

## PM/MAP Checklist Guidance Document

1. Contact Person: Include the name, title, telephone number (extension if applicable) and e-mail address for the person that may be contacted with questions regarding this Preventative Maintenance/Malfunction Abatement Plan (PM/MAP) with the transmittal letter accompanying the PM/MAP rather than within the body of the PM/MAP.

### Engines

2. Engine Identification: For each engine at the facility, list the engine manufacturer, model and type of engine (rich burn or lean burn) and the type of add-on control equipment used (oxidation catalyst, 3-way catalyst), if any. Also, identify each engine with an air to fuel ratio controller (AFRC).
3. Engine operating variables to be monitored. Provide the normal engine maintenance log.
4. Corrective procedures in the event of an engine malfunction: Provide a brief summary of the procedures that will take place in the event of an engine malfunction. A malfunction is defined in Rule 113(d) of the State of Michigan Air Pollution Control Rules which states, in part, 'any sudden, infrequent and not reasonable preventable failure of the equipment to operate in a normal or usual manner. Failures caused in part by poor maintenance or careless operation are not malfunctions.'
5. Major parts replacement inventory: Provide a list of major replacement parts that shall be maintained in inventory for quick replacement. If no replacement parts are kept on site provide a statement that no parts shall be kept.

### Add-On Controls

6. Catalytic converter operating variables to be monitored: Provide:
  - a. A list of variables that will be monitored to measure catalytic converter performance including the catalytic converter inlet and outlet temperature, pressure differential across the catalytic converter, and any other relevant catalytic converter variables that are monitored.
  - b. The normal operating range that has been developed for each variable; acceptable ranges shall include documentation as to how the range was determined (i.e. manufacturer's recommendations or determined in the field with documentation or testing).
  - c. The method of monitoring the variables, and
  - d. The frequency of monitoring the variables.
7. Corrective procedures in the event of a malfunction of the catalytic converter: Malfunction is defined in number 4 above. Provide information on what steps shall be taken when a variable is out of range. This could include monitoring of emissions or cleaning and/or replacement of the catalytic converter.
8. AFRC O<sub>2</sub> sensor replacement schedule or operating variables to be monitored (chose either 8a or 8b).
  - a. O<sub>2</sub> sensor replacement interval or sensor life detector
  - b. If monitoring, then provide:
    1. A list of variables monitored to measure AFRC performance (i.e. millivolt output, O<sub>2</sub>, and/or any other relevant AFRC variables that are monitored).
    2. The normal operating range that has been developed for each variable; acceptable ranges shall include documentation as to how the range was determined (i.e.

- manufacturer's recommendations or determined in the field with documentation or testing).
3. The method of monitoring the variables.
  4. The frequency of monitoring the variables.
9. Corrective procedures in the event of a malfunction of the AFRC: Malfunction is defined in number 4 above. If choosing monitoring in paragraph 8.b above, provide information on what steps shall be taken when a variable is out of range.
10. Emission checks: Describe when a portable analyzer would be used and how it will be used.
- a. Calibration of the analyzer will be conducted as required by manufacturer's specifications. Records shall be kept on file and made available to the Air Quality Division upon request.
  - b. Checks for both CO and NOx.
  - c. Checks to be used to:
    1. Check performance if monitored parameter is out of normal range, e.g. low inlet temperature (an engine specific minimum inlet temperature could then be established).
    2. When vendor cleaned catalyst is installed. This check will normally occur in the 12-18 month window as specified for routine cleaning.
  - d. Companies may choose to perform any of the three valid methods:
    1. Inlet and outlet checks and estimate destruction efficiency.
    2. Outlet testing and check for g/hp-hr compared to levels used for permitting.
    3. Outlet testing and use the uncontrolled vendor data to establish destruction efficiency.
11. Scheduled maintenance: Describe the scheduled cleaning and/or replacement of the catalytic converter.
- a. Frequency of catalytic converter inspection and field catalyst media cleaning (vacuum catalyst face). Follow vendor recommendations, typically 12-18 months unless parameters (pressure drop, temperature deviations, etc) indicate otherwise.
  - b. Catalyst media removal and wash in chemical solution by manufacturer. Used if catalyst media does not respond to field cleaning. A replacement catalyst media will be used during the cleaning process.
  - c. Catalytic converter gasket replacement. Follow vendor recommendations, typically 12-18 months when catalyst is serviced.
  - d. Replace catalyst media. If not functioning properly after vendor cleaning, or in lieu of vendor cleaning.
12. Major parts replacement inventory: Provide a list of major replacement parts that shall be maintained in inventory for quick replacement. If no replacement parts are kept on site provide a statement that no parts shall be kept.
13. Supervisory personnel responsible for maintenance of the control equipment: Include the contact information. This person or position can be a company employee or contractor and may or may not be the same person/position listed in No. 1 above.
14. Retention of records: Records shall be kept on file and retained as described in the permit.
15. Updates of PM/MAP: Any updates to the plan shall be submitted to the AQD District Supervisor for written approval as required in the permit (the MDEQ recommends the PM/MAP be reviewed annually).