Testimony of
Rob Ellis, PG
Greenhouse Gas Program Manager
Advanced Waste Management Systems, Inc (AWMS)
Chattanooga, Tennessee

before the
Subcommittee on Energy and Environment
Committee on Science and Technology
U.S. House of Representatives

"How Do We Know What We Are Emitting? Monitoring, Reporting and Verifying Greenhouse Gas Emissions"
February 24, 2009

Over the past decade the world has developed sophisticated approaches to control and monitor greenhouse gas emissions, including creating an economic model by which greenhouse gas caps are mandated allowing industry to emit a set level of carbon dioxide equivalent tons (there are six greenhouse gases, each a multiple of CO_2 which is the base greenhouse gas).

An industry exceeding the cap is permitted to continue operation if it exceeds these limits, but it must buy offsets from industries that are emitting less greenhouse gas than the limit. This is the "Cap & Trade" mechanism well tested in many international markets.

The commerce in these carbon markets now involves tens of billions of dollars of trade in carbon credits. Carbon credits are essentially traded as a commodity in much the same way as corn or wheat. Successful markets include the European Union Emission Trading Scheme and here in the US, the Chicago Climate Exchange.

In addition, both voluntary and mandatory emissions reporting programs have been established. Examples include The Climate Registry, the Regional Greenhouse Gas Initiative (RGGI), and the California Global Warming Solutions Act of 2006 (AB 32). These programs are fundamentally based upon companies accurately reporting their greenhouse gas inventories.

Given the value of greenhouse gas reductions claims, or credits, and the need for accurate emissions inventories, the opportunity for fraud is huge. Plus, a greenhouse gas credit is not obvious as is a bushel of corn. To ensure the validity of greenhouse gas claims a third party, disinterested verifier is required. These verifiers must pass rigorous examination, field observation, and in-house auditing to become accredited to the international greenhouse gas verification standards, ISO 14064-3 and ISO 14065. The

American National Standards Institute (ANSI) oversees this accreditation process. Advanced Waste Management Systems, Inc. (AWMS) was one of six North American firms to successfully pass these requirements for verifying greenhouse gas inventories for The Climate Registry. In addition, AWMS holds accreditation from The Chicago Climate Exchange to perform greenhouse gas offset project verification. We arrived at this point by operating an office in Europe since 2002 to pursue greenhouse gas verification under international UNFCCC protocols. Additionally, AWMS retained the top British trainer in greenhouse gas verification to come to our headquarters office in Tennessee to train all 10 of our degreed professional staff.

The Chicago Climate Exchange accreditation process entailed submitting detailed financial, operational, and personnel information in one complete package. This package was judged by the Chicago Climate Exchange to warrant accreditation of AWMS as a verifier within the project types of Landfill Methane and Renewable Energy. The Chicago Climate Exchange has determined, however, that ANSI accreditation will now be required of all verifiers.

The ANSI accreditation process began with an application phase that required AWMS to submit its complete management system. This management system was based upon AWMS international experience as well as the requirements of The Climate Registry. ANSI, based upon an initial review, judged the AWMS management system to be robust enough to warrant entry into the pilot accreditation program. This program was divided into two phases: a witness assessment and a program/office assessment.

For the witness assessment, AWMS was required to make available a Member of The Climate Registry pursuing verification to ANSI staff for the purpose of witnessing AWMS staff perform the verification. The ANSI auditor shadowed the AWMS verification team to judge whether the AWMS verifiers possessed the technical capabilities and knowledge of the protocols required. AWMS passed this phase of the accreditation process with no nonconformities or findings.

The program/office assessment entailed ANSI auditors auditing the AWMS management system at AWMS headquarters. The audit team reviewed our complete system and confirmed whether our program met the requirements of ISO 14065 and The Climate Registry. This audit included checks such as conflict-of-interest and impartiality assurances, methods for ensuring qualified personnel are assigned to each verification, on-going training tools, records keeping, AWMS' ability to adjust to revisions to relevant protocols, and AWMS' internal corrective and preventive action system. Again, AWMS successfully completed this phase of the verification.

Upon completion of the ANSI audits AWMS was granted accreditation as one of only six companies to pass the pilot application process.

Advanced Waste Management Systems, Inc. utilizes ISO 14065 as the foundation for its greenhouse gas verification procedures. This Standard dictates four phases to the verification process: Pre-Engagement, Approach, Verification, and Verification Statement. This ISO Standard is a general set of rules designed to allow their adaptation to more specific protocols such as those of The Climate Registry and the Chicago Climate Exchange. AWMS has created a specific set of procedures for our verification activities. Program specific protocols also provide specific guidance on performing verifications.

As an example, AWMS has created a procedure defining the process for verification of an inventory of a Member of The Climate Registry. The Pre-Engagement phase of this procedure centers on formally establishing the relationship between the Member and AWMS, the verifier. This process is initiated by an application filed by the Member. This application includes information such as the number of sites comprising the Member, the number of employees at each site, and the primary greenhouse gases emission sources at each of those sites. This information allows AWMS to determine the appropriate amount of resources required to perform the verification. The application also provides the required information to initiate a conflict-of-interest assessment. The Climate Registry, as with all greenhouse gas accounting programs in which AWMS has participated, has a very strict conflict-of-interest policy. For example, AWMS must demonstrate that no employee who will be involved in a verification owns greater than $5,000 interest in that Member. This information is submitted to The Climate Registry for formal approval of the relationship. Upon approval of the conflict-of-interest AWMS submits to the Member a Verification Agreement that formalizes AWMS' roles as that Member's verifier. This document also outlines the Member's rights and duties. AWMS assigns a Lead Verifier at this point, as well.

The Approach phase of this procedure centers on communication between the Member and AWMS. Central to this communication is the Verification Plan. The Verification Plan includes sections defining topics such as the level of assurance, verification objectives, verification criteria, verification scope, and the materiality. This Verification Plan also defines the schedule of activities. A kick-off meeting is held during this phase that covers the topics of the Verification Plan in order to achieve consensus with the Member. Once the Verification Plan is finalized a notification of activities is formally presented to The Climate Registry for approval. During this phase, AWMS also presents to the Member a list of information that will need to be provided in order to perform the verification. Examples may include the spreadsheet or database used to track emissions, meter readings, electric and/or gas bills, emissions monitoring reports, maintenance and calibration records, etc.

The Verification phase of this procedure entails the detailed verification activities. The verification process is initiated with a desk audit. A desk audit is performed remotely using the electronic or hard copy data that has been submitted to AWMS by the Member. The primary focus of the desk audit is to determine whether appropriate emissions factors and equations have been utilized to calculate the metric tons of CO2

equivalent and to assess conformance to appropriate reporting protocols. In the case of The Climate Registry the desk audit also includes an assessment of the on-line based CRIS reporting tool. This tool allows the Member to enter source data (e.g. electricity usage, fuel usage) into a web-based database that will then calculate the Member's inventory using the appropriate emissions factors and equations. By utilizing CRIS the Member can be assured that the appropriate calculations are being made, and AWMS as the verifier does not need to check each individual calculation. The option is available to the Member, however, to perform their own internal calculations of their greenhouse gas inventory and to then input these final numbers into CRIS. In this case the desk audit is the stage where AWMS performs a detailed evaluation of these internal tools to confirm the calculations are correct. Typically this involves large spreadsheets with many internal links and source data. The desk audit specifically involves deconstructing these spreadsheets to understand how the data was utilized. AWMS utilizes the Member provided information such as electric and gas bills to perform a check on data entry as well. Errors often include transcription errors, missing entries, and copy and paste errors. Any such errors are tracked on an issues log maintained by each member of the verification team.

The results of the desk audit are the basis of a risk assessment performed by the AWMS verification team to determine the schedule on-site activities. In the case of The Climate Registry an on-site assessment is always required for a Member reporting an inventory of greater than 1,000 metric tons of CO2 equivalent. The risk assessment is conducted to determine those areas of the Member's reported inventory that have either the highest impact on the total inventory or those areas that have the highest likelihood of error. Examples might include a Member with 90% of their inventory resulting from a single electric meter or a Member with refrigerant usage that is tracked by a single maintenance technician. Upon completion of the risk assessment AWMS generates a formal Sampling Plan that is distributed to the Member for planning.

The on-site portion of the verification is focused on the actual data utilized to generate the Member's inventory. The fundamental principle of the on-site verification is that an inventory calculation is only as good as the data that it is based upon. The verification team is focused on determining whether this raw data is being appropriately tracked and gathered. This includes detailed checks on metrology such as flow meters, electricity meters, and continuous emissions monitors. These checks include verification that routine maintenance has been performed, and whether routine calibrations are performed as required. The on-site portion of the verification also entails detailed personnel interviews. These interviews are conducted to determine whether the data collection methodologies are appropriate and complete. Information such as whether the data is collected via electronic data logger versus hand written readings supports the accuracy of the raw data. For example, if the data is logged via handwritten forms, the verification team determines whether the individuals recording the data are trained on that instrumentation and whether there are trained backups available on-site should that technician be unavailable. In many cases the data is not

collected as simply as one meter or instrument, but rather as an extrapolation. This is most common to vehicle emissions where fuel consumption may vary from on-site tanks that are routinely monitored to fleet vehicles which fuel at public gas stations. In these cases it is necessary for the verification team to confirm the validity of the techniques used to arrive at the final value. The Climate Registry protocols allow for varying levels of data quality, however the verifier must ensure that Members accurately state their data quality. As with the desk audit phase, each member of the verification team maintains an issues log used to track any noted errors.

Upon completion of the on-site verification the AWMS verification team performs a debrief at which time the errors noted on each verification team member's issues log are reconciled. Noted errors are communicated to the Member giving them an opportunity to perform possible corrective actions. AWMS at all times maintains third party status and is obligated as a verifier to simply communicate error; at no time does AWMS engage in consulting as to how to fix the errors. The sum of the errors (in percentage of the direct emissions value and indirect emissions value) drives the necessity for corrective action. In the case of The Climate Registry any error of greater than 5% (regardless of whether it is under reporting or over reporting) results in a negative verification. In these cases the Member must make corrective action in order to remain conformant with The Climate Registry. Corrective action must substitute good data for bad or missing data or result in a sound enough estimation technique to bridge the bad or missing data. Substitute data can be found, for example, by using electric bills in place of direct meter readings, or fuel purchase records in place of flow meter readings. Estimation techniques may include using sound data points from either side of the gap to create a trend. Members have the option to use simplified estimation techniques for up to 5% of their total inventory.

The Verification Statement phase of the procedure begins upon completion of the on-site verification activities that conclude with the verification team issuing the verification report. This report is handed off to an AWMS technical reviewer who may be any qualified verifier that has not participated in the verification in any way up until this point. It is the responsibility of this technical reviewer to conduct an additional complete review of the Member's inventory. The technical reviewer utilizes the observations of the verification team in place of a repeat on-site assessment. The technical reviewer is responsible for issuing the final verification statement. This statement may reflect either a positive verification or a statement that the inventory was not verifiable.

The Climate Registry Members must complete the verification process annually. Initial baseline verifications require a higher level of effort, but the process flow remains the same every time. AWMS maintains routine communication with those Members that have verification statements issued by AWMS in order to determine if protocol driven triggers require a new baseline inventory. In cases where these triggers are not met,

the verification process may take less time given the level of familiarity with the Member's internal monitoring methodologies.

As programs continue to be developed and honed, AWMS sees one key issue that bears close attention: conflict-of-interest management. The situation of a company performing a verification of a body of work which that same company's consulting wing has generated must be protected against. As the various greenhouse gas inventory and offset programs continue to expand their membership the opportunity for this conflict expands as well. To maintain validity such programs must have thorough mechanisms to prevent verifiers from hiding consulting work behind false corporate separations. Similarly greenhouse gas programs must be aware that opportunity exists for several verifiers to pass work between themselves with a tacit agreement that Company A will verify Company B's consulting work if Company B returns the favor. The independence of the verification body is critical to the viability of any greenhouse gas trading scheme or inventory program.