air pollution control district
SANTA BARBARA COUNTY

Guidance Document for Soil Moisture and Silt Content Sampling Plans

Santa Barbara County Air Pollution Control District — November 2026

This document and the District's *Guidance Document for Silt Loading / Silt Content Sampling Plans* (November 2026) together supersede *Requirements for Soil Moisture and Silt Content Sampling Plan* (September 2020).

1. Applicability

This document applies when a sampling plan establishes a soil moisture content, a moisture-dependent control efficiency, or moisture and silt inputs to an emission factor (e.g., AP-42 Section 13.2.2, Unpaved Roads; Section 13.2.4, Aggregate Handling and Storage Piles; or Section 13.2.5, Industrial Wind Erosion) for watered or otherwise controlled sources, including unpaved roads, disturbed areas, bulk and cover materials, and storage piles. For verification of a silt loading on paved roads, or a silt content where no moisture determination is required, use the District's *Guidance Document for Silt Loading / Silt Content Sampling Plans*.

2. Plan Submittal

Prepare a soil moisture and silt content sampling plan for the District's review and approval prior to sampling. Use USEPA's AP-42 Appendix C.1, *Procedures for Sampling Surface/Bulk Dust Loading* (https://www.epa.gov/sites/default/files/2020-11/documents/app-c1.pdf), and Appendix C.2, *Procedures for Laboratory Analysis of Surface/Bulk Dust Loading Samples* (https://www.epa.gov/sites/default/files/2020-11/documents/app-c2.pdf), for developing the sampling plan. The District's *Source Test Procedures Manual* (https://www.ourair.org/wp-content/uploads/srctest.pdf) provides guidelines for preparing a testing plan.

3. Sampling Schedule

a. Controlled sources: If water is used for dust control, collect a minimum of three samples per watering event: one immediately before watering, and at least two after watering, collected at 30- to 60-minute intervals following application. Collect samples during a minimum of three runs throughout the usual working day (typical hours that watering and traffic occur). The first run must coincide with the first watering event of the day, with the first sample taken prior to any watering; at least one run must occur during the forecasted high temperature of the day.

b. Uncontrolled sources: If no controls are used, collect samples during a minimum of three runs throughout the usual working day, with at least two hours between runs; one run must occur during the forecasted high temperature of the day.

c. Do not collect samples on a day with measurable precipitation. AP-42 recommends collection at various times of year or, if only one sample set will be collected, during hot, dry summertime conditions. To avoid multiple sample sets, collect on a hot, dry day.

4. Sample Locations and Collection

a. Unpaved roads: Select sample locations per AP-42 Appendix C.1.1. Collect one sample per 0.5 mile of road segment length, or portion thereof, for each road segment, and document the centerline length of each segment in the plan (a GIS or aerial-imagery measurement, such as on Google Earth, is acceptable). When determining locations, consider variations in traffic volume, watering frequency, and watering intensity, and discuss these factors in the plan. On chemically treated or

otherwise controlled unpaved surfaces, collect additional increments until the 400 g minimum sample mass for silt and moisture analysis is achieved (AP-42 Appendix C.1.1).

b. Storage piles: Select sample locations per AP-42 Appendix C.1.3, based on the size of the pile. Each sample is a composite of increments: a minimum of six increments distributed among the top, middle, and bottom of piles that can be scaled (climbed) by a person carrying a shovel and pail, or a minimum of ten increments collected as near to mid-height as practical for piles that cannot.

c. Record GPS coordinates and photographs for every sample location.

d. Collect surface (wind-erosion) samples to a depth of approximately 1 cm, or the diameter of the largest particle, whichever is less. Deeper collection dilutes the surface fines that erode.

e. Provide a diagram of proposed sample locations overlaid on an aerial photograph (plus a separate detailed diagram if needed for clarity), with the watering intensity (gal/yd²) identified for each area (if controlled).

5. Sample Handling and Moisture Analysis

a. Seal each sample airtight in the field with minimal headspace. Record the wet (as-received) weight either in the field at the time of collection or at the laboratory on the same day as collection; state in the plan which will be used. Collect all increments for a sample from the same location and within the same time window, and seal the sample promptly; material collected at different times since watering shall not be composited into a single sample.

b. Oven-dry at approximately 110 °C to constant mass and determine the moisture content before sieving (AP-42 Appendix C.2; the constant-mass endpoint follows ASTM D2216). ASTM D2216 is acceptable for the moisture determination.

c. Moisture results must fall between 0 and 100 percent. Results outside this range are invalid and will not be accepted; investigate the cause and re-sample as necessary. Review all results for consistency with field conditions and the watering cycle.

6. Silt Analysis

a. Silt is determined by mechanical dry sieving per AP-42 Appendix C.2, under the same requirements and ASTM equivalence determinations as the District's *Guidance Document for Silt Loading / Silt Content Sampling Plans*: no hand sieving; mechanical shaker in 10-minute cycles until successive pan weighings change by less than 3.0 percent (maximum 40 minutes); sieve stack including the No. 20 and No. 200 with a bottom pan; balance readable to 0.1 g or better with recorded specifications. ASTM D1140, C117, D422, D6913 (as routinely performed), D2217, and D7928 (dispersed-suspension hydrometer) are not acceptable; ASTM C136 is acceptable only when run entirely dry with the stated modifications.

b. Bulk samples are oven-dried before sieving.

c. If the plan supports a threshold friction velocity (TFV) determination per AP-42 Section 13.2.5, the plan must fully define the TFV determination procedure. **The dry sieving must use the 4, 2, 1, 0.5, and 0.25 mm sieve series** specified in AP-42; no other sieve series will be accepted.

7. Laboratory

Samples must be analyzed by an independent third-party laboratory. Provide chain of custody from field to laboratory. Laboratory reports must include bench sheets and the balance specifications above.

8. Sampling and Reporting Parameters

Uncontrolled and controlled sources:

a. Diagram of the location of each sample, overlaid on an aerial photograph (with a separate detail diagram if needed);
b. GPS coordinates and photographs;
c. Surface area and average height (for stockpiles);
d. Diagram of the location of the watered area, overlaid on an aerial photograph;
e. Ambient temperature during each sampling;
f. Relative humidity during each sampling;
g. Traffic:
    i. Traffic volume in vehicles/hr;
    ii. Number of vehicles between samplings;
    iii. Vehicle types (e.g., route trucks, non-route trucks, non-route trucks with trailers);
h. Time between samplings.

Controlled sources only:

a. Volume of water used for each watering event in gallons, by area;
b. Area watered in yd^2;
c. Water intensity in gal/yd^2;
d. Time of day of each watering event;
e. Cloud cover during each sampling;
f. Solar radiation during each sampling.