THE FOLLOWING PRE-FILED TESTIMONY ATTACHMENT WILL BE PRESENTED ON BY ONE OR MORE OF THE FOLLOWING INDIVIDUALS:

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February 23, 2009

SUBJECT: COMMENTS IN RESPONSE TO PROPOSED AMENDMENTS TO SECTION 742 OF THE STATE OF ILLINOIS' TIERED APPROACH TO CORRECTIVE OBJECTIVES (TACO) DOCUMENT, DATED 5-23-08

The purpose of this letter is to address proposed amendments to Section 742 of the State of Illinois' Tiered Approach to Corrective Objectives (TACO) Document, dated May 23, 2008. Specifically, this letter addresses Section 742.1210c of that document, which recognizes building control technologies for the purpose of determining remediation objectives that exceed residential remediation objectives. Under the sub-membrane depressurization (SMD) systems section, a "cross-laminated polyethylene membrane liner at least 0.15 mm (or 6 mil)" would be recognized as an adequate vapor barrier. This letter addresses our concerns with respect to the use of this type and thickness of material for vapor mitigation purposes.

GeoKinetics has extensive experience in the investigation and mitigation of subsurface methane gas and organic vapors – both naturally occurring (as is typically the case for methane) or associated with releases of gasoline, chlorinated solvents and other hydrocarbon compounds. GeoKinetics has performed subsurface methane and/or soil vapor investigations and interior air quality monitoring at many thousands of residential and/or commercial properties. These investigations have involved both existing and planned structures. Where regulated levels of methane or Volatile Organic Compounds (VOC's) have been identified, GeoKinetics has implemented appropriate mitigation measures under regulatory oversight. These mitigation measures have included the installation of sub-slab vapor barriers, the installation of passive and active subsurface ventilation systems, and others. The undersigned have prepared plans and specifications for methane and/or vapor mitigation systems for more than 10,000 buildings in the United States over the last three decades. These buildings have included single family residences, multi-family residences, school facilities, hospitals, apartment buildings, retail centers, shopping malls, and commercial / industrial buildings. GeoKinetics has provided a full range of services with respect to methane and VOC barriers – including permitting, installation, and post-installation monitoring. GeoKinetics has developed smoke testing procedures to confirm the integrity of membrane installations and manufactures the equipment necessary for this type of testing. Smoke testing can help insure that tears, perforations, pin-holes, and improperly sealed seams or penetrations are not present in the membrane at the completion of the installation.

In addition to the design of methane and organic vapor barrier systems, GeoKinetics has been extensively involved in the testing of these barriers for performance, reliability and chemical compatibility. Along these lines, GeoKinetics has performed diffusion testing, permeability testing, and strength testing for a number of membrane materials and products. Many of the diffusion tests have extended for periods in excess of six months in order to more thoroughly evaluate the long term performance and chemical compatibility of the membranes. We have also performed post-construction monitoring and testing of sub-slab membrane installations. This work has included the collection of air samples above the membrane and below the floor slab, as well as on the interior of the protected building, to monitor for contaminants. It has also included the coring of floor slabs at more than 1,000 buildings to collect membrane samples for inspection and testing. Many of the membrane samples that were retrieved had been in place for ten years or more.

Several things have become apparent based upon our experience as set forth above. First of all, no membrane is completely effective in so far as blocking the passage of contaminants. All membranes “leak” to some degree. Secondly, there is significant variability in the effectiveness of different types of vapor barrier materials – in other words, some membranes leak much more than others. For example, the rate at which organic vapors can pass through a 6-mil low density polyethylene membrane can be orders of magnitude greater than for a more conventional 60-mil high density polyethylene membrane. Third, damage in the form of penetrations and tears, along with improperly sealed seams, can cause order of magnitude increases in the rate of vapor transmission across a membrane. Relatively thin 6 to 10-mil membranes are much more prone to construction damage than the standard 60-mil membranes that are typically used for VOC vapor mitigation. Of the thousand+ structures with 6 and 10-mil vapor barriers that we have performed post-construction testing on to date, we have yet to find a single installation that did not have an unacceptably high rate of membrane holes / open penetrations for a VOC barrier application. This is in contrast to standard 60-mil membranes where holes / open penetrations are rare.

Based upon our experience and observations, we do not believe the use of a 6-mil cross laminated polyethylene vapor barrier would be effective or appropriate for many installations. As outlined above, there is a much greater potential for elevated rates of vapor migration across such a membrane for many reasons. Our experience indicates a typical 6-mil installation is not nearly as effective or reliable as a standard 60-mil barrier. This is not to say there are no suitable applications for 6-mil vapor barriers. There are many appropriate applications that need to be evaluated and identified on a site by site basis. However the adoption of a standard that would allow for the universal use of a 6-mil vapor barrier would be problematic and would likely result in excessive VOC vapor transmission, along with potential exposure issues, and/or excessive water vapor transmission and associated property damage in many instances.

Furthermore, Section F of the SMD sub-section of Section 742 requires that a smoke test be performed in accordance with the manufacturer's requirements to ensure that no leaks exist. In our experience, smoke testing a 6-mil polyethylene system is very difficult to perform, and in many cases is not fully effective. Since the barrier is so thin and light, it is lifted off of the sub-grade at a pressure of approximately 0.003 psi. This low confining pressure makes the smoke test less effective. Higher pressures typically result in excessive lifting of the membrane and the associated potential for damage. A 6-mil polyethylene barrier is often capable of providing adequate protection from water vapor transmission, depending upon the site conditions. However, when the health and safety of building occupants is dependant upon the quality and reliability of a barrier, it is our opinion that a 6-mil vapor barrier would present an unacceptably high level of risk at many sites.

We hope this information is helpful to you. We would be happy to address any questions or comments the assembly members might have in regard to this issue, or any related issue. Please do not hesitate to contact either of the undersigned if you have any questions or comments.

Sincerely,
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