Draft of my comments for the Park District of Highland Park

I always like to start off my comments with a joke. So here it is "The bartender said 'Hey, we don't serve faster than light neutrinos in this bar.' A neutrino walked into the bar."

I didn't get this joke when I first read it, but scientists at the CERN physics lab in Europe recently reported that they detected a neutrino moving faster than the speed of light, which violates the fundamental laws of physics described by Einstein 100 years ago. So, in the joke the image of neutrino comes into the bar before the neutrino arrives. Thus the normal order is reversed.

But this joke highlights an important principle of science, theories are supported by evidence gathered through research, and as long as the evidence supports the theory, all is well. However, once data shows the theory fails, then a new theory must be developed.

Today, you're dealing with the issue of using herbicides to control weeds in turf. The question you want answered is "are these pesticides safe to our children, pets, and to adults?"

Let me ask you a question. Do you believe human activity is causing our climate to change? I'm not a climate scientist, but the Intergovernmental Panel on Climate Change (IPCC) represents climate scientists from around the world who are in near total agreement that human activities are causing global climate change. However, many in the conservative media have waged an active campaign to discredit the world's climate scientists. And in the US, they have largely succeeded. Climate skeptics abound, and they believe the climate scientists are corrupt and that government funding only goes to those who are willing to support the theory that greenhouse gases cause global climate change. On its face, this is preposterous. Science doesn't work this way, and you can't have a conspiracy around the globe to present fraudulent data. Yet, I'm confident everyone in this room knows a climate skeptic or two.

So, what is the point you might ask? Herbicides are rigorously tested for environmental safety, evaluated by EPA scientists, and decisions rendered with the public's health as the first priority. Yet, many people in this room believe that the EPA scientists are corrupt, that data is falsified, and that these companies put their profits above human

safety. I've found that I can't reason with climate skeptics, they dismiss all the arguments I know (for example, 97% of the world's climate scientists are in agreement that human-generated greenhouse gases are causing the climate to change). Likewise, I can't reason with people who believe pesticides are carcinogenic, highly toxic, and responsible for most of the cancer and birth defects in our country. The data clearly doesn't support people who think this way, yet many do. A considerable number of parents have stopped vaccinating their children because of a discredited research paper. Why do we find it so difficult to believe in scientific consensus?

Just as there are climate skeptics, there are a number of pesticide skeptics, those who believe that, despite the scientific consensus, pesticides pose an unreasonable risk to human health. Some of these skeptics are PhD trained scientists and I respect their scientific opinions and research. Science works by consensus. If you think the consensus is wrong, you do experiments to show that, and you publish the results. If you're right, others will repeat and expand your work and results. Slowly, the consensus changes.

Dr. Warren Porter submitted a letter to the board expressing his opinions on pesticide concerns. I'm not a toxicologist, and Dr. Porter's publication record indicates that he is principally an entomologist studying the effects of climate change on insects, but I wish to draw your attention to two statements made by Dr. Porter that I believe are telling. In his first paragraph he states "…"other" ingredients are designed to promote rapid penetration across the skin and respiratory surfaces." His statement is extremely misleading. Why would a company that develops a product to control weeds design that product to penetrate skin and respiratory surfaces? Wouldn't the better course be to develop a product that readily passes through the cuticle of a leaf?

In his last paragraph, he has a statement that defies credulity. He states that because Whitefish Bay WI has the second highest incidence of breast cancer in the US and you can "smell pesticides from April through September", therefore breast cancer is caused by lawn care chemicals. Does this kind of science pass the smell test (pun intended)? Despite his olfactory analysis, these products are widely used around the country and I highly doubt you can correlate lawn care pesticide use with breast cancer rates. By the way the 1997 registration for triclopyr is available through the EPA web site and is a wealth of toxicological and environmental data. The carcinogenicity rating for triclopyr is a Group D chemical (not classifiable as to human carcinogenicity).

I'm not a toxicologist, I study turf management and pesticides are a part of turf management. Do they have to be? No, but turf quality is generally improved when pesticides are used judiciously to control pests that can't be controlled in other ways. I'm a big believer in organic production techniques, particularly the use of composts and natural products in agronomic, i.e. row crops like corn and soybeans, fertility. However, I do not believe that organic management systems are clearly superior to using pesticides and inorganic fertilizers in a turf management system, except where soil quality is poor, i.e. disturbed soils, subsoils, and soils high in clay content. In those soils, using compost or composted manures or meals (i.e. bone, feather, etc) is a better practice than using conventional fertilizers and will result in higher turf quality. The concern with using natural product fertilizers is the increased potential for phosphorus runoff. Natural products will contain phosphorus and most of our soils in Illinois have sufficient phosphorus, so using a natural fertilizer is a double-edged sword. Yes, it is good for the soil, but the potential for P runoff increases. Using conventional fertilizers without any phosphorus is probably a better environmental practice when soil quality is good.

Why do we need herbicides in turf?

Broadleaved weeds are common in turf and include plants such as dandelion, white clover, plantains, knotweeds, spurge, oxalis, etc. Many of these weeds are perennials and once established they have to be killed or removed, they don't go away on their own. Annuals, by contrast, die each year so a healthy turf is often the best defense against annual weeds since competition will help keep them out. However, once weeds like dandelion, plantain, and white clover become established, they need to be killed, removed, or lived with. Broadleaf weeds disrupt the uniformity of the turf and may affect playability of the field if they affect footing, ball bounce, etc. There are no current organic products that selectively control broadleaf weeds. We recently conducted a small trial to examine organic methods to control weeds. We compared vinegar, clove oil, and Ortho EcoSense. All products are non-selective, that is you have to selectively treat just the weeds as treating the turf can cause damage. Vinegar kills weeds but is very injurious to any turf it contacts. Clove oil is marginal at best. Ortho Ecosense looks a little more promising, particularly on dandelion. My guess is that the dandelion leaves are controlled, not the

whole plant (taproot) and it will come back from the taproot. This trial is ongoing and may lead to an acceptable alternative if the EcoSense does indeed control dandelion. Other universities have not seen good control from these products.

What happens to Pesticides applied to turf?

One of the major problems I have with citizens who think pesticides applied to turf are serious health risks is the level of exposure. How do youth get exposure to these products? Contrary to Dr. Porter's conjecture, pesticides are designed to be absorbed into the foliage of the plant (if they are postemergence herbicides like the ones we use to control broadleaf weeds). This occurs relatively rapidly for most pesticides and after the pesticide dries on the leaf, it is difficult, but not impossible, to dislodge these residues off the leaf surface. Once dry, I would have no problem with my children playing on such surfaces one day after an herbicide application. Second, turf is a great system for degrading pesticides and other applied organic materials. Unlike row crops, a good turf is a layer of organic matter on top of the soil. Organic matter is highly absorptive of organics and is teeming with microorganisms that can readily break down pesticides. Pesticide half-lives are determined in an aerobic soil environment, and these are the values reported to the EPA. However, half-lives determined in turf are usually smaller, faster degradation, than in soil. A former graduate student of mine determined the half-lives of five pesticides in turf or in bare soil (Gardner et al. 2000 and Gardner and Branham, 2001a and b (see CV)). We found that pesticide half-life for halofenozide, an insecticide, was not significantly different in turf versus bare soil. However, for the fungicide propiconazole (Bannner ™) the half-life decreased from 29 days in bare soil to 12-15 days in turf. The herbicide ethofumesate (Prograss) had a soil half-life of 51 days and a half-life in turf of 3 days. So, turf is very good system for degrading applied herbicides.

How do we get exposure to these pesticides? Dr. Porter made a comment in his letter about smelling these pesticides, and blanket statements are to be avoided, but most broadleaf herbicides for use on turf are applied as amine salts, this is how they are formulated. Salts are usually non-volatile; table salt has no smell or odor. Often the odor we do smell is not the herbicide but either impurities or other materials in the herbicide formulation. Some manufacturers have developed low-odor formulations for this very

reason. So, inhalation is not a common route of exposure since the amine salts are non-volatile. Oral uptake would occur from chewing on the grass, which should be discouraged. The other route of entry is dermal exposure. Once dry, these compounds would be difficult to dislodge from the turf. However, some exposure may occur if the turf is used the morning following an application, and there is significant dew that could cause the herbicide to go back into solution.

The major source of pesticide exposure for most Americans is from our food supply. Specifically from fresh fruits and vegetables. Our modern agricultural system is highly mechanized and efficient, and pesticides are sprayed frequently on fruits and vegetables. Yet despite this, every study shows that you are much healthier by eating a diet rich in fruits and vegetables.

Recommended strategy

The decision to use herbicides rests with the Park District management. However, the citizens should have a say in whether herbicides are used or are not used. This meeting is an excellent venue to voice your concerns. The most commonly used herbicide in lawn weed control is still 2,4-D, which was discovered over 70 years ago and has been widely used in lawn weed control since the 1970's. Surely, if this was problem, scientists would have discovered the cause and effect by now. So, I caution the community not to overreact to a very rational herbicide use policy employed by the Park District. I fear we are entering a new "dark age" where science is trumped by internet rumor, innuendo, and fabrication.

I believe a single application of a broadleaf herbicide, such as Confront, can be safely applied after the soccer season is completed, provide outstanding control of the broadleaf weeds*, and by virtue of the application timing, be completely safe to the children of Highland Park. By applying the herbicide after the season is complete, you can keep children and pets off the field for several days (or as long as you wish) to reduce the potential for pesticide exposure. If you have further questions, I would be happy to answer them.

Sincerely,

Bruce Branham
Professor
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* I can provide data showing the performance of late season, 10/15-11/15, broadleaf herbicide applications that indicate that this timing provides better control than traditional spring applications or applications made in early September, the traditional timing for a late year treatment.