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TO: Julie R. McDill
Senior Engineer
Mid-Atlantic Regional Air Management Association, Inc.
8600 LaSalle Road Suite 636
Baltimore, MD 21286

FROM: Arthur Werner, MACTEC
William Hodan, MACTEC
Scott Justice, MACTEC
MACTEC Project 827008G233

SUBJECT: Emissions Factors for Condensable Particulate Matter Emissions from Electric Generating Units

Introduction

Accurate emissions factors are needed to model the effect of condensable emissions on regional haze in the MANE VU region. Particulate matter smaller than 2.5 micrometers in diameter ($PM_{2.5}$) emitted from stationary sources has two components, particles that are solid regardless of stack temperature (filterable) and gases that condense shortly after exiting the stack (condensable). For electric generating units (EGUs) burning oil or natural gas, condensable particulate matter (CPM) emissions can be greater than filterable emissions. However, there is a great deal of uncertainty about the best way to measure condensable emissions. Essentially all CPM emissions factors in EPA's WebFIRE (the database containing AP-42 emissions factors) and CPM emissions data collected recently were measured using EPA Reference Method 202. In Method 202, an effluent gas stream, after passing through a filter to remove solid particulate, is bubbled through a series of impingers to collect CPM. In measuring CPM from combustion of fuels containing sulfur, it has been shown by EPA that SO_2 collected in the impingers can be oxidized to sulfate and produce a variable sulfate artifact that results in overestimation of condensable emissions. In this example, if impingers are not purged with nitrogen, errors associated with the sulfate artifact may be inflated. The emissions factors in WebFIRE were developed from source test data that are more than 10 years old and may not represent newer refinements to Method 202. See the following link for more information on Method 202 and the nitrogen purge: http://www.epa.gov/ttn/emc/methods/method202.html.

Because of these and other uncertainties, condensable emissions were not calculated uniformly across all states in the MANE-VU region in the 2002 emissions inventory. For the future year MANE VU (2009, 2012, and 2018) emissions inventories, MARAMA has requested that MACTEC evaluate available data on condensable emissions from EGUs and recommend emissions factors to be used for the future year inventories.