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Confronting Chronic Pollution: A Socio-Legal Analysis of Risk and Precaution

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Confronting Chronic Pollution: A Socio-Legal Analysis of Risk and Precaution

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**CONFRONTING CHRONIC POLLUTION:
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Abstract: The central aim of this article is to demonstrate a socio-legal approach to risk and precaution using the example of chronic pollution. Drawing on ongoing empirical work with the Aamjiwnaang First Nation, which is tucked into Sarnia's "Chemical Valley," a secondary aim is to influence and shape how we understand the problem and confront the risks of chronic pollution. This article forwards the argument that the prevailing regulatory approach is incapable of capturing the essence of contemporary pollution harms, because those harms are increasingly linked to continuous, routine, low-dose exposures to contaminants that are within legally sanctioned limits. Community residents and advocates struggling against chronic pollution are increasingly identifying with the environmental justice movement and adopting its strategies of resistance, including its mantra of "precaution." These strategies of resistance have the potential to dramatically expose the impotence of the prevailing regulatory approach to chronic pollution.

Keywords: environmental justice; risk; pollution; precaution; socio-legal analysis

JEL classification: K32, K39

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CONFRONTING CHRONIC POLLUTION: A SOCIO-LEGAL ANALYSIS OF RISK AND PRECAUTION

Dayna Nadine Scott*

I. INTRODUCTION

This article employs a socio-legal analysis to confront one of the most intractable problems facing modern environmental law: the issue of chronic pollution. By “chronic”, I mean to draw attention to the continuous or continuously-recurring exposures to low doses of pollutants and contaminants that characterize the experience of living in the industrialized world. Traditional toxicology is based on high-dose tests and linear dose-response relationships reflecting the prevailing paradigm of *dosis facit veninum*: “the dose makes the poison”.¹ But evidence to the contrary is piling up. Epidemiological studies now routinely forward claims of irreversible developmental effects at low levels of exposure to certain key chemicals.² In this way, the “risks” of long-term low-dose

* Assistant Professor, Osgoode Hall Law School, York University. The author wishes to acknowledge the brave resolve and dedication demonstrated by the members of the Aamjiwnaang First Nation in confronting the chronic pollution they experience. She would also like to acknowledge the important research contributions of Judy Bang, Sidra Sabzwari and Alexandra Stiver. This article has benefitted tremendously from their skills and careful attention. My colleague Stepan Wood also provided very thorough and insightful feedback. Finally, there have been a number of students over the past year who have contributed to my thinking about chronic pollution and environmental justice, and I thank them for their passion, curiosity and commitment to change.

¹ Nicolas van Larebeke *et al.*, “Sex Ratio Changes as Sentinel Health Events of Endocrine Disruption” (2008) 14 *Int.J.Occup.Environ.Health* 138 at 138.

² *Ibid.* at 140. Abraham Brouwer *et al.*, “Characterization of Potential Endocrine-Related Health Effects at Low-Dose Levels of Exposure to PCBs” (1999) 104 *Environmental Health Perspectives* 639; David Gee *et al.*, *Chemicals in the European Environment: Low Doses, High Stakes?* (1998) online: European Environment Agency < <http://reports.eea.europa.eu/NYM2/en/page008.html>> 4; Matthew Hogg, *Chemicals Harmful to Health in Low As Well As High Doses* (23 January 2007) online: The Environmental Illness Resource < <http://www.ei-resource.org/news/general-environmental-health-news>>; Sergio Kuriyama *et al.*, “Developmental Exposure to Low - Dose PBDE-99 Effects on Male Fertility and Neurobehavior in Rat Offspring” (2005)

exposures to pollution are becoming increasingly contested as a result of pressure from emerging social movements, such as the environmental justice movement. This movement has been a key impetus behind the precautionary principle or “precaution”, especially with respect to its application to the regulation of toxic chemical pollution.

On a socio-legal analysis of risk and precaution, the inquiry consists of two branches. The aim of the first branch is to understand the multiple subjective understandings or accounts of risk, while the aim of the second branch is to demonstrate how particular understandings or accounts influence the form of law’s response to the risk. This approach to studying risk and precaution is part theory, part practice. It is engaged theoretical work that contributes to social transformation: the aim here is to influence and shape how we understand the problem and confront the risks of chronic pollution.

The argument put forward in this article is that the prevailing regulatory approach to the problem of chronic exposures is incapable of capturing the essence of contemporary pollution. The difficulties become apparent on a socio-legal analysis which allows us to clearly see the basis upon which our regulatory regime rests. The basic deal we have struck as a society is that most pollution is in fact state-sanctioned -- it is permitted according to certain specified limits or standards set down in regulations, and in the rare case where this legally-sanctioned pollution results in proven harm, the state relies on tort law to step in and provide compensation.³ For this

113 *Environmental Health Perspectives* 149; Stefano Parmigiani *et al.*, “Exposure To Very Low Doses of Endocrine Disrupting Chemicals (EDCs) During Fetal Life Permanently Alters Brain Development and Behavior in Animals and Humans” (2002) *International Seminar on Nuclear War and Planetary Emergencies: 27th Session*: World Scientific Publishing Co. 293; Frederick S. Vom Saal, & Claude Hughes, “An Extensive New Literature Concerning Low-Dose Effects of Bisphenol A Shows the Need for a New Risk Assessment” (2005) 113:8 *Environmental Health Perspectives* 926; Wade V. Welshons, Susan C. Nagel, & Frederick S. vom Saal, “Large Effects from Small Exposures. III. Endocrine Mechanisms Mediating Effects of Bisphenol A at Levels of Human Exposure” (2006) 147 *Endocrinology* S56.

³ This is admittedly an oversimplification. Regulatory regimes may also provide compensation in some limited circumstances, and criminal or regulatory enforcement proceedings are also available in situations of harm resulting from authorized releases, although they tend to be infrequently invoked, and they do not necessarily address the environmental harm to individuals or communities. At the same time, tort law provides

standard regulatory approach to be sustained, the incidence of harm associated with pollution must continue to be understood as *unusual* — insignificant and peripheral to the routine processes of modern industrial production. But the environmental justice movement is persistently chipping away at this understanding. The new and emerging account of risk would construe the incidence of harm tied to pollution as not only significant, intentional and expected, but also as inherent to our practices of production and consumption.

Advocates railing against chronic pollution and contamination are increasingly identifying with and being inspired by the environmental justice movement. A central focus is the notion of “disproportionate burdens” — the claim that while pollution is everywhere, it is most easily found in a few choice places, particularly those inhabited by the poor, the racialized, and the marginalized.⁴ Thus, the environmental justice

an inadequate answer. For example, in negligence claims, plaintiffs routinely fail to establish their claims on the basis of the “causation analysis”. For a consideration of the applicability of property torts, such as nuisance and trespass, as instruments for protecting “aboriginal environments”, see Lynda Collins, “Protecting Aboriginal Environments: A Tort Law Approach” in Louise Belanger-Hardy et al. (eds.) *Critical Torts*, forthcoming as a special issue of the Supreme Court Law Review 2008.

⁴ Timothy W. Luke, “Rethinking Technoscience in Risk Society: Toxicity as Textuality” in Richard Hofrichter, ed., *Reclaiming the Environmental Debate: The Politics of Health in a Toxic Culture* (Cambridge, Mass.: MIT Press, 2000) 239 at 249. The environmental justice framework was developed in the U.S. context and to date has largely been focused on the distribution of the benefits and burdens of environmental management. When authors describe the “sacrifice communities”, they are referring to the generally rural and poor, Black or Hispanic communities disproportionately chosen to house toxic waste, coal-fired utility plants, and nuclear reactors (Robert Bullard, *Dumping in Dixie: Race, class and environmental quality* (Boulder, CO: Westview Press, 1990); Robert Bullard, *Confronting Environmental Racism: Voices from the Grassroots* (Boston: South End Press, 1993); Luke Cole & Sheila Foster, “From the Ground Up: Environmental Racism and the Rise of the Environmental Justice Movement” (New York: NYU Press, 2001; C. Rechtschaffen & E. Gauna, *Environmental Justice: Law, Policy and Regulation* (Durham, N.C.: Carolina Academic Press, 2002.). See also Virginia A. Sharpe, “Environmental Justice and the Social Determinants of Health” in Gerald Visgilio & Diana Whitelaw, eds., *Our Backyard: The Quest for Environmental Justice* (Lanham, MD: Rowman & Littlefield, 2003) at 25-38; David Harvey, “The Environment of Justice” in Frank Fischer & Maarten A. Hajer, eds., *Living with Nature: Environmental Politics as Cultural Discourse* (Oxford: Oxford University Press, 1999) at 153; Stella M. Capek, “The “Environmental Justice” Frame: A Conceptual Discussion and an

movement seeks explicitly to “confront[] the *polluters* with the *polluted*.”⁵ That the polluted are powerless is thought to be evident in the very fact of their pollution.

On the Aamjiwnaang First Nation reserve, in the shadow of Sarnia’s “Chemical Valley”, a recent study confirmed what residents had suspected for years — that the community’s sex ratio (the number of boy babies born relative to the number of girl babies) is declining at an alarming rate.⁶ It is speculated that chronic exposure to toxic chemical pollution, specifically a group of endocrine-disrupting chemicals provocatively nicknamed the “gender-benders,” is responsible. And while the skewed sex ratio is a potent symbol of the complexity of contemporary pollution harms, it is by no means the only manifestation of the pervasive, diffuse, body-altering pollution that the residents report. Ongoing empirical work is uncovering, from an Aamjiwnaang perspective, just how oppressive chronic pollution can be. Preliminary results illustrate quite clearly how on a socio-legal approach, multiple subjective understandings of the risk of chronic pollution exist, and how dramatically different strategies of risk governance flow directly from them, depending on which account is adopted.

In the course of their ongoing struggles against chronic pollution, the Aanishnaabek of Aamjiwnaang have employed several strategies for community empowerment which demonstrate the growing influence of the environmental justice movement. Two of the most exciting new strategies employed by activists and communities inspired by the movement are biomonitoring or “body burden” testing, and community environmental monitoring including the deployment of so-called “bucket brigades”. Biomonitoring is a “new science that derives from critical epidemiology and citizen-science alliance” — it generates a measure of a person’s “body burden”, which is thought to give direct information about total exposures

Application” (1993) 40:1 Social Problems 5 and Susanne Antonnetta, *Body Toxic: An Environmental Memoir*, (Washington DC: Counterpoint, 2001).

⁵ Robert Bullard, ed., *The Quest for Environmental Justice: Human Rights and the Politics of Pollution* (San Francisco: Sierra Club Books, 2005) at 6.

⁶ C.A. Mackenzie, A. Lockridge & M. Keith, “Declining Sex Ratio in a First Nation Community” (2005)

113 Environmental Health Perspectives 1295.

to pollutants across time and from all sources.⁷ The “bucket brigades” are motivated groups of “residents who live in industrial zones and are recruited to monitor air, using low-cost grab samplers, near oil refineries, chemical factories, and power plants. They are deployed on the frontlines of efforts to improve environmental monitoring and reinvigorate environmental enforcement”.⁸

These strategies are deployed by environmental justice activists in the attempt to expose the impotence of the prevailing regulatory approach to pollution. Specifically, they seek to marshal the evidence that is needed to demonstrate that chronic exposures to pollution are causing environmental health harms, even at the “safe doses” permitted by existing regulations. Precaution, in contrast, would demand that governance strategies take account of the cumulative effects of exposures from all sources, across time. Thus, I draw on the Aamjiwnaang case not only to articulate what a socio-legal approach to issues of risk and precaution might produce with respect to the question of chronic pollution, but to demonstrate how the community’s resistance exposes the inadequacies of the law’s treatment of chronic pollution.

The analysis consists of five parts. The first part provides a theoretical grounding in contemporary risk and regulation debates. The second part details the ongoing struggles of the Aamjiwnaang First Nation with respect to chronic pollution and its effects on their community. The third part introduces the elements of a socio-legal analysis of risk and precaution, drawing on a framework recently put forward by Jonathan Simon. In the fourth part, I describe two contrasting accounts of the risks of chronic pollution that exist with respect to Sarnia’s Chemical Valley. This is followed by the fifth part which demonstrates how the adoption of each distinct account of risk would lead to a very different regulatory approach. Finally, I detail the strategies of resistance that the Aamjiwaang have deployed in seeking to displace the prevailing regulatory regime to demonstrate how the community’s resistance exposes the inadequacies of

⁷ Phil Brown, *Toxic Exposures: Contested Illnesses and the Environmental Health Movement* (New York: Columbia University Press, 2007) at 265.

⁸ Dara O’Rourke & Gregg Macey, “Community Environmental Policing: Assessing New Strategies of Public Participation in Environmental Regulation” (2003) 22 *J. of Policy Analysis and Mgmt* 383 at 385.

the law's treatment of chronic pollution. I conclude with some comments on future directions for the socio-legal study of risk and precaution.

II. THE RISE OF RISK

The concept of risk has become central to modern environmental law.⁹ In fact, many contemporary problems such as genetic engineering, climate change, and the detection of latent environmental and health hazards, have come to symbolize the preoccupation with “post-industrial risks” described by Ulrich Beck in his ground-breaking theory of the “risk society”.¹⁰ Beck's central claim is that risk is now an integral element of contemporary industrial society; so systematically is it reproduced that society has become preoccupied with its understanding and control.¹¹ Further, Beck argues that the placement of legal responsibility for demonstrating liability is fueling the crisis. Because people need to be exposed to hazards before it is possible to demonstrate that they are harmful (the idea of “society as laboratory”), the public's response tends to be a form of “industrial fatalism”.¹² Beck says that the public must live with obvious threats of uncontrolled industrial development but are unable to account for the nature of the risks nor to identify the culprits. Further, he argues that the political and legal systems that should be managing these hazards tend — both intentionally and unintentionally — to deny the *social* origins of the risks. Thus the public's fatalistic response --to ignore and deny the risk because of a lack of control over it — in Beck's view is expected.

⁹ Nicolas de Sadeleer, *Environmental Principles: From Political Slogans to Legal Rules*, trans. by Susan Leubusher (Oxford: Oxford University Press, 2002) at 3. The phrase “rise of risk” is drawn from the title of David Garland's chapter in 2003 in *Risk and Morality*, edited by R. Ericson and A. Doyle (Toronto: University of Toronto Press, 2003) 48-86, in which he details the centrality of the idea of risk for understanding modern times (at 49).

¹⁰ Ulrich Beck, *Risk Society: Towards a New Modernity* (London: Sage Publications Ltd., 1992).

¹¹ *Ibid.*

¹² Ulrich Beck, *Ecological Politics in an Age of Risk* (London: Polity Press, 1995) at 56-57.

An important characteristic of modern pollution is that these risks are virtually undetectable without scientific investigation. In many cases they must be actively brought into public awareness to be identified as a social threat. As Frank Fischer notes, the highly technical and invisible nature of these risks means that the “politics of risk intrinsically emerge as a politics of knowledge, typically contested through expertise and counter-expertise”.¹³ In Beck’s theory, risks exist in the social world only so far as there is scientific translation. This “elevates the expertise and status of the knowledge professions to a prime political position in the discourse of risk, leaving little or no room for the layperson”.¹⁴ The result is a growing tension between those who have ‘knowledge’ and those who do not.¹⁵

Beck argues that while science is essential to the awareness of modern risks, its failure as an institution to speak authoritatively about risks has been a main driver of the current crisis.¹⁶ Beck’s solution lies with “ecological democracy”: a public and “polyvocal” conversation about technologies that is based on a more reflexive or self-critical practice of science. But as Beck’s critics have pointed out, this is where he leaves the topic. He does not extend his analysis to include a challenge to the conventional understandings of science. As Fischer says, “we are left with the need to look for new ways to further democratize the processes of counter-expertise”.¹⁷ In fact, Brian Wynne argues that the ‘risk society’ thesis fails to really question the meaning of expertise and knowledge, especially what Wynne would call the social and cultural bases of their indeterminacies.¹⁸ He suggests that citizens’ responses to expert

¹³ Frank Fischer, *Citizens, Experts, and the Environment: The Politics of Local Knowledge* (Durham, North Carolina: Duke University Press, 2000) at 51.

¹⁴ *Ibid.*

¹⁵ See Maarten Hajer, *The Politics of Environmental Discourse* (Oxford: Oxford University Press, 1995) and Fischer & Hajer *supra* note 4.

¹⁶ It should be noted that Beck’s work has been criticized for employing “sweeping generalizations” in its questioning of “science” and for lacking specific illustrations (see e.g. William Leiss, Book Review of *Risk Society, Towards a New Modernity* by Ulrich Beck, online: <http://www.ualberta.ca/~cjscopy/articles/leiss.html>). Most adherents to the environmental justice movement would also reject explicitly Beck’s notion that class consciousness and identity struggles are somehow erased by risk consciousness.

¹⁷ *Supra* note 13 at 59.

¹⁸ Brian Wynne, “May the Sheep Safely Graze? A Reflexive View of The Expert-Lay Knowledge Divide” in S. Lash, S. Bronislaw & B. Wynne, eds., *Risk, Environment and Modernity; Towards a New Ecology of Risk* (London: Sage, 1996) 44 at 46.

knowledge should be seen as *conditioned* by social dependency on expert institutions.¹⁹ Wynne is essentially arguing that Beck's idea of industrial fatalism is flawed. In Wynne's view, the risk society thesis underappreciates the sense of dependency and lack of agency that pervades citizens' experiences with expert institutions.²⁰

Overcoming this dependency and lack of agency is a key goal of the environmental justice movement and the driving force behind the rise of "popular epidemiology".²¹ Popular epidemiology is a form of political struggle through which community members *themselves* engage in the collection of data and the marshalling of knowledge and evidence needed to explain their experience of contamination.²² To varying extents, residents involved in this type of struggle will also draw on and enlist the knowledge and resources of experts. But popular epidemiology is more than just lay persons participating in traditional epidemiological practice: it tends to include social and structural factors as part of the causal disease chain, thus challenging the basic assumptions of and conventional approaches to risk.²³

A. THE CAUSAL INQUIRY

The risks associated with chronic pollution illustrate Beck's thesis perfectly. They are virtually undetectable without scientific investigation. They manifest, in Carl Cranor's words, as "harms caused by molecules".²⁴ To understand the mechanics of endocrine disruption, for example, the way that certain chemicals mimic hormones in the body by binding with

¹⁹ *Ibid.* [Emphasis mine].

²⁰ *Ibid.*

²¹ Fischer, *supra* note 13 at 121.

²² Phil Brown & Edwin J. Mikkelsen, *No Safe Place: Toxic Waste, Leukemia, and Community Action* (Berkeley: University of California Press, 1990).

²³ Phil Brown, "Popular Epidemiology and Toxic Waste Contamination: Lay and Professional Ways of Knowing" (1992) 33 *Journal of Health and Social Behavior* 267. Phil Brown's concept of "contested illnesses" also relies on a form of popular epidemiology in which laypeople combine with progressive professionals to challenge the dominant epidemiological paradigms.

²⁴ Carl F. Cranor, *Toxic Torts: Science, Law and the Possibility of Justice* (New York: Cambridge University Press, 2006) at 12.

available receptors and influencing gene expression, we are forced to rely on scientific and technical ways of knowing.²⁵ Kai Erikson calls these contemporary risks a “new species of trouble”.²⁶ They are “insidious” in that the consequences of exposure tend to eventually manifest themselves in ways that start from “within the body and work their way out.”²⁷ Further, as Erikson argues, the latency period associated with many contemporary environmental health risks underscores their psychological impact in that it renders the experience of risk unbounded; the ‘all clear’ is never sounded.²⁸

Pollution generates powerful anxieties in people. It works involuntarily on human bodies; in most cases, we have no way of being aware of its intrusion and yet it raises the prospect of irreversible and cataclysmic harms.²⁷ The “injurious encounter” in chronic pollution cases takes place at the molecular level.²⁸ This, and the environmental dispersal of multiple injurious agents by multiple polluters, “renders the project of causal tracing difficult, if not impossible in many cases”.²⁹ As Cranor notes,

carcinogens, reproductive toxicants and neurotoxicants are invisible, undetectable intruders that can have long latency periods (i.e. from a few months to more than forty years for cancer), rarely leave signature diseases, often operate by means of unknown, complex, subtle molecular mechanisms and, when they materialize into harm, injure humans in ways that researchers might not discover for years.³⁰

Long latency periods between exposure and effect are particularly difficult in that they allow openings for those seeking to resist the linking of

²⁵ Beck, *supra* note 10 at 63.

²⁶ Kai Erikson, “A new species of trouble” in Stephen R. Couch & J. Stephen Kroll-Smith, eds., *Communities At Risk: Collective Responses to Technological Hazards* (New York: Peter Lang, 1991) 11 at 11.

²⁷ Mary Douglas & Aaron Wildavsky, *Risk and culture. An essay on the selection of technological and environmental dangers* (Berkeley, CA: University of California Press, 1982) at 26.

²⁸ Lynda Collins, “Material Contribution to Risk and Causation in Toxic Torts” (2001) 11 *Environmental Law & Practice* 105 at 107.

²⁹ *Ibid.*

³⁰ *Supra* note 24 at 11.

environmental health harms with pollution to point to any number of possible intervening causal events.

To overcome these difficulties, many communities organizing around environmental health harms turn to the science of epidemiology for assistance. Epidemiology is the study of disease in the population as a whole, as distinguished from the study of disease in individuals.³¹ It is the study of the *distribution* of a disease or physiological condition in human populations, and of the factors that influence that distribution.³² Most toxic substances in the environment, however, have simply not been subjected to systematic epidemiological study.³³ Where there are studies to draw on, the scientific evidence typically provides that the toxic chemical in question *might* be hazardous, but not that it *is* hazardous. In order to show that exposure to a toxic substance caused or contributed to human harm, substantial, lengthy, expensive studies are needed.³⁴ Thus, epidemiological evidence is generally treated as useful for demonstrating links or associations between particular illnesses and potential toxins but not as providing definitive causal pronouncements in particular instances.

The critique of conventional epidemiology from an environmental health perspective is that “[s]ubjective claims about the body are subordinated to statistical correlations between exposure and [populations]”.³⁵ The focus is not on individual suffering, not even on community-wide illness or harm, but on aggregated and probabilistic harm across disembodied “populations”. The result blurs the details of individual lives and community struggle in the hopes of creating a pattern, or revealing a “cluster”. Thus, epidemiology’s “statistical vision” tends to turn individuals suffering from the effects of chronic contamination into mere “victims of chance”, denying the social origins of pollution and the

³¹ *Rothwell v. Raes* (1990), 76 D.L.R. (4th) 280 at para. 50 (Ont. C.A.).

³² *Supra* note 24 at 9.

³³ See Brown, *supra* note 7 and Cranor, *supra* note 24. For endocrine disruptors, Mary Wolff states: “basic knowledge about fate and transport in the body is very sketchy for many chemicals: where do they come from and how long do they last in the body?” (Mary S. Wolff, “Endocrine Disruptors. Challenges for Environmental Research in the 21st Century” (2006) 1076:1 *Ann. N.Y. Acad. Sci.* 228 at 234).

³⁴ Brown, *ibid.*

³⁵ Sheila Jasanoff, “Science and the Statistical Victim: Modernizing Knowledge in Breast Implant Litigation” (2002) 32:1 *Social Studies of Science* 37 at 37.

blameworthiness of those who perpetuate it.³⁶ The social aspects of risk and its consequences can be brought into focus, however, through close empirical study, and I turn now to the struggles of the Aanishnabek of Aamjiwnaang.

III. THE CHRONIC CONTAMINATION OF AAMJIWNAANG FIRST NATION

The Aamjiwnaang First Nation is a community of approximately 900 Aanishnabek people living on a reserve located immediately adjacent to Sarnia's notorious "Chemical Valley". This area of southwestern Ontario, located at the southern tip of Lake Huron, bordering Michigan, houses one of Canada's largest concentrations of industry, including several large petrochemical, polymer, and chemical industrial plants. In recent years, residents began to wonder about why they were starting to require two softball teams to accommodate the girls on reserve, and they could barely field one team of boys.³⁷ Soon, they had documented a marked decrease in the number of males born into their community. With the assistance of researchers affiliated with the University of Ottawa and the Occupational Health Clinic for Ontario Workers, an investigation was launched to explain this phenomenon, and the Aamjiwnaang First Nation now has the unwelcome distinction of the world's lowest documented birth ratio.³⁸

Using data reported to the Department of Indian and Northern Affairs, the researchers assessed trends in the ratio of male to female births for the years 1984-2003.³⁹ The results of linear regression analyses showed that while the proportion of male births was relatively stable for the years 1984-1993, it declined sharply from 1994 to 2003. The most pronounced decrease was noted during the most recent 5 years. Globally, the

³⁶ *Ibid.*

³⁷ Ada Lockridge, Health and Environment Committee Chair, Aamjiwnaang First Nation, personal communication (March 26, 2008).

³⁸ Mary Ann Colihan, "Chemical Valley: Aamjiwnaang First Nation in Sarnia Sounds Alarm Over Toxins" (CBC News In Depth, 2008), online: <<http://www.cbc.ca/news/background/aboriginals/health.html>>.

³⁹ C.A. Mackenzie, A. Lockridge & M. Keith, *supra* note 6 at 1296.

percentage of male births typically hovers just about 50%. In Canada, 51.2% of live births are male. In the 10-year period from 1994 to 2003, the study authors found that the proportion of male births in the Aamjiwnaang community steadily declined, accounting for only 41.2% of births. In the five years from 1999 to 2003, the decline was even more pronounced, with males totalling only 34.8% of births. Although sex ratios may fluctuate over time, the deviation identified in the Aamjiwnaang community, according to the study, was “outside the range of normal.”⁴⁰

The study recommended further research to determine whether the noted decline in sex ratio was correlated with the community members’ exposure to industrial pollutants. Other studies conducted in this region have found changes in the sex ratios and reproductive ability of fish, bird, and turtle populations, which are thought to be due to exposures to endocrine-disrupting chemicals.⁴¹ Endocrine disruptors are said to have a “hormone-mimicking” effect.⁴² They may induce long-term effects upon low-dose exposures in susceptible developmental phases.⁴³ It is hypothesized that these environmental contaminants disrupt the human endocrine system, influencing the sex ratio by changing parents’ hormonal milieu or by inducing sex-specific mortality in miscarriage.⁴⁴

To the legacy of colonialism, the Aamjiwnaang First Nation adds the legacy of a century of petrochemical production. Talfourd Creek gathers

⁴⁰ *Ibid.*

⁴¹ Endocrine disrupting chemicals include a diverse set of compounds such as persistent organic pollutants like dioxins and polychlorinated biphenols (PCBs), several insecticides and fungicides, and a number of widespread industrial chemicals such as brominated fire retardants. Alberto Mantovani, “Risk Assessment of Endocrine Disruptors: The Role of Toxicological Studies” (2006) 1076 *Ann.N.Y.Acad.Sci.* 239 at 240.

⁴² T. Colborn, D. Dumanoski & J. Peterson Myers, *Our Stolen Future: Are We Threatening Our Fertility, Intelligence and Survival?: A Scientific Detective Story* (New York: Dutton, 1996).

⁴³ In particular, “the “continuum from gamete production and fertilization through to intrauterine and post-natal development of progeny, is recognized as especially vulnerable to endocrine disruption”. Mantovani, *supra* note 41 at 239.

⁴⁴ Dr. William Foster, Medical Director at the Center for Reproductive Care at Hamilton Health Sciences center (lecture delivered at the Aamjiwnaang Environmental Health Symposium, Sarnia, 26 March 2008) stated that the driving mechanism is still very much contested. Some studies point towards a paternally-mediated effect, while others indicate a maternally-mediated effect.

its waters in an industrial corridor home to 40% of Canada's chemical production before it meanders through the Aamjiwnaang reserve and empties into the St. Clair River.⁴⁵ The mantra of the environmental justice movement, that "some live more downstream than others"⁴⁶ is an obvious reality in this community. There are 62 large emitting industrial facilities within 25 kilometers of the reserve.⁴⁷ In 2005 there were 5.7 million kilograms of toxic air pollutants released from the facilities on the Canadian side of the border alone.⁴⁸

While the Aamjiwnaang community experiences anxiety and fear related to the frequent pollution "incidents" or accidents that are part of life in Chemical Valley, it is the "slow poisoning" and the accumulation of toxins over time that they have come to dread most. Contamination of their bodies and their traditional territory has had an enormous emotional effect.⁴⁹ And, as they've come to discover, the skewed sex ratio may just be the tip of the iceberg. Residents of the Aamjiwnaang First Nation have expressed both a building anger, and a lingering sadness and distress upon learning of the extent of their health problems and the mounting evidence linking those problems to the actions of their industrial neighbors.⁵⁰ The knowledge itself is upsetting, but "the unknowns" can have an equally corrosive effect. For example, in part because it is widely accepted among epidemiologists that exposures to toxic chemicals in one generation may produce effects in the next, no one can tell the Aamjiwnaang community

⁴⁵ Elaine MacDonald & Sarah Rang, "Exposing Canada's Chemical Valley: An Investigation of Cumulative Air Pollution Emissions in the Sarnia, Ontario Area" (October 2007), online: Ecojustice <<http://www.ecojustice.ca/publications/reports/report-exposing-canadas-chemical-valley/attachment>>.

⁴⁶ Jim Tarter, "Some Live More Downstream than Others: Cancer, Gender, and Environmental Justice" in Joni Adamson, Mei Mei Evans, & Rachel Stein eds., *The environmental justice reader: politics, poetics, & pedagogy* (Tucson, Arz.: University of Arizona Press, 2002) at 213.

⁴⁷ MacDonald & Rang, *supra* note 45.

⁴⁸ *Ibid.*

⁴⁹ For example, Dean Jacobs of Walpole Island First Nation, located on the St. Clair river has underlined the "psychosocial and cultural dimensions" of the chronic pollution and contamination, describing a form of "chemophobia" in which "everyone blames everything on the pollution" ("Environmental Health Status of First Nations" presented at the Aamjiwnaang Environmental Health Symposium, Sarnia, 26 March 2008, notes on file with author).

⁵⁰ Community member comments to the Aamjiwnaang Environmental Health Symposium, Sarnia, Ontario, 27 March 2008, notes on file with author.

whether they face a present danger, or are experiencing the latent manifestation of exposures long past: “was it me, was it my dad, my mom?...we don’t know who’s been exposed”.⁵¹ But it is clear that the Aamjiwnaang First Nation is a deeply injured community.

“Implicit in the term injury”, according to Christopher Williams, “is a relationship between two events (cause and effect) that culminate in a tangible harm”.⁵² Cultural anthropologist Sarah Jain uses the term “wound” to capture the sense that harms exist out there in the world that are not contained in the legal notion of “injury”.⁵³ And, as she reminds us, “wellness and wounding will always be at play within various cross-cutting hierarchies” pre-existing in our society.⁵⁴ “[W]ounding itself”, she states, “brings a mode of attention to objects into being...objects only emerge as separate from the [agent] when something goes wrong.”⁵⁵ It is as if the chronic chemical pollution in the streams, rivers, air, and soil of the Aamjiwnaang reserve is suddenly rendered visible by the duly documented epidemiological study of the plummeting sex ratio.

In reality, the Aamjiwnaang story is one of the individual trauma of repeated miscarriage and the collective loss of a viable future. What is striking about this case, and the issue of chronic pollution more generally, is that the ‘risk’ is

defined not privately, but interpersonally, a kind of threat that individuals do not take on consciously or accept, but gradually find themselves enduring; it is risk identified not with individual persons or actions, but emergent at the level of social life and collective choice.⁵⁶

⁵¹ Ron Plain, (“Exposing Canada’s Toxic Shame” event, lecture delivered at the Faculty of Environmental Studies, York University, 12 March 2008, notes on file with author).

⁵² Christopher Williams, “An Environmental Victimology” (1996) 23 *Social Justice* 16 at 20.

⁵³ Sarah Jain, *Injury: The Politics of Product Design and Safety Law in the United States* (Princeton, New Jersey: Princeton University Press, 2006) at 6.

⁵⁴ *Ibid* at 5.

⁵⁵ *Ibid*.

⁵⁶ Richard P. Hiskes, “Hazardous Liasons: Risk, Power, and Politics in the Liberal State” (1998) 26 *Policy Studies Journal* 257 at 257.

The risk is not one for which the people of Aamjiwnaang have made trade-offs, not one that they've accepted in exchange for some benefit accruing to them or even to society as a whole. It is a risk that they now actively resist. Their strategies, taken in concert with environmental justice activists, are the focus of attention worldwide. And, as I will argue, those strategies have the potential to expose the impotence of current environmental law as an answer to contemporary pollution problems.

IV. ELEMENTS OF A SOCIO-LEGAL ANALYSIS OF RISK

Conventionally, as environmental lawyers and legal academics we have been concerned with environmental “problems”. But more recently we are concerned with environmental “risks” and in essence what the environmental justice movement seeks to mobilize us around are more accurately described as “environmental health risks”, that is, threats to humans that derive from, or are transmitted through air, soil, water and/or food chains.⁵⁷ The “target” of pollution that is a concern for environmental lawyers can no longer be just “ecosystems”: it must include human bodies. It is less about protecting the environment from humans, and more about protecting humans from the environment. At the same time, we must also recognize that threats to both humans and ecosystems are not “caused” by the environment, but are “environmentally *mediated* hazards” — the harmful effects are “first and foremost injuries and justice problems” as opposed to “diseases and health problems”.⁵⁸

In the rationalist tradition, “risk is a quantity that can be measured precisely by means of a formula”.⁵⁹ It is a simple function of the magnitude of the loss and the probability of it transpiring. In other words, something is considered “risky” if the consequence of the risk

⁵⁷ I draw here on the distinctions made by Harris Ali, “Dealing with Toxicity in the Risk Society: The case of the Hamilton, Ontario Plastics Recycling Fire” (2002) 39:1 *CRSA/RCSA* 29 at 30.

⁵⁸ Christopher Williams, “Environmental Victims: An Introduction” (1996) 23 *Social Justice* 1 at 2.

⁵⁹ Piet Strydom, *Risk, Environment and Society: Ongoing debates, current issues and future prospects* (Buckingham: Open University Press, 2002) at 76.

materializing is very serious and/or if it is very likely to happen. Studies of risk from this perspective tend to rely on experts to determine for us what these formulas “say” about particular human activities, and then prescribe what a ‘rational’ regulatory response to the risk would be on that basis.⁶⁰

But how ordinary people judge whether a particular activity is “risky” depends on several other factors outside of just consequence (the ‘magnitude of the loss’) and the probability of it transpiring.⁶¹ Importantly, those factors most often include whether the risk is seen as *voluntary* and whether it is seen as *fair*.⁶² Making judgments on both of these factors involves an assessment of the *distribution* of the costs and the benefits associated with taking the risk. Expert risk management institutions calculate the costs and the benefits of the risky action for society as a whole — they rarely attach much significance to the *distributional* question of: who bears the costs and who reaps the benefits? But residents of contaminated communities often find this, quite rationally, to be a highly relevant criterion.

Once a particular risk has manifested, or — most problematically when an ‘effect’ is present that could potentially (but might not) be attributable to the risk — the next question is one of how to determine cause-and-effect. In law, the establishment of a causal link is generally seen as a prerequisite

⁶⁰ See, for example, Cass R. Sunstein, *Laws of Fear: Beyond the Precautionary Principle* (Cambridge, UK: Cambridge University Press, 2005) and Cass R. Sunstein, *Risk and Reason: Safety, Law and the Environment* (Cambridge, UK: Cambridge University Press, 2004).

⁶¹ Much work has been devoted to the question of why citizen perceptions of a risk may differ from ‘expert assessments’ of the same risk. At bottom, the answer seems to be that public perception of risk tends to include elements that are excluded from expert assessments. As Sunstein and Pildes note: “There is one strikingly consistent finding in risk studies: Laypeople assess risk through different value frameworks from those implicitly embedded in expert approaches. Laypeople do not look only or even primarily to expected annual mortality; they look as well at a number of factors determining the acceptability of different risks in different contexts” (Richard H. Pildes & Cass R. Sunstein, “Reinventing the Regulatory State” (1995) 62 U.Chi.L.Rev. 1 at 56). Specifically, study after study has found that citizens often take account of the ‘catastrophic’ nature of the risk; the ‘controllability’ of the risk; the permanence of the potential loss; the equitable distribution of the danger and benefits associated with the risk; and the characteristics of the likely victims.

⁶² See, for example, Pildes & Sunstein, *ibid* at 66.

to the assignment of responsibility and blame.⁶³ Social scientists and interdisciplinary legal scholars have long been contending that “people’s perceptions and descriptions of cause-and-effect relationships vary according to their time, place, culture and interest”.⁶⁴ In other words, however committed an expert, or a resident, is to practices for causal attribution that are “objective” and “natural”, those practices are inescapably contingent. Judgments about fairness in the allocation of risks and burdens in society inevitably seep into the purportedly objective determinations of cause and effect. And, as Arthur McEvoy has demonstrated, these “struggles over [the] causal definitions of problems are contests over basic structures of social organization”⁶⁵ with striking political and distributional consequences.⁶⁶

As will become clear, the conceptualization of risk inherent in the socio-legal approach recognizes that risks are as much the product of “dynamic social processes of definition, negotiation and legitimation”⁶⁷, as they are biophysical realities. Risk is taken as harbouring both subjective and objective elements.⁶⁸ Harm exists. Communities suffer. That said, the focus of the analysis is on the *claims made about risk*.⁶⁹ Specifically, the task is to define how socio-legal factors participate in and influence the definition of what is “risky”. It is to take account of the critical influence

⁶³ Ernest Weinrib, *Tort Law: Cases and Materials*, 2d ed., (Toronto: Edmond Montgomery, 2003).

⁶⁴ Arthur F. McEvoy, “The Triangle Shirtwaist Factory Fire of 1911: Social Change, Industrial Accidents, and the Evolution of Common-Sense Causality” (1995) 20 *Law & Social Inquiry* 621 at 623; Sally Lloyd-Bostock, “The Ordinary Man and the Psychology of Attributing Causes and Responsibility” (1979) 42 *Modern Law Review* 143 at 143-168; and Kelly G. Shaver, *The Attribution of Blame: Causality, Responsibility, and Blameworthiness* (New York: Springer Verlag, 1985).

⁶⁵ Deborah Stone, *Policy Paradox and Political Reason* (New York: Harper Collins, 1988) at 162.

⁶⁶ *Supra* note 64.

⁶⁷ John Hannigan, *Environmental Sociology: A Social Constructionist Perspective* (New York: Routledge, 1995) at 31.

⁶⁸ As Levenstein and Wooding note, “science reveals real hazards”. Charles Levenstein & John Wooding, “Deconstructing Standards, Reconstructing Worker Health” in Richard Hofrichter, ed., *Reclaiming the Environmental Debate: The Politics of Health in Toxic Culture* (Cambridge, MA.: MIT Press, 2000) 39 at 47.

⁶⁹ Ali, *supra* note 57.

of “power, institutionalized interests, organizations, and the state in the social construction, creation, and allocation of risk”.⁷⁰

A. WHAT IS A SOCIO-LEGAL ANALYSIS OF RISK?

To understand the significance of the ‘rise of risk’ in contemporary environmental discourse, the most useful studies, in my view, are focused at a level where the social construction of risk actually takes place, and where scientific claims-making about risk is consequential. We need to look more carefully at particular communities and their struggles. This article is a modest attempt to set out a framework for socio-legal studies of risk and precaution, and to apply it in the context of chronic pollution.

Jonathan Simon, in a recent essay, outlines two primary branches of inquiry for socio-legal studies of risk.⁷¹ In the first branch, scholars should aim to understand the various ways in which subjects apprehend risk: how it becomes problematized at particular moments in particular places. This approach grows out of a recognition of not only multiple understandings of risk, but also of the historically-specific privileging of particular accounts or narratives of risk. It aims to generate richer, thicker descriptions of risk:

[a] socio-legal account of risk and the law, however, insists on the inclusion of these narratives and their evidence as to how risks actually arise and confront people, not in the abstract, but in specific ways rooted in racial, ethnic, class and gender characteristics. This evidence provides essential material for understanding the ways in which differently situated subjects interpret the *stakes of addressing* certain risks.⁷²

⁷⁰ Kathleen Tierney, “Toward a Critical Sociology of Risk” (1999) 14 Sociological Forum 215 at 217.

⁷¹ Jonathan Simon, “Risk and Reflexivity: What Socio-Legal Studies Adds to the Study of Risk and the Law” (2005) 57 Ala. L. Rev. 119 (Meador Lecture Series on Risk and the Law, delivered at the University of Alabama School of Law, 17 October 2005).

⁷² *Ibid* at 127 [my emphasis].

In other words, subjects who confront risks are not “generic human beings”.⁷³ In Sarnia, they are wage workers in petrochemical facilities, they are oil company executives, they are municipal government planners, they are environmental advocates and they are the widows of the “Victims of Chemical Valley”; and on the Aamjiwnaang reserve, they are young aboriginal mothers, they are parents who routinely receive “emergency alerts” over the radio indicating that they should “Shelter in Place” as a result of an incident or a “fugitive release” from neighboring industry, they are daycare workers responding to the sirens by shuffling toddlers inside and closing the vents, they are health clinic staff staring down bewildering statistics, they are teenagers struggling with asthma, developmental and attention-deficit disorders, and they are young children prevented from swimming in the contaminated creek that passes through their traditional powwow grounds.⁷⁴ Without these narratives, our understandings of the risks of chronic pollution are diminished and our judgments about when precaution is warranted are impoverished.

In the second branch of the inquiry, according to Simon, the goal is to explore how particular techniques or strategies of risk governance become accepted as workable solutions or responses to the ‘risk’.⁷⁵ The analysis under this second branch is concerned with the contest of ideas. It exposes the interests at play in the battle to characterize the risk — the outcome of which is critical to the determination of the appropriate “solution”. Thus, a socio-legal approach tries to uncover not just the “plurality of different ways that risk choices are ordered by actual institutions, belief systems, and identities”, but the way in which that ordering results in the allocation and distribution of risks in the world.⁷⁶

⁷³ *Ibid.* This is captured by the rationalists’ behavioral cost/benefit models.

⁷⁴ These hypothetical risk “subjects” are drawn from encounters with real people in the context of my ongoing empirical work with the Aamjiwnaang First Nation. For example, Barb Millet runs non-profit group called the “Victims of Chemical Valley” which is largely a collection of Sarnia-area widows. A “Shelter-in-Place” order was issued by Sarnia police as recently as March 14, 2008 following a benzene vapor leak at Imperial Oil. Residents were told by emergency TV and radio broadcast that they should stay indoors and close all windows and air intakes. Jack Poirier, “Sarnia issues warning after benzene vapor leak at plant”, *Times Herald* (March 15, 2008).

⁷⁵ *Supra* note 71.

⁷⁶ *Ibid.*

Where conventional approaches to studying risk in the rationalist tradition often promote the management of the risks we face in the present by predicting the future, a socio-legal analysis of risk is “historical and reflexive”.⁷⁷ Work in the behavioral law and economics mode, for example, often takes as a given that “risk” is calculable and expressible as a probability. But the task for socio-legal scholars, Simon argues, is to strive to uncover “real historical risk practices, struggles and ideologies”.⁷⁸ Real subjects rarely confront risks as products of precisely specified costs/consequences and their probabilities of manifesting. Instead, “their situations vis-à-vis institutions, practices, and beliefs have already marked them with particular social associations and positioned them in proximity to particular technologies of risk management and strategies of governance”.⁷⁹ As McEvoy has stated, “how people put events together depends a great deal on who they are and what they are trying to explain.”⁸⁰

The strength of the socio-legal approach is its validation of multiple accounts of risk, and its ability to expose how regulatory approaches necessarily depend, in their logic, on a particular account. “Differently situated subjects”, as Simon notes, not only experience risks differently, but “interpret the stakes of addressing” risks differently as well.⁸¹ In this study, the socio-legal approach allows us to clearly see the basis of our regulatory regime with respect to chronic pollution, and the vulnerability of the assumptions upon which it rests.

V. SUBJECTIVE ACCOUNTS OF CHRONIC POLLUTION

The first branch of the inquiry seeks to document how various subjects or actors understand the ‘risks’ of chronic pollution, how they would describe the ‘harms’ associated with it, and how they would construct the “causes” of those harms. For each subject, it is expected that the answers will be

⁷⁷ *Ibid.* at 123.

⁷⁸ Simon, *supra* note 76 at 137.

⁷⁹ *Ibid.* at 123.

⁸⁰ *Supra* note 64 at 624-25.

⁸¹ *Supra* note 71 at 127 [my emphasis].

informed by personal experience, by distinct cultural traditions, local knowledges and identities.⁸² Drawing on Haraway's conception of "situated knowledges,"⁸³ this should not serve to diminish the authority of those understandings, but to cement it. According to this view, communally accepted knowledge derives its "robustness" from its roots in a particular "way of knowing," and not from a claim to universalism. In other words, it is the "situatedness" of knowledge about risk that makes it compelling, whether the knowledge is scientific or not. As Valverde, Levi and Moore have shown, knowledges of risk are often a hybrid mix of expert and everyday knowledges.⁸⁴ For some, they are the experiential knowledges derived from literally "living and breathing" contamination; they are the knowledges of those whose depth of familiarity with exposures and effects is grounded in years of observation and reflection.

For the purposes of this article, in which my main goal is to set out a framework for a socio-legal analysis of risk and precaution, I hope to illustrate the approach by drawing on preliminary results of empirical work that is ongoing on the Aamjiwnaang reserve. The analysis aims to demonstrate how a materially constituted and situated subjectivity about risk generates multiple accounts of the risk, and how those distinct accounts would translate into distinct regulatory solutions or responses to the risks. Neither of the two subjective accounts presented here, particularly the alternative account, should be interpreted as internally hegemonic or monolithic. The intention is to identify some broad, shared or unifying characteristics for heuristic purposes.

A. THE DOMINANT ACCOUNT: ENVIRONMENTAL HEALTH HARMS ARE INCIDENTAL AND ACCIDENTAL

⁸² See for example, S. Jasanoff, "Restoring Reason: Causal Narratives and Political Culture" in B. Hutter & M. Power, eds., *Organizational Encounters with Risk* (New York: Cambridge University Press, 2005) 209 at 230.

⁸³ D.J. Haraway, "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective" in D.J. Haraway, ed., *Simians, Cyborgs and Women: The Reinvention of Nature* (New York: Routledge, 1991) 183.

⁸⁴ M. Valverde, R. Levi & D. Moore, "Legal Knowledges of Risk" in Law Commission of Canada, ed., *Law & Risk* (Vancouver: UBC Press, 2005) 86.

The dominant narrative for explaining the relationship between pollution and environmental health harms would construe those harms as both “incidental” and “accidental”. The harms are *incidental* to the processes of industrial production and consumption that continually produce them; that is, they are so minor or insignificant when seen in the context of the tremendous social benefit we derive from the modern petrochemical economy, that they barely merit mention. The basic deal that is struck with respect to pollution reflects this understanding: it is permitted, with the caveat that tort law will always be available to compensate victims, in the unusual case where legally sanctioned pollution results in proven harm.⁸⁵

The Sarnia-Lambton Environmental Association is a “voluntary co-operative of 20 industrial facilities” in the Sarnia area.⁸⁶ It owns a network of seven air and water quality monitoring stations (to the Ministry of Environment’s two monitoring stations). Its goal is to “share knowledge and resources to understand the effects of their operations and to develop better ways to eliminate spills and cut emissions to air, water, and land”.⁸⁷ Further, they aim to “remain well below the allowable limits set by Ontario’s clean air regulations, which protect public health and the environment”.⁸⁸ The effect of their efforts is to “identify and manage the quality of each emission source”.⁸⁹

On this account, environmental health harms are also *accidental*, in the sense of random, unexpected, unpredictable events, without any culpable cause. For example, the Sarnia Lambton Environmental Association reports that with respect to the Lambton Industry Meteorological Alert (LIMA) Regulation for sulphur dioxide emissions, in 2006 there were

⁸⁵ A Victim Fee Surcharge is also collected by the courts under the Provincial Offences Act of Ontario (O.Reg.161/00, s.60.1) in cases where a fine is levied. Normally, the surcharge is paid into a “victims justice fund account” managed by the municipality in which the offence occurred. There is not, as yet, an established practice for redistributing these funds to compensate individuals or communities harmed by pollution.

⁸⁶ Sarnia Lambton Environmental Association, *2006 Progress Review Technical Summary*, online: <<http://www.sarniaenvironment.com/pdf/SLEA-2006-Technical-Program-Summary.pdf>> at i.

⁸⁷ *Ibid.*

⁸⁸ *Ibid.* at 1.

⁸⁹ *Ibid.*

“seven LIMA events” in which the daily criterion was exceeded.⁹⁰ According to the organization, “[t]he exceedances were the result of weather conditions that prohibited normal emission dispersion”.⁹¹ With respect to ethylene, a volatile organic compound (VOC), the organization reports that the Ontario daily ambient air quality criterion was “exceeded on a total of 20 days at the various monitoring locations during the year”.⁹² This time, no excuse is offered, but we are encouraged to see the results in light of the fact that the annual sum averages of VOCs have been on a “downward trend” over the past 17 years.⁹³

Despite the fact that the Aamjiwnaang residents are most concerned about the ongoing day-to-day exposures from substances that are constantly released into the air,⁹⁴ high profile “spills” and “accidents” continue to occupy the bulk of the Ministry’s attention. For example, in January of this year, Nova Chemicals was fined \$550,000 when they pleaded guilty to “discharging or causing or permitting the discharge of a contaminant, namely benzene, into the natural environment that caused or was likely to have caused an adverse effect”.⁹⁵ The hydrocarbon leak, which could not be contained by the company until approximately 16 hours later, caused roadblocks to be set up in the area, all non-essential personnel at neighboring facilities to be ordered to leave (and everyone else to be issued respirators), and caused several individuals to experience “headaches, sore throats and other symptoms consistent with benzene exposure”.⁹⁶ The Ministry reported that “the neighboring Aamjiwnaang

⁹⁰ *Ibid.* at 2.

⁹¹ *Ibid.*

⁹² *Ibid.* at 5.

⁹³ *Ibid.*

⁹⁴ Ron Plain, personal communication during my “Toxic Tour” of the First Nation, September 14, 2007, notes on file with author. For example, Ada Lockridge, resident and Chair of the Aamjiwnaang Health and Environment Committee stated on March 26, 2008 that “we are all afraid...the kids are afraid”, notes on file with author. See also, Ada Lockridge’s remarks as quoted in “Community in Canada’s so-called Chemical Valley calls for limits on emissions”, *Canadian Press* (March 15, 2008).

⁹⁵ This is in violation of Air Pollution – Local Air Quality O. Reg. 419/05 [O.Reg.419/05], thereby committing an offence under s.186(1) of the Ontario Environmental Protection Act, R.S.O. 1990, c. E.19. [OEPA].

⁹⁶ *R. v. Nova Chemicals* (16 January 2008), Sarnia IEB file # 4602-6H3R67 (Ontario Court of Justice) (Prosecution Disposition Report (Trial)).

First Nations chose to evacuate their buildings when benzene was detected in air monitoring in the building”.⁹⁷

In another ‘incident’, a “Shelter-in-Place” order was issued by Sarnia police as recently as March 14, 2008 following a benzene vapor leak at Imperial Oil. Residents were told by emergency TV and radio broadcast that they should stay indoors and close all windows and air intakes.⁹⁸ The ‘accident’ occurred when the roof on a storage tank collapsed. An “emergency CVECO [Chemical Valley Emergency Coordinating Organization] Code 8 was issued, which notifies of a potential problem in Chemical Valley. A Code 6 followed, which calls for full traffic control in response to a toxic vapor release”.⁹⁹ CVECO and a related organization called CAER (Community Awareness and Emergency Response) which is part of the chemical industry’s “Responsible Care” program, operate a network of sirens that alert community members when evacuation is required due to chemical release.¹⁰⁰ Those sirens are tested every Monday at 12:30pm. An actual alert occurs by a continuous 3 minute cycle of a one-minute high tone followed by a one minute silence. Residents are to tune into a local radio station for instructions.¹⁰¹ The rationale for the organization is stated as follows: “[t]his thriving, modern community is located close to large chemical manufacturing, industrial, and oil refining industries, presenting a unique public safety challenge”.¹⁰²

This narrative that explains the relationship between pollution and environmental health harms as deriving from accident, occurring rarely, in discrete, isolated events, at the same time construes them as, consequently, *incidental* to the central contribution that industry makes to the well-being and vitality of Sarnia and southwestern Ontario. The City of Sarnia’s website describes the presence of the petrochemical industry in their city as follows:

⁹⁷ *Ibid.*

⁹⁸ Poirier *supra* note 74.

⁹⁹ *Ibid.*

¹⁰⁰ Community Awareness and Emergency Response, “Emergency”, online: <<http://www.caer.ca/emergency.html>>.

¹⁰¹ *Ibid.*

¹⁰² Community Awareness and Emergency Response, “Home”, online: <<http://www.caer.ca/>>.

Extending from Sarnia for some 32 kilometers (20 miles) southward is an impressive series of multi-million dollar petrochemical plants which make up the greatest concentration of this type of industry in Canada. For the newcomer to the area, the industries appear as a vast collection of pipes, tubes, towers and tanks - all creating a fascinating display that is unique to this part of Ontario. At night, the display takes on an even more impressive, almost beautiful appearance, with its thousands of twinkling lights.¹⁰³

In 2005, about half of the facilities in the Sarnia area failed to implement any new pollution prevention measures.¹⁰⁴ In fact, it is expected from surveys conducted with the facilities that 90% of the chemical releases over the next few years will either increase or show no improvement.¹⁰⁵

This account of the risk of chronic pollution is supported by the dominant epidemiological paradigm which is a set of practices and beliefs embedded within science, government, and official understandings that emphasizes individual behavior factors rather than environmental or social factors as keys to disease prevention. These are the so-called “lifestyle” factors. On this account, risks derive primarily from the lifestyle choices of individuals.¹⁰⁶ Individual behavior (if not personal characteristics) come under the microscope. This paradigm is under heavy fire from the social determinants of health model, which would instead understand health to be dependent on social gradient: the higher the family income, the better the housing, and importantly, the better the environment in early life, the better the individual’s health.¹⁰⁷

¹⁰³ The City of Sarnia, “Economic Development”, online: <<http://www.city.sarnia.on.ca/visit.asp?sectionid=431>>.

¹⁰⁴ Rang & MacDonald, *supra* note 45 at 23.

¹⁰⁵ *Ibid* at 24.

¹⁰⁶ See, for example, the work of Deborah Lupton: *Risk* (New York: Routledge, 1999); (ed.) *Risk and socio-cultural theory: new directions and perspectives* (Cambridge University Press, 1999) and *The imperative of health : public health and the regulated body* (London: Sage, 1995).

¹⁰⁷ Michael Marmot, “Introduction” in Marmot and Wilkinson (eds.) *Social Determinants of Health*, 2d ed. (Oxford: Oxford University Press, 2006) 1.

B. AN ALTERNATIVE ACCOUNT: ENVIRONMENTAL HEALTH HARM IS INHERENT TO INDUSTRIAL PRODUCTION

An alternative, emerging narrative for explaining the relationship between pollution and environmental health harms would portray those harms as both chronic and intentional. It would understand pollution to be one of the “inherent by-products of ordinary, everyday life”¹⁰⁸, but would also understand that devastating injury, disease and “wounding” are similarly embedded. On this account, the production of harm in the “ever expanding mosh pit of toxic chemicals” is inextricable from the production of commodities.¹⁰⁹

Most residents of the Aamjiwnaang First Nation take it as a given that there is a causal relationship between chronic exposures to chemicals and injury to human health. They acknowledge that the evidence is only now starting to come in, and they recognize that there is much to be learned.¹¹⁰ But those who would ascribe to this alternative account would include a much broader cast of characters than just the Aamjiwnaang First Nation. In fact, this account can be thought of as an umbrella under which a wide variety of diverse risk subjects with partly overlapping and partly conflicting agendas seem to be converging.¹¹¹ For example, long-time Sarnia mayor Mike Bradley now agrees with the Aamjiwnaang Health and Environment Committee that there are urgent health issues facing Sarnia residents, and that they are attributable to pollution. “There is a price to pay”, he stated recently.¹¹²

¹⁰⁸ Luke, *supra* note 4 at 242.

¹⁰⁹ Sandra Steingraber, *Living Downstream: An Ecologist Looks at Cancer and the Environment* (New York: Addison-Wesley Publishing Company, Inc., 1997) at 100.

¹¹⁰ This was the basis for the recent Environmental Health Symposium hosted by the Aamjiwnaang First Nation, March 26 and 27, 2008 in Sarnia. Letter of invitation to the Symposium, on file with author.

¹¹¹ For example, many risk subjects rejecting the dominant account of the relationship between environmental health harms and pollution might agree that that exposures are chronic and that harm is foreseeable, but would not go so far as to characterize it as *intentional* except in egregious cases. Instead, they may characterize it as advertent (rather than inadvertent), in the sense that it falls short of intent but remains a form of subjective knowledge. Similarly, they may agree that industry actors often *pollute* with intent, but not that they *harm* with intent, even where the actors simply do not want to know, measure or understand what harm the pollution may cause.

¹¹² Colihan, *supra* note 38.

Further, activists from the Aamjiwnaang First Nation have teamed up with progressive environmental epidemiologists that are working on compiling the growing evidence around chronic exposures, or what is sometimes called “sub-clinical chemical injury”.¹¹³ Ted Schettler, a physician with the Science and Environmental Health Network stated at a recent Environmental Health Symposium in Sarnia that “children, from fetus onward, are disproportionately susceptible to contaminants. Early exposure for children, even in the womb, can be linked to diseases that show up later in life, and failure to conceive is part of this continuum”.¹¹⁴ Schettler sees the Aamjiwnaang community’s skewed birth ratio as a clear signal that “something is very wrong in Sarnia”.¹¹⁵

On this account, profound human wounding, through chronic low-dose exposures to toxic chemicals, is understood as a central, *foreseeable* consequence of the production process. “The release of massive amounts of air pollutants into the airshed” is seen as an “obvious burden on the health of local residents as well as on the environment”.¹¹⁶ It is in this sense that environmental justice activists talk about “sacrifice zones”: those communities located in close proximity to industry that are seen powerless and expendable.¹¹⁷ In Louisiana, these activists have re-dubbed their chemical valley as “Cancer Alley”.¹¹⁸ To a certain extent, this understanding of the “risk” of air pollution is almost mainstream: Health Canada researchers, for example, authored a study in 1998 that found, from a review of 11 Canadian cities, that mortality increased as ambient air quality declined.¹¹⁹ The Canadian Medical Association also attributes an extra 100 deaths per year, 270 hospital admissions, 920 emergency

¹¹³ P. Grandjean and P.J. Landrigan, “Developmental Neurotoxicity of Industrial Chemicals” (2006) 368:9553 *The Lancet* 2167.

¹¹⁴ Colihan, *supra* note 38.

¹¹⁵ *Ibid.*

¹¹⁶ MacDonald & Rang, *supra* note 45 at 8.

¹¹⁷ See for example, Bullard *supra* note 5 at 85.

¹¹⁸ Beverly Wright, “Living and Dying in Louisiana’s “Cancer Alley” in Robert Bullard, ed., *The Quest for Environmental Justice: Human Rights and the Politics of Pollution* (San Francisco: Sierra Club Books, 2005) 87 at 87.

¹¹⁹ R. Burnett, S. Cakman, and J. Brook, “The Effect of Urban Ambient Pollution Mix and Daily Mortality rates in 11 Canadian cities” (1998) 89 *Canadian Journal of Public Health* 152.

visits and 471,000 minor illness days to the air pollution in Sarnia-Lambton as a whole.¹²⁰

In 2006, the Aamjiwnaang Health and Environment Committee interviewed members on their experience of living with pollution, and conducted a “body mapping” exercise.¹²¹ Body mapping is a way of pooling the collective health complaints of people so that patterns can be identified. Residents were asked to place colour-coded sticky dots on maps of a human body to represent their symptoms. The result, when all of the maps are laid on top of each other, is a stark visual representation. What the Committee found was alarming: 17% of adults and 22% of children surveyed had asthma; about 25% of adults experienced high blood pressure and/or chronic headaches; about 25% of children suffered from learning and behavioural problems; and about 40% of women experienced had miscarriage or stillbirth.¹²²

In light of all this “accumulating trouble”, residents of affected communities find it increasingly difficult to characterize the incidence of “harm” from pollution as deriving from a few discrete, isolated events.¹²³ The once unremarkable daily pollutant loads have come to be seen as incrementally, over time, amounting to devastating consequences. In this respect, the concept of “total loadings” has become salient. It derives from the application of ecological principles to contemporary pollution problems. It aims to employ a systems lens, incorporating all inputs that might combine to act on ecological function. In its application to human communities, it serves to emphasize the accumulation of stresses that together could constitute a “disproportionate burden”.

On this account, the “old denials” embedded in the turn to lifestyle factors as possible explanations for increased rates of disease is a failure to face

¹²⁰ Ontario Medical Association, “Illness Costs of Air Pollution (ICAP) – Regional Data for 2005,” online: <<http://www.oma.org/phealth/ICAP2005regional.pdf>>.

¹²¹ Sharilyn Jonston & Ron Plain, “Environmental Health Status of First Nations: Aamjiwnaang First Nation Health Studies” (presented to the Aamjiwnaang Environmental Health Symposium (26 March 2008), notes on file with author).

¹²² *Ibid.*

¹²³ Thomas D. Beamish, “Accumulating Trouble: Complex Organization, a Culture of Silence and a Secret Spill” (2000) 47:4 *Social Problems* 473 at 477.

the mounting evidence of disease from chronic pollution.¹²⁴ A common thread linking environmental justice struggles across Canada and the US has been the common experience of residents having to answer government claims that their illnesses or health impacts were more likely related to their rates of smoking, addiction or obesity, than to their exposures to environmental contaminants.¹²⁵ The degree to which a subject assigns relevance to lifestyle factors in explaining the incidence of illness and its ‘disproportionate impact’ on particular communities maps well onto the divergent accounts of risk presented here. In the next section, I explore how those distinct accounts translate into regulatory solutions.

VI. LAW’S TREATMENT OF CHRONIC POLLUTION

In this second branch of the inquiry, the task is to demonstrate how particular accounts of risk shape the ‘solutions’ that can be considered. A fundamental justification for the socio-legal approach is that differently situated subjects interpret the *stakes of addressing* any given risk differently.¹²⁶ In other words, how a subject, or a collective of subjects, understands the relationship between pollution and environmental health harms is largely determinative of what she or they might think is an appropriate way to manage or respond to that risk.

¹²⁴ For example, Jim Brophy of the Occupational Health Clinics for Ontario Workers in Sarnia, notes the similarities from a time when government officials blamed the high mortality rates of asbestos workers on their own personal choices, like smoking. Colihan, *supra* note 38. An unidentified commentator at the Aamjiwnaang Environmental Health Symposium commented that “we’ve heard these old denials before” (notes on file with author).

¹²⁵ See, for example, Elizabeth May and Maude Barlow’s account of the struggles of the workers and residents of Sydney, Nova Scotia in *Frederick Street: Life and Death on Canada’s Love Canal* (Ahrper Collins, 2001).

¹²⁶ Simon, *supra* note 71 at 122 [my emphasis].

A. THE DOMINANT ACCOUNT LEADS TO A STRATEGY OF “RISK MANAGEMENT”

It is significant to the analysis that we notice environmental ‘problems’ now to be continually re-inscribed as environmental ‘risks’. As Jenny Steele has noted, “to name undesired potential outcomes in terms of risk is to begin to structure an approach to action”.¹²⁷ Specifically, to call a problem a “risk” leads directly to a solution of risk management. Eliminating risk is not an option - conventional approaches simply seek to “manage, regulate and distribute risks”.¹²⁸ And, as the environmental justice movement makes obvious, the way those risks are distributed is starkly gendered and even more starkly racialized, even in Canada.¹²⁹

Pollution control laws were some of the earliest environmental laws.¹³⁰ Civil remedies, between individuals, were dismissed as being ineffective as legal tools for the general systemic control of pollution (although they are relied on to ‘pick up the slack’ when things go wrong). A regulatory approach was judged to be more effective. It was administered by technical agencies staffed with scientific and engineering experts focused on determining the “safe” levels of various pollutants in the environment. The job was one of identifying pollution sources, bringing them under permit, and then controlling the quality and quantity of emissions discharged through the terms and conditions of the permit.¹³¹ The “underlying assumption was that the natural environment, with its air, water and land components, could, through careful management, be used to dispose of, dilute, and cleanse the waste produced by human activity”.¹³² This is largely still the basis for the contemporary regulatory

¹²⁷ Jenny Steele, *Risks and Legal Theory* (Portland, OR: Hart Publishing, 2004) at 203.

¹²⁸ Bullard, *supra* note 5.

¹²⁹ Andil Gosine & Cheryl Teelucksingh, *Environmental Justice and Racism in Canada: An Introduction* (Toronto: Emond Montgomery, 2008) especially 33-62; Maureen G. Reed & Bruce Mitchell, “Gendering Environmental Geography” (2003) 47 *The Canadian Geographer/Le Géographe Canadien* 318.

¹³⁰ Alastair Lucas, “The New Environmental Law” in Elaine L. Hughes, Alastair R. Lucas, William A. Tilleman, eds., *Environmental Law and Policy*, 3d ed. (Toronto: Emond Montgomery Publications, 2003) 163 at 164.

¹³¹ *Ibid.*

¹³² Lucas, *supra* note 130 at 164.

regime. It is only a “matter of measuring, then carefully and fairly allocating this environmental assimilative capacity”.¹³³

The *Ontario Environmental Protection Act* is the principal law governing air quality in the province.¹³⁴ It contains a general discharge prohibition on “contaminants” in combination with the issuance of “permits” for emissions in accordance with a Certificate of Approval (CofA) issued by the Minister of the Environment.¹³⁵ A “CofA” is a legally binding license that sets out the conditions under which a facility can operate, including the “maximum permissible contaminant emission levels”. The entire approach is predicated on the development and implementation of standards. Many of the standards for air were established more than 20 years ago. Recently, some progress has been made on updating the standards and on incorporating more sophisticated “air dispersion models” in Ontario.¹³⁶ The models and the procedures for how they inform the granting of individual CofAs are contained in *Ontario Regulation 419/05, Air Pollution - Local Air Quality*.¹³⁷ The MOE calls this regulation the “cornerstone of [their] efforts to protect local air quality”.¹³⁸

The scheme essentially works like this. The Ministry sets Ambient Air Quality Criteria (AAQC) to limit “total atmospheric contaminant levels”.¹³⁹ These place upper limits on the average contaminant concentrations permissible during set time periods at a particular point or “receptor”.¹⁴⁰ They are based on either human health or environmental

¹³³ *Ibid.*

¹³⁴ *OEPA*, *supra* note 95. New standards added in 2005. Ministry of the Environment, Standards Development Branch. “Summary of O. Reg. 419/05 Standards and Point of Impingement Guidelines & Ambient Air Quality Criteria (AAQCs)” (December 2005). Online: <<http://www.ene.gov.on.ca/envision/gp/2424e04.pdf>>

¹³⁵ *Ibid.*, ss. 6(1) and 9(1).

¹³⁶ Ministry of the Environment, “Setting Environmental Quality Standards in Ontario: The Ministry of the Environment’s Standards Plan,” online: http://www.ene.gov.on.ca/envision/env_reg/er/documents/2000/pa9e0004.htm and MOE, *supra* note 134.

¹³⁷ O.Reg 419/05, *supra* note 95.

¹³⁸ Ministry of the Environment, “Setting Air Quality Standards in Ontario,” online: <<http://www.ene.gov.on.ca/en/air/ministry/standards.php>>.

¹³⁹ There are more than 300.

¹⁴⁰ Ambient standards are limits on the concentration of specific pollutants in outdoor air. Another regulatory option would be an effluent standard. A typical standard based on

‘endpoints’, whichever is the most sensitive. The Ministry uses the AAQCs to guide the setting of individual CofA limits.¹⁴¹

Also crucial in the setting of individual CofA limits are the legally-binding “Point-of-Impingement” (POI) standards for the contaminant content of emissions produced by individual facilities. In practice, the point-of-impingement is the location at which a contaminant first leaves the ‘property’ of the source emitter.¹⁴² Maximum average contaminant concentrations (over a half-hour period) at the POI may not be exceeded unless the source is specifically exempted by regulation.¹⁴³ But the concentrations at the POI are not measured, they are calculated. The regulation sets out formulae to calculate concentrations of contaminants at the POIs which purport to incorporate variable environmental conditions. In order to determine compliance, the facility calculates its POI concentrations using these formulae and compares its highest POI concentration with the standard.¹⁴⁴

The glaring failure of this approach is that it does not consider the “environment” being dumped into: it does not take into account the background contaminant levels in the ambient air. In fact, it takes these background levels to be zero — even though they are not required to be zero at the POI, they are only required to be “less than the POI concentration” as they cross boundaries onto neighboring facilities. In

ambient air quality would state: “The average concentration of pollutant X in the air shall not exceed Y micrograms per cubic metre during any 24 hour period”, whereas a typical effluent standard would state: “The maximum daily discharge of pollutant A from point source B shall not exceed 2 kg.”

¹⁴¹ Where national standards exist, they also inform this process. The AAQCs are used by the MOE to set the POI standards, via a set of established mathematical relationships.

¹⁴² O.Reg. 419/05, s.2 (1) states that “ a point of impingement with respect to the discharge of a contaminant does not include any point that is located on the same property as the source of contaminant” (s.2(1), except where there may be a sensitive receptor located on the source’s property, such as a child care facility, a senior citizens’ residence or a school (s.2(2)).

¹⁴³ O.Reg. 419/05, s.18(1).

¹⁴⁴ Under s. 22 of the regulation, a person who applies for a CofA must prepare a “Emission Summary and Dispersion Modelling” report, and under s.28, that person must also notify the Ministry if either modelling or measurements indicate contraventions or measurement indicate the possibility of an “adverse effect”. Thirty days later, the polluter must submit an abatement plan (s.29).

other words, as advocates have noted, while the system might work for an individual facility, it does nothing to take into account the emissions produced by other facilities.¹⁴⁵ “[I]t does not guarantee, therefore, that if the POI limits were met by all contaminant sources, that the AAQC for total atmospheric contaminant levels would also be satisfied”.¹⁴⁶ The regulation seems to be based on the unlikely assumption that pollution never leaves industrial property.

There is very large and well-respected body of scientific evidence that supports correlations between air pollution and health effects.¹⁴⁷ This data is the same data used by governments to set ambient air quality standards. It is also well-documented that the ambient concentration of an air pollutant in a particular location depends on many factors including “emission sources, weather (for example, temperature, wind speed and direction, and precipitation) and land patterns”.¹⁴⁸ Pollutant concentrations for a given area can vary on a seasonal or daily basis. According to critics, an “important feature of ambient standards is that they cannot protect everyone because of the range of [human] susceptibility [to pollutants]”.¹⁴⁹ “Despite the intent to protect public health with a margin of safety, standard setting is a political process that involves compromises”.¹⁵⁰

¹⁴⁵ Cooper *et al.*, *Environmental Standard Setting and Children’s Health* (25 May 2000), online: Canadian Environmental Law Association <<http://www.cela.ca/publications/cardfile.shtml?x=1114>>.

¹⁴⁶ *Ibid.* According to the MOE, this is only a concern for a few contaminants like particulate matter, where background levels are significant: for all other contaminants, background levels of pollution in the ambient air are “apparently minimal”, as advocates have noted with disbelief.

¹⁴⁷ Brown *et al.*, “The Health Politics of Asthma: Environmental Justice and Collective Illness Experience” in David Naquib Pellow & Robert J. Brulle, eds., *Power, Justice, and the Environment: A Critical Appraisal of the Environmental Justice Movement* (Cambridge, MA: MIT Press, 2005) 185 at 190.

¹⁴⁸ M.L. Bell & J.M. Samet, “Air Pollution” in H. Frumkin, ed., *Environmental Health: from Global to Local* (San Francisco: Jossey-Bass, 2005) 331 at 334.

¹⁴⁹ *Ibid.* at 353.

¹⁵⁰ *Ibid.*; Liora Salter “the housework of capitalism” 1993-1994 23 *International Journal of Political Economy* 105; Stepan Wood “Green Revolution or Greenwash? Voluntary Environmental Standards, Public Law and Private Authority in Canada” in Law Commission of Canada (ed) (New Perspectives on the Public/Private Divide) (Vancouver: UBC Press 2003) 123-165.

We might consider O.Reg.419/05 as part of the larger statutory regime. For example, the EPA also contains a prohibition against causing “adverse effects” which applies notwithstanding any other provisions of the Act or the regulations, and O.Reg.419/05 contains a prohibition against causing discomfort to persons, notwithstanding compliance with the standards as set out in the regulation.¹⁵¹ We might say that these general prohibitions can inform the exercise of discretion on the part of the Director such that any shortcomings with the actual regulation can be overcome. But again, this falls short. The “adverse effects” we are concerned about are not likely to be attributable to any one specific polluter. It is the cumulative effects of the many CofAs granted for operations within any specific “airshed” that worries residents. On the dominant account of risk, then, the logic goes like this: if a permit or CofA is issued which meets the requirements as set out in provincial law to protect human health and the environment, this cannot be said to have an “adverse effect”. If there is no “adverse effect”, then there can be no harm, and there can be no “disproportionate burden”.

Privileging of this dominant narrative for explaining pollution’s harms — one that understands them to be incidental and accidental - depends on expert constructions of the risks. This account not surprisingly leads to the adoption of a decision-making process about pollution that seeks primarily to *inform*, rather than to actively involve community members. In fact, one of the nasty ‘by-products’ of a permitting system for pollution control is that many decisions are now made “underground”, in the “quiet and less visible regulation and license negotiating processes of government”.¹⁵² The Director may always impose stricter standards in a CofA than are required by O.Reg.419/05, but it is very difficult for community members to have any influence over these decisions.¹⁵³ Further, it seems that the pattern, in Sarnia at least, is not for standards stricter than those required

¹⁵¹ *OEPA*, *supra* note 95 s.14 and O.Reg.419/05, *supra* note 95 s.33.

¹⁵² K. Webb, “Pollution Control in Canada: The Regulatory Approach in the 1980s” in Elaine L. Hughes, Alastair R. Lucas, William A. Tilleman, eds., *Environmental Law and Policy*, 3d ed. (Toronto: Emond Montgomery Publications, 2003) 165 at 166.

¹⁵³ This is not meant to detract from the significance of the public notice, comment and appeal processes available in most Canadian jurisdictions since the 1980s. For a description of the Ontario Environmental Bill of Rights and its associated online registry, see Mark S. Winfield, “A Political and Legal Analysis of Ontario’s Environmental Bill of Rights” (1998) 47 UNB LJ 325.

by the regulation, but for *exemptions* from those regulations: Royal Polymer, a company producing PVC in Chemical Valley in close proximity to the Aamjiwnaang reserve, has been so repeatedly found in non-compliance with their CofA that they have now asked the Ministry to provide them with an exemption from that standard.¹⁵⁴ The regulatory process includes the invisible application of discretion in the granting of CofAs and the setting of their terms, and that discretion is a crucial actor in the allocation and distribution of risk to particular communities.

The dominant account also obscures the sustained, intentional, profit-seeking dimensions of chronic pollution. It hides from view the exploitative way in which polluting industries perpetually occupy some communities.¹⁵⁵ As Caitlin Zaloom quips, “[r]isk reaps reward”.¹⁵⁶ Emitting pollution in the quantities spewed into the air around Sarnia, even when legally sanctioned, can still be conceived of as “risk-taking” by the corporations. They are pushing the boundaries and betting on the fact that those harmed by their actions will not be able to make out a viable tort claim. The risk society, in other words, “is a society in which some take risks for the sake of possible benefits and others are compelled to face the dangerous consequences of such risk taking”.¹⁵⁷

Polluting, then, is a complex practice that is at once morally reprehensible, and an exemplary act of contemporary productivity¹⁵⁸, depending on your perspective. We can name this business: it is turning risk into profit. As Zaloom argues “aggressive risk taking” is established and sustained by the routinization and legitimation provided by the regulatory structure that permits pollution.¹⁵⁹ Risk “off-loading” is a technology of generating

¹⁵⁴ Instrument Proposal Notice, Royal Polymers Ltd., Environmental Registry, (07 February 2007) online: < <http://www.ebr.gov.on.ca/ERS-WEB-External/displaynoticecontent.do?noticeId=MjkyNjI=&statusId=MjkyNjI=&language=en> > . The Ministry has not yet taken a decision with respect to this matter.

¹⁵⁵ Ellen L. Omohundro, *Living in a Contaminated World: Community Structures, Environmental Risks and Decision Frameworks* (Burlington, VT: Ashgate, 2004); Bullard, *supra* note 5.

¹⁵⁶ Caitlin Zaloom, “The Productive Life of Risk” (2004) 19 *Cultural Anthropology* 365 at 365.

¹⁵⁷ Strydom, *supra* note 59 at 76.

¹⁵⁸ Zaloom, *supra* note 156.

¹⁵⁹ *Ibid.*

wealth, and it is a “critical component of satisfying needs in contemporary capitalism”.¹⁶⁰ In the classic legal treatment, any harm from routine pollution is considered precisely incidental to our system of industrial production. We depend on tort law to step in when catastrophe strikes and to “salve injuries through the compensatory award.”¹⁶¹ But as the Aamjiwnaang example demonstrates with devastating clarity, our habits of production create and sustain inequities that are not capable of being captured (let alone compensated) by the “moral and material logic of repairable harm” that forms the basic premise of tort law.¹⁶² Worse, probabilities are not randomly distributed and the pervasiveness of risk in contemporary society is not uniformly experienced.

Environmental offences are rarely sanctioned or shamed.¹⁶³ The causes and costs of chronic contamination remain hidden because the logic of industrial progress demands pollution. Thus the roots of illness and wounding in toxic chemical pollution, and the possibility of prevention, remain obscure as well. Risk fades into the social landscape: it is treated as a natural by-product of industrial production with no legal nor political significance. Harm is predictable in the aggregate, but never in the individual case.¹⁶⁴

On the surface, of course, regulators claim to be taking action to prevent harm and reduce pollution.¹⁶⁵ But even as the government purports to crack down on air pollution, as the MOE recently has, the incentives on polluters (as evidenced in the regulation) are not structured so as to

¹⁶⁰ *Ibid.* at 367.

¹⁶¹ Jain, *supra* note 53.

¹⁶² *Ibid.* at 31.

¹⁶³ S. Bittle & L. Snider, “From Manslaughter to Preventable Accident: Shaping Corporate Criminal Liability” (2006) 28:4 Law & Policy 470; Keith Hawkins, *Environment and Enforcement: Regulation and the Social Definition of Pollution* (Oxford: Clarendon Press, 1984).

¹⁶⁴ In the case of chronic exposures to pollution, though we cannot know with precise certainty how many or which particular individuals will be harmed by toxic chemical pollution in a given year, we can predict with startling accuracy that many thousands will. (See generally, Cranor *supra* note 24 and Luke *supra* note 4 at 248.)

¹⁶⁵ Ministry of the Environment, Press Release, “Ontario’s New Air Standards Among the Toughest in the World: New Air Standards Will Better Protect Ontario Communities” (31 August 2007) online: <<http://www.ene.gov.on.ca/en/news/2007/083101.php>>.

accomplish this goal.¹⁶⁶ It is in this respect that we might say that environmental law is ambivalent to chronic pollution. The ambivalence, I would argue, derives from the continued prominence of the account that understands environmental health harms as incidental to, and not central to, industrial production. Any harm caused by legally sanctioned, permitted pollution (as most of it is in Sarnia's chemical corridor) is treated as a by-product or an accidental side effect of the economic activity. It remains "unintentional". And yet, pollution is a "fixed feature" of modern economies.¹⁶⁷ The production of chemicals, the refining of oil, and the generation of electricity in the Sarnia corridor has harm and wounding embedded in it. It is equally the *production* of pollution.

A central issue with the alternative account, of course, is whether pollution, especially low-dose, chronic exposures, can be said to be the "cause" of environmental health harms. As McEvoy demonstrated, a "causal explanation is most often prompted by the occurrence of something *unusual*: we ask for the causes of accidents, catastrophes, deviations from the normal or accepted course of events."¹⁶⁸ It is for this reason that a transformative shift in thinking is required in order for environmental health harms to be attributed to polluters. The "normal" background conditions of industrial production cannot, in law, be held to be the "cause" of illness and suffering.¹⁶⁹ In seeking this transformative shift in thinking, many turn back to the precautionary principle. Can "precaution" provide this transformative stimulus?

B. THE EMERGING ACCOUNT LEADS TO A STRATEGY OF PRECAUTION

¹⁶⁶ Further, the enactment of "tougher standards" presumes and requires that governments will enforce them, and that they will enforce them equally. For a discussion of what one author calls Canada's culture of "systemic non-enforcement", see Lynda Collins, "Tort, democracy and environmental governance: The case of non-enforcement" (2007) 15 *Tort Law Review* 107.

¹⁶⁷ Luke, *supra* note 4 at 248.

¹⁶⁸ Bostock, *supra* note 64 at 147.

¹⁶⁹ H.L.A. Hart & Tony Honore, *Causation and the Law*, 2d ed. (Oxford: Clarendon Press, 1985).

The account of risk that construes environmental health harms as inherent to our industrial model often leads to policy solutions seeking “cumulative impact assessment”. It is widely acknowledged that the problems of persistence and bioaccumulation in toxic chemicals pollution make the “assimilative approach unsuitable”.¹⁷⁰ On this account, it is also now obvious that traditional pollution control regimes are completely ineffective against chronic low-dose exposures to toxic chemicals such as endocrine disruptors. Conventional practices of risk assessment are based on the premise that “while a serious hazard may exist, there is no *risk* without a path of exposure”.¹⁷¹ Thus risk assessment enables the “continued use of toxic chemicals at scientifically sanctioned “acceptable” levels”.¹⁷² But evidence is starting to come in that certain classes of chemicals in widespread use, such as endocrine disruptors, “are capable of exerting population-wide effects at current levels of exposure”.¹⁷³ The solution? Precaution.

“Precautionary activists contest traditional risk assessment with *cumulative* risk assessment”.¹⁷⁴ Advocates in the environmental justice movement now also routinely demand that regulators take an “ecosystem approach”. This would be grounded in an assessment of the overall consequence of all human activities on a living system, including human communities. It would focus on “cumulative effects” and not on individual facility emissions. Specifically, on this account, we would see the emissions from newly permitted facilities measured in combination with existing sources. “[C]onsiderable impetus for this cumulative risk assessment comes from environmental justice groups who argue that the multiple assaults on their communities cannot be understood if government and science focus on isolated, individual chemical risks”.¹⁷⁵

¹⁷⁰ Lucas, *supra* note 130 at 164.

¹⁷¹ A. Tarbell & M. Arquette, “Akwasasne: A Native American Community’s Resistance to Cultural and Environmental Damage” in Richard Hofrichter, ed., *Reclaiming the Environmental Debate: The Politics of Health in a Toxic Culture*, (Cambridge, Mass.: MIT Press, 2000) 93 at 102.

¹⁷² National Wildlife Federation & Canadian Institute for Environmental Law and Policy, *A prescription for healthy Great Lakes: Report on the Program for Zero Discharge* (Washington, DC: National Wildlife Federation, 1991).

¹⁷³ *Ibid.*

¹⁷⁴ Brown, *supra* note 5 at 209.

¹⁷⁵ *Ibid.*

For example, Aamjiwnaang Chief Christopher Plain stated recently that the MOE should be working towards “diminishing the cumulative exposure of the public to chemicals”.¹⁷⁶ Chemicals work in concert with each other: “in other words, even if every facility that affects a community...has a legally adequate permit, the cumulative burden of these facilities nonetheless must be conceived of as being capable of creating harm”.¹⁷⁷

The emerging, alternative account of the relationship between pollution and environmental health harms would judge the prevailing regulatory approach to be fundamentally flawed. It is seen as patently unable to address the risks from chronic air pollution. The thrust of the emerging account is reflected in a recent decision of the Environmental Review Tribunal for Ontario. The decision states:

POI standards are helpful guidelines or signposts, but they can only estimate acceptable levels because it is not possible to know the circumstances in which individual applications arise, such as whether the facility is in an isolated location or a heavy industrial area; in a pristine or polluted region; whether cumulative impacts are low or high; the type and nature of other contaminants in the area; the additive and/or synergistic effects of the proposed emissions with other materials in the environment; and so on.¹⁷⁸

The Environmental Commissioner for Ontario has also lamented the “continued reliance on a POI approach” which, as the Commissioner points out, “is not directly controlling annual *loadings*” of contaminants.¹⁷⁹ The Commissioner notes that the prevailing approach cannot offer protection for “pollution “hotspots”; industrial airsheds with significant

¹⁷⁶ Personal communication, (20 February 2008).

¹⁷⁷ Holly D. Gordon & Keith I. Harley, “Environmental Justice and the Legal System” in David Naquib Pellow & Robert J. Brulle, eds., *Power, Justice, and the Environment: A Critical Appraisal of the Environmental Justice Movement* (Cambridge, MA: MIT Press, 2005) 153 at 160.

¹⁷⁸ *Dawber v. Director, Ministry of the Environment*, [2007] O.E.R.T.D. No. 25, 28 C.E.L.R. (3d) 281 at 16.

¹⁷⁹ Environmental Commissioner for Ontario, “Neglecting our Obligations: 2005-2006 Annual Report Supplement” online: <http://www.eco.on.ca/eng/index.php/eco-publications/eco-publications-2/2005-06-annual-report.php> at 83.

background concentrations from pollutants from multiple facilities”.¹⁸⁰ On this account, it is argued that industry should be required to prove that ambient standards are not exceeded at critical locations (and for vulnerable ‘receptors’) when applying for (or renewing) a CofA. Instead of being conceived as granted in accordance with a general right to pollute, CofAs should be subject to continuous supervision — they should be thought of as temporary concessions or revocable licenses.

There are several elements of a “cumulative approach”. On top of the focus on additive effects or total loadings, there is also the issue of *interactions* between chemicals. While our regulatory approach, and its attendant risk assessments, are based on the individual assessments of isolated chemicals, in reality, we are exposed to complex mixtures. “Scientific studies make it clear that chemicals can interact or act together to produce an effect that none could produce individually”.¹⁸¹ The legal regime currently ignores both additive and synergistic effects:

Regulating as if chemicals act only individually is as unrealistic as assuming that a batter in a baseball game can only score a run for his team if he hits a home run. In real life and in baseball, the bases may already be loaded and a single could well be enough.¹⁸²

In particular, the potential for multiple exposure to chemicals with common targets or a common mechanism of toxicity (or “mode of action”) calls for attention to interaction and the effects of mixtures. In this respect, current knowledge is woefully incomplete.

Calls for cumulative impact assessment also tend to be calls for a more “place-based”, or situated approach, returning the focus to the central *spatial* aspects of pollution. As Sandra Steingraber notes, “the distribution of illness in space reveals clues about its causes”.¹⁸³ In both the infamous Woburn and the Love Canal environmental justice struggles, residents employed an explicitly spatial analysis to solidify their claims about the source and origins of the pollution. In the Woburn case, this involved

¹⁸⁰ *Ibid.*

¹⁸¹ Colborn *et al.*, *supra* 42 at 220.

¹⁸² *Ibid.*

¹⁸³ Steingraber, *supra* note 109.

tracing of the movement of underground *plumes* of groundwater as a way of demonstrating a pathway of exposure.¹⁸⁴ In Love Canal, residents, led by a group of self-proclaimed “housewives”, faced the familiar challenge of proving that the toxic chemicals from the Canal were the cause of the noted health effects including elevated rates of cancer, uterine infections, and birth anomalies.¹⁸⁵ Geologists eventually conducted a mapping of *swales* (“moist surface valleys or underground soil intersections”) and the residents overlaid those maps on maps of the community’s disease profile.¹⁸⁶ This image ultimately proved persuasive in explaining the way that chemicals were picked up and transferred, and showing exactly how residents were being exposed to the contamination from the Canal.¹⁸⁷

The attention to these pathways for chemical migration is critical. In Aamjiwnaang, the residents of the reserve have for many years been calling for attention to be paid to the prevailing winds and the way they disperse and distribute the pollution through the formation of plumes (streams of pollution that can remain distinct from ambient air over various distances because of differences in temperature and density). In fact, the notion of “disproportionate burdens” deployed by the environmental justice movement has a fundamentally spatial character. When communities sense they are bearing “more than their *fair share*” of environmental burdens this often leads directly to calls for an analysis of cumulative impacts. This is because the very idea of burden sharing inherently involves some form of counting — whether it is the number of facilities, or the “total pollutant loading” -- and a comparison. Residents of pollution hot spots intuitively know that living among sixty-two large polluting facilities is worse than living near two (even when the regulator insists that none of these sixty-two produce any “offsite impacts”).

In non-aboriginal populations, the spatial aspects of pollution have exacerbated the difficulties of proving harms are related to exposures.

¹⁸⁴ Paula Diperna, "Leukemia Strikes a Small Town" *The New York Times* (2 December 1984).

¹⁸⁵ New York State Department of Health, “Love Canal; Public Health Time Bomb” (September 1978) online: <http://www.health.state.ny.us/environmental/investigations/love_canal/lctimbmb.pdf> .

¹⁸⁶ Phil Brown & Richard Clapp, "Looking Back on Love Canal" (2002) 117 *Public Health Reports* 95 at 96.

¹⁸⁷ *Ibid.*

This is because “people shift their spatial location and visibility” over time.¹⁸⁸ People move. In fact, in several seminal environmental justice struggles involving chronic contamination of non-aboriginal populations such as Love Canal, or Frederick Street in the Sydney Tar Ponds, a key demand made by the residents was for a state-sponsored buy-out or relocation of their communities. These demands were needed because, in most cases, the effects of the contamination on the property values were more easily observed than those on the bodies. Residents that hadn’t left the community of their own accord before the contamination controversy flared were trapped by the economics of the situation. In fact, members of the Aamjiwnaang First Nation, when they speak out against the chronic pollution they experience, often face the question from outsiders: “why don’t you leave”? “Why should *we* leave?” is Ron Plain’s response. When a member of the community noted recently that “Aamjiwnaang is situated right next to industry”, Ada Lockridge, Chair of Aamjiwnaang’s Health and Environment Committee interjected immediately to correct: “No”, she stated, “industry is situated right next to *us*”.¹⁸⁹

Aboriginal peoples, “unlike most Americans and Canadians, are not a transient population and cannot abandon their homeland to find cleaner air, water, and land”.¹⁹⁰ Native people, “like resident plants and animals, will live adjacent to these [contaminated] sites forever and experience the effects of persistent contaminants for generations to come”.¹⁹¹ The connection to the land is tied to identity: as Tarbell and Arquette insist, “the only place the people of Akwesasne can be Mohawk is on Mohawk land”.¹⁹² The same is true for the Aamjiwnaang. The

¹⁸⁸ David N. Pellow, “Environmental Inequality Formation: Toward a Theory of Environmental Injustice” (2000) 43 *American Behavioral Scientist* 581 at 590.

¹⁸⁹ Environmental Health Symposium, 26 March 2008, Sarnia, notes on file with author.

¹⁹⁰ Tarbell & Arquette, *supra* note 171 at 99. This claim must be understood in the context of a history of forced displacement and sedentarization of First Nations peoples through state policies and legislation such as the *Indian Act* (see for example, John Tobias, “Protection, Civilization, Assimilation: An Outline History of Canada’s Indian Policy” in Ian Getty and Antoine Lussier (eds.) *As Long as the Sun Shines and the Water Flows: A Reader in Canadian Native Studies* (Vancouver: UBC Press, 1983) 39-55). Further, the understanding that native people are “tied to the land” can be challenged empirically on the basis of recent census data that reveals a significant aboriginal population that, in fact, does move freely on and off and among traditional territories.

¹⁹¹ *Ibid.*

¹⁹² *Ibid* at 103.

Aanishinaabek people have occupied their lands at the southernmost tip of Lake Huron for hundreds of years. As Ron Plain will tell you, on the Aamjiwnaang burial grounds, you will find the remains of four generations of his ancestors, all in one place, literally on the fenceline of a large refinery: “we all lived *here* – all our lives”.¹⁹³ The permanence of both the risk and of the Aamjiwnaang First Nation on the landscape, has been suggested as a possible explanation for why we might see a disproportionate effect of chronic pollution in this community: it is grounded both spatially and historically.¹⁹⁴ It also demonstrates clearly how toxic chemical pollution exists in social contexts that can exacerbate its effects.¹⁹⁵

C. STRATEGIES OF RESISTANCE: BODY BURDENS AND BUCKET BRIGADES

Two strategies that increasingly constitute integral parts of the campaigns by environmental health and justice advocates, body burden testing and bucket brigades, flow directly from the characterization of the risk of harms from pollution as chronic and inherent. Advances in biomonitoring have enabled communities to obtain measures of a person’s “body burden”, which is thought to give direct information about total exposures across time and from all sources.¹⁹⁶ The testing is expensive and it is risky. For a community under siege from pollution, the greatest fear is a study that returns the headline “Community Pollution Levels Within the ‘Normal’ Range”. Nevertheless, communities are moving forward with this strategy confident that they will generate evidence that cannot be ignored. Similarly, “bucket brigades” are teams of local residents in “fenceline communities” that are out to generate the data - the *evidence* - that can be used to force their governments into action.

¹⁹³ Ron Plain, *supra* note 121.

¹⁹⁴ Dr. Devra Davis, “Keynote Address: New Social Movements” (presented to the Environmental Health Symposium 27 March 2008), noted that for many environmental justice struggles in the U.S., entire communities like Reveilletown and Mossport, La., contaminated by the chemical industry, were essentially evacuated: people moved away *en masse*. “We lost the ability to document the problem”, she stated. Colihan, *supra* note 38.

¹⁹⁵ Luke, *supra* note 4 at 248.

¹⁹⁶ Brown, *supra* note 7 at 265.

Everywhere we go, it seems, we bring our bodies. Biomonitoring technologies have now advanced to the extent that they can detect minute concentrations of contaminants in nearly every individual living. A body burden is a measure of a person's chemical load: it is the sum total of exposures from all routes of entry (inhalation, ingestion and skin absorption) and from all sources (food, air, water) from all the places we work, live and play. For a complete measure of the total burden you would need samples from every fluid and compartment of tissue in the exposed body. More commonly, a sample of blood or urine, semen, umbilical cord blood or fingernails is extracted and subjected to expensive analysis.¹⁹⁷ The risk 'subject' then is confronted with the task of making sense of the textual representation of her contamination. As Steingraber notes, it is "our bodies, inscribed".¹⁹⁸ In the case of "fat soluble, persistent chemicals, body burdens provide a measure of cumulative exposures" that have built up over time but for "chemicals quickly metabolized and excreted, the body burden is an index akin to a press release rather than a biography".¹⁹⁹ It "reports on the status of immediate and ongoing exposures to particular contaminants at single points in time".²⁰⁰

As is often said in the environmental justice movement, that the polluted are powerless is proven by the very fact of their *pollution*.²⁰¹ But this is a campaign that, while widely embraced, in my view exposes a conceptual discontinuity.²⁰² A coming challenge for this emerging social movement

¹⁹⁷ The testing of umbilical cord blood is highly controversial, as is practice of breast-milk monitoring for pollutants. These are socially-significant mediums for which to announce the presence of toxins. On the breast milk issue, environmental health advocates want to be sure that alerting mom-to-be about the toxins in their breast-milk won't cause them to give up breastfeeding in favour of formula.

¹⁹⁸ Steingraber, *supra* note 109 at 236.

¹⁹⁹ *Ibid.* at 236.

²⁰⁰ *Ibid.*

²⁰¹ Bullard seems to indicate that "powerless communities" are those forced to bear disproportionate environmental costs", *supra* note 5 at 31.

²⁰² There are a growing number of environmental groups engaged in biomonitoring. For example, the US-based Environmental Working Group (EWG) have a campaign titled "Across Generations" which involves testing of mothers and daughters, a campaign entitled Mother's Milk, and a campaign targeting pollution in newborns. Online: <www.ewg.org>. Similarly, Environmental Defence has a biomonitoring campaign entitled Toxic Nation. Online: <www.environmentaldefence.ca>

against chronic pollution is to wrestle with the underlying tension that has environmental justice activists wanting to put forward both of the following claims about pollution at the same time:

- 1) that “its in all of us”²⁰³, or, that “we all live downstream”²⁰⁴; and
- 2) that “some of us live more downstream than others”.²⁰⁵

Can we have both? It is clear that at some level, yes, we are all polluted, and yes, it is also clearly a matter of degree. But does it undermine the basis of the central environmental justice claim when groups demonstrate that the rich and powerful are also ‘polluted’?²⁰⁶ With respect to low-dose chronic exposures, while it may be true that “no one can fully escape”, it is also clear that some of us can and do avoid exposures to the most toxic local contaminants that others are unable to dodge.²⁰⁷ Radioactive waste disposal sites, incinerators, refineries, coal-fired utilities, and cement kilns are not located in wealthy neighborhoods.

Still, forcing Canadians to confront the fact that our current laws and complex regulatory regimes are failing demonstrably to prevent the build-up of a whole slew of known toxins in our own bodies is a worthy aim of these campaigns. They may also serve to promote an awareness of emerging research that now points to health effects at levels below the “safe doses” currently set by our regulatory agencies, and to demonstrate the ubiquity of certain substances in the environment. While work to date has not moved to correlate burdens with actual health status, this is a direction of future research. But again, as a mobilizing strategy, biomonitoring when combined with individual health data, is potentially

²⁰³ *Ibid*, Environmental Defence.

²⁰⁴ S. Boyd, D. Chunn & R. Menzies, “We All Live in Bhopal” in S. Boyd, D. Chunn & R. Menzies, eds., *Toxic Criminology: Environment, Law and the State in Canada* (Halifax: Fernwood Publishing, 2002) 11 at 11.

²⁰⁵ Tarter, *supra* note 46.

²⁰⁶ For example, the EWG campaign included high profile public figures and ED’s “Toxic Nation” campaign tested the body burdens of a variety of people, from federal politicians and celebrities to ordinary Canadians (*supra* note 202).

²⁰⁷ *Ibid*.

individualizing and medicalizing, and thus working at cross-purposes with exercises in popular epidemiology.²⁰⁸

Launching their own “bucket brigades” is a second new strategy which allows residents of contaminated “fenceline” communities to actively participate in environmental monitoring and regulation. In essence, those residents are equipped to sample the ambient air in their communities at times and locations of their own choosing. The team consists of “sniffers” and “samplers” in a coordinated network using low-cost grab samplers that are explicitly designed to be “inexpensive, easy to use, and made of materials that can be found at a local hardware store”.²⁰⁹ At the same time, these buckets are capable to storing a sample of ambient air that can be subject to sophisticated analysis with proven credibility.

The strategy is motivated by the firm belief that the current monitoring systems in place are wholly inadequate and that they in fact “perpetuate an environment in which firms pollute beyond safe levels, and with little threat of punishment”.²¹⁰ It is also widely understood in the environmental justice movement that the “location, range and focus of ambient monitors are determined through an inherently political process”.²¹¹ In Sarnia, there are no ambient air quality monitors belonging to the Ministry of the Environment located downwind of Chemical Valley. In fact, when faced with the recent publication of some test results from a air sample captured by the Aamjiwnaang bucket brigade, the MOE agreed to install an air quality monitoring station on the reserve.

Without the monitors, or the capacity to do their own monitoring, the Aamjiwnaang First Nation faces this very typical scenario: “Industry has an accident that results in a chemical release; government officials arrive too late to inspect or evaluate the release; and industry announces that there is no risk to the community”.²¹² Following a massive power failure a few years ago in Sarnia, “one company famously declared “no offsite

²⁰⁸ Phil Brown’s concept of “contested illnesses” also relies on a form of popular epidemiology in which laypeople combine with progressive professionals to challenge the dominant epidemiological paradigms.

²⁰⁹ O’Rourke & Macey *supra* note 8 at 389.

²¹⁰ *Ibid.* at 384.

²¹¹ *Ibid.*

²¹² *Ibid.* at 391.

impact” even as clouds of black smoke billowed over the city”.²¹³ As Vicki Ware, an Aamjiwnaang band councillor states, “By the time you get someone to come out to the community to test the air, you’re not going to get an accurate sample”.²¹⁴ The bucket brigades are intended to shift the essential power relations inherent in this scenario by providing the community with an indispensable tool to deploy: information that they control. “With just a few air samples”, Denny Larson of Global Community Monitor explains, “the community can collapse the house of cards built by the government and industry that pollution doesn’t cross the industry’s fence line”.²¹⁵ This expectation is reflected in the remark by Ada Lockridge, Chair of Aamjiwnaang’s Health and Environment Committee, after the test results came in: “The Ministry of the Environment has to move on this. We have the proof”.²¹⁶

A central concern for those worried about cumulative effects of exposures is that government agencies “are not monitoring the full range of chemicals that [residents] are exposed to”.²¹⁷ For example, what the recently released Aamjiwnaang bucket results revealed was unusually high levels of benzene, which is a chemical for which Ontario does not even have an ambient air quality standard.²¹⁸ Benzene is a volatile organic compound (VOC) which can be hazardous to human health when inhaled. Because benzene has been noted as toxic, and is a probable human carcinogen, the official provincial position is that its emissions are to be prevented or limited to the greatest extent possible.²¹⁹ As a result of the bucket brigade results, John Steele, spokesperson from the MOE, stated that the province is looking into establishing a standard for benzene and that the government will also install an air monitoring station in the Aamjiwnaang community by spring 2008.²²⁰ Thus, for communities under

²¹³ Editorial, “Do-it-yourself air monitoring” *The Sarnia Observer* (11 May 2007).

²¹⁴ Jack Poirier, “Band to Monitor Industry” *The Sarnia Observer* (10 May 2007).

²¹⁵ Global Community Monitor, “History of the Bucket Brigade” (2006) online: <<http://www.bucketbrigade.net/article.php?list=type&type=74>>.

²¹⁶ “Localized study is complete; Aamjiwnaang test finds high levels of hazardous chemicals” *The Sarnia Observer* (15 March 2008).

²¹⁷ O’Rourke & Macey, *supra* note 8 at 395.

²¹⁸ *Supra* note 216.

²¹⁹ MOE, *supra* note 134 and *Bogan v. Director, Ministry of the Environment* [2007] O.E.R.T.D. No. 12.

²²⁰ Jack Poirier. “Aamjiwnaang test finds high levels of hazardous chemicals.” *Sarnia Observer* (February 20, 2008). Online: Ecojustice <<http://www.ecojustice.ca/media->

seige from toxic emissions, the mobilization of a bucket brigade can signal the “transition from victims to agents of change”.²²¹

The account of risk that holds environmental health harms to be an inherent aspect of pollution and production, is one that now invariably leads to a solution of “precaution”. That solution has usually focussed on calls for attention to cumulative impacts. Thus, strategies of resistance employed in environmental justice struggles worldwide necessarily aim to force the recognition of cumulative effects. The body burden campaigns, while they have their difficulties, essentially want to demonstrate the “burden”, in a cumulative, embodied sense, of what we breathe and what we consume. The bucket brigades, in an entirely different way, get at the notion of cumulative effects because they expose so graphically that what we “count” in our official regulatory system, is only a fraction of what we are forced to bear. Both strategies have the potential to expose the difficulties with law’s treatment’s of chronic pollution.

VII. CONCLUSION

According to Simon, empirically-informed socio-legal studies of risk “can complement and complicate” other approaches.²²² In this case, the analysis demonstrates that multiple, competing accounts of the “risks” of chronic pollution exist and that depending on which is adopted, distinct and very different regulatory approaches follow. Whoever defines the risk, as Alice Tarbell and Mary Arquette observe with respect to the Akwesasne’s experience of chronic contamination, also “gets to define what is a rational course of action”.²²³ The strategies put forward flow directly from the subjective accounts of risk. But I have drawn on the ongoing empirical work with the Aamjiwnaang First Nation not only to articulate what a socio-legal approach to issues of risk and precaution might produce with respect to the question of long-term, low-dose

[centre/press-clips/localized-study-is-complete-aamjiwnaang-test-finds-high-levels-of-hazardous-chemicals/](http://www.centre/press-clips/localized-study-is-complete-aamjiwnaang-test-finds-high-levels-of-hazardous-chemicals/)>.

²²¹ O’Rourke & Macey, *supra* note 8 at 398.

²²² *Supra* note 71 at 137.

²²³ Tarbell & Arquette, *supra* note 190.

exposures to toxic chemicals, but also to demonstrate how the community's resistance exposes the inadequacies of the law's treatment of chronic pollution.

Environmental justice activists, and their allies in environmental health, are beginning to marshal the evidence that is needed to demonstrate that chronic exposures to pollution are causing environmental health harms, even at the "safe doses" permitted by existing regulations. They are deploying this evidence to demand that regulators implement "precaution" -- governance strategies for pollution that take account of the cumulative effects of exposures from all sources, across time. In other words, they are demanding that the regulatory solutions carried forward to address the risks of chronic pollution reflect the emerging understandings of those risks that challenge the dominant account.

As McEvoy vividly demonstrates in his memorable analysis of the Triangle Shirtwaist Fire and its influence on how law treats industrial 'accidents', "[l]aw is both an index for social thought and an agent for changing it."²²⁴ That is to say, law is at once a "mechanism for maintaining, reproducing, *and challenging* unequal social relations — continually setting and resetting the acceptable relations between markets and bodies..."²²⁵ Exposing the emerging accounts of the "risks" of chronic pollution and potential environmental health harms could potentially catalyze a process of social learning and lead to a transformation in our way of thinking.

On a socio-legal analysis, as Simon notes, it is the "particular context, characters, narratives, institutions, etc., within which a precautionary...or any other risk governance strategy is deployed that makes all the difference."²²⁶ In particular, some of the strategies employed by environmental justice activists embody very progressive constructions of precaution that are potentially transformative. In particular, the focus is coming to be placed on the "availability of alternative, less harmful processes and products" championed by the toxics-use-reduction movement. This movement demands that industry work toward

²²⁴ McEvoy, *supra* note 64 at 625.

²²⁵ Jain, *supra* note 53 at 5.

²²⁶ Simon, *supra* note 71 at 138.

“accelerated elimination” of toxic chemicals and that governments implement “safe substitution” programs that would require facilities to switch to safer alternatives whenever they are available.²²⁷ These progressive constructions of precaution with ties to industrial ecology and the ‘clean production approach’, look to determine the simplest, safest way to achieve our social goals, instead of investing so much in determining whether particular chemicals pose ‘unacceptable risks’.²²⁸

²²⁷ An example would be the Massachusetts *Toxics Use Reduction Act* passed in 1989. The Act “requires that manufacturing firms using specific quantities of some 900 industrial chemicals undergo a bi-yearly process to identify alternatives to reduce use of those chemicals”. A goal is to achieve in-plant changes that would eliminate and avoid the use of hazardous chemicals or their generation as by-products on a per-end-unit of product basis so as to reduce the risk of exposure to workers, consumers and the environment (without transferring risks among those groups) (Joel Tickner, “The Precautionary Principle and Toxics Use Reduction” (1998) 3:1 *The Networker*, online: <http://www.sehn.org/Volume_3-1.html>). There is some indication that the movement is beginning to have influence over policy in Canada as well. For example, the Ontario government recently established a Toxics Reduction Strategy which includes a mandate for an Expert Panel to consider ‘substitution’ as a policy alternative (Ontario, “Terms of reference for the Toxics Reduction Expert Panel”, online: <<http://www.ene.gov.on.ca/en/toxics/terms.php>>). Further, while the Canadian Environmental Protection Act contains provisions for “virtual elimination” of substances that are persistent and bioaccumulative (s.77(4)) that have been, until very recently, largely ignored by the federal government, recent moves by Health Canada and Environment Canada under the Chemicals Management Plan may indicate a new direction. See for example, the “Challenge” program which institutes a “reverse onus” scheme for a group of 200 high priority chemicals: in other words, the government indicated a “predisposition” towards listing these chemicals as toxic and invited industry to submit information that would convince them otherwise. Under this program, for example, the government recently announced its intention to add Bisphenol A (BPA) to its list of toxic substances under CEPA (Government of Canada, “Chemical Substances – The Challenge”, online: http://www.chemicalsubstanceschimiques.gc.ca/challenge-defi/index_e.html>).

²²⁸ See for example the San Francisco Precautionary Principle Ordinance which requires all “officers, boards, commissions, and departments of the City and County” to implement the precautionary principle in conducting their affairs. This includes a duty of anticipatory action to prevent harm, the recognition of a “community right to know”, an obligation to conduct an alternatives assessment (and to *select the alternative with the least potential impact on human health and the environment*), a requirement for full cost accounting, and a call for participatory decision-making (SF Environment, SF Precautionary Principle Ordinance, online: <http://www.sfenvironment.com/aboutus/policy/legislation/precaution_principle.htm>).

The goal is to move from the question “How much exposure/risk can we absorb without harm?” to the question “How much exposure can we avoid”? It is to move away from “protracted, unwinnable debates” over how to quantify the risks and where to set the legal maximum limits for their presence in our environment²²⁹ -- because these are debates in which “the chemical enemy becomes the central concern, not the system that produces the chemical or the social and political relations that enable it to be produced and used”.²³⁰ Thus, precaution, in practice, is coming alive as it is being transformed by these activists into a flexible philosophy of action that grounds real, concrete demands for policy change. It is, as Phil Brown notes, “a powerful alternative vision”.²³¹

With respect to lessons for the study of risk and precaution, what is made obvious through the Aamjiwnaang situation, as well as through the basic thrust of the environmental justice movement which trades in “communities” and not in individual well-being, is the centrality of community level effects in the formation of accounts of risk.²³² Phil Brown’s concept of the collective illness experience postulates that “tying together their illness experience and awareness of local hazards can lead people to a social discovery”.²³³ This incorporates the notion of *embodied health*, through which people “begin to see their bodies through a lens of social stigma and discrimination”.²³⁴ The *body mapping* exercise undertaken by the Aamjiwnaang Health and Environment Committee is part of this process: the relations between people and pollution, knowledge and power, become tangible on paper. Residents begin to make connections between their experience and the social determinants of their health.²³⁵

²²⁹ Steingraber, *supra* note 109 at 271.

²³⁰ Levenstein and Wooding, *supra* note 68 at 41.

²³¹ *Supra* note 7 at 202.

²³² Kai Erikson, *Everything in its Path: Destruction of Community in the Buffalo Creek Flood* (New York: Simon and Schuster, 1972); and Michael R. Edelstein, *Contaminated Communities: Coping with Residential Toxic Exposure* (Boulder, CO: Westview Press, 1988). Also see Richard P. Hiskes, “Hazardous Liasons: Risk, Power, and Politics in the Liberal State” (1998) 26 *Policy Studies Journal* 257 at 257.

²³³ Brown, *supra* note 7 at 24.

²³⁴ *Ibid.*

²³⁵ Brown *et al.*, *supra* note 147 at 186.

Sociologists have long known that the experience of illness shapes identity.²³⁶ Ron Plain states: “Our daughters will have to look outside our community for their partners”²³⁷, reflecting, in a sense, how the Aamjiwnaang residents have begun to forge a collective identity from their experiences of chronic pollution. As they search for the “cause” of their illnesses, they engage in a process to attribute responsibility for the harm.²³⁸ As Omohundro argues, understanding environmental risk is not just about understanding contaminants (individually *or* cumulatively), but is about understanding how people, collectively, interact with their landscapes, particularly in situations where toxic chemicals perpetually occupy that landscape.²³⁹ Conventional environmental health research has focused on individual risk perceptions, expert opinions, and exposures to the exclusion of questions about social group dynamics, collective risk perceptions, and the significance of shared histories and community identities.²⁴⁰ But “[t]oxicity...is a communal construct — fearing it, seeing it, typing it, measuring it, judging it — all involve many complex, multi-layered acts of cultural, social and political interpretation”.²⁴¹ Perceiving risks, making determinations of cause and putting forward strategies is an “active, constructive process ... influenced by the motives, values, experiences, and other characteristics of the judger, the specific context, and the anticipated consequences”.²⁴²

It is time to recognize the disingenuousness in a reliance on tort law as a “fall back” for a failing regulatory system. Tort law governs “the field of *accidental* harms”.²⁴³ Profound human wounding, through chronic low-dose exposures to toxic chemicals, should not continue to be understood as accidental, but should be seen as a central and inherent consequence of the production process. Concrete material conditions link risks with the

²³⁶ See for example, Gareth Williams “The genesis of chronic illness: Narrative reconstruction” (1984) 6 *Sociology of Health & Illness* 175.

²³⁷ *Supra* note 51.

²³⁸ Brown *et al.*, *supra* note 147.

²³⁹ Omohundro, *supra* note 155.

²⁴⁰ *Ibid.* at 4.

²⁴¹ Luke, *supra* note 4 at 240.

²⁴² *Supra* note 64 at 167.

²⁴³ Pat O'Malley, “The Government of Risks” in Austin Sarat (ed.) *The Blackwell Companion to Law and Society* (Malden, MA: Blackwell Publishing Ltd., 2004) 292 at 298.

conditions of their perpetuation on the landscape, and accepted patterns and practices of production link pollution and profit. The new instinct in social thought must be to link sick bodies and wounded communities with known pollutants.²⁴⁴ The task is to re-imagine law's treatment of low-dose, long-term exposures so as to better equip current environmental law to tackle contemporary pollution problems.

²⁴⁴ Steve Kroll-Smith & Sandra D. Westervelt, "People, Bodies and Biospheres: Nexus and the Toxic Tort" (2004) 26 *Law & Policy* 177 at 178.