

December 16, 2021

Blues City Brewery

Subject: December 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.

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

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

<u>Class III</u>: 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.

<u>Class IV</u>; 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,

David W Shook

David W. Shook Senior Reliability Specialists *Hi-Speed* Industrial Service dshook@gohispeed.com

7030 Ryburn Drive Millington, TN 38053 P. 901-873-5300 F. 901-873-5301

Reportable equipment

Middle and South Boiler Feed Water Pumps

Data shows shaft speed vibrations in the pumps. There could be wear causing possible imbalance or run out. No action required. **Rated a Class I Defect.**

Boiler 3 Fan, Motor Bearings

Bearing defect frequencies are present in the motor vibration data. The acceleration trend has increased this survey. The overalls are almost 4 g's RMS. Expect to change out the bearings in the future. **Rated a Class II Defect.**

Boiler 3 Fan, Fan Bearings

The inboard fan bearing shows strong non-synchronous peaks in the acceleration spectrum up around 2500 Hz. Vibrations are over 7 g's RMS overall. Expect to change out the bearings in the future. **Rated a Class II Defect.**

Service Water Pump 8

The shaft speed vibrations in the motor radial and axial are still reportable. Harmonics of shaft speed are present in the pump input bearing which could indicate looseness in the bearing fits. Check for loose fasteners, shaft misalignment, bent shafts, or coupling defects. Perform a lift check on the pump shaft. **Rated a Class II Defect.**

Service Water Pump 3

There has been an increase in what appears to be a 2x shaft speed vibration in the motor, and it is the dominant vibration. This could be caused by shaft misalignment, bent shaft, or coupling defects. There is also a slight possibility it could be an electrical or mechanical air gap issue in the motor if this unit is on a drive. Check all electrical connections and check for soft foot if this is the case. **Rated a Class II Defect.**

Service Water Pump 7

The vibration data for the pump still shows strong 1x and 2x RPM vibrations. This is usually a good indicator of misalignment or shaft/coupling run out. Inspect the shafts and coupling for run out and alignment. Check all fasteners, feet, and the base. **Rated a Class II Defect.**

2nd Floor South Hot Water Pump

Shaft speed vibration still dominates the motor vibration data at near 0.4" per second velocity peak. A 2x RPM vibration is also present. Inspect the unit base, structure, coupling and fasteners for issues. Have the shaft alignment checked too. **Rated a Class I Defect.**

GF-VP2 GALLERY DA VAC PUMP-SKID 2

Multiple vibrations throughout unit are still above 1"/second at shaft speed. Inspect the coupling and alignment first. Check for shaft and coupling for runout and alignment. Inspect the structure, fasteners, and feet. The pump could be worn or have stuck vanes. **Rated a Class III Defect.**

GF-CP2 GALLERY DA CIRC PUMP- SKID 2

Motor vertical shows a 1x and smaller 2x RPM vibration; however this unit is close to the vacuum pump that has a very high vibration. Check the unit fasteners, feet, and structure. Impeller could be worn. **Rated a Class II Defect.**

Sugar Tank Viking Pump #3

The pump data still shows slight non-synchronous harmonic peaks in the data. This could indicate distress in the unit bearings. We will watch for changes. **Rated a Class I Defect.**

Sugar Tank Viking Pump #4

Gearbox data shows multiple low level harmonics that could be early signs of wear and looseness. The gearbox to pump coupling ring still seems to be out of position. Inspect the coupling as soon as possible Perform oil analysis of the gearbox lubricants. **Rated a Class II Defect.**

Administration HVAC Hot Water Pump

Motor and pump vibration is still about 0.4"/second velocity peak overall. There could still be an alignment or coupling issue. Inspect the coupling and check the shaft alignment. **Rated a Class I Defect.**

Alcohol Pump Room Skid 1 RO Pump 3

The pump vibration data shows an increased vibration at shaft speed to over 0.4"/second velocity peak in the time waveform. Inspect the unit fasteners and structure. Inspect the pump impeller as time allows. **Rated a Class I Defect.**

Filter Cellar Chill Water Circulator Pump 1

Vibrations are still at 2x line frequency. Unbalanced electrical phases or poor connections can cause the vibration since it changes in amplitude over time. Perform a motor phase and voltage analysis up to and including PDMA if necessary. Check for soft foot in the motor. **Rated a Class I Defect.**

Gov Cellar Cold Glycol Pump #2

Vibrations have dropped in this unit. Non-rated.

Gov Cellar Cold Glycol Pump #3

Vibration data suggests maintenance was performed. No further action required.

Gov Cellar Packaging Cold Glycol Pump #2

Motor vibration data still indicates possible early distress in the bearings. Ensure the bearings are lubricated properly. No other action is suggested. **Rated a Class I Defect.**

G Cellar 128 NANO Pump

Vibrations at shaft speed are still excessive. Ensure all fasteners are tight and support structure is sound. Check for pipe strain. Make sure coupling is in good shape and shaft alignment is precise. **Rated a Class II Defect.**

G Cellar 129 NANO Pump

Motor bearings have signs of early defects. No action required at this time other than ensuring the bearings have lubrication. **Rated a Class I Defect.**

Units previously reported but not running this survey

Boiler Fan 2

Vibrations are very high in the motor. Velocity overall is still over 1.75"/second peak for radial and 01.3" for axial measurements. Ensure all foot bolts on the motor and all fan bearing bolts are torqued and there is no soft foot. This is more than likely a fan imbalance that is transferring through the motor. Still recommend having fan pulled and shop balanced on a balance stand. **Rated as a Class III Defect.**

Yellow Box Filtered Water Pump

Shaft speed vibration is still evident in the inboard pump horizontal. Inspect the coupling first for signs of wear that could cause imbalance. Check the alignment if the coupling looks good. The pump could be in distress if the coupling and alignment are good. **Rated a Class II Defect.**

Service Water Pump 5

The unit still has signs of possible misalignment or coupling defects. Check in the near future. The pump also has multiple non-synchronous vibration peaks in the upper frequencies, which we believe to be bearing defects. **Rated a Class II Defect.**

RO Water Pump 1

Data is collected infrequently on this unit. This pump has two vibrations at 128 and 149 Hz that come into and out of phase causing a beat vibration. There could be wear in the pump, damage, or there could be a flow issue. We recommend further inspection and adjustments of flow related controls, filters, screens, or piping and finally internal inspection if needed. **Rated a Class II Defect.**

WORTA-WORT TRANSFER PUMP A

The pump axial vibration at shaft speed has been slowly increasing over time. Check the shaft alignment as well as the coupling for wear and run out. Check unit fasteners, feet, and base. **Rated a Class I Defect.**

W COOL A-CHILL WATER WORT COOL SIDE A (5)

Last data in May with same recommendation.

There appears to be sidebands around shaft speed in the motor. Perform an inspection of the coupling, fasteners, and structure as soon as possible. If nothing is found, we suggest the motor needs to be inspected as well as all electrical connections. Motor replacement should be considered if all else reveals nothing. **Rated a Class III Defect.**

G Cellar Cold Glycol Pump #5

Motor still has a dominant vibration at 4X shaft speed with sidebands or shaft speed harmonics. Inspect for loose fasteners, coupling, and alignment issues. Could be a pump issue too if it has 4 flutes in the impeller. **Rated a Class II Defect.**

Da St Re	tabase: Blues_city.rbm ation: POWER HOUSE port Date: 16-Dec-21	13:27	
MEASUREMENT POIN	T OVERALL LEVEL	HFD / VHFD	MACHINE SPEED
AIR COMP 3 - COM	PRESSOR #3 - 250HP	(16-Dec-21)	
	OVERALL LEVEL	1-20 KHZ	
11	.116 In/Sec	1.493 G-s	1792.0 RPM
12	.107 In/Sec	.786 G-s	
13	.074 In/Sec	.784 G-s	
21	.158 In/Sec	1.838 G-s	
22	.176 In/Sec	1.296 G-s	
23	.065 In/Sec	.614 G-s	
71	.170 In/Sec	2.400 G-s	3655.7 RPM
72	.091 In/Sec	2.242 G-s	
73	.208 In/Sec	2.184 G-s	
81	.122 In/Sec	1.353 G-s	
82	.111 In/Sec	1.227 G-s	
83	.136 In/Sec	1.562 G-s	
AIR COMP 5 - COM	PRESSOR #5	(16-Dec-21)	
	OVERALL LEVEL	1-20 KHZ	
11	.145 In/Sec	.420 G-s	1788.0 RPM
12	.081 In/Sec	.266 G-s	
13	.117 In/Sec	.388 G-s	
21	.182 In/Sec	.306 G-s	

22	.088 In/Sec	.299 G-s	
23	.112 In/Sec	.499 G-s	
71	.129 In/Sec	.335 G-s	1785.0 RPM
72	.095 In/Sec	.389 G-s	
73	.169 In/Sec	.854 G-s	
81	.118 In/Sec	.735 G-s	
82	.050 In/Sec	.784 G-s	
83	.098 In/Sec	.428 G-s	
AIR COMP 6 -	COMPRESSOR #6	(16-Dec-21)	
	OVERALL LEVEL	1-20 КНZ	
11	.144 In/Sec	.666 G-s	1788.0 RPM
12	.077 In/Sec	.511 G-s	
13	.098 In/Sec	.117 G-s	
21	.124 In/Sec	.463 G-s	
22	.090 In/Sec	.483 G-s	
23	.075 In/Sec	.493 G-s	
71	.095 In/Sec	.694 G-s	1785.0 RPM
72	.118 In/Sec	.455 G-s	
73	.163 In/Sec	.900 G-s	
81	.108 In/Sec	.770 G-s	
82	.062 In/Sec	.302 G-s	
83	.128 In/Sec	.787 G-s	
BFWPMIDLE2 -	BOILER FEED WATER PUMP MI	D 2 (16-Dec-21)	
	OVERALL LEVEL	1-20 KHZ	
11	.128 In/Sec	.496 G-s	3540.0 RPM
12	.144 In/Sec	.554 G-s	
21	.141 In/Sec	.628 G-s	
22	060 Tn/Sec	424 G-s	
23	080 Tn/Sec	400 G-s	
71	279 In/Sec	1 091 C-s	
72	230 Tn/Sec	1 155 G-s	
73	085 TD/Sec	1 236 G-s	
81	396 TR/Sec	787 C-8	
82	107 Tp/Sog	.707 G S	
02	.107 11/360	.114 6-5	
BEWPSOUTH1 -	BOTLER FEED WATER PIMP S	1 (16-Dec-21)	
211120001112	OVERALL LEVEL	1-20 кнд	
11	148 TD/Sec	231 G-s	3540 0 RPM
12	.138 In/Sec	.398 G-s	
21	.099 Tn/Sec	.316 G-8	
22	.081 Tn/Sec	.392 G-8	
23	.069 Tn/Sec	.055 G-8	
71	334 Tn/Sec	1 188 C-s	
72	157 In/Sec	1 002 G-s	
73	070 TR/Sec	1 054 C-s	
81	378 Tn/Sec	248 C-s	
82	123 Tn/Sec	451 C-s	
02	.125 11/ 580	.431 6-5	
BOILERFAN1 -	BOILER FAN #1	(16 - Dec - 21)	
	OVERALL LEVEL	1-20 KHZ	
11		209 6-9	1750 0 PDM
12	255 Tn/Sec	.200 G-S	1750.0 RFM
21		188 C-5	
21	.030 IN/SEC	101 C-2	
22	157 TR/SEC	.IVI G-S	
23	.15/ IN/SeC	.202 G-S	

71	.085 In/Sec	.097 G-s	
BOILERFAN3	- BOILER FAN #3 - 1780 RP	M Max (16-Dec-21)	
	OVERALL LEVEL	1-20 KHZ	
11	.152 In/Sec	1.882 G-s	1780.0 RPM
12	.193 In/Sec	3.881 G-s	
21	.154 In/Sec	2.303 G-s	
22	.220 In/Sec	3.114 G-s	
23	.119 In/Sec	1.671 G-s	
71	.161 In/Sec	7.456 G-s	
72	.103 In/Sec	1.654 G-s	
73	.133 In/Sec	2.864 G-s	
81	.274 In/Sec	.372 G-s	
CR DIMP 1	- CARBON RECTRC PUMP	(16-Dec-21)	
CR FOMF I	OVERALL LEVEL	1-20 KHZ	
11		159 C-8	3545 0 PDM
12	.042 IN/Sec	157 G-s	5545.0 KFM
21	.034 IN/Sec	249 6-8	
22	.045 IN/Sec	136 C-6	
22	.035 IN/Sec	.130 G-S	
23	.075 IN/Sec	.102 G-S	
71	.037 III/Sec	.208 G-S	
72	.040 IN/Sec	.151 G-S	
/ J 01	.036 IN/Sec	.028 G-S	
00	.022 III/Sec	.143 G-S	
02	.026 IN/Sec	.065 G-8	
SW PUMP 8	- SERVICE WATER PUMP 8	(16-Dec-21)	
	OVERALL LEVEL	1-20 KHZ	
11	.157 In/Sec	.286 G-s	3545.0 RPM
12	.374 In/Sec	.539 G-s	
21	.111 In/Sec	.690 G-s	
22	.143 In/Sec	.606 G-s	
23	.653 In/Sec	.331 G-s	
71	.354 In/Sec	.647 G-s	
72	.282 In/Sec	.614 G-s	
73	.131 In/Sec	.828 G-s	
81	.152 In/Sec	.796 G-s	
82	.154 In/Sec	.915 G-s	
SW PUMP 3	- SERVICE WATER PUMP 3	(16-Dec-21)	
	OVERALL LEVEL	1-20 KHZ	
11	.425 In/Sec	.549 G-s	3545.0 RPM
12	.184 In/Sec	.152 G-s	
21	.484 In/Sec	1.781 G-s	
22	.127 In/Sec	1.009 G-s	
23	.286 In/Sec	.341 G-s	
71	.283 In/Sec	1.358 G-s	
72	.197 In/Sec	.980 G-s	
73	.269 In/Sec	1.870 G-s	
81	.141 In/Sec	1.934 G-s	
82	.077 In/Sec	.923 G-s	
CH DIMD 7		(16 Dec 21)	
SW FOMP /	- SERVICE WATER PUMP /	(10-Dec-21) 1-20 KBV	
11	220 TR/Car	258 C-C	3545 0 004
11	.239 III/Sec	.230 G-S	5545.0 KPM
12	.226 IN/Sec	.4/2 G-S	

23	.434 In/Sec	.470 G-s		
71	.547 In/Sec	1.299 G-s		
72	.430 In/Sec	1.239 G-s		
73	.354 In/Sec	.893 G-s		
81	.488 In/Sec	2.409 G-s		
82	.277 In/Sec	.444 G-s		
RO 2 -	RO WATER PUMP 2	(16-Dec-21)		
	OVERALL LEVEL	1-20 KHZ		
11	.114 In/Sec	.545 G-s	3545.0 RPM	
12	.120 In/Sec	1.034 G-s		
21	.121 In/Sec	.802 G-s		
22	.200 In/Sec	.763 G-s		
23	.105 In/Sec	.565 G-s		
71	.253 In/Sec	.737 G-s		
72	.257 In/Sec	.731 G-s		
73	.270 In/Sec	.996 G-s		
81	.119 In/Sec	1.006 G-s		
82	.177 In/Sec	.473 G-s		
AMMCOMP 2 -	AMMONIA COMP - #2	(16-Dec-21)		
	OVERALL LEVEL	1-20 KHZ		
11	.048 In/Sec	.127 G-s	3592.0 RPM	
12	.097 In/Sec	.017 G-s		
13	.077 In/Sec	.118 G-s		
21	.103 In/Sec	.151 G-s		
22	.069 In/Sec	.096 G-s		
23	.123 In/Sec	.0/2 G-s		
71	.095 In/Sec	.783 G-s		
72	.21/ In/Sec	.720 G-S		
/ 3 91	.139 IN/Sec	.8/4 G-S		
82	167 TR/Sec	.905 G-S		
83	170 Tp/Sec	.923 G-S		
71 F	.170 IN/Sec	.222 G-S		
725	239 In/Sec	931 G-s		
73F	.115 In/Sec	.591 G-s		
81F	.069 In/Sec	.766 G-s		
825	.146 In/Sec	.730 G-s		
83F	.118 In/Sec	.523 G-s		
				_
Clarificat:	ion Of Vibration Units:			
ACC	> G-S PK	3.6.6	menioted Test Messurem	
Vel	> In/Sec PK	ADD	previated Last Measurem	ent
Summary	*********	****	**	
	Database: Blues city of	m		
	Station: UPPER FLOORS			
	Report Date: 16-Dec-21	13:27		
			MACHINE COSTO	

2SHWP	- 2ND FLOOR S. HOT WAY	TER PUMP (16-Dec-	-21)
	OVERALL L	EVEL 1-20 KHZ	
11	.130 In/	Sec .392 G-s	3545.0 RPM
12	.391 In/3	Sec 1.266 G-s	
21	.145 In/3	Sec 1.120 G-s	
22	.248 In/3	Sec 1.016 G-s	
23	.408 In/3	Sec .677 G-s	
71	.108 In/3	Sec 1.222 G-s	
72	.143 In/3	Sec 1.202 G-s	
73	.090 In/3	Sec 1.054 G-s	
81 82	.089 In/3 .104 In/3	Sec .763 G-s Sec 2.035 G-s	
GF-VP2	- GALLERY DA VAC PUMP	-SKID 2 (16-Dec-	-21)
	OVERALL L	EVEL 1-20 KHZ	
11	.503 In/	Sec .273 G-s	1770.0 RPM
12	.597 In/	Sec .259 G-s	
21	.197 In/a	Sec .386 G-s	
22	1.176 In/s	Sec .582 G-s	
23	.272 In/	Sec .929 G-s	
71	.369 In/a	Sec 4.456 G-s	3610.8 RPM
72	1.776 In/8	Sec 3.788 G-s	
73	1.027 In/	Sec 4.121 G-s	
81	.999 In/a	Sec 6.476 G-s	
82	1.195 In/s	Sec 5.876 G-s	
GF-DP2	- GALLERY DA DISCH PU	MP-SKID 2 (16-Dec-	-21)
	OVERALL L	EVEL 1-20 KHZ	
11	.098 In/	Sec .073 G-s	3520.0 RPM
12	.312 In/	Sec .194 G-s	
21	.169 In/3	Sec .190 G-s	
22	.225 In/3	Sec .202 G-s	
23	.147 In/3	Sec .130 G-s	
GF-CP2	- GALLERY DA CIRC PUM	P- SKID 2 (16-Dec-	-21)
	OVERALL L		2525 0 DDM
11	.233 IN/3	Sec .260 G-s	3535.0 RPM
12	.527 10/3	Sec .500 G-S	
21	.250 IN/3	Sec .238 G-S	
22	.352 In/3	Sec .039 G-s	
Clarific Acc	ation Of Vibration Uni > G-s PK	ts:	
Vel	> In/Sec PK		Abbreviated Last Measuremen
Summary			
	Database: Blues_c	ity.rbm	
	Station: BREWING	1ST FLOOR	
	Report Date: 16-De	ac-21 13:27	
MEASUREMEN	T POINT OVERALL LET	VEL HFD / VHF	D MACHINE SPEED

*** NO DATA Was Found That Meets the Report Specification ***

Database: Blues_city.rbm Station: BREWING BASEMENT Report Date: 16-Dec-21 13:27

MEASUREMENT	POINT	OVERALL LEVEL	HFD / VHFD	MACHINE SPEED
WORTA -	WORT	TRANSFER PUMP A	(17 - Nov - 21)	
		OVERALL LEVEL	1-20 KHZ	
11		.138 In/Sec	.307 G-s	3565.0 RPM
12		.168 In/Sec	.381 G-s	
21		.163 In/Sec	.414 G-s	
22		.103 In/Sec	.448 G-s	
23		.239 In/Sec	.108 G-s	
71		.133 In/Sec	.576 G-s	
72		.149 In/Sec	.388 G-s	
73		.401 In/Sec	.865 G-s	
81		.071 In/Sec	.677 G-s	
82		.110 In/Sec	.592 G-s	
Clarificat:	ion Of	Vibration Units:		
Acc	>	G-s PK		
Vel	>	In/Sec PK	Abbı	reviated Last Measurement
Summary				
		*****	*****	**
	Data	base: Blues_city.rb	m	
	Stat	ion: GRAIN TRANSFE	R	
	Repo	rt Date: 16-Dec-21	13:27	
MEASUREMENT	POINT	OVERALL LEVEL	HFD / VHFD	MACHINE SPEED
Abbreviated La	*** N ast Me	O DATA Was Found Tha asurement Summary *******************	t Meets the Report	t Specification ***
	Data Stat	base: Blues_city.rb ion: SUGAR PUMPS	m	
	Repo	rt Date: 16-Dec-21	13:27	
MEASUREMENT	POINT	OVERALL LEVEL	HFD / VHFD	MACHINE SPEED
V3 -	SUGAR	TANK VIKING PUMP #3	(16-Dec-21)	
		OVERALL LEVEL	1-20 KHZ	1750 0 554
11		.089 In/Sec	.290 G-s	1/50.0 RPM
12		.106 In/Sec	.260 G-S	
21				
22		.107 In/Sec	.940 G-S	
		.107 In/Sec .097 In/Sec	.948 G-S .299 G-S	
23		.107 In/Sec .097 In/Sec .091 In/Sec	.946 G-S .299 G-S .308 G-S	

	11 12		.051 In/ .047 In/	Sec Sec	.456 .590	G-s G-s	3555.0 RPM
SK1	RO1	- SKID	1 - RO PUMP #1 OVERALL L	EVEL	(16 1-20	-Dec-21) KHZ	
MEAS	SUREMEN	T POINT	OVERALL LE	VEL 	HFD	/ VHFD	MACHINE SPEED
		Repo	rt Date: 16-D	ec-21 1	3:28		
		Data Stat	base: Blues_c ion: ALCOHOL	ity.rbm PUMP ROOM	м		
			*******	*******	****	*******	*
Summa	ary		IN DEC FIC			ADDI	eviated hast Measurement
	Acc Vel	>	G-s PK			Abbr	reviated Last Measurement
cı	larific	ation Of	Vibration Uni	ts:			
			· · · · · · · · · · · · · · · · · · ·				
	82		.110 In/	Sec	.308	G-s	
	81		.128 In/	Sec	.243	G-s	
	72		.107 II/ 091 Tp/	Sec	.290	G-8	
	71		.141 ín/ 107 T-/	Sec	.373	G-S C-S	
	23		.082 In/	Sec	.333	G-s	
	22		.035 In/	Sec	.288	G-s	
	21		.186 In/	Sec	. 386	G-s	
	12		.043 In/	Sec	.347	G-s	
	11		.205 In/	Sec	.146	G-s	1175.0 RPM
		20011	OVERALL L	EVEL	1-20	KHZ	
v 5		- SUGAR	TANK VIKING P	UMP #5	(16	-Dec-21)	
	73		.119 In/	Sec	.244	G-s	
	72		.090 In/	Sec	.561	G-s	
	71		.072 In/	Sec	.285	G-s	
	63		.102 In/	Sec	. 596	G-s	
	62		.074 In/	Sec	.764	G-s	
	61		.063 In/	Sec	1.130	G-s	
	33		.091 In/	Sec	.488	G-s	
	32		.090 In/	Sec	. 906	G-s	
	31		.064 In/	Sec	1.025	G-s	
	22		.073 Tn/	Sec	. 377	G-s	
	21		.050 IN/ 071 Tn/	Sec	.423	G-8	
	21		.044 IN/ 050 To/	Sec	.259	G-S C-S	
	11		.037 In/	Sec	. 328	G-s C-s	1750.0 RPM
* 1		JUGAN	OVERALL L	EVEL	1-20	KHZ	1750 0 554
V 4		- SUGAR	TANK VIKING P		(16	-Dec-21)	
	73		.072 In/	Sec	. 442	G-s	
	72		.063 In/	Sec	. 379	G-s	
	71		.061 In/	Sec	.275	G-s	
	63		.104 In/	Sec	.287	G-s	
	62		.112 In/	Sec	.849	G-s	
	61		.130 IN/ 109 Tn/	Sec	1 039	G-8	
	32		.154 IN/ 136 Tr/	Sec	. 003	G-S C-S	
	20		154 /	~	660	a .	

21	.076 In/Sec	.306 G-s	
22	.202 In/Sec	.235 G-s	
23	.076 In/Sec	.370 G-s	
	,		
SK1 RO4	- SKID 1 - RO PUMP #4	(16 - Dec - 21)	
	OVERALL LEVEL	1-20 KHZ	
11	075 Jn/Sec	154 G-s	3515 0 RPM
12	132 Tn/Sec	224 G-s	551510 1411
21	078 Jn/Sec	133 G-8	
22	135 TR/Sec	286 C-6	
22	128 Tr/Sec	149 C-3	
23	.120 117 500	.140 8-5	
SK1 PO3	- SKTD 1 - PO DIMP #3	(16 - Dec - 21)	
SKI KOS	OVERALL LEVEL	1-20 KHZ	
11		770 6-8	3550 0 PDM
12	219 In/Sec	.770 G-S	5550.0 KPM
21	.210 III/Sec	.501 G-S	
21	.1/1 III/Sec	.004 G-S	
22	.207 III/Sec	1.194 G-S	
23	.215 IN/Sec	.540 G-S	
/1	.146 In/Sec	.662 G-S	
72	.288 In/Sec	.711 G-s	
73	.158 In/Sec	.541 G-s	
81	.174 In/Sec	.795 G-s	
82	.427 In/Sec	.654 G-s	
		(10 - 01)	
SKI RO2	- SKID I - RO PUMP #2	(16-Dec-21)	
	OVERALL LEVEL	1-20 KHZ	
11	.098 In/Sec	.371 G-s	3570.0 RPM
12	.045 In/Sec	.714 G-s	
21	.085 In/Sec	.718 G-s	
22	.059 In/Sec	.573 G-s	
23	.050 In/Sec	.271 G-s	
71	.069 In/Sec	.452 G-s	
72	.038 In/Sec	.380 G-s	
73	.081 In/Sec	.362 G-s	
81	.093 In/Sec	.768 G-s	
82	.050 In/Sec	.478 G-s	
SK2 RO1	- SKID 2 - RO PUMP #1	(16-Dec-21)	
	OVERALL LEVEL	1-20 КНZ	
11	.084 In/Sec	.358 G-s	3555.0 RPM
12	.037 In/Sec	.252 G-s	
21	.057 In/Sec	.320 G-s	
22	.202 In/Sec	.413 G-s	
23	.151 In/Sec	.161 G-s	
SK2 RO4	- SKID 2 - RO PUMP #4	(16-Dec-21)	
	OVERALL LEVEL	1-20 КНZ	
11	.068 In/Sec	.039 G-s	3515.0 RPM
12	.112 In/Sec	.274 G-s	
21	.070 In/Sec	.077 G-s	
22	.088 In/Sec	.169 G-s	
23	.089 In/Sec	.049 G-s	
SK2 RO3	- SKID 2 - RO PUMP #3	(16-Dec-21)	
	OVERALL LEVEL	1-20 KHZ	
	109 Tp/Soc	1 150 C-e	3550 0 DDM

12		.267 In/Sec	.755 G-s	
21		.115 In/Sec	.648 G-s	
22		.279 In/Sec	1.283 G-s	
23		170 In/Sec	500 G-s	
71		152 Tr/Sec	664 G-s	
72		280 Tp/Soc	506 C-s	
72		291 Tp/Sec	251 C-2	
73		.201 III/Sec	.251 G-S	
81		.135 In/Sec	.658 G-S	
82		.148 In/Sec	.680 G-s	
SK2 RO2	- SKID 2	- RO PUMP #2	(16-Dec-21)	
		OVERALL LEVEL	1-20 кнz	
11		.052 In/Sec	.210 G-s	3570.0 RPM
12		.035 In/Sec	.439 G-s	
21		.046 In/Sec	.592 G-s	
22		.036 In/Sec	.701 G-s	
23		.033 In/Sec	.142 G-s	
71		.051 In/Sec	.329 G-s	
72		.043 In/Sec	.317 G-s	
73		173 In/Sec	447 C-s	
01		.175 IN/Sec		
01		107 Tr (0. c	.400 G-S	
82		.12/ In/Sec	.450 G-S	
Classifi		Tibuction Maite.		
Clarific		VIDEACION UNICS:		
Acc	> (is PK		
Vel	>]	In/Sec PK	Abb	reviated Last Measurement
		, 500 11		
Summary		****	*****	**
Summary		****	*****	**
Summary	Databa	**************************************	**************************************	**
Summary	Databa	**************************************	 ********************************	**
Summary	Databa Static Report	**************************************	 ********************************	**
Summary	Databa Static Report	**************************************	 *******************************	**
Summary	Databa Static Report	**************************************	 *******************************	** MACHINE SPEED
Summary MEASUREMEN	Databa Static Report	**************************************		** MACHINE SPEED
Summary MEASUREMEN	Databa Static Report	**************************************		** MACHINE SPEED
Summary MEASUREMEN HVAC COLD	Databa Static Report NT POINT - HVAC CO	**************************************		** MACHINE SPEED
Summary MEASUREMEN HVAC COLD	Databa Static Report NT POINT - HVAC CO	**************************************	<pre> ************************************</pre>	** MACHINE SPEED
Summary MEASUREMEN HVAC COLD	Databa Static Report NT POINT - HVAC CO	**************************************	AREA 13:28 HFD / VHFD 4P (16-Dec-21) 1-20 KHZ 495 G-s	** MACHINE SPEED
Summary MEASUREMEN HVAC COLD 11	Databa Static Report NT POINT - HVAC CO	**************************************	AREA 13:28 HFD / VHFD 4P (16-Dec-21) 1-20 KHZ .495 G-s 484 G-s	** MACHINE SPEED 3600.0 RPM
Summary MEASUREMEN HVAC COLD 11 12 21	Databa Static Report NT POINT 	**************************************	<pre>// AREA 13:28 HFD / VHFD //P (16-Dec-21) 1-20 KHZ .495 G-s .484 G-s .465 C-s </pre>	** MACHINE SPEED 3600.0 RPM
Summary MEASUREMEN HVAC COLD 11 12 21	Databa Static Report NT POINT 	**************************************	AREA 13:28 HFD / VHFD MP (16-Dec-21) 1-20 KHZ .495 G-s .484 G-s .465 G-s	** MACHINE SPEED 3600.0 RPM
Summary MEASUREMEN HVAC COLD 11 12 21 22	Databa Static Report NT POINT - HVAC CO	<pre>************************************</pre>	AFD / VHFD 	** MACHINE SPEED 3600.0 RPM
MEASUREMEN HVAC COLD 11 12 21 22 23	Databa Static Report NT POINT 	<pre>************************************</pre>	Arrow Content of the second se	** MACHINE SPEED 3600.0 RPM
Summary MEASUREMEN HVAC COLD 11 12 21 22 23 71	Databa Static Report	<pre>************************************</pre>	OT TE AREA 13:28 HFD / VHFD MP (16-Dec-21) 1-20 KHZ .495 G-s .484 G-s .465 G-s .232 G-s .092 G-s .227 G-s	** MACHINE SPEED 3600.0 RPM
Summary MEASUREMEN HVAC COLD 11 12 21 22 23 71 72	Databa Static Report	<pre>************************************</pre>	Dm /E AREA 13:28 HFD / VHFD MP (16-Dec-21) 1-20 KHZ .495 G-s .484 G-s .465 G-s .232 G-s .092 G-s .227 G-s .349 G-s	** MACHINE SPEED 3600.0 RPM
Summary MEASUREMEN HVAC COLD 11 12 21 22 23 71 72 73	Databa Static Report	<pre>************************************</pre>	AREA 13:28 HFD / VHFD MP (16-Dec-21) 1-20 KHZ .495 G-s .484 G-s .465 G-s .232 G-s .092 G-s .227 G-s .349 G-s .097 G-s	** MACHINE SPEED 3600.0 RPM
Summary MEASUREMEN HVAC COLD 11 12 21 22 23 71 72 73 81	Databa Static Report	<pre>************************************</pre>	AREA 13:28 HFD / VHFD MP (16-Dec-21) 1-20 KHZ .495 G-s .484 G-s .465 G-s .232 G-s .092 G-s .227 G-s .349 G-s .097 G-s .409 G-s	** MACHINE SPEED 3600.0 RPM
Summary MEASUREMEN 	Databa Static Report	<pre>************************************</pre>	AREA 13:28 HFD / VHFD MP (16-Dec-21) 1-20 KHZ .495 G-s .484 G-s .465 G-s .232 G-s .092 G-s .227 G-s .349 G-s .097 G-s .409 G-s .276 G-s	** MACHINE SPEED 3600.0 RPM
Summary MEASUREMEN 	Databa Static Report	<pre>************************************</pre>	Dm /E AREA 13:28 HFD / VHFD MP (16-Dec-21) 1-20 KHZ .495 G-s .484 G-s .465 G-s .232 G-s .092 G-s .227 G-s .349 G-s .097 G-s .409 G-s .276 G-s	** MACHINE SPEED
Summary MEASUREMEN HVAC COLD 11 12 21 22 23 71 72 73 81 82 HVAC HOT	Databa Static Report TPOINT - HVAC CO	<pre>************************************</pre>	Dm /E AREA 13:28 HFD / VHFD MP (16-Dec-21) 1-20 KHZ .495 G-s .484 G-s .465 G-s .232 G-s .092 G-s .227 G-s .349 G-s .097 G-s .409 G-s .276 G-s (16-Dec-21)	** MACHINE SPEED
Summary MEASUREMEN HVAC COLD 11 12 21 22 23 71 72 73 81 82 HVAC HOT	Databa Static Report NT POINT - HVAC CO - HVAC HO	<pre>************************************</pre>	Dm /E AREA 13:28 HFD / VHFD MP (16-Dec-21) 1-20 KHZ .495 G-s .484 G-s .465 G-s .232 G-s .092 G-s .227 G-s .349 G-s .097 G-s .409 G-s .276 G-s (16-Dec-21) 1-20 KHZ	** MACHINE SPEED 3600.0 RPM
Summary MEASUREMEN HVAC COLD 11 12 21 22 23 71 72 73 81 82 HVAC HOT 11	Databa Static Report NT POINT - HVAC CO	<pre>************************************</pre>	Dm /E AREA 13:28 HFD / VHFD MP (16-Dec-21) 1-20 KHZ .495 G-s .484 G-s .465 G-s .232 G-s .092 G-s .227 G-s .349 G-s .097 G-s .409 G-s .276 G-s (16-Dec-21) 1-20 KHZ .275 G-s	** MACHINE SPEED 3600.0 RPM 3600.0 RPM
MEASUREMEN HVAC COLD 11 12 21 22 33 71 72 73 81 82 HVAC HOT 11 12	Databa Static Report NT POINT - HVAC CO	<pre>************************************</pre>	Dm /E AREA 13:28 HFD / VHFD MP (16-Dec-21) 1-20 KHZ .495 G-s .484 G-s .465 G-s .232 G-s .092 G-s .227 G-s .349 G-s .097 G-s .409 G-s .276 G-s (16-Dec-21) 1-20 KHZ .275 G-s .321 G-s	** MACHINE SPEED 3600.0 RPM 3600.0 RPM
Summary MEASUREMEN HVAC COLD 11 12 21 22 23 71 72 73 81 82 HVAC HOT 11 12 21	Databa Static Report NT POINT - HVAC CO - HVAC HO	<pre>************************************</pre>	Dm /E AREA 13:28 HFD / VHFD 4P (16-Dec-21) 1-20 KHZ .495 G-s .484 G-s .465 G-s .232 G-s .092 G-s .227 G-s .349 G-s .097 G-s .409 G-s .276 G-s (16-Dec-21) 1-20 KHZ .275 G-s .321 G-s .470 G-s	** MACHINE SPEED 3600.0 RPM 3600.0 RPM
Summary MEASUREMEN HVAC COLD 11 12 21 22 23 71 72 73 81 82 HVAC HOT 11 12 21 22 23 71 72 73 81 82 21 22 23 71 72 73 81 82 22 23 71 72 73 81 82 22 22 23 73 81 82 22 22 23 23 23 23 23 23 23 23 23 23 23	Databa Static Report NT POINT - HVAC CO	<pre>************************************</pre>	Dm /E AREA 13:28 HFD / VHFD 4P (16-Dec-21) 1-20 KHZ .495 G-s .484 G-s .465 G-s .232 G-s .092 G-s .227 G-s .349 G-s .097 G-s .409 G-s .276 G-s (16-Dec-21) 1-20 KHZ .275 G-s .321 G-s .470 G-s .937 C-s	** MACHINE SPEED 3600.0 RPM 3600.0 RPM
MEASUREMEN HVAC COLD 11 12 21 22 23 71 72 73 81 82 HVAC HOT 11 12 21 22 21 22 21 22 21	Databa Static Report - HVAC CO - HVAC HO	<pre>************************************</pre>	Dm /E AREA 13:28 HFD / VHFD MP (16-Dec-21) 1-20 KHZ .495 G-s .484 G-s .465 G-s .232 G-s .092 G-s .227 G-s .349 G-s .097 G-s .409 G-s .276 G-s (16-Dec-21) 1-20 KHZ .275 G-s .321 G-s .937 G-s .937 G-s .255 C-s	** MACHINE SPEED

71	.233 In/Sec	.668 G-s	
72	.412 In/Sec	.378 G-s	
73	.142 In/Sec	.386 G-s	
81	.180 In/Sec	.345 G-s	
82	.194 In/Sec	.506 G-s	
Clarification C	of Vibration Units:		
Acc>	G-s PK		
Vel>	In/Sec PK	Abbı	reviated Last Measurement
Summary			
	*************	******	**
Dat	abase: Blues_city.rbm	n	
Sta	tion: FILTER CELLAR		
Rep	ort Date: 16-Dec-21	13:28	
MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD	MACHINE SPEED
CHILL 1 - CHIL	L WATER CIRC PUMP #1	(16-Dec-21)	
	OVERALL LEVEL	1-20 KHZ	
11	.282 In/Sec	.669 G-s	3600.0 RPM
12	.201 In/Sec	.114 G-s	
21	.315 In/Sec	.883 G-s	
22	.239 In/Sec	.545 G-s	
23	.266 In/Sec	.496 G-s	
71	.128 In/Sec	.633 G-s	
72	.156 In/Sec	.530 G-s	
73	.207 In/Sec	.096 G-s	
81	.073 In/Sec	1.213 G-s	
82	.069 In/Sec	.429 G-s	
WARM GLY 2 - WARM	GLYCOL PUMP #2	(16-Dec-21)	
	OVERALL LEVEL	1-20 KHZ	
11	.034 In/Sec	.262 G-s	3600.0 RPM
12	.033 In/Sec	.222 G-s	
21	.061 In/Sec	.414 G-s	
22	.024 In/Sec	.292 G-s	
23	.032 In/Sec	.105 G-s	
71	.027 In/Sec	.079 G-s	
72	.046 In/Sec	.086 G-s	
73	.025 In/Sec	.175 G-s	
81	.032 In/Sec	.048 G-s	
82	.030 In/Sec	.052 G-s	
WARM GLY 3 - WARM	GLYCOL PUMP #3	(16-Dec-21)	
	OVERALL LEVEL	1-20 KHZ	
11	.035 In/Sec	.129 G-s	3600.0 RPM
12	.027 In/Sec	.112 G-s	
21	.046 In/Sec	.438 G-s	
22	.034 In/Sec	.165 G-s	
23	.059 In/Sec	.151 G-s	
71	.035 In/Sec	.143 G-s	
72	.067 In/Sec	.190 G-s	
73	.048 In/Sec	.074 G-s	
81	.027 In/Sec	.131 G-s	
		0 0	

82	.035 I	n/Sec	.150 G-s	
Clarificatio	n Of Vibration U	nits:		
Acc	> G-s PK			
Vel	> In/Sec PK		Al	bbreviated Last Measurement
Summary				
	******	******	****	****
	Database: Blues	city rbm		
	Station: GOVER	NMENT CEL	LAR	
	Report Date: 16	-Dec-21	13:28	
MEASUREMENT PO	TNT OVERALL	LEVEL.	HED / VHED	MACHINE SPEED
COLD GLY 2 - C	OLD GLYCOL PUMP	#2	(16-Dec-21))
	OVERALL	LEVEL	1-20 KHZ	
11	.160 I	n/Sec	.281 G-s	3600.0 RPM
12	.074 I	n/Sec	.468 G-s	
21	.136 I	n/Sec	.110 G-s	
22	.106 I	n/Sec	.146 G-s	
23	.072 I	n/Sec	.233 G-s	
71	.063 I	n/Sec	.172 G-s	
72	.067 I	n/Sec	.166 G-s	
73	.051 I	n/Sec	.101 G-s	
81	.052 I	n/Sec	.119 G-s	
82	.053 I	n/Sec	.282 G-s	
COLD GLY 3 - C	OLD GLYCOL PUMP	#3	(16-Dec-21))
	OVERALL	LEVEL	1-20 KHZ	
11	.070 I	n/Sec	.276 G-s	3600.0 RPM
12	.050 I	n/Sec	.302 G-s	
21	.062 I	n/Sec	.889 G-s	
22	.083 I	n/Sec	.716 G-s	
23	.055 I	n/Sec	.661 G-s	
71	.103 I	n/Sec	.158 G-s	
72	.094 I	n/Sec	.234 G-s	
73	.048 I	n/Sec	.192 G-s	
81	.073 I	n/Sec	.172 G-s	
82	.048 I	n/Sec	.169 G-s	
COLD GLY 4 - C	OLD GLYCOL PUMP	#4	(16-Dec-21)	
	OVERALL	LEVEL	1-20 KHZ	·
11	.088 I	n/Sec	.403 G-s	3600.0 RPM
12	.048 I	n/Sec	.402 G-s	
21	.093 I	n/Sec	.480 G-s	
22	.065 I	n/Sec	.758 G-s	
23	.063 I	n/Sec	.333 G-s	
71	.119 I	n/Sec	1.669 G-s	
72	.068 I	n/Sec	.875 G-s	
73	.087 I	n/Sec	.510 G-s	
81	.091 T	n/Sec	1.213 G-s	
82	.057 I	n/Sec	.909 G-s	
PACK GLY 2 - E	ACKAGING COLD GL	YCOL PUMP	2 (16-Dec-21))
	OVERALL	LEVEL	I-ZU KHZ	

11		.037 I	n/Sec	1.723	G-s	3600.0 1	RPM
12		.022 I	n/Sec	1.412	G-s		
21		.041 I	n/Sec	1.353	G-s		
22		.029 I	n/Sec	1.150	G-s		
23		.024 I	n/Sec	.467	G-s		
71		.044 I	n/Sec	.726	G-s		
72		.019 I	n/Sec	.338	G-s		
73		.019 I	n/Sec	.271	G-s		
81		.025 I	n/Sec	.451	G-s		
82		.020 I	n/Sec	.343	G-s		
NANO 126	- NANO SKID	PUMP 12	6	(16-	Dec-21)		
		OVERALL	LEVEL	1-20 K	HZ		
11		.098 I	n/Sec	.332	G-s	3570.01	RPM
12		.092 I	n/Sec	1.068	G-s		
21		.142 I	n/Sec	.546	G-s		
22		.165 1	n/Sec	.292	G-S		
23		.13/ 1	n/Sec	.428	G-S		
71		.151 1	n/Sec	.5//	G-S		
72		.110 1	n/Sec	.483	G-S		
73		.11/ 1	n/Sec	.100	G-S		
81		.100 1	n/Sec	.307	G-S		
82		.109 1	n/sec	.316	G-S		
NANO 127	- NANO SKID	PIIMP 12	7	(16-	Dec-21)		
		OVERALL	LEVEL	1-20 K	HZ		
11		.110 I	n/Sec	.524	G-s	3570.0 1	RPM
12		.082 I	n/Sec	1.001	G-s		
21		.088 I	n/Sec	.525	G-s		
22		.149 I	n/Sec	.541	G-s		
23		.079 I	n/Sec	.314	G-s		
71		.082 I	n/Sec	.463	G-s		
72		.216 I	n/Sec	.523	G-s		
73		.133 I	n/Sec	.267	G-s		
81		.091 I	n/Sec	.366	G-s		
82		.177 I	n/Sec	.291	G-s		
NANO 128	- NANO SKID	PUMP 12	8	(16-	Dec-21)		
		OVERALL	LEVEL	1-20 K	HZ		
11		.565 I	n/Sec	.213	G-s	3570.0 1	RPM
12		.674 I	n/Sec	.879	G-s		
21		.582 I	n/Sec	.700	G-s		
22		.373 I	n/Sec	.548	G-s		
23		.598 I	n/Sec	.313	G-s		
71		.152 I	n/Sec	.430	G-s		
72		.560 1	n/Sec	.488	G-s		
73		.402 I	n/Sec	.199	G-s		
81		.308 I	n/Sec	.306	G-s		
82		.352 1	n/Sec	. 359	G-S		
NANO 129	- NANO SKTD	PIIMP 12	9	(16-	Dec-21)		
NANO 129	- NANO SKID	PUMP 12	9 TEVEL	(16- 1-20 K	Dec-21) Hz		
NANO 129	- NANO SKID	PUMP 12 OVERALL	9 LEVEL n/Sec	(16- 1-20 K	Dec-21) HZ G-s	3570.0 1	RPM
NANO 129 11 12	- NANO SKID	PUMP 12 OVERALL .088 I .128 T	9 LEVEL n/Sec n/Sec	(16- 1-20 K .502 1.910	Dec-21) HZ G-s G-s	3570.0 1	RPM
NANO 129 11 12 21	- NANO SKID	PUMP 12 OVERALL .088 I .128 I .133 T	9 LEVEL n/Sec n/Sec n/Sec	(16- 1-20 K .502 1.910 1.360	Dec-21) HZ G-s G-s G-s	3570.0 1	RPM
NANO 129 11 12 21 22	- NANO SKID	PUMP 12 OVERALL .088 I .128 I .133 I .170 I	9 LEVEL n/Sec n/Sec n/Sec n/Sec	(16- 1-20 K .502 1.910 1.360 .846	Dec-21) HZ G-s G-s G-s G-s	3570.0 1	RPM

71	.094 In/Sec	.534 G-s	
72	.132 In/Sec	.462 G-s	
73	.085 In/Sec	.224 G-s	
81	.076 In/Sec	.295 G-s	
82	.183 In/Sec	.457 G-s	
Clarification Of	Vibration Units:		
Acc> (G-s PK		
Vel>	In/Sec PK	Abb	reviated Last Measurement
Summary			
	******	*****	**
Databa	ase: Blues_city.rb	om	
Statio	on: UNUSED / REMC	VED	
Report	t Date: 16-Dec-21	13:28	
MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD	MACHINE SPEED

*** NO DATA Was Found That Meets the Report Specification ***