

*The*  
MINNESOTA  
PROJECT

ADVANCING SUSTAINABILITY FOR COMMUNITIES ACROSS MINNESOTA

March 10, 2010

Gregg Regimbal  
Minnesota Department of Agriculture  
Pesticide and Fertilizer Management Division  
625 Robert Street North  
Saint Paul, MN 55155-2538

RE: Comments on the Special Registration Review of the Herbicide Atrazine in Minnesota

Dear Mr. Regimbal:

The Minnesota Project would first like to thank the Minnesota Department of Agriculture for inviting comments on the Special Registration Review of the Herbicide Atrazine in Minnesota, as requested in the Minnesota State Register, dated January 19, 2010.

The Minnesota Project is a non-profit organization dedicated to creating more sustainable systems of agriculture, food, and energy. For over 30 years, The Minnesota Project has been at the forefront of efforts to improve the wellbeing of Minnesotans through a focus on ecological health, sustainable farming practices, and rural economic development. The organization played a key role in establishing the RIM-CE, Reinvest in Minnesota-Clean Energy, program and has played a lead role in establishing innovative environmental quality indices programs designed to easily and effectively measure and quantify the environmental impacts of various crop production techniques. The Minnesota Project has also worked at the federal level to lead in the effort to increase federal funding for natural resource conservation. It is in light of this deep investment in the land and people of Minnesota that we offer the following comments on the review of atrazine use in our state.

We applaud the Minnesota Department of Agriculture for promoting alternative approaches to atrazine application. Chemical herbicides are not a necessary part of corn production. This is particularly true when the herbicide in question has such a significant environmental impact. Crop rotations of soybean, forages, and small grains have proven effective in breaking up weed cycles in corn, without having to rely on atrazine and other chemicals. Cover crops such as hairy vetch and rye effectively suppress weed growth by out-competing weeds for sunlight, nutrients, moisture, and space; and have the added benefit of reducing erosion and enriching the soil. Simple physical controls to impede weed growth were mankind's first method of herbicide. The rolling cultivator, the spring-tine weeder, and the flame weeder are essential

tools in organic operations, and bring added efficiency without the burden of chemicals. Yet, despite the effectiveness of these methods, it will take more than a statement of endorsement by the MDA to make them common practice. Independent farming is a difficult profession. It is unrealistic to expect such a financially vulnerable sector of the industry to voluntarily forgo the benefits of a product based on a recommendation alone. This is exacerbated by the fact that such recommendations invariably are met with an amply funded backlash from atrazine's primary manufacturer, Syngenta. Taking atrazine off the market or significantly restricting its use and application are the only ways to truly encourage farmers to look at effective alternative methods of pest control that do not carry the environmental impact of atrazine. Such a move would be both environmentally beneficial in the short-term and serve as an impetus to broader reform in agricultural practices. Yet this will not be possible as long as Syngenta is allowed to manipulate farmers and the regulatory process intended to protect them. To bolster an agricultural system that is becoming ever more untenable, both ecologically and economically, we depend on a practical dialogue between regulators and farmers about these issues. For this dialogue to transcend the narrative of the last 50 years, regulators must take greater note of the needs and health of independent farmers, their families, and consumers.

When weighing the costs and benefits of an herbicide such as atrazine—which is reasonably effective at achieving its marketed function of eradicating broadleaf weeds, but is also classified as an endocrine disruptor in mammals—it is generally understood that there is an implicit and accepted risk. This concept is based on the assumption that said risk is both transparent and minimal, and has a negative correlation to the economic benefits of the product. Or, as stated in Minnesota Statute 18B.01; Subdivision 31, the use of atrazine and other herbicides must not present an “unreasonable risk to humans or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide.” Similar language is included in the Federal Insecticide, Fungicide, and Rodenticide Act. We believe, and numerous peer-reviewed scientific studies<sup>1</sup> support this belief, that atrazine has the potential for serious and detrimental effects on both human and environmental health, and that these dangers far outweigh the economic benefits of continued use of the herbicide, especially in light of readily available replacement herbicides and, more importantly, chemical-free weed management techniques.

We also object to the way in which Syngenta has misrepresented its product to farmers, the U.S. Environmental Protection Agency, and the general public. The company's insistence, in the face of mounting evidence to the contrary, that there is no risk to human health or the environment from the “recommended use” of its product is contradictory to the findings of many scientists engaged in independent research of the chemical, most prominent among them Dr. Tyrone Hayes of the University of California, Berkley.

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<sup>1</sup> A) Tyrone Hayes, et al., “Hermaphroditic, Demasculinized Frogs After Exposure to the Herbicide Atrazine at Low Ecologically Relevant Doses,” *Proceedings of the National Academy of Sciences* 2002, Vol. 99; part 8, pages 5476-5480. B) Jennifer Sass and Paul Brandt-Rauf, “Cancer Incidence Among Triazine Herbicide Manufacturing Workers,” *Journal of Occupational and Environmental Medicine*. Vol. 45, No. 4 (April 2003), 343-344. C) M.A. Kettles, et al., “Triazine Exposure and Breast Cancer Incidence: An ecologic study of Kentucky counties,” *Environmental Health Perspectives*, Vol. 105, No. 11 (1997), 1222-1227.

Syngenta's claims regarding the safety of atrazine are also inconsistent with the findings of the EPA. The agency discovered atrazine concentration to be above the federal safety standard of three parts per billion in 94 of the 136 public water systems tested in a 10-state monitoring program between 2003 and 2005.<sup>2</sup> The program's formula specified that atrazine concentration had to persist at levels above the federal standard for at least 90 days to be considered noteworthy. This requirement is more stringent than the one Syngenta is obliged to abide by based on federal guidelines. The EPA only requires that levels stay under three parts per billion as an annual average. Even extended periods above this percentage are acceptable, as long as the average concentration for the year does not exceed the limit. This program's findings disprove Syngenta's claim of absolute safety. Given that the levels set by the EPA are considered to be the *maximum acceptable for public health*, the fact that atrazine has exceeded this level even once means that the "recommended use" of the herbicide does, under the EPA's own definition, pose a risk to human health. Ninety-four such instances of excess are unconscionable. The only reason the company is able to avoid penalty is thanks to this yearly-average accounting loophole. There is no evidence, however, that a cycle of short, precipitous spikes in atrazine followed by longer periods of low-level exposure is any safer than a more constant, moderate level of exposure.

In fact, research suggests the opposite. Studies show that exposure to high levels of atrazine, however brief in duration, is dangerous.<sup>3</sup> The EPA's current atrazine standards wrongly assume that the human body can withstand exposure to high concentrations of this chemical, if it is in turn allowed an extended period of lower levels to detoxify. This may be a reasonable assumption, if the primary concerns about atrazine were based on its chemical toxicity. But chemical toxicity is not the main problem resulting from widespread atrazine use. It is atrazine's propensity to disrupt the endocrine system in amphibians that worries Dr. Hayes, not its direct toxicity. In the course of his research, which was initially funded by Syngenta, Hayes found that introducing atrazine into the habitat of African clawed frogs at concentrations 30 times **below** the federally established limit for safety caused severe hormonal disruption in the males of that species. These disruptions were characterized by hermaphroditic development, absent or additional testicles, and other sex organ abnormalities. Hayes concluded that atrazine activates a gene that produces aromatase, an enzyme that converts testosterone into a powerful form of estrogen. The presence of excessive amounts of aromatase could explain the sex organ abnormalities in the male frogs, and also account for the lack of disruption in the females. These reactions occur on a hormonal rather than a chemical level, and hormones such as testosterone and estrogen function at micro levels. Very minute alterations can prove incredibly disruptive. This means that the consequence of very low doses of atrazine and other hormone disruptors can be amplified within the delicate endocrine systems of both amphibians and humans. Such amplification indicates that, while the toxicological risks of atrazine may be relatively low; from an endocrinological standpoint, atrazine is quite dangerous. Because of amphibians' ability to serve as accurate proxies for predicting human response to chemicals, the disastrous effect atrazine had on the frogs in

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<sup>2</sup> Mae Wu, et al., "Poisoning the Well: How the EPA is ignoring atrazine contamination in surface and drinking water in the Central United States" 2009, Natural Resources Defense Council publication, pages 3-5 <http://www.nrdc.org/health/atrazine/default.asp> (accessed Feb. 15, 2010).

<sup>3</sup> T. Colborn, "Commentary: Setting aside tradition when dealing with endocrine disruptors," 2004 *Institute for Laboratory Animal Research Journal* 45(4):394-400 (accessed Feb. 15, 2010).

Hayes's experiments should be taken seriously as an indicator of long-term impacts on human health and well-being.<sup>4</sup>

A recent study of atrazine by the Natural Resources Defense Council also found that concentrations of atrazine in drinking water frequently exceeded acceptable levels. Using data collected during a U.S. Geological Survey, the NRDC found that approximately 75 percent of stream water and 40 percent of groundwater in agricultural areas is contaminated with atrazine. The study highlighted the way atrazine concentration periodically spikes far above acceptable levels. Perhaps more noteworthy were the NRDC's findings regarding the relationship between atrazine exposure and fetal development:

The adverse reproductive effects of atrazine have been seen in amphibians, mammals, and humans—even at low levels of exposure. Concentrations as low as 0.1 ppb have been shown to alter the development of sex characteristics in male frogs. When exposure coincides with the development of the brain and reproductive organs, that timing may be even more critical than the dose. Also of great concern is the potential for atrazine to act synergistically with other pesticides to increase their toxic effects.<sup>5</sup>

Spikes in atrazine saturation raise a number of troubling issues. The high levels noted by the EPA monitoring program and the NRDC study offer cause for serious consideration, given their impact on human reproductivity and early brain development. The 90-day peaks observed in the EPA program represent an entire trimester of the human pregnancy cycle. Many public health experts have voiced concern with the potentially harmful effects of exposure to pregnant women and other high-risk groups. Yet current regulations take no added precautions to protect them. The third through eighth weeks of pregnancy are known collectively as the embryonic stage, during which time the embryo experiences most of its major organ development. It is also the stage where the embryo is most susceptible to hormonal disruptions caused by toxins and other environmental factors. Women in agriculture-rich areas who have the misfortune of entering this stage of pregnancy during the spring, when atrazine and other chemical levels in drinking water are at their peak due to runoff and crop treatment, face heightened risk of having babies with disrupted brain development. It is incumbent upon regulators to monitor water quality more vigilantly to protect pregnant women from harmful chemicals already present in drinking water systems, and tighten restrictions on these chemicals for the safety of future generations.

If history teaches us anything about the delicate relationships between the chemicals used to improve industrial productivity and human health, it is that it takes years for us to fully understand impacts of chemical use or to recognize the correlation between chemical use and unintended side effects. This story has played out before; with DDT, polychlorinated biphenyls (PCBs), and daminozide, to name just a few. Just like atrazine, all of these chemicals went through comprehensive short-term testing and were deemed safe by federal regulatory agencies. Just like atrazine, they enjoyed miracle status in their respective sectors of industry thanks to their unique properties and ability to increase profitability. Yet all fell

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<sup>4</sup> William Souder, "It's Not Easy Being Green: Are weed-killers turning frogs into hermaphrodites?" *Harper's Magazine* Aug. 2006 (accessed Feb. 6, 2010).

<sup>5</sup> Wu, "Poisoning the Well," Pages 3-4 (accessed Feb. 15, 2010).

from grace as a result of greater scientific understanding of their impact on human and ecological health.

In the mid-20<sup>th</sup> century, DDT was heralded as a godsend. It was used to combat malaria in the Pacific Theatre during the Second World War, and to control predatory insect populations at home. At the height of its popularity, DDT was considered so safe that the U.S.D.A. recommended it as an everyday household cleaner, perfect for use on kitchen surfaces “where flies may be attracted by food odors.”<sup>6</sup> It took over fifteen years for the federal government to implement a ban on DDT after the first scientific findings began to indicate its dangers. Even after the publication of Rachel Carlson’s seminal work *Silent Spring*, in 1962, it took the EPA another 10 years to restrict application of the pesticide. The costs of this delay are still being felt. According to a 2007 study by researchers at UC Berkley, women who were exposed to DDT as children are five times more likely to develop breast cancer as adults.<sup>7</sup> Similarly, knowledge of PCBs’ dangerous toxicity dates back at least to 1937, when Harvard’s School of Public Health held a conference on the subject. Yet use of PCBs continued without real restriction until a ban by congress in 1979. Thirty years later, our addiction to PCBs and the ease they brought to manufacturing electrical components continues to haunt us. Over the next six years, 250,000 pounds of the chemical are expected to be dredged from the Hudson River, according to the EPA. Yet fish from the river will still be far too toxic to eat 60 years after the river has been cleaned.<sup>8</sup> Of the three now-restricted chemicals, the case of the daminozide ban is perhaps the closest to a public health success story. Only five years elapsed between the EPA classifying the chemical as a probable carcinogen and its ban in 1989. Interestingly, the ban appeared only after the product had been voluntarily withdrawn by its manufacturer.

Presenting profitability and responsibility in farming as a zero sum game creates a false choice and provides an inaccurate representation of the options available to Minnesota farmers. Agricultural producers can make choices that promote ecological health while still maintaining and even increasing farm profitability. This reality is amply supported by recent market trends in organic agriculture. But aside from the robust increase in consumer demand for organic and chemical-free products, it should be noted that even farmers who regularly use other forms of chemical pesticide on their crops are growing leery of products containing atrazine, in light of mounting scientific evidence pointing to the serious dangers of the chemical. Atrazine use has been banned in the European Union for seven years, as well as in Syngenta’s home country of Switzerland. Wisconsin has restricted its use, with no discernable economic ill effect. And the MDA has itself promoted alternatives to atrazine treatment.

As with other products the public has deemed too risky to justify continued use in spite of the absence of a federal ban (the world’s largest retailer, Wal-Mart, has removed products containing Bisphenol A and rBST from its shelves) it is possible that the market will correct

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<sup>6</sup> L.S. Henderson, "DDT in the Home," *Yearbook of Agriculture, 1943-1947* 1947, Washington: USGPO, pg 646 (accessed March 2, 2010).

<sup>7</sup> Marla Cone, “Study Finds DDT, Breast Cancer Link,” *Los Angeles Times* Sept. 30, 2007 (accessed March 2, 2010).

<sup>8</sup> David Gargill, “The General Electric Superfraud: Why the Hudson River will never run clean,” *Harper’s Magazine*, Dec. 2009 (accesses Jan. 12, 2010).

itself, and atrazine will be phased out. But due to its ubiquity and the huge market share occupied by Syngenta, such a correction would take years, and is not guaranteed to occur. Unregulated, market forces will continue to reward the use of atrazine. This places considerable costs on others who must address the environmental and health problems caused by its use. This matter requires more immediate attention by the MDA.

When reviewing the economic impact of atrazine, one must consider the hidden costs associated with the chemical, not just the direct costs of weed management. Many farmers in the Midwest enjoy the low cost per acre of administering atrazine to their fields. However, these same farmers are unwittingly sharing, together with everybody in the region, the estimated \$400 million annual cost to water utilities of cleaning up atrazine contamination in ground and surface water. And, according to WorldWatch Institute, the U.S. National Research Council estimates that “initial cleanup of contaminated groundwater at some 300,000 sites in the United States could cost up to \$1 trillion over the next 30 years.”<sup>9</sup> This cost is unacceptable, given that Syngenta’s reported revenue for 2009 was over \$11.5 billion.<sup>10</sup> In no way should a foreign company be allowed to reap these huge profits when such profits get developed by creating undue costs to consumers and taxpayers.

It is up to the agencies charged with ensuring the health of our people and our land to bring about change. Most farmers, like most citizens in general, look to federal agencies such as the EPA and state agencies such as the Minnesota Department of Agriculture to keep them safe from toxins and other environmental hazards. They assume a product registered with the agency must be safe. Yet the Government Accountability Office raised some serious concerns in a report last year regarding the quality of the oversight provided by the EPA. According to the report, the EPA “lacks adequate scientific information on the toxicity of many chemicals that may be found in the environment — as well as on tens of thousands of chemicals used commercially” in the United States.<sup>11</sup> The agency has struggled with setting a standard for potential harm caused by industrial and agricultural chemicals. Chemical impacts on the endocrine system are far more complex than those associated with direct toxicity, and the agency’s oversight in this field is relatively new. This reality places the burden squarely on the shoulders of the MDA to protect Minnesotans from the dangers of atrazine.

Furthermore, as can be seen in the cases of DDT, PCBs, and daminozide; progress on the federal level to take appropriate action can be incredibly slow. But we cannot afford to wait while the EPA faces its own internal entropy. Toxins found in groundwater are filtered out much more slowly than those found in rivers. Ancient underground aquifers still contain water from 1,400 years ago. Contamination of groundwater is essentially permanent. It is only a matter of time before atrazine leaches into these aquifers. And there it will stay. Nearly 99 percent of America’s rural population depends on groundwater for drinking, and 43 percent of

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<sup>9</sup> “The Hidden Freshwater Crisis,” The World Watch Institute, Dec. 9, 2000.  
<http://www.worldwatch.org/node/1684> (accessed Feb. 15, 2010).

<sup>10</sup> <http://investing.businessweek.com/research/stocks/snapshot/snapshot.asp?ticker=SYT:US> (accesses March 8, 2010).

<sup>11</sup> “Transforming EPA’s Process for Assessing and Controlling Toxic Chemicals,” United States Government Accountability Office, [http://www.gao.gov/highrisk/risks/safety-security/epa\\_and\\_toxic\\_chemicals.php](http://www.gao.gov/highrisk/risks/safety-security/epa_and_toxic_chemicals.php) (accessed Feb. 15, 2010).

irrigation uses groundwater.<sup>12</sup> It is imperative that we confront this looming catastrophe now, while we still can. It would be a grave mistake for state regulatory agencies to follow the example set by the EPA's leisurely and short-sighted review process. Federal inaction is an opportunity for Minnesota to set the standard for responsibility. The MDA should lead the way in promoting farming practices that protect farmers and consumers and instigate responsible crop production by reconsidering its registration of atrazine and placing restrictions on atrazine appropriate to addressing the harm this chemical presents to human reproductivity and brain development.

Thank You,

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Morgan Winters  
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<sup>12</sup> "The Hidden Freshwater Crisis," The World Watch Institute.