INSTITUTE OF CLEAN AIR COMPANIES

December 09, 2015

The Honorable Gina McCarthy, Administrator
Environmental Protection Agency
1300 Pennsyvania Avenue, NW
Washington DC 20460

EPA Docket Center (EPA/DC)
Attn: Docket ID No. EPA-HQ-OAR-2014-0292, in reference to 80 FR 54146 I.
General Information Section F, posted September 8, 2015
WJC West Building
U.S. Environmental Protection Agency
Mailcode 28221T
1200 Pennsylvania Avenue NW
Washington, DC 20460

Reference: Solicited Comments to Docket ID No. EPA-HQ-OAR-2014-0292, in reference to 80 FR 54146 Section F Changes to the Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (Subpart JJJJ) Part 60 and the Technical Memorandum Proposal to remove EPA Methods 18, 320, and ASTM D6348-03 as acceptable methods for measuring total VOC under 40 CFR 60, Subpart JJJJ

Dear Administrator McCarthy,

The Institute of Clean Air Companies (ICAC) is pleased to provide comments to the Docket ID No. EPA-HQ-OAR-2014-0292 opposing the Environmental Protection Agency's proposal of Revisions to Test Methods, Performance Specifications, and Testing Regulations for Air Emission Sources (80 FR 54146) to remove EPA Methods 18, 320 and ASTM D6348-03 as acceptable methods for directly measuring total volatile organic compounds (VOC) under 40 CFR 60, subpart JJJJ.

The ICAC membership includes representatives from heavy industry, testing specialists, air pollution control, instrument vendors, and affected Industry stakeholders. In the ever-changing environmental climate, ICAC understands the need to update existing regulations, remove errors, and improve the efficacy of published methods and performance specifications. Our member companies have been pioneers in developing air pollution control and compliance measurement technologies, and are hereby submitting formal written comments to address this important topic.

The ICAC prides itself on being a conduit for collaboration between industry and government. Because many member companies and industries are affected by the proposed rule, we have participated in many stakeholder meetings which have been used to help produce and revise many EPA Test Methods or Performance Specification standards. The ICAC appreciates the ability to provide comments on the proposed rule changes. We would like to offer the following solicited comments in response to EPA's letter dated September 28, 2015 and entitled “Proposal to remove EPA Methods 18, 320, and ASTM D6348-03 as acceptable methods for measuring total VOC under 40 CFR 60, Subpart JJJJ” from Steffan Johnson – OAQPS AQAD Measurement Technology Group Leader to Docket # EPA-HQ-OAR-2014-0292-0001.

Again, thank you for your consideration of these comments on this important rulemaking. Please feel free to contact Haley Armstrong, Marketing Coordinator, ICAC, at harmstrong@icac.com should you have any questions.

Sincerely,

Betsy M. Natz

Betsy Natz
ICAC Executive Director

Comment 1: - Response to the information contained in the letter marked Attachment A and the ramifications of proposed rule changes.

EPA has not specifically stated why it is revising a proposed rule after seven years of being acceptable and published in the CFR, with gas chromatography (GC) and Fourier Transform Infrared spectroscopy (FTIR) being acceptable methodologies. Proposed rule changes must contain certain information as required by the Clean Air Act, Section 307 d (3), which states the reasons for proposing rule (and thereby rule changes) must include: "(A) the factual data on which the proposed rule is based; (B) the methodology used in obtaining the data and in analyzing the data; and (C) the major legal interpretations and policy considerations underlying the proposed rule." A letter written by Mr. Steffan Johnson of OAQPS outlines the stated reasons for removal of FTIR and GC, but no data nor methodology was stated or offered in obtaining the data, nor have the major legal interpretations and policy considerations underlying the proposed rule change been submitted as required by law.

Comment 2: - EPA did not consider the ramifications of this proposed rule change that will impact those companies that are engaged in emission certification measurement using FTIRs. It is clear from statements made by various state and local regulators that some have since declared the use of FTIR to no longer provide quality results not only for VOC measurements on Quad J engines but also for other components including NO, NO2, CO, CO2 and SO2 due to this proposed rule change statement.

EPA has given the impression that FTIR is not a reputable nor quality instrument and several states including New Jersey, Ohio, and Pennsylvania have stated that they will no longer accept FTIR measurements for Quad J VOC testing even before any final promulgated rule change has been released or implemented.

The New Jersey Department of Environmental Protection (NJDEP) Bureau of Technical Services rejected a test plan in November 2015 that was to use FTIR EPA Method 320 to test heaters fired with pipeline quality natural gas. They rejected it stating *"An FID must be used to sample for total hydrocarbons (THC) in accordance with USEPA Method 25A. A separate sample must be taken either on-line (direct) or by bag in conjunction with the Method 25A tests and analyzed by GC for methane and ethane in accordance with USEPA Method 18. The GC must be calibrated with the required standards of methane and ethane which bracket the stack concentrations. The methane/ethane is subtracted from the THC results to produce TNMHC or VOC. Please submit a complete description of your procedures describing how this will be accomplished."*[1]

[1] Nov 11, 2015 e-mail summary of Letter from NJDEP to Nathan Chenaux, REM, Environmental Specialist, Williams Natural Gas Pipeline, 2800 Post Oak L9, Houston, TX 77056 rejecting Test Plan for Quad J Testing by FTIR

This statement by NJDEP is counter to the proposed amendment and is prejudicial against a methodology that has been proven to be equivalent to a THC-FID and CH4-FID measurement as well as the GC measurement[2] requiring to testing company to purchase even more equipment unnecessarily.

NJDEP further stated that FTIR will no longer be accepted for the EPA-listed technology neutral methodologies for oxides of nitrogen (NOx), carbon monoxide (CO), and carbon dioxide (CO_2) stating, "*The proposal to perform the nitrogen oxide, carbon monoxide and carbon dioxide sampling by FTIR is not acceptable. EPA Methods 3A, 7E, and 10 must be utilized. Please submit your complete procedures describing how this will be accomplished".* All of the aforementioned EPA methods are technology neutral and by law, the FTIR analyzer can be used in these methods provided the tester validates the FTIR according to the procedures listed in each of the methods.

Many test companies that perform this type of testing have committed significant capital resources since promulgation of the rule in 2008 to provide FTIR and GC testing services. Should this proposed rule proceed through final promulgation, these companies will be forced to commit another round of significant capital for FID instrumentation and their FTIR and/or GC instrumentation may become obsolete for the primary testing services that they perform. Compliance testing is a very competitive and a low profit-margin industry; therefore, many companies performing Quad J engine testing as their primary source of income, for which there are many, may need to close their businesses. Additionally, several FTIR and GC vendors will lose significant instrumental sales as a result of this rule change.

EPA Comment 3: On Page 2 paragraph 5, EPA states, "Appropriate use of these [FTIR and GC] QA/QC procedures requires a full understanding of the individual compounds being measured along with the gas matrix containing the compounds, such that the QA/QC challenges presented to the sampling and analytical systems are appropriate to qualify the most difficult to measure compounds. With an extensive list of compounds to be measured, such QA/QC procedures to validate these data are both expensive and time consuming.

ICAC Response: The ICAC and its membership understand the difficult job that environmental compliance specialists have, at both the state and federal levels of government, to keep abreast of all technologies and technology advancements. However, EPA Methods 18 and EPA Methods 320/ASTM D6348 have been around for many years and the comfort level with these technologies has increased significantly. In lieu of removing these technologies from the list of approved methods for Quad J testing, we would propose to create a training program for stack testers and any regulatory agency that reviews or observes FTIR or GC testing for compliance measurements. This could be incorporated into the QSTI program that is currently used for other methods covered under 40 CFR Part 60, 63, and 75. Doing so would offer benefits to state and federal regulators, which ensures that each stack tester and

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[2]"Toward the Inclusion of FT-IR in the Certification of Engine Emissions for Both Standard and Alcohol-Based Fuel Blends" R. Frazee presented at 23 CRC Real World Workshop 2013.

[3]"Time-Resolved FTIR Measurements of Non-Methane Organic Gases (NMOG) in Vehicle Exhaust Gas", C. Gierczak poster presented at 23 CRC Real World Workshop 2013.

agency demonstrates knowledge of the method and can apply sound engineering and chemical principles to the measurement. These would undoubtedly give added confidence in the final result. A similar document has been created and published by the Society of Automotive Engineers (SAE) J2992[2,3] that spells out the standard operating procedure for the performance evaluation of an FTIR as applied to the Original Engine Manufacturer's required certification testing which must follow EPA Part 1065 performance specification testing. This document can easily be used as a starting point for a standard operating procedure for stack emissions testing. Each specific instrument manufacturer must supply to the end user and to the state regulator, if requested, a check sheet that provides proof that the instrument is performing correctly and where this proof is found with the specific software that is used. A generic checklist can be made from the ASTM D6348 FTIR performance verification method that must be followed by every stack tester. See Appendix B for a sample of such a check list that specifically lays out what and where to find each element of an FTIR performance validation for an FTIR. This document was provided to the state regulators that attended the MKS webinar training series this summer.

It is not prudent nor fair to disallow a proven technology that EPA accepts for many other methodologies, as well as performance specifications, just because a tester or observer/reviewer is not trained in how to properly perform the testing and QA/QC. That is not EPA's role when EPA has been moving toward more technology-neutral methodologies in the recent past. It must be noted that some of our member companies have committed significant resources to perform training of both state and federal regulators and stack testers for free and will continue to provide those services.

Additionally, many testers favor FTIR instruments due to the multi-component aspect which reduces the compliance testing time and complexity involved in the QA/QC process if there are many different analyzers involved. The QA/QC procedures are "self-validating" as spelled out in EPAs own FTIR EPA Reference Method 320.

EPA Comment 4 – In Page 3 Paragraph 3, EPA states, "It is our understanding that following promulgation of the revisions to Subpart JJJJ in 2008, some compliance test protocols have been submitted where emissions test firms base compliance testing on an approach to measure total VOC by quantifying a specific list of VOC compounds they believed to best match the effluent of Subpart JJJJ engines. This may be a credible way to perform speciated VOC sampling for those targeted compounds, however we have not seen any evidence to support that such a targeted list represents the total VOC from these sources, much less during different operations or when burning different fuels. As such, this VOC list has been determined by the tester or an instrument vendor, and not the regulatory authority."

ICAC Response: The emissions from natural gas engines are well defined and fully developed lists of all compounds present have been presented to EPA which cover >95% of the total hydrocarbons present in the engine emissions. Natural gas engines comprise the majority of engines in use today (99%) that are under the Quad J ruling. VOC emission compound lists are available to EPA, and have been offered to EPA in the past. VOC components that are almost always found in CNG-fuel based emissions include ethylene, acetylene, propane, propylene, butane, formaldehyde, acetaldehyde, formic acid, and methanol, along with additional VOCs: 1,3-butadiene, benzene, octane, and toluene which are seldom found in CNG-based emissions. If these additional VOCs are present, they are in very low amounts relative to the total VOC content and a portion of their spectral features will be picked up by propane and butane which are always present in the method.

It should be noted that there are many published papers and presentations that have direct THC-FID and THC-CH4 or NDIR-CH4 comparisons to FTIR derived values which run on the more complicated Diesel-based engine emissions (see Reference 1 above). The diesel-fuel based emissions are much more complex when compared to the CNG-based fuel emissions as they contain higher levels of aromatic and aliphatic compounds, but the test results show that the THC and NMHC reported concentrations fall easily within 5-10% of the standard FID-based analysis proving that the FTIR based methods are equivalent to the FID-based methods.

For other fuels including the Quad J which is a methane based fuel, a similar approach can be taken like that which produced the SAE J2992 document. At SAE, a committee produced lists of the required elements that are tested based upon the fuel type, and included the interferents for each component tested as a function of the fuel which was CNG, diesel or gasoline based. This defined list of gases would be able to produce an equivalent FID-THC, NMHC and NMNEHC value within 10%. The list can be validated by several instrument manufacturers which can then provide the required EPA equivalency test which then qualifies the FTIR for VOC emission. Below is a table of speciated components from natural gas fired Quad J engines, which if used as a basis for all FTIR and GC testing, will produce accurate VOC results. The data is based on hundreds of validated EPA Reference Method 320 or ASTM D6348 compliance source tests.

Speciated FTIR Component	Comment	RF EPA Part 1065.845[2]	RF SAE[3]	FID-equivalent RF for FTIR
Methane	Needed as interferent for analysis			1.05-1.15
Ethane	Needed as interferent for analysis for VOC Standard NMHC Component		1	1
Ethylene	Standard VOC Component		0.95	0.95
Acetylene	Standard VOC Component		1.2	1.2
Propane	Standard VOC Component		1	1
Propylene	Standard VOC Component		0.95	0.95
Butane	Standard VOC Component			1
	Oxygenated HC			
Formaldehyde	Standard VOC Component	0		0
Acetaldehyde	Standard VOC Component	0.5		0.5
Formic Acid	Standard VOC Component	NA		0
Methanol	Standard VOC Component	0.63		0.63
	Added if Needed During QA/QC			
1,3-Butadiene	Not Standard VOC			1
Benzene	Not Standard VOC		0.9	0.9
Octane	Surrogate for heavy HCs if present			1
Toluene	Surrogate for Aromatic HCs if present		0.9	0.9

EPA Comment 5: In Page 3 paragraph 5, EPA states, "we would need to evaluate the suite of VOC emissions from such lists to determine applicable target analytes for spiking and recovery studies, and from there would be also be the need to develop a list of standard response factors with which to equate the speciated VOC to a propane basis for a final compliance determination.

ICAC Response: Measurements using FTIR and GC are currently the only methods that can provide mass emission rates of VOC. EPA Method 25A is a surrogate method which uses the propane response to simulate all other VOC responses on the FID analyzer. This may prove to be extremely important to those states where VOC mass emission rates must be known in order to meet the stringent ozone NAAQS. It has been recognized by industry as well as EPA that EPA Method 25A and the difference method (the subtraction of the methane and ethane content from the THC), when used for Quad J testing, can report negative VOC values, which are then reported as a value of zero. States in non-attainment areas will have no recourse and can initiate no enforcement actions against those sources where negative VOC values are obtained with a Method 25A measurement. This summation of thousands of negative results where VOC emissions are reported to be zero, grossly underestimate VOC emissions as a whole.

The list of VOCs from Quad J engines is limited and well characterized. The results from FTIR and GC fall within EPA M25A error bars at 95% confidence intervals in almost all cases. Response factors for individual compounds on the Quad J list are published by both EPA and some instrument vendors. EPA can use established QA/QC spiking or dry calibration gas procedures to validate FTIR and/or GC and choose one or more compounds from different chemical groups to ensure proper QA/QC as acceptable by other EPA methodologies for FTIR and GC. EPA should not bias technologies because of untrained testers or regulatory personnel. EPA should enforce better review processes and training and reject reports if the procedures and QA/QC are not properly followed or the individual FTIR or GC instruments cannot meet the required performance as is the case in every other EPA Reference method of performance specification.

Appendix A

A letter from EPA Stating Reasons and Rationale for Disallowing FTIR and GC VOC Emissions Measurements for Quad J Engine Testing

TECHNICAL MEMORANDUM

DATE: September 28, 2015

SUBJECT: Proposal to remove EPA Methods 18, 320, and ASTM D6348-03 as acceptable methods for measuring total VOC under 40 CFR 60, Subpart JJJJ
FROM: Steffan Johnson – OAQPS AQAD Measurement Technology Group Leader
TO: Docket # EPA-HQ-OAR-2014-0292-0001

Background

On September 8, 2015 the Measurement Technology Group of the EPA published proposed revisions to Test Methods, Performance Specifications, and Testing Regulations for Air Emission Sources (80 FR 54146). In this rulemaking, we propose to remove EPA Methods 18, 320, and ASTM D6348-03 an acceptable methods for measuring total Volatile Organic Compounds (VOC) under 40 CFR 60, Subpart JJJJ. It has come to our attention that we have not supplied sufficient information supporting our rationale for making this change in the rule package and docket. The intent of this memo is to provide the rationale for this proposed action.

For clarification we would also point out that the September 8, 2015 proposal did not remove an option to use Method 320, ASTM 6348, and EPA Method 18 for methane and ethane determination, however this is not clearly stated in the preamble of the Revisions to Test Methods, Performance Specifications, and Testing Regulations for Air Emission Sources; Proposed Rule (80 FR 54146). The EPA recognizes that the measurement technologies used in these methods are appropriate for the purpose of measuring specific organic compounds, and will continue to specify their use for compliance measurement for this purpose. While these measurement techniques excel in speciated VOC measurements, Methods 18, 320 and ASTM D6348-03 are not robust total VOC measurement methods as currently required by Subpart JJJJ, where the measurement result is the basis for determination of compliance with a total VOC emissions limit.

EPA Methods 18, 320, and ASTM D6348-03 were included in, ”Standards of Performance for Stationary Spark Ignition Internal Combustion Engines” 40 CFR 60, Subpart JJJJ in 2008 (73 FR 3568) as alternative methods to Method 25A, based on recommendations by two commenters (EPA-HQ-OAR-2005-0030-0150 - American Petroleum Institute and EPA-HQ-OAR-2005-0030-0157 - Interstate Natural Gas Association of America) during the comment period of the proposed rule dated June 12, 2006 (71 FR 33804). Both commenters specifically requested use of EPA Method 320 for measurement of nitrogen oxides and carbon monoxide. Both commenters also requested the need for a method to determine non-methane hydrocarbons and proposed use of Method 18 and pointed out that a “validated” FTIR method could also be acceptable.

Discussion

The proposed removal of EPA Method 320 and ASTM D6348-03 (both of which rely on Fourier Transform infrared (FTIR) technology) is due to the lack of a consistent, demonstrable, and validated approach to measuring total VOC emissions, primarily due to the lack of a discrete list of compounds identified as those constituting the total VOC for the emissions sources affected by this rule. Since promulgation of the revisions to Subpart JJJJ in 2008, EPA's Office of Air Quality Planning and Standards, Measurement Technology and Measurement Policy Groups have been unable to provide adequate technical assistance to regulatory agencies who must make compliance determinations for Subpart JJJJ sources with data collected using these methods. The complexity of attempting to accurately quantify a total VOC value using FTIR technology should not be underestimated.

A primary point of concern is that neither EPA Method 320 nor ASTM D6348-03:

(1) Include procedures and quality assurance /quality control processes for conducting a summed measurement of large numbers of VOC analytes or,

(2) Describe how this sum equates to total VOC in the sampled gas streams.

The list of potential VOC species which must be addressed by a total VOC method is extensive. EPA defines VOC in §60.2 as "…any organic compound which participates in atmospheric photochemical reactions; or which is measured by a reference method, an equivalent method, an alternative method, or which is determined by procedures specified under any subpart".

In addition, the applicability, accuracy, and precision of FTIR measurements are influenced by a number of interrelated factors, which may be divided into two classes: Sample-independent and sample dependent factors, and these factors must be considered for each analyte measured with this approach. Examples of sample independent factors are system configuration and performance (e.g., detector sensitivity and infrared source output), quality and applicability of reference absorption spectra, and type of mathematical analyses of the spectra. These factors define the fundamental limitations of FTIR measurements for a given system configuration. These limitations may be estimated from evaluations of the system before samples are available. For example, the detection limit for the absorbing compound under a given set of conditions may be estimated from the system noise level and the strength of a particular absorption band. Examples of sample-dependent factors are spectral interferents (e.g., water vapor and CO2, both present in quantity from engine emissions) or the overlap of spectral features of different compounds and contamination deposits on reflective surfaces or transmitting windows. To maximize the effectiveness of the mathematical techniques used in spectral analysis, identification of interferents (a standard initial step) and analysis of samples (including the effect of other analytical errors) are necessary. As stated above, such measurement interferences and effects must be understood for each analyte measured, thus exacerbating the difficulty of measurement where a large number of individual compounds are present (or may be present) in the emissions stream.

EPA Method 320 incorporates method specific data validation processes by which data collected is quality controlled and assured; likewise, ASTM D6348-03 includes a number of Annexes that perform a similar function. Appropriate use of these QA/QC procedures requires a full understanding of the individual compounds being measured along with the gas matrix containing the compounds, such that the QA/QC challenges presented to the sampling and analytical systems are appropriate to qualify the most difficult to measure compounds. With an extensive list of compounds to be measured, such QA/QC procedures to validate these data are both expensive and time consuming.

Another concern that complicates measurement of total VOC using these FTIR methods is the variability of the matrix of pollutant species that make up total VOC emissions from engine exhaust. The EPA does not have sufficient information in hand to know when Methods 320 or ASTM D6348-03 have actually measured and correctly quantified each constituent VOC in the exhaust stream, unless each compound has been validated through the QA/QC procedures outlined in Section 13.0 of Method 320 or Annex 5 of ASTM D6348-03. We also recognize that the potential VOC compounds emitted from an internal combustion engine vary depending on several factors including but not limited to fuel type (engines combusting No. 2 diesel will have a different VOC emission profile than engines combusting landfill gas, bio gas, ag-grade diesel, or one combusting field gas at an upstream oil and gas facility). Other factors influencing variable emissions include (but are not limited to) engine maintenance, age, make-up air temperature, and humidity. Additionally, we are aware that many FTIR measurement approaches are not sensitive enough to individually quantify all compounds present, and may not quantify benzene, toluene, ethylbenzene, and xylenes (BTEX) due to water interference, a common concern with FTIR measurement. Furthermore, we have apprehensions with the ability of FTIR device software to correctly identify and quantify the potential target compounds in the engine exhaust such as speciation of C3+ alkane mixtures to properly account for number of carbons for proper conversion to a propane basis.
It is our understanding that following promulgation of the revisions to Subpart JJJJ in 2008, some compliance test protocols have been submitted where emissions test firms base compliance testing on an approach to measure total VOC by quantifying a specific list of VOC compounds they believed to best match the effluent of Subpart JJJJ engines. This may be a credible way to perform speciated VOC sampling for those targeted compounds, however we have not seen any evidence to support that such a targeted list represents the total VOC from these sources, much less during different operations or when burning different fuels. As such, this VOC list has been determined by the tester or an instrument vendor, and not the regulatory authority.

These target compound lists are very important, as they may not meet the definition of “total volatile organic compounds” as stated in Subpart JJJJ, and the associated measurement would then not demonstrate compliance. For these reasons, we are proposing to remove Method 320 and ASTM D6348-03 as total VOC compliance methods from Subpart JJJJ until there is an establishment of a comprehensive, standardized measurement protocol that can be used to accurately identify and quantify a value representative of total VOC from the wide variety of these engine and fuel emissions profiles.

We believe that establishment of a comprehensive standardized protocol for FTIR measurement of total VOC under Subpart JJJJ is dependent on developing an understanding of some very complex concerns. First, a sufficient catalog of speciated VOC emissions data from a wide variety of engine exhausts must be developed to determine if a discrete list of VOC compounds could be derived for each process configuration (engine and controls) and fuel type. This information could then be used to design a total VOC measurement approach which accurately quantifies each compound in a specified list of VOC list representative of the total VOCs from a given process and control configuration. Additionally, we would need to evaluate the suite of VOC emissions from such lists to determine applicable target analytes for spiking and recovery studies, and from there would be also be the need to develop a list of standard response factors with which to equate the speciated VOC to a propane basis for a final compliance determination. While this represents a substantial amount of work, it is not insurmountable, although we are lacking the raw data with which to begin such analysis, making a timeline to resolution lengthier than we would like.

Unlike the FTIR methods discussed above, EPA Method 18 does include guidance for total VOC measurement which involves a process known as “screening” whereby the source is pre-surveyed prior to conducting the emissions test for all possible VOC compounds according to Section 16.1 of Method 18. Compounds that are detected in a measureable quantity during this intensive screening process are then targeted in the subsequent compliance test. We find this procedure impractical for use in subpart JJJJ as the wide scope of sampling protocols involved, and subsequent calibration and QA/QC requirements (use of calibration standards for and spiking of each VOC to be quantified) required to conduct Method 18 would be exceedingly costly, rendering the requirement to conduct such a pre-survey at each source as cost prohibitive. Indeed, to date, no data has been presented to EPA showing speciated VOC sampling according to Method 18 as accurate or viable, though it may be achievable through a good deal of effort and expense. Like with the FTIR, we believe a comprehensive measurement protocol could be developed for GC measurement based upon a sufficient catalog of Method 18 screening data from a wide variety of engine exhausts (engine, controls and fuel type) to develop a target list of VOC compounds.

With the proposed removal of EPA Methods 18 and 320, as well as ASTM D6348-03 for use in measuring total VOC under Subpart JJJJ, owners and operators must use EPA Method 25A as the methodology to perform VOC measurements. Method 25A measures the aggregate of total VOC that respond to the FIA detector as measurement of total VOC as defined by §60.2. Using EPA Method 25A to determine compliance with the emission limit incorporates the reduced response of the aldehydes and other oxygenated organics considered when the emission limits were set and therefore remains consistent with the procedures used to establish the emission limit.

Closing

The EPA recognizes the utility of both GC and FTIR technologies and has routinely required their use in air emissions standards; however, we are concerned that current implementation of these test methods under Subpart JJJJ does not provide for proper and consistent quality assurance for compliance demonstration with total VOC measurement as required by the subpart. Because of these concerns and implementation issues, we are proposing to remove the use of Method 18, Method 320, and ASTM D6348-03 for total VOC compliance determination under 40 CFR 60 Subpart JJJJ.

We are interested in identifying a standardized approach that would provide consistent and repeatable measurement of total VOC using these techniques, and whereby we could again allow the use of these test methods to demonstrate compliance for total VOC emissions limit(s) under Subpart JJJJ. How quickly the EPA can proceed on this path will depend on our access to data necessary in order to develop the protocol laid out above.

Appendix B

Example of a Check List taken from the required ASTM D6348-03 FTIR Performance Verification procedures and aligning them to a specific instrument manufactures processes for producing the results.

Information to be supplied by an FTIR Stack Tester or Third Party Validator
[UPDATED – 10/27/2015]

ICAC recommends the following data be requested by EPA regulators and auditors when reviewing compliance test data performed with an FTIR in the field. Collecting the information below will ensure the data can be properly validated and will give the regulator confidence that the reported data is of high quality.

This document has been revised from its original version provides a wider operating range for some of the parameters given. These changes have minimal, if any, effect on analytical accuracy.

Manual FTIR Health Checks (To be completed prior to any other steps)			
Item	**Information to be Supplied**	**Format from MKS User**	**Comments**
1a	Detector linearity check	Screen shot as pdf	Instrument Monitor Screen showing response below detector cutoff in Single Beam. Average values must be +/- 0.008 on Y-axis from ~250 to 400 cm^{-1} **Examples of Provided Information that should be submitted** to Test Reviewers for Quad J Engine Testing **Figure 1. Detector Linearity from Instrument Monitor**
1b	X-axis accuracy check	Reported value	Calculated Laser frequency value from the MG2000 Peak Analysis routine. Acceptable range: 15798.15 to 15798.35 cm^{-1} **Figure 2. Peak Analysis Screen Laser Frequency**
1c	Line shape check	Reported value	Calculated Full Width at Half Height (FWHH) value from the MG2000 Peak Analysis routine when Peak Height on y axis is 0.15 to 0.25 AUs Acceptable range: 0.46 to 0.50 cm^{-1} **(See Note 1)** **Figure 2. Peak Analysis Screen Laser Frequency**
1d	Signal loss	Reported value	Greater than 40% Interferogram signal loss not acceptable *UNLESS* SNR results are within specification. **Figure 3. Signal Loss**
1e	Instrument Monitor showing full single beam of nitrogen gas /direct zero prior to taking background	Screen shot as pdf	Example of what a good MKS single beam spectrum looks like in Instrument monitor. Water peaks between 1,400 cm^{-1} and 1,700 cm^{-1} should not dip below half of the maximum signal. **Figure 4. Single Beam**
1f	SNR test results	Screen shot as pdf	SNR Test Results from MG2000 FTIR-Diagnostics 1,000 – 1,100 cm^{-1}: > 800 to 480 2,100 – 2,200 cm^{-1}: > 1200 to 720 2,900 – 3,000 cm^{-1}: >800 to 480 **Figure 5. SNR Test** Results

1g	FTIR Gas Cell Temperature and Pressure	Screen shot as pdf	Run screen showing measured temperature and pressure. Acceptable: Temperature +/-2 °C and Pressure +/-0.1 atmosphere **Figure 6. Temperature and Pressure**
1h	Key FTIR performance parameter checks	Screen shot as pdf	HCU advanced screen shots (including SNR) showing all parameters in “green” indicating pass **Error! Reference source not found.**

Note 1: If testing at higher altitude and gas cell pressures are near 0.9 atm, FWHH values down to 0.44 cm^{-1} are acceptable.

Examples of Provided Information that should be submitted to Test Reviewers for Quad J Engine Testing

Figure 1. Detector Linearity from Instrument Monitor

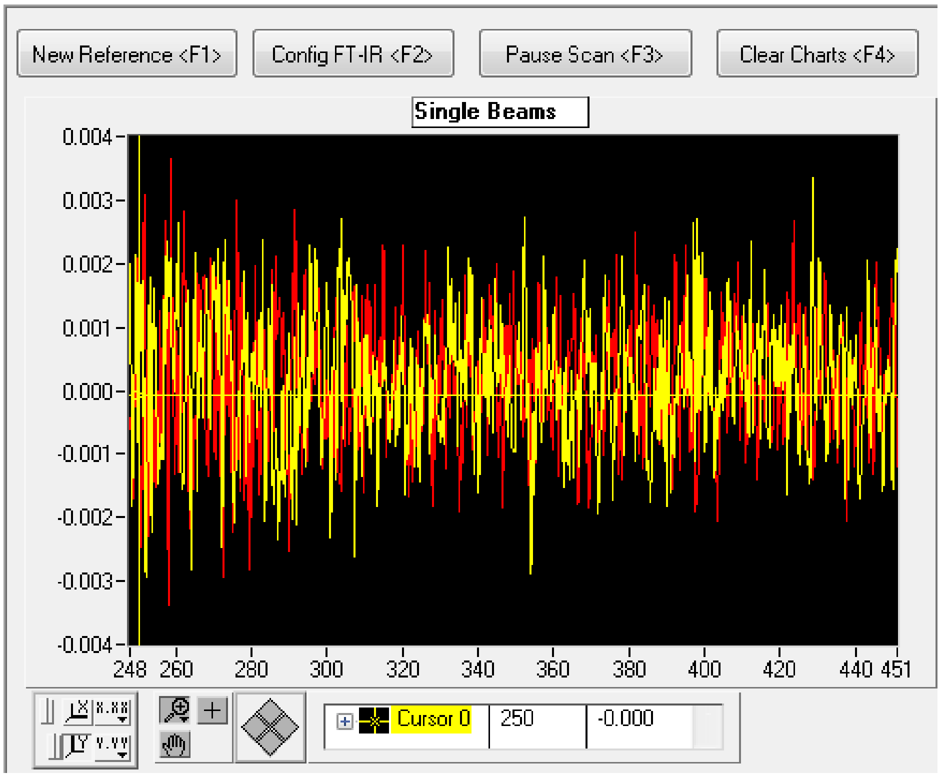


Figure 2. Peak Analysis Screen Laser Frequency/FWHH

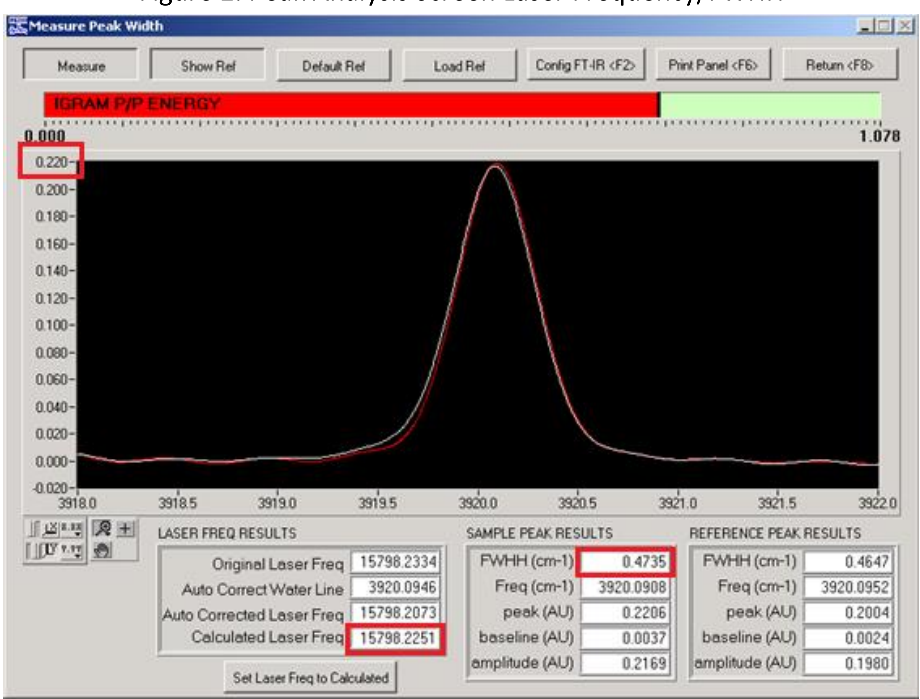


Figure 3. Signal Loss

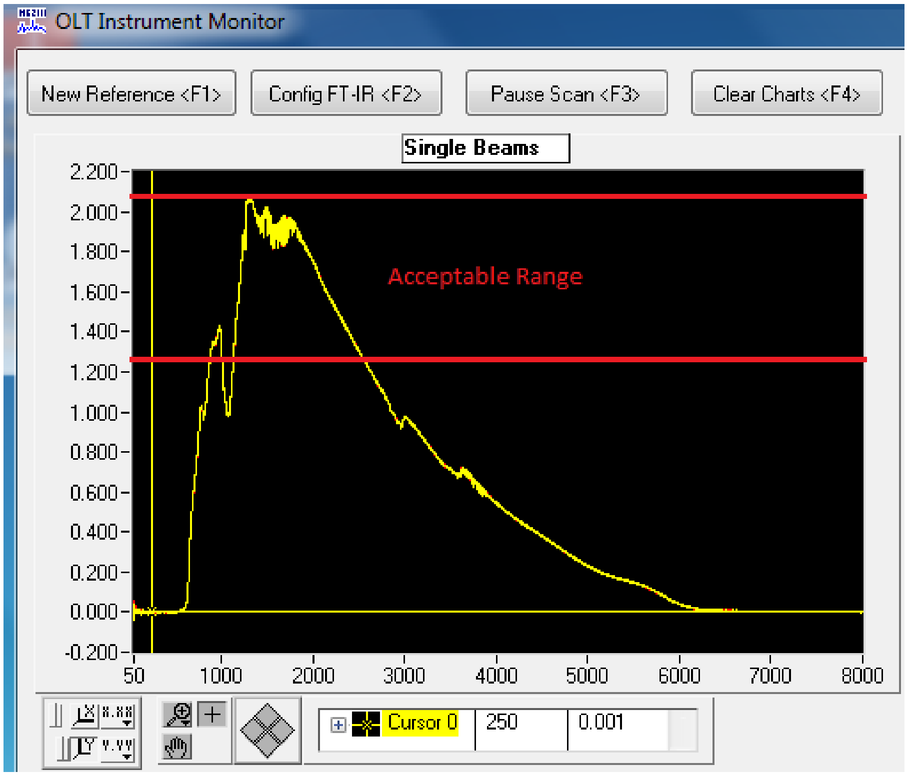


Figure 4. Single Beam

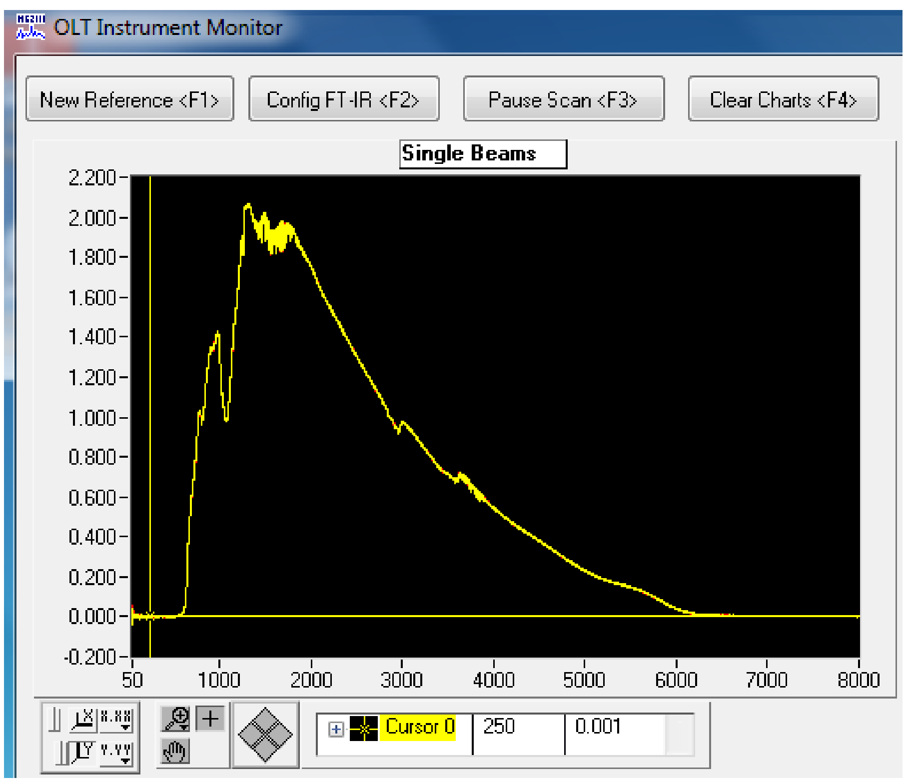


Figure 5. SNR Test Results

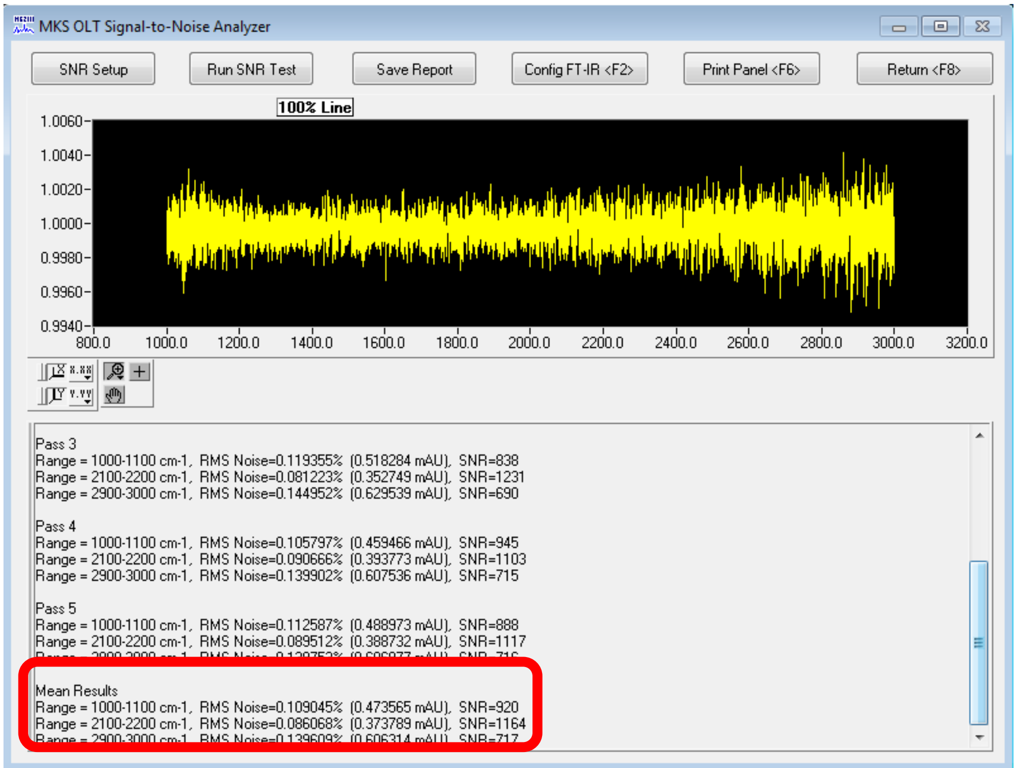
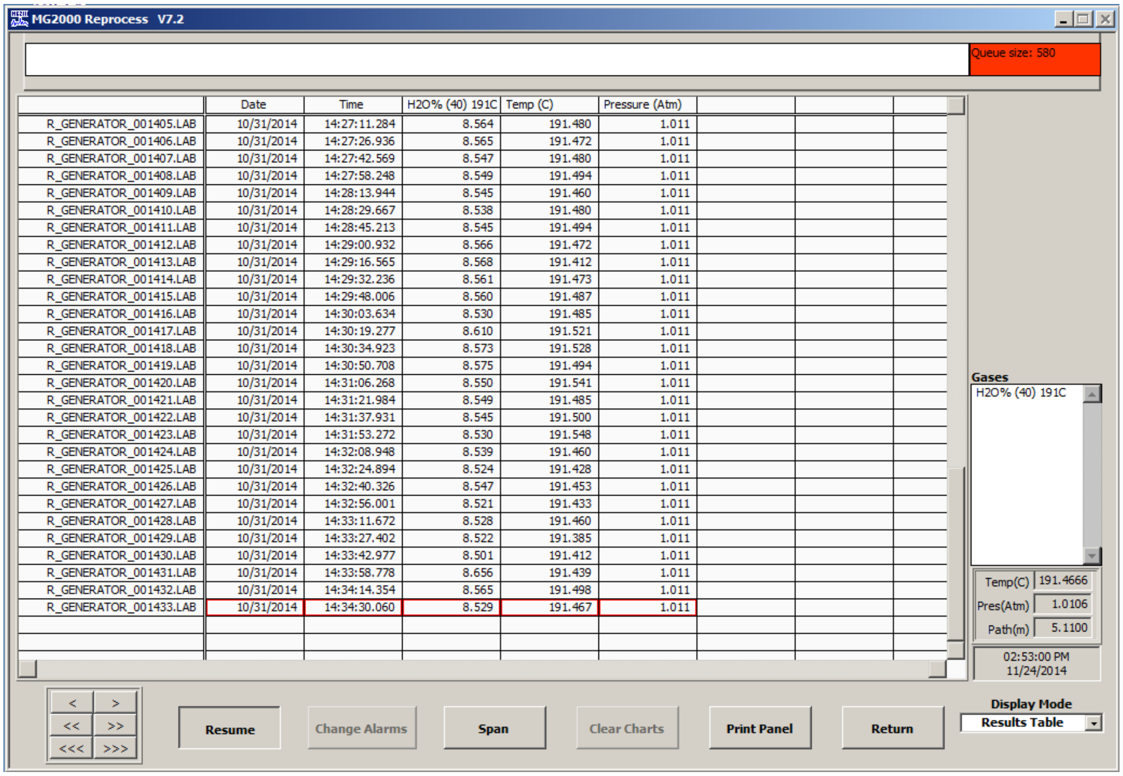


Figure 6. Temperature and Pressure



	Date	Time	H2O% (40) 191C	Temp (C)	Pressure (Atm)
R_GENERATOR_001405.LAB	10/31/2014	14:27:11.284	8.564	191.480	1.011
R_GENERATOR_001406.LAB	10/31/2014	14:27:26.936	8.565	191.472	1.011
R_GENERATOR_001407.LAB	10/31/2014	14:27:42.569	8.547	191.480	1.011
R_GENERATOR_001408.LAB	10/31/2014	14:27:58.248	8.549	191.494	1.011
R_GENERATOR_001409.LAB	10/31/2014	14:28:13.944	8.545	191.460	1.011
R_GENERATOR_001410.LAB	10/31/2014	14:28:29.667	8.538	191.480	1.011
R_GENERATOR_001411.LAB	10/31/2014	14:28:45.213	8.545	191.494	1.011
R_GENERATOR_001412.LAB	10/31/2014	14:29:00.932	8.566	191.472	1.011
R_GENERATOR_001413.LAB	10/31/2014	14:29:16.565	8.568	191.412	1.011
R_GENERATOR_001414.LAB	10/31/2014	14:29:32.236	8.561	191.473	1.011
R_GENERATOR_001415.LAB	10/31/2014	14:29:48.006	8.560	191.487	1.011
R_GENERATOR_001416.LAB	10/31/2014	14:30:03.634	8.530	191.485	1.011
R_GENERATOR_001417.LAB	10/31/2014	14:30:19.277	8.610	191.521	1.011
R_GENERATOR_001418.LAB	10/31/2014	14:30:34.923	8.573	191.528	1.011
R_GENERATOR_001419.LAB	10/31/2014	14:30:50.708	8.575	191.494	1.011
R_GENERATOR_001420.LAB	10/31/2014	14:31:06.268	8.550	191.541	1.011
R_GENERATOR_001421.LAB	10/31/2014	14:31:21.984	8.549	191.485	1.011
R_GENERATOR_001422.LAB	10/31/2014	14:31:37.931	8.545	191.500	1.011
R_GENERATOR_001423.LAB	10/31/2014	14:31:53.272	8.530	191.548	1.011
R_GENERATOR_001424.LAB	10/31/2014	14:32:08.948	8.539	191.460	1.011
R_GENERATOR_001425.LAB	10/31/2014	14:32:24.894	8.524	191.428	1.011
R_GENERATOR_001426.LAB	10/31/2014	14:32:40.326	8.547	191.453	1.011
R_GENERATOR_001427.LAB	10/31/2014	14:32:56.001	8.521	191.433	1.011
R_GENERATOR_001428.LAB	10/31/2014	14:33:11.672	8.528	191.460	1.011
R_GENERATOR_001429.LAB	10/31/2014	14:33:27.402	8.522	191.385	1.011
R_GENERATOR_001430.LAB	10/31/2014	14:33:42.977	8.501	191.412	1.011
R_GENERATOR_001431.LAB	10/31/2014	14:33:58.778	8.656	191.439	1.011
R_GENERATOR_001432.LAB	10/31/2014	14:34:14.354	8.565	191.498	1.011
R_GENERATOR_001433.LAB	10/31/2014	14:34:30.060	8.529	191.467	1.011