BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:

PROPOSED NEW 35 ILL. ADM. CODE 225, CONTROL OF EMISSIONS FROM LARGE COMBUSTION SOURCES (MERCURY MONITORING)	R09-010 (Rulemaking – Air)

NOTICE OF FILING

To: Those Individuals Listed on Attached Service List

Please take notice that on February 2, 2009, the undersigned caused to be filed with the Clerk of the Illinois Pollution Control Board the Testimony of David Nuckols on behalf of Kincaid Generation LLC, copies of which are herewith served upon you.

By: _____
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	)	**(Rulemaking -Air)**
PROPOSED NEW 35 ILL. ADM. CODE 225 CONTROL OF EMISSIONS FROM LARGE COMBUSTION SOURCES (MERCURY MONITORING)	)	

TESTIMONY OF DAVID NUCKOLS
KINCAID GENERATION LLC

My name is David Nuckols and I am Manager of Dominion's Emissions Monitoring Support Group. Dominion is one of the nation's largest producers of energy with a portfolio of approximately 27,000 megawatts of generation. Dominion owns and operates electric generating facilities in eleven states, including the 1250 megawatt coal-fired Kincaid Generation LLC power plant, located in Kincaid, Illinois. Dominion also owns a 50% interest in the 1400-megawatt natural gas-fired Elwood Energy, LLC combustion turbine plant, located in Elwood, Illinois. Dominion has also announced plans to build 300 megawatts of wind turbines in Central Illinois. The project, Prairie Fork Wind Farm, will include 150 to 200 wind turbines in Christian and Montgomery Counties.

My group provides support for the continuous emissions monitors at most of the Dominion power plants, including the two units at Kincaid. We also provide test services for many of the Dominion sites and have interim accreditation as an Air Emissions Testing Body (AETB) by the Stack Testers Accreditation Council (STAC). I received my B.S. in Engineering from Virginia Tech in 1975 and am licensed as a Professional Engineer in the State of Virginia. During my 33-year career at Dominion, I have worked at several power plants and as Staff Engineer for the engineering groups that support power plant operation and construction. I have worked in the

area of continuous emissions monitoring systems since 1992 and have served in my current role since 2001.

Introduction

We believe IEPA has been very receptive to Dominion concerns regarding the proposed monitoring rules. Dominion provided comment on the draft proposal last July as part of the IEPA stakeholder outreach efforts. Several very important changes were made to the proposal during that round of comment including:

- The removal of the "data substitution" provisions based on the 40 CFR Part 75 rules, which were developed to support an emissions trading program. The Illinois mercury rule is more of a "command and control" regulation with a "hard" emissions limit. Therefore, certain aspects of 40 CFR Part 75 are inappropriate for inclusion in the Illinois regulation, including the missing data substitution procedures for mercury continuous emissions monitors (§75.38) and for sorbent trap monitoring systems (§75.39). IEPA agreed with this proposed change and withdrew these provisions.

- The removal of the bias adjustment factor, also based on USEPA's Part 75 rules. In our July comments, Dominion recommended IEPA withdraw the bias adjustment factor provided for in §2.3.4 of Appendix D of 40 CFR Part 75. USEPA's Part 75 rules require that the monitor values be adjusted upward when the readings are lower than the reference method results. However, USEPA does not allow the values to be adjusted downward when the readings are higher than the reference method results. USEPA describes its unidirectional of the bias test as a policy decision, *consistent with an emission trading program.* Again, IEPA agreed to withdraw the bias adjustment factor.

- A decrease in the data availability requirements from 80% to 75%. Dominion, and others, stated that it would be difficult to achieve an 80% data availability given the current state of the mercury monitoring technology. IEPA responded by lowering the data availability from 80% to 75%. While this is a good start, as I discuss below, we recommend that further flexibility be added to this requirement.

Dominion supports these changes and applauds IEPA's cooperative, practical consideration of Dominion's and the other affected companies' comments during the stakeholder process. Nevertheless, our experience is that it will be extremely difficult to operate these monitors and to keep them operating for sufficient periods of time to ensure compliance with the proposed monitoring provisions. We have been operating these monitors at a number of our facilities for over a year and are well qualified to testify to the reliability and maintenance issues involved in the day-to-day operations of these systems. Because of the problems associated with the current state of this technology, Dominion urges the Illinois Pollution Control Board to adopt as much flexibility as possible in these rules. We have included in this testimony several suggestions on how that might be accomplished.

I. Background

Dominion Resources, Inc. owns and operates electric generating facilities in eleven states, including the 1250 megawatt coal-fired Kincaid Generation LLC power plant, located in Kincaid, Illinois. The company's assets include about 27,000 megawatts of power generation, 6,000 miles of electric transmission, 14,000 miles of natural gas transmission pipeline and the nation's largest natural gas storage system, with more than 975 billion cubic feet of storage capacity.

The Kincaid plant has compiled an exemplary environmental compliance record. Since Dominion purchased the plant in 1998, the plant has received no environmental violations and has cut sulfur dioxide and nitrogen oxide emissions drastically from pre-1998 levels. Kincaid was awarded the 2007 Illinois Association of Water Pollution Control Operators (IAWPCO) *Wastewater Treatment Plant of the Year* award in the Industrial or Class K division. This honor is given, in conjunction with the Illinois Environmental Protection Agency (IEPA), at the annual IAWPCO conference. Kincaid Station was nominated for the award by the IEPA as one of four finalists out of the 1,594 industrial wastewater treatment facilities in the State of Illinois. Kincaid Station was recognized for excellence in operating the facility resulting in no permit excursions in 2006.

In 2008, Kincaid applied for and received a permit from the IEPA to construct activated carbon injection (ACI) equipment for mercury emissions control at both Kincaid units. That construction is progressing and we expect the ACI installation to be complete during March, 2009, well before the July 1, 2009 deadline for compliance with the Illinois mercury rules.

II. Discussion of Dominion experience with mercury monitors

The available suppliers of mercury CEMS (continuous emissions monitoring systems) monitors are very limited. Currently, only two companies provide most of the mercury CEMS installed at utility plants, Thermo Fisher Scientific and Tekran Instrument Corp. After evaluating both systems, including temporary installations of the systems at Dominion power plants, we have chosen the Tekran system for all of our continuous monitoring sites.

Dominion has since installed 12 mercury CEMS and three sorbent trap systems in response to state requirements or for compliance with the now vacated Clean Air Mercury Rule (CAMR). My group provided technical oversight and startup support for the installation projects. We also participated in the mercury calibrator study conducted by RMB Consulting for USEPA and EPRI (Electric Power Research Institute) with two systems. My group owns and operates four Reference Method 30B systems and has conducted mercury testing at most of Dominion's sites.

Although we have been generally successful in installing and operating the mercury CEMS, there are significant issues and challenges for us and the utility community to overcome. Much of the hardware used for these systems is new and unproven. Many of the components are modified for conventional CEMS, but are much more complex and operating under much more demanding requirements. CEMS for SO2, NOx and CO2 are comparatively simple, consisting of a dilution probe, unheated umbilical, analyzer, sample controller, and calibration gas cylinders. The pollutants are relatively high level in parts per million or percent of volume and generally non reactive with many materials. Mercury is very reactive with most metals typically used for probes and filters, so everything in contact with the sample must be glass coated or PFA TEFLON. Mercury is present in much lower concentrations than the other regulated gases (1 ug/m^3 is approximately 120 parts per trillion) and is present in two forms, elemental (Hg^0) and oxidized (Hg^+ generally $HgCl_2$) . If the sample is not kept very hot the oxidized Hg will stick to the transport materials and not make it to the analyzer. Also, all the Hg must be converted to elemental Hg to be measured by the Hg analyzer. Because of the reactive nature of Hg, calibration gas cylinders are not stable and very expensive, so the system must generate its own calibration gases. Inert gases, such as ultra-pure Argon or nitrogen and de-ionized water are

needed to carry and wash the sample. These issues make the Hg CEMS a complex system of many components that must work precisely together to obtain accurate measurements. The complexity of the measurement requirements and the multitude of components needed to make it all work, make the systems fragile and difficult to maintain.

The following is a list of some of the significant issues we have encountered:

1) Umbilical Failures: The bundle of tubes and wires that transport the mercury sample collected from the power station smoke stack to the mercury analyzer housed on the ground is called an "umbilical". A heater strip runs beside the tubes to keep the sample inside the tubes hot, and the whole bundle is insulated. Most of the umbilicals are installed up the outside of the stack in cable trays and are 200 feet to 450 feet in length. It is the single-most difficult and expensive component of the mercury CEMS to replace. Five of the thirteen umbilicals that Dominion has placed in service have experienced fatal failures and had to be replaced. Umbilicals used in the Tekran systems have PFA TEFLON tubes and Tekran originally recommended that they be operated at 180°C, (356 °F) which is very near the melting point of PFA. Due to the number of failures, however, Tekran has withdrawn this recommendation but has not developed an alternative operational temperature. Several of these failures occurred after nearly a year of operation. They are engineered and manufactured for specific site specifications and delivery is typically 4 to 12 weeks. Installation requires specialized equipment and craft to remove the damaged umbilicals and re-pull and hang the replacement. Assuming weather is not an issue, this typically will take a week to complete. In anticipation of this potentially extended downtime for umbilical failure, Dominion has installed a "spare

backup" umbilical at all sites, however we had one of our backup umbilicals also fail and the system was down for weeks.

2) Umbilical Temperature Control: In addition to the umbilical failures, we are having problems with temperature control along the length of the umbilical. We installed multiple sensors in the length of the umbilical and see differences of as much as 40°C between points. The sample temperature has to be maintained high enough to prevent loss of oxidized Hg sample. We are currently working with the vendors to resolve this issue.

3) Probe Heater Failure: We had one probe heater fail, which had to be returned to the manufacturer for repair. The system has been down since mid-December 2008 and we do not have the repaired parts yet. Another probe overheated and melted the filter and gaskets resulting in more than a week of downtime.

4) Oxidized Mercury Calibrator: Dominion also had an oxidized mercury calibrator fail at one of our sites and it had to be returned to the manufacturer. That system has been operating without conducting system integrity tests since late September 2008 and the calibrator had to be sent to Canada and has not yet been returned.

5) Sample Pump Failure: Sample pumps were not recommended as spare parts; and the pump took a week to be shipped from Canada.

6) System Contamination: Problems with the argon and water supply caused contamination. It took almost 5 days to return to service.

7) Failed System Integrity Tests: The System Integrity Test was the most failed QA test for the units that conduct them. We recorded from 80 to 150 hours downtime per system in

2008 due to failed integrity tests. The technicians manually control the test each week to make sure they work properly and to minimize downtime.

There are very limited vendor resources to support these systems. With the vacatur of CAMR, the mercury CEMS market is very unclear and vendors do not appear to be willing to invest in sufficient qualified personnel. Additionally, they have a captive market, where there is virtually no competition or other source of expertise. Most service must be scheduled weeks in advance and with the technicians traveling on Mondays and Fridays, they provide only 3 days of work per week.

The mercury CEMS are new and relatively complex systems, primarily due to the reactive nature of mercury and the extremely low levels of concentrations in utility boiler exhaust gases. It has taken at least a year for competent, trained technicians that work on mercury CEMS consistently to be able to do non-routine diagnostics on these systems. Most technicians, unless dedicated to operating and maintaining these systems, will not be able to perform more than routine maintenance, and will require outside expertise to diagnose and repair non-routine problems.

III. Dominion urges the IPCB to incorporate as much flexibility as possible into the Illinois mercury monitoring rules.

Because of the experiences we have described above, we have concerns about our ability to maintain compliance with the current mercury monitoring proposal. Our experience indicates that failures with these systems can result in weeks of downtime and will result in our inability to demonstrate compliance. We offer the following suggestions:

A. **Data availability should be based on a 12-month period**. Section 225.260 specifies that monitor availability be determined on a calendar quarter basis in accordance with Section 1.8 of Appendix B following initial certification of the required CO2, O2, flow monitor, or mercury concentration or moisture monitoring system(s) at a particular unit or stack location.

We do not believe demonstration of compliance with a 12-month rolling average emissions standard should be based on data availability calculated over only one fourth of the compliance period. It should be based on the availability over the compliance period. The acid rain monitoring program, under 40 CFR Part 75 and which much of the Illinois proposed mercury monitoring program is based, calculates data availability for missing data purposes over 8760 operating hours, or 3 years.[1] The 40 CFR Part 60 rules (relating to monitoring requirements for new or modified sources) generally require 75% data capture over the averaging period for long term rolling averages, (such as 22 days of a 30 day average). We believe the compliance determination for the monitoring systems should be based on the same period as the mercury emissions standard, which is a 12-month rolling average.[2] We also recommend that special consideration should be offered for the first 12 months of operation which is likely to be the most difficult period to achieve reliable operation. This can be accomplished by removing any specific data availability for the first 12 months. Until a full 12 months of data is collected, the number

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[1] 40 CFR Part 75.32, "Determination of monitor data availability for standard missing data procedures"

[2] Title 35, Subtitle B, Chapter I, Subchapter c, Part 225 "Control of Emissions from Large Combustion Sources", Section 225.230, "Emission Standards for EGUs at Existing Sources."

of possible hours in the calculation is smaller, giving each hour of downtime more weight, making it more difficult to meet an availability requirement. There would be strong incentive to achieve high availability, since these hours would be used in calculating the rolling availability following the first 12 months.

Dominion believes there is strong justification to change this quarterly data availability calculation and recommends the Board adopt changes to the rule that would align this data availability calculation with the mercury emissions limitation averaging scheme. We offer the following wording changes:

225.APPENDIX B Continuous Emission Monitoring Systems for Mercury

Section 1.8 Determination of monitor data availability

a) Following ~~initial certification and up to~~ the first 12 months of operation of the required CO_2, O_2 flow monitoring systems(s), Hg concentration, or moisture monitoring system(s) at a particular unit or stack location (i.E., the date and time at which quality-assured data begins to be recorded by the CEMS(s) at that location), the owner or operator must begin calculating the percent monitor data availability as described in paragraph (a)(1) of this Section, by means of the automated data acquisition and handling system, and the percent monitor data availability for each monitored parameter.

1) Following initial certification, the owner or operator must use Equation 8 to calculate, hourly, percent monitor data availability for each ~~calendar quarter~~ 12 month period.

$$\text{Percent monitor data availability} = \frac{\text{Total unit operating hours For which quality-assured data was recorded for the ~~for the calendar quarter~~ 12-month period}}{\text{Total unit operating hours for the ~~calendar quarter~~ 12-month period}} \times 100 \quad \text{(Eq.8)}$$

B. **The final percent data availability standard should be phased in to 75%.**

Section 225.260 of the IEPA mercury rules ("Out of Control Periods and Data Availability for Emission Monitors") requires "[c]ompliance with the percent reduction standard in Section 225.230(a)(1)(B) or 225.237(a)(1)(B) or the emissions concentration standard in Section 225.230(a)(1)(A) or 225.237(a)(1)(A) can only be demonstrated if the monitor data availability is equal to or greater than 75 percent; that is, quality assured data must be recorded by a certified primary monitor, a certified redundant or non-redundant backup monitor, or reference method for that unit at least 75 percent of the time the unit is in operation."[3] As we have stated previously, we recognize this represents a favorable change from the IEPA initial draft of these rules. However, given the difficulty Dominion has encountered, as described here, during the initial phases of implementation of our mercury monitoring program, we believe a phase-in of the 75% data availability requirement is warranted. We suggest the IEPA program begin with a 65% data availability requirement in July 2010 rising to a 75% standard in July 2011. We offer the following wording changes:

Section 225.260 "Out of Control Periods and Data Availability for Emission Monitors"

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[3] IBID, Section 225.260(b)

b)... "Compliance with the percent reduction standard in Section 225.230(a)(1)(B), 225.233(d)(1)(B) or (d)(2)(B), 225.237(a)(1)(B) or 225.294(c)(2), or the emissions concentration standard in Section 225.230(a)(1)(A) or 225.237(a)(1)(A) can only be demonstrated if the monitor data availability is equal to or greater than 65 percent following the first year the rule is effective (July 1, 2010) and increasing to 75 percent the next year starting July 1, 2011; that is, quality assured data must be recorded by a certified primary monitor, a certified redundant or non-redundant backup monitor, or reference method for that unit at least 65 percent for the first year (July 1, 2010 through June 30, 2011) and 75 percent of the time the unit is in operation after that first year."

C. **The January 14, 2009 revision to Appendix B Section 1.7 added weekly system integrity tests as an "out-of-control period". Exhibit B of Appendix B Section 2.6 also specifies failed integrity tests as an "out-of-control period". These tests are difficult to pass and we ask the Board to consider less stringent criteria.** We have found the system integrity test to be very difficult to meet on a weekly basis and believe it will create significant additional out-of-control periods with the current technology. This test is different and much more difficult than the linearity because it requires oxidized Hg standards. Based on our experience, we request more reasonable criteria than the 10% of the reference value or 0.8 ug/m^3 absolute difference specified in the Section 3.2(c) of Exhibit A to Appendix B for weekly checks. We recommend expanding the requirements to allow these limits to be considered a "maintenance limit" and having the out-of-control limits at twice the linearity standard or 20% and 1.6 ug/m^3. We also recommend that additional time be allowed between tests before the system is

considered out-of–control. The weekly criteria are specified as 168 operating hours, which does not allow for flexibility in running the tests. We typically manually initiate the test to make sure the system operates correctly and so that they can take immediate action if there are problems. They would have to be available the same day and hour each week to keep the system on the same schedule. This request is similar to having 26 hours to conduct a daily calibration. We suggest the following change to Section 2.6 of Exhibit B Appendix B:

2.6 System Integrity Checks for Mercury Monitors

For each mercury concentration monitoring system (except for a mercury monitor that does not have a converter), perform a single-point system integrity check weekly, i.e., approximately ~~at least~~ once every 168 unit or stack operating hours, using a NIST-traceable source of oxidized mercury. Perform this check using a mid- or high-level gas concentration, as defined in Section 5.2 of Exhibit A to this Appendix. The measurement error must not exceed twice the performance specifications in subsection (3) of Section 3.2 of Exhibit A to this Appendix must be met, otherwise the monitoring system is considered out-of-control, from the hour of the failed check until a subsequent system integrity check is passed. If a required system integrity check is not performed and passed within ~~168~~ 216 unit or stack operating hours of last successful check, the monitoring system will also be considered out of control, beginning with the ~~169th~~ 217th unit or stack operating hour after the last successful check, and continuing until subsequent system integrity check is passed. This weekly check is not required if the daily

calibration assessments in Section 2.1.1 of this Exhibit are performed using a NIST-traceable source of oxidized mercury.

D. **Much of the IEPA Quality Assurance Procedures included in this rulemaking refer to monitors for SO_2, NO_x, CO_2, and flow. These should be removed.** Dominion recommends IEPA remove all quality assurance references to monitoring procedures that are not relevant to mercury monitors. Duplication of these requirements will cause confusion and errors when the 40 CFR Part 75 or the IEPA rules are updated and any requirement is changed. This will eliminate major portions of Exhibit B, Exhibit C and Exhibit D of Appendix B, and minimize the duplication of QA requirements already specified in Part 75 regulations. We will provide recommended strikethrough language of the duplicated QA text if requested.

E. **The USEPA has removed the requirements for accreditation of Air Emissions Testing Bodies (AETB) conducting relative accuracy testing for CEMS and sorbent traps from the 40 CFR Part 75 rules, pending litigation.[4] The IEPA rules referring to AETB should also be removed.** Section 6.1.2 of Exhibit A to Appendix B of the IEPA proposed rules set out requirements for AETB conducting QA emissions testing on mercury CEMS. USEPA has withdrawn this portion of the 40 CFR Part 75 rules while the agency reviews legal issues that have been raised. The IEPA rules should withdraw

[4] 73 Fed. Reg.65554, November 4, 2008.

these provisions as well. We therefore suggest the following change to Section 6.1.2 of Exhibit A to Appendix B:

~~***6.1.2 Requirements for Air Emission Testing Bodies***~~

~~*(a)On and after January 1, 2009, any Air Emission Testing body (AETB) conducting relative accuracy test audits of CEMS and sorbent trap monitoring systems under Part 225, Subpart B, must conform to the requirements of ASTM D7036-04 (incorporated by reference under Section 225.140). This Section is not applicable to to daily operation, daily calibration error checks, daily flow interference checks, quarterly linearity checks or routine maintenance of CEMS.*~~

~~*(b) The AETB must provide to the affected source(s) certification that the AETB operates in conformance with, and that data submitted to the Agency has been collected in accordance with, the requirements of ASTM D7036-04 (incorporated by reference under Section 225.140). This certification may be provided in the form of:*~~

~~*(1) A certificate of accreditation of relevant scope issued by a recognized, national accreditation body; or*~~

~~*(2) A letter of certification signed by a member of the senior management staff of the AETB.*~~

~~*(c) The AETB must either provide a Qualified Individual on-site to conduct or must oversee all relative accuracy testing carried out by the AETB as required in ASTM D7036-04 (incorporated by reference under section 225.140). The Qualified Individual*~~

~~*must provide the affected source(s) with copies of the qualification credentials relevant to the scope of the testing conducted.*~~ ~~"~~

F. **The Quality Assurance Procedures for sorbent trap monitors contains a provision to multiply the results from one sorbent trap when one of the two traps fails. This is unnecessarily stringent and should be removed.** Exhibit D to Appendix B, Section 8.0 "Quality Assurance and Quality Control" provides performance criteria for validating mercury emissions data from sorbent trap monitoring systems. For situations when one trap fails, data from the other trap may be used but the values must be multiplied by a factor of 1.111. This is another holdover from the federal mercury monitoring program, designed for allowance trading and should be deleted for the Illinois rules.[5]

We offer the following wording to effect these changes:

"Exhibit D to appendix B – Quality assurance and Operating Procedures for Sorbent Trap monitoring Systems

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*[FN**] Note: If both traps fail to meet the acceptance criteria, the data from the pair of traps are invalidated. However, if only one of the paired traps fails to meet this particular acceptance criterion and the other sample meets all of the applicable QA criteria, the results*

[5] 40 CFR Part 75.15(h)(2) "Special provisions for measuring Hg mass emissions using the excepted sorbent trap monitoring methodology"

of the valid trap may be used for reporting under this part, ~~provided that the measured Hg concentration is multiplied by a factor of 1.111~~...."

G. **Dominion supports the inclusion of an alternative to continuous emissions monitoring for compliance demonstrations, but asks the Board to make the alternative a permanent option.** The IEPA rules include at section 225.239 periodic emissions testing as an alternative to the continuous emissions monitoring requirement. We are supportive of such an alternative but urge the IEPA to adopt this option as a permanent alternative rather than making it available only until 2012. For many of the reasons we have presented here provide justification to make this alternative permanent, or extended to 2015 or later. We also suggest IEPA consider how an affected facility could "opt in" to this alternative after they have determined, following a good faith effort, that a continuous emissions monitoring option simply will not work for their application.

These changes could be accomplished by the following:

"Section 225.239 Periodic Emissions Testing Alternative Requirements

a) ***

~~*3) The alternative method of compliance provided under this subsetion may only be used until June 30, 2012, after which a CEMS (or an excepted [sic] monitoring system) certified in accordance with Section 225.250 of this Subpart B must be used."*~~

Or, if the alternative is extended to 2015:

a) ***

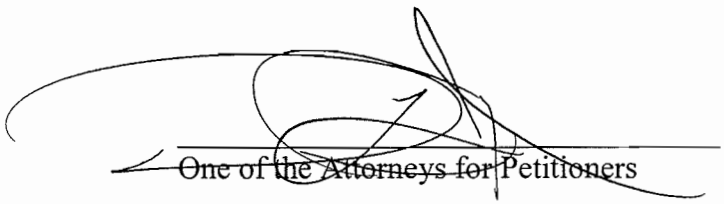
3. *The alternative method of compliance provided under this subsection may only be used until June 30, ~~2012~~ 2015, after which a CEMS (or an excepted [sic] monitoring system) certified in accordance with Section 225.250 of this Subpart B must be used."*

Conclusion

For the reasons listed above Kincaid requests this Board to adopt the changes we have identified in this testimony so that affected facilities can proceed expeditiously with plans for compliance with the IEPA rules.

CERTIFICATE OF SERVICE

I, David L. Rieser, one of the attorneys for Kincaid Generation LLC, certify that I served a copy of Testimony of David Nuckols to th0se persons listed on the attached Notice of Filing on February 2, 2009 electronically and by First Class Mail, postage prepaid.



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