Dear Mr. Luening,

Unfortunately, I am not available to attend the meeting next week. My teaching assignment at Suffolk University will not allow me to make it there in time for the meeting. I can see that you would like to have an expert in attendance that could address questions on fluridone herbicide product. My supervisor and I would like to reiterate that the fluridone is approved for permitted use in Massachusetts lakes and ponds. Review of this herbicide in context of typical conditions in the state have indicated that the use according to label instructions and any additional conditions specified with the permitting does not cause unreasonable adverse effects to human health and the environment. As indicated in the information that I provided last year, the label allows the use of this herbicide in drinking water reservoirs. During several decades of use of fluridone herbicide, the Department has not learned of any human health issues related to exposure of drinking water to this herbicide.

Your email also points to concerns about the breakdown product NMF. I did take some time to collect some information on NMF which is included in the attachment. The information suggests that NMF is initially formed as part of the fluridone degradation process, it is very short lived and highly susceptible to biodegradation. For this reason, NMF is typically not detected in treated water bodies. The low exposure levels are therefore not of concern for toxicological effects.

I hope this is helpful information.

Best regards,

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Fluridone and NMF breakdown product information:

N-methyl Formamide (NMF) is the major degradate when fluridone is applied to water bodies. A number of studies have been conducted under field conditions and these studies suggest that NMF is undetectable in water bodies treated with fluridone at the maximum application rate.

Source: EPA 2004: http://www.epa.gov/pesticides/reregistration/REDs/fluridone_tred.pdf

Cornell Cooperative Extension Services:

An issue associated with the use of fluridone concerns a potential photolytic breakdown product. N-methyl formamide (NMF) is a potential teratogen, fetotoxin, hepatotoxin, and cytotoxin. NMF was first observed in laboratory photolytic studies using distilled water and lake water (Saunders and Mosier 1983). However, NMF was not observed in field studies conducted outdoors in artificial ponds with radiolabelled fluridone (Berard and Rainey 1981 in Osborne et al. 1989) or in experimental ponds in Florida at a detection limit of 2 ppb (Osborne et al. 1989). Although NMF has never been observed as a breakdown product under natural conditions, worst case calculations were performed on its potential to affect human health by the state of Washington (WSDOE, 2000). In summary, the safety factors for NMF exposure through drinking water and through skin absorption are very high, both under a worst case scenario (30,303 X and 1,111,111 X, respectively) and under more realistic conditions (>149,254 X and >5,555,555 X). Under worst case conditions, a person would need to drink 15,852 gallons of treated drinking water per day to reach the NOEL, or greater than 78,077 gallons per day under realistic case conditions. For incidental ingestion, a person would have to swim in fluridone treated water for 1,014 years under worst case conditions and for >5,070 years under realistic case conditions in order to be exposed to equal the no-effect level (NOAEL, No Observable Adverse Effect Level), or the concentration at which health effects were first observed. Washington State concluded that the use of fluridone according to label instructions does not pose any effect to human health. These are large margins of safety, and the amount of water a person would need to drink or the time a person would need to swim to reach the NOAEL is very unrealistic (WSDOE, 2000). - See more at: http://staff.ccetompkins.org/environment/invasive-species/fluridone-herbide-treatment-faq#sthash.QG3gWJnV.dpuf

Source: Fluridone: herbicide treatment FAQ - Cornell Cooperative Extension of Tompkins County

USDA Forest Service Risk Assessment of Fluridone (2008):

This document contains a section that reviews information on the NMF metabolite; below is the an excerpt from concluding paragraph:

-----the field data from West et al. (1990) as well as Osborne et al. (1989) indicate that NMF is not found in natural water after fluridone applications. This information is consistent with the supposition that NMF is formed by the photolysis of fluridone but is much more rapidly biodegraded in water. Thus, there is no basis for asserting that NMF exposures will be toxicologically significant, relative to those of fluridone. As discussed further in Section 3.4.3 (Risk Characterization for members of the general public), the hazard quotients for fluridone are far below any level of concern, and any incidental exposure to NMF would not substantially impact the characterization of risk.

Source: http://www.fs.fed.us/foresthealth/pesticide/pdfs/0521002a_Fluridone.pdf