

AIR POLLUTION CONTROL DISTRICT
REGULATORY COMPLIANCE DIVISION

POLICIES AND PROCEDURES

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Topic: Turbines

Distribution: All Policy Holders

Gas turbines, which are essentially jet engines, are utilized to provide electrical power and, when installed at cogeneration facilities, thermal energy. Either natural gas or diesel (or both) are commonly used as fuel. Turbines can be found at on- and offshore facilities.

Emissions control technology for gas turbines in Santa Barbara County consists primarily of water/steam injection and a selective catalytic reduction (SCR) system. For offshore applications, only water injection has been used. Water/steam injection into the combustion chamber reduces the combustion temperature and consequently the formation of NO_x . SCR systems treat the exhaust gas by passing the gas through a catalyst bed in the presence of ammonia (NH_3).

As is the situation with cogeneration units, the inspection of turbines depends in great part on the specific permit conditions. The inspector should, in conjunction with the project manager, thoroughly review the permit and prepare a source specific check list.

The following items may require inspection:

1. Gas Turbine(s)
 - fuel rate (scf/hr)
 - water injection rate (gallons/minute)
 - generator output (KW)
 - water/fuel mass ratio
 - diverter valve status (open/shut)
 - operating limits: number of turbines operating simultaneously, heat input rate/turbine, hours operation/turbine, fuel usage rate (scf/hr)

2. SCR Unit(s)
 - inlet NO_x (ppm)
 - outlet NH_3 (ppm)
 - outlet O_2 (ppm)
 - ammonia feed rate (scf/hr)
 - inlet temperature
 - outlet temperature (degree F)
 - auxiliary heater fuel rate (scf/hr)
 - ammonia/inlet NO_x molar ratio
 - differential pressure across the SCR (inches of water)

3. Stack data
 - NO_x (ppm, lb/hr) lb/MMbtu
 - CO (ppm, lb/hr)
 - O₂ (ppm)
 - flue gas flow rate (scf/hr)
 - temperature
 - visible emissions

4. Operator logs
 - maintenance activities (turbines, CEM)
 - downtime
 - KWe generated
 - total number of cold starts and total hours of operation per turbine
 - water ratio logs
 - number of starts
 - total hours per start

5. Other
 - limitations on standby equipment use

6. Continuous Emission Monitoring - many of the emissions and process parameters listed in Items #1-3 (above) may be continuously monitored at the facility. The inspector should obtain the necessary data from these monitors. If the data are not available, a note should be made of this situation. Additionally, the following CEM logs should be checked:
 - daily and weekly preventive maintenance forms prepared and completed
 - manual calibrations performed and documented
 - record of all down time and reason (maintenance, calibration, repair, power failure)
 - record of alarms (number, date and time, cause and solution)

It should be noted that the averaging time for the data from a given offshore platform may range from minute-to-minute to hourly to a daily basis. The inspector must consult with the project manager to determine which averaging time is required.

An inspection report will 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, Policy and Procedure VII.A, "Enforcement Actions - The Notice of Violation", will be followed.