 G-s
23	- MOTOR INBOARD AXIAL	.115 In/Sec	1.842 G-s
71	- MALE - CPLG END HORIZ	.130 In/Sec	2.453 G-s
72	- MALE - CPLG END VERT	.108 In/Sec	1.129 G-s
73	- MALE-CPLG END AXIAL	.115 In/Sec	1.332 G-s
81	- MALE- OPP END HORIZ	.137 In/Sec	4.270 G-s
82	- MALE- OPP END VERT	.137 In/Sec	.910 G-s
71F	- FEMALE - CPLG END HORIZ	.166 In/Sec	.729 G-s
72F	- FEMALE- CPLG END VERT	.099 In/Sec	1.549 G-s
81F	- FEMALE- OPP END HORIZ	.130 In/Sec	1.395 G-s
82F	- FEMALE- OPP END VERT	.091 In/Sec	1.977 G-s

C36-SOUTH - UTILITY AIRCOMP ROTARY 150HP (21-Oct-20)

		OVERALL LEVEL	1-20 KHZ
11	- MOTOR OUTBOARD HORIZ	.048 In/Sec	.826 G-s
12	- MOTOR OUTBOARD VERT	.053 In/Sec	1.220 G-s
21	- MOTOR INBOARD HORIZ	.046 In/Sec	.621 G-s
22	- MOTOR INBOARD VERT	.118 In/Sec	1.032 G-s
23	- MOTOR INBOARD AXIAL	.062 In/Sec	1.838 G-s
71	- MALE - CPLG END HORIZ	.065 In/Sec	.939 G-s
72	- MALE - CPLG END VERT	.105 In/Sec	1.382 G-s
73	- MALE-CPLG END AXIAL	.068 In/Sec	.523 G-s
81	- MALE- OPP END HORIZ	.090 In/Sec	.966 G-s
82	- MALE- OPP END VERT	.096 In/Sec	1.449 G-s
71F	- FEMALE - CPLG END HORIZ	.053 In/Sec	1.037 G-s
72F	- FEMALE- CPLG END VERT	.115 In/Sec	2.266 G-s
81F	- FEMALE- OPP END HORIZ	.092 In/Sec	1.123 G-s

82F - FEMALE- OPP END VERT		.122 In/Sec	.843 G-s
P39-4-877 - WELL PUMP #4	(21-Oct-20)		
		OVERALL LEVEL	1-20 KHZ
11 - MOTOR TOP N-S		.270 In/Sec	.499 G-s
12 - MOTOR TOP E-W		.207 In/Sec	.459 G-s
21 - MOTOR BOTTOM N-S		.124 In/Sec	.248 G-s
22 - MOTOR BOTTOM E-W		.115 In/Sec	.165 G-s
23 - MOTOR BOTTOM VERT		.059 In/Sec	.421 G-s
C42-4 - AXIAL TWIN SCREW COMPRESSOR	(21-Oct-20)		
		OVERALL LEVEL	1-20 KHZ
11 - MOTOR OUTBOARD HORIZ		.077 In/Sec	2.388 G-s
12 - MOTOR OUTBOARD VERT		.062 In/Sec	2.934 G-s
21 - MOTOR INBOARD HORIZ		.090 In/Sec	2.197 G-s
22 - MOTOR INBOARD VERT		.049 In/Sec	1.456 G-s
23 - MOTOR INBOARD AXIAL		.061 In/Sec	1.994 G-s
71 - MALE - CPLG END HORIZ		.092 In/Sec	1.602 G-s
72 - MALE - CPLG END VERT		.044 In/Sec	.600 G-s
73 - MALE-CPLG END AXIAL		.125 In/Sec	1.696 G-s
81 - MALE- OPP END HORIZ		.104 In/Sec	.614 G-s
82 - MALE- OPP END VERT		.038 In/Sec	.568 G-s
83 - MALE-OPP END AXIAL		.100 In/Sec	.743 G-s
71F - FEMALE - CPLG END HORIZ		.122 In/Sec	1.133 G-s
72F - FEMALE- CPLG END VERT		.076 In/Sec	.211 G-s
73F - FEMALE-CPLG END AXIAL		.079 In/Sec	1.488 G-s
81F - FEMALE- OPP END HORIZ		.122 In/Sec	.379 G-s
82F - FEMALE- OPP END VERT		.069 In/Sec	.577 G-s
83F - FEMALE- OPP END AXIAL		.106 In/Sec	.665 G-s
P42-4A - CENTRIFUGAL HOT OIL PUMP 5HP	(21-Oct-20)		
		OVERALL LEVEL	1-20 KHZ
11 - MOTOR OUTBOARD HORIZ		.015 In/Sec	.092 G-s
21 - MOTOR INBOARD HORIZ		.066 In/Sec	.073 G-s
71 - PUMP COUPLING END HORIZ		.016 In/Sec	.635 G-s
P42-4B - CENTRIFUGAL HOT OIL PUMP 5HP	(21-Oct-20)		
		OVERALL LEVEL	1-20 KHZ
11 - MOTOR OUTBOARD HORIZ		.045 In/Sec	.018 G-s
21 - MOTOR INBOARD HORIZ		.045 In/Sec	.155 G-s
23 - MOTOR INBOARD AXIAL		.037 In/Sec	.056 G-s
71 - PUMP COUPLING END HORIZ		.027 In/Sec	.165 G-s
P42-4D - CENTRIFUGAL HOT OIL PUMP 5HP	(21-Oct-20)		
		OVERALL LEVEL	1-20 KHZ
11 - MOTOR OUTBOARD HORIZ		.010 In/Sec	.088 G-s
21 - MOTOR INBOARD HORIZ		.018 In/Sec	.115 G-s
23 - MOTOR INBOARD AXIAL		.048 In/Sec	.068 G-s
71 - PUMP COUPLING END HORIZ		.022 In/Sec	.096 G-s
P48-7B - ROTOJET HIGH PRESS PUMP 15HP	(21-Oct-20)		
		OVERALL LEVEL	1-20 KHZ
11 - MOTOR OUTBOARD HORIZ		.077 In/Sec	.193 G-s
12 - MOTOR OUTBOARD VERT		.083 In/Sec	.195 G-s
21 - MOTOR INBOARD HORIZ		.069 In/Sec	.794 G-s
22 - MOTOR INBOARD VERT		.068 In/Sec	.815 G-s
23 - MOTOR INBOARD AXIAL		.069 In/Sec	.369 G-s

71	- PUMP CPLG END HORIZ	.220 In/Sec	1.540 G-s
72	- PUMP CPLG END VERT	.086 In/Sec	1.244 G-s
73	- PUMP CPLG END AXIAL	.066 In/Sec	1.395 G-s
81	- PUMP OPP END HORIZ	.260 In/Sec	2.026 G-s
82	- PUMP OPP END VERT	.105 In/Sec	1.030 G-s

R48-2	- AGITATOR GEARBOX FAULK 15HP	(21-Oct-20)	
		OVERALL LEVEL	
11	- MOTOR OUTBOARD NORTH	.275 In/Sec	
12	- MOTOR OUTBOARD WEST	.337 In/Sec	
21	- MOTOR INBOARD NORTH	.189 In/Sec	
22	- MOTOR INBOARD WEST	.303 In/Sec	
23	- MOTOR INBOARD AXIAL	.073 In/Sec	
31	- GEARBOX INPUT SHAFT NORTH	.183 In/Sec	
32	- GEARBOX INPUT SHAFT WEST	.181 In/Sec	
41	- AGITATOR SEAL BEARING NORTH	.157 In/Sec	

C53-1A-050	- C1-A H2 COMPRESSOR	(21-Oct-20)	
		OVERALL LEVEL	1-20 KHZ
11	- MOTOR OUTBOARD HORIZ	.080 In/Sec	1.029 G-s
12	- MOTOR OUTBOARD VERT	.034 In/Sec	1.052 G-s
21	- MOTOR INBOARD HORIZ	.086 In/Sec	.340 G-s
22	- MOTOR INBOARD VERT	.075 In/Sec	2.641 G-s
23	- MOTOR INBOARD AXIAL	.060 In/Sec	1.129 G-s
71	- PUMP CPLG END HORIZ	.113 In/Sec	.101 G-s
72	- PUMP CPLG END VERT	.029 In/Sec	.064 G-s
73	- PUMP CPLG END AXIAL	.070 In/Sec	.081 G-s
81	- PUMP OPP END HORIZ	.122 In/Sec	.089 G-s
82	- PUMP OPP END VERT	.014 In/Sec	.050 G-s

C53-301B	- C-301B RECIP COMPRESSOR	(21-Oct-20)	
		OVERALL LEVEL	1-20 KHZ
11	- MOTOR OUTBOARD HORIZ	.044 In/Sec	.651 G-s
12	- MOTOR OUTBOARD VERT	.044 In/Sec	1.398 G-s
21	- MOTOR INBOARD HORIZ	.053 In/Sec	.938 G-s
22	- MOTOR INBOARD VERT	.042 In/Sec	2.945 G-s
23	- MOTOR INBOARD AXIAL	.064 In/Sec	.254 G-s
71	- CRANKSHAFT DRIVE END HORIZ	.059 In/Sec	.092 G-s
72	- CRANKSHAFT DRIVE END VERT	.028 In/Sec	.175 G-s
73	- CRANKSHAFT DRIVE END AXIAL	.081 In/Sec	.123 G-s
81	- CRANKSHAFT OPP END HORIZ	.060 In/Sec	.074 G-s
82	- CRANKSHAFT OPP END VERT	.039 In/Sec	.074 G-s

P53-301	- ANSI CENTRIFUGAL PUMP 50 HP	(21-Oct-20)	
		OVERALL LEVEL	1-20 KHZ
11	- MOTOR OUTBOARD HORIZ	.128 In/Sec	.081 G-s
12	- MOTOR OUTBOARD VERT	.137 In/Sec	.087 G-s
21	- MOTOR INBOARD HORIZ	.107 In/Sec	.396 G-s
22	- MOTOR INBOARD VERT	.074 In/Sec	.455 G-s
23	- MOTOR INBOARD AXIAL	.153 In/Sec	.128 G-s
71	- PUMP CPLG END HORIZ	.081 In/Sec	.494 G-s
72	- PUMP CPLG END VERT	.076 In/Sec	.345 G-s
73	- PUMP CPLG END AXIAL	.067 In/Sec	.376 G-s
81	- PUMP OPP END HORIZ	.062 In/Sec	1.152 G-s
82	- PUMP OPP END VERT	.055 In/Sec	.325 G-s

R53-301	- AGITATOR GBX CHEMINEER 15HP	(21-Oct-20)

		OVERALL LEVEL
11	- MOTOR OUTBOARD HORIZ	.239 In/Sec
12	- MOTOR OUTBOARD VERT	.212 In/Sec
21	- MOTOR INBOARD HORIZ	.227 In/Sec
22	- MOTOR INBOARD VERT	.333 In/Sec
23	- MOTOR INBOARD AXIAL	.528 In/Sec
31	- GEARBOX INPUT SHAFT-INBD HOR	.168 In/Sec
32	- GEARBOX INPUT SHAFT INBD VERT	.058 In/Sec
33	- GEARBOX INPUT SHAFT INBD AXIAL	.234 In/Sec
41	- GEARBOX INPUT SHAFT OUTBD HOR	.210 In/Sec
42	- GEARBOX INPUT SHAFT OUTBD VERT	.122 In/Sec
51	- GEARBOX OUTPUT SHAFT TOP N-S	.191 In/Sec
52	- GEARBOX OUTPUT SHAFT TOP E-W	.041 In/Sec
61	- GEARBOX OUTPUT SHAFT MID N-S	.129 In/Sec
62	- GEARBOX OUTPUT SHAFT MID E-W	.063 In/Sec
71	- GEARBOX OUTPUT SHAFT BOT N-S	.027 In/Sec

P53-310A - GRUNDFOSS VERT PUMP 10HP (21-Oct-20)

		OVERALL LEVEL	1-20 KHZ
11	- MOTOR OUTBOARD HORIZ	.110 In/Sec	.165 G-s
12	- MOTOR OUTBOARD VERT	.113 In/Sec	.066 G-s
21	- MOTOR INBOARD HORIZ	.047 In/Sec	.660 G-s
22	- MOTOR INBOARD VERT	.057 In/Sec	.400 G-s
23	- MOTOR INBOARD AXIAL	.040 In/Sec	.187 G-s
71	- PUMP CPLG END HORIZ	.087 In/Sec	.310 G-s
72	- PUMP CPLG END VERT	.072 In/Sec	.309 G-s
81	- PUMP OPP END HORIZ	.015 In/Sec	.300 G-s
82	- PUMP OPP END VERT	.021 In/Sec	.119 G-s

C54--115 - COMP 2CYL 2 STAGE 75 HP (21-Oct-20)

		OVERALL LEVEL	1-20 KHZ
11	- MOTOR OUTBOARD HORIZ	.055 In/Sec	.403 G-s
12	- MOTOR OUTBOARD VERT	.185 In/Sec	.278 G-s
21	- MOTOR INBOARD HORIZ	.056 In/Sec	.639 G-s
22	- MOTOR INBOARD VERT	.057 In/Sec	.405 G-s
23	- MOTOR INBOARD AXIAL	.171 In/Sec	.142 G-s
71	- PUMP CPLG END HORIZ	.083 In/Sec	.031 G-s
72	- PUMP CPLG END VERT	.034 In/Sec	.040 G-s
73	- PUMP CPLG END AXIAL	.037 In/Sec	.065 G-s
81	- PUMP OPP END HORIZ	.026 In/Sec	.027 G-s
82	- PUMP OPP END VERT	.085 In/Sec	.027 G-s

P54-112 - CANNED MOTOR CENTRIFUG PUMP (21-Oct-20)

		OVERALL LEVEL	1-20 KHZ
11	- MOTOR OUTBOARD HORIZ	.064 In/Sec	.019 G-s
12	- MOTOR OUTBOARD VERT	.026 In/Sec	.066 G-s
13	- MOTOR OUTBOARD AXIAL	.061 In/Sec	.030 G-s
21	- MOTOR INBOARD HORIZ	.061 In/Sec	.134 G-s
22	- MOTOR INBOARD VERT	.016 In/Sec	.154 G-s
71	- PUMP CPLG END HORIZ	.065 In/Sec	.088 G-s
72	- PUMP CPLG END VERT	.031 In/Sec	.111 G-s
81	- PUMP OPP END HORIZ	.061 In/Sec	.012 G-s
82	- PUMP OPP END VERT	.033 In/Sec	.021 G-s

R55-101 - AGITATOR GBX AND MOTOR (21-Oct-20)

		OVERALL LEVEL
11	- MOTOR OUTBOARD HORIZ	.107 In/Sec

12	- MOTOR OUTBOARD VERT	.034 In/Sec	
21	- MOTOR INBOARD HORIZ	.110 In/Sec	
22	- MOTOR INBOARD VERT	.041 In/Sec	
23	- MOTOR INBOARD AXIAL	.059 In/Sec	
31	- GEARBOX INPUT SHAFT-INBD HOR	.094 In/Sec	
32	- GEARBOX INPUT SHAFT INBD VERT	.017 In/Sec	
33	- GEARBOX INPUT SHAFT INBD AXIAL	.055 In/Sec	
41	- GEARBOX INPUT SHAFT OUTBD HOR	.092 In/Sec	
42	- GEARBOX INPUT SHAFT OUTBD VERT	.020 In/Sec	
51	- GEARBOX OUTPUT SHAFT TOP N-S	.087 In/Sec	
52	- GEARBOX OUTPUT SHAFT TOP E-W	.019 In/Sec	
61	- GEARBOX OUTPUT SHAFT MID N-S	.081 In/Sec	
62	- GEARBOX OUTPUT SHAFT MID E-W	.034 In/Sec	

R55-102 - REACTOR AGIT R-102 (21-Oct-20)

		OVERALL LEVEL	1-20 KHZ
11	- MOTOR OUTBOARD HORIZ	.036 In/Sec	.250 G-s
12	- MOTOR OUTBOARD VERT	.033 In/Sec	.108 G-s
21	- MOTOR INBOARD HORIZ	.031 In/Sec	.573 G-s
22	- MOTOR INBOARD VERT	.039 In/Sec	.336 G-s
23	- MOTOR INBOARD AXIAL	.047 In/Sec	.200 G-s
31	- GEARBOX INPUT SHAFT-INBD HOR	.025 In/Sec	
32	- GEARBOX INPUT SHAFT INBD VERT	.011 In/Sec	
33	- GEARBOX INPUT SHAFT INBD AXIAL	.027 In/Sec	
41	- GEARBOX INPUT SHAFT OUTBD HOR	.022 In/Sec	
42	- GEARBOX INPUT SHAFT OUTBD VERT	.013 In/Sec	
51	- GEARBOX OUTPUT SHAFT TOP PERP	.019 In/Sec	
61	- GEARBOX OUTPUT SHAFT MID PERP	.018 In/Sec	

P67-54 - HOT OIL CIRC PMP CENT 15HP (21-Oct-20)

		OVERALL LEVEL	1-20 KHZ
11	- MOTOR OUTBOARD HORIZ	.073 In/Sec	.203 G-s
12	- MOTOR OUTBOARD VERT	.023 In/Sec	.083 G-s
21	- MOTOR INBOARD HORIZ	.080 In/Sec	.183 G-s
22	- MOTOR INBOARD VERT	.022 In/Sec	.167 G-s
23	- MOTOR INBOARD AXIAL	.044 In/Sec	.075 G-s
71	- PUMP CPLG END HORIZ	.062 In/Sec	.236 G-s
72	- PUMP CPLG END VERT	.046 In/Sec	.291 G-s
73	- PUMP CPLG END AXIAL	.049 In/Sec	.400 G-s
81	- PUMP OPP END HORIZ	.061 In/Sec	.402 G-s
82	- PUMP OPP END VERT	.030 In/Sec	.232 G-s

P67-504 - HOT OIL CIRC PMP CENT 50HP (21-Oct-20)

		OVERALL LEVEL	1-20 KHZ
11	- MOTOR OUTBOARD HORIZ	.028 In/Sec	.225 G-s
12	- MOTOR OUTBOARD VERT	.050 In/Sec	.075 G-s
21	- MOTOR INBOARD HORIZ	.033 In/Sec	.150 G-s
22	- MOTOR INBOARD VERT	.057 In/Sec	.156 G-s
23	- MOTOR INBOARD AXIAL	.083 In/Sec	.074 G-s
71	- PUMP CPLG END HORIZ	.143 In/Sec	.244 G-s
72	- PUMP CPLG END VERT	.089 In/Sec	.068 G-s
73	- PUMP CPLG END AXIAL	.105 In/Sec	.034 G-s
81	- PUMP OPP END HORIZ	.074 In/Sec	.199 G-s
82	- PUMP OPP END VERT	.084 In/Sec	.176 G-s

R80-10 - AGITATOR GBX (21-Oct-20)

		OVERALL LEVEL

11 - MOTOR OUTBOARD HORIZ	.103 In/Sec	
12 - MOTOR OUTBOARD VERT	.150 In/Sec	
21 - MOTOR INBOARD HORIZ	.076 In/Sec	
22 - MOTOR INBOARD VERT	.075 In/Sec	
23 - MOTOR INBOARD AXIAL	.072 In/Sec	
31 - GEARBOX INPUT SHAFT-INBD HOR	.087 In/Sec	
32 - GEARBOX INPUT SHAFT INBD VERT	.057 In/Sec	
41 - GEARBOX INPUT SHAFT OUTBD HOR	.077 In/Sec	
42 - GEARBOX INPUT SHAFT OUTBD VERT	.068 In/Sec	
43 - GEARBOX INPUT SHAFT OUTBD AXIAL	.044 In/Sec	
51 - GEARBOX OUTPUT SHAFT TOP N-S	.062 In/Sec	
52 - GEARBOX OUTPUT SHAFT TOP E-W	.095 In/Sec	
61 - GEARBOX OUTPUT SHAFT MID N-S	.054 In/Sec	
62 - GEARBOX OUTPUT SHAFT MID E-W	.079 In/Sec	
63 - GEARBOX OUTPUT SHAFT MID VERT	.051 In/Sec	

P81-101B - Fire Pump - West (21-Oct-20)

	OVERALL LEVEL	1-20 KHZ
11 - MOTOR OUTBOARD HORIZ	.136 In/Sec	.998 G-s
12 - MOTOR OUTBOARD VERT	.131 In/Sec	.652 G-s
13 - MOTOR OUTBOARD AXIAL	.144 In/Sec	.186 G-s
21 - MOTOR INBOARD HORIZ	.141 In/Sec	.933 G-s
22 - MOTOR INBOARD VERT	.137 In/Sec	3.962 G-s
23 - MOTOR INBOARD AXIAL	.125 In/Sec	1.340 G-s
71 - PUMP CPLG END HORIZ	.364 In/Sec	16.65 G-s
73 - PUMP CPLG END AXIAL	.613 In/Sec	4.461 G-s
83 - PUMP OPP END AXIAL	.341 In/Sec	6.590 G-s

P81-101A - Fire Pump - East (21-Oct-20)

	OVERALL LEVEL	1-20 KHZ
11 - MOTOR OUTBOARD HORIZ	.142 In/Sec	.311 G-s
12 - MOTOR OUTBOARD VERT	.156 In/Sec	1.147 G-s
13 - MOTOR OUTBOARD AXIAL	.168 In/Sec	.451 G-s
21 - MOTOR INBOARD HORIZ	.263 In/Sec	.358 G-s
22 - MOTOR INBOARD VERT	.276 In/Sec	.792 G-s
23 - MOTOR INBOARD AXIAL	.117 In/Sec	.940 G-s
71 - PUMP CPLG END HORIZ	.119 In/Sec	.302 G-s
72 - PUMP CPLG END VERT	.159 In/Sec	.674 G-s
73 - PUMP CPLG END AXIAL	.333 In/Sec	.365 G-s
81 - PUMP OPP END HORIZ	.175 In/Sec	.477 G-s
82 - PUMP OPP END VERT	.170 In/Sec	.666 G-s
83 - PUMP OPP END AXIAL	.223 In/Sec	.188 G-s

P81-102A - JOCKEY FIRE PUMP HORIZONTAL (21-Oct-20)

	OVERALL LEVEL	1-20 KHZ
11 - MOTOR OUTBOARD HORIZ	.123 In/Sec	.258 G-s
12 - MOTOR OUTBOARD VERT	.299 In/Sec	.109 G-s
13 - MOTOR OUTBOARD AXIAL	.735 In/Sec	1.543 G-s
21 - MOTOR INBOARD HORIZ	.471 In/Sec	.607 G-s
22 - MOTOR INBOARD VERT	.352 In/Sec	1.407 G-s
23 - MOTOR INBOARD AXIAL	.838 In/Sec	.962 G-s

B82-101A - FAN FORCED DRAFT 10HP SOUTH (21-Oct-20)

	OVERALL LEVEL	1-20 KHZ
11 - MOTOR OUTBOARD HORIZ	.103 In/Sec	.196 G-s
12 - MOTOR OUTBOARD VERT	.153 In/Sec	.118 G-s
21 - MOTOR INBOARD HORIZ	.181 In/Sec	.220 G-s

22	- MOTOR INBOARD VERT	.250 In/Sec	.204 G-s
23	- MOTOR INBOARD AXIAL	.308 In/Sec	.113 G-s

B82-102	- INDUCED DRAFT 150 HP	(21-Oct-20)	
		OVERALL LEVEL	1-20 KHZ
11	- MOTOR OUTBOARD HORIZ	.035 In/Sec	.072 G-s
12	- MOTOR OUTBOARD VERT	.026 In/Sec	.092 G-s
21	- MOTOR INBOARD HORIZ	.038 In/Sec	.541 G-s
22	- MOTOR INBOARD VERT	.044 In/Sec	.670 G-s
23	- MOTOR INBOARD AXIAL	.036 In/Sec	.274 G-s
31	- FAN INBOARD HORIZONTAL	.030 In/Sec	.435 G-s
32	- FAN INBOARD VERTICAL	.035 In/Sec	.087 G-s
41	- FAN OUTBOARD HORIZONTAL	.030 In/Sec	.055 G-s
42	- FAN OUTBOARD VERT	.028 In/Sec	.086 G-s

CHLR67-1W	- 240T TRANE CHILLER WEST	(21-Oct-20)	
		OVERALL LEVEL	
11	- HOTOR OUTBOARD HORIZ	.200 In/Sec	
12	- HOTOR OUTBOARD VERT	.260 In/Sec	
13	- HOTOR OUTBOARD AXIAL	.396 In/Sec	
21	- HOTOR INBOARD HORIZ	.141 In/Sec	
22	- HOTOR INBOARD VERT	.201 In/Sec	
71	- COMP INBOARD HORIZ	.125 In/Sec	
72	- COMP INBOARD VERT	.111 In/Sec	
81	- COMP OUTBD HORIZ	.143 In/Sec	
82	- COMP OUTBD VERT	.205 In/Sec	

CHLR45-1	- 20T TRANE CHILLER	(21-Oct-20)	
		OVERALL LEVEL	
11E	- EASTMOTOR OUTBOARD HORIZ	1.270 In/Sec	
12E	- EAST MOTOR OUTBOARD VERT	.523 In/Sec	
13E	- EAST MOTOR OUTBOARD AXIAL	.392 In/Sec	

Clarification Of Vibration Units:

Acc	-->	G-s	PK
Vel	-->	In/Sec	PK

Abbreviated Last Measurement Summary

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Database: penn.rbm
Station: HYDROGEN PLANT (ALL)76 53
Report Date: 23-Oct-20 12:14

	MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD
C-4	- C-4 H2 COMPRESSOR, FA PLANT	(12-Sep-19)	
		OVERALL LEVEL	1-20 KHZ
11	- MOTOR OUTBOARD HORIZ	.082 In/Sec	
12	- MOTOR OUTBOARD VERT	.060 In/Sec	
13	- MOTOR OUTBOARD AXIAL	.150 In/Sec	
21	- MOTOR INBOARD HORIZ	.088 In/Sec	
22	- MOTOR INBOARD VERT	.093 In/Sec	
23	- MOTOR INBOARD AXIAL	.123 In/Sec	
71	- PUMP CPLG END HORIZ	.105 In/Sec	
72	- PUMP CPLG END VERT	.086 In/Sec	

73	- PUMP CPLG END AXIAL	.190 In/Sec
81	- PUMP OPP END HORIZ	.209 In/Sec
82	- PUMP OPP END VERT	.127 In/Sec
83	- PUMP OPP END AXIAL	.159 In/Sec

Clarification Of Vibration Units:

Vel --> In/Sec PK