October 23, 2023

Nathan Allen
North Shelby Plant
Millington, TN

Nathan,

The following is a summary of findings from the October 2023 monthly vibration survey at the North Shelby site.

QualiTest® uses a four-step rating system for defects.

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

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

Class III: 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.

Class IV: 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

Defects

101-B Feed Compressor
Equipment was not in service during this survey; however, the following still applies: Compressor data shows some high frequency acceleration amplitude with noise floor. Peaks in spectral data suggest possible wear of internal compressor components. We are watching this closely. Rated as a **CLASS I** defect.

506 B Product Compressor
Motor data shows defects are present in motor bearings. Motor will need to be swapped out as soon as practical. Rated as a **CLASS III** defect.

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              Abbreviated Last Measurement Summary
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          Database:  Clean Energy.rbm
          Area:      millington plant
          Route No.  1:  CLEAN ENERGY

 MEASUREMENT POINT            OVERALL LEVEL        HFD / VHFD
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 301 FLARE  - 301 FLARE BLOWER             (20-Oct-23)
                              OVERALL LEVEL    1K-20KHz
         MOH                  .112 In/Sec      .959 G-s
         MOV                  .233 In/Sec      .169 G-s
         MIH                  .146 In/Sec      .775 G-s
         MIV                  .128 In/Sec      .148 G-s
         MIA                  .101 In/Sec      .325 G-s
         EIH                  .271 In/Sec      .269 G-s
         EIV                  .073 In/Sec      .205 G-s
         EIA                  .036 In/Sec      .101 G-s
         EOH                  .194 In/Sec      .253 G-s
         EOV                  .045 In/Sec      .081 G-s


 RINSE COMP - RINSE COMPRESSOR             (20-Oct-23)
                              OVERALL LEVEL    1K-20KHz
         MOH                  .104 In/Sec     3.379 G-s
         MIH                  .108 In/Sec     2.924 G-s
         MIA                  .110 In/Sec      .485 G-s
         IIH                  .101 In/Sec     1.588 G-s
         IIA                  .081 In/Sec      .519 G-s
         IOH                  .113 In/Sec      .678 G-s
         OIH                  .069 In/Sec      .571 G-s
         OIA                  .103 In/Sec      .132 G-s
         OOH                  .133 In/Sec      .541 G-s


 VAC COMP   - VACUUM COMPRESSOR            (20-Oct-23)
                              OVERALL LEVEL    1K-20KHz
         MOH                  .079 In/Sec     1.596 G-s
         MIH                  .115 In/Sec     1.960 G-s
         MIA                  .091 In/Sec      .129 G-s
         IIH                  .062 In/Sec     1.226 G-s
         IIA                  .064 In/Sec      .145 G-s
         IOH                  .111 In/Sec     1.179 G-s
         OIH                  .100 In/Sec     1.119 G-s
         OIA                  .069 In/Sec      .161 G-s
         OOH                  .092 In/Sec      .960 G-s


 COOLFAN1    - COOLING FAN 1               (20-Oct-23)
                              OVERALL LEVEL    1K-20KHz
         MOH                  .024 In/Sec      .473 G-s
         MOV                  .068 In/Sec      .087 G-s
         MIH                  .013 In/Sec      .511 G-s
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          MIV                      .066 In/Sec          .130 G-s
          MIA                      .015 In/Sec          .071 G-s


101A COMP   - 101A FEED COMPRESSOR            (20-Oct-23)
                               OVERALL LEVEL      1K-20KHz
          MOH                      .036 In/Sec          .367 G-s
          MIH                      .085 In/Sec          .313 G-s
          MIA                      .048 In/Sec          .399 G-s
          IIH                      .199 In/Sec         1.022 G-s
          IIA                      .263 In/Sec          .922 G-s
          IOH                      .162 In/Sec         1.129 G-s
          OIH                      .188 In/Sec          .796 G-s
          OIA                      .131 In/Sec         2.483 G-s
          OOH                      .099 In/Sec         1.059 G-s


HX132A FAN - HX132A GAS OIL COOLER FAN      (20-Oct-23)
                               OVERALL LEVEL      1K-20KHz
          EIH                      .053 In/Sec          .090 G-s
          EOH                      .099 In/Sec          .053 G-s


451A PUMP   - 451A VACCUM PUMP               (20-Oct-23)
                               OVERALL LEVEL      1K-20KHz
          MOH                      .067 In/Sec          .753 G-s
          MOV                      .083 In/Sec          .393 G-s
          MIH                      .089 In/Sec          .325 G-s
          MIV                      .119 In/Sec          .501 G-s
          MIA                      .052 In/Sec          .153 G-s
          EIH                      .199 In/Sec          .343 G-s
          EIV                      .112 In/Sec          .100 G-s
          EIA                      .113 In/Sec          .119 G-s
          EOH                      .130 In/Sec          .610 G-s
          EOV                      .156 In/Sec          .087 G-s


HX453A FAN - HX453A VAC PUMP OIL COOL FAN   (20-Oct-23)
                               OVERALL LEVEL      1K-20KHz
          MOH                      .193 In/Sec          .118 G-s
          MIH                      .125 In/Sec          .064 G-s


451B PUMP   - 451B VACCUM PUMP               (20-Oct-23)
                               OVERALL LEVEL      1K-20KHz
          MOH                      .049 In/Sec          .498 G-s
          MOV                      .077 In/Sec          .162 G-s
          MIH                      .065 In/Sec          .453 G-s
          MIV                      .076 In/Sec          .181 G-s
          MIA                      .038 In/Sec          .130 G-s
          EIH                      .194 In/Sec          .332 G-s
          EIV                      .119 In/Sec          .137 G-s
          EIA                      .132 In/Sec          .150 G-s
          EOH                      .198 In/Sec          .593 G-s
          EOV                      .231 In/Sec          .198 G-s


HX453B FAN - HX453B VAC PUMP OIL COOL FAN   (20-Oct-23)
                               OVERALL LEVEL      1K-20KHz
          MOH                      .145 In/Sec          .186 G-s
          MIH                      .105 In/Sec          .127 G-s


451C PUMP   - 451C VACCUM PUMP               (20-Oct-23)
                               OVERALL LEVEL      1K-20KHz
          MOH                      .111 In/Sec          .316 G-s
          MOV                      .106 In/Sec          .082 G-s
          MIH                      .127 In/Sec          .314 G-s
          MIV                      .208 In/Sec          .107 G-s
          MIA                      .070 In/Sec          .057 G-s
          EIH                      .132 In/Sec          .681 G-s
          EIV                      .129 In/Sec          .129 G-s
          EIA                      .095 In/Sec          .186 G-s
          EOH                      .125 In/Sec          .569 G-s
          EOV                      .087 In/Sec          .132 G-s
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    HX453C FAN - HX453C VAC PUMP OIL COOL FAN  (20-Oct-23)
                                OVERALL LEVEL      1K-20KHz
         MOH                    .121 In/Sec         .265 G-s
         MIH                    .089 In/Sec         .158 G-s

    451D PUMP  - 451D VACCUM PUMP                (20-Oct-23)
                                OVERALL LEVEL      1K-20KHz
         MOH                    .073 In/Sec         .774 G-s
         MOV                    .078 In/Sec         .438 G-s
         MIH                    .120 In/Sec        1.784 G-s
         MIV                    .104 In/Sec         .172 G-s
         MIA                    .035 In/Sec         .410 G-s
         EIH                    .182 In/Sec         .516 G-s
         EIV                    .102 In/Sec         .123 G-s
         EIA                    .072 In/Sec         .203 G-s
         EOH                    .151 In/Sec         .316 G-s
         EOV                    .145 In/Sec         .234 G-s

    HX453D FAN - HX453D VAC PUMP OIL COOL FAN  (20-Oct-23)
                                OVERALL LEVEL      1K-20KHz
         MOH                    .227 In/Sec         .091 G-s
         MIH                    .242 In/Sec         .090 G-s

    506B COMP  - 506B PRODUCT COMPRESSOR       (20-Oct-23)
                                OVERALL LEVEL      1K-20KHz
         MOH                    .117 In/Sec        2.017 G-s
         MIH                    .170 In/Sec        4.791 G-s
         MIA                    .099 In/Sec        3.257 G-s
         IIH                    .148 In/Sec         .707 G-s
         IIA                    .145 In/Sec        1.434 G-s
         IOH                    .217 In/Sec        2.637 G-s
         OIH                    .210 In/Sec        2.270 G-s
         OIA                    .122 In/Sec        1.232 G-s
         OOH                    .192 In/Sec        1.708 G-s

    HX507B FAN - HX507B GAS COOL FAN           (20-Oct-23)
                                OVERALL LEVEL      1K-20KHz
         MOH                    .124 In/Sec         .055 G-s
         MIH                    .138 In/Sec         .066 G-s

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  Clarification Of Vibration Units:
     Acc      -->  G-s       RMS
     Vel      -->  In/Sec    PK
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As always, it has been a pleasure to serve North Shelby-Archaea Energy. If there are any comments or questions, do not hesitate to contact us.

Sincerely,

Kevin W. Maxwell

ISO Certified Vibration Analyst, Category III