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October 26, 2023

Steve Benesch Valero West Memphis Terminal West Memphis, AR

Steve,

The following is a summary of findings from the October 2023 quarterly vibration survey at your facility. We were unable to collect data on the Barge Pumps this survey due to pumps not being lined up to run. Please let us know if there are any questions or concerns.

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.

31-15-042 Short Horn Lateral Pump

Motor/Pump was not in service during this survey.

#1 Barge Loading Pump

Motor/Pump was not in service during this survey.

#2 Barge Loading Pump

Motor/Pump was not in service during this survey.

#3 Barge Loading Pump

Motor/Pump was not in service during this survey.

#4 Barge Loading Pump

Motor/Pump was not in service during this survey.

#8 LX Truck Loading Pump

Motor/Pump appeared to be operating at acceptable vibration levels during this survey.

#12 LX Truck Loading Pump

Motor/Pump appeared to be operating at acceptable vibration levels during this survey.

#13 XX Truck Loading Pump

Motor/Pump appeared to be operating at acceptable vibration levels during this survey.

<u>#14 XX Truck Loading Pump</u>

Motor/Pump appeared to be operating at acceptable vibration levels during this survey.

#17 LS Truck Loading Pump

Motor/Pump was not in service during this survey.

#15NL Truck Loading Pump

Pump data still shows some signs of bearing defects/wear in the pump. No change to note at this time. We will monitor this issue closely. Rated as a **CLASS I** defect.

#18 NL Truck Loading Pump

Vibration data indicates an increased 1 x rpm vibration in the axial direction of the pump. There is also a 2 x rpm vibration present in the outboard end of the pump. This may be caused by excessive pump shaft run out. Inspect the pump shaft as time allows. Perform a run out check and lift check using a dial indicator with magnetic base. Rated as a **CLASS II** defect.

#6 Transfer Pump

Motor/Pump was not in service during this survey.

#5 Truck Loading Pump

Motor data shows an increase in high frequency amplitude. Spectral data indicates some bearing defects may be present in the motor bearings. Inspect motor as time allows. Rated as a **CLASS II** defect.

#7 Truck Loading Pump

Motor/Pump appeared to be operating at acceptable vibration levels during this survey.

#43 Bio-Diesel Pump North

Motor/Pump appeared to be operating at acceptable vibration levels during this survey.

#44 Bio-Diesel Pump Middle

Motor data is still showing elevated 1 x rpm vibration, especially in the inboard axial. Amplitude is .9 ips. This is very high and could be coupling related. Inspect coupling and alignment. Ensure motor does not have a soft foot condition. Motor drive end bearing data also indicates bearing defects. Inspect unit for these issues as time allows. We will monitor these issues closely. Rated as a **CLASS II** defect.

#45 Bio-Diesel Pump South

Pump was out of service. Motor needs to be replaced while pump is out due to motor bearing defects present.

We recommend changing the coupling type of the Bio-Diesel Pumps. The type of coupling that we recommend is the Rexnord Omega Coupling. TB Woods couplings tend to cause high vibration in high speed pumps when couplings begin to wear.

See link below for coupling information.

Omega Elastomeric Couplings Elastomeric Couplings - Couplings | Rexnord

Abbreviated Last Measurement Summary

Database:	west memphis.rbm
Station:	WEST MEMPHIS TERMINAL
Route No.	1: VALERO WM

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD
		6 oct 22)
#8LX POMP - #8 LX TROC	CK LOADING POMP (2	1 - 20 KHz
MOH	OVERALL LEVEL	1 - 20 KHz
MON	.059 IN/Sec	.002 G-s
MTH	043 In/Sec	547 G-s
MIV	.083 In/Sec	.104 G-s
MIA	.055 In/Sec	.123 G-s
#12LX PUMP - #12 LX TRU	UCK LOADING PUMP (2	6-0ct-23)
	OVERALL LEVEL	1 - 20 KHz
MOH	.244 In/Sec	.110 G-s
MOV	.194 In/Sec	.017 G-s
MIH	.135 In/Sec	.145 G-s
MIV	.086 In/Sec	.043 G-s
MIA	.074 In/Sec	.046 G-s
EIH	.031 In/Sec	.261 G-s
EIV	.028 In/Sec	.063 G-s
EIA	.020 In/Sec	.065 G-s
#13XX PUMP - #13 XX TRU	UCK LOADING PUMP (2	6-0ct-23)
	OVERALL LEVEL	1 - 20 KHz
MOH	.053 In/Sec	.371 G-s
MOV	.068 In/Sec	.115 G-s
MIH	.037 In/Sec	.370 G-s
MIV	.061 In/Sec	.139 G-s
MIA	.034 In/Sec	.173 G-s
#14XX PUMP - #14 XX TRU	UCK LOADING PUMP (2	6-0ct-23)
	OVERALL LEVEL	1 - 20 KHz
MOH	.088 In/Sec	.618 G-s
MOV	.087 In/Sec	.144 G-s
MIH	.072 In/Sec	.592 G-s

MIV	.081 In/Sec	.143 G-s
MIA	.067 In/Sec	.108 G-s
#15NL PUMP	- #15 NL TRUCK LOADING PUMP	(26-Oct-23)
	OVERALL LEVEL	1 - 20 KHz
MOH	045 In/Sec	137 G-s
MOM	048 In/Sec	053 6-8
MUV	.040 IN/Sec	.055 G S
MIH		.154 G-S
MIV	.036 In/Sec	.027 G-S
MIA	.039 In/Sec	.027 G-S
EIH	.129 In/Sec	1.272 G-s
EIV	.187 In/Sec	.498 G-s
EIA	.089 In/Sec	.256 G-s
EOH	.101 In/Sec	.462 G-s
EOV	.135 In/Sec	.126 G-s
EOA	.127 In/Sec	.129 G-s
#18NT. DIIMP	- #18 NI. TRUCK LOADING DIMP	(26 - 0c + -23)
"IOUT IOUT	WERALL INCOM LONDING FOR	1 - 20 KHR
MOH		125 C-s
MOH	.042 III/Sec	.125 G-S
MOV	.139 In/Sec	.037 G-S
MIH	.048 In/Sec	.121 G-S
MIV	.285 In/Sec	.019 G-s
MIA	.124 In/Sec	.017 G-s
EIH	.284 In/Sec	.165 G-s
EIV	.402 In/Sec	.074 G-s
EIA	.215 In/Sec	.091 G-s
EOH	.101 In/Sec	.423 G-s
EOV	.199 In/Sec	.109 G-s
EOA	.270 In/Sec	.105 G-s
	,	
#5TRCKLOAD	- #5 TRUCK LOADING PUMP	(26 - 0ct - 23)
	OVERALL LEVEL	1 - 20 KHz
мон	134 In/Sec	464 G-8
MOII	.134 III/Sec	176 0 0
MOV		.176 G-S
MIH	.134 In/Sec	.829 G-S
MIV	.221 In/Sec	.216 G-s
MIA	.177 In/Sec	.174 G-s
EIH	.151 In/Sec	.176 G-s
EIV	.177 In/Sec	.105 G-s
EIA	.130 In/Sec	.094 G-s
EOH	.137 In/Sec	.471 G-s
EOV	.240 In/Sec	.172 G-s
EOA	.167 In/Sec	.150 G-s
#7 ₩₽ ₽₽₽	- #7 TRUCK LOADING DUMP	(26 - 0a + - 23)
", INCITIOND	", INCOM DOLDING FOMP	1 - 20 KH-
MOH	121 TP/Coo	121 C a
MOH	.121 IN/Sec	.121 G-S
MOV		.037 G-S
MIH	.083 In/Sec	.120 G-S
MIV	.193 In/Sec	.030 G-s
MIA	.125 In/Sec	.028 G-s
EIH	.173 In/Sec	.197 G-s
EIV	.290 In/Sec	.054 G-s
EIA	.192 In/Sec	.087 G-s
EOH	.245 In/Sec	.190 G-s
EOV	.131 In/Sec	.062 G-s
EOA	.211 In/Sec	.069 G-s
#43BOIDSLP	- #43 BIO-DIESEL PUMP NORTH	(26-Oct-23)
	OVERALL LEVEL	1 - 20 KHz
MOH	.138 In/Sec	.250 G-s
MOV	.225 In/Sec	.102 G-s
MIH	.120 In/Sec	.320 G-s
MIV	.191 In/Sec	.038 G-s
MIA	.270 In/Sec	.057 G-s
EIH	.116 In/Sec	.405 G-s
EIV	.202 In/Sec	.155 G-s
EIA	.119 In/Sec	.265 G-s
EOH	.124 In/Sec	.590 G-s

EOV		.282 In/Se	c .170 (<u>G-s</u>
EOA		.106 In/Se	c.259 (<u>G-s</u>
#44BOIDSLP -	#44 BIO-DIESEL	PUMP MIDDLE	(26-Oct-23)	
		OVERALL LEV	EL 1-20	KHz
MOH		.236 In/Se	c 1.951 (G-s
MOV		.466 In/Se	c.675 (G-s
MIH		.203 In/Se	c 2.926 (3-s
MIV		.199 In/Se	c.459 (3-s
MIA		.577 In/Se	c.436 (3-s
EIH		.130 In/Se	c.660 (3-s
EIV		.182 In/Se	c .323 (3-s
EIA		.081 In/Se	c.372 (<u>G-s</u>
EOH		.094 In/Se	c.789 (3-s
EOV		.309 In/Se	c .214 (3-s
EOA		.151 In/Se	c .260 (<u>G-s</u>
Clarification Of	Vibration Unit	s:		
Acc>	G-s RMS			
Vel>	In/Sec PK			

As always, it has been a pleasure to serve the Valero West Memphis Truck Terminal. If there are any comments or questions, do not hesitate to contact us.

Sincerely,

Kerin W. Maruell

ISO Certified Vibration Analyst, Category III



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