



## Method 22 Procedures For Conducting Rule 1155 Visible Emissions Observations

Section (e)(1) of Rule 1155 - Particulate Matter (PM) Control Devices requires the operator of any permitted baghouse or other PM control device subject to this rule comply with the following requirements:

1. No later than March 31, 2010, to ensure that at least one person on site has been trained in the observation and reading of visible emissions (VE) pursuant to *EPA Method 22 - Visual Determination of Fugitive Emissions from Material Processing Sources*.
2. No later than April 1, 2010, to conduct continuous five-minute VE observations once a week using EPA Method 22, and to maintain records for each observation.

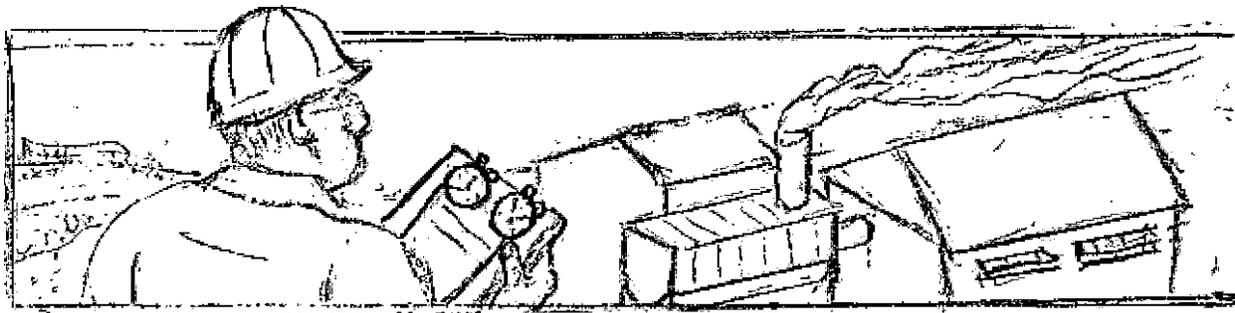
Method 22 is a simple procedure that uses direct visual observations to determine the duration of VE caused by the operation of an industrial source. When conducted on a regular basis, Method 22 observations not only help ensure the proper operation of a facility's process and emission control equipment, but can also alert operators to potential equipment failures and provide opportunities for more prompt corrective action.

Unlike *EPA Method 9 - Visual Determination of the Opacity of Emissions from Stationary Sources*, Method 22 does not require an observer to attend a formal VE evaluation class or to pass an official certification test confirming the observer's ability to rate VE based on observed opacity. Instead, Method 22 simply requires self training, and the observer to record the amount of time that visible emissions are observed.

Method 22 procedures are straightforward, but every observer must also know and understand the effects that background, weather conditions, ambient lighting and the observation point can have on VE observations.

This document was developed as self-training guide for conducting VE observations in accordance with EPA Method 22 and complying with the "trained observer" requirement specified in Rule 1155 (e)(1). All observers are encouraged to review the following steps carefully and to rely on this document for reference when conducting VE observations.

## Method 22 General Procedures



### 1. What equipment does an observer need to measure visible emissions (VE) using Method 22?

The observer will need:

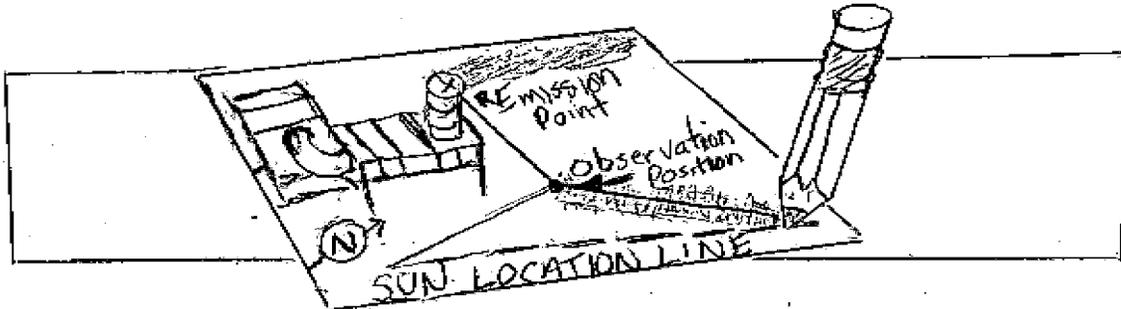
- ✓ 2 Stopwatches with an accumulative time function and unit divisions of at least 0.5 seconds.
- ✓ For indoor observations, a light meter capable of measuring luminance in the 50 to 200 lux range is also required.

### 2. Where should the observer be positioned to observe VE?

The following factors should be considered when selecting an observation position:

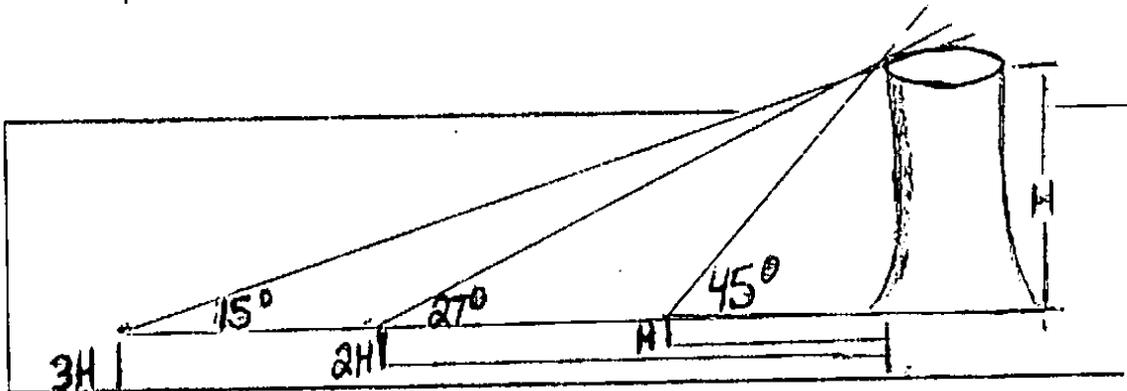
- ✓ Clear View of Emission Source(s)  
For the purposes of Rule 1155 compliance, the emission source is the outlet or stack of any permitted particulate matter (PM) control device, except those listed in Rule 1155 (g). The observer should select a location where the emission sources are in clear view. Rule 1155 allows operators to make simultaneous observations of multiple emission points provided that the observer can clearly distinguish one emission point or process unit from another.
- ✓ Plume Background  
The plume should be observed against a clearly visible background of contrasting color to ensure accuracy.
- ✓ Light Conditions and Sun Angle
  - **Indoors**  
A successful indoor VE observation requires luminance of more than 100 lux as measured by a light meter. Light meter readings must be taken and recorded for each indoor VE observation.
  - **Outdoor**  
Outside observers should position themselves so that the sun is within a 140 degree arc to their back during daylight hours. To determine the proper position for observation, use Section 3 - Source Layout Sketch on Form 1155A (or use a separate piece of paper when needed for multiple emission points or observation points) as follows:
    - Draw the emission points and the observation points.
    - Draw a line of sight from the observer's position to the emission point.

- Draw a triangle (as indicated in the illustration below) with the widest angle at the observation point that opens in the direction of the sun. Label the long segment or side of the triangle as the Sun Location Line.
- Stand a pencil upright on the sun line behind the observer position. Move the pencil along the line until the shadow crosses the observers point. Then draw the sun at the point the pencil touches the sun line.



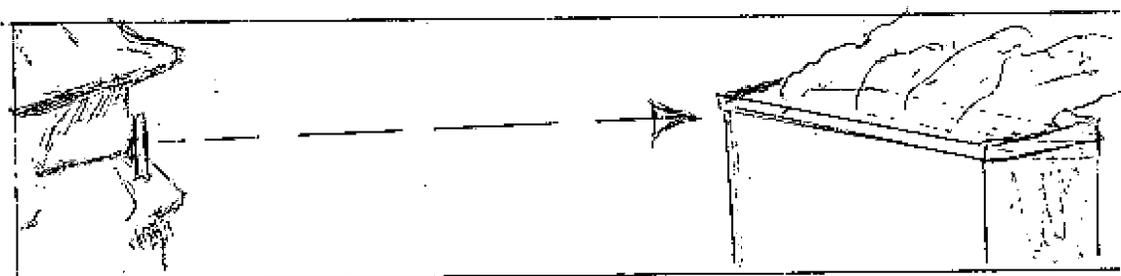
✓ **Viewing Angle to Stack**

The observer should be positioned at least three stack heights (minimum 15 feet), but not more than a quarter mile from the stack or emission point. The object is to minimize the observer's viewing angle relative to the plume to ensure that the observer is looking straight across the base of the plume at the stack exit, and not up into the plume.



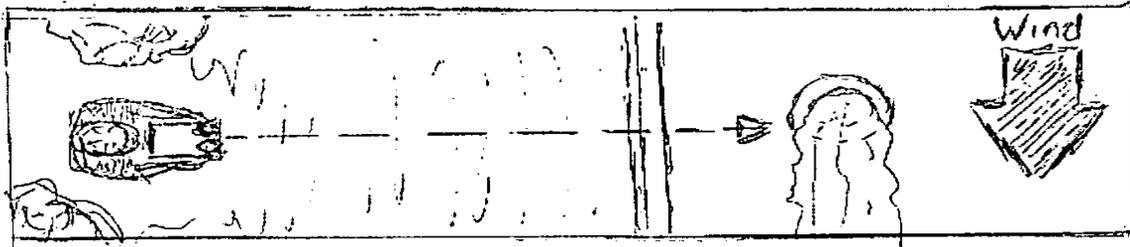
✓ **Perpendicular to the Long Axis of the Emission Point**

When observing emissions from rectangular openings, the observer's line of sight should be perpendicular to the longer axis of the opening.



✓ **Adjust Position for Wind Direction**

When looking at the potential plume from a stack, the observer should be positioned at a right angle to the wind direction.

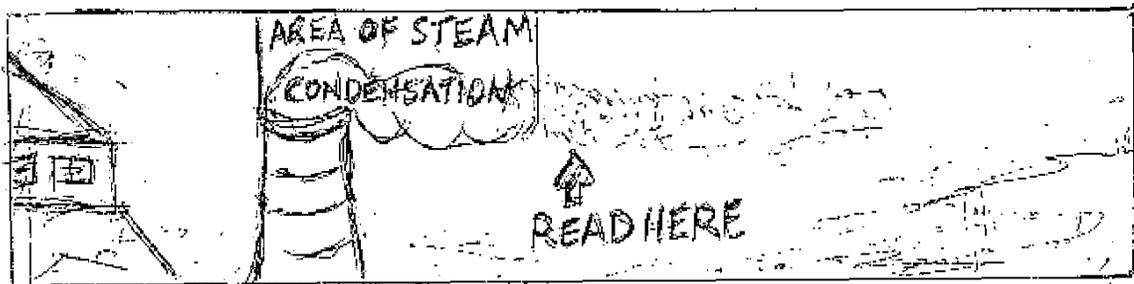


**3. What kind of plume is observed for VE?**

The observer is required to identify and record the presence of **particulate emissions only**. Condensed water vapor is not considered an emission.

Water vapor is present in the exhaust gas stream of many processes, such as drying, cooling and the combustion of certain fuels, and from air pollution control equipment such as a wet scrubber. When the hot gas stream containing water vapor is exposed to cooler ambient air and the water vapor cools to below its dew point, the water vapor condenses into a visible opaque white mist.

Often the dilution and disappearance of the water vapor in a plume will reveal a residual particulate plume. **This residual plume must be observed at the point where the water vapor plume has completely disappeared**, as indicated in the illustration below.



**4. How are Method 22 VE observations performed?**

All visible emission observations under Rule 1155 should be performed for a period of at least 5 minutes on a weekly (or, for units with verified filtration products, on a monthly) basis. When making an observation, the observer should:

✓ **Record Observation Data**

- Record the time of day (Clock Time) when an observation begins.
- Start the first stopwatch to monitor the duration of the observation period. If the observation period is divided into two or more segments by process shutdowns or if the observer takes rest breaks, stop the stopwatch and restart it without resetting when the segment or break ends.
- Stop the stopwatch at the end of the observation period. The accumulated time indicated by the first stopwatch is the duration of observation period. The

observer should record the time of day (clock time) when the observation period is complete. Each observation period should last at least 5 minutes.

✓ **Record Emission Data**

- Start the 2<sup>nd</sup> stopwatch at the time emissions are observed.
- Stop the 2<sup>nd</sup> stopwatch when the emissions stop and restart if the emissions start again. Repeat this procedure as necessary for the entire observation period.
- At the end of the observation period, the accumulated elapsed time on the 2<sup>nd</sup> stopwatch is the total time that emissions were visible during the observation period.

The requirement to conduct VE observations does not apply during the first half hour of start-up (including start-up after a repair or maintenance activity, which includes baghouse filter cleaning, e.g., pulsing). VE should also not occur in the way of fugitive emissions from the control device, other than the stack, or ancillary equipment (e.g., ducting). If VE occurs the operator is required to implement corrective action within 24 hours to eliminate the VE and must record the corrective action, including the date and time the corrective action was taken.

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## 5. What records must the VE observer keep?

AQMD has developed recordkeeping forms to help operators understand and comply with Rule 1155 recordkeeping requirements. **All operators conducting VE observations are required to complete Forms 1155A and 1155B or equivalent** (operators may develop their own forms provided that each document created includes all data elements found in the AQMD Rule 1155 recordkeeping form which it is intended to replace).

These forms can be found on AQMD's website [www.aqmd.gov](http://www.aqmd.gov), and are described below.

✓ **Form 1155A - Particulate Matter Control Devices Summary**

Form 1155A is the master form used by operators to record information about the facility, including permitted control devices subject to the rule and source layout sketches; the observer; and light source/meter information for indoor observations.

Because it contains background information that is referenced by other Rule 1155 recordkeeping forms, Form 1155A must be kept current & available at all times.

✓ **Form 1155B - Particulate Matter Control Device Records**

Form 1155B is used by operators to record data from actual VE observations. A total of 15 observations may be recorded per form.

In addition, operators with Tier 3 control devices equipped with baghouse leak detection systems (BLDS) are required to complete Form 1155C, as follows:

✓ **Form 1155C - Baghouse Leak Detection System Records**

Form 1155C is used by operators to record information related to alarm events and regular maintenance of permitted control equipment.

For detailed instructions on completing these forms, see [Instructions for Completing Forms 1155A, 1155B and 1155C](#) located on AQMD's website.