COMMENTS CONCERNING "DETAILED PROCEDURES FOR PREPARING EMISSION FACTORS (DRAFT), DATED JUNE 29, 2006

SUBMITTED BY THE NATIONAL STONE, SAND & GRAVEL ASSOCIATION

The National Stone, Sand & Gravel Association (NSSGA) appreciates the opportunity to submit these comments concerning the document titled, "Detailed Procedures for Preparing Emission Factors (Draft)" dated June 29, 2006 and posted on the U.S. Environmental Protection Agency website on July 5, 2006. NSSGA understands that this EPA document is part of the overall Emission Factor Improvement Program being conducted by the Emission Factors and Policy Applications Group (EFPAG).

Based near the nation's capital, NSSGA is the world's largest mining association by product volume. Its member companies represent more than 90 percent of the crushed stone and 70 percent of the sand and gravel produced annually in the U.S. and approximately 117,000 working men and women in the aggregates industry. During 2005, a total of about 3.2 billion tons of crushed stone, sand and gravel, valued at $17.4 billion, were produced and sold in the United States.

NSSGA is especially well qualified to provide these comments. NSSGA has enjoyed a cooperative relationship with EPA since 1991 concerning the development of accurate and complete emission factor data sets for the crushed stone and sand and gravel industries. The results of these efforts have included updating AP42 Section 11.19.2 in January 1995 and in August 2004. The AP42 data now include much more accurate PM_{10} data, new $PM_{2.5}$ data, and emission factors for processes not previously addressed in Section 11.19.2. Overall, this cooperative emission factor development program has accomplished precisely what EPA is now hoping to achieve with respect to emission factors for other industrial categories. The comments provided by NSSGA are based on experience gained over this 15 year cooperative effort with EPA in upgrading emission factor data.

While emission factors were first developed in the late 1960s or 1970s as discretionary, the Clean Air Amendments of 1990 have now made their use essential and even mandatory in many jurisdictions. Emission factors are especially important to the mineral product industries due to the complexity and cost associated with testing of fugitive dust emission sources. In most cases, it is not economically practical for sources to obtain site-specific data. Emission factors are needed to prepare plant specific emission inventories, to determine the applicability of facilities to regulatory requirements, to support meteorological dispersion models, and to calculate annual operating permit fees. NSSGA believes that accurate emission factor data are especially important for communicating with neighbors and the communities served by aggregate processing facilities. For these reasons, NSSGA is interested in ensuring that any changes to the emission factor program do not reverse the significant progress that has been made with respect to mineral industry emission factor data and that the changes in the EFPAG program are beneficial with respect to the emission factors for other industrial categories.

1. Collaborative Effort

The single clearest lesson drawn from the 15-year EPA-NSSGA cooperative program is that the development of emission factors is time consuming, labor intensive, and expensive. A collaborative program is needed involving EPA, State and local agencies, industrial trade associations, industrial facilities, and experienced emission testing organizations.

The program designed to streamline the development, quality assurance review, and updating of EPA emission factor data sets must be scientifically valid and clear to all parties involved, including the public. All of the information used to develop emission factors, including the emission test reports and quality assurance reviews should be readily accessible to interested parties through conventional electronic means. All technical procedures used to calculate emission factors based on a set of emission factor tests should be straightforward and based on standard statistical procedures understandable to all stakeholders, especially the public. Complex rating systems based on subjective and qualitative criteria that can only be interpreted after detailed study of support manuals do little to clarify the quality of emission factor data to the public and other stakeholders. In designing a mechanism for updating emission factors, EPA must not only reduce the mathematical "uncertainty" of the emission factors, but also improve the "clarity" of the emission factors.

Once a transparent, simple, and scientifically valid process is available for updating emission factors, many industrial trade associations and operating companies will have an interest in providing the technical expertise, funds, and emissions data necessary to update and expand the emission factor data sets. A well designed emission factor operating system will also open the door for experienced quality assurance reviewers to provide a comprehensive review of the emission test data available in the EPA electronic files. Quality assurance review can be provided by individuals in State and local agencies, experienced testing firms, industrial facilities, trade organizations, other Federal agencies, and technical consulting firms. The updating process designed by EPA must, to the maximum extent possible, facilitate the participation of a large and diverse set of organizations and individuals. The mechanism should not re-create a bottleneck step created by the need for a single group strangled by limited resources to review and process new emission factor data. Later recommendations in these comments address simple and economical approaches to ensure the maximum possible participation in a collaborative effort to upgrade the emission factor data sets.

2. High Quality Emission Factor Data

The NSSGA-EPA emission factor program begun in 1991 emphasized the measurement of emission factor data using EPA Reference Methods and recommended quality assurance procedures. The use of EPA reference methods such as Methods 5 and 201A were at the foundation of this program. NSSGA sponsored the use of the combined $PM_{10}/PM_{2.5}$ method that was developed by NSSGA member company Air Control Techniques, P.C. and is now available as EPA Conditional Method 040. Use of EPA reference methods is one of the most important requirements in order to reduce "uncertainty" of data.

Considering the importance of high quality data, NSSGA was especially concerned about the statement provided on page 5 of the document prepared by MACTEC.

> "A key step in the quality assurance review of the source test data is the assessment of compliance with the appropriate EPA test method(s). Any deviations should be noted so that they can be accommodated in the assessment of compliance and used in calculating the estimated uncertainty of the source test." Page 5

Test data gathered with procedures that do not conform to EPA Reference Methods should simply be rejected. There is no need for procedures to "accommodate" bad data. This is especially a problem if existing valid data are "polluted" with poor quality data, making the uncertainty of the resulting emission factor data set appear to be greater than it is.

The goal of the emission factor improvement program should be to reduce the uncertainty of emission factor data rather than simply to determine the uncertainty of the data. The best ways to reduce uncertainty are to (1) use well established EPA reference methods that provide reproducible data and (2) encourage the maximum possible level of emission factor testing to ensure that emission factors are representative of the industry. This is exactly the approach taken in the successful NSSGA-EPA emission factor compilation program.

3. Emission Factor Program Improvements Should be Consistent with Stakeholder Recommendations.

Comments and recommendations provided by stakeholders participating in the EPA workshops and by organizations providing written comments have not been adequately addressed with respect to the June 29, 2006 document. Some specific examples of stakeholder issues not addressed in this document are discussed in Appendix A of these NSSGA comments.

NSSGA's analysis of the workshop summaries and the August 2005 comments indicates that the stakeholders are requesting a refined and upgraded AP42 dataset that has the following attributes.

- More comprehensive set of high quality emission factors to minimize the uncertainty of emission estimates due to the lack of emission factors and/or the low quality and poorly documented emission factor tests
- Quality assurance review of new emission factor data to ensure that the test data supporting the emission factor are accurate and that the source tested is representative of the source category updated
- A streamlined process for the submittal, quality assurance review, and updating of AP42 emission factor data sets
- $PM_{2.5}$ emission factor data for many categories of sources
- A mechanism for electronic submittal and streamlined quality assurance review of new emission factor data

- An electronic mechanism for the retrieval of the emission factors and all of the supporting information for all of the tests used to calculate the factors
- A means to quantify the variability of the data supporting an emission factor
- A means to ensure that the cost of emission factor testing is the responsibility of the source operators or industry trade association

Based on NSSGA's experience in emission factor development and on the stakeholder comments and recommendations, we recommend that the overall procedures for developing and updating emission factors summarized in Figure 1-1 of the June 29, 2006 report be revised.

Maintenance of the database should be performed by an EPA contractor who is subject to Federal Advisory Committee (FAC) oversight and guidance. The FAC should compile a list of qualified quality assurance reviewers for evaluating new emission factor test reports. The list of qualified QA reviewers should include individuals from EPA, other federal agencies, State and local agencies, industrial sources, industrial trade associations, engineering consulting firms, air emission testing firms, and citizen groups. An organization submitting new emission factor test data should request that at least two FAC qualified reviewers conduct independent reviews of the document once it is posted electronically on an EPA web site. The document should also be available to others who may wish to submit technical comments regarding the accuracy and completeness of the test report. Once at least two qualified QA reviewers have independently confirmed that the test procedures were consistent with EPA Reference Methods (or equivalent) and that the data are accurate, then the data should be combined with emission factor data applicable to the same SCC code.

Once this basic system is established, the compilation, submittal, and acceptance of new emission factor test data would be rapid and economical. NSSGA recommends the procedures listed in Table 1 for obtaining and processing new emission factor test data. The procedures proposed in the June 29, 2006 report are also shown in Table 1 to illustrate that the NSSGA proposed approach is more comprehensive and more efficient.

Table 1. NSSGA Proposed Procedures for Emission Factor Development

June 29 Draft Report (Figure 1-1), Page 3	NSSGA Recommendations	Comments
Not included	Step 1. Prepare a draft test protocol including a description of the test methods, the process operating parameters to be documented, the data reduction procedures, and a discussion of the representativeness of the source to be tested.	Constructive comments provided prior to an emission test program are much more valuable than criticism following the completion of a test program. The review of a protocol was not addressed in the MACTEC June 29, 2006
Not Included	Step 2. Post the draft protocol on the EPA web site at least 30 days prior to the intended start of testing	

Not Included	Step 3. Allow two weeks for all stakeholders to recommend changes to the test program.	draft report.
Not Included	Step 4. Revise the protocol to the extent necessary and conduct the air emission tests	

Table 1. NSSGA Proposed Procedures (Continued)		
June 29 Draft Report (Figure 1-1), Page 3	NSSGA Recommendations	Comments
Not included	Step 5. Advise State and local agencies of the test dates, and invite agency representatives to observe the tests.	On-site monitoring of tests is helpful in improving confidence in the test results.
Step 1. Test and process data collection	Step 6. Conduct the tests in accordance with the revised protocol to the maximum extent possible.	NSSGA step 6 is similar to MACTEC step 1.
Step 2. Data submission process (Use ERT or submit other form of Electronic media.)	Step 7. Submit the full test report including all documentation to a new report section on the AP42 web site. Use ERT (or equivalent).	NSSGA step 7 is similar to MACTEC step 2.
Step 3. Independent test and process data quality assurance to be completed by independent 3rd party (not EPA) Step 6. Data Verification Step 7. Public participation through WebFIRE and notification through EPA's Info CHIEF. Step 8. Respond to public comments.	Step 8. The organization submitting the new emission factor data requests that two or more QA reviewers on the FAC approved reviewer list conduct an independent review and post comments on the EPA new report web site. All interested stakeholders, including citizen groups are also invited to submit review comments. At least one month is provided to the report authors to respond to comments and/or make necessary changes. Costs for the QA review are the responsibility of the organization providing the emission factor data.	In accordance with the NSSGA proposed approach, QA reviews will be conducted in a streamlined manner because there will be a large group of approved reviewers on the FAC list. Furthermore, the QA reviews and public comments are received simultaneously. This facilitates responses from the report authors.
Step 4. Test and process data uncertainty calculation completed. Step 5. Data Submission to EPA (ERT submittal preferred)	Step 9. Once every three months, the emission factor database should be updated by the EPA contractor maintaining the AP42 database. All test data that are found satisfactory by two independent, approved FAC reviewers should be included in the emission factor database. Emission factor variability is re-calculated using standard statistical procedures based on the expanded data set. Any disputes	In accordance with the NSSGA procedures, the AP42 database is updated every three months. Only data that pass two independent QA reviews or is otherwise approved by the FAC committee is

	regarding the accuracy and appropriateness of new emission factors should be resolved by the FAC committee.	included.
Step 9. Incorporation of Emission Factors and background data into WebFIRE	Step 10. Post new emission factors on the EPA website. Also post all emission test reports, QA reviews, public comments, and other relevant information.	NSSGA step 10 is similar to MACTEC step 9.

The NSSGA proposed approach uses an electronic information submittal, storage, and retrieval system to be designed and supported by EPA. The emission factor database is maintained by an EPA contractor working under the guidance of EPA and the Federal Advisory Committee. The accuracy and scientific validity of the new emission factor data are ensured by (1) pre-test review of test protocols, (2) on-site monitoring of tests by state and local agencies to the maximum extent possible, (3) post-test QA reviews by FAC approved individuals, and (4) reviews of the draft test reports by all interested stakeholders. Costs for emission testing and quality assurance review are the responsibility of the organization submitting the test data. NSSGA recommends this procedure as a means to operate an agency-industry collaborative process for the compilation of accurate emission factors.

4. Formal Rulemaking Consistent with 40 CFR Part 51, Appendix W is Needed.

The proposed changes to the compilation of emission factors will almost certainly have a major impact on the regulatory status of many sources and on the annual Title V operating fees calculated using emission factors. Changes to the procedures used to compile, review, and update emission factors should be the subject of formal rule making. Similar conclusions were stated by the Alliance of Automobile Manufacturers and the National Environmental Development Association Clean Air Project (NEDA/CAP).

The informal, unstructured procedures presently being used by EPA with respect to emission factor compilation and application are entirely inconsistent with the well defined procedures described in guidelines for the use of atmospheric dispersion models. Dispersion modeling is subject to clear guidance promulgated 40 CFR Part 51, Appendix W. This regulatory guidance ensures that models are used in appropriate applications and in accordance with well conceived procedures. This approach based on formal rule making minimizes the uncertainty associated with the dispersion modeling results.

Unfortunately, the scientifically valid and reasonable procedures established for dispersion models can be overwhelmed by inaccurate emission factor data used as input to the dispersion model. Without reasonable guidance and regulatory limits on the use of emission factors, the intent of Appendix W is frustrated. Formal rulemaking procedures similar to those applied to dispersion modeling are needed for the compilation and use of emission factors.

5. General Strategy for Addressing Uncertainty

EPA has recently promulgated changes to the dispersion modeling regulatory guidelines presented in 40 CFR Part 51, Appendix W. Sections 9.1.3 and 9.2 of the guidance promulgated

on November 9, 2005 present a reasonable approach to addressing the uncertainty associated with dispersion modeling. A similar approach should be taken with respect to the uncertainty associated with emission factors. Specifically, emission factor users should be instructed to use the mean (or preferably median) value of the emission factor data set rather than use an altered value based on a poorly defined upper or lower error band.

6. Completeness of Emission Factor Program Changes

EPA appears to be making a step-by-step set of changes to fundamentally alter the development and use of emission factors. The June 29th document primarily concerns the compilation of emission factor test data. This document has only a limited discussion of the use of emission factors and the means to be used to address the variability in emission factor values in each SCC category. Without a clear summary of the complete emission factor program, it is difficult to fully evaluate the implications of the changes proposed by EPA. EPA should leave the record open concerning the present document until draft materials on all elements of the emission factor program are fully disclosed.

7. Bias to Higher-Than-True Emissions

The program proposed by MACTEC and endorsed by EPA will result in the specification of upper and lower limits to the "error-band" for emission tests. Once emission factor "uncertainties" (better termed as "variability") are determined, there will also be upper and lower limits to the value of the emission factors based on a set of emission factor tests. State and local regulatory agencies addressing concerns of citizens will, in most cases, find it necessary to use the maximum value (measured value plus default error plus the upper limit error band) to evaluate the source emissions. The average value will become relatively meaningless, unless EPA provides clear guidance regarding the uses of the emission test and emission factor distribution data. For example, upper limit emission test and/or emission factor data should not be used in dispersion models to evaluate annual average, 24-hour, or 3-hour maximum concentration levels around a new source. Upper limit emission values should also not be used to determine the applicability of a source to Title V operating permit requirements or PSD requirements stated in terms of tons of pollutant per year. The upper limit values should also not be used in risk assessment studies involving moderate-to-long term exposure. In these examples and numerous other possible regulatory applications, the use of an upper limit value introduces a significant bias to higher-than-true impact that ignores the routine variability of emissions from the source. The mathematical formation of mythical air emissions over a long term period will have little beneficial impact on air quality and community health.

8. Meaning of Emission Test Values

The June 29th document concerns emission factor test report development. However, it is clear that any assessment of emission test upper and lower "uncertainty" limits will also be applied to site-specific emission test data used in lieu of emission factor values. This approach might also be carried over to compliance tests. EPA should state whether or not, they expect similar "uncertainty" evaluations to be conducted on site-specific emission tests. This change would have a significant impact on the stringency of regulatory requirements and, therefore, be subject to formal rulemaking.

9. Disputes Regarding Emission Factor Test Results and Emission Factors

It is apparent that EPA is reducing its commitment to the development of emission factors and delegating a major portion of its responsibility to others. However, EPA has not established a practical and efficient system to resolve disputes regarding the technical adequacy of a new emission factor test result or in the updated emission factor value changed due to a new emission factor test value. NSSGA proposes that disputes be resolved by the FAC members following the submittal of QA reviews by two independent reviewers listed on the FAC approved list. The FAC committee could provide guidance to EPA and the EPA database contractor regarding the suitability of including or excluding specific emission test report data.

10. Scientific Validity of EPA's Proposed Test Result Uncertainty Assessment

EPA and MACTEC have proposed procedures to assess the uncertainty of emission test results that are (1) scientifically unsound, (2) superficial, (3) incomplete, and (4) lacking in consistency with well established statistical procedures used in scientific and engineering disciplines. Specifically, EPA and MACTEC have created a Data Quality Question (termed by MACTEC as "DQQ") to establish error bands. There is no scientific basis for this approach. It is not consistent with well established statistical analysis procedures. Furthermore, the rankings proposed by MACTEC are not consistent with well established facts regarding the relationship between test equipment operating parameters and the measurements obtained during EPA reference method tests. The error levels for many of the parameters listed are severely understated. Many of the errors that can create the largest positive and negative biases in emission test results are missed by the EPA/MACTEC qualitative procedures. This approach creates the impression of a technically valid procedure while only contributing guesswork and poorly based assumptions to the test results. This is simply not good science. Based on the review of stakeholder comments, NSSGA does not believe that the stakeholders requested a system similar to the proposed DQQ approach. Detailed comments concerning technical objections to the DQQ procedures are provided in Appendix B of these NSSGA comments.

11. Characterizing Emissions Data

EPA has historically used the arithmetic average to characterize emission factors. Considering that EPA has been asked by various stakeholders to reduce the uncertainty of emission factors, it would be fair to ask EPA to use the median of emission factor data sets rather than the arithmetic average. As we have commented in the past, statisticians almost always recommend the median as the preferred means to characterize the central tendency of a distribution of data when it is possible to have extremely high or low values that are not necessarily representative of the overall population being evaluated. This value of the median can be demonstrated by means of an example summarized in Table 2.

Table 2. Example Calculation of Central Tendency

Data/Parameter	Value
Value 1	2.1
Value 2	3.8

Value 3	5.5
Value 4	4.8
Value 5	25.6
Arithmetic Average	8.4
Median	4.8

The arithmetic average is subject to significant changes due to the addition of either an extremely high or extremely low value. In the example provided above, it is apparent that the average is above four of the five test values. Conversely, the median does provide a good characterization of the first four test values.

12. Emission Factor Uses

It is apparent that EPA is justifying the sweeping changes to the emission factor program due, in part, to the wide variety of emission factor applications. As indicated on page 2 of the June 29th document, EPA lists ten different applications. Among these, EPA includes "Compliance determinations" and "Emissions offsets/emission banking confirmation." Considering that EPA believes it has been charged with the responsibility to improve the emission factor program, perhaps a logical first step should be determining the emission factor applications that are and are not appropriate. The use of industry average emission factors values to determine the compliance status of a specific facility should not be allowed. Furthermore, the use of emission factors for "emission offset/emission banking confirmation" should not be allowed. It is especially difficult to determine how the upper error band quantity would be viewed with respect to the site specific compliance determination or with respect to an emission banking confirmation.

13 Adequacy of Emission Test Procedures

The June 29th document prepared by MACTEC implies that the uncertainty in emission factor values is primarily dependent on the variability of process operating conditions and the error band of the reference method test procedures. This document ignores a major source of error, namely fundamental flaws in the EPA reference method procedures themselves. A good example of a flawed EPA procedure is Method 202, which is subject to severe bias in the measurement of condensable particulate matter due to the inadvertent capture of gaseous sulfur dioxide and soluble organics followed by their aqueous phase oxidation to form artifact condensable particulate matter. EPA could contribute substantially to reduce uncertainty in emission factor data by expediting improvements to emission factor testing procedures. It should be noted that NSSGA member company Air Control Techniques, P.C. has made a contribution in that respect by submitting an improved version of Method 202 for consideration by EPA and by providing the method that EPA has adopted as Conditional Method 040 for the measurement of $PM_{2.5}$ and PM_{10}.

14. Regulatory Agency Resources

EPA and MACTEC have proposed that State and local agencies serve as the primary providers of quality assurance monitoring procedures for emission factor tests. This appears to be a mini-version of the numerous unfunded mandates that the Federal Government thrusts on State and local governments. It would be highly surprising if the State and/or local agencies have the resources necessary to provide these services. Furthermore, it is not clear that these agencies can perform this function in a timely manner and thereby ensure that the emission factor test data will be available for use. State and local agencies could be most effective by focusing their limited resources on the on-site monitoring of emission factors tests.

15. Process Operation "Uncertainty"

EPA and MACTEC have proposed an overly simplistic and unrealistic approach to evaluating the "uncertainty" in process operating conditions during emission factor tests. The authors of the June 29th document are making the assumption that is it possible to quantify the impact of a variety of process operating parameters on the emission rates measured during an emission factor test program. This type of "uncertainty" assessment would require an exceptionally large matrix of tests involving a large number of parameters. Many of these operating parameters (e.g. particle size distributions, flyash resistivity distributions, and raw material composition distributions) are not entirely under the control of the operator. The discussion of process operation "uncertainty" evaluation plows new ground in the field of wishful thinking. The best way to address process operation uncertainty is to create a streamlined system for compiling and processing new, high quality emission factor data. Once a reasonably sized set of accurate data is available, it is possible to analyze the supporting process information to identify many of the factors that have a major impact on the emission factors. More high quality data are needed, not assumptions and guesswork.

16. Reconciling New and Existing Emission Factors

There is no discussion of the procedures to be used to combine new emission factors with the upper and lower error bands with emission factor data compiled previously. Very few of the emission factor tests conducted previously included the parameters that EPA would now like to evaluate with respect to uncertainty. Surely, EPA does not intend to abandon the previously compiled emission factor data. If the existing data are being retained, it is difficult to see how the emission factors in each SCC category will be developed.

17. Representativeness of the Sources Tested

Surprisingly, the June 29th document does not address the issue of the representativeness of the source and/or emission unit being tested as part of the emission factor development program. The representativeness of the source design and/or operating conditions could have a major impact on the variability of the industry average emission factor data.

18. Availability of New Emission Factor Data

EPA and MACTEC suggest that the proposed emission factor compilation procedures are a streamlined version of the present procedures. In fact, the quality assurance prerequisite steps

required by EPA prior to accepting new emission factor test data probably will introduce substantially more delay than the present system (if that is possible.) Furthermore, the process characterization efforts that EPA and MACTEC suggest are necessary will substantially increase the costs and increase the probability that the scope of data gathering will stray unnecessarily over into source-confidential areas. All of these aspects of the "improved" emission factor compilation program will slow down acceptance of new data and will create financial and administrative disincentives to conducting emission factor tests.

19. Emission Factor Calculations

The test report quality assurance evaluation procedures advocated by the authors of the June 29th report assume that the testing contractor correctly labeled all sample containers and correctly calculated all emission rates. Organizations experienced in quality assurance monitoring of air emission testing check sample labeling and check emission calculations very carefully. This often is a major source of error.

20 Detailed Comments

Page 5 – It is not clear how the "… emission factors will be reviewed for engineering plausibility."

Page 7 – It is not clear how an emission testing organization or sponsor test site would answer questions concerning "dates of last maintenance performed on control devices," or description of last maintenance performed on control devices." In a few cases the answers to these questions are straightforward. In most cases, the on-going maintenance activities could not be fully summarized. Furthermore, there is no quantified relationship between the level of maintenance and the emissions on any specific test day.

Page 10 – The authors of this document are requesting flowcharts that are more detailed than block diagrams but less detailed than full P&I and process flowcharts. It is not clear what they consider sufficient.

Page 17 – Concerning process operation uncertainty, the authors state that: "If there are no uncertainty values submitted, then default values will be used." It is not clear what the technical basis for the default values would be.

Page 17 – The authors state that: "Because the error bounds for each test run are assigned conservatively based on maximum parameter measurement errors, emission factors and error bounds should be calculated using maximum errors, rather than statistical procedures." This statement demonstrates that the proposed procedures are scientifically unsound.

NSSGA hopes that these comments and recommendations are helpful to EPA in developing a streamlined system for the compilation of accurate emission factors. NSSGA remains

committed to a collaborative process for the compilation of scientifically valid and accurate emission factors. Please contact me if you have any questions at 703/526-1065.

Sincerely,

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APPENDIX A

STAKEHOLDER COMMENTS NOT ADDRESSED IN THE EPA DOCUMENT TITLED, "DETAILED PROCEDURES FOR THE DEVELOPMENT OF EMISSION FACTORS"

In the following material, NSSGA has selected a number of stakeholder comments that do not appear to be adequately addressed in the draft EPA document. The numbering of these comments is provided simply for the convenience of the reviewers of these comments. The numbering of comments was not provided in the original workshop notes or documents.

It is important to note that the comments summarized below primarily concerning the emission testing aspects of emission factor development. The workshops and submittals contain numerous comments and recommendations that primarily concerning the use of the emission factors. The application-oriented recommendations are not considered directly relevant to the June 29, 2006 document and are, therefore, not addressed below.

Alliance of Automotive Manufacturers, August 31, 2005.

Statement A1. - "In mapping out each project, the Alliance recommends that EFPAG provide additional information regarding how and why these particular projects were chosen and why certain options have been disregarded. For instance, how did the EFPAG decide to develop the Microsoft Access Electronic Report Tool (ERT) instead of other forms of electronic automation?" Page 3, Valerie Ughetta

> Comment A1 - NSSGA shares the concerns of the Alliance with respect to Microsoft Access ERT. Many stakeholders do not use Access. More generally available software is available for electronic reporting and compilation of emission factors data. The June 29th report did not address this comment by providing a justification for the use of Microsoft Access ERT.

Statement A2. – "The Alliance is concerned about the use of the term "uncertainty" in this context. Rather, we would propose the use of the term "variability." Variability will always be present in any testing methodology and can be determined or estimated. However, "uncertainty" is not an accurate term when suggesting that it represents an amount that can be estimated or calculated." Page 5, Valerie Ughetta

> Comment A2 - NSSGA agrees with the Alliance that the term "uncertainty" is not appropriate. There are well-established, straightforward techniques to quantify the variability of a data set. The meaning of the term "uncertainty" is subject to many interpretations. The June 29th document continues to use the term "uncertainty" despite a number of comments concerning the inappropriateness of this term.

Statement A3 - "The Alliance is concerned that by creating variability statistics for emission factors, permit limits could result in a different measure of compliance. ... The existence of

variability should not limit the application of certain emission factors if they represent the best data available. …The source variability underlying a factor should only be utilized to assist EFPAG with the development of an emission factor rating, which will assist the user with selection of the most appropriate emission factor." Page 5, Valerie Ughetta

> Comment A3 - NSSGA agrees with the Alliance that the variability statistics should be used strictly to help users select the most appropriate emission factor, not to adjust the measured value to a higher or lower level.

E.I. DuPont de Nemours, Inc. August 31, 2005.
Statement A4 – "It seems from the report that more extensive regulatory work is in progress that may not been needed. …it should be left to the sources and permitting authorities, etc. to determine how best to use the information on limitations, etc and whet(h)er improvements are needed in the estimates" John Dege, Page 1

> Comment A4 - NSSGA agrees that the revised emission factor database should include considerable flexibility. The procedures described in the June 29th report do not clearly provide for this flexibility.

U.S. EPA, August 12, 2005

Statement A5 – "In terms of data quality, one of the most important things to provide is all the available numerical data on both emissions and process parameters. That will allow users to derive their own conclusions about the quality of data using analyses they may see fit for a particular application." Page 1, Andy Miller

> Comment A5 - NSSGA agrees with the fundamental principle stated above. All of the information relating to an emission factor test and its quality assurance reviews should be electronically available so that each user can reach their own decision regarding the applicability of a factor to their emission unit.

The National Environmental Development Association, August 31, 2005.

Statement A6 – "…NEDA/CAP objects to the need for third-party certifications of emission testing in general. We hope that this recommendation was intended to be limited to testing for AP-42 factor development, but such limitation is difficult to read into the report which appears to contemplate all stack testing become part of the dynamic improvement of emission factors ongoing into the future" Page 6, Leslie Ritts

> Comment A6 - NSSGA does not object to third party, independent quality assurance reviews. However, these must be conducted in a manner that (1) does not unnecessarily slow down the acceptance and use of new data, (2) is performed by qualified reviewers, and (3) includes an opportunity for test report submitters to challenge biased or incorrect technical comments on the part of QA observers. An independent organization, such as a

Federal Advisory Committee, should make the final determination regarding the adequacy of a disputed emission factor test value.

The National Stone, Sand & Gravel Association, August 31, 2005

Statement A7 – "Accept only data from emission tests conducted specifically for the purpose of emission factor development that include analysis of the representativeness of the source tested with respect to the overall population of sources." Page 2, John Hayden

Comment A7 - NSSGA continues to believe that information concerning the respresentativeness of the source and its operating conditions is an important part of the emission factor test data set. This issue was not addressed in the June 29th draft report.

Statement A8 – "Develop a statistical evaluation procedure to screen out outlier data." Page 2, John Hayden.

Comment A8 - NSSGA believes that it is especially important to screen out outlier data using well-established outlier identification techniques. This issue was not addressed in the June 29th draft report.

Statement A9 – "Reject reports that fail to adhere to EPA reference methods (when applicable) or fail to include the necessary documentation to facilitate an independent quality assurance evaluation." Page 2, John Hayden.

Comment A9 - NSSGA believes that this is an especially important procedure to minimize the uncertainty of emission factor data. The June 29th draft report discusses techniques to evaluate the uncertainty of data that are missing important documentation or that fail to meet EPA reference method requirements. This especially important recommendation was ignored in the June 29th draft report.

Statement A10 – "Create a peer review process for review of electronically provided test report and test data summaries." Page 2, John Hayden

Comment A10 - NSSGA has proposed a FAC-based system for the expeditious review of emission factor test reports by FAC-approved reviewers. This approach is discussed in detail in this NSSGA submittal. This recommendation was not addressed in the June 29th draft report.

Statement A11 – "As part of the review of existing AP42 emission factor data, retire old data that were obtained under conditions that are no longer representative of the industry addressed in the AP42 section." John Hayden

Comment A11 - NSSGA believes that EPA should allow emission factor users the opportunity to post comments on the EPA website concerning emission factor data that

are no longer applicable. There should be a mechanism to confirm these statements and remove out-of-date emission factor data. This issue was not discussed in the June 29th draft report.

Statement A12 – "MACTEC reports that EFPAG has identified 'assessing and documenting the quality of source tests' as one of the four main program elements to be addressed; however, the information compiled by EPA does not provide a clear technical basis for concluding that the variability observed in emission factor data sets is due to source test quality as opposed to source-to-source variability and source specific routine variability. This suggests that EFPAG is taking an approach based more on preconceived opinions rather than an adequate evaluation of the presently available information in the AP42 data sets." Page 3, John Hayden.

Comment A12 - NSSGA recommends that EPA continue to seek comments from regulatory agencies, industrial organizations, and other stakeholders regarding new procedures for emission factor compilation, review, and updating.

Statement A13 – "As indicated in the Executive Summary and in the attached Issue Option Paper, EFPAG is apparently attempting to evaluate the '…uncertainties that result when stack tests deviated from the prescribed methods.' It is extremely difficult to accurately evaluate the errors introduced into test results due to deviations from the reference test methods. If the deviation is significant, the test results should not be tabulated as part of AP42." Page 4, John Hayden.

Comment A13 - Test data not meeting reference method requirements should be deleted. The June 29th draft report included procedures for assessing the "uncertainty" of these low quality reports. As stated earlier, this important recommendation was ignored in the June 29th draft report.

Statement A14 – "Test data ….deemed inappropriate for emission factors development by a state/local agency would be rated not applicable." Page 5, John Hayden.

Comment A14 - The June 29th report continues to provide too large of a role for state and local agencies and very little role of other important stakeholders. This comment was ignored in the June 29th draft report.

June 8, 2004 Workshop, MACTEC Memorandum Dated September 30, 2004

Statement A15 – "Proposal 2: EPA should solicit experts to establish an emissions factor QA workgroup. The workgroup would define AQ criteria for uncertainty, relevance by source. The workgroup would also define requirements and user needs for an electronic cataloging (database) system." Page 2

Comment A15 - The June 29th report did not include a QA workgroup.

Statement A16 – "Establish a task force of stakeholders (EPA, State, local, tribal organizations, Regional Planning Organizations, STAPPA/ALAPCO, environmental organizations, trade associations, and industry) to: create an administrative structure/process that will govern the development of an emissions factor database, establish QA/QC procedures and protocols, coordinate the development of new test methods, and streamline key processes." Page 3.

> Comment A16 - The June 29th report did not address any role of a task force of stakeholders. If created, NSSGA would like to participate in this task force.

Statement A17 - "Establish a FAC-like process to frame guidelines for the emissions factor development process." Page 2-8.

> Comment A17 - The June 29th report did not address the creation and role of a Federal Advisory Committee.

August 25, 2004 Workshop

Statement A18 – "Establish through stakeholder collaboration, baseline criteria and protocols for developing emission factors and for accepting and applying test data (including modeling data, lab data, CEMS) to factor development." Page 4-3

> Comment A18 - The June 29th report appears to have superficial and highly subjective report review criteria that preempt any meaningful input from stakeholders.

Statement A19 – Develop, through stakeholder collaboration, standard operating procedures for test data auditing, conducting QA/QC, and completing the certification process." Page 4-3

> Comment A19 - The June 29th report did not appear to address this recommendation.

Statement A20 – "Establish a collaborative group to develop standard protocols for data generation and collection, data evaluation, a data depository, and use of emission factor data." Page 4-4

> Comment A20 - The June 29th report did not address any possible role for a collaborative group.

August 26, 2004 Workshop

Statement A21 - . Streamline the emission factor development process by: involving partners who are willing to commit resources, developing objective criteria for emission factor rating tests, developing standard testing protocols, and forming a group to certify tests." Page 4-5

Comment A21 - The June 29th report did not address the possible role of a group to certify tests.

Statement A22 – "Reduce the uncertainty in emission factors by using only A or B rated data in emission factor development, providing both a range and a median value for emission factors, establishing criteria for quantifying uncertainty, and explaining uncertainty in AP42." Page 4-5

Comment A22 - The June 29th report addressed the assessment of "uncertainty" for reports that failed to meet EPA reference method requirements. Accordingly, this recommendation was ignored.

November 8, 2004 Workshop

Statement A23 - "Develop guidance for non-inventory applications/uses understanding that uncertainty is a function of the time interval of the application." Page 5-6

Comment A23 - The June 29th report did not acknowledge the important fact that "uncertainty" (better stated as "variability") is a function of the averaging time. This comment was ignored.

APPENDIX B.

TECHNICAL COMMENTS CONCERNING THE DATA QUALITY QUESTIONS APPROACH

General Comments Concerning Emission Test Evaluation

Comment B1 - On page 5, MACTEC states that,

> "A key step in the quality assurance review of the source test data is the assessment of compliance with the appropriate EPA test method(s). Any deviations should be noted so that they can be accommodated in the assessment of compliance and used in calculating the estimated uncertainty of the source test."

Test data gathered with procedures that do not conform to EPA Reference Methods should simply be rejected. There is no need for procedures to "accommodate" bad data. This is especially a problem if existing valid data are "polluted" with poor quality data, making the uncertainty of the resulting emission factor data set appear to be greater than it is.

Comment B2 - On page 14, MACTEC states that,

> "When taken together, these factors will impact the accuracy of the emissions test and are generally understood well enough to permit estimation of their impact on accuracy of test results."

This is an extremely broad and highly surprising statement. The authors have an obligation to provide citations to scientific and engineering literature that support this conclusion.

Comment B3 - On page 15, MACTEC states that,

> "For some parameters, knowledge of the basic measurement method allows for an estimate of increased uncertainty. For other parameters, good engineering judgment is used to assess the uncertainty."

EPA and experienced testing organizations have spent considerable effort to develop technically valid and reproducible means to measure air emissions. Now, it appears that that MACTEC is proposing to pile on a generous dose of "engineering judgment" to the measured value. There is no clear basis for this "engineering judgment." Conversely, there are well established statistical procedures to evaluate the variability of technically valid data. Competent individuals in different organizations will arrive at the same result when using scientifically valid statistical procedures. It is highly unlikely that competent individuals in different organizations will arrive at the same result when applying "engineering judgment." It is important to note that engineering judgment is used only as a last resort when all other means to assess an issue are impractical. Engineering judgment should not be established as the foundation of the emission factor program.

Comment B4 - On page 15, MACTEC states that,

> "In the approach described here and presented in Appendix A, the overall uncertainty is defined as a lower or upper bound on a parameter in the emission factor equation or in the estimation of the process rate. The bounds are generally derived based on engineering judgment of manufacturer's specifications, but are occasionally derived using empirical testing. The bounds are not generally derived using standard statistical calculations (e.g. the 95% upper bound on a sample mean.)"

In this paragraph, the authors clearly state that the "uncertainty" calculations are not being based on standard statistical procedures but instead are being based on engineering judgment. It is far from clear how engineering judgment is instructive with respect to air emission test data obtained by clearly defined EPA reference method techniques. It is also quite unclear how "manufacturer's specifications" provide useful information for assessing "uncertainty." What is clear from this paragraph is that MACTEC is proposing to invent an uncertainty assessment system based on little more than guesswork and un-based assumptions rather than on well established science.

Due to the importance of emission factors to entire industries, the uncertainty calculation procedures need to be clearly described and subject to formal rule making.

Comment B5 - On page 16, MACTEC states that,

> "On the other hand, quantitative uncertainties resulting from taking measurements with a sample train that was not leak checked before and after a test are generally not available."

EPA should not be attempting to determine the uncertainty of a test conducted using procedures that did not meet the requirements of the EPA reference method. If the method has not been followed, the data are simply invalid and should be entirely rejected from the emission factor database. A similar approach is taken with respect to compliance determinations. Test data obtained by procedures inconsistent with the EPA reference method are simply rejected. It is not practical or scientifically valid to attempt to "repair" the flawed data by piling on an error band based on guesses and bad assumptions.

With respect to leak checks, it is important to note that the post-run leak check is an essential step in essentially all EPA reference method tests (pre-run leak checks are discretionary). In the ERT format, the reviewer will not have access to any of the test run information necessary to verify if the testing organization did, or did not, conduct the required post-run leak check. All of the verification information is buried in the detailed field data sheets that are not submitted along with the test results. Accordingly, the reviewer will have to take the word of the testing organization that the leak check was successfully completed. This is an especially significant flaw in this data gathering procedure. There is simply no substitute for conducting full quality assurance audits during the field work, and this includes watching the leak check while on the stack. Confirming leak checks is not done from the comfort of an office far removed in time and distance from the field work.

Comment B6 - On page 16, MACTEC states that,

> "The maximum quantitative deviation around the expected average value can be calculated by assuming that all parameters that affect an emission value have simultaneous values that that maximize the deviation of the calculated value relative to the "true" value."

It is clear from this statement that the authors are attempting to define a maximum possible error band. It is not clear how this maximum possible value will be used in emission factor calculations or analyses based on emission factors.

Appendix A, Table 4 Uncertainty Assumptions

Unlike the examples shown in Appendix A, this maximum possible value will be far above the reported value if the maximum possible errors for each parameter are taken into account. A number of the "uncertainty" percentage values in Appendix A badly underestimate these possible deviations. This is illustrated by a few examples of the values specified in Table 2 of Appendix A.

Comment B7 - DQQ 1. " Is the cross section area more than 5% different from the previous test?" If yes, assign an uncertainty of 2%.

The mass emission rate from a stack is directly proportional to the flow rate, which is a function of the average gas velocity and the stack area. If the cross sectional area is in error by 5%, then the mass flow rate is potentially in error by 5%. There are only two reasons for a test-to-test difference in stack area: (1) a new stack has been installed, or (2) either the previous testing organization or the present testing organization has failed to accurately measure the stack. If there are concerns regarding the stack area, the data should be rejected entirely. The error in the reported emission rate far exceeds the arbitrary 2% value specified in Table 4 of Appendix A.

Comment B8 - DQQ 2. "Are all of the velocity head pressures (delta p's) the same?" If yes, assign an uncertainty of 2%.

This is an extremely improbable condition that is inconsistent with the physics of air flow in ducts and stacks. It is highly probable that any testing organization that reported these results had (1) a plugged Pitot tube, (2) a leaking Pitot tube, or (3) a disconnected sensing line. On-site quality assurance checks are designed to identify defective Pitot tubes prior to the start of field work. Unfortunately, the ERT system being proposed by EPA does not include any procedures for addressing defective Pitot tubes. At the very least, highly improbable data such as consistent velocity pressures should result in the complete rejection of the test data. The 2% error band suggested in MACTEC Appendix A Table 4 is low. Actual error could be extreme.

Comment B9 - DQQ 3 "Were the yaw angles >20 degrees at this location?" If yes, assign an uncertainty of 3%.

EPA Reference Methods clearly specify that cyclonic flow conditions be measured prior to the start of the test program. If the average flow angle exceeds 20%, an alignment approach is needed to measure the velocity pressures and to capture the sample gas stream. Using the ERT system without the benefit of on-site quality assurance monitoring, it is not clear how a reviewer would be able to verify that the testing organization properly checked for cyclonic flow conditions prior to the test. It is highly unlikely that a testing organization would admit that the flow angle exceeded 20 degrees and then admit to using standard traversing procedures. Accordingly, this potentially large error will go undetected using the proposed ERT system for quality assurance evaluation.

In the unlikely event that the testing organization admitted to a large flow angle, but failed to use the alignment traversing approach, the 3% error is inadequate. The actual errors both in the velocity pressure measurement and in the sample catch weight measurements can be very high. The errors with respect to particulate matter depend strongly on the particle size distribution due to the difficulty of maintaining true isokinetic sampling conditions in a probe not aligned with actual flow angles.

The failure to recognize and properly respond to cyclonic flow conditions is a frequent and significant problem. The ERT system is poorly equipped to address this error.

Comment B10 - DQQ 4. "Is the distance from the ports to the upstream disturbance < 2 dia?" If yes, assign an uncertainty of 3%.

Either the test was conducted in accordance with Methods 1 and 2, or it was not. If not, the test should simply be rejected. Attempting to assign an uncertainty value to a test conducted in violation of Methods 1 and 2 is imprudent. These methods lie at the very foundation of all air emission testing.

A testing organization should take all steps possible to avoid sampling locations that do not satisfy Method 1. If that is not possible, then the number of traverse points should be selected based on Methods 1 and 2. The data provided in the test report should demonstrate that the testing organization selected and used the appropriate number of traverse points.

The errors associated with non-Method 1 sampling locations can far exceed the 3% uncertainty listed in MACTEC Appendix A Table 4. There are errors both with respect to the point-by-point velocity pressures and with respect to particulate matter capture. The extent of the error depends, in part, on the particulate matter size distribution.

Comment B11 - DQQ5 "Was a standard pitot used?" If yes, assign an uncertainty of minus 1.

It is apparent that MACTEC is providing an "uncertainty" reduction due to the use of a standard Pitot tube because it is considered a primary standard for velocity pressure

measurement. However, the use of standard Pitot tubes is restricted almost entirely to industrial hygiene applications in very clear gas streams. In the presence of particulate matter, the small static pressure sensing ports on the side of the standard Pitot can plug within seconds of insertion into a stack. Once in the stack, the standard Pitot with plugged static sensing ports will simply indicate the total gas stream pressure, not the gas stream velocity pressure. This can result in major testing errors. Standard Pitot tubes are virtually never used in air emission testing applications, and their use should not be encouraged by the misguided "credit" implicit in MACTEC Appendix A, Table 4.

Comment B12 - DQQ 6. "Was a 3D directional probe used?" If so, assign an uncertainty of minus 2.

3-D probes are inherently more accurate for gas flow rate measurement when these are used properly. However, the five sensing ports on the 3-D sampling head are especially prone to pluggage in gas streams having moderate-to-high particulate matter loadings or having entrained water droplets. The gas flow rate measurement error obtained using a probe that is partially or completely plugged can be extremely large. Without on-site quality assurance monitoring information, there is simply no basis for assuming that the use of a 3-D sampling head provides accurate gas flow rate data.

Comment B13 - DQQ13. "Is leak check info missing or >0.02 cfm?" If yes, assign an uncertainty of 2.

If leak check information is missing or exceeds 0.02 cfm, the test should be rejected for failure to meet EPA reference method requirements. The magnitude of the error cannot be quantified. For example, if the sampling train was leaking 75%, the magnitude of the error was approximately 400%. The 2% uncertainty value provided in MACTEC Appendix A, Table 4 seems overly generous considering that the testing organization has failed to provide fundamentally important information and may well have provided data biased substantially below true emission rates.

Comment B14 - DQQ15. "Is the isokinetic sampling rate <90 or >110%?" If yes, assign an uncertainty of +/- 2.

If a Method 5-based test has an isokinetic sampling rate below 90% or 110%, the test has failed a critical requirement of the method. The report should be rejected. No attempt should be made to repair fundamentally flawed data. Furthermore, the MACTEC proposed uncertainty value of plus or minus 2 percent grossly understates the probable error. It is well established in the air emission testing research literature that the extent of error due to non-isokinetic sampling is a strong function of the particle size distribution and can be quite large. As a starting point, sampling at over isokinetic conditions exceeding 110% is considered to generate errors roughly equal to the percentage over 110%. Accordingly, a test run conducted at 140% of isokinetic conditions would have an error of minus 30%. Conversely, sampling at an isokinetic rate of 70% would have a positive bias of approximately 20%. If the particulate matter size distribution is especially large, these errors increase. If the particulate matter size distribution is

primarily less than 10 micrometers or the stack gas velocity is quite low, then these errors due to non-isokinetic conditions decrease. The value of plus or minus 2 percent is not appropriate.

Comment B15 - DQQ 17. "Is the raw field data missing?" If yes, assign an uncertainty of 100.

If the raw field data are missing, then the reviewer simply does not have a test report to review. The test report should be rejected. There is no means available to conduct a quality assurance evaluation without the data from the test. Furthermore, the MACTEC uncertainty value of 100 simply means that the reported test value is within a factor of 2 of the true value. This is a leap of faith concerning a test report for which there is inadequate documentation.

Comment B16 - DQQ18. "Is the laboratory report insufficiently detailed or missing?" If yes, assign an uncertainty of 100.

If the laboratory data are missing or incomplete, then it is impossible to make a meaningful review of the test results. The test report should be rejected. No self-respecting state or local agency would accept a compliance test report having missing or incomplete laboratory data. Furthermore, no knowledgeable testing organization would attempt to assess the uncertainty of reported results without complete laboratory data. These fatally flawed test reports should simply be rejected.

Comment B17 - DQQ19. "Are the sample custody records missing?" Is yes, assign an uncertainty of 50.

It is not clear how MACTEC has quantified the uncertainty associated with missing chain of custody records. Test reports without chain-of-custody records are simply rejected as being fatally flawed.

Comment B18 - DQQ20 "Are the >30% different than previous results?" If yes, assign an uncertainty of 5.

It is hard to be charitable or reserved when criteria such as DQQ20 are proposed. Please note that companies experienced in the air emission testing business have long recognized that there is significant routine variability in emissions (hourly, daily, and seasonally) due to numerous process and air pollution control device operating parameters. Furthermore, all testing organizations do not conduct emission tests with equal accuracy. One set of emission test data should not be judged based, in part, on a comparison with a previous test at the same source. Each test should be evaluated on its own merits.

Comment B19 - DQQ 22 and 23. "Was the probe temperature outside of the method specs?" "Was the filter temperature outside of the method specs?" If yes to either, assign an uncertainty of 2% for each deviation.

The probe and filter temperatures are critical sampling requirements. Failure to operate the sampling train within the method specifications results in invalid data. The test report should simply be rejected. The uncertainty value of 2% is simply ridiculous.

Comment B20 - DQQ24. "If Method 202, was the nitrogen purge omitted?" Is yes, assign an uncertainty of 2

If the nitrogen purge was omitted, the test report should be rejected entirely. It is well established that the lack of an adequate nitrogen purge results in a bias to substantially higher than true condensable particulate matter emission rates. As part of the Method 202 sample recovery, it is also critical to measure the solution pH. This is not addressed in the DQQ information.

Comment B21 - DQQ25. "If Method 202, was purge performed with air?" If yes, assign an uncertainty of 2.

This is a complete violation of Method 202 and flies in the face of common sense. The test should be rejected.