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May 17, 2023

Shawna Guffey Arkema Memphis, TN

The following is a summary of findings from the May 2023 WEEK 2 vibration survey at the H2O2 Plant that was performed on May 15th, 2023.

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.

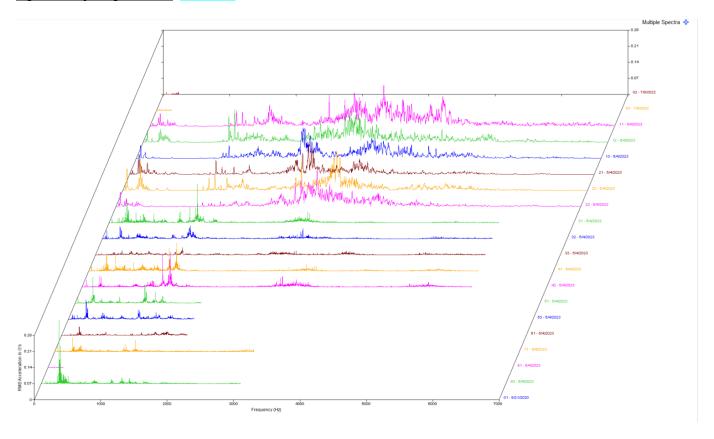
<u>CLASS III</u>; Defect (s) present that may cause failure in short term (less than 2 months). This should be addressed as soon as practical, with a high maintenance priority. Increase monitoring frequency.

<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.

Defect Summary

Agitator, Hydrogenator C CLASS II



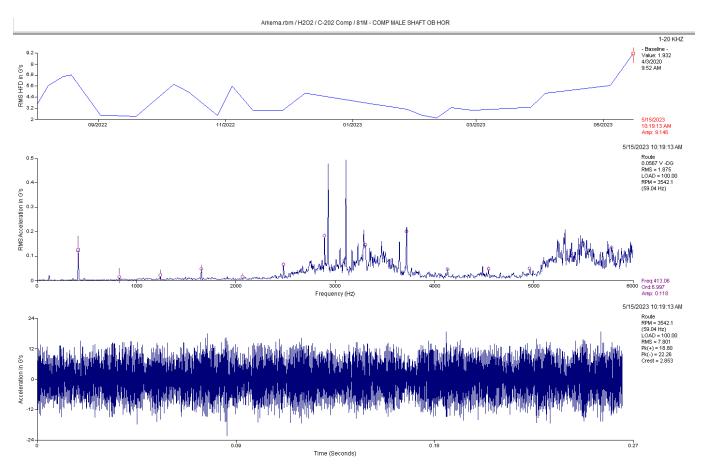
Observation:

Data above is a multipoint spectral waterfall. Notice the noise floor in the motor data. Data points labeled 11-23.

Recommendation:

Motor data suggests a possible lubrication issue in the motor. For now, it is recommended that the motor has an adequate amount of grease.

C 202 Compressor CLASS I



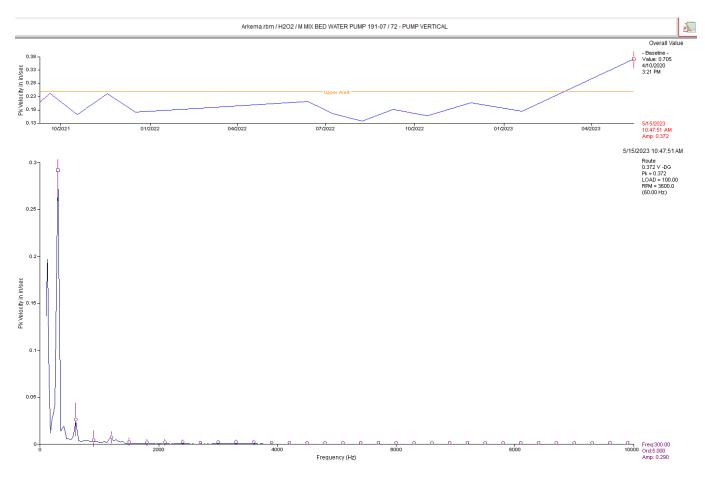
Observation:

Overall vibration has increased this survey in the compressor male section. Femail section is lower this survey compared to last week. Harmonics seen in spectral data above show a fundamental frequency at 413.Hz. This peak may be an output rpm harmonic. This may be due to heavy load on the air end during data acquisition but could also be signs of internal compressor issue or gear pump issue. For now, we will monitor this compressor closely each week.

Recommendation:

Inspect compressor load and ensure compressor is operating under normal parameters.

191-07 Middle Mix Bed Water Pump CLASS II



Observation:

Spectral data above shows a high 5 x rpm vibration in the pump vertical. This is likely vane pass vibration.

Recommendation:

Pump has a high vibration at what appears to be 5 x rpm. This is very likely vane pass frequency if impeller has 5 vanes. If so, then impeller may be damaged or some other internal issue in pump is causing a vane pass vibration. Inspect pump flow

Database: Arkema.rbm Station: PEROXIDE

MEASUREMEN	T POINT		LEVEL	HFD / VHFD
XSTORPMP	- X STORAGE PUMP		(15-M	ay-23)
MOTORITAL	A DIOIGIOL TONI	OVERALI	L LEVEL	
11		.033		.728 G-s
21		034 .	In/Sec	.740 G-s
23		.054	In/Sec	.870 G-s
71		.103	In/Sec	.158 G-s
72		.038	In/Sec	
2130-1old	- C Concentrator			
		OVERAL	L LEVEL	
11		.081	In/Sec	.379 G-s
21		.088	In/Sec In/Sec	.618 G-s
23				.398 G-s
71		.135	In/Sec	1.185 G-s
81		.194	In/Sec In/Sec	.466 G-s
83		.187	In/Sec	1.063 G-s
7000-01	- AGITATOR, HYDROG			
			L LEVEL	
02				.053 G-s
03		.045	In/Sec	.020 G-s
11				1.383 G-s
12				.491 G-s
13			In/Sec	.860 G-s
21		.098	In/Sec	1.037 G-s
22		.172	•	.652 G-s
23			In/Sec	.472 G-s
31		.067	In/Sec	.508 G-s
32			In/Sec	.332 G-s
33		.047	In/Sec	.439 G-s
41		.065	In/Sec	.522 G-s
42		.084	In/Sec	.413 G-s
51		.058	In/Sec	.253 G-s
53		.048	In/Sec	.244 G-s
61		.031	In/Sec	.257 G-s
71		.046	In/Sec	.261 G-s
81		.019	In/Sec	.347 G-s
83		.039	In/Sec	.415 G-s
57	- A/B Concentr Va	c Pmp-va	r RPM (15-M	ay-23)
				1-20 KHz
11			In/Sec	.651 G-s
12			In/Sec	.676 G-s
21			•	1.358 G-s
23			In/Sec	.486 G-s
71		.062	In/Sec	.895 G-s
81		.083	In/Sec	.829 G-s
83		.068	In/Sec	.622 G-s
2130-1	- FLASH VAP VAC P	UMP-var	speed (15-M	ay-23)
		OVERAL	L LEVEL	1-20 KHz
11		.047	In/Sec	.209 G-s
12		.047	In/Sec	.450 G-s
21		.041	In/Sec	.783 G-s
22		.098	In/Sec	.294 G-s
23		.060	In/Sec	.179 G-s
71		.178	In/Sec	.663 G-s
72		.206	In/Sec	.371 G-s
81		.191	In/Sec	.917 G-s
82		.147	In/Sec	1.095 G-s
- -			•	-

C-203		- C-203	Comp			•	fay-23	•
					LL LEVEI		1-20 1	
	11				In/Sec		2.813	
	12 21				In/Sec		.847	
	22				In/Sec In/Sec		2.815	
	23				In/Sec		.342	
	23				LL LEVEI		1-20	
	71M				In/Sec		5.327	
	72M				In/Sec		1.392	
	73M				In/Sec		1.240	
	81M			.049	In/Sec		6.882	G-s
	82M			.040	In/Sec		1.392	G-s
	71F			.043	In/Sec		3.651	G-s
	72F			.049	In/Sec		1.256	G-s
	73 F			.040	In/Sec		1.045	G-s
	81F			.058	In/Sec		2.708	G-s
	82F			.050	In/Sec		1.051	G-s
~ 000		~ 000	_					
C-202		- C-202	Comp	OTTED A	LL LEVEI		1ay-23 1-20	
	11				In/Sec		.427	
	12				In/Sec		.294	
	21				In/Sec		.733	
	22				In/Sec		.211	
	23				In/Sec		.153	
					LL LEVEI	_	1-20 1	
	71M				In/Sec		3.081	
	72M				In/Sec		1.121	
	73 M			.081	In/Sec		1.016	G-s
	81M			.057	In/Sec		12.93	
	82M			. 055	In/Sec		1.883	G-s
	71F			.047	In/Sec		3.086	G-s
	72F			.076	In/Sec		. 989	G-s
	73F			.066	In/Sec		.866	G-s
	73F 81F				In/Sec In/Sec		3.500	G-s
				.055	•			G-s
201_00	81F 82F	- COMPRI	eccod nacu a	.055 .054	In/Sec In/Sec	/1 F_M	3.500 .943	G-s G-s
201-08	81F 82F	- COMPRI	ESSOR,NASH A	.055 .054	In/Sec In/Sec		3.500 .943 May-23	G-s G-s
201-08	81F 82F 8A	- COMPRI	•	.055 .054 .201- OVERA	In/Sec In/Sec 08A LL LEVEI		3.500 .943 fay-23	G-s G-s) KHz
201-08	81F 82F 8A	- COMPRI	•	.055 .054 A 201- OVERA: .048	In/Sec In/Sec 08A LL LEVEI In/Sec		3.500 .943 May-23; 1-20 1 .102	G-s G-s) KHz G-s
201-08	81F 82F 8A 11 12	- COMPRI	•	.055 .054 A 201- OVERA .048 .055	In/Sec In/Sec 08A LL LEVEI In/Sec In/Sec		3.500 .943 fay-23 1-20 .102 .145	G-s G-s) KHz G-s G-s
201-08	81F 82F 8A	- COMPRI	•	.055 .054 A 201- OVERA .048 .055 .112	In/Sec In/Sec 08A LL LEVEI In/Sec In/Sec In/Sec		3.500 .943 May-23; 1-20 1 .102	G-s G-s) KHz G-s G-s
201-08	81F 82F 8A 11 12 13	- COMPRI	•	.055 .054 A 201- OVERA .048 .055 .112	In/Sec In/Sec 08A LL LEVEI In/Sec In/Sec		3.500 .943 fay-23 1-20 .102 .145 .066	G-s G-s) KHz G-s G-s G-s
201-08	81F 82F 8A 11 12 13 21	- COMPRI	•	.055 .054 A 201- OVERAL .048 .055 .112 .048 .064	In/Sec In/Sec 08A LL LEVEI In/Sec In/Sec In/Sec In/Sec		3.500 .943 fay-23 1-20 .102 .145 .066 .128	G-s G-s) KHZ G-s G-s G-s G-s
201-08	81F 82F 8A 11 12 13 21 22	- COMPRI	•	.055 .054 A 201-OVERAL .048 .055 .112 .048 .064 .159	In/Sec In/Sec 08A LL LEVEI In/Sec In/Sec In/Sec In/Sec In/Sec		3.500 .943 fay-23; 1-20 1 .102 .145 .066 .128	G-s G-s) KHZ G-s G-s G-s G-s
201-08	81F 82F 8A 11 12 13 21 22 23	- COMPRI	•	.055 .054 A 201-(OVERA: .048 .055 .112 .048 .064 .159 .188	In/Sec In/Sec O8A LL LEVEI In/Sec In/Sec In/Sec In/Sec In/Sec In/Sec In/Sec		3.500 .943 fay-23 1-20 .102 .145 .066 .128 .115 .110	G-s G-s) KHz G-s G-s G-s G-s G-s
201-08	81F 82F 7A 11 12 13 21 22 23 71	- COMPRI	•	.055 .054 A 201-(OVERA .048 .055 .112 .048 .064 .159 .188 .176	In/Sec In/Sec O8A LL LEVEI In/Sec In/Sec In/Sec In/Sec In/Sec In/Sec In/Sec In/Sec	-	3.500 .943 fay-23 1-20 .102 .145 .066 .128 .115 .110	G-s G-s) KHz G-s G-s G-s G-s G-s
201-08	81F 82F 2A 11 12 13 21 22 23 71 72	- COMPRI	•	.055 .054 A 201- OVERA .048 .055 .112 .048 .064 .159 .188 .176 .136	In/Sec In/Sec O8A LL LEVEI In/Sec In/Sec In/Sec In/Sec In/Sec In/Sec In/Sec In/Sec In/Sec	2	3.500 .943 1-20 1 .102 .145 .066 .128 .115 .110	G-s G-s) KHz G-s G-s G-s G-s G-s G-s
201-08	81F 82F 2A 11 12 13 21 22 23 71 72 73 81 82	- COMPRI	•	.055 .054 A 201-(OVERA .048 .055 .112 .048 .064 .159 .188 .176 .136	In/Sec In/Sec In/Sec O8A LL LEVEI In/Sec In/Sec In/Sec In/Sec In/Sec In/Sec In/Sec In/Sec In/Sec		3.500 .943 1-20 1 .102 .145 .066 .128 .115 .110 .645 .151 .193 .222	G-s G-s) KHZ s s G-s G-s G-s G-s G-s G-s G-s
201-08	81F 82F 2A 11 12 13 21 22 23 71 72 73 81	- COMPRI	•	.055 .054 A 201-(OVERA .048 .055 .112 .048 .064 .159 .188 .176 .136	In/Sec In/Sec O8A LL LEVEI In/Sec In/Sec In/Sec In/Sec In/Sec In/Sec In/Sec In/Sec In/Sec		3.500 .943 1-20 1 .102 .145 .066 .128 .115 .110 .645 .151 .193	G-s G-s) KHZ s s G-s G-s G-s G-s G-s G-s G-s
	81F 82F 2A 11 12 13 21 22 23 71 72 73 81 82 83			.055 .054 A 201-(OVERA .048 .055 .112 .048 .064 .159 .188 .176 .136 .141 .186	In/Sec		3.500 .943 1-20 1 .102 .145 .066 .128 .115 .110 .645 .151 .193 .222 .095	G-s G-s) KHz G-s G-s G-s G-s G-s G-s G-s G-s
	81F 82F 2A 11 12 13 21 22 23 71 72 73 81 82 83		SEAL LIQUID	.055 .054 .054 .048 .055 .112 .048 .064 .159 .188 .176 .136 .141 .186	In/Sec In	(15-M	3.500 .943 1-20 1 .102 .145 .066 .128 .115 .110 .645 .151 .193 .222 .095 .176	G-s G-s) KHz G-s G-s G-s G-s G-s G-s G-s
	81F 82F 2A 11 12 13 21 22 23 71 72 73 81 82 83		SEAL LIQUID	.055 .054 .054 .048 .055 .112 .048 .064 .159 .188 .176 .136 .141 .186 .118	In/Sec	(15-M	3.500 .943 1-20 1 .102 .145 .066 .128 .115 .110 .645 .151 .193 .222 .095 .176	G-s G-s) KHz G-s G-s G-s G-s G-s G-s G-s
	81F 82F 2A 11 12 13 21 22 23 71 72 73 81 82 83		SEAL LIQUID	.055 .054 .054 .048 .055 .112 .048 .064 .159 .188 .176 .136 .141 .186 .118 .190 .190 .190 .190 .190 .190 .190 .190	In/Sec In	(15-M	3.500 .943 lay-23 1-20 .102 .145 .066 .128 .115 .110 .645 .151 .193 .222 .095 .176	G-s G-s) KHZ G-s G-s G-s G-s G-s G-s G-s G-s
	81F 82F 2A 11 12 13 21 22 23 71 72 73 81 82 83		SEAL LIQUID	. 055 . 054 . 201- . 048 . 055 . 112 . 048 . 064 . 159 . 188 . 176 . 136 . 141 . 186 . 118 . PUMP- . OVERA . 019 . 024	In/Sec In/Sec In/Sec O8A LL LEVEI In/Sec	(15-M	3.500 .943 lay-23 1-20 .102 .145 .066 .128 .115 .110 .645 .151 .193 .222 .095 .176 day-23 1-20 .098 .211	G-s G-s) KHz G-s G-s G-s G-s G-s G-s G-s G-s
	81F 82F 7A 11 12 13 21 22 23 71 72 73 81 82 83		SEAL LIQUID	. 055 . 054 . 201- . 048 . 055 . 112 . 048 . 064 . 159 . 188 . 176 . 136 . 141 . 186 . 118 . PUMP- . OVERA . 019 . 024	In/Sec In/Sec In/Sec O8A LL LEVEI In/Sec	(15-M	3.500 .943 lay-23 1-20 .102 .145 .066 .128 .115 .110 .645 .151 .193 .222 .095 .176	G-s G-s) KHz G-s G-s G-s G-s G-s G-s G-s G-s G-s
	81F 82F 7A 11 12 13 21 22 23 71 72 73 81 82 83		SEAL LIQUID	. 055 . 054 . 201- . 0VERA . 048 . 055 . 112 . 048 . 064 . 159 . 136 . 141 . 186 . 118 . 118 . 0VERA . 018 . 019 . 024 . 036	In/Sec	(15-M	3.500 .943 day-23 1-20 .102 .145 .066 .128 .115 .110 .645 .151 .193 .222 .095 .176 day-23 1-20 .098 .211 .079	G-s G-s) KHz G-s G-s G-s G-s G-s G-s G-s G-s G-s
	81F 82F 7A 11 12 13 21 22 23 71 72 73 81 82 83 11 21 23 71		SEAL LIQUID	. 055 . 054 . 201- . 0VERA . 048 . 055 . 112 . 048 . 064 . 159 . 136 . 141 . 186 . 118 . 118 . 0VERA . 018 . 019 . 024 . 036	In/Sec	(15-M	3.500 .943 1-20 1 .102 .145 .066 .128 .115 .110 .645 .151 .193 .222 .095 .176 4ay-23 1-20 1 .098 .211 .079	G-s G-s) KHz G-s G-s G-s G-s G-s G-s G-s G-s G-s
202-05	81F 82F 7A 11 12 13 21 22 23 71 72 73 81 82 83 11 21 23 71 72	- NASH S	SEAL LIQUID	. 055 . 054 . 201-(OVERAL . 048 . 055 . 112 . 048 . 064 . 159 . 136 . 141 . 186 . 118 . 019 . 024 . 036 . 018	In/Sec In	(15-M	3.500 .943 day-23 1-20 .102 .145 .066 .128 .115 .110 .645 .151 .193 .222 .095 .176 day-23 1-20 .098 .211 .079 .076	G-s G-s) KHz G-s G-s G-s G-s G-s G-s G-s G-s G-s
202-05	81F 82F 7A 11 12 13 21 22 23 71 72 73 81 82 83 71 21 21 23 71 72 73	- NASH S	SEAL LIQUID	. 055 . 054 . 201- . 048 . 055 . 112 . 048 . 064 . 159 . 188 . 176 . 136 . 141 . 186 . 118 . 019 . 024 . 036 . 018	In/Sec	(15-M	3.500 .943 1-20 1 .102 .145 .066 .128 .115 .110 .645 .151 .193 .222 .095 .176 4ay-23 1-20 1 .079 .076 .070	G-s G-s G-s KHz G-s-s G-s G-s G-s G-s G-s G-s G-s G-s KHz G-s G-s
202-05	81F 82F 11 12 13 21 22 23 71 72 73 81 82 83 11 21 23 71 72	- NASH S	SEAL LIQUID	. 055 . 054 . 201-(OVERA. . 048 . 055 . 112 . 048 . 164 . 159 . 186 . 141 . 186 . 118 . 0VERA. . 018 . 019 . 024 . 036 . 018 . 019 . 024 . 036 . 018	In/Sec	(15-M	3.500 .943 lay-23, 1-20, .102 .145 .066 .128 .115 .110 .645 .151 .193 .222 .095 .176 lay-23, 1-20, .098 .211 .079 .070	G-s G-s (Hz s-s-s-s-s-s-s-s-s-s-s-s-s-s-s-s-s-s-s-
202-05	81F 82F 2A 11 12 13 21 22 23 71 72 73 81 82 83 71 72 73 81 82 83	- NASH S	SEAL LIQUID	.055 .054 .055 .054 .048 .055 .112 .048 .064 .159 .186 .141 .186 .118 .019 .024 .036 .018 .019 .024 .036 .018	In/Sec	(15-M	3.500 .943 lay-23 1-20 .102 .145 .066 .128 .115 .110 .645 .151 .193 .222 .095 .176 day-23 1-20 .079 .070	G-s G-s G-s KHz G-s-s-s G-s-s-s G-s-s G-s-s G-s-s KHZ-s-s KHZ-s-s
202-05	81F 82F 11 12 13 21 22 23 71 72 73 81 82 83 11 21 23 71 72	- NASH S	SEAL LIQUID	. 055 . 054 . 201- . 048 . 055 . 112 . 048 . 064 . 159 . 188 . 176 . 136 . 141 . 186 . 118 . 019 . 024 . 036 . 018 . 019 . 024 . 036 . 018 . 019 . 024 . 036 . 018 . 019 . 024 . 036 . 018 . 018 . 019 . 024 . 036 . 037 . 036 . 036 . 037 . 036 . 037 . 036 . 037 . 036 . 037 . 038 . 038 . 039 . 039	In/Sec	(15-M	3.500 .943 lay-23, 1-20 1 .102 .145 .066 .128 .115 .110 .645 .151 .193 .222 .095 .176 lay-23, 1-20 1 .079 .076 .070	G-s G-s G-s KHz G-s-s-s G-s-s-s G-s-s KHZ-s-s KHZ-s-s KHZ-s-s
202-05	81F 82F 11 12 13 21 22 23 71 72 73 81 82 83 11 21 23 71 72 0	- NASH S	SEAL LIQUID	.055 .054 .055 .048 .055 .112 .048 .064 .159 .186 .141 .186 .118 .019 .024 .036 .018 .019 .024 .036 .018 .055 .051 .052 .051 .052	In/Sec	(15-M	3.500 .943 flay-23 .102 .145 .066 .128 .115 .110 .645 .151 .193 .222 .095 .176 flay-23 .1-20 .079 .070 .070 flay-23 .1-20 .198 .503 .242 .201	G-s G-s KHz G-s-s-s-s-s-s G-s-s-s-s KG-s-s KG-s-s KG-s-s KKG-s-s KKG-s-s KKG-s-s
202-05	81F 82F 2A 11 12 13 21 22 23 71 72 73 81 82 83 71 72 73 81 82 83	- NASH S	SEAL LIQUID	.055 .054 .055 .048 .055 .112 .048 .064 .159 .186 .141 .186 .118 .019 .024 .036 .018 .019 .024 .036 .018 .055 .051 .052 .051 .052	In/Sec	(15-M	3.500 .943 lay-23, 1-20 1 .102 .145 .066 .128 .115 .110 .645 .151 .193 .222 .095 .176 lay-23, 1-20 1 .079 .076 .070	G-s G-s KHz G-s-s-s-s-s-s G-s-s-s-s KG-s-s KG-s-s KG-s-s KKG-s-s KKG-s-s KKG-s-s

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31L
                               .125 In/Sec
                                                 .823 G-s
                              OVERALL LEVEL
                                                1-20 KHz
                               .076 In/Sec
       51
                                                .330 G-s
                               .176 In/Sec
                                                 .330 G-s
       51L
                               .194 In/Sec
                                                 .657 G-s
       52
       52L
                              .175 In/Sec
                                                 .249 G-s
       53
                               .180 In/Sec
                                                 .236 G-s
       53L
                               .114 In/Sec
                                                 .266 G-s
       61
                               .115 In/Sec
                                                 .117 G-s
                               .192 In/Sec
                                                 .117 G-s
       61L
       81
                               .034 In/Sec
                                                 .040 G-s
       82
                               .053 In/Sec
                                                 .037 G-s
       83
                               .043 In/Sec
                                                 .034 G-s
9003-01 - D-HYDRO PRIMARY FILT FD PUMP (15-May-23)
                              OVERALL LEVEL
                                             1-20 KHz
                               .038 In/Sec
       11
                                                 .486 G-s
                               .058 In/Sec
       21
                                                2.052 G-s
                               .060 In/Sec
                                                .774 G-s
       23
                                                 .268 G-s
       71
                               .070 In/Sec
       72
                               .106 In/Sec
                                                 .319 G-s
9001-01
          - D-HYDRO SECOND. FILT FD PUMP (15-May-23)
                              OVERALL LEVEL
                                             1-20 KHz
       11
                               .043 In/Sec
                                                .384 G-s
       21
                               .057 In/Sec
                                                1.617 G-s
                                               .529 G-s
       23
                               .028 In/Sec
       71
                               .059 In/Sec
                                                 .511 G-s
       72
                               .058 In/Sec
                                                 .411 G-s
          - Two Stage Water Pump A-WEST (15-May-23)
192-03
                              OVERALL LEVEL
                                               1-20 KHz
       11
                               .044 In/Sec
                                                .512 G-s
       21
                               .059 In/Sec
                                                .620 G-s
       23
                               .048 In/Sec
                                                 .433 G-s
                               .118 In/Sec
       71
                                                1.014 G-s
       72
                               .059 In/Sec
                                                 .523 G-s
191-07 - M MIX BED WATER PUMP 191-07 (15-May-23)
                             OVERALL LEVEL
                                                1-20 KHz
                               .080 In/Sec
                                                .730 G-s
       11
       21
                               .057 In/Sec
                                                1.881 G-s
                               .089 In/Sec .303 In/Sec
       23
                                                .226 G-s
       71
                                                 .422 G-s
       72
                               .372 In/Sec
                                                 .313 G-s
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Clarification Of Vibration Units:

Acc --> G-s PK Vel --> In/Sec PK As always, it has been a pleasure to serve Arkema. If there are any comments or questions, do not hesitate to contact us.

Sincerely,

ISO Certified Vibration Analyst, Category III

Kevin W. Mozewell



QualiTest_® Diagnostics

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