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Aria Energy North Shelby Plant Millington, TN

The following is a summary of findings from the July 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

## **101A Feed Compressor**

Overall vibration amplitudes continue to remain low this survey likely due to the compressor operating at a low feed rate during the survey. This unit tends to have a higher than normal 1 x rpm vibration. This vibration fluctuates depending upon load and speed and is likely causing a resonant vibration at 1 x rpm. We will monitor this closely. Rated as a **CLASS I** defect.

## **101B Feed Compressor**

Motor has previously had a high vibration that is likely resonance related. This month, vibration is lower. Overall vibration of the motor outboard horizontal was .38 ips-pk this month. Motor appeared to be operating near 1594 rpm during the survey. Resonant frequency appears to be around 1650-1700 rpm. We will continue to monitor this closely. 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.

Abbreviated Last Measurement Summary						
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Database: Clea	an Energy.rbm					
Area: millington plant						
MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD				
303 FLARE - 303 FLARE F	Jul-21)					
	OVERALL LEVEL	1K-20KHz				
МОН	.043 In/Sec	.648 G-s				
MOV	.113 In/Sec	.258 G-s				
MIH	.086 In/Sec	.568 G-s				
MIV	.082 In/Sec	.272 G-s				
MIA	.040 In/Sec	.476 G-s				
EIH	.035 In/Sec	.244 G-s				
EIV	.027 In/Sec	.178 G-s				
EIA	.036 In/Sec	.156 G-s				
EOH	.067 In/Sec	.385 G-s				
EOV	.193 In/Sec	.209 G-s				
101A COMP - 101A FEED C	COMPRESSOR (13-	Jul-21)				
	OVERALL LEVEL	1K-20KHz				
MOH	.051 In/Sec	.125 G-s				
MIH	.057 In/Sec	.169 G-s				
MIA	.036 In/Sec	.203 G-s				
IIH	.109 In/Sec	.704 G-s				
IIA	.187 In/Sec	.702 G-s				
IOH	.120 In/Sec	.505 G-s				
OIH	.088 In/Sec	1.169 G-s				
AIO	.164 In/Sec	1.091 G-s				
OOH	.084 In/Sec	1.289 G-s				
1018 COMP - 1018 FFFD (						
TOTE COMP TOTE FEED C	OVERALL LEVEL	1K-20KHz				
мон	380 In/Sec	243 G-s				
мтн	.362 In/Sec	.451 G-s				
MIA	.057 In/Sec	.431 G-s				
IIH	.127 In/Sec	1.412 G-s				

IIA	.252 In/Sec	1.122 G-s
IOH	.099 In/Sec	.917 G-s
OIH	.128 In/Sec	1.221 G-s
OIA	.076 In/Sec	1.609 G-s
OOH	082 In/Sec	2 602 G-s
0011		2.002 0 0
HX132A FAN	- HX132A GAS OIL COOLER FAN	(13-Jul-21)
	OVERALL LEVEL	1K-20KHz
MOH	.086 In/Sec	.124 G-s
MIH	.083 In/Sec	.116 G-s
EIH	.036 In/Sec	.040 G-s
EOH	055 In/Sec	058 G-s
	,	
HX132B FAN	- HX132B GAS OIL COOLER FAN	(13-Jul-21)
	OVERALL LEVEL	1K-20KHz
MOH	.045 In/Sec	.080 G-s
MIH	.117 In/Sec	.107 G-s
EIH	.175 In/Sec	.079 G-s
EOH	.039 In/Sec	.043 G-s
451A PUMP	- 451A VACCUM PUMP	(13-Jul-21)
	OVERALL LEVEL	1K-20KHz
MOH	.082 In/Sec	.809 G-s
MOV	.086 In/Sec	.304 G-s
MIH	.097 In/Sec	.395 G-s
MIV	.114 In/Sec	.779 G-s
МТА	063 In/Sec	237 G-s
ЕТН	192 In/Sec	321 G-s
FTV	132 In/Sec	394 C-s
	.152 III/Sec	.394 G-S
EIA	.150 11/500	.303 G-S
EOH	.1/8 IN/Sec	.549 G-S
EOV	.142 In/Sec	.383 G-s
HX453A FAN	- HX453A VAC PUMP OIL COOL FAN	(13-Jul-21)
		<b>\</b>
	OVERALL LEVEL	1K-20KHz
MOH	OVERALL LEVEL	1K-20KHz
МОН	OVERALL LEVEL .206 In/Sec 128 In/Sec	1K-20KHz .144 G-s 070 G-s
MOH MIH	OVERALL LEVEL .206 In/Sec .128 In/Sec	1K-20KHz .144 G-s .070 G-s
MOH MIH 451B PUMP	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP	1K-20KHz .144 G-s .070 G-s (13-Jul-21)
MOH MIH 451B PUMP	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz
MOH MIH 451B PUMP MOH	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s
MOH MIH 451B PUMP MOH MOV	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s
MOH MIH 451B PUMP MOH MOV MIH	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .067 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s
MOH MIH 451B PUMP MOH MOV MIH MIV	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .059 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s
MOH MIH 451B PUMP MOH MOV MIH MIV MIA	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s
MOH MIH 451B PUMP MOH MOV MIH MIV MIA EIH	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .159 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s
MOH MIH 451B PUMP MOH MOV MIH MIV MIA EIH	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .159 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s
MOH MIH 451B PUMP MOH MOV MIH MIV MIA EIH EIV EIV	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .059 In/Sec .059 In/Sec .159 In/Sec .105 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s
MOH MIH 451B PUMP MOH MOV MIH MIV MIA EIH EIV EIA EOH	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .059 In/Sec .059 In/Sec .105 In/Sec .105 In/Sec .108 In/Sec .207 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .507 G-s
MOH MIH 451B PUMP MOH MOV MIH MIV MIA EIH EIV EIA EOH	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .105 In/Sec .108 In/Sec .207 In/Sec .197 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .507 G-s .166 G-s
MOH MIH 451B PUMP MOH MOV MIH MIV MIA EIH EIV EIA EOH EOV	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .105 In/Sec .105 In/Sec .108 In/Sec .207 In/Sec .197 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .507 G-s .166 G-s
MOH MIH 451B PUMP MOH MOV MIH MIV MIA EIH EIV EIA EOH EOV	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .105 In/Sec .105 In/Sec .108 In/Sec .108 In/Sec .197 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .507 G-s .166 G-s (13-Jul-21)
MOH MIH 451B PUMP 451B MOH MOV MIH MIV MIA EIH EIV EIA EOH EOV	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .105 In/Sec .105 In/Sec .108 In/Sec .108 In/Sec .107 In/Sec .197 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .507 G-s .166 G-s (13-Jul-21) 1K-20KHz
MOH MIH 451B PUMP MOH MOV MIH MIV MIA EIH EIV EIA EOH EOV HX453B FAN	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .105 In/Sec .105 In/Sec .108 In/Sec .108 In/Sec .107 In/Sec .197 In/Sec .197 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .507 G-s .166 G-s (13-Jul-21) 1K-20KHz .276 G-s
MOH MIH 451B PUMP 451B ROM MOH MOV MIH MIV MIA EIH EIV EIA EOH EOV HX453B FAN	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .105 In/Sec .105 In/Sec .108 In/Sec .108 In/Sec .197 In/Sec .197 In/Sec .174 In/Sec .116 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .507 G-s .166 G-s (13-Jul-21) 1K-20KHz .276 G-s .183 G-s
MOH MIH 451B PUMP 451B MOH MOV MIH MIV MIA EIH EIV EIA EOH EOV HX453B FAN MOH	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .105 In/Sec .105 In/Sec .108 In/Sec .108 In/Sec .197 In/Sec .197 In/Sec .174 In/Sec .116 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .507 G-s .166 G-s (13-Jul-21) 1K-20KHz .276 G-s .183 G-s
МОН 451В Р∪МР 451В кон МОН МОЧ МОН БІА БІА БОР БІА БОР БОР БОР БОР БОР БОР БОР БОР БОР БОР	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .105 In/Sec .108 In/Sec .108 In/Sec .108 In/Sec .197 In/Sec .197 In/Sec .174 In/Sec .116 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .176 G-s .166 G-s (13-Jul-21) 1K-20KHz .276 G-s .183 G-s (13-Jul-21)
МОН МІН 451В Р∪МР МОН МОЧ МІН МІЧ ЕІН ЕІЧ ЕІА ЕОЧ НХ453В FAN МОН МІН	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .105 In/Sec .105 In/Sec .108 In/Sec .207 In/Sec .197 In/Sec .197 In/Sec .116 In/Sec .116 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .507 G-s .166 G-s (13-Jul-21) 1K-20KHz .276 G-s .183 G-s
<ul> <li>МОН МІН</li> <li>451В</li> <li>451В</li> <li>МОН МОЧ МІН МІН ЕІЧ ЕІЧ</li> <li>400</li> <li>451С</li> <li>У∪МР</li> <li>400</li> </ul>	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .105 In/Sec .105 In/Sec .108 In/Sec .108 In/Sec .107 In/Sec .197 In/Sec .197 In/Sec .116 In/Sec .116 In/Sec .060 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .507 G-s .166 G-s (13-Jul-21) 1K-20KHz .276 G-s .183 G-s (13-Jul-21) 1K-20KHz .983 G-s
MOH MIH 451B P∪MP MOH MOV MIH MIH EIV EIA EOV EIA EOV EIA EOV EIA EOV EIA EOV EIA EIA EIA EIA EIA EIA EIA EIA EIA EIA	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .105 In/Sec .105 In/Sec .108 In/Sec .108 In/Sec .108 In/Sec .107 In/Sec .197 In/Sec .197 In/Sec .116 In/Sec .116 In/Sec .192 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .507 G-s .166 G-s (13-Jul-21) 1K-20KHz .276 G-s .183 G-s (13-Jul-21) 1K-20KHz .983 G-s .114 G-s
HX452B HUMP A51B HUMP MOH MOY MIH MOY MIH EIV EIX EOH EOV ENA EIH EIV EIX EOH EOV EIX EOH EOV HX452B FAN	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .105 In/Sec .105 In/Sec .108 In/Sec .108 In/Sec .207 In/Sec .197 In/Sec .197 In/Sec .116 In/Sec .116 In/Sec .192 In/Sec .092 In/Sec .073 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .507 G-s .166 G-s (13-Jul-21) 1K-20KHz .276 G-s .183 G-s .183 G-s .114 G-s 1.229 G-s
HX453B HUMP 451B HUMP MOH MOV MIH MIN EIH EIV EIA EOH EOV HX453B FAN MOH MIH	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .105 In/Sec .105 In/Sec .108 In/Sec .108 In/Sec .108 In/Sec .107 In/Sec .116 In/Sec .116 In/Sec .092 In/Sec .092 In/Sec .073 In/Sec .107 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .507 G-s .166 G-s (13-Jul-21) 1K-20KHz .276 G-s .183 G-s (13-Jul-21) 1K-20KHz .983 G-s .114 G-s 1.229 G-s .204 G-s
HX452B WOH A51B VVP MOH MOV MIH MIN EIN EIN EIN EIN EIN EIN EIN EIN EIN E	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .105 In/Sec .105 In/Sec .108 In/Sec .108 In/Sec .207 In/Sec .107 In/Sec .116 In/Sec .116 In/Sec .092 In/Sec .092 In/Sec .073 In/Sec .107 In/Sec .051 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .507 G-s .166 G-s (13-Jul-21) 1K-20KHz .276 G-s .183 G-s .183 G-s .114 G-s 1.229 G-s .204 G-s .263 G-s
МОН         451В       Р-ШР         451В       МОН         МОР       МОН         МОР       МОН         МОР       МОН         МОР       МОР         МОР       МОР         МОР       МОР         МОР       МОР         НХ45-30       FAN         451C       МОР         МОР       МОР         МОР       МОР         451C       МОР         МОР       МОР	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .105 In/Sec .105 In/Sec .108 In/Sec .108 In/Sec .107 In/Sec .106 In/Sec .116 In/Sec .092 In/Sec .092 In/Sec .092 In/Sec .091 In/Sec .091 In/Sec .092 In/Sec .091 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .507 G-s .166 G-s (13-Jul-21) 1K-20KHz .276 G-s .183 G-s .114 G-s 1.229 G-s .204 G-s .263 G-s
A51B       У         A51B       У         A51B       МОН         MOH       М	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .105 In/Sec .105 In/Sec .108 In/Sec .108 In/Sec .107 In/Sec .116 In/Sec .116 In/Sec .092 In/Sec .092 In/Sec .092 In/Sec .092 In/Sec .092 In/Sec .092 In/Sec .073 In/Sec .107 In/Sec .051 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .176 G-s .166 G-s (13-Jul-21) 1K-20KHz .983 G-s .114 G-s 1.229 G-s .204 G-s .263 G-s (13-Jul-21) 1K-20KHz
ИОН         451В       Р	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .105 In/Sec .105 In/Sec .108 In/Sec .108 In/Sec .107 In/Sec .116 In/Sec .116 In/Sec .092 In/Sec .092 In/Sec .092 In/Sec .092 In/Sec .092 In/Sec .092 In/Sec .073 In/Sec .107 In/Sec .051 In/Sec .051 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .507 G-s .166 G-s (13-Jul-21) 1K-20KHz .276 G-s .183 G-s .114 G-s .2983 G-s .114 G-s .204 G-s .204 G-s .263 G-s (13-Jul-21) 1K-20KHz .263 G-s
451В       Э         451В       Э         451В       Э         МОН       МОН         451С       Э         451С       Э         МОН       МОН         МОН       МОН         МОН       МОН         НХ453С       БАЛ	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .105 In/Sec .105 In/Sec .108 In/Sec .108 In/Sec .107 In/Sec .116 In/Sec .116 In/Sec .092 In/Sec .092 In/Sec .092 In/Sec .092 In/Sec .073 In/Sec .107 In/Sec .107 In/Sec .051 In/Sec .051 In/Sec .051 In/Sec .051 In/Sec .051 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .507 G-s .166 G-s (13-Jul-21) 1K-20KHz .276 G-s .183 G-s .114 G-s .2983 G-s .204 G-s .204 G-s .263 G-s (13-Jul-21) 1K-20KHz .263 G-s
451В       У         451В       У         451В       МОН МОУ МІН ЦІР         МОН МОР ЦІР       МОН ЦІР         451С       Р         451С       У         451С       ВОН МОР         451С       ВОН МОР         451С       Р         451С       БОР         451С       ВОР         451С       В	OVERALL LEVEL .206 In/Sec .128 In/Sec - 451B VACCUM PUMP OVERALL LEVEL .050 In/Sec .067 In/Sec .067 In/Sec .059 In/Sec .032 In/Sec .105 In/Sec .105 In/Sec .108 In/Sec .108 In/Sec .107 In/Sec .116 In/Sec .116 In/Sec .092 In/Sec .092 In/Sec .092 In/Sec .092 In/Sec .073 In/Sec .107 In/Sec .051 In/Sec .051 In/Sec .051 In/Sec .051 In/Sec .051 In/Sec .051 In/Sec .051 In/Sec .137 In/Sec	1K-20KHz .144 G-s .070 G-s (13-Jul-21) 1K-20KHz .719 G-s .146 G-s .618 G-s .244 G-s .282 G-s .351 G-s .391 G-s .176 G-s .507 G-s .166 G-s (13-Jul-21) 1K-20KHz .276 G-s .183 G-s .114 G-s 1.229 G-s .204 G-s .204 G-s .263 G-s (13-Jul-21) 1K-20KHz .186 G-s .111 G-s

451D PUMP -	451D VACCUM PUMP		(13-Jul-21)	
		OVERALL LEVEL	1K-20KHz	
MOH		.101 In/Sec	.641 G-s	
MOV		.118 In/Sec	.247 G-s	
MIH		.111 In/Sec	1.676 G-s	
MIV		.090 In/Sec	.335 G-s	
MIA		.059 In/Sec	.342 G-s	
EIH		.203 In/Sec	.602 G-s	
EIV		.111 In/Sec	.073 G-s	
EIA		.114 In/Sec	.090 G-s	
EOH		.201 In/Sec	.330 G-s	
EOV		.115 In/Sec	.135 G-s	
HX453D FAN - 1	HX453D VAC PUMP	OIL COOL FAN	(13-Jul-21)	
		OVERALL LEVEL	1K-20KHz	
MOH		.229 In/Sec	.090 G-s	
MIH		.221 In/Sec	.072 G-s	
MIA		.231 In/Sec	.061 G-s	
506A COMP -	506A PRODUCT COM	PRESSOR	(13-Jul-21)	
		OVERALL LEVEL	1K-20KHz	
MOH		.045 In/Sec	.311 G-s	
MIH		.057 In/Sec	.426 G-s	
MIA		.091 In/Sec	.312 G-s	
IIH 		.354 In/Sec	.854 G-s	
		.424 In/Sec	1.4/2 G-S	
		.305 In/Sec	3.113 G-S	
OIH		.302 111/580	5.054 G-S	
HX507A FAN -	HX507A GAS COOL	FAN	(1311-21)	
		OVERALL LEVEL	1K-20KHz	
МОН		.141 In/Sec	.079 G-s	
MIH		.187 In/Sec	.059 G-s	
		• • • •		
506C COMP -	506C PRODUCT COM	PRESSOR	(13-Jul-21)	
		OVERALL LEVEL	1K-20KHz	
MOH		.089 In/Sec	.340 G-s	
MIH		.069 In/Sec	.370 G-s	
MIA		.073 In/Sec	.268 G-s	
IIH		.300 In/Sec	.635 G-s	
IIA		.271 In/Sec	1.359 G-s	
IOH		.191 In/Sec	1.829 G-s	
HX507C FAN - 1	HX507C GAS COOL	FAN	(13-Jul-21)	
		OVERALL LEVEL	1K-20KHz	
MOH		.157 In/Sec	.063 G-s	
MIH		.222 In/Sec	.068 G-s	
Clarification of	Vibration Unite			
Acc>	G-s RMS	•		
Vel>	In/Sec PK			
	1., 000 1.			

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

Sincerely,

Kerin W. Maxuell

ISO Certified Vibration Analyst, Category III



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