HI-SPEED INDUSTRIAL SERVICE

MILLINGTON, TN

February 1, 2021

Bio Energy

Subject: February vibration service

Most of the machines surveyed were found to be in good condition with the exception of the following: Supporting data included.

***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

***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.

This completes our assessment of your equipment for this survey. Thank you for your business and don't hesitate to call if you have any comments or questions.

Sincerely,

David W Shook

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**Reportable equipment**

**PC 1001B**
The Pump bearings are most likely in distress and have overall acceleration at near 5 G's RMS. This is the first data we have on this unit. Have a replacement pump ready for future changeout. **Rated a Class II Defect.**

**PC 1425A**
Most measurements on this unit are at shaft speed and the vibrations are near ½"/second velocity peak. We suspect imbalance, alignment or possible loose fasteners or structural issues are at the root cause of the high vibration. Inspect for suggested issues at the next opportunity. **Rated a Class II Defect.**

**PC 1520B**
Pump vibration data shows harmonics of 9x RPM (vane pass) and possible early bearing defects. Check pump operating parameters. Ensure pump bearing are lubricated. **Rated a Class I Defect.**

**PC 1538A (maybe PM 1538A) Dosing Pump Caustic**
There is an extremely high vibration in the motor at 85 Hz. The data does not point to any direct problem that we can identify at this time. We can only recommend a thorough inspection of this unit as soon as possible. **Rated a Class III Defect.**

**PC 1538B**
There is an elevated vibration in the motor at near 46 Hz. Inspect the drive train component, all fasteners, and check the alignment. **Rated a Class II Defect.**

**PC 3110A**
Data shows an elevated vibration at about 54 Hz which we believe is 3x RPM. Inspect the coupling and alignment. **Rated a Class II Defect.**

**PC 7215B**
Motor data indicates an air gap issue between the rotor and stator or possibly an electrical issue. Check all electrical connections, perform a phase to phase current and voltage check, and ensure there is no motor case distortion due to a soft foot. **Rated a Class II Defect.**

**PC 7225A**
Motor data shows a moderate shaft speed vibration at the motor fan end. Inspect the motor for loose fasteners, broken fan, coupling wear, or shaft alignment issues. **Rated a Class I Defect.**

**PC 7245**
Vibration data shows a moderate shaft speed vibration in the unit. Inspect the unit for loose fasteners, broken fan, coupling wear, or shaft alignment issues. **Rated a Class I Defect.**

**PC 9320**
Vibration data for the pump shows multiple shaft speed harmonics which could indicate possible slight looseness in the pump bearing fits or pump flow issues. Non-synchronous vibrations also possibly indicate early bearing defects. Ensure the pump bearing have lubrication and that the pump is operating in the performance curve. **Rated a Class I Defect for now.**

**PC 9432A**
Vertical pumps tend to have higher vibration levels due to the nature of the design, either at shaft speed, vane pass, or sometimes at resonant frequencies. This unit has a slightly elevated shaft speed vibration. No immediate concern. **Rated a Class I Defect.**

**DAF EFFULENT PUMP**
Vibration data shows a moderate shaft speed vibration in the unit. Inspect the unit for loose fasteners, broken fan, coupling wear, or shaft alignment issues. **Rated a Class I Defect.**

**DAF INFULENT PUMP**
Vibration data possibly indicate early bearing defects in the motor. No immediate concern at this time. **Rated a Class I Defect.**

**Abbreviated Last Measurement Summary**
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**Database: Bio Energy .rbm**
**Station: BIO ENERGY**
**Route No. 3: BIO NEW 0-6999**
**Report Date: 01-Jun-21 14:04**

| MEASUREMENT POINT | OVERALL LEVEL | HFD / VHFD | MACHINE SPEED |
|---|---|---|---|
| 1001 - PC 1001 A | (19-May-21) | | |
| | OVERALL LEVEL | 1 - 20 KHz | |
| MOH | .019 In/Sec | .493 G-s | 1785.0 RPM |
| MOV | .031 In/Sec | .247 G-s | |
| MIH | .019 In/Sec | .396 G-s | |
| MIV | .029 In/Sec | .046 G-s | |
| MIA | .018 In/Sec | .088 G-s | |

| | | | |
|---|---|---|---|
| EIA | .038 In/Sec | .105 G-s | |
| EIH | .089 In/Sec | .417 G-s | |
| EIV | .071 In/Sec | .129 G-s | |
| EOH | .061 In/Sec | .452 G-s | |
| EOV | .085 In/Sec | .111 G-s | |

1001 B - PC 1001 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .028 In/Sec | .448 G-s | 1785.0 RPM |
| MOV | .042 In/Sec | .113 G-s | |
| MIH | .030 In/Sec | .560 G-s | |
| MIV | .042 In/Sec | .092 G-s | |
| MIA | .035 In/Sec | .205 G-s | |
| EIA | .109 In/Sec | 1.494 G-s | |
| EIH | .271 In/Sec | 4.184 G-s | |
| EIV | .311 In/Sec | 3.523 G-s | |
| EOH | .212 In/Sec | 4.648 G-s | |
| EOV | .197 In/Sec | 1.519 G-s | |

1425 A - PC 1425 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .546 In/Sec | .266 G-s | 1785.0 RPM |
| MOV | .287 In/Sec | .054 G-s | |
| MIH | .606 In/Sec | .358 G-s | |
| MIV | .367 In/Sec | .060 G-s | |
| MIA | .209 In/Sec | .096 G-s | |
| EIA | .211 In/Sec | .138 G-s | |
| EIH | .563 In/Sec | .486 G-s | |
| EIV | .481 In/Sec | .140 G-s | |
| EOH | .559 In/Sec | .554 G-s | |
| EOV | .241 In/Sec | .204 G-s | |

1430 A - PC 1430 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .016 In/Sec | .222 G-s | 1785.0 RPM |
| MOV | .014 In/Sec | .044 G-s | |
| MIH | .011 In/Sec | .067 G-s | |
| MIV | .0097 In/Sec | .023 G-s | |
| MIA | .0071 In/Sec | .017 G-s | |
| EIA | .0070 In/Sec | .021 G-s | |
| EIH | .0091 In/Sec | .049 G-s | |
| EIV | .0090 In/Sec | .017 G-s | |
| EOH | .0091 In/Sec | .065 G-s | |
| EOV | .011 In/Sec | .017 G-s | |

1520 B - PC 1520 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .078 In/Sec | .868 G-s | 1785.0 RPM |
| MOV | .086 In/Sec | .204 G-s | |
| MIH | .069 In/Sec | .698 G-s | |
| MIV | .067 In/Sec | .139 G-s | |
| MIA | .052 In/Sec | .248 G-s | |
| EIA | .059 In/Sec | .711 G-s | |
| EIH | .064 In/Sec | 1.166 G-s | |
| EIV | .065 In/Sec | .585 G-s | |
| EOH | .060 In/Sec | 2.653 G-s | |
| EOV | .060 In/Sec | .379 G-s | |

1526 B - PC 1526 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .066 In/Sec | 1.312 G-s | 1785.0 RPM |
| MOV | .046 In/Sec | .195 G-s | |
| MIH | .045 In/Sec | .319 G-s | |
| MIV | .045 In/Sec | .104 G-s | |
| MIA | .021 In/Sec | .067 G-s | |
| EIA | .010 In/Sec | .032 G-s | |
| EIH | .012 In/Sec | .132 G-s | |
| EIV | .012 In/Sec | .106 G-s | |
| EOH | .0087 In/Sec | .045 G-s | |
| EOV | .012 In/Sec | .073 G-s | |

1538 A - PC 1538 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .332 In/Sec | .321 G-s | 1785.0 RPM |
| MOV | 1.164 In/Sec | .144 G-s | |
| MIH | .661 In/Sec | .295 G-s | |
| MIV | 1.202 In/Sec | .189 G-s | |
| MIA | .411 In/Sec | .177 G-s | |
| EIA | .292 In/Sec | .074 G-s | |
| EIH | .311 In/Sec | .087 G-s | |
| EIV | .174 In/Sec | .116 G-s | |
| EOH | .484 In/Sec | .215 G-s | |
| EOV | .183 In/Sec | .153 G-s | |

1538 B - PC 1538 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .469 In/Sec | .398 G-s | 1785.0 RPM |
| MOV | .465 In/Sec | .562 G-s | |
| MIH | .306 In/Sec | .355 G-s | |
| MIV | .463 In/Sec | .138 G-s | |
| MIA | .163 In/Sec | .188 G-s | |
| EIA | .044 In/Sec | .050 G-s | |
| EIH | .040 In/Sec | .130 G-s | |
| EIV | .068 In/Sec | .086 G-s | |
| EOH | .034 In/Sec | .113 G-s | |
| EOV | .035 In/Sec | .080 G-s | |

1631 B - PM 1631 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .029 In/Sec | .062 G-s | 1785.0 RPM |
| MOV | .020 In/Sec | .049 G-s | |
| MIH | .012 In/Sec | .0009 G-s | |
| MIV | .011 In/Sec | .0039 G-s | |
| MIA | .014 In/Sec | .0035 G-s | |
| EIA | .022 In/Sec | .030 G-s | |
| EIH | .011 In/Sec | .029 G-s | |
| EIV | .016 In/Sec | .014 G-s | |
| EOH | .011 In/Sec | .018 G-s | |
| EOV | .011 In/Sec | .0088 G-s | |

1632 A - PD 1632 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .024 In/Sec | .216 G-s | 1785.0 RPM |
| MOV | .069 In/Sec | .127 G-s | |

| | | | | |
|---|---|---|---|---|
| | MIH | .023 In/Sec | .299 G-s | |
| | MIV | .060 In/Sec | .097 G-s | |
| | MIA | .047 In/Sec | .124 G-s | |
| | EIA | .028 In/Sec | .205 G-s | |
| | EIH | .031 In/Sec | .344 G-s | |
| | EIV | .048 In/Sec | .152 G-s | |
| | EOH | .034 In/Sec | .315 G-s | |
| | EOV | .047 In/Sec | .158 G-s | |

2101 B - PC 2101 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .026 In/Sec | 1.096 G-s | 1785.0 RPM |
| MOV | .023 In/Sec | .113 G-s | |
| MIH | .023 In/Sec | .689 G-s | |
| MIV | .018 In/Sec | .123 G-s | |
| MIA | .0097 In/Sec | .203 G-s | |
| EIA | .022 In/Sec | .027 G-s | |
| EIH | .020 In/Sec | .069 G-s | |
| EIV | .020 In/Sec | .036 G-s | |
| EOH | .018 In/Sec | .104 G-s | |
| EOV | .011 In/Sec | .0079 G-s | |

2105 A - PC 2105 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .042 In/Sec | .456 G-s | 1785.0 RPM |
| MOV | .037 In/Sec | .125 G-s | |
| MIH | .042 In/Sec | .703 G-s | |
| MIV | .084 In/Sec | .363 G-s | |
| MIA | .069 In/Sec | 1.104 G-s | |
| EIA | .033 In/Sec | .281 G-s | |
| EIH | .051 In/Sec | .484 G-s | |
| EIV | .048 In/Sec | .318 G-s | |
| EOH | .039 In/Sec | .529 G-s | |
| EOV | .048 In/Sec | .259 G-s | |

2106 - PC 2106 (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .052 In/Sec | .228 G-s | 1785.0 RPM |
| MOV | .042 In/Sec | .111 G-s | |
| MIH | .069 In/Sec | .361 G-s | |
| MIV | .122 In/Sec | .127 G-s | |
| MIA | .049 In/Sec | .080 G-s | |
| EIA | .045 In/Sec | .124 G-s | |
| EIH | .073 In/Sec | .230 G-s | |
| EIV | .062 In/Sec | .091 G-s | |
| EOH | .059 In/Sec | .334 G-s | |
| EOV | .042 In/Sec | .102 G-s | |

2115 B - PV 2115 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .119 In/Sec | .336 G-s | 1785.0 RPM |
| MOV | .132 In/Sec | .471 G-s | |
| MIH | .090 In/Sec | .464 G-s | |
| MIV | .152 In/Sec | .165 G-s | |
| MIA | .079 In/Sec | .114 G-s | |
| EIA | .104 In/Sec | .417 G-s | |
| EIH | .169 In/Sec | 1.147 G-s | |

| | | | |
|---|---|---|---|
| EIV | .178 In/Sec | .343 G-s | |
| EOH | .240 In/Sec | .985 G-s | |
| EOV | .176 In/Sec | .243 G-s | |

2205 B - PC 2205 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .068 In/Sec | .821 G-s | 1785.0 RPM |
| MOV | .066 In/Sec | .195 G-s | |
| MIH | .090 In/Sec | .419 G-s | |
| MIV | .085 In/Sec | .110 G-s | |
| MIA | .067 In/Sec | .171 G-s | |
| EIA | .056 In/Sec | .109 G-s | |
| EIH | .068 In/Sec | .516 G-s | |
| EIV | .102 In/Sec | .403 G-s | |
| EOH | .036 In/Sec | .396 G-s | |
| EOV | .075 In/Sec | .237 G-s | |

2206 A - PC 2206 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .046 In/Sec | .388 G-s | 1785.0 RPM |
| MOV | .052 In/Sec | .347 G-s | |
| MIH | .031 In/Sec | .174 G-s | |
| MIV | .092 In/Sec | .146 G-s | |
| MIA | .035 In/Sec | .084 G-s | |
| EIA | .037 In/Sec | .126 G-s | |
| EIH | .046 In/Sec | .243 G-s | |
| EIV | .038 In/Sec | .137 G-s | |
| EOH | .035 In/Sec | .325 G-s | |
| EOV | .030 In/Sec | .113 G-s | |

2301 A - PC 2301 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .033 In/Sec | .144 G-s | 1785.0 RPM |
| MOV | .065 In/Sec | .093 G-s | |
| MIH | .021 In/Sec | .203 G-s | |
| MIV | .026 In/Sec | .052 G-s | |
| MIA | .025 In/Sec | .057 G-s | |
| EIA | .023 In/Sec | .037 G-s | |
| EIH | .016 In/Sec | .101 G-s | |
| EIV | .018 In/Sec | .036 G-s | |
| EOH | .020 In/Sec | .195 G-s | |
| EOV | .020 In/Sec | .048 G-s | |

2301 C - PC 2301 C (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .026 In/Sec | .099 G-s | 1785.0 RPM |
| MOV | .055 In/Sec | .044 G-s | |
| MIH | .020 In/Sec | .135 G-s | |
| MIV | .034 In/Sec | .194 G-s | |
| MIA | .030 In/Sec | .206 G-s | |
| EIA | .032 In/Sec | .084 G-s | |
| EIH | .016 In/Sec | .060 G-s | |
| EIV | .025 In/Sec | .065 G-s | |
| EOH | .014 In/Sec | .102 G-s | |
| EOV | .020 In/Sec | .085 G-s | |

2310 A - PC 2310 A (19-May-21)

| | | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|---|
| | MOH | .025 In/Sec | .375 G-s | 1785.0 RPM |
| | MOV | .084 In/Sec | 1.118 G-s | |
| | MIH | .023 In/Sec | .724 G-s | |
| | MIV | .023 In/Sec | .111 G-s | |
| | MIA | .020 In/Sec | .132 G-s | |
| | EIA | .033 In/Sec | .317 G-s | |
| | EIH | .033 In/Sec | .229 G-s | |
| | EIV | .027 In/Sec | .039 G-s | |
| | EOH | .024 In/Sec | .196 G-s | |

2501 B - PC 2501 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .0050 In/Sec | .0035 G-s | 1785.0 RPM |
| MOV | .0076 In/Sec | .0035 G-s | |
| MIH | .0041 In/Sec | .0018 G-s | |
| MIV | .0056 In/Sec | .0043 G-s | |
| MIA | .0056 In/Sec | .0035 G-s | |
| EIA | .0056 In/Sec | .0042 G-s | |
| EIH | .0053 In/Sec | .0024 G-s | |
| EIV | .0065 In/Sec | .0043 G-s | |
| EOH | .0058 In/Sec | .0021 G-s | |
| EOV | .0080 In/Sec | .0043 G-s | |

2502 A - PC 2502 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .047 In/Sec | .023 G-s | 1785.0 RPM |
| MOV | .095 In/Sec | .013 G-s | |
| MIH | .043 In/Sec | .016 G-s | |
| MIV | .057 In/Sec | .036 G-s | |
| MIA | .045 In/Sec | .028 G-s | |
| EIA | .047 In/Sec | .036 G-s | |
| EIH | .044 In/Sec | .019 G-s | |
| EIV | .062 In/Sec | .078 G-s | |
| EOH | .072 In/Sec | .098 G-s | |
| EOV | .068 In/Sec | .083 G-s | |

2510 B - PV 2510 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .159 In/Sec | .148 G-s | 1785.0 RPM |
| MOV | .129 In/Sec | .026 G-s | |
| MIH | .089 In/Sec | .075 G-s | |
| MIV | .100 In/Sec | .039 G-s | |
| MIA | .072 In/Sec | .043 G-s | |
| EIA | .080 In/Sec | .101 G-s | |
| EIH | .058 In/Sec | .165 G-s | |
| EIV | .093 In/Sec | .116 G-s | |
| EOH | .043 In/Sec | .125 G-s | |
| EOV | .056 In/Sec | .075 G-s | |

3110 A - PC 3110 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .222 In/Sec | .323 G-s | 1785.0 RPM |
| MOV | .465 In/Sec | .142 G-s | |

4125 B - PC 4125 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz |
|---|---|---|

| | | | |
|---|---|---|---|
| MOH | .030 In/Sec | .080 G-s | 1785.0 RPM |
| MOV | .036 In/Sec | .068 G-s | |
| MIH | .031 In/Sec | .082 G-s | |
| MIV | .038 In/Sec | .050 G-s | |
| MIA | .018 In/Sec | .088 G-s | |
| EIA | .055 In/Sec | .144 G-s | |
| EIH | .047 In/Sec | .518 G-s | |
| EIV | .073 In/Sec | .229 G-s | |
| EOH | .036 In/Sec | .651 G-s | |
| EOV | .075 In/Sec | .245 G-s | |

4300 B - PC 4300 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .044 In/Sec | .082 G-s | 1785.0 RPM |
| MOV | .039 In/Sec | .023 G-s | |
| MIH | .046 In/Sec | .100 G-s | |
| MIV | .030 In/Sec | .034 G-s | |
| MIA | .025 In/Sec | .030 G-s | |
| EIA | .068 In/Sec | .175 G-s | |
| EIH | .047 In/Sec | .157 G-s | |
| EIV | .040 In/Sec | .186 G-s | |
| EOH | .042 In/Sec | .506 G-s | |
| EOV | .044 In/Sec | .145 G-s | |

4304 B - PC 4304 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .056 In/Sec | .203 G-s | 1785.0 RPM |
| MOV | .049 In/Sec | .081 G-s | |
| MIH | .054 In/Sec | .191 G-s | |
| MIV | .041 In/Sec | .052 G-s | |
| MIA | .018 In/Sec | .102 G-s | |
| EIA | .028 In/Sec | .258 G-s | |
| EIH | .027 In/Sec | .231 G-s | |
| EIV | .029 In/Sec | .223 G-s | |
| EOH | .028 In/Sec | .364 G-s | |
| EOV | .029 In/Sec | .231 G-s | |

4306 A - PC 4306 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .041 In/Sec | .099 G-s | 1785.0 RPM |
| MOV | .034 In/Sec | .029 G-s | |
| MIH | .043 In/Sec | .083 G-s | |
| MIV | .034 In/Sec | .020 G-s | |
| MIA | .018 In/Sec | .032 G-s | |
| EIA | .018 In/Sec | .067 G-s | |
| EIH | .015 In/Sec | .092 G-s | |
| EIV | .014 In/Sec | .095 G-s | |
| EOH | .013 In/Sec | .098 G-s | |
| EOV | .011 In/Sec | .071 G-s | |

4401 A - PC 4401 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .0057 In/Sec | .086 G-s | 1785.0 RPM |
| MOV | .0068 In/Sec | .022 G-s | |
| MIH | .0067 In/Sec | .106 G-s | |
| MIV | .0065 In/Sec | .029 G-s | |
| MIA | .0068 In/Sec | .028 G-s | |

| | | | |
|---|---|---|---|
| EIA | .0097 In/Sec | .064 G-s | |
| EIH | .0070 In/Sec | .048 G-s | |
| EIV | .0085 In/Sec | .080 G-s | |
| EOH | .0045 In/Sec | .035 G-s | |
| EOV | .0075 In/Sec | .050 G-s | |

4410 A - PC 4410 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .013 In/Sec | .082 G-s | 1785.0 RPM |
| MOV | .0099 In/Sec | .019 G-s | |
| MIH | .013 In/Sec | .052 G-s | |
| MIV | .0089 In/Sec | .022 G-s | |
| MIA | .0061 In/Sec | .039 G-s | |
| EIA | .015 In/Sec | .020 G-s | |
| EIH | .029 In/Sec | .049 G-s | |
| EIV | .027 In/Sec | .020 G-s | |
| EOH | .017 In/Sec | .063 G-s | |
| EOV | .020 In/Sec | .019 G-s | |

5201 B - PC 5201 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .021 In/Sec | .227 G-s | 1785.0 RPM |
| MOV | .021 In/Sec | .047 G-s | |
| MIH | .022 In/Sec | .428 G-s | |
| MIV | .020 In/Sec | .145 G-s | |
| MIA | .013 In/Sec | .126 G-s | |
| EIA | .024 In/Sec | .013 G-s | |
| EIH | .032 In/Sec | .051 G-s | |
| EIV | .038 In/Sec | .020 G-s | |
| EOH | .036 In/Sec | .137 G-s | |
| EOV | .032 In/Sec | .023 G-s | |

6110 B - PC 6110 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .034 In/Sec | .439 G-s | 1785.0 RPM |
| MOV | .027 In/Sec | .137 G-s | |
| MIH | .028 In/Sec | .372 G-s | |
| MIV | .038 In/Sec | .365 G-s | |
| MIA | .015 In/Sec | .104 G-s | |
| EIA | .037 In/Sec | .250 G-s | |
| EIH | .041 In/Sec | .345 G-s | |
| EIV | .043 In/Sec | .085 G-s | |
| EOH | .032 In/Sec | .355 G-s | |
| EOV | .036 In/Sec | .206 G-s | |

6120 A - PC 6120 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .037 In/Sec | .105 G-s | 1785.0 RPM |
| MOV | .034 In/Sec | .051 G-s | |
| MIH | .025 In/Sec | .129 G-s | |
| MIV | .020 In/Sec | .050 G-s | |
| MIA | .012 In/Sec | .123 G-s | |
| EIA | .012 In/Sec | .133 G-s | |
| EIH | .022 In/Sec | .190 G-s | |
| EIV | .020 In/Sec | .144 G-s | |
| EOH | .023 In/Sec | .278 G-s | |
| EOV | .020 In/Sec | .032 G-s | |

6501 B - PC 6501 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .042 In/Sec | .080 G-s | 1785.0 RPM |
| MOV | .029 In/Sec | .045 G-s | |
| MIH | .040 In/Sec | .065 G-s | |
| MIV | .020 In/Sec | .032 G-s | |
| MIA | .019 In/Sec | .039 G-s | |
| EIA | .037 In/Sec | .051 G-s | |
| EIH | .050 In/Sec | .048 G-s | |
| EIV | .026 In/Sec | .034 G-s | |
| EOH | .042 In/Sec | .050 G-s | |
| EOV | .016 In/Sec | .036 G-s | |

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Clarification Of Vibration Units:
Acc --> G-s RMS
Vel --> In/Sec PK

Abbreviated Last Measurement Summary

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Database: Bio Energy .rbm
Station: BIO ENERGY
Route No. 4: BIO NEW 7K UP
Report Date: 01-Jun-21 14:04

| MEASUREMENT POINT | OVERALL LEVEL | HFD / VHFD | MACHINE SPEED |
|---|---|---|---|

7210 B - PC 7210 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .028 In/Sec | .191 G-s | 1785.0 RPM |
| MOV | .039 In/Sec | .078 G-s | |
| MIH | .029 In/Sec | .130 G-s | |
| MIV | .066 In/Sec | .100 G-s | |
| MIA | .053 In/Sec | .123 G-s | |
| EIA | .093 In/Sec | .198 G-s | |
| EIH | .041 In/Sec | .280 G-s | |
| EIV | .038 In/Sec | .146 G-s | |
| EOH | .065 In/Sec | .736 G-s | |
| EOV | .058 In/Sec | .152 G-s | |

7215 B - PC 7215 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .225 In/Sec | .147 G-s | 1785.0 RPM |
| MOV | .168 In/Sec | .067 G-s | |
| MIH | .199 In/Sec | .266 G-s | |
| MIV | .323 In/Sec | .039 G-s | |
| MIA | .116 In/Sec | .029 G-s | |
| EIA | .073 In/Sec | .692 G-s | |
| EIH | .128 In/Sec | 1.647 G-s | |
| EIV | .094 In/Sec | .445 G-s | |
| EOH | .102 In/Sec | 1.738 G-s | |
| EOV | .180 In/Sec | .304 G-s | |

7220 B - PC 7220 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz |
|---|---|---|

| | | | |
|---|---|---|---|
| MOH | .250 In/Sec | .379 G-s | 1785.0 RPM |
| MOV | .068 In/Sec | .078 G-s | |
| MIH | .254 In/Sec | .397 G-s | |
| MIV | .051 In/Sec | .090 G-s | |
| MIA | .035 In/Sec | .109 G-s | |
| EIA | .027 In/Sec | .157 G-s | |
| EIH | .036 In/Sec | .152 G-s | |
| EIV | .026 In/Sec | .061 G-s | |
| EOH | .038 In/Sec | .358 G-s | |
| EOV | .029 In/Sec | .084 G-s | |

7225 A - PC 7225 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .336 In/Sec | .255 G-s | 1785.0 RPM |
| MOV | .160 In/Sec | .083 G-s | |
| MIH | .155 In/Sec | .473 G-s | |
| MIV | .071 In/Sec | .163 G-s | |
| MIA | .097 In/Sec | .179 G-s | |
| EIA | .068 In/Sec | .297 G-s | |
| EIH | .066 In/Sec | .923 G-s | |
| EIV | .041 In/Sec | .292 G-s | |
| EOH | .018 In/Sec | .761 G-s | |
| EOV | .031 In/Sec | .219 G-s | |

7240 A - PC 7240 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .098 In/Sec | .702 G-s | 1785.0 RPM |
| MOV | .254 In/Sec | .203 G-s | |
| MIH | .118 In/Sec | .406 G-s | |
| MIV | .155 In/Sec | .139 G-s | |
| MIA | .090 In/Sec | .307 G-s | |
| EIA | .078 In/Sec | .190 G-s | |
| EIH | .120 In/Sec | .953 G-s | |
| EIV | .133 In/Sec | .284 G-s | |
| EOH | .199 In/Sec | .640 G-s | |
| EOV | .103 In/Sec | .344 G-s | |

7245 - PV 7245 (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .073 In/Sec | .172 G-s | 1785.0 RPM |
| MOV | .340 In/Sec | .147 G-s | |
| MIH | .117 In/Sec | .128 G-s | |
| MIV | .341 In/Sec | .277 G-s | |
| MIA | .094 In/Sec | .050 G-s | |
| EIA | .178 In/Sec | 1.049 G-s | |
| EIH | .170 In/Sec | 1.362 G-s | |
| EIV | .311 In/Sec | .616 G-s | |
| EOH | .292 In/Sec | 1.073 G-s | |
| EOV | .230 In/Sec | .579 G-s | |

7252 A - PC 7252 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .029 In/Sec | .214 G-s | 1785.0 RPM |
| MOV | .022 In/Sec | .048 G-s | |
| MIH | .029 In/Sec | .220 G-s | |
| MIV | .022 In/Sec | .037 G-s | |
| MIA | .015 In/Sec | .038 G-s | |

| | | | | |
|---|---|---|---|---|
| | EIA | .013 In/Sec | .028 G-s | |
| | EIH | .039 In/Sec | .123 G-s | |
| | EIV | .021 In/Sec | .099 G-s | |
| | EOH | .035 In/Sec | .128 G-s | |
| | EOV | .024 In/Sec | .056 G-s | |

7501 A - PC 7501 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .028 In/Sec | .305 G-s | 1785.0 RPM |
| MOV | .027 In/Sec | .100 G-s | |
| MIH | .027 In/Sec | .432 G-s | |
| MIV | .021 In/Sec | .301 G-s | |
| MIA | .013 In/Sec | .244 G-s | |
| EIA | .016 In/Sec | .034 G-s | |
| EIH | .026 In/Sec | .116 G-s | |
| EIV | .017 In/Sec | .040 G-s | |
| EOH | .022 In/Sec | .100 G-s | |
| EOV | .020 In/Sec | .035 G-s | |

7505 A - PC 7505 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .034 In/Sec | .117 G-s | 1785.0 RPM |
| MOV | .019 In/Sec | .024 G-s | |
| MIH | .029 In/Sec | .891 G-s | |
| MIV | .023 In/Sec | .184 G-s | |
| MIA | .021 In/Sec | .162 G-s | |
| EIA | .077 In/Sec | .234 G-s | |
| EIH | .079 In/Sec | .250 G-s | |
| EIV | .055 In/Sec | .173 G-s | |
| EOH | .064 In/Sec | .318 G-s | |
| EOV | .044 In/Sec | .057 G-s | |

7522 B - PC 7522 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .107 In/Sec | .277 G-s | 1785.0 RPM |
| MOV | .167 In/Sec | .086 G-s | |
| MIH | .077 In/Sec | .359 G-s | |
| MIV | .098 In/Sec | .076 G-s | |
| MIA | .048 In/Sec | .040 G-s | |
| EIA | .033 In/Sec | .093 G-s | |
| EIH | .075 In/Sec | .533 G-s | |
| EIV | .089 In/Sec | .125 G-s | |
| EOH | .069 In/Sec | .468 G-s | |
| EOV | .069 In/Sec | .067 G-s | |

9202 B - PC 9202 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .125 In/Sec | .190 G-s | 1785.0 RPM |
| MOV | .103 In/Sec | .029 G-s | |
| MIH | .122 In/Sec | .143 G-s | |
| MIV | .085 In/Sec | .063 G-s | |
| MIA | .067 In/Sec | .072 G-s | |

9305 A - PC 9305 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .104 In/Sec | .470 G-s | 1785.0 RPM |
| MOV | .067 In/Sec | .101 G-s | |

| | | | |
|---|---|---|---|
| MIH | .096 In/Sec | .424 G-s | |
| MIV | .092 In/Sec | .174 G-s | |
| MIA | .036 In/Sec | .088 G-s | |
| EIA | .071 In/Sec | .329 G-s | |
| EIH | .087 In/Sec | .387 G-s | |
| EIV | .045 In/Sec | .287 G-s | |
| EOH | .049 In/Sec | .507 G-s | |
| EOV | .039 In/Sec | .283 G-s | |

9305 B - PC 9305 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .165 In/Sec | .340 G-s | 1785.0 RPM |
| MOV | .128 In/Sec | .079 G-s | |
| MIH | .146 In/Sec | .370 G-s | |
| MIV | .124 In/Sec | .113 G-s | |
| MIA | .016 In/Sec | .087 G-s | |
| EIA | .057 In/Sec | .242 G-s | |
| EIH | .202 In/Sec | .460 G-s | |
| EIV | .106 In/Sec | .241 G-s | |
| EOH | .148 In/Sec | .413 G-s | |
| EOV | .082 In/Sec | .249 G-s | |

9320 - PC 9320 (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .092 In/Sec | 1.349 G-s | 1785.0 RPM |
| MOV | .170 In/Sec | .308 G-s | |
| MIH | .075 In/Sec | 1.180 G-s | |
| MIV | .099 In/Sec | .867 G-s | |
| MIA | .047 In/Sec | .501 G-s | |
| EIA | .044 In/Sec | .741 G-s | |
| EIH | .067 In/Sec | 1.995 G-s | |
| EIV | .094 In/Sec | .711 G-s | |
| EOH | .044 In/Sec | .624 G-s | |
| EOV | .040 In/Sec | .530 G-s | |

9321 - PC 9321 (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .135 In/Sec | .249 G-s | 1785.0 RPM |
| MOV | .219 In/Sec | .112 G-s | |
| MIH | .097 In/Sec | .262 G-s | |
| MIV | .149 In/Sec | .079 G-s | |
| MIA | .036 In/Sec | .080 G-s | |
| EIA | .038 In/Sec | .235 G-s | |
| EIH | .069 In/Sec | .289 G-s | |
| EIV | .110 In/Sec | .201 G-s | |
| EOH | .037 In/Sec | .467 G-s | |
| EOV | .047 In/Sec | .130 G-s | |

9322 - PC 9322 (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .087 In/Sec | 1.087 G-s | 1785.0 RPM |
| MOV | .104 In/Sec | .194 G-s | |
| MIH | .074 In/Sec | .865 G-s | |
| MIV | .105 In/Sec | .203 G-s | |
| MIA | .028 In/Sec | .248 G-s | |
| EIA | .026 In/Sec | .166 G-s | |
| EIH | .041 In/Sec | .700 G-s | |

| | | | |
|---|---|---|---|
| EIV | .085 In/Sec | .164 G-s | |
| EOH | .019 In/Sec | .338 G-s | |
| EOV | .037 In/Sec | .208 G-s | |

9432 A - PC 9432 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .304 In/Sec | .150 G-s | 1785.0 RPM |
| MOV | .299 In/Sec | .071 G-s | |
| MIH | .144 In/Sec | .217 G-s | |
| MIV | .167 In/Sec | .439 G-s | |
| MIA | .130 In/Sec | .377 G-s | |
| EIA | .072 In/Sec | .628 G-s | |
| EIH | .168 In/Sec | .706 G-s | |
| EIV | .126 In/Sec | .534 G-s | |
| EOH | .086 In/Sec | .925 G-s | |
| EOV | .052 In/Sec | .204 G-s | |

9435 - PK 9435 (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .135 In/Sec | .536 G-s | 1785.0 RPM |
| MOV | .129 In/Sec | .226 G-s | |
| MIH | .109 In/Sec | .975 G-s | |
| MIV | .094 In/Sec | .147 G-s | |
| MIA | .136 In/Sec | .242 G-s | |

9520 B - PC 9520 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .056 In/Sec | .994 G-s | 1785.0 RPM |
| MOV | .083 In/Sec | .654 G-s | |
| MIH | .046 In/Sec | .395 G-s | |
| MIV | .079 In/Sec | .461 G-s | |
| MIA | .044 In/Sec | .229 G-s | |
| EIA | .133 In/Sec | 1.075 G-s | |
| EIH | .134 In/Sec | 1.756 G-s | |
| EIV | .196 In/Sec | .822 G-s | |
| EOH | .165 In/Sec | 1.937 G-s | |
| EOV | .193 In/Sec | .843 G-s | |

9601 A - PC 9601 A (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .018 In/Sec | .147 G-s | 1785.0 RPM |
| MOV | .065 In/Sec | .079 G-s | |
| MIH | .029 In/Sec | .135 G-s | |
| MIV | .131 In/Sec | .024 G-s | |
| MIA | .135 In/Sec | .053 G-s | |
| EIA | .027 In/Sec | .134 G-s | |
| EIH | .021 In/Sec | .401 G-s | |
| EIV | .024 In/Sec | .143 G-s | |
| EOH | .032 In/Sec | .424 G-s | |
| EOV | .033 In/Sec | .108 G-s | |

9701 B - PC 9701 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .174 In/Sec | .296 G-s | 1785.0 RPM |
| MOV | .149 In/Sec | .054 G-s | |
| MIH | .117 In/Sec | .269 G-s | |
| MIV | .173 In/Sec | .047 G-s | |

| | | | |
|---|---|---|---|
| MIA | .065 In/Sec | .052 G-s | |
| EIA | .044 In/Sec | .169 G-s | |
| EIH | .063 In/Sec | .238 G-s | |
| EIV | .086 In/Sec | .071 G-s | |

9901 B - PC 9901 B (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .030 In/Sec | .167 G-s | 1785.0 RPM |
| MOV | .025 In/Sec | .048 G-s | |
| MIH | .035 In/Sec | .209 G-s | |
| MIV | .027 In/Sec | .071 G-s | |
| MIA | .021 In/Sec | .125 G-s | |
| EIA | .117 In/Sec | .270 G-s | |
| EIH | .123 In/Sec | .807 G-s | |
| EIV | .090 In/Sec | .580 G-s | |
| EOH | .084 In/Sec | 1.319 G-s | |
| EOV | .090 In/Sec | 1.031 G-s | |

INFLUENT - DAF INFULENT (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .112 In/Sec | .121 G-s | 1785.0 RPM |
| MOV | .047 In/Sec | .111 G-s | |
| MIH | .028 In/Sec | .098 G-s | |
| MIV | .060 In/Sec | .043 G-s | |
| MIA | .075 In/Sec | .039 G-s | |
| EIA | .365 In/Sec | .047 G-s | |
| EIH | .186 In/Sec | .076 G-s | |
| EIV | .354 In/Sec | .041 G-s | |

CIRC PUMP - DRUM CIRCULATION PUMP (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .034 In/Sec | .138 G-s | 1785.0 RPM |
| MOV | .060 In/Sec | .038 G-s | |
| MIH | .035 In/Sec | .141 G-s | |
| MIV | .044 In/Sec | .030 G-s | |
| MIA | .024 In/Sec | .043 G-s | |

EFFULENT - DAF EFFULENT (19-May-21)

| | OVERALL LEVEL | 1 - 20 KHz | |
|---|---|---|---|
| MOH | .265 In/Sec | .260 G-s | 1785.0 RPM |
| MOV | .218 In/Sec | .152 G-s | |
| MIH | .359 In/Sec | .705 G-s | |
| MIV | .264 In/Sec | .205 G-s | |
| MIA | .055 In/Sec | .227 G-s | |
| EIA | .108 In/Sec | .201 G-s | |
| EIH | .402 In/Sec | .543 G-s | |
| EIV | .116 In/Sec | .205 G-s | |

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Clarification Of Vibration Units:

| | | |
|---|---|---|
| Acc | --> G-s | RMS |
| Vel | --> In/Sec | PK |