

Health Hazards of the Stericycle Medical Waste Incinerator

Report from the Utah Physicians for a Healthy Environment
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Stericycle, Inc. operates a medical waste incinerator in North Salt Lake at 90 North Foxboro Dr. This facility has been in operation since 1989. The decision to originally allow such an incinerator at that location was controversial at the time, and the Utah Air Quality Board approved the permit by only one vote.

The controversy increased when in the early 2000s an entire subdivision was allowed to be built in the area around Stericycle, with homes now literally sharing fence lines with the incinerator.

In response to the Governor's announcement of a health study of Stericycle, and a "fact" sheet distributed by Stericycle to residents of North Salt Lake the Utah Physicians for a Healthy Environment issue the report below.

Will the Governor's "Health Study" Provide Answers About Whether Stericycle Should be Shut Down?

While it is possible that the Governor's health investigation may reveal serious threats, this study is far too limited to be any real help in decision making. A definitive study with a control group population that is unexposed to the toxins in Stericycle's emissions is impossible to create because all humans harbor these toxins in their bodies. Any attempt at a comprehensive health study specific to this facility would also take a long time--literally decades--would have to examine the health of individuals yet unborn to future parents who lived near Stericycle, would be very expensive, and should be done by an independent body, not by any state agency under the purview of the Governor, and certainly not a sister agency of the DAQ that is burdened with the conflict of interest of having issued Stericycle their permits.

In the meantime, the Governor is allowing Stericycle to operate until they are proven unsafe beyond any doubt. A wealth of existing research and the anecdotal evidence from residents in the area is more than enough to demand a safer, conservative, precautionary approach, i.e. the facility should not be in operation until it can be proven beyond reasonable doubt to be safe.

This precautionary approach is the platform for diagnostic investigation in medicine, as well as the way most people conduct their daily lives. No rational person demands proof that they are about to be involved in a life threatening accident before they buckle their seat belt. Statistically, use of seat belts saves lives even though the chance of that accident per individual is small. And we didn't wait for a study specific to Utah before we made the common sense of wearing your seat belt a Utah law.

Living near an incinerator, or having your body "contaminated" with "incinerator" toxins originating miles away, statistically increases your chance of many types of serious

diseases. We don't need to wait for a study specific to Utah to confirm that. Stericycle's permit authorizes it to release 9.51 tons of the most toxic substances known to man every year. 200 tons of sheer poison over 20 years. That is as much as a full sized oil refinery. No one would dare suggest that an oil refinery's emissions are not a health hazard. But because those emissions are released from a much shorter stack, the impact on local health is greater.

On measuring toxins, the Governor's study will only examine soil samples for compounds for which Stericycle was violating their permit, essentially just dioxins and the related compounds, furans. No human samples like breast milk will be examined, and no heavy metals, or PAHs. Apparently the rationale behind that approach was that whatever Stericycle was emitting within their permit was "safe." We strongly disagree with that assumption as will be addressed later in this report.

Regarding an epidemiological investigation, the study will try and establish a baseline for cancer rates in the area. But because of cancer's long latency period, it will be many years before comparative rates would show anything. The most useful part of the study will be a look at adverse pregnancy outcomes and neonatal mortality in eight census tracts in North Salt Lake, Woods Cross, and West Bountiful. But the control group will be the rest of the state of Utah. With over 80% of Utahns living along the Wasatch Front, being exposed to much of the same environmental threats as Stericycle's neighbors, it is very possible that meaningful differences will not be found. If they are found, Stericycle could make a case that the refineries and/or nearby freeway traffic are more the cause than they are. A study from Italy was just published evaluating populations surrounding eight municipal incinerators (medical waste incinerator emissions are even more toxic). The researchers demonstrated a 30% increase in pre-term births among pregnant women most exposed to incinerator emissions (1). The authors concluded, "Maternal exposure to incinerator emissions, even at very low levels, was associated with preterm delivery."

Any study limited to impacts in the immediate area of the incinerator will not address the far reach of Stericycle's emissions. Dioxins in the breast milk of Inuit Native Americans in Northern Canada have been traced to incinerators in the US (2,3).

The Governor's health study will only tangentially address the health threat from Stericycle's air emissions. Air pollution control is largely a zero-sum game: what is removed from the air emissions must be trapped in the ash. This is particularly clear in the case of heavy metals, which cannot be created or destroyed in an incinerator. The quantity going in will be the same as the quantity going out. Yet heavy metals in particulate form or in fine particles of ash are more dangerous than those same metals in the preincinerator trash. Freed from the materials in which they were previously bound up, reduced to elemental form or to simpler compounds, they become more mobile and more biologically available. This makes them more likely to enter ground and surface water supplies, to enter the food chain, and to affect humans. Similarly, dioxin releases in ash can be much greater than dioxin releases to air, if the air pollution control equipment is working properly. The ash will be sent to a landfill, but all landfills eventually leak (according to the EPA), and are otherwise buffeted by wind, rain, ice, snow and erosion, slowly releasing the toxins back into the environment affecting populations far beyond North Salt Lake.

Suppose the Governor's limited study concludes there is no public health risk from

Stericycle. Do we discard the thousands of studies that draw the opposite conclusion about other incinerators scattered throughout the world, the toxicity of their emissions, and the advice of multiple health groups that have declared incinerators hazardous?

While ordering new “Utah” science Governor Herbert is ignoring a much larger body of existing science. The most powerful message of new air pollution and environmental research is this: Few things have more public health impact than the air a pregnant mother breathes. Intrauterine exposure to contaminants can have irreversible disease consequences and multiple generations can be affected. While the Governor calls yet another press conference, forms yet another air pollution committee, orders yet another study, the clock is ticking on tens of thousands of children making their one time pass through critical stages of embryonic development, forever losing their chance at a genetic and epigenetic profile that will allow them optimal health.

If the state’s default priority is to protect business, the burning will continue until the evidence is tragically irrefutable. If our priority is to protect lives, the burning would have stopped months ago.

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Has Stericycle Broken the Law, Violated Their Permit, and Operated in a Manner that Recklessly Endangers the Public?

In a June, 2013 private meeting with the director of Utah Division of Air Quality, Bryce Bird, we were told that Stericycle's notice of violation had led to a criminal investigation of the facility by both the state and the federal government. It is no surprise that Stericycle is fighting these allegations because enormous sums of money are at stake for Stericycle. Despite Stericycle's assertions, we reiterate that they have been accused of cheating on their stack tests and grossly exceeding their permit emissions limits for some of the most deadly components of their pollution, dioxins and furans, and other less toxic components, like nitrogen oxides.

Through GRAMMA requests, Erin Brockovich's team uncovered additional relevant information. Since the original permit, Stericycle has applied for and received twice, a permit to increase the amount of waste stream handled by the incinerator such that it is now permitted to handle 100% more volume per unit time than its original permit, without

any change in the facility. In industrial combustion facilities like this and refineries, managers have a term to describe this pushing of the equipment to the limit--"run to failure." Undoubtedly this has contributed to excessive "bypass" events. An e-mail exchange between DAQ employees recites a conversation with a manager at Stericycle who made this observation, "He is under a lot of pressure...to feed more and more waste through the plant, and that the plant can't handle what they want it to." To us this is further evidence of a profitability imperative at Stericycle, and a disregard for safety.

Stericycle's claims of "bypass" conditions occurring only 0.03% of the time is simply not to be believed, especially as the neighbors have been able to document what really is happening at the plant. That kind of performance would be superior to virtually any other incinerator that has been studied. Studies at other facilities show on average that bypass conditions occur about 10% of the time. Start ups and shut downs (during which time combustion of materials is incomplete and therefore yields more pollution) are happening about every 7 days, by Stericycle's own admission. During bypass, start up and shut down conditions the amount of toxic emissions can be hundreds or even 1,000 times greater than those during steady state conditions. (Gass, Lder et al. 2002; Nordsieck, Neuer-Etscheidt et al. 2003; Environment Agency 2006; Neuer-Etscheidt, Nordsieck et al. 2006; Tejima, Nishigaki et al. 2007; Wang, Hwang et al. 2007; Wang, Hsi et al. 2007; Chen, Lin et al. 2008). It is notable that these start-up periods are never monitored with spot dioxin tests.

Tests of a modern incinerator in Japan showed that a single start up released more dioxins than two months worth of steady state conditions. If an incinerator was started more than four times a year, the majority of dioxin emissions would come from unregulated start ups. Other studies showed a single start up emitted twice as much dioxin as occurred during a year of normal operations (1,2,3).

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Is Stericycle a Health Threat?

“The emissions from incinerator processes are extremely toxic. Some of the emissions are carcinogenic. We know, scientifically, that there is no safe threshold below which we can allow such emissions. We must use every reasonable instrument to eliminate altogether.”

— U.K. Environment Minister Michael Meacher to a House of Lords Inquiry, 1999

Stericycle's claim that it, "does not present any significant risk to the surrounding community or health of its citizens" is a self serving contradiction of the evidence. Even if Stericycle had been operating in full compliance with their permit and with impeccable integrity, this facility would still represent a serious public health threat.

Incineration does not prevent disease, it actually spreads disease. Incineration not only does not remove toxins, it actually creates new ones and merely concentrates and redistributes existing ones. Emissions from incinerators are probably the most toxic type of air pollution, contaminated with the deadliest compounds known to science--including dioxins, furans, heavy metals, radioactive elements, chemotherapy drugs and even prions (the highly infective proteins that cause the 100% fatal human "Mad Cow"disease). These toxic substances impair human health and all living enzyme systems.

Because of these deadly toxins in incinerator emissions, large medical studies show increased rates of serious diseases--like cancer, pregnancy complications, birth defects, and autism--among people who live within several miles of incinerators. Utah has the highest rates of autism in the nation, double the national average. Wide spread suspicion in Foxboro, the closest subdivision to Stericycle, that there were high rates of serious diseases including cancer, is what prompted the residents to contact the Utah Physicians for a Healthy Environment for help.

Stericycle's permit allows it to emit a combined 9.51 tons every year of the most toxic substances known to man. That is as much as a full sized oil refinery or coal fired power plant. No one would dare suggest that an oil refinery's emissions are not a health hazard. But because those emissions are released from a much shorter stack than an oil refinery, the impact on local health is greater.

Stericycle also releases extremely fine particulate matter. Particles this small are not usually captured by pollution control equipment with an efficiency greater than 5 to 30%. These particles typically carry with them dioxins, polycyclic aromatic hydrocarbons, and heavy metals which will be discussed in more detail later in this report.

For an extensive report of the medical research revealing the health threat of incinerators, like increased rates of cancer and birth defects, go to http://www.ecomed.org.uk/content/IncineratorReport_v3.pdf

Stericycle Paints a Rosy Picture of Dioxins and Toxicology Risks

Stericycle's "fact" sheet about the toxicity of dioxins requires a stiff rebuttal. From the research and policy organization, the Environmental Working Group:

"EPA first declared 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD, often referred to as dioxin) to be a probable human carcinogen in 1985. In 1997 the International Agency for Research on Cancer classified dioxin as "carcinogenic to humans," and in 2001 the National Toxicology Program, a government research agency that is part of the National Institutes of Health, also classified dioxin as a known human carcinogen. EPA has proposed updating its own classification to deem dioxin a definite "human carcinogen."

That the EPA has dragged out a thorough evaluation of the toxicity of dioxins for three decades is the result of pressure from the industries that would be adversely affected by the results--the defense, chemical, pesticide, incineration and agricultural industries. For a more complete history of the EPA's prolonged dioxin evaluation see Appendix A at the end of this report

For Stericycle to try and comfort residents with statements like "Industry, scientific, and regulatory experts have stated that 99.99% of dioxins can be destroyed in the combustion process of a compliant incinerator," is simply a verbal parlor trick. Many studies have established that the majority of dioxins released from incinerators are not formed in the furnace, but rather in exhaust gases, as they cool after leaving the furnace (1). Dioxin is not present in the medical waste prior to combustion, but is the accidental and unavoidable by-product of incomplete combustion of waste that contains chlorine, such as the PVC plastic that is prevalent in medical devices.

Even so, if 99.99% of your house is not on fire, then you'd better call the fire department immediately. Likewise, if 99.99% of your body's cells do not have cancer, that means absolutely nothing about whether you have cancer. If Stericycle is capturing 99.99% of their dioxin that tells you absolutely nothing about how much dioxin they are emitting or whether the dioxins they are emitting are harming your health.

Furthermore, that degree of dioxin capture is not true of start ups, shut downs, and bypass events, which Stericycle admits occur every seven days (see the previous section). Note also that the statement refers to a "compliant incinerator." The charges that DAQ has made against Stericycle, including grossly exceeding their permit limits of dioxin, are all about Stericycle being "non-compliant."

The hotter the temperature of the furnace, the better the destruction of dioxins. But that is offset by increased volatilization of heavy metal gases like mercury which is every bit as dangerous as dioxins.

Stericycle implies that because they are not the only source of dioxin exposure that therefore you can relax about their emission of dioxins. Just because people are exposed to other sources of dioxins doesn't mean that we should tolerate a virtual dioxin factory next door to thousands of people. While most people's dioxin exposure comes through food, the original source of most dioxin is industrial processes, incineration in particular, that have steadily and progressively contaminated the food chain.

Furthermore, only a small fraction of the dioxins created by incineration are released into the atmosphere. One study found that only 1.7 percent of an incinerator's dioxin releases went out the stack, with the vast majority released in ash and slag, which can re-enter the Wasatch Front ecosystem putting everyone at risk. Top notch stack pollution controls only increase the dioxins in this part of waste stream (2).

Stericycle is permitted to and does emit dioxins into the community that would not otherwise be there. Dioxins are one of the main reasons why epidemiological studies show communities with incinerators have higher rates of multiple adverse health outcomes.

Hundreds of other halogenated organic compounds are released by incineration that have been studied less thoroughly than dioxins. For example PCBs and hexachlorobenzene (HCB) fall into the category of Persistent Organic Pollutants (POPs) and endocrine disruptors. Many of these compounds are thought to have dioxin-like toxicity.

“POPs have been linked to numerous adverse effects in humans and animals. Those include cancer, central nervous system damage, reproductive disorders and immune system disruptions. They are, in fact, lethal.”

— EPA Administrator Christie Whitman, 2001

Studies specific to PCBs and HCB show a wide variety of adverse health outcomes with increased exposure, including markedly increased rates of childhood obesity, shorter stature, impaired fetal growth, decreased birth wt. and size and markedly higher rates of obesity in adults, and abnormal sex chromosomes (3,4,5,6,7,8,9,10,11,12,13). Intrauterine exposure to HCB and PCBs significantly increases the likelihood of developing asthma in childhood and adolescence, most likely by impairing normal development of the immune system (14).

Stericycle makes this statement that, "In 2012, U.S. EPA released its updated science assessment of dioxins, their toxicity, and risk they pose to health. U.S. EPA said, "Today's findings show that generally, over a person's lifetime, current exposure to dioxins does not pose a significant health risk." This deserves a lengthy response.

To begin with, in that statement, the EPA was not addressing communities that live near incinerators. More broadly, while the EPA is better than nothing as a government regulatory body, it is far removed from the presumed pedestal of an impartial judge and jury of scientific literature. Those in the EPA that make decisions on regulations are not the scientists themselves, but the political appointees. The EPA is every bit as much a political body, as it is a scientific agency. The EPA is subject to the same kind of business and political influence peddling that every other agency is subject to. This characterization is amply illustrated by the fact that every relevant medical specialty has for years asked the EPA to make air pollution regulations stricter. But even when the EPA does that, it is often many years after the fact and hardly ever does the EPA make standards as strict as public health scientists request. Furthermore, the EPA often, if not usually, ends up making regulations less strict than their own scientific advisors recommend, purely as a political appeasement to industry pressure.

More specifically, in the case of chemical evaluations:

There are about 84,000 chemicals currently produced by industry and to which we are all exposed in modern society. The EPA has limited capability of evaluating all those chemicals and companies often use the EPA as a shield to declare that a certain chemical is OK because the EPA has not acted against it. At least 5-10% of those 84,000 chemicals are known carcinogens (15), yet the EPA has only seriously tested about 200 of those chemicals and taken action against only nine in their entire history--one of those nine is dioxins. That provides commentary on toxic dioxins are.

The World Health Organization states:

"[Dioxins] have the dubious distinction of belonging to the "dirty dozen" - a group of dangerous chemicals known as persistent organic pollutants. Dioxins are of concern because of their highly toxic potential. Experiments have shown they affect a number of organs and systems. Once dioxins have entered the body, they endure a long time because of their chemical stability and their ability to be absorbed by fat tissue, where they are then stored in the body. Their half-life in the body is estimated to be seven to eleven years. In the environment, dioxins tend to accumulate in the food chain. The higher in the animal food chain one goes, the higher the concentration of dioxins."

Dioxins are ubiquitous in the environment. In humans, most of the average person's dioxin exposure comes from food, especially meat, dairy, and in the case of infants, human breast milk. However, most of that dioxin originated from incinerators which then spread throughout our ecosystems to reach worldwide distribution.

The International Agency for Research on Cancer (IARC) -- part of the World Health Organization -- published their research into dioxins and furans and announced on February 14, 1997, that the most potent dioxin, 2,3,7,8-TCDD, is now considered a Group 1 carcinogen, meaning that it's a known human carcinogen.

Most government and industry scientists that study environmental contaminants are not physicians, but rather toxicologists. In recent years the medical community has increasingly parted ways with toxicologists regarding the health consequences of environmental and chemical toxins. For 400 years the foundation of toxicology has been the concept of "the dose makes the poison," which is a presumption that health effects are related to dose, and that a dose can be found for virtually all chemicals where no effect is found. As reassuring as that thought may be, it no longer holds up to scientific scrutiny.

Medical scientists are now pointing out two important contradictions to this pillar of toxicology. The greatest public health threat of chemicals is for fetal exposure and that dose is less important than the timing, i.e. does the exposure occur during a critical window of embryonic development? The second contradiction is the idea that the smaller the dose, the less effect. Medicine is now discovering that for some toxic chemicals the clinical effect can actually increase as the chemical concentration decreases.

Dioxins can trigger health effects at extremely low concentrations. Indeed, there is no known level below which dioxins are known to be harmless, even though everyone has some dioxin their body. Dioxins have been linked to cancer, neurotoxicity, abnormal sexual development, birth defects, immunosuppression, behavioral disorders, diabetes, and altered sex ratios of newborns. Dioxin exposures are typically measured in picograms (one picogram is one trillionth of a gram) per day. At this level of concentration, even detection is difficult.

Incinerators also emit toxic heavy metals which are not part of the Governor's health evaluation. In fact Stericycle's permit allows them to emit 130 lbs. of lead, 912 lbs of chlorine, and 60 lbs. of mercury. The CDC has stated there is no safe amount of exposure to lead. None (16).

Every bit of lead exposure will cause impairment of cognitive abilities. Recent research has established this correlation: for every .19 ug/dl of lead in an adolescent's blood, there

was a loss of one IQ point. In this study the average lead level was 1.71 ug/dl. This means that the average person tested lost more than 8 IQ points due to lead exposure at levels far less than are considered toxic (17).

Mercury is about 1,000 times more toxic to brain cells than is lead and combinations of heavy metals may act synergistically in their toxicity. There is an inescapable conclusion. If Stericycle is releasing highly toxic heavy metals into the air (they are) especially from a short stack, children in the area are experiencing higher levels in their blood because of Stericycle. Stericycle is therefore harming the intelligence of any child exposed to their emissions.

Studies of children living near sources of heavy metal pollution show higher rates of autism and special needs requirements (18,19). While Stericycle isn't the only source of heavy metal exposure in North Salt Lake, it is a completely unnecessary one.

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Traditional Toxicology is Grossly Inadequate in Evaluating Health Risks

Stericycles's self serving statement about no health risk relies exclusively on the process of "toxicology risk assessment." Unfortunately, this type of assessment is also used by government regulatory bodies, in part because it is historically entrenched, and in part because it yields looser regulations for industry.

Risk assessment is a method developed for engineering but is very poor for assessing the biological complexities of human health for the following reasons. This type of assessment is outdated and throughly inadequate for the following reasons.

1. Risk assessments using dispersion modeling are not accurate in predicting ground level concentrations of pollutants. For example, modeling almost never takes into account secondary particulates formed as the products of combustion rise up the stack. These secondary particulates can double the total volume of particulates beyond the stack. These risk assessments have almost always concluded that incinerators are safe which flies in the face of epidemiological data showing the opposite.
2. Typically these assessments involve estimating the risk to health of only a small fraction of the hundreds of different pollutants emitted by incinerators. The absurd assumption is made that if emitted substances are not assessed (which is the overwhelming number of toxic pollutants) then they have zero risk. One study found that the amounts of unknown, but likely dangerous, organohalogen compounds formed by waste incineration are higher by orders of magnitude than the amount of dioxins.
3. Toxicology assessments assume, wrongly, that all pollutants have thresholds below which they are safe. Doctors who specialize in hormone and endocrine diseases have officially contradicted this claim (see the next section). The science is very clear this is not the case. Many pollutants, including dioxins, many heavy metals and radioactive particulates--exactly what comes out of Stericycle's smoke stack-- do not have "safe" thresholds and some may even be more dangerous at lower concentrations.
4. Traditional toxicology assessments assume wrongly that only air emissions need to be considered and bioaccumulation in food can be ignored. Air emissions may be only the tip of the iceberg. Most food today is contaminated with dioxins, predominantly from past incinerator emissions. 93% of human dioxin exposure comes from meat and dairy products despite the fact that 96% of dioxins originated as air emissions.
5. Risk assessment focuses on diseases like cancer, but almost completely ignores other health outcomes like infertility, immunosuppression, endocrine disruption, altered behavior and reduced intellectual capacity. The impact on genetic and epigenetic integrity can influence the health of subsequent generations which is seldom if ever considered in such an assessment.
6. Build up in the environment faster than biodegradation can occur and is not factored in. In the case of most heavy metals--they are not combustible, do not degrade and cannot be destroyed. Dioxins only degrade over several decades. Concentrations of these toxins in

the local environment will steadily increase over time. Stericycle's citing of a 2003 U. of Utah study showing that dioxin levels in Davis County soil were far below levels needed for health screening conveniently ignores the fact that levels in the area undoubtedly are greater now than they were ten years ago. If the plant continues operating for another ten years they will be greater still.

Furthermore, dioxin levels in the soil is not very revealing about what health risks are present. Through biological processes many toxic substances accumulate in organisms, concentrate in certain tissues of those organisms, and increase in concentration as they move up the food chain. Humans are at the top of the food chain and because our capacity to break down dioxins is very limited, concentrations in our bodies usually increase over time. Lipophilic toxins like dioxins will concentrate especially in human breast milk. Nursing infants consume 10 to 20 times as much dioxin as the average adult. Six months of breast feeding will transfer 20% of a mother's lifetime accumulation of chemicals like dioxins to the nursing child.

If Stericycle's emissions are not safe for nursing infants then the facility is not safe. Soil sampling will reveal nothing about dioxin and other organochlorine chemicals concentrations in breast milk.

7. Typical toxicology assessments incorrectly assume that the hazard posed by each individual compound tested out of context and in isolation can predict the hazard of the entire complex mixtures of chemicals, ignoring the cumulative risk and the likelihood of synergistic impacts. Under this approach a safe dose of aspirin, combined with safe doses of ibuprofen, oxycontin, toradol, acetaminophen, and three glasses of wine would be considered "safe" but in reality might add up to be lethal. When a supposedly tolerable exposure to mercury is combined with a tolerable exposure to dioxins, to cadmium, lead, and arsenic, etc--the end result can be an intolerable health consequence.

8. Toxicology assessments ignore the impact of toxic exposures to genetics and epigenetic and the likelihood of many adverse impacts not showing up for decades or being passed on to multiple subsequent generations.

9. Toxicology assessments assume wrongly that the cumulative burden from all the air toxics sources in North Salt Lake and South Davis County can be ignored and that the emissions from Stericycle can be viewed in isolation, as if residents were not further exposed by other sources, like freeways, and the five refineries.

10. Traditional toxicology assessments assume wrongly that we have a comprehensive understanding of the complexity of biological processes and chemical toxicity when in reality there are vast information gaps. Lack of knowledge cannot be equated with safety, it can only be equated with lack of knowledge.

11. Risk assessments generally ignore the extra vulnerability of the 15-30% of the adult population that is uniquely sensitive to chemical insults.

All of the critiques of Stericycle's downplaying of dioxins' risk are even more true of the other toxic components of their emissions, like the heavy metals, polycyclic aromatic hydrocarbons, and radioactive elements.

As mentioned before, the health threat is not just a one neighborhood issue. Emissions from incinerators can travel hundreds of miles. Residents throughout Salt Lake, Davis, Utah, and Weber Counties are undoubtedly being affected and a health study of Foxboro will reveal nothing about the far reaching impact of the Stericycle incinerator.

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Stericycle's Statements on the Risk of Prions in Their Waste Stream is Incorrect and Out of Date

Prions are the deformed, highly infective protein strands responsible for TSEs (Transmissible Spongiform Encephalopathy). TSEs are 100% fatal, destructive brain diseases that have become manifest in numerous mammals and in humans--Scrapie in sheep, Chronic Wasting Disease in deer and elk, Mad Cow in cattle, feline spongiform encephalopathy in cats, and Cruetzfeld-Jacob Disease (CJD) in humans. How easily the disease can be transmitted from one species to another is not clear. However, it is well known that humans have been infected by eating prion contaminated beef.

Stericycle makes this claim regarding prions. "Peer reviewed documents show that incineration is an appropriate method of managing this waste and that there has been no evidence of infectious prions in residual ash or air emissions. There is no evidence or any known ability for prions to be exhausted through the air pollution control system. The Utah Division of Air Quality (DAQ) has concluded the incinerator has demonstrated compliance with all emission limits and that it is not presenting any risk of imminent harm."

It should be easy to understand that if one does not look for evidence, no evidence will be found. No one has looked for any of the evidence that Stericycle says doesn't exist regarding prions in their ash, emissions, or in the surrounding environment. Furthermore, it is not the Utah Division of Air Quality that has any oversight over the issue of prions, it is the Utah Division of Solid and Hazardous Waste.

Virtually every bodily tissue and fluid from an infected person or animal can carry prions, but brain and nervous tissue are the most contaminated. Stericycle's permit allows it to incinerate known prion contaminated material. Perhaps more worrisome, it has been documented that tissue from patients without any symptoms, including blood and purified blood products transfusions and pituitary glands, has infected and led to over 160 prion deaths (1). A recent study documented that one in every 2,000 appendices shows infection with prions (2). Several studies have demonstrated that anywhere from 1% to 25% of people clinically diagnosed with Alzheimer's were found at autopsy to have CJD instead (3,4,5,6). Transmission of the disease through reuse of surgical instruments despite best practices for sterilization has been documented (7).

Because of the long latency period between infection and the onset of symptoms,

averaging about 11 years in humans, there is a near certainty that human and animal tissue and fluids incinerated at Stericycle are infected with prions, even if it is unknown both to the facility that shipped the waste, and to Stericycle.

Incineration is used to dispose of infected animal carcasses, but that is despite the fact there is no scientific certainty whatsoever about what temperatures are required to deactivate prions, or even if incineration at any temperature is effective. There is growing concern among prion experts that incineration is in fact not a reliable way to deactivate prions. One of the few experts in prion science made this comment in one of his research papers.

"A second aim of the study was to investigate the survival of the infective agent at temperatures in the range of those used in the primary (600°C) and secondary (1,000°C) chambers of medical waste incinerators. The survival of infectivity at 600°C, even at the very low levels observed in this study, suggests that the agent may not be fully inactivated in the residual ash from the first chamber, and ash formed in this chamber usually is removed without being exposed to the 1,000°C temperature used to treat the gaseous and particulate emissions that enter the second chamber before discharge to the atmosphere. There is also no assurance that any combustion emissions containing the agent that enter the secondary chamber would be inactivated because the residence time there is at most only a few seconds." (8).

In the last two years, new studies have been published about prions with alarming implications. One: prions can be taken up by plants, increasing their distribution throughout an ecosystem (9) Two: prions can be transmitted through inhalation of contaminated air (10,11). Three: Evidence is increasing that prions may be contributing to the growing epidemic of Alzheimer's (see above) and other serious and fatal brain diseases (12). Four: there is an exploding epidemic of prion caused chronic wasting disease in North American deer and elk that could put many more humans at risk (13).

An author of one of these recent studies stated, "We were totally surprised and also a bit frightened at how efficient [airborne infections] were."

While prions and their infectivity, survivability and role in human diseases are still inadequately investigated, the information is sufficiently compelling, and the possible consequences sufficiently dire, that we must demand every reasonable precaution be taken. Until or unless prions are better understood by science, allowing Stericycle to incinerate human and animal tissue that is almost certainly contaminated with prions, with the chance of spread to the community, is a risk that simply can't be tolerated.

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In Fact Stericycle's Emissions are an Urgent Public Health Threat

The extraordinary vulnerability of the first three months of embryonic development makes Stericycle's emissions a public health urgency. This risk was specifically addressed by a recent joint public statement by the American College of Obstetricians and Gynecologists and the American Society for Reproductive Medicine (1) The position statement included this:

“Reducing exposure to toxic environmental agents is a critical area of intervention for obstetricians, gynecologists, and other reproductive health care professionals. Patient exposure to toxic environmental chemicals and other stressors is ubiquitous, and

preconception and prenatal exposure to toxic environmental agents can have a profound and lasting effect on reproductive health across the life course. Prenatal exposure to certain chemicals has been documented to increase the risk of cancer in childhood...[we] join leading scientists and other clinical practitioners in calling for timely action to identify and reduce exposure to toxic environmental agents while addressing the consequences of such exposure.”

A 2009 statement by the Endocrine Society, the largest organization of internal medicine physicians that specialize in endocrine and hormonal diseases, made this statement regarding endocrine disruptors that include toxic compounds like dioxins and other components of Stericycle's emissions and their potential harm to fetal development:

“Even infinitesimally low levels of exposure indeed, any level of exposure at all, may cause endocrine or reproductive abnormalities, particularly if exposure occurs during a critical developmental window. Surprisingly, low doses may even exert more potent effects than higher doses” (2).

Finally, a report published in the most prestigious medical journal in the world, The New England Journal of Medicine, regarding the toxicity of volatilized compounds from oil made this statement illustrating the risk from small exposure to toxic agents.

“Mutagenic effects theoretically can result from a single molecular DNA alteration. Regulatory prudence has led to the use of “one-hit models” for mutagenic end points, particularly cancer, in which every molecule of a carcinogen is presumed to pose a risk.” And, “Pregnant women should particularly avoid dermal contact with oil and should avoid areas with visible oil contamination or odors.” This illustrates the exquisite sensitivity that the developing fetus has to toxic agents at extremely small doses (3).

The mainstream medical community recognizes that indeed, the integrity of intrauterine development is at risk from exposure to the toxic components of Stericycle's emissions.

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Is Incineration of Medical Waste Necessary, Required, or Even "Preferred"?

In short, none of the above. Incineration of medical waste is "preferred" only by Stericycle, because they make a lot of money doing it. There is no need to incinerate waste, including medical waste. There is no law requiring incineration, and 98% of the nation's medical waste incinerators have been closed in the last 15 years. The only theoretical reason to treat medical waste any differently than landfill waste is to neutralize pathogens. But all the same pathogens exist in waste from the community at large, and that waste is not incinerated. Furthermore, not all pathogens can be eliminated, but several new technologies are just as effective as incineration in eliminating those pathogens that can be eliminated. There are better and less expensive alternatives to incineration available right now. Several countries, and cities have banned medical waste incineration altogether.

Toxic chemotherapy drugs are cited by Stericycle as one medical waste that is necessary to incinerate. There is no law that requires incineration of this kind of waste either, and there is evidence that incinerators may not detoxify chemotherapy drugs which are extremely stable and highly potent (1). Because of those properties, the World Health Organization states that incineration is not the preferred method of handling chemotherapy waste (2).

Stericycle imports and burns waste from eight surrounding states, making Utah a pollution dumping ground with no offsetting benefit realized by our community. As those communities have become cleaner, Salt Lake has become dirtier.

There are numerous alternatives to incineration that are available now. They present a much safer approach to medical waste management. The most favorable evidence that defenders of Stericycle could call upon would suggest

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Summary

Stericycle imports and burns waste from eight surrounding states, making Utah a pollution dumping ground with no offsetting benefit realized by our community. As those communities have become cleaner, Salt Lake has become dirtier. There are numerous alternatives to incineration that are available now. They present a much safer approach to medical waste management.

The most favorable evidence that defenders of Stericycle could call upon might suggest that the health impacts to the community are small. We believe, however, that evidence is largely out of date and there is a substantial body of newer research that leads to the conclusion that those health risks are much greater. Some of that evidence has been cited

in this report. But there can be no dispute that incineration of medical waste is unnecessary and can and should be replaced by newer, cleaner, safer technologies.

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Appendix A

The shackling of EPA's efforts to protect public health from dioxin has a long history. Environmental Working Group

1949: The first recorded case of human exposure in the United States occurs when an explosion at a Monsanto plant exposes more than 200 workers to dioxin-contaminated herbicides, causing severe skin lesions.

1962-1970: The American military in Vietnam extensively sprays Agent Orange, a potent defoliant and herbicide contaminated with dioxin. Decades later, exposed veterans have an increased risk of developing diabetes and multiple cancers.

1971: The entire town of Times Beach, Missouri, is exposed to dioxin from contaminated waste oils spread on dirt roads to suppress dust. Residents are later evacuated and the location is declared a Superfund site. In the same year, scientists at the National Institute of Environmental Health Sciences determine that fetal exposure to dioxin causes developmental abnormalities in laboratory animals, including cleft palates and kidney malformations.

1976: Dioxin is released in an accident at a pesticide manufacturing plant in Seveso, Italy, contaminating people, air, soil and water. Decades later, scientists find adverse effects on reproductive function, including infertility and low sperm counts; lowered male/female sex ratio in newborns; changes in hormones; diabetes; cardiovascular effects; and elevated incidence of certain cancers (Baccarelli 2008; Eskenazi 2010; Mocarelli 2008; Pesatori 2003; Pesatori 2009)

1978: Scientists at Dow Chemical publish the first study of dioxin carcinogenicity in laboratory animals (Kociba 1978). In the same year, the New York Times publishes a story on the plight of residents near Love Canal, N.Y., where industrial dumping released dozens of toxic substances, many suspected carcinogens. Dioxin and dioxin-like chemicals are among them.

1982: EPA's National Human Monitoring Program begins testing Americans' tissues for the presence of dioxin and dioxin-like chemicals, polychlorinated dibenzo-p-dioxins and dibenzofurans (EPA 1987).

1983: Responding to mounting public concern over dioxin contamination, Congress directs the EPA to launch the National Dioxin Study to determine the extent of pollution nationwide (Barnes 1986). The EPA survey focuses on plants producing herbicides, incinerators and waste dumps.

1985: EPA publishes its "Health Assessment Document for Polychlorinated Dibenzop-

dioxins," classifying dioxin as a known animal carcinogen and probable human carcinogen (EPA 1985). The EPA's Science Advisory Board reviews EPA's assessment, the first of five reviews of dioxin's toxicity and carcinogenicity that SAB conducts between 1985 and 2010. SAB agrees with the EPA's overall approach but calls the evidence for carcinogenicity of dioxins in humans "uncertain" (SAB 1985).

1986: A joint publication of the EPA and the Midwest Research Institute based on EPA biomonitoring data concludes that dioxin-like pollutants "are prevalent in the general U.S. population" (Stanley 1986).

1986: Research by Greenpeace and other activist groups uncovers collusion between EPA and the paper bleaching industry to keep secret the detection of dioxin in discharges from paper mills and in finished paper products (Van Strum & Merrell 1987; Weisskopf 1987).

1987: Leaked documents from the American Paper Institute reveal industry's strategy to "Get EPA to 'rethink' dioxin risk assessment" so as to avoid liability and "unnecessary changes" in production processes prompted by "unsound scientific data" (Weisskopf 1987).

1988-1989: The Science Advisory Board reviews for the second time EPA's dioxin assessment, presented in two draft documents: "A Cancer Risk-specific Dose Estimate for 2,3,7,8-TCDD" and "Estimating Exposure to 2,3,7,8-TCDD" (SAB 1989).

1990: The Chlorine Institute, an industry trade group, starts a public campaign claiming that dioxin is "much less toxic to humans than originally believed," misrepresenting scientific opinion on its dangers (Roberts 1991).

1991: EPA administrator Bill Reilly tells The New York Times: "We are now seeing new information on dioxin that suggests a lower risk assessment for dioxin should be applied" (Schneider 1991). EPA launches its second reassessment of dioxin.

1992: The International Joint Commission (IJC) for the U.S. and Canada issues its Sixth Biennial Report on Great Lakes Water Quality, highlighting evidence that the developing fetus is likely more sensitive to toxic contaminants than adults are (IJC 1992).

1994: EPA releases a draft Health Assessment Document for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds. The draft assessment concludes that these chemicals may be harmful at levels similar to those found in the general public, increasing the risk of cancer and causing potential damage to the immune, nervous and reproductive systems (EPA 1994).

1995: EPA's Science Advisory Board completes its third review of EPA's dioxin assessment and agrees with the agency that "the margin of safety (between background exposures and levels of exposure where effects have been observed in test animals) for dioxin-like compounds is smaller than the EPA usually sees for many other compounds" (SAB 1995).

1997: The International Agency for Research on Cancer declares dioxin a known human carcinogen (IARC 1997).

1999: The United Nations Environment Programme warns that dioxin is a concern for all

countries and drafts an international treaty that would ban, phase out or limit production of 12 "persistent organic pollutants" (POPs). POPs are chemicals that resist degradation, bioaccumulate through the food web and have a variety of adverse effects on human health and the environment. The United Nations POP list includes, among other substances, dioxin and other polychlorinated dioxins and furans (UNEP 1999).

2000: EPA publishes its Draft Final Report on "Exposure and Human Health Reassessment of 2,3,7,8-Tetrachlorodibenzo-P-Dioxin (TCDD) and Related Compounds."

2000: EPA updates its 1994 draft and submits its revised Dioxin Reassessment to the SAB. This is the SAB's fourth review of the dioxin assessment and culminates in publication of an SAB review document in 2001.

2000: The Food Industry Dioxin Working Group, representing beef producers, food processing, farming and retailing, urges the EPA to revise its dioxin assessment to lessen the chance that the assessment will "create a health scare."

2003: The EPA asks the National Academy of Sciences (NAS) to review the agency's draft dioxin reassessment, "Exposure and Human Health Reassessment of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds."

2003: The Food Industry Dioxin Working Group again pushes EPA to delay its dioxin assessment, calling for "additional research, data collection and more comprehensive government coordination... before any government action is contemplated."

2005: Japanese scientists publish a study finding that TCDD and related dioxins cross the human placenta and are detectable in cord blood (Suzuki 2005). EWG scientists report finding dioxin-like compounds in cord blood samples from 10 of 10 newborns tested (EWG 2005), further confirming the transfer of a mother's dioxin load to her child in utero.

2006: NAS publishes its report, "Health Risks from Dioxin and Related Compounds: Evaluation of the EPA Reassessment." NAS issues a press release titled "EPA assessment of dioxin understates uncertainty about health risks and may overstate human cancer risk" (NAS 2006). In its 2010 draft, EPA has carefully considered the NAS recommendations by documenting alternative assessments; evaluating sources of uncertainty; and providing the rationale for its proposed decisions.

2009: EPA releases its Science Plan for Activities Related to Dioxins in the Environment, promising to "accelerate the long-delayed scientific process to complete the assessment of the health risks dioxins pose to the public" and to publish a final report and assessment by the end of 2010 (EPA 2009).

2009: EPA Administrator Lisa Jackson pledges strong federal action to clean up a dioxin-contaminated Dow Chemical site in Michigan and to accelerate the assessment of dioxins' human health impacts (EPA 2009; EPA 2010; Melzer 2009).

May 2010: The agency publishes "EPA's Reanalysis of Key Issues Related to Dioxin Toxicity and Response to NAS Comments." The SAB initiates its fifth review of EPA's dioxin assessment.

