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EPA Docket Center (Air Docket)
U.S. Environmental Protection Agency
Mail Code: 2822T
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Attention: Docket ID Number: EPA–HQ–OAR–2009–0234

Re: National Emission Standards for Hazardous Air Pollutants From Coal- and Oil-Fired Electric Utility Steam Generating Units; 76 FR 24976-25147 (May 3, 2011)

The Institute of Clean Air Companies (ICAC) appreciates the opportunity to comment on the EPA's proposed national emission standards for hazardous air pollutants from coal- and oil-fired electric utility steam generating units. ICAC is the national non-profit trade association of companies that supply air pollution control and monitoring systems, equipment, reagents, and services for stationary sources. ICAC has promoted the air pollution control (APC) industry and encouraged improvement of engineering and technical standards since 1960. Our members include over 100 companies who are leading manufacturers of products, equipment and services to control and monitor emissions of particulate matter (PM), volatile organic compounds (VOC), sulfur dioxide (SO_2), nitrogen oxides (NOx), hazardous air pollutants (HAP), and greenhouse gases (GHG). The ICAC members are well positioned to supply the control and monitoring equipment needed to comply with the proposed existing unit HAP emission limits identified in the EPA's proposed Utility MACT rule.

Executive Summary

ICAC provides the following key points in these comments:

1) ICAC is confident that the proposed emission limits for total particulate matter (PM), hydrogen chloride (HCl), and mercury (Hg) for ***existing*** facilities can be simultaneously met, and reliably measured and monitored, based on 30-day rolling averages: however, additional controls may be required (page 2).
2) ICAC questions the basis of the proposed ***new*** unit emission limits, in particular, the validity of the test data for the best-performing units in the ICR. We urge EPA to re-examine the data with ASME methodology, and re-test where necessary (pages 2-3).
3) The new Method 202 for measuring total PM needs to be better understood (page 3).
4) EPA and NIST need further focus and collaboration on low-level (i.e. $< 0.5\ \mu g/m^3$) Hg measurements traceability and certification (page 5).

5) PM and Hg CEMS not available or proven to meet the proposed ***new*** unit emission limits (page 5-6).
6) Calibration of the PM CEMS operating limit based on Method 5 filterable values needs clarification (pages 5).
7) EPA needs to develop performance specifications for low-level HCl measurement to provide the industry more confidence in using HCl monitoring technology (page 10).
8) For dry sorbent injection (DSI), reagent reactivity must also be considered included as a performance parameter (pages 6-7).
9) The APC industry has multi-pollutant engineering, equipment and monitoring capabilities that the utility industry can rely on for its compliance requirements (pages 3-5).

Overarching Comments

ICAC is confident that the proposed existing unit emission limits for total particulate matter, hydrogen chloride (HCl) and mercury (Hg) can be simultaneously met, and reliably measured and monitored, based on 30-day rolling averages; however, additional controls may be required.

When the EPA sets an emission limit, all EGUs establish operating levels below the EPA or permit levels, to some extent, to compensate for operational variability, fuel changes, and startup and shut down times that occur during normal plant operations, and in order to remain in compliance over the averaging period. Therefore, emission limits need to be established within the capabilities and accuracy of monitoring systems. Also, when Owners/Operators purchase control equipment, they may add an operational margin in their specification and request for performance guarantees.

Monitoring systems have to be capable of accurately measuring emissions below the limits established by the EPA and in practice emission control technologies must be able to provide long term control at emission levels below the proposed limits. Based on information provided in this proposed Rule we cannot validate that technology exist to accurately measure the proposed emission limits for new units.

The new unit limitations would have a major impact on the future of coal generation, and therefore it is critical for these limitations to be correct. ICAC is particularly concerned about the mercury, HCl and total PM limitations on new units as these limits may be at levels that approach the "noise" of practical measurement methods. For this reason, ICAC urges the EPA to verify the following:

- That the reported performance for the best performing unit that is the basis of the limit is in fact correct. This should be done through thorough re-examination of the test reports and procedures. We urge the EPA to validate the ICR test data using the ASME program ReMap and ASME's 19.1 Test Uncertainty. We also recommend re-testing of these units under the same conditions to verify if these emissions measurements are, in fact, repeatable and sustainable over an operating period that includes periods of start-up and shutdown.

- That the measurements of flue gas using practical methods for performance testing are in fact repeatable and reliable at the concentrations associated with the proposed new unit limits. For example, while mercury measurement methods have been developed rapidly over the past decade, there is insufficient experience measuring mercury in flue gas at concentrations equivalent to the proposed new unit limits to understand the detection limitations and quantitative accuracy at such low mercury concentrations for either of the two continuous methods – sorbent traps or continuous analyzers. Without better information on the limitations of these measurement methods at such low mercury concentrations, it is difficult to have confidence in measurements taken at these low concentrations.

- Furthermore, ICAC believes that continuous monitoring is best done with methods that provide "real time" monitoring that can alert operators to changes in conditions that affect emission rates. Sorbent traps, while a valid continuous measurement method for mercury emissions, do not provide adequate response time to be useful for control and achievement of compliance at the new unit limits due to the long time necessary for sampling and the difficulty of making up for periods of above-limit emission in a 30-day averaging period including startup and shutdown periods.

- The APC industry needs to understand the new Method 202 and the issues related to SO_3, or more correctly Sulfuric Acid Mist (SAM, or H_2SO_4). A unit firing high sulfur bituminous coal can easily emit 10-15 ppm of SO_3, which is approximately equivalent to 0.030-0.045 lb/MMBtu of SAM. Even higher SO_3 levels have been reported on high sulfur units with SCRs. Wet FGD systems are not very effective at capturing SAM (15-20% removal). Thus, even before considering filterable PM and other condensables (e.g., VOCs, NH3, etc.), total PM emissions can be at or above 0.030 lb/MMBtu just due to SAM (please see Appendix, page 14).

<u>Maturation of the APC Industry</u>

The APC industry has matured greatly from 2000-2011 having installed 150-200 gigawatts (GW) of combined advanced controls for NOx and SO_2. Adding reagent usage and monitoring equipment, the North American APC industry is now a $4 billion per year industry. These advanced controls, selective catalytic reduction (SCR) for NOx and flue gas desulfurization (FGD) for SO_2 control, have collectively eliminated millions of tons of pollutants from the atmosphere at very reasonable costs, especially when compared to the health cost savings. But the industry has not remained static, and in the last decade the APC industry has achieved greater reduction efficiencies – from 70 to over 90% for NOx and from 90 to over 98% for SO_2. As of 2011, these highly efficient workhorses are the norm with about 60% of the coal fleet using FGD and about 50% using SCR. However, ICAC would like to emphasize that the competition in the APC industry in the last decade has matured and diversified the industry and has led to the development and deployment of many additional emission reduction technologies including low capital intensity approaches for a range of pollutants. Some examples of the broadened technologies available and their relevance to HAP's include:

- For the acid gases and SO_2, spray dryer absorbers (SDA), circulating dry scrubbers (CDS), wet fluidized bed FGD, and dry sorbent injection (DSI) into the flue gas with calcium or sodium-based reagents.

- For Hg, co-benefit capture by units with both SCR and wet FGD firing bituminous fuel, and for sub-bituminous fuel when using halogen addition.
- For Hg and dioxins / furans (D/F), activated carbon injection (ACI) utilizing various types of carbons and treatments required for the various fuels to meet the emission limits, and upstream coal modifications and furnace injection which may include halogen addition for mercury oxidation.
- For PM, upgrade of existing electrostatic precipitators (ESP) (replacement of older controls with modern, high-frequency voltage rectifiers, adding fields, and improvement in gas flow distribution), wet ESP polishing and various fabric filter alternatives, including new fabric filters and polishing fabric filters (TOXECON) and ESP-to-Fabric Filter conversions.

Adaptability of the APC Industry / Technical Innovations in the APC Industry

Another significant development that has occurred in the APC industry over the past decade is its adaptability in helping sources comply with more stringent emission limits, both for criteria and HAP, in a timely manner. For example, pollution controls aimed at controlling one pollutant can now control additional pollutants. Also, better reagent feed and injection can optimize reagent usage. These technological innovations provide sources with a wide range of cost-effective compliance strategies. Examples include:

- Circulating dry scrubber (CDS) technology has been in use in the U.S. since 1995 but recently market conditions have brought additional applications. CDS increases the contact and reaction time between flue gas contaminants and reagents resulting in high acid gas and SO_2 removal rates while optimizing reagent usage and minimizing wastewater treatment concerns.
- Dry sorbent injection (DSI) was initially utilized in utility applications to control SO_3 emissions that can cause "blue plumes." DSI with sodium or calcium-based reagents can also consistently remove a high percentage of acid gases (HCl, HF) along with FF for particulate removal, and, as a co-benefit, SO_2 removal. The use of DSI technology for SO_3 control has provided valuable information on the ancillary impacts, both negative and positive, of the injection of alkaline reagents. DSI will be a cost effective option for many sites. In addition to low capital requirements, systems can be installed in a matter of months with little downtime for the facility.
- Optimization of both sodium and calcium reagents. For sodium reagents, in-line milling of DSI reagents increases surface area a$_n$d optimizes reagent usage. For calcium reagents, physical properties such as surface area and porosity have been manipulated to maximize acid gas control effectiveness.
- Real-time feedback signals from continuous emission monitor systems (CEMS) to activated carbon feed and reagent injection pumps optimize activated carbon and reagent usage. For example, sources could use inlet and outlet SO_2 CEMS to optimize reagent usage for meeting the surrogate SO_2 limit for HCl compliance.
- Innovations in bag compositions for fabric filters enhance particulate matter removal over a wide range of operating parameters.
- Innovations in ESP performance using new high-frequency voltage rectifiers.

- New SCR catalyst technology can provide enhanced Hg oxidation performance to improve downstream Hg capture.
- Computational Fluid Dynamics (CFD) modeling has been commonly used for almost all air pollution control projects for HAPs and criteria pollutants to:
  - Ensure uniform reagent distribution
  - Maximize reagent residence times
  - Determine optimal reagent feed rates
  - Determine the optimum lance quantity, design, and location
  - Optimize duct layout
  - Ensure proper mixing within the flue gas stream for maximum capture efficiency.
- The development of Hg CEMS and other new CEMS technology offer not only reagent use optimization but also facilitate compliance assurance.
- Wet Electrostatic Precipitators (WESP) are installed as a final polishing device after wet FGD systems on over 5,000 MW of coal fired generation at six utilities in the United States. The WESP technology reduces visible opacity to less than 10% by capturing both sub-micron filterable and condensable particulate with over 90% removal efficiency.

<u>General Comments and Recommendations</u>

Our comments on the proposed Utility MACT highlight the following issues:

1. We believe that the recalculated mercury emission limit of 1.2 lb/TBtu for existing coal-fired units >8,300 Btu/lb is achievable.
2. In an effort to increase confidence in low level mercury measurement, the EPA should collaborate with NIST to initiate a NIST protocol for traceability of mercury generators for mercury concentrations <0.5 µg/m^3. NIST should be capable of providing support in the 0.0 – 1.0 ug/m^3 range with defensible set points at nominally 0.1, 0.25, 0.5, and 1.0 ug/m^3. Results from real-time monitoring allow for signal feedback to injection equipment to optimize reagent usage, increase fuel flexibility, and enable more cost-effective compliance strategies.
3. For new unit mercury limits, calibration standards would need to exist for levels of mercury which are 1-2 orders of magnitude lower than those above.
4. In the interest of having to achieve a total PM emission limit during normal plant operations that is accurately verifiable and thus not an impediment to construction of new coal-fired EGU's including the application of IGCC technology, ICAC suggests that a factor be added to the total PM emission limit for new EGU's to account for the current measurement uncertainty of the new Reference Method 202. The factor needs to cover uncertainty in test methods and variability in plant operations. ICR tests were conducted under "ideal" test conditions and may not reflect variations in daily plant operations.
5. The proposed rule states that "continuous compliance would be determined using a PM CEMS with an operating limit established based on the filterable PM values measured using Method 5." (76 FR 25029/2) This appears to mean that the PM CEMS would be correlated against the filterable PM fraction of total PM, though it doesn't explicitly state this. ICAC urges the agency to make this language more explicit in the final rule to avoid confusion.
6. ESP's are the primary particulate collection equipment for many utility boilers. Some of these ESP's have a sufficient Specific Collecting Area (SCA) to meet the proposed total

PM emission limits for existing units. It is in the utility sector's best interest to consider how to retain these existing plant assets to the greatest extent possible, while complying with the proposed MACT rules. Existing ESP's may be upgraded in performance by improved maintenance/repair, parts replacement, controls replacement, gas distribution studies, gas conditioning and/or rebuilding to increase available SCA, installation of high frequency switch mode power supplies, improved rapping, etc. The existing ESP may also be converted to a modern Pulse Jet Fabric Filter (PJFF) if the casing is of sufficient size.

7. Compliance monitoring and measurement for the proposed new unit emission limits are of concern, and vendor guarantees may be problematical without the ability to consistently measure remaining pollutants at the low emission levels proposed.
8. The proposed rule suggests that using a compliance approach for DSI of setting injection rate operational limits based on performance testing. Since this approach could result in operators setting injection limits based on performance testing with a higher reactivity sorbent and later substituting a lesser quality sorbent, compliance with the HAP limit could be jeopardized. To avoid this potential issue we recommend the use of CEMS technology to facilitate ongoing HCl emissions compliance. At a minimum, if injection rate limits are utilized, reagent reactivity should also be specified.
9. There is a factual error in Table 17 (76 FR 25065). Table 17 lists the best performing units in terms of percentage SO_2 control and the subsequent commentary indicates that with the exception of the HL Spurlock Units 3 and 4, all utilize wet limestone scrubbing technology. This is factually incorrect. The three units at the Harrison Station utilize wet magnesium on demand lime scrubbing technology, not wet limestone technology.

<u>Emissions Limitations Comments</u>

A. Mercury Emissions Limits and Compliance Monitoring

As part of their proposed Utility MACT regulations, the EPA has set forth emissions limits for mercury (Hg) from existing and new coal-fired power plants, as 1.2 lb/10^{12} Btu and 0.0002 lb/GWh (approximately 0.02 lb/10^{12} Btu), respectively. The flue gas Hg concentration limits resulting from these caps are approximately1.5 µg/m^3 (existing electric generating units [EGU]) and 0.023 µg/m^3 (new EGU). A number of challenges ensue from these proposed limits, including:

1. Plant Operations and Use of Hg CEMS

In response to the above limits, plant operators will likely target lower emissions levels (e.g. ~50% of the above mentioned limits) for their control set points, in order to have sufficient margin to achieve the proposed 30-day rolling averages for Hg emissions. As electronic real-time Hg CEMS will likely be used for emissions control, monitoring and reporting, there are a number of prospective hurdles, *viz.*

a) Although measurements have and are successfully being made at low levels (<1.0 µg/m^3), commercially-available Hg CEMS have not been fully certified at low levels (<1.0 µg/m^3) due to the NIST standard at 0.5 µg/m^3 only recently being available.

b) The EPA NIST protocol for traceability of Hg generators has not been implemented at Hg concentrations <0.5 µg/m^3. More testing, and possibly development and evaluation of commercially-available Hg generators is needed to ensure that NIST traceability can be demonstrated and that the Hg CEMS enable control methods for units to stay in compliance.

c) We are concerned that the low Hg emissions level required for new units may be lower than the uncertainty of available measurement methods. Sorbent Trap Reference Method 30B requires a fresh look, particularly relative to sampling protocol and lower limits of detection (LLD) to meet and certify the new EGU limits for mercury. Further, it is unlikely that current electronic Hg CEMS can be confidently or reliably employed for monitoring, control and reporting of prospective new EGUs emissions under the proposed Utility MACT.

2. Air Pollution Control Equipment Performance Evaluations, Guarantees and Monitoring

Utilities, pollution control equipment providers and researchers are using Hg CEMS to support performance evaluations of prospective Hg abatement strategies. Critical decisions have and will be made relative to the selection, monitoring and optimization of fuel blending, combustion strategies and pollution control equipment. Further, commercial guarantees and their administration, including performance and acceptance testing, will likely depend upon both electronic Hg CEMS and sorbent trap testing.

There are clearly both challenges and concerns about the traceability of commercially-available Hg CEMS required to effectively administer the proposed existing unit emission limits. By example, it is recommended that the EPA develop a strategic initiative with NIST, targeting lower-level Hg (i.e. <0.5 µg/m^3) calibration and standards traceability and support for Hg CEMS and sorbent trap methods.

ICAC is prepared to assist the EPA in taking an informed and objective look at the science and know-how required to support the proposed existing unit emission limits, given the new focus on extremely low levels of mercury that would result from the promulgation of the proposed rule.

B. Dry Sorbent Injection (DSI) for Acid Gas Control Limitations

The proposed rule outlines a compliance approach for DSI systems by setting operational limits of reagent injection rate based on performance testing. (76 FR 25031) If operational limits consisting of injection rate for DSI technology are going to be utilized to demonstrate compliance for a given level of HCl control, the reagent reactivity must also be considered an operational limitation. In the case of $Ca(OH)_2$, this could be accomplished by including reagent physical parameters such as porosity and surface area in the operational limitation. In the case of sodium reagents, the physical properties of either trona or sodium bicarbonate can impact the effectiveness of a specific reagent for an acid gas control application. As an example, the particle size to which trona is milled prior to use is an important consideration.

C. Total Particulate Matter (PM) Emissions Limits and Compliance Monitoring

1. Enforcement of the proposed Utility MACT PM limits to some degree relies on the efficacy of the new Reference Method 202 for condensables since the limits are based on total PM (filterable and condensable). Although the new RM202 as published in December 2010 has by many reports been improved considerably from a repeatability standpoint, there is still much debate about the magnitude of the new method's lower detectable limit and artifact creation. While ICAC feels that the new RM202 is appropriate for the proposed 0.030 lb/MMBtu total PM limit for existing EGU sources, t he aforementioned debate concerning its actual measurement uncertainty calls into question its use for reliable quantification of total PM on new EGU sources, since by s ome accounts, in extreme cases condensable PM reference method measurement uncertainties may approach between 25 and 50 percent of the proposed applicable standard. ICAC understands the desirability of limiting emissions of condensable PM and supports the agency's efforts in this area. However, in the interest of having a PM emission limit that is accurately verifiable and thus not an impediment to construction of new EGU's, ICAC suggests that an adjustment be made to the total PM emission limit for new EGU's to account for the current measurement uncertainty of the new Reference Method 202.

2. As noted above, the proposed rule states that "continuous compliance would be determined using a PM CEMS with an operating limit established based on the filterable PM values measured using Method 5." (76 FR 25029/2) This appears to mean that the PM CEMS would be correlated against the filterable PM fraction of total PM, though it doesn't explicitly state this. ICAC urges the agency to make this language more explicit in the final rule to avoid confusion.

3. While the proposed total PM emission limits for existing sources is more stringent than the previous requirements that didn't include condensables in reality, dry particulate emissions removal may need to be at a level of 0.015 lb/MMBtu to allow for condensable materials. That performance level can be achieved in many instances by modifying the existing ESPs.

The potential for upgrading existing ESP installations to meet the proposed limits is very site specific. In many instances, precipitators constructed in the 1970's and through the 1980's were designed to achieve 0.03 lb/MMBtu dry particulate emissions with a very wide range of fuels. Often, the design fuel resulted in SCA's for the precipitators of 600 ft^2/kacfm or larger. In other cases, client requirements for guaranteed performance with a number of bus sections out of service only added to the installed redundancy. For this category of installation, relatively little may be needed to meet the new standards. Modifications might include:

- Installation of High Frequency Switch Mode Power Supplies
- Improvements in gas distribution and gas sneakage devices
- Improvements in sectionalization
- Improvements in controls
- Improvements in rapping

A second group of units will be those that may not have been designed to achieve 0.03 lb/MMBtu to begin with, or were marginally designed and fall short of being able to achieve the proposed MACT standards. Again, the problem is site specific and each installation comes with its own particular challenges. In some cases, existing ESP's can be expanded in terms of collecting area by increasing plate height, where space permits, and adding additional treatment length. Another possible solution can be the installation of a polishing FF after the ESP designed to operate at a relatively high air-to-cloth ratio since its inlet loading following the ESP is low. This approach comes at the expense of additional pressure drop and impacts the ID fans and structure due to the increased pressure. It also requires a larger footprint for the air quality controls system (AQCS) Island to accommodate the new FF. Obviously; a new FF requires foundations, support structures, ash handling equipment, new casings, etc.

In some instances, the best solution will be the conversion of the existing ESP to a pulse jet fabric filter (PJFF). Advantages that a polishing FF approach and the ESP to FF conversion approach have are the ability to better utilize trona or lime for HCl and SO_3 control and the potential for inclusion of other reagents to address post combustion mercury control. Again, for an ESP to PJFF conversion, there is a consequence in terms of impacts on the ID fans and structure, but in general, the footprint of the equipment remains unchanged, and the costs associated with replacing the support structures and a large part of the casing and ductwork, and ash handling system can be avoided. ICAC expects to see much more activity along these lines.

Another potential solution is the addition of a WESP to an existing Wet FGD to capture both filterable and condensable particulate. This alternative approach is demonstrated by the Dallman (ORIS Code 963 Unit 34) and HL Spurlock (ORIS Code 6041 Unit 1) plants in the ICR PM database. Dallman has a FF, wet FGD and WESP and HL Spurlock has a dry ESP, wet FGD and WESP configuration both of which are in the top 25 plants for PM control. This alternative approach has the advantage of using the existing APC equipment with relatively low increase in pressure drop while meeting the proposed standards for existing EGUs.

D. HCl Emissions Limits and Compliance Monitoring

ICAC recognizes there is reluctance within the utility industry to proceed with plans to measure HCl for several reasons:

1) They know it can be difficult to measure in low concentrations;
2) The technologies used for it such as FTIR, TDL or Perma Pure driers with GFC analyzers are unfamiliar to them;
3) The EPA has not published performance specifications for HCl measurement leading to some uncertainty.

However, we believe that if electric generating facilities can identify a reliable, low-maintenance, affordable option for low level HCl measurement (0-10 ppm), they will adopt it more readily. The EPA should help try to prove this point out over the coming months.

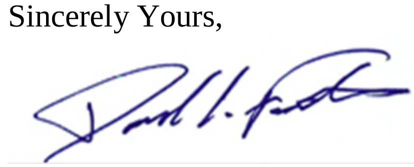
Conclusion

Since 1990, ICAC members have been instrumental in keeping pace with the utility EGU market compliance needs that have been largely remedial, requiring retrofit of existing sources that technically differ substantially from each other (many times despite being in the same source category) while offering commercial guarantees for performance of these retrofit control systems. Our members have also kept pace with electric utilities' needs during the extensive NOx SIP Call deployment when nearly 90 GW of SCR systems were retrofit in a 3 year time span. Following that effort our members again successfully deployed systems to fulfill Phase 1 of the CAIR rule when over 100 GW were retrofit with NOx and SO_2 control and monitoring systems in accordance with utilities outage schedules. During these efforts our members also met the control/monitoring needs of new production sources as they sought air permits and were placed into service.

In these comments, ICAC strives to present a balanced and objective perspective on the control and monitoring systems and services that affected sources rely on to meet regulatory requirements. ICAC members have developed and established the technologies needed for compliance and have intimate knowledge of the sources charged with meeting emissions limitations. Moreover, ICAC is the best source for updated information regarding advancements and developments of commercial air pollution control and monitoring systems.

We look forward to working with the EPA on the issues noted above, and affected sources for compliance with a final Utility MACT rule in a cost effective and expeditious manner.

Sincerely Yours,



David Foerter, ICAC Executive Director

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Appendix

A. Dry Sorbent Injection (DSI) for Acid Gas Control Limitations

Given the reliance on DSI technology in the proposed rule for HCl compliance, we have provided a few comments regarding recent experience with this technology. The significantly lower capital costs of DSI technology vs. traditional scrubbing technology suggests DSI will play a significant role in utility acid gas control MACT compliance. However, recent results suggest there are limitations on the use of the technology for MACT compliance that should be recognized. Accordingly, the suitability of DSI for a given facility needs to be evaluated on a site by site basis. Additionally, there can be ancillary effects of DSI, positive or negative, on compliance with other MACT standards such as mercury and PM that must also be considered. These issues are discussed in more detail below.

1. **While dry sorbent injection (DSI) will no doubt be utilized by some facilities for HCl MACT compliance at a standard of 0.002 lb/MMBtu, the economics of DSI will be dependent on factors such as operating rate and level of acid gases in the coal.**

   Both sodium and calcium dry sorbent injection has been used for HCl control for decades, primarily in the waste incineration market, and removal rates in excess of 98% are well established. These alkaline materials are highly reactive with HCl in the flue gas. At issue is how effective these materials can be in capturing HCl in the much higher SO_2 flue gas streams associated with coal-fired utilities in the U.S. The degree to which these alkaline reagents are consumed capturing acid gases other than HCl can affect the practicality and economics of HCl removal with DSI technology.

   ICAC member companies have data that clearly demonstrates the potential for high performance calcium hydroxide reagents, $Ca(OH)_2$, to achieve HCl capture in the 96-98% control range in utility applications. At the proposed MACT HCl limit of 0.002 lb/MMBtu, this suggests that the technology could be limited to facilities combusting low to moderate chloride fuels concentrations. While it is possible that this performance can be driven higher at facilities with low sulfur containing fuels and/or high performance baghouse devices, the limitations of the technology should be considered in the rulemaking process. This suggests that facilities that require the flexibility to combust high chloride containing fuels may elect to invest in traditional dry or wet scrubbing technology.

   Sodium sorbents are routinely used for SO_3 control in some existing units firing high sulfur coals. There are many tests underway at the present time that will provide data to better determine the extent of sulfur removal when treating for HCl. While acid levels and plant size are important drivers, capacity utilization, plant life expectancy, and capital availability are also important factors in determining the economics of DSI systems.

2. The impact of DSI on both PM emission and mercury emissions should be evaluated.

The use of DSI technology for acid gas compliance will also impact both PM emissions and mercury emissions. If does not appear that these ancillary impacts are considered in the MACT rulemaking process. Utilizing DSI technology for HCl control will inevitably result in a high degree of SO_3 capture. In that SO_3 reacts with water in the flue gas to create H_2SO_4, which is a measurable condensable particle, PM will be reduced. Also, injection of alkaline reagents can also impact the effectiveness of ESP technology by increasing the particulate loading and/or changing the resistivity of the fly ash. However, in some cases sodium reagents can improve the performance of ESP collection systems.

Additionally, SO_3 is known to hinder mercury capture with activated carbon reagents. Therefore, when SO_3 is controlled by DSI, the effectiveness of mercury control with activated carbon is enhanced. Both factors suggest that the combination of DSI and baghouse technology have synergistic benefits for MACT compliance.

B. HCl instrument detection capabilities

The proposed new unit HCl emission limits are 0.3 lb/GWh output at 3% O_2, 0.02 lb/MWh, or 0.0024 lb/MMBtu for bituminous and 6 x 10^{-4} lb/MMBtu for sub-bituminous. Calculations have translated to 0.028 ppm (30 ppb) emissions limits for HCl. It is difficult to measure, with certainty, HCl concentrations at this level by either wet test or instrumental methods.

A quick review of capabilities for stack tester and laboratory EPA Method 26 or 26A total determination of hydrogen halide and halogen emissions from stationary sources reveals approximate detection limits that range from 7 ppbv to 100 ppbv. Much longer runs than the required three 1-hour runs may be required to meet a 0.03 ppm detection limit and leave more room for contamination, leaks, lack of real time operational control, and tester error. Some of these tests may need to be run for more than three hours in length.

A review of listings for standard off the shelf FTIR and TDL instruments shows that HCl minimum detection limits (MDL) are approximately 0.1-0.2 ppm. FTIR is the instrument that is stable and able to achieve lower detection limits to approximately 25-50 ppb with instrument modifications that limit its ability to measure a wide spectrum of target compounds and thus its cost effectiveness.

If detection limits for HCl can be achieved at or close to the published detection limit for HCl, there is great concern for the precision and accuracy of the instruments used to measure at those concentrations. Statistical analysis of the instrument capabilities need to be addressed and evaluated.

Currently there are many detection limit calculations published for instrumental methods in the scientific literature. FTIR generally uses EPA Method 320 appendices, ASTM D-6348, or NIOSH 3800 methods. A standard ASTM detection limit measurement of three times the standard deviation of consecutive measurements of spectra will not suffice for this published detection limit for HCl and does not represent real world conditions. Those types of calculations and procedures do not address any issues of interference from other compounds in the gas matrix. Additionally, differences in minimum detection limits (MDL) and limits of quantification (LOQ) must also be addressed as there may be 2 or 3 times differences in detection limits for 1, 2, or 3 sigma calculations. The differences in these calculations may be different by orders of magnitude. EPA Method 321 and ASTM-D6348 do not adequately address measurements at these concentration levels. Issues with obtaining stable NIST traceable standards at low levels of HCl or the added errors associated with dilutions and field spiking requirements should also be addressed if the current low concentration level of HCl published remains set at its current level.

The current published emission limits for HCl is too low for analytical instrumentation currently in use and available to industry. There is too much error and differences in instrument performance at currently published HCl limits. Wet test method laboratory published detection limits vary by an order of magnitude.

The Cement MACT has current HCl limits set at 3 ppm. This is an achievable emission limit that may be measured accurately and with precision on several instruments. The HCl lifespan in the atmosphere is on the order of 5 days and does not persist as long as other acid gases such as SO2. EPA has flexibility in setting a compliance limit higher than the top 12-15% performers due to measurement limits.

It is also the opinion of many in the industry that control technologies that would reduce HCl would also control other inorganic compounds that are acid gases. Thus, the best controls for HCl would also be the best controls for other inorganic HAP that are acid gases. Therefore, HCl is a good surrogate for inorganic HAP because controlling HCl will result in a corresponding control of other inorganic HAP emissions.

C. Alternate SO2 Emission Limit Compliance and Reagent Optimization

The units that do elect to comply with the acid gas emission limits using the alternate SO_2 emission limit have the flexibility of operating an SO_2 CEMS due to the fact nearly all utility units have them installed for Acid Rain compliance. As an alternative to just an outlet SO_2 monitor, a source may consider the addition of an inlet SO_2 monitor, to provide reagent feed process optimization control that potentially limits reagent overuse and reduces operating expenses.

D. Sulfuric Acid Mist (SAM) Emissions

Although SAM emissions can be controlled via DSI or WESPs, it may be that many of the units in the ICR database were not controlling SAM. Even if some of the units were using DSI, it's likely they were trying to minimize visible emissions, which require SAM emissions in the 5-7 ppm range, and not necessarily trying to minimize total PM. Under those circumstances, achieving the proposed 0.030 lb/MMBtu total PM would be difficult.