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February 11, 2021

Aria Energy North Shelby Plant Millington, TN

The following is a summary of findings from the February 2021 monthly vibration survey at your facility. Please let us know if there are any questions or comments.

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.

Defects

451C Vacuum Pump

Motor has an increased 1 x rpm vibration since replacing the motor. This could be caused by some slight imbalance of the motor or a sheave issue such as excessive face run-out or misalignment. Inspect motor sheave for run-out and misalignment as scheduling allows. Ensure all motor fasteners are tight and motor does not have a soft foot condition also. Rated as a **CLASS II** defect.

451D Vacuum Pump

Motor on this unit continues to have an electrical related vibration. We will monitor this closely. Rated as a **CLASS I** defect for now.

506B Product Compressor

Compressor inboard axial has had an increase in vibration at 4 x rpm. This is likely a harmonic of reciprocating frequency of the compressor and may indicate an internal mechanical issue or loading issue. Compressor may need attention in the next few months. Rated as a **CLASS II** defect.

breviated Last Measurement Summary ************************************						
301 FLARE - 301 FLARE B	LOWER (0)	5-Feb-21)				
Soi i mad Soi i mad E	OVERALL LEVEL	1K-20KHz				
MOH	.086 In/Sec	.157 G-s				
MIH	.124 In/Sec	.468 G-s				
MIA	.089 In/Sec	.385 G-s				
EIH	.207 In/Sec	.488 G-s				
EIA	.114 In/Sec	.427 G-s				
EOH	.119 In/Sec	.140 G-s				
101A COMP - 101A FEED C	COMPRESSOR (0!	5-Feb-21)				
	OVERALL LEVEL	1K-20KHz				
MOH	.042 In/Sec	.138 G-s				
MIH	.056 In/Sec	.094 G-s				
MIA	.040 In/Sec	.102 G-s				
IIH	.082 In/Sec	.412 G-s				
IIA	.112 In/Sec	.321 G-s				
IOH	.113 In/Sec	.953 G-s				
OIH	.102 In/Sec	.533 G-s				
OIA	.172 In/Sec	.290 G-s				
OOH	.099 In/Sec	.267 G-s				
101B COMP - 101B FEED C	COMPRESSOR (0	5-Feb-21)				
	OVERALL LEVEL	1K-20KHz				
MOH	.263 In/Sec	.259 G-s				
MIH	.249 In/Sec	.329 G-s				
MIA	.055 In/Sec	.229 G-s				
IIH	.100 In/Sec	.821 G-s				
IIA	.219 In/Sec	.657 G-s				
IOH	.094 In/Sec	.722 G-s				
OIH	.072 In/Sec	.799 G-s				
OIA	.111 In/Sec	.757 G-s				
OOH	.106 In/Sec	1.183 G-s				

MOH			.130	In/Sec	.035 G-s
			OVERAI	LL LEVEL	1K-20KHz
HX507B FAN	-	HX507B GAS COOL	FAN		(05-Feb-21)
IOH			.198	In/Sec	1.186 G-s
IIA			.532	In/Sec	.297 G-s
11H ++-			.142	III/Sed	./93 G-S
MIA TTU			140		.050 G-S 702 C-A
MIH			1095	TU/Sec	.291 G-S
MUH			.130		.212 G-S 201 C-A
MOT			120	Tn/Coo	272 C-C
JUDB COMP	-	JUD FRODUCT COM	10663773r	יי ד. ד. היי <i>ו</i> היי	
FOGD CONT	_		ADDEGGO	-	(05-Ech- 21)
MIH			.190	In/Sec	.035 G-s
MOH			.206	In/Sec	.040 G-s
107			OVERAL	⊔⊔ ⊔≌∨≝⊔ ⊤≂∕∝	
RA455U FAN	-	TA455D VAC PUMP	OTT COC	JL FAN	(VO-FED-ZI)
UV/520 EAN	-			א אים דר	(05-Fob-21)
EOH			.128	IN/Sec	.45/ G-S
EIA FOU			.003	TU/Sec	.344 G-S 157 C
ETU ETU			. 1 1 3		.34/ G-S 34/ C-c
ETH			173		347 C-e
MTA			044	In/Sec	710 C-e
мтн			.075		1 051 G-S
моч			075	In/Sec	597 C-e
ADID FOMP	_	JID ANCOM FOM	- OVERAI	T. T.EVET	1K-20KH-21
451 סעוואס ב	_		5		(05-Feb-21)
MIH			.104	TIL Sec	.040 G-S
MOH			161	TU/Sec	.051 G-S
MOU			07ERAI 21 E	uu ueveu Tn/goo	051 C-C
HATJJC FAN	-	MAJJC VAC PUMP	ONEDY1	LI. I.EVET	1K-20KH+
HX453C FAN	_	HX453C VAC DIMD		ЭТ. FAN	(05-Feb-21)
EOH			.151	TII\ 26C	.340 G-S
EIA EOU			.0/4		.224 G-S 348 C-c
51H 577			.138	III/Sed	.40/ G-S 22/ G-S
ETU MIA			159		.333 G-8
МТА			. 104		333 C-0
мон			.212	III/ Sec	.213 G-S 172 C-c
MOH			OVERAL 212	ці івубі Тр/бос	212 C
451C PUMP	-	451C VACCUM PUM	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	T T 121 7 723 7	(US-Feb-21)
4510 5		4510 10 00000	-		(05 Bab 01)
MIH			.108	In/Sec	.084 G-s
MOH			.149	In/Sec	.144 G-s
			OVERAI	LL LEVEL	1K-20KHz
HX453B FAN	-	HX453B VAC PUMP	OIL COO	OL FAN	(05-Feb-21)
EOH			.150	In/Sec	.216 G-s
EIA			.072	In/Sec	.249 G-s
EIH			.162	In/Sec	.254 G-s
MIA			.040	In/Sec	.059 G-s
МІН			.078	In/Sec	.235 G-s
MOH			.063	In/Sec	.374 G-s
1012 1011		1012 1100011 1011	OVERAI	LL LEVEL	1K-20KHz
451B PUMP	_	451B VACCUM PUM	2		(05-Feb-21)
MTH			. 103	TII\ 26C	.UZI G-S
MOH			.291	IN/Sec	.095 G-S
MOT			OVERAI	LL LEVEL	LK-20KHz
HX453A FAN	-	HX453A VAC PUMP	OIL COC	OL FAN	(U5-Feb-21)
EOH			.120	In/Sec	.302 G-s
EIA			.098	In/Sec	.278 G-s
EIH			.140	In/Sec	.289 G-s
MIA			.050	In/Sec	.207 G-s
MIH			.071	In/Sec	.505 G-s
MOH			.063	In/Sec	.574 G-s
451A POMP	-	451A VACCOM POM	OVERAI		(05-reb-21)
	_	4513 VACCIM DIMI	.		(05-Fob-21)

506C CC	OMP -	506C	PRODUCT	COMPRESSOR	ર	(05-Feb-21)	
				OVERAI	L LEVEI	1K-20F	CHz
	MOH			.090	In/Sec	. 439	G-s
	MIH			.069	In/Sec	.548	G-s
	MIA			.047	In/Sec	.173	G-s
	IIA			.138	In/Sec	.280	G-s
	IOH			.127	In/Sec	. 985	G-s
	OIH			.179	In/Sec	1.706	G-s
HX507C	FAN -	HX507	C GAS CO	OOL FAN		(05-Feb-21)	
				OVERAI	L LEVEL	1K-20K	(Hz
	MOH			.142	In/Sec	.047	G-s
	MIH			.228	In/Sec	.060	G-s
Clarificat	tion O	f Vibr	ation U	nits:			
Acc	>	G-s	RMS	5			
Vel	>	In/S	ec PK				

As always, it has been a pleasure to serve North Shelby. If there are any comments or questions, do not hesitate to contact us.

Sincerely,

Kevin W. Maxwell

ISO Certified Vibration Analyst, Category III



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