Particulate Air Monitoring Program, West Oakland

Under contract to the Port of Oakland, GAIA is the prime contractor and project manager of a four-company team to perform particulate air monitoring of PM_{10} and $PM_{2.5}$ at the Port of Oakland and in West Oakland. The contract is for four years with a total value of $200,000. The goal of the monitoring program is to identify whether construction of the Vision 2000 program and/or increased Port operations are having an adverse impact on particulate matter concentrations in West Oakland. Both diesel emissions and dust from construction activities could contribute to any increase in particulate matter emissions; diesel emissions are of greater concern due to the carcinogenic nature of some emission by-products released in diesel particulate matter.

The project involves: analysis of three prior years of data; continuation of the weekly air sampling; collection and analysis of meteorological data; preparation of quarterly and annual reports; presentation of information to organized West Oakland community groups; and coordination of data, equipment audits, and reports with the Bay Area Air Quality Management District (BAAQMD). Data collected from the dichotomous sampler locations and the meteorological tower are reported to the BAAQMD as supplemental information to their Bay-Area-wide particulate and meteorological sampling program. The data collected are compared statistically to the results from four regional monitoring stations maintained by BAAQMD.

When GAIA took over the sampling program, we performed extensive analysis of the existing program to determine if the program was achieving its objective. The program review included possibly changing particulate sampling technology, or adding additional sampling sites in the Oakland area, as well as QA/QC of prior statistical analyses of the data. As a result of the analysis, GAIA modified the data source for the upgradient regional monitoring comparison location, and performed an extensive audit and calibration check of the existing equipment.

GAIA's review also indicated that Port activities did not appear to be influencing West Oakland particulate matter concentrations, and that particulate matter concentrations appear to be more regionally influenced. In addition, our analysis indicated that there were isolated occurrences of elevated (relative to regional concentrations) concentrations of particulate matter at the Port monitoring station (but not at the West Oakland monitoring station). Analysis of the data suggested that these concentrations were most likely due to dust rather than diesel emissions. The elevated particulate matter concentrations were limited to PM_{10}, and were not reflected in the $PM_{2.5}$ concentrations. Because diesel emissions consist largely (more than 90%) of $PM_{2.5}$, it is unlikely that diesel emissions were the source of the isolated occurrences of elevated particulate matter concentrations.

Air Emission Estimate Development

As a subcontractor to Moffatt & Nichol Engineers (M&N), GAIA has been developing estimates of total criteria air pollutants for a large, confidential development project proposed for Northern California. M&N provided detailed construction cost estimates and construction schedules, and GAIA converted the construction information to estimated operating times for various pieces of equipment. The size of the equipment, estimated load factors and operating factors, and emission factors (provided by another consultant) were then used to calculate total emissions associated with each piece of equipment. The construction schedule information was then used to predict the annual construction emissions from the project. GAIA has completed calculations for two scenarios, as well as several alternatives incorporating project modifications.

Diesel Emission Reduction Technology Research

As a subcontractor to Moffatt & Nichol Engineers (M&N), GAIA researched the status and availability of various emission reduction technologies for diesel-powered equipment. The survey included both land-based and marine construction equipment. Technologies reviewed included engine modifications, engine replacement, exhaust after treatment, fuel modifications, and alternative fuel sources. GAIA developed projected emission reduction factors for various constituents based on the appropriate type(s) of technologies for each category of construction equipment. These reduction factors were then applied to total emissions estimates developed pursuant to a previous project. The survey focused on proven, practical (i.e., feasible in the field) technologies, and recommended further evaluation of certain highly-promising innovative, unproven technologies.