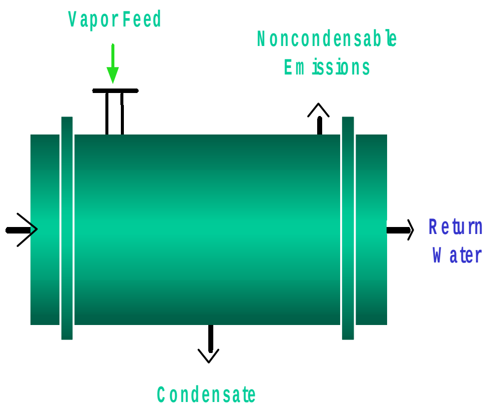
5.5.5 Inspection and Monitoring Requirements



Additional information regarding carbon absorbtion systems can be found in Carbon Bed Fires and the Use of Carbon Canisters for Air Emission Controls on Fixed Roof Tanks.

Condenser

If a condenser is used, the owner or operator has two choices for monitoring the unit. The first option is a monitoring device equipped with a continuous recorder to measure the concentration level of the organic compounds in the exhaust vent stream from the condenser. This value will be used to show that there is 95 percent reduction of organics in the waste stream. The other option is to install a temperature monitoring device equipped with a continuous recorder. This device must be installed at a location in the exhaust vent stream from the condenser. This location was selected because the monitoring of the gas exhaust provides a direct characterization of the performance of the condenser. The temperature monitoring device must operate with an accuracy of + 1 percent of the temperature being monitored in $_{o}$C or + 0.5 $_{o}$C . This measurement will indicate if the condenser is operating at optimum capacity in order to reduce organics by 95 percent or greater.

Carbon Absorber

When a carbon adsorber is used the owner or operator must monitor the unit to determine when breakthrough has occurred. If the unit is a fixed-bed carbon adsorber that regenerates the carbon bed directly in the control device, the owner or operator has two options for monitoring. The first is to install a continuous recorder to monitor the organic concentration in the exhaust vent stream from the carbon bed. A large increase in organic concentration would indicate that breakthrough has occurred and that the carbon needs to be regenerated. If there are no large increases of organic concentrations, the adsorber is being regenerated before breakthrough has occurred and will continue to operate at optimum capacity. The other option, is to install a monitoring device equipped with a continuous recorder to measure a parameter that indicates the carbon bed is regenerated on a regular predetermined time cycle. The owner or operator must inspect the readings from each monitoring device at least once each operating day to insure the control device is operating at optimum capacity.

A fixed-bed carbon adsorber that regenerates the carbon bed directly onsite in the control device, must replace the existing carbon in the control device with fresh carbon at a regular, predetermined time interval that is no longer than the carbon service life. The owner or operator must determine the time breakthrough will occur in the carbon adsorber using performance tests or engineering calculations. The predetermined time interval will then be less than the time of breakthrough.

A carbon adsorption system such as a carbon canister that does not regenerate the carbon bed directly onsite in the control device must replace the existing carbon in the control device with fresh carbon on a regular basis using one of two options. The first option is to monitor the concentration level of the organic compounds in the exhaust vent stream from the carbon adsorption system on a regular schedule and replace the existing carbon with fresh carbon immediately when carbon breakthrough is indicated. The monitoring frequency must be daily or at an interval no greater than 20 percent of the time required to consume the total carbon working capacity, whichever is greater. The second option is to replace the existing carbon with fresh carbon at a regular, predetermined time interval that is less than the design carbon replacement interval.

Flare

A flare used to comply with the Subpart CC regulations must be steam-assisted, air-assisted or nonassisted. A flare must be designed for and operated with no visible emissions as determined by Method 22 which is found in 40 CFR part 60. This method requires there to be no visible emissions except for periods not to exceed a total of five minutes during any two consecutive hours. The flare must be operated with a flame present at all times. A heat sensing monitoring device with a continuous recorder is used to indicate the continuous ignition of the pilot flame.

The flare may only be used if the net heating value of the gas being combusted is 11.2 MJ/scmn (300 Btu/scf) or greater, if the flare is steam-assisted or air-assisted. The flare can operate if the net heating value of the gas being combusted is 7.45 MJ/scm (200 Btu/scf) or greater if the flare is nonassisted. The net heating value of the gas being combusted must be determined using the following equation:

$$H_T = K\,[\sum C_i H_i]$$

(Equation 5-1)

where: H_T = Net heating value of the sample, MJ/S.M.; where the net enthalpy per mole of off gas is based on combustion at 25 ^oC and 760 mm Hg, but the standard temperature for determining the volume corresponding to 1 mol is 20 ^oC;

K = Constant, $1.74x10^{-7}$ (1/ppm) (g mol/S.M.) (MJ/kcal) where standard temperature for (g mol/S.M.) is 20 ^oC;

C_i = Concentration of sample component i in ppm on a wet basis, as measured for organics by Reference Method 18 in 40 CFR part 60 and measured for hydrogen and carbon monoxide by ASTM D 1946-82; and

H_i = Net heat of combustion of sample component i, kcal/g mol at 25 ^oC and 760 mmHg. The heats of combustion may be determined using ASTM D 2383 if published values are not available or cannot be calculated.

A steam-assisted or nonassisted flare must be designed for and operated with an exit velocity of less than 18.3 m/s (60 ft/s). If the net heating value of the gas being combusted is greater than 37.3 MJ/SCM., a steam-assisted or nonassisted flare may be designed for and operated with an exit velocity equal to or greater than 18.3 m/s but must be less than 122 m/s. The exit velocity must be determined by dividing the volumetric flow rate (in units of standard temperature and pressure), as determined by Reference Methods 2, 2A, 2C, or 2D in 40 CFR part 60 as appropriate, by the unobstructed cross-sectional area of the flare tip.

A steam-assisted or nonassisted flare which is designed for and operated with an exit velocity, less than the velocity V_{max}, and less than 122 m/s is allowed. The maximum allowed velocity, V_{max}, is determined by the following equation:

$$\mathbf{Log_{10}(V_{max}) = (H_T + 28.8)/31.7}$$

(Equation 5-2)

where: H_T = The net heating value
28.8 = constant
31.7 = constant

An air-assisted flare must be designed and operated with an exit velocity less than the velocity, V_{max}. The maximum allowed velocity, V_{max}, for an air-assisted flare must be determined by the following equation:

$$\mathbf{V_{max} = 8.706 + 0.7084\ (H_T)}$$

(Equation 5-3)

where: 8.706 = constant
0.7084 = constant
H_T = The net heating value

Enclosed Combustion Devices

Enclosed combustion devices must be operated to achieve one of the following three conditions: i) reduce the organic emissions vented to it by 95 weight percent or greater; ii) achieve a total organic compound concentration of 20 ppmv, expressed as the sum of actual compounds, not carbon equivalents, on a dry basis corrected to three percent oxygen; or, iii) provide a minimum residence time of 0.5 seconds at a minimum temperature of 760 °C.

If a thermal vapor incinerator is used as a control device, the incinerator must have a temperature monitoring device equipped with a continuous recorder installed at a location downstream of the combustion zone. Catalytic vapor incinerators are required to have a temperature monitoring device installed at two locations. One location must be in the vent stream feeding the unit at the nearest feasible point to the catalyst bed inlet. The other location must be in the vent stream at the nearest feasible point to the catalyst bed outlet.

If the enclosed combustion device is a boiler or process heater, then the vent stream must be introduced into the flame combustion zone of the boiler or process heater. There are specific monitoring requirements required for boilers and process heaters to insure a reduction of organics by 95 percent or greater. A temperature monitoring device with a continuous recorder is required for a boiler or process heater with a design capacity less than 44 MW. This temperature monitoring device must have an accuracy of + 1 percent of the temperature being monitored in °C or +0.5 °C, whichever is greater. The temperature sensor must be installed at a location in the furnace downstream of the combustion zone. If the boiler or process heater has a design capacity greater than or equal to 44 MW, a monitoring device equipped with a continuous recorder to measure a parameter(s) that indicates good combustion operating practices are being used must be installed. A device that measures the organic concentration of the effluent of the boiler or process heater is one example of such a parameter.