AIR POLLUTION CONTROL DISTRICT
REGULATORY COMPLIANCE DIVISION

POLICIES AND PROCEDURES

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Topic: Internal Combustion Engines

Distribution: All Policy Holders

This policy and procedure document provides guidance on the inspection of stationary internal combustion (I.C.) engines. Internal combustion engines act as primary drivers for many types of process equipment. In Santa Barbara County their current applications include serving as the primary drivers for oil production rod-type pumping units, air compressors, compressors of dry and wet natural gas, pumps, electric generators, fire water pumps, and cogeneration units.

Fuel for I.C. engines may be either low sulfur content fuel oil, gasoline, or gaseous fuel. Gaseous fuel may be produced at the facility, purchased from a utility company or in some cases purchased from another oil and gas production company.

Most of the I.C. engines currently operating in Santa Barbara County are older or modestly rated (lower heat input) I.C. engines and are not equipped with specific emission control devices. For these engines, emissions may be reduced through proper engine maintenance and the use of low sulfur content fuels. A number of newer and larger rated I.C. engines are equipped with one or more of the following emission control devices or technologies:

- Staged combustion such as pre-stratified charge combustion (PSC).
- Exhaust gas recirculation (EGR).
- Non-selective catalytic reduction (NSCR) equipped with one of the following options to control the varying temperature, oxygen content and NO_x levels in the exhaust stream:
  - An exhaust gas monitoring system (EGMS).
  - A programmable air/fuel ratio controller.
  - An oversized catalyst and exhaust stack to increase the retention time.
  - A mixing tank installed between the exhaust manifold and the catalyst to hold a volume of exhaust gas equal to the volume of exhaust generated during one cycle which "averages out "the exhaust gas composition.

Inspection of IC Engines:

The inspection of IC engines consists of the determination of the source's compliance status with the applicable District Rules, the conditions of the permits issued for such engines, and the requirements of any other agreements which may apply (i.e. Offset Mitigation Agreements). Where the conditions of an applicable permit

are source specific, additional information may be required. In such cases, the inspector should consult with the project manager and develop a source-specific inspection checklist. At a minimum, prior to conducting an inspection, the inspector should thoroughly review the following:

1. The Permit to Operate
2. The source specific District approved Fuel Use Monitoring Plan and Operations Monitoring Plan (e.g. use of engine hour meters).
3. The Catalytic Converter Performance Plan and the Exhaust Gas Monitor Compliance Plan (for engines equipped with non-selective catalytic converters).
4. Any other agreements which may apply.

The District Rules which regulate the operation of IC engines are:

Rule 201	Permits Required
Rule 202	Exemptions to Rule 201
Rule 203	Transfer
Rule 205.A and 205.B	Standards for Granting Applications
Rule 205.C	New Source Review (NSR)/Prevention of Significant Deterioration (PSD)
Rule 206	Conditional Approval of Authority to Construct or Permit to Operate
Rule 302	Visible Emissions
Rule 303	Nuisance
Rule 304	Particulate Matter - Northern Zone
Rule 305	Particulate Matter Southern Zone
Rule 309	Specific Contaminants
Rule 310	Odorous Organic Sulfides
Rule 311	Sulfur Content of Fuels

During an inspection, inspectors will conduct a field interview and complete the I.C. Engine Checklist (ENF-34), Attachment 1. In order to complete the checklist, inspectors must review the following items which are required by the conditions of District permits issued for the operation of I.C. engines.

1. Verify that all records are available upon request, review the records for completeness, and verify that the records document compliance with the conditions of the permit.

2. Verify that each engine is equipped with an accessible and legible permanently affixed identification plate, listing the engine's make, model, maximum brake horsepower rating and serial number (or the operator's unique tag number).

3. Verify that each engine inspected is as described on the PTO. This includes verifying each engine's permit rated maximum brake horsepower and that it is equipped with the required type of control device. Any discrepancies should be noted on the comments page of the checklist and referred to the Engineering Division for evaluation prior to issuing a notice of violation.

4. Verify compliance with the emission limits for the engines with non-selective catalytic converters by confirming that the oxygen sensor output voltage from the Exhaust Gas Monitoring System (EGMS) is within the compliance range set for each engine. Operation of the engine with the oxygen sensor output voltage outside of the compliance range is a violation of the PTO. Generally, engines with staged type of combustion systems (such as pre-stratified charge) or exhaust gas return systems do not have EGMS. Source testing is required to determine compliance with emission limits for these types of control systems.

5. Verify that each engine is equipped with a non-resettable hour meter, or that equivalent data is being provided by the permittee through the District approved Fuel Use Monitoring Plan. In providing equivalent data under the Fuel Use Monitoring Plan, the operator must be able to supply the inspector with copies of the Dept. of Oil & Gas (DOG) Form-110 reports and "on-time" data sheets upon request. In most cases IC engines currently under permit with the District are permitted for 24 hr./day operation. However, the inspector should confirm the permitted operation limits and verify that the elapsed hours of operation do not exceed the permitted limits.

6. Review the source file to ensure that a complete annual report was received by the District within the required time period. If required by permit condition, review the source file to ensure that complete quarterly reports have been received by the District within the required time period. Review each report and determine compliance with District Rules and permit conditions.

7. Review the source file for the periodic (quarterly/bi-annual/annual) fuel use meter calibration reports to determine that a 5% meter accuracy is achieved, and that the calibration reports were received by the District within the required time frame. Meter accuracy should be determined through consultation with the IC Engine Project Manager or appropriate permit engineer. During the inspection, the inspector should determine the rate of fuel consumption and estimate the hourly heat input to the engine(s) served by the meter by:

   A. Noting the fuel use meter readings and multiplying by the meter factor or meter coefficient to obtain fuel use in SCF/Hr.

   B. Then multiply the SCF/Hr. by the high heating/calorific value (BTU/SCF) to obtain the hourly heat input in BTU/Hr.

8. Verify that the fuel supplied to the engines has been periodically (quarterly/bi-annually/annually) tested for sulfur content and high heating/calorific value and that records of the test results are available upon request.

9. Per Policy and Procedure III. Samples, "Samples should only be taken if there is no other readily available means of determining whether the source is in compliance with the permit conditions or District Rules and Regulations". If it is necessary to obtain an

independent sample to verify the accuracy of the source's reported fuel sulfur content, obtain a sample of the fuel supplied to the engines using one of the following methods:

A) Policy and Procedure III. H. Drager Detector Tubes for gaseous fuels.

B) Policy and Procedure III. C.I. Paint, Fuel Oil, & Other VOC Samples for liquid fuels. If a liquid fuel sample is obtained follow the guidelines of Policy and Procedure III.B. Chain of Custody.

10. Review the "permittee-designed" operation and maintenance procedures, and the record of engine maintenance for completeness. Each I.C. engine permit holder is required by permit condition to maintain onsite a copy of the "permittee-designed" engine operation and maintenance procedure. For the purpose of minimizing emissions proper engine maintenance should include the following:

Changing - engine oil, oil filter, air filter, spark plugs, crank case breathers and fuel filter.

Checking - engine RPM, oil pressure, fuel pressure, engine temperature, inlet manifold vacuum, air-fuel ratio setting, magneto timing, and engine compression.

Adjusting - valves, carburetor, magneto timing, engine RPM. fuel pressure and air-fuel ratio.

Miscellaneous - blow-down fuel scrubber

11. Perform a visible emissions evaluation using the methods described in Policy and Procedure I.D.1 Visible Emission Evaluation Procedures. A VEE form (ENF-11) should be completed for each engine inspected. In cases where no visible emissions are observed, the completed ENF-11 will provide documentation that a baseline exists and illustrate that the engine has operated in compliance. The Visible Emissions Evaluation performed for each engine should clearly document either compliance or non-compliance with District Rule 302..

An inspection report should be prepared after the inspection has been conducted. The report should include an explanation of the reason for the inspection, the results of the inspection and recommendations. If violations of permit conditions or District rules are detected, the inspector should refer to Policy and Procedures VII. A., "Enforcement Actions - the Notice of Violation", for guidance. In cases where sufficient information is not available to make a compliance determination, the inspector should refer to Policy and Procedure I.C. - Using the Request for Information (42303 Letter).

I C ENGINE INSPECTION CHECKLIST

DATE:_____

EQUIPMENT OWNER/OPERATOR:_____

STATIONARY SOURCE:_____

FACILITY/LEASE/FEE NAME:_____

PERMITS #s INSPECTED:_____

CONTACT:_____TITLE:_____

PHONE:_____DATE OF LAST INSPECTION:_____

1. All records available upon request?___Yes___No___
   If No, 42303 Letter issued?__Yes (attach)__No (see comments)

2. Each engine equipped with an accessible and legible identification plate, or a legible tag number? __ Yes ___No (see comments)

3. Does the engine identification plate list all required information, (ie. engine make, model, horsepower, etc.).
   __ Yes ___No (see comments)

4. Records of engine inventory complete and as described on PTO?
   ___Yes___No
   If No, 42303 Letter issued?__Yes (attach)__No (see comments)

5. Emission Limits (engines equipped with non-selective catalytic converters)
   Compliance Range:_____

   Oxygen Sensor Output Voltage:_____

   In compliance?___Yes___No (see comments)

6. Engine equipped with a non-resettable hour meter?__Yes__No
   Records of equivalent engine hour operation data complete?
   ___Yes___No
   If No, 42303 Letter issued?__Yes (attach)__No (see comments)

7. Annual/Quarterly Report submitted?
   ___Yes___No (see comments)
   Date report was received _____
   Has the report been reviewed for completeness and found to demonstrate compliance with the emission limitations of the

PTO.___Yes ___No
If No to either of the above, 42303 Letter issued? ___ Yes (attach)___No (see comments)

8. Type of fuel meter, (orifice, positive displacement, turbine, etc.)_____
Consistent with approved Fuel Use Monitoring Plan.__Yes__No
Meter coefficient/factor_____Meter reading_____
Observed fuel use rate_____(specify units)
Engine heat input:
_____SCF/Hr. X _____ BTU/SCF = _____ BTU/Hr.
Fuel meters calibrated quarterly?
___Yes / Date of last calibration _____/ ___ No
If No, 42303 Letter issued? __ Yes (attach) __ No (see comments)
Fuel meter calibration reports submitted to District within 45 days of calibration?___Yes / Date received _____/ No (see comments)
If No, 42303 Letter issued?__Yes (attach) __No (see comments)

9. Fuel sulfur content tested quarterly? __Yes __No / Date last tested _____Name of laboratory/vendor:_____
Sulfur Content of analyzed sample:_____ppm
In compliance ___Yes ___No NOV #_____

10. Fuel gas sample obtained? ___Yes ____No
Range of Drager tube _____ppm
Observed sulfur content of fuel gas _____ppm
In compliance ___Yes ___No NOV # _____

Liquid fuel sample obtained ___Yes (Attach Chain of Custody Form) ___No
Sample ID No. _____
Name of Laboratory receiving sample:_____
Comments _____
_____

11. Engine Maintenance Records complete? ___Yes ___No
If No, 42303 Letter issued? __ Yes (attach) ___No (see comments)

12. Engines maintained in accordance with the permittee designed engine maintenance procedures ___ Yes ___ No (see comments)

13. Last reported high heating / calorific value of fuel? _____
Date of last fuel analysis? _____Lab/Vendor _____

14. Exhaust gas temperature: _____
15. Engine RPM: _____
16. Permit available upon request ___ Yes ___ No

COMMENTS:_____
_____
_____

In Compliance ___Yes __No NOV # _____Rule Violated _____

_____ Date _____

Inspector

(Attach 42303 Letter, VEE Form, and Notice of Violation if issued)