

MATES-III
DRAFT
MICROSCALE STUDY WORKPLAN

May 2004

Purpose

The microscale study is a component of MATES-III but with different objectives than the primary fixed-site study. These objectives are discussed below:

- 1) The microscale component is not intended to assess community risk, but rather to determine if there are locations which have higher concentrations than those represented by the fixed sites. Since the fixed sites are situated on a “neighborhood” scale (e.g., representative of a broader neighborhood area not influenced by significant sources, either mobile or stationary), there are likely to be specific neighborhoods which are close to significant sources of either mobile or stationary sources of toxic air pollutants, or both.
- 2) Sampling for the microscale sites is for a temporary period of time, covering several weeks. With a limited number of mobile monitoring platforms, limited sampling durations allows for movement of these platforms to other locations. It is expected that a minimum of 10 locations can be sampled under the microscale program during the one-year MATES-III sampling program.
- 3) Microscale sites are to be determined based on several factors:
 - a) neighborhood proximity to a source or cluster of sources of toxic air contaminants as represented by the following potential categories of sources:
 - i. airport operations
 - ii. rail yards
 - iii. port operations
 - iv. mobile sources (confluence of major freeways; heavy truck traffic)
 - v. refinery operations
 - vi. landfill operations
 - vii. warehouse/distribution operations
 - viii. battery recycling operations
 - ix. agricultural operations
 - x. multiple source clusters
 - b) previous modeling showing areas of potential relative higher risk
 - c) considerations for environmental justice neighborhoods
 - d) considerations for public concerns
 - e) geographical representation among the four counties in the District
- 4) The hypothesis to be tested is that there are neighborhood locations with statistically significant higher concentrations than those measured at the fixed sites. During the MATES-II study, with a similar hypothesis, very few statistically significant differences were found at 14 microscale locations. This study will continue to test that hypothesis with additional sites. Should such locations be found, it will be necessary to conduct longer-term sampling to evaluate appropriate air toxic risks, although some estimates of such may be derived through empirical and/or deterministic modeling of the microscale data.

Site Selection Process

Site selection is a multi-step process. Each step is detailed below:

- 1) Based on the MATES-II modeling, determine areas containing grids where higher cancer risk values are located.
- 2) Based on direction of the Governing Board, determine where environmental justice neighborhoods are coincident with the grids
- 3) Develop a list of communities from which significant community concern has been expressed regarding certain source(s) of emissions.
- 4) Based on the areas identified in Steps 1-3, as well as the need to include locations in all four counties within the jurisdiction of the AQMD, develop an initial candidate list of areas.
- 5) For each candidate area, obtain aerial photographs.
- 6) For each candidate area, identify if there are neighborhoods in close proximity to mobile or stationary sources.
- 7) Develop a list of initially recommended communities, representing a reasonable cross-section of different source types and geographic areas.
- 8) Review list with the Technical Advisory Group and obtain comments and other suggestions with respect to the initial recommended list of communities.
- 9) Based on Step 8, develop a priority short-list of communities which satisfy the objectives of the Microscale Study. This short-list is intended to begin the deployment of the initial round of monitoring with the mobile sampling platforms.
- 10) For each of the short-list communities:
 - a. Determine key sources in the areas and plot on aerial maps;
 - b. Identify specific neighborhoods in close proximity to those sources;
 - c. Determine prevailing wind directions for the initial sampling period, and determine scope of neighborhoods which are downwind of the identified source(s);
 - d. From the aerial maps, locate schools, parks, which are within the scope of the sampling area, for which locating a mobile platform may be possible.
 - e. In addition to (d), staff to conduct physical survey of area to determine other possible locations within the scope of the sampling area.
 - f. Based on (d) and (e), prioritize candidate sampling locations.
 - g. Staff to contact owners/responsible parties of each candidate sampling location, beginning with the highest priority location. If the owner/responsible party is willing to host the platform, and the location

- meets general sampling guidelines (e.g, free from obstructions), then no further contacts are necessary.
- h. Prepare appropriate contract/lease, as needed, for legal permission to use premises.
 - i. Make arrangements for power, fencing, etc, as necessary to support the mobile platform.
 - j. Locate the mobile platform on-site.
- 11) For remaining candidate locations, complete items 10(a) through 10(c), and make additional priority recommendations for the remaining sequence of candidate sites.
- 12) Bring the results of Step 11 to the Technical Advisory Group for discussion and comment. (Note: Steps 11 and 12 may be repeated, if necessary, to reflect two or more additional “short lists.”)

Sampling and Laboratory Analysis

Parameters to be Measured

Sampling Schedule

Quality Assurance

Analytical Approach

The approach taken to test the hypothesis that microscale site locations are higher than the regional sites will follow the same general approach used in MATES-II. Each microscale site will be paired with its nearest fixed site, and the distance between the paired sites will be determined.

Data will be compiled for each contaminant/pollutant for all monitoring dates in common at both locations. Where the microscale sites may have more frequent monitoring, such as 8-hour sampling for VOCs as compared to 24-hr samples at the fixed sites, the data from the 8-hour samples will be combined (averaged) to reflect a comparable 24-hr period.

Given information on the sample sizes and sample distributions, student t-tests will be performed to determine if the samples collected at the microscale sites are statistically different from the samples collected at the fixed sites. Levels of significance can be determined at the 90%, 95%, and 99% confidence levels. Generally speaking, at least a 95% confidence level difference between the two distributions is necessary for acceptance of statistical significance. This comparison will be done for each contaminant/pollutant for which there are data at each of the paired sites.

A second comparison will be done to compare the microscale site to the fixed site with the highest corresponding concentrations of each pollutant for any analysis shown to

exceed the paired fixed site concentrations at the 95% confidence level. The approach taken will be similar to that taken for the paired sites. The purpose of this analysis is to determine if the concentrations at that microscale site are significantly higher than any such concentrations measured over the entire regional fixed site network.

Other analyses to be conducted include summary tables or graphs showing the results of the 8-hr samples at the microscale sites. Simple averages and error bars for each of the 8-hr periods, averaged over all such sampling dates, will be depicted.

Lastly, for those microscale sites with wind speed and direction measurements, wind roses will be produced covering: (1) the entire window in which the equipment was operational, and (2) the sampling dates only. The purpose of this comparison is to see if the wind conditions on the sampling dates are reasonably similar to the larger window period.

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