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**From Pay Cut
or Furlough**

Soil vs. Oil

Wednesday 12 July @ 17:12:32

Or How Not To Treat Soil Like Dirt

By Leah Johnston

Watching the sun come up over an organic broccoli field on a recent Monday, I witnessed a pink and orange burst of light hovering above the horizon, obscured only slightly by a dress of mist. I put my hands into the clay loam soil. It felt rich and fertile, yielding row after tended row of plump, perfect broccoli stalks. A tepid wind blew in the chamomile fragrance of recently-cut pineapple weed. I was in Eureka Township, 40 minutes south of the Twin Cities, on a 100-acre farm known as Gardens of Eagan. The farm belongs to Martin and Atina Diffley and their land has been certified organic since 1974. The Diffley family started farming in the Twin Cities area in 1857, but Martin's aunts were forced to sell their original Eagan homestead in 1989 due to suburban sprawl and the resulting insurmountable tax assessments.



After an extensive search, Martin and Atina found their present land in Farmington. If you've ever bought organic produce from The Wedge, or other local co-ops, Whole Foods, Lunds or Byerly's—chances are you've tasted the quality of their produce. They also operate a roadside stand that runs from late July through October at 4355 S. Robert Trail, in Eagan. In 2005, 650,000 pounds of vitally-charged fruits and vegetables were brought to local stores by the Diffleys. That's a testament to the idea of keeping it local, keeping it organic. Long-term health studies reveal the dangers of pesticide-derived toxins that harm physical health, while petroleum prices skyrocket due to dwindling resources (making shipping food a more expensive enterprise). Organic local farmland could well be the hobbit that will save us all.

So it is ironic that a farm, designed to reduce demand on petroleum by providing healthy, life-sustaining fruits and vegetables to our local markets is currently under threat by petroleum interests.

The Threat

On Jan. 5, 2006, the Minnesota Public Utilities Commission (PUC) received an application for a routing permit from the Minnesota Pipe Line Company (MPL) to build a 295-mile pipeline for transporting Canadian crude oil from Clearbrook, Minnesota to the Flint Hills Resources Refinery (also known as the Koch Refinery) in Rosemount. The proposal, called the MinnCan Project, would cut a pipeline route through 149 miles of farmland, including four organic farms.

The heart of Gardens of Eagan is directly in its proposed path. The pipeline would carry as much as 350,000 barrels per day of crude oil and would operate at a maximum pressure of 1,462 pounds per square inch.



In a letter prepared by Atina Diffley for the general public to create awareness of this issue, she asks, “Do you think organic food should be grown on top of crude oil pipelines?” This is an important question. To begin to answer it, one need look no further than Minnesota Pipe Line Company’s 250-page Routing Permit Application. It starts off simply enough, stating basic structural facts.



For example, the pipe’s outside diameter is 24 inches, its wall thickness ranges from 0.350 to 0.500 inches, and the tensile strength in pounds per square inch ranges from a minimum of 66,000 psi to 82,000 psi. However, an extensive Material Safety data sheet casts an ominous shadow over things. Ingredients that will run through the pipeline are listed as follows: crude oil, n-Hexane, benzene, toluene, xylenes, hydrogen sulfide, ethylbenzene, and polycyclic aromatic compounds. Several health hazard warnings are then explicitly stated. According to MPL’s routing permit application, hydrogen sulfide “causes rapid death due to metabolic asphyxiation. Case reports suggest that toxic amounts can enter the body through a punctured eardrum, even while wearing some types of respiratory protective equipment.” N-Hexane is a “skin, eye and respiratory tract irritant. It is a cardiac sensitizer, central nervous system depressant and a neurotoxin. Acute exposure may result in dizziness, asphyxia, anesthesia, brain damage and cardiac arrest at high concentrations.” The list of warnings for n-Hexane also includes “paralysis of the limbs” and “damage to the testes and fetal effects in a two generation animal study.” Overexposure to Toluene “may result in damage to the brain, liver, kidney, cardiovascular, respiratory and neurological systems” as well as “blindness and hearing loss.” [Attachment 4415.0120, pg. 9]



The list goes on and does nothing to alleviate concerns about the harmful effects of crude oil materials on our soil. Do we want to take the chance that this product, in whatever amount, could end up in our food supply? MPL’s data shows 176 spills since 2000—approximately 10,134 barrels, or 425,628 gallons of petroleum were released from Koch Pipelines [MPL CON (certificate of need), p. 17]. One of the pipeline ruptures near Little Falls, Minn., spilled 134,000 gallons of crude oil, according to the Pioneer Press on July 17, 2006. Fortunately, the spokesman for the Minnesota Pollution Control Agency, Steve Mikkelson, quoted in the Star Tribune, reported that the spill didn’t reach any rivers or lakes that “lead to the Mississippi River,” an occurrence that would have been disastrous.

How organic farms work

But, to understand how the pipeline construction process will hurt the Gardens of Eagan organic farm, even if there is never a spill, one needs to understand the basic philosophy of organic farming. According to Atina Diffley, the key to it all is soil health. “In organic farming, we feed the soil, then the soil feeds the plants. A pest problem, disease or yield problem are symptoms of a system out of balance. On a conventional farm, pesticides, fungicides and chemical fertilizers treat symptoms but they don’t explore the root causes. Thus, symptoms usually return and chemical use is accepted as a necessary routine.” This type of farm is based on a chemical “recipe” and doesn’t take into consideration the specific, individual needs of biological life. The organic system is based on observation and problem prevention through overall systemic support.



Eliot Coleman, in “The New Organic Grower” states, “The systems of the natural world are elegant and logical. The idea of striving to create life-giving foods while simultaneously dousing them with deadly poisons is inelegant and illogical.” Mr. Coleman rejects the idea that “plants are defenseless victims and pests are vicious enemies.” In his experience, well-grown plants are inherently less susceptible to pests.

On an organic farm, nitrogen is generated through soil-building crops and compost applications. Vetch, considered the “miracle plant” among organic growers, takes nitrogen out of the air and fixes it in the roots. Planted in August and September the vetch over-winters, protecting the soil from wind and water erosion. In spring it starts to grow again, and by late May is chest high and ready to be incorporated into the top two inches of soil. Not only does it provide nitrogen but it also adds organic matter to the soil and feeds the biological life, creating a biologically rich, fertile, arable natural resource.

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Other natural soil-building crops used to create healthy organic systems include soybeans, buckwheat and sudan grass. Buckwheat smothers weeds, and sudan grass, growing approximately 10 feet tall, generates a bounty of organic matter. Soybeans mellow the soil and increase nitrogen levels. Most of the fields at Gardens of Eagan have vetch on them through the winter months. They also receive soy and sudan crops in mid-summer.

One of the more dangerous fuel-based products used in conventional systems is anhydrous ammonia. According to Michael Pollan, in "Omnivores Dilemma," one-half gallon of it is used for every bushel of conventional field corn produced. In an April 2001 article by Eddie Funderburg listed on the Samuel Roberts Nobel Foundation website, Funderburg states, "In 1910, scientists discovered that they could combine natural gas and the atmosphere at a very high temperature (about 900 degrees F) and pressure (between 200 and 1,000 atmospheres) to create anhydrous ammonia gas.

This technique is called the Claude-Haber ammonia synthesis process." He goes on to explain that the atmosphere is composed of 80 percent nitrogen. "However, it is difficult to extract it from the air into plant-available forms. In response to this, conventional farmers use anhydrous ammonia and the properties of this fertilizer make it one of the most dangerous chemicals used in chemical agriculture." The anhydrous does provide nitrogen, a necessity for plant growth, but it also destroys organic matter, kills worms and hurts the biological life of the soil, creating biologically dead, hard, compacted soil. The military used anhydrous during the Vietnam war to turn swamps into airstrips. Atina Diffley says, "All life depends on soil. When you kill the soil by destroying the biological life and organic matter, it is no longer soil, it is dirt."



Another key to a healthy system on an organic farm is supporting biodiversity. At Gardens of Eagan, 35 percent of their land is utilized for biodiversity habitat. Insects, birds, vertebrae-type animals, grasses, wildflowers and even rodents are useful in a healthy organic management system. For example, when weeds go to seed in the fields, mice eat approximately 80 percent of the seeds so that there are a lot less weeds. Birds eat insects and weed seeds, lady bugs eat aphids, and spiders eat pest insects. Tiny parasitic wasps lay eggs inside broccoli worms and when their larvae hatch they kill the worms.

Thus, the same aim achieved through pesticides and other chemical treatments is generated through healthy maintenance of the natural flora and fauna and the biological life that exists predominantly in the top two inches of soil.

On conventional row crop farms, crop rotation generally consists of two crops. A typical example would be to plant corn one year, and soybeans the next. As a result, the disease and pest cycles are not allowed a sufficient break. An example of the Diffley's rhythm would be to plant sweet corn one year, over-winter with vetch, broccoli the next year, over-winter with vetch again, and then perhaps plant tomatoes. Afterwards, they allow the field to rebuild by giving it a full year of soil-building crops. The result of this practice is reduced disease problems, healthy soil and a natural dying away of predatory invaders, since a particular type of insect would not find its necessary diet due to rotation cycles.

When the Diffleys first purchased their land, conventional farm practices had depleted the soil of its natural biological life. It took years to revitalize it. Atina Diffley compared it to our physical bodies. "When you stop using agricultural chemicals on soil after it has been conventionally farmed, you witness similar effects to those a drug addict might experience after stopping substance abuse. No biological balance is in place because it's been killed and there is susceptibility to illness for a long time."

There are increased problems with weeds and insects because the chemical fix is not available. But slowly, over time, balance is restored. "After 15 years on our present property we are still seeing improvements every year. This spring has been stellar, the soil is in beautiful condition and we are seeing exceptional crop health and quality." Atina Diffley said. Additionally, a number of studies suggest that under stressful conditions, like drought or too much rainfall, organic farms fare much better than their conventional counterparts. This is attributed to improved tilling methods, higher levels of organic matter, and the presence of biological life.

Organic farming is a knowledge-based system. One example Atina Diffley cited was in the cold, wet season of 1993. The Diffleys planted their watermelons on a 50-foot high gravel hill with beach sand on top. Originally a desert plant, watermelons thrive in hot, dry conditions. Their root structure can go 10 feet deep in search of its water needs. A conventional farmer on a neighboring property planted his watermelons in a low spot. Even though he sprayed them with fungicide every three days during this wet, cold year they succumbed to fungal diseases.



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Knowing the plant's needs and providing for them was more effective than spraying chemical fungicides. When he visited the Diffley's farm he was amazed to see their melons thriving on the gravel hill.

Martin and Atina Diffley also spend a great deal of time teaching their craft to younger generations of organic farmers. In any given year, apprenticeships are offered to interested parties and their passionate commitment to fostering the growth of organic farms is something I have witnessed firsthand. Their patient and thorough instruction is of the highest order.

Back to the original question. Do you think organic food should be grown on top of crude oil pipelines? Many of the short and long-term effects of such an action are simply not known. We do know that the pipe in a pipeline is typically delivered with a factory coating of fusion-bonded epoxy or similar material to prevent corrosion, but what we don't know is the effect of that fusion-bonded epoxy on overall soil health. MPL's Agricultural Mitigation Plan states that MPL will not knowingly allow more than 12 inches of topsoil erosion. The pipe itself would have a depth cover of 4.5 feet in agricultural land and 3 feet in non-agricultural land. When watermelons can grow 10 feet deep, a conflict on this level is self-evident.

The Minnesota Pipeline Company stated in their Environment Assessment Supplement (EAS) to the Pipeline Routing Permit Application as follows:

"In cultivated areas, construction will result in a short-term loss of crops and may interfere with planting or harvesting, depending on the timing of construction. Impacts on agricultural areas will be minimized by the segregation and replacement of topsoil, rock removal and deep tillage of construction areas to alleviate compaction ... Following construction and restoration, agricultural activities will be allowed to resume along the permanent right-of-way." [p. 35]

A critical point is that no distinction is made between organic and conventional farms, though clearly their practical needs differ greatly. Due to the sensitive, biodiversity requirements of an organic farm, removal of the topsoil (even if subsequently replaced) would create innumerable long-term and potentially irreparable problems.

Approximately six acres of Gardens of Eagan will be directly deleted from production, but the risk of oil spills is a formidable concern. Though MPL is taking precautionary measures to ensure the integrity of the pipeline, including regular aerial and ground patrols, the truth is that there is no way they can guarantee a non-destructive outcome.

Additionally, the standards for organic certification are rigid and this could jeopardize the status of Gardens of Eagan, something that could be avoided altogether by altering the pipeline route. (Are there alternate routes being talked about?)

Obviously, Martin and Atina Diffley are very concerned about the potentially explosive damage that oil leakage and seepage could create for their farm, but they are also concerned by the fact that there are no regulations in place to protect organic farmers from these types of situations.

In order to secure protection, not only for themselves but for all organic farms, many of whom are too small to afford a legal battle, Martin and Atina have teamed up with Midwest Organic and Sustainable Education Services (MOSES), the Land Stewardship Project, the Twin Cities Co-ops and the Organic Consumers Association to advocate that organic farms should be avoided if there are feasible alternatives and that special precautions should be taken to protect organic ecosystems and certification.

A proposal for modification of the MPL's Agricultural Impact Mitigation Plan and Environment Assessment has been filed with the Public Utilities Commission. Anyone can propose alternate routes for the pipeline; the Diffleys have proposed one which would pass about one-half mile north of their property.

Preliminary pipeline hearings are scheduled through the months of August and September. Here is where you can help. If you think organic farms should be protected from damage to soil health, or that organic farms are an essential resource, now is the time to voice your opinion. Letters may be sent to:

Administrative Law Judge Beverly Heydinger, Office of Administrative Hearings, Suite 1700, 100 Washington Square, Minneapolis, MN 55401. Her email address is beverly.heydinger@state.mn.us, and her fax number is 612-349-2665.

The state Office of Administrative Hearings is taking evidence through August on this issue. The Diffleys and the aforementioned organizations are asking for public testimony and attendance at the upcoming hearings. A schedule of the preliminary hearings is available at <http://www.gardensofeagan.com>. Sample letters and a guideline to use in writing your own letter are also available on the website. Governor Tim Pawlenty can be reached at 651-296-3391, or 1-800-657-3717.

Franklin Delano Roosevelt said, "A nation that destroys its soil destroys itself." And like the old bumper sticker says, "Stop treating your soil like dirt." To this end, a special call is made to organic consumers and advocates, alternative health practitioners and organic farmers to provide testimonies on this critical issue. The goal isn't to stop the pipeline from its expansion plan, but simply to divert it to areas with less vital land use. A further goal is to create legislation that protects and pre



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