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To:

Subject: FW: please release the PFOS data

From: Joe Minor
Sent: Wed 04/04/2012 11:53 AM
To: clerk@hamilton.ca
Subject: please release the PFOS data

To: All City Councillors and the Mayor c/o the Clerk, the Airport Operator, the Niagara Peninsula Conservation Authority, Environment Hamilton, Ontario Ministry of the Environment, Environment Canada, Health Canada, Transport Canada, Public Works and Government Services Canada, Auditor General of Canada, Environmental Commissioner of Ontario, Glanbrook Conservation, Welland River Keepers, Lake Ontario Waterkeepers

Please include this in the official (publicly available) correspondence for the next meeting of Council.

Thank you (to Hamilton City Council) for directing staff to hold a Public Open House regarding the PFOS contamination at the Hamilton International Airport in June, 2012.

I am hopeful that this Open House will include a full disclosure of what is known about the toxic contaminated mess at the airport. This disclosure needs to include all of the data that has been collected. Since a competent survey of the toxic mess should include large amounts of data that have not yet been shared with the public, a meaningful and fact based Open house can be best achieved if this data is released to the public prior to the Open House occurring.

If this disclosure does not occur, I fear we will see a repeat of the fiasco that occurred at the December 2011 GIC meeting. In this meeting everyone's time was wasted as dozens of people sat around literally all day in order to make a few brief (5 minute) statements of opinion regarding the toxic PFOS mess at the airport. A meaningful, fact based discussion did not occur because the facts were withheld from both the public and Council until the day after the meeting. Considering much of this data had been known since June, it is difficult to understand why it showed up a day late in December. Withheld from Council and the public for months were the facts that soil is contaminated at 26,000,000 ng/kg PFOS and groundwater is contaminated at 560,000 ng/L PFOS. The report that was withheld until the day after the meeting contains both errors and significant deficiencies (including a failure to sample the area that is likely to be the most contaminated).

Please make your best efforts to avoid a repeat of the wasted GIC meeting by making sure the data that is needed to have a meaningful Open House is available before the Open House.

While the information coming from local sources regarding the PFC/PFOS toxic contaminated mess at the Hamilton International Airport could be improved, the local disclosure is currently better than the disclosure of information that needs to come from the federal government. In an attempt to get the federal government to disclose more information, I have prepared a "petition under section 22 of the *Auditor General Act*". This petition is copied below. I have sent this petition to the federal Auditor General. Hopefully we will have some answers in 120 days (although there is nothing in the law that would prevent the public release of this government information sooner).

Copy of petition:

This is a petition under section 22 of the *Auditor General Act*.

Request for federal assistance in dealing with a toxic hotspot of perfluorocarbon (PFC) contamination (including PFOS and PFECHS) at the Hamilton International Airport (Ontario, Canada)

BACKGROUND

Perfluorocarbons (PFCs) are a group of chemical compounds that share the property of having all of the hydrogens attached to the carbon backbone substituted with fluorines. This renders these chemicals extremely resistant to degradation and as a result these compounds are environmentally persistent.

Perfluorooctane sulfonate is the anionic form of perfluorooctane sulfonic acid. "PFOS" is the acronym that applies to both forms of the chemical. PFOS is a PFC that is particularly stable, and has accumulated in the environment all over the planet. It attaches to proteins, and is biomagnified up food chains. As a result, virtually all humans have accumulated a body burden of PFOS (11). Perfluorooctanoic acid (PFOA) is another PFC that is also a widespread environmental contaminant (PFOA is commonly referred to as C8 in the United States).

Much of the early industry funded research into PFOS failed to detect significant problems with the chemical. However, recent human epidemiological studies have found a positive association between serum PFOS concentrations and reduced immune response (10), chronic kidney disease (11), breast cancer (12), and ADHD (13,14). The concentrations of PFOS that are of concern are very low, and are already present in most of the human population. Until further research is done, it would seem prudent to limit exposure to concentrated sources of PFCs (including PFOS).

PFC/PFOS/PFECHS CONTAMINATION AT THE HAMILTON INTERNATIONAL AIRPORT

The local (Burlington, Ontario) Canada Centre for Inland Waters is a leading research centre for the study of the environmental effects of PFCs. Environment Canada research at CCIW had shown that since PFCs were widely used in products such as non-stick cookware, water repellant clothing, "food-paper", and stain resistant carpets, that a dominant source of PFCs to the local environment is sewage treatment plants (STPs). As part of these ongoing studies, Environment Canada researchers wanted to compare the levels of PFOS in the serum of snapping turtles living near STPs in Hamilton and Toronto to the levels in less polluted "control" turtles living in a lake in the countryside in the southeast of Hamilton (Lake Niapenco, Binbrook Conservation Area).

The unexpected result was that the turtles in Lake Niapenco were far more contaminated with PFOS than those from near the STPs (this result, along with much more subsequent work, was later published in reference 1). In fact, the turtles from Lake Niapenco appear to be the most heavily PFOS contaminated turtles in the world (1).

Since the Niagara Peninsula Conservation Authority promotes catching and eating fish from Lake Niapenco, the Ontario Ministry of the Environment (OMOE) was contacted and conducted PFOS testing on the fish in the lake. These results (along with later work) were eventually published in the "Guide to Eating Ontario Sport Fish, 2011-2012" (2). This work led to an advisory being given to some of the anglers entering the lake at the main gate. The levels of PFOS contamination were so unusually high that they resulted in the first time adoption of consumption guidelines for PFOS in Ontario. The carp appear to be the most heavily PFOS contaminated carp in the world (only two carp were tested that were longer than 20 inches, their fillets were contaminated with 1200 and 2300 ppb PFOS, OMOE data). The Hamilton International Airport is the sole source for all (100%) of the inland PFOS/PFC fish consumption advisories in Ontario. The number of advisories caused by the airport is so large that it registers as significant even in summaries of pollution in Ontario (see page 20 of reference 2).

The identification of the Hamilton International Airport (HIA) as the source of the PFOS contamination was not done by officials of either the airport or government, but instead was done by a volunteer for a nongovernmental organization (Environment Hamilton - EH). This led to a news broadcast on March 24th, 2011 (3). Lake Niapenco is downstream from HIA, and subsequent testing by EH pinpointed the airport fire fighting practice pad (location: 43.166886°, -79.939753°) at HIA as the source of most of the PFOS contamination. Testing by EH showed high levels of contamination by both PFOS and PFOA. The volunteer was able to pinpoint the source of the contamination in the first spot he looked because the source was obvious: PFOS is a component of the AFFF fire fighting foam that was used at the

fire fighting training site at the airport. This information was communicated in local newspapers on April 23, 2011 (4).

In that April 23rd article (4), the Ontario Ministry of the Environment announced that it would "also soon begin testing" and "hopes that tests will be able to 'trace' or 'track-back' the PFOS to the original source or sources". This led to a June 3, 2011 report (5) that confirmed what EH had said in April. The MOE found that there were extremely high and toxic levels of PFOS and PFOA contamination in the pond immediately downstream of the fire fighting practice pad and that this contamination was the primary source of the PFOS contamination that extended all the way down to Lake Niapenco and beyond.

The Environment Canada study (1) that started with snapping turtles was expanded to include many other aquatic organisms (including amphipods) and water samples. This study carefully analyzed the more than one dozen forms of PFCs that are found in the Welland River downstream of the airport. PFC contamination extends more than 52 km downstream from the airport. While most of the PFC contamination was due to PFOS, there were also significant amounts of the PFC perfluoroethylcyclohexane sulfonate (PFECHS). The vast majority of the PFOS contamination is thought to be from the AFFFs (aqueous film forming foams) that were used for fire fighting practice on the pad. However, the only known source of PFECHS is from Aviation Hydraulic Fluids (AHFs). Table 2, column 1 in (1) indicates that 1.8% of the PFCs in water and 3.3% of the PFCs in amphipods are in fact PFECHS. Since there is no reason why AHFs should have been used at the pad, the source of this possibly ongoing contamination by PFECHS needs to be located.

The private sector operator of the airport (Tradeport) hired its own consultant (exp) to study the PFC pollution at the fire fighting practice pad. Their report is reference (6). The study consisted both of an "historical review" and checking for the presence of PFOS/PFOA at the site.

According to "exp" (6):

"The Fire Training facility was in use by Transport Canada as a Regional fire training facility between 1985 and 1994. Aerial photographs reviewed as part of this investigation indicate that the fire training facility was constructed in 1985. Prior to 2005 aerial photographs indicate that there was a berm located around the central grassy area that houses the fuselage. This berm was removed sometime after 2005 and a layer of granular material was spread over the Site. … Currently there is no fire training carried out at the facility."

This information is similar to information provided by the airport operator to Hamilton City Council (7):

"It's important to remember that there were no fires nor fire training at the airport since 1994, so there should have been no discharge of foam containing PFOS. The fire training site, which is where the PFOS contamination seems to be flowing from, was closed in 1994, two years before TradePort International took over operations of the airport."

Which differs from information in the 2004 Airport Master Plan (8):

"A fire training area, located west of Runway 06-24 and south of the approach to Taxiway Lima, is still in use. Although

live petroleum fires are no longer permitted at the fire-training site HIL still have live fire exercises that involve burning Class "A" combustibles (i.e. wood, straw, paper). It is HIAL's intention to continue with this practice and even expand our current use of this facility to enable us to offer outside agencies emergency response type courses utilizing this site." (page 47)

Use of the area for fire training continued up to 2010, and in 2005 included a large exercise utilizing "a massive foam hose"(9).

While the issue of when PFOS use at the fire fighting practice pad ended needs further investigation and disclosure, at a minimum the continued application of fire suppressants (even if they were just water) to the toxic contaminated site no doubt facilitated the mobilization of PFOS. The berm that was in place until 2005 probably decreased downstream migration of PFOS (but may have contributed to groundwater contamination). The removal of the berm after 2005 probably increased downstream migration of PFOS. The effects of actions taken by "exp" (e.g., drilling of holes, plugging of culverts/ponds) on the movement of PFOS also need consideration.

Soil and groundwater samples were collected and analyzed in June 2011. Surficial soils were contaminated at 26,000,000 ng/kg PFOS and groundwater was contaminated at 560,000 ng/L PFOS. Even though this extraordinarily high level of contamination was known in June, the public was not told until December. The highest levels of contamination are still unknown (at least to the public) because the area of presumed highest contamination (closer to the fake airplane fuselage) was not sampled.

DISCLOSURE OF PFC/PFOS/PFECHS POLLUTION THAT OCCURED UNDER FEDERAL SUPERVISION

It is believed that the bulk of the PFCs (including PFOS) that were released at what is now Hamilton International Airport were released as part of fire fighting training exercises conducted under the auspices of Transport Canada. While federal ownership of the site ended in 1994, Transport Canada may have continued to supervise fire fighting at the site for a few years longer.

Most of the releases of PFOS probably occurred between 1984 and 1994 at the location of the fire fighting practice pad. Thousands and thousands of dollars have been spent by the airport operator, City government (well testing), the provincial Ministry of the Environment, federal scientists (Environment Canada), and even a non-governmental organization (Environment Hamilton) trying to figure out how bad the contamination is. While every round of testing has revealed even worse problems, there are limits to how much can be learned from Sherlock Holmes style investigations. It is a waste of public resources (both time and money) trying to "discover" what happened at the airport when the airport has always known. The public would benefit greatly if those who know what happened would spend some time checking their records and using their best expert knowledge in order to provide at least an estimate of how much PFCs/PFOS were

used. The limited amount of data that have been released (6) suggest that there are at least 38 kg of PFOS in the surficial soils within the 2005 berm at the practice pad (17). If even an estimate of the amount of PFOS that was applied to the site could be provided it would help us understand if the sampling that has been conducted to date has located most of the contamination.

The first thing that could be done would be to catalog the quantity of PFCs that were purchased and brought to the site. All investigations need to consider the spectrum of PFCs applied to the site. One reason is that mixtures of PFCs contain "preFOS": precursors of PFOS that degrade to PFOS in the environment.

Another helpful approach would be to review the types of exercises that were conducted at the site, and then make an estimate of the total number of the exercises and how much PFCs/PFOS were used in the exercises.

1) Will the federal government (including Transport Canada and any other departments that might have relevant information) please provide whatever information it can with respect to when, where, and how much PFCs were used at Hamilton International Airport?

INFORMATION FROM AIRPORT REGULATORS NEEDED

Even though Transport Canada stopped supervising fire training at the sight (circa 1996?, please let us know....), Transport Canada still has regulatory authority over airport operations and therefore has much knowledge about what is (or at least should be) occurring at Hamilton International Airport.

There are many types of information that Transport Canada could provide that would be helpful.

It would be useful to know the types and quantities of PFCs that were bequeathed to the City and/or the private operator when Transport Canada abandoned the site.

Transport Canada is in charge of regulations regarding what types of materials must be stored and or used at airports. It would be useful to know the regulations regarding AFFFs and AHFs and how have they changed with time.

In trying to figure out the source and timing of PFC contamination (e.g., PFECHS), it would be useful to know the formulations of AFFFs and AHFs. Part of the problem facing current investigation is that the current airport operator does not know for certain what is in the formulations they stock, in part because the formulations are hidden as "trade secrets". Transport Canada (and possibly the Pesticide Management Regulatory Agency) should know, or be able to find out, what these formulations are. Environment Canada has the scientific and technical capability to determine these formulations by testing in the laboratory.

It will take millions of dollars to conduct even a partial cleanup of the PFC mess at the Hamilton International Airport alone. Current scientific research suggests that the potential health effects (e.g., reduced immune response(10), chronic kidney disease(11), breast cancer(12), ADHD(13,14)) of PFC contamination will be far more costly to deal with if the cleanup is ineffective. Certainly the public interest in knowing what PFCs are being released into the environment greatly outweighs the questionable practice of allowing "trade secrets" to disguise environmental pollution.

It would be really helpful if Transport Canada could use its expertise in aviation to provide an accounting of what the formulations of AFFFs and AHFs were/are, and how they have changed with time.

2) Will the federal government (including Transport Canada, Environment Canada, and any other departments that might have relevant information (e.g., the Pesticide Management Regulatory Agency?)) please use their technical expertise to help us understand what PFCs were used at the airport after ownership was transferred?

PINPOINTING THE LOCATION OF POSSIBLY ONGOING SOURCES OF PFC POLLUTION

Environment Canada scientists "discovered" the PFC pollution that had not been reported by any of the airport operators. EC also found the presence of the PFECHS downstream of the airport. The only known source of PFECHS to the environment is "misplaced" AHFs (Aviation Hydraulic Fluids). The EC lab at CCIW may be the only lab in North America capable of tracing the PFECHS contamination back to the specific location of its source at the airport.

3) Will the federal government allow the technical and scientific expertise of its scientists (e.g., at Environment Canada) to help with determining the other sources of PFC pollution at the Hamilton International Airport?

BETTER FEDERAL LEADERSHIP NEEDED TO MOVE TOWARD "VIRTUAL ELIMINATION" OF PFOS

From the Canada Gazette (15):

"While addition to the Virtual Elimination List compiled under CEPA 1999 requires the identification of the level of quantification and the publication of regulations prescribing the quantity or concentration of the substance that may be released into the environment, the Ministers are not required to do so under the Act. ...

The Perfluorooctane Sulfonate Virtual Elimination Act does not require any further management action that would include determining the lowest level of release or the development and implementation of regulations to virtually eliminate PFOS from the environment. Therefore, no incremental costs will be incurred by the Government, the industry or the public as a result of the addition of PFOS and its salts to the Virtual Elimination List."

It its current form, the PFOS Virtual Elimination Act specifically omits any management actions or regulations to reduce (much less virtually eliminate) PFOS. In its current form the Act is responsible for a lack of federal leadership with respect to the virtual elimination of PFOS. This is not "good government". The fact that the federal government is responsible for PFOS contamination at multiple sites (16, 18, 19) underscores the need for better federal leadership on the virtual elimination of PFOS. Please see below for a specific example of how a lack of federal leadership has hampered PFOS regulation in Ontario.

The PFOS Virtual Elimination Act could be greatly improved if it "identified the level of quantification" and if it published "regulations prescribing the quantity or concentration of the substance that may be released into the environment" (as required by CEPA). The proof that the act has been made meaningful will come when regulations are passed and management actions taken that actually move Canada towards virtual elimination.

4) Will the government of Canada review its "PERFLUOROOCTANE SULFONATE VIRTUAL ELIMINATION ACT" with a view to increasing its effectiveness?

TOXIC RUNOFF FROM THE AIRPORT AND THE FISHERIES ACT

The data collected by the Ontario Ministry of the Environment (2) indicates that the toxic mess running off of the airport has resulted in fish consumption advisories that extend for 50 km downstream of the airport. Many of the fish that would be caught in Lake Niapenco (12 km downstream from the airport) should not be eaten in any amount by women

and children. Toxic levels of PFOS extend from the contaminated pad (43.166886°, -79.939753°) for several kilometers off of airport property.

5) Will the federal government (i.e., the Department of Fisheries and Oceans) please investigate whether or not the toxic mess (both PFCs and other toxic materials) that runs off of airport property and into the Welland River constitutes a harmful alteration, disruption or destruction (HADD) of fish habitat or any other violation of the Fisheries Act?

SAFE EXPOSURE LIMITS FOR PFCs (including PFOS)

The establishment of safe exposure limits has usually been done for many toxic substances, and certainly for those marked for "virtual elimination". The failure to do this research and review has frustrated the usual deliberative process for establishing fish consumption guidelines in Ontario.

The usual process, according to the Ontario Ministry of the Environment, is:

"Fish consumption advisories are based on guidelines developed by the Food Directorate of Health Canada which, through research and review of toxicological data, has determined safe dosages for an extensive list of contaminants. This amount is referred to as a tolerable daily intake (TDI). It is then determined what proportion of the TDI comes from each of the environmental pathways such as air, water and different types of food, including sport fish." (Page 6 in reference 2).

However, since Health Canada has failed to set a TDI for PFOS, when the highly PFOS contaminated fish were discovered downstream from the airport the Ontario MOE was forced to adopt fish consumption guidelines without the benefit of the usual research from Health Canada. The process used by the Ontario MOE is unclear, but appears to have been to adopt guidelines similar to neighboring jurisdictions.

This means the guidelines have not had the opportunity to be adjusted based on recent scientific studies. The early industry funded studies failed to detect significant problems with PFOS. Part of the reason for this is that the types of studies that were done had technical limitations that precluded them from investigating the long term effects of chronic low doses. Since experimentation on humans is not possible for ethical reasons, experimentation is usually done on lab animals. Since this type of research is expensive, small numbers of animals are usually studied for short time periods under relatively high doses. This is in an attempt to squeeze statistical significance out of the small numbers. Interestingly, a few of the early studies that did have detections were those that went for the longest time periods. But even the longest duration studies were only 2 years, which hardly provides a basis for understanding health effects of chronic exposure for a human lifetime.

(Noteworthy examples of modern animal experimentation can be seen in references 6, 26, and 27 cited in reference 10 below. In these experimental studies in rodents "the adverse effects of PFOS on humoral immune function were observed at serum concentrations similar to those reported in the present study and at levels prevalent in the United States." These three scientific studies show a causal reduction in humoral immune function in rodents treated with PFOS at the low levels already present in the general U.S. human population.)

In order to understand the effects on humans of chronic low dose levels of PFOS, it is necessary to do epidemiological studies. Due to the widespread low level contamination, virtually the entire human population has been exposed to PFOS. This means that as a practical matter one cannot compare PFOS exposed to PFOS unexposed humans, because you cannot locate a large sample of unexposed humans. The modern epidemiological studies study a large population of individuals and see if there are differences in health outcome that vary with exposure level. These studies have found a positive association between serum PFOS concentrations and reduced immune response (10), chronic kidney disease (11), breast cancer (12), and ADHD (13,14). The serum concentrations of PFOS that are of concern are very low, and are already present in most of the human population.

When Health Canada considers exposure levels such as TDIs (and when the Ontario MOE is deciding how to use the information), the fact that some sources of PFOS are more easily avoided than others deserves consideration. It may be difficult to avoid low levels of PFOS in water, but it is certainly much easier to simply not consume recreationally caught fish that are much more contaminated with PFOS.

It is therefore difficult to understand the logic behind the current fish consumption guidelines for PFOS. The guidelines (2) actually RECOMMEND the consumption of up to 24 pounds per year of fish whose dorsal fillets (the consumed part) are contaminated with up to 159 ppb PFOS. A person following these guidelines could accumulate a body burden of 12 milligrams of PFOS. (This calculation depends on the measured PFOS body half life of 5.4 years and makes only one conservative assumption: that 90% of the consumed PFOS is absorbed.) Assuming an average sized adult (70kg, ref.2) and a single uniform compartment, a 12mg body burden equates to a serum PFOS concentration of 176 ng/mL. Since the median serum concentration of PFOS in the adult population (U.S.) is 18.8 ng/mL (11), eating fish according to the guidelines would increase the average person's serum PFOS levels by more than 9-fold (936%). This large of an increase is positively associated with much higher risks in all of the cited epidemiological studies (refs. 10,11,12,13,14).

It would be very helpful if Health Canada would review the literature, establish safe dosages (e.g., TDIs), and discuss harmonizing fish consumption guidelines with modern science.

6) Will the federal government (e.g., Health Canada) research and review the scientific literature in order to establish safe exposure limits for PFOS?

PUBLIC HEALTH IMPLICATIONS

The fact that virtually everyone is contaminated with PFOS means that if PFOS has health effects at or near the median concentration level then the size of the affected population could be large – hence a very public health concern.

It turns out that small increases in serum PFOS concentration – just a few fold around the median concentration – are positively associated with reduced immune response (10), chronic kidney disease (11), breast cancer (12), and ADHD (13,14).

Quoting the medical doctors:

"These results indicate that PFC exposures at commonly prevalent serum concentrations are associated with lower antibody responses to childhood immunizations and an increased risk of antibody concentrations below the level needed to provide long-term protection. … Prenatal and postnatal PFOS exposures, as well as postnatal PFOA exposure, were associated with increased odds of antibody concentrations below the protective level. If the associations are causal, the clinical importance of our findings is therefore that PFC exposure may increase a child's risk for not being protected against diphtheria and tetanus, despite a full schedule of vaccinations." (10)

"Chronic kidney disease (CKD) is a major public health problem. … The authors found that serum levels of PFCs, including perfluorooctanoic acid and perfluorooctane sulfonate, were positively associated with CKD. … This association was independent of confounders such as age, sex, race/ethnicity, body mass index, diabetes, hypertension, and serum cholesterol level. … The present results suggest that elevated PFC levels are associated with CKD. … Our findings are of public health importance because serum PFCs appear to be positively related to kidney disease even at relatively low background exposure levels in the US general population. Therefore, if our findings are replicated in future prospective studies, the population attributable risk of CKD by PFC exposure would be high." (11)

"We observed for the very first time a significant association between serum PFC levels and the risk of breast cancer." (12)

"Our results, using cross-sectional data, are consistent with increased odds of ADHD in children with higher serum PFC levels." (13)

"When examining ADHD with medication, however, our study also yielded a positive association for PFOS." (14)

Since all of these studies suggest that elevated PFOS levels are potential risk factors for disease, the public health implications of inadequately cleaning a highly concentrated source of PFOS (like the Hamilton International Airport) need careful consideration. The Public Health Agency should consider modern science and help decide the level of clean up that would best protect public health.

7) Will the federal government (e.g., the Public Health Agency) please consider the public health implications of PFOS contamination and living near highly concentrated sources of PFOS (and then take corrective action)?

EXPERTISE IN PFOS CLEANUP NEEDED

The federal government has experience dealing with its own contaminated sites, hence the "Federal Contaminated Sites National Workshop" (16, 18). The federal government even has experience in the remediation of PFOS contaminated sites (16, 18, 19). Considering that the bulk of the PFOS contamination at the Hamilton International Airport occurred under the supervision of a federal agency (Transport Canada), it seems appropriate for the federal government to share the resources it has to help fix the problem.

Federal expertise would be really useful, particularly since the local clean up effort has started so poorly. The clean up plan being pursued (6) failed to consider alternatives. The cleanup up plan proposes to use ozone to degrade PFOS. The scientific literature is quite clear that this will not work (the F-C bond is the strongest covalent bond known and cannot be effectively attacked by ozone). For discussion, see (17).

Please use federal expertise to help with the clean up at the airport.

8) Will the federal government (Transport Canada, Public Works and Government Services Canada, Real Property Institute of Canada, Environment Canada) please use its experience with contaminated sites and their cleanup to assist with the clean up of the toxic mess at Hamilton International Airport?

IDENTIFICATION OF OTHER PFOS CONTAMINATED SITES

The federal government is responsible for PFOS contamination in multiple locations (16, 18, 19). The PFOS contamination in Hamilton was not reported by Transport Canada, but rather was discovered by accident by Environment Canada. Given the shared properties of the contaminated sites, it should be fairly easy to identify other potentially contaminated sites. A simple Google search for "former fire-fighting training area" would be a good place to start, but the federal government should have even better resources at its disposal. Please review federal records and consult with the new owners when property has been transferred out of federal ownership. There is a clear public interest in trying to minimize the spread of PFOS contamination from unidentified toxic sites.

9) Will the federal government (e.g., Transport Canada, the RCAF, Public Works and Government Services Canada, Real Property Institute of Canada, Environment Canada) please make its best efforts to publicly identify other locations contaminated with PFOS?

REFERENCES:

1) "Highly elevated levels of perfluorooctane sulfonate and other perfluorinated acids found in biota and surface water downstream of an international airport, Hamilton, Ontario, Canada". DeSolla, DeSilva, and Letcher. **Environment International 39**:19-26, 2012.

2) "Guide to Eating Ontario Sport Fish, 2011-2012". Ontario Ministry of the Environment. 2011.

3) Television news broadcast. RDI news. Channel 10 (CBLTF), 6:47PM March 24, 2011.

4) "High levels of chemical found near airport". Nicole O'Reilly. **Hamilton Spectator** April 23rd, 2011.

5) "PFOS in the Welland River and Lake Niapenco". Craig Fowler, Ontario Ministry of the Environment. June 3, 2011.

6) "Initial Subsurface Investigation – Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoate (PFOA). Former Fire

Training Facility, 9800 Airport Road, Hamilton, ON. Hamilton International Airport. HAM_000200231_A0". exp Services Inc. December 9, 2011.

7) Memo to: Mayor and Council. From: Hamilton International Airport. June 17, 2011.

8) Hamilton International 2004 Airport Master Plan Update. December 2004.

9) "Fighting fires on airplanes 'like being in a cigar tube'". Dana Borcea. **Hamilton Spectator**. Oct 3, 2005.

10) "Serum Vaccine Antibody Concentrations in Children Exposed to Perfluorinated Compounds". Grandjean et al. **Journal of the American Medical Association 307**(4):391-397, 2012.

11) "Perfluoroalkyl Chemicals and Chronic Kidney Disease in US Adults". Shankar, Xiao, Ducatman. **American Journal of Epidemiology 174**(8):893–900, 2011.

12) "Perfluorinated compounds are related to breast cancer risk in greenlandic inuit: A case control study". Bonefeld-Jorgensen et al. **Environmental Health** 10:88, 2011.

13) "Children's Health Exposure to Polyfluoroalkyl Chemicals and Attention Deficit/Hyperactivity Disorder in U.S. Children 12–15 Years of Age". Hoffman et al. **Environ Health Perspect**. 2010 December; **118**(12): 1762–1767.

14) "Serum perfluorinated compound concentration and attention deficit/hyperactivity disorder in children 5-18 years of age". Stein and Savitz. **Environ Health Perspect.** 2011 Oct;119(10):1466-71.

15) **Canada Gazette 142**(36):2587-2591. September 6, 2008.

16) "Hazard Assessment and Derivation of Risk Based Remedial Targets for PFOS".

Tara Siemens Kennedy. Federal Contaminated Sites National Workshop, April 30, 2008.

17) http://www.hamilton.ca/NR/rdonlyres/0D169D19-7B53-4C2E-B224-A8FA6B1FAAB4/0/Jan11Item510.pdf

18) http://www.rpic-ibic.ca/downloads/FCS_2012/2012_PosterAbstracts.pdf (see pages 14 and 21)

19) http://www.rcaf-arc.forces.gc.ca/14w-14e/nr-sp/index-eng.asp?id=12115

Submitted by:

Joe Minor