Disaster and the Political Economy of Recycling: Toxic Fire in An Industrial City

S. HARRIS ALI, *York University, Toronto*

The case of a large toxic fire occurring at the Plastimet plastics recycling facility in Hamilton, Ontario is used as an empirical referent to investigate the structural origins involved in the incubation of a technological disaster. Hamilton is known as the "recycling center of Canada," and this paper examines the role of the broader socio-historical forces that led to this development and then relates this to the general issue of how specialized communities with a narrow economic base may become particularly vulnerable to the onset of technological disasters. As such, a political economy of place is developed to help understand how historically based regulatory, industrial, political, economic and social processes may interact in a complex manner to produce devastating results. Specifically, this paper identifies and discusses several particularly important features involved in disaster incubation, including: (i) a lax regulatory and enforcement framework related to land use, as well as, building and property codes at the local level; (ii) a legal loophole in the regulatory policy that governs materials recycling; (iii) the market dynamics of materials recycling; (iv) the transformation of spatial fix; and most notably, (v) the deviant industrial practice of "sham recycling."

According to Ulrich Beck's (1995:2) "risk society" thesis, environmental risk issues have gained particular prominence in the contemporary era. Beck (1992:26) contends that for much of the period after Second World War, Western societal development was centered around issues related to the institutionalization of the emerging welfare state and the accompanying concerns related to the distribution of "positives" such as: wealth, consumer goods, incomes, educational opportunities, jobs and property. In contrast, Beck argues that today, societal attention increasingly tends to focus on issues related to distribution of the "negatives," such as the *unanticipated* side-effects or *unintended* consequences and externalities of the industrialization process—notably, technologically produced environmental disasters and risks. In support of the risk society thesis, Anthony Giddens (1990:124) claims that, among other factors, the risk profile of modernity has significantly changed because the *frequency* and the *magnitude* of the impacts of technological disasters and risks have both increased dramatically. Thus, for example, Benjamin Goldman (1991:14, cited by Cable and Benson 1993:466) has found that on average, the United States experiences four toxic chemical spills per day resulting in the annual release of 370 thousand tons of toxins into the air.

Echoing the sentiment expressed in the risk society thesis, environmental justice scholar Richard Hofrichter (2000:1) argues that modern society is very much a "toxic culture" founded upon *social arrangements that encourage and excuse the deterioration of the environment and human health.* Key questions then arise as to how it is that our way of life and overall social conditions contribute to the development of a toxic culture? And, in particular, how do these social conditions foster the unanticipated side effects of industrialization? This paper explores

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these general questions by examining the case of a large toxic fire occurring in the Southern Ontario city of Hamilton (population: 337,000).

The Plastimet Fire

The devastating plastics fire at the Plastimet Inc. recycling facility has proven to be one of the worst environmental disasters faced by the province. Erupting on the evening of 9 July 1997, the raging fire lasted for four days and was fueled by over four hundred tons of polyvinyl chloride and polyurethane foam from dashboards, interior door panels and other soft components of automobiles. The incomplete combustion of the plastic materials led to the release of a toxic mix of chemicals such as furans, benzene, hydrogen chloride and other dangerous compounds such as dioxin (City of Hamilton Project Team 1997). In fact, a subsequent Environment Canada study revealed the seriousness of the toxic threat posed by the fire in noting that five per cent of the nation's total annual generation of the deadly chemical dioxin was attributable to the Plastimet blaze alone (McNeil 1999).

As the chemicals collected in the air, a very large and highly visible plume of dense black smoke formed and drifted across the city, leaving in its wake a thin film of toxic black soot on all outdoor articles, houses and properties in the vicinity. In response to the risk of exposure to these airborne and deposited toxins, the municipal government issued an emergency evacuation order and 650 residents fled their homes. The residents were permitted to return the next day, but were warned by government health officials not to allow their children to play on lawns and sandboxes in the area; not to consume any of the vegetables or fruits grown in their home gardens; and to wash all outdoor items very thoroughly before use. Finally, it is worth noting that within 48 hours after the Plastimet conflagration was extinguished, a fire broke out at another recycling facility in the same northern part of the city (herein referred to as the "North End").

Popular accounts attributed the fire to negligence by the Plastimet owner, but many scholars (for example: Clarke 1993, 1998; Lee and Ermann 1999; Perrow 1984; and Vaughan 1996, 1999) note that such accounts tend to neglect the important influences that the organizational, industrial and legal/regulatory settings may actually have had on the genesis of disaster. Furthermore, as Thomas D. Beamish (2000:473) has demonstrated in the case of an oil spill disaster in Guadalupe, California, "common place social and organizational structures" can combine with "equally unremarkable, yet incrementally cumulative," events to produce a remarkable outcome—such as the seepage of millions of gallons of petroleum over a period of thirty-eight years. Similarly, Kroll-Smith and Couch (1990) document the insidious threats posed by an underground mine fire that lasted for twenty-five years in the small town of Centralia, Pennsylvannia. Technological disasters such as these, highlight the importance of considering the incremental, contextual, and socio-historical dimensions of disaster development, and following this analytical lead, I use the case of the Plastimet fire to understand how the general political-economic context of a locality may increase the potential for disasters to occur in the community. At the empirical level, the data concerning the historical dimensions of the political economy of Hamilton and the North End were obtained from secondary sources, notably, the writings of academic historians, political scientists and newspaper journalists who write about this city, while government documents were consulted in regard to the changing nature of the local economy.

Risk Society, Environmental Justice and the *Ex-Post-Facto* Analysis of Disasters

According to the risk society thesis, the proliferation of high profile controversies about modern environmental risks and disasters leads to a raised public awareness and identification

of risk *as* risk (Beck 1992; Giddens 1990:125). This, in turn, is believed to lead to the unsettling public realization that some modern environmental risks cannot be satisfactorily assimilated within the existent institutions of industrial society (Ali 1997, 1999). Thus, Beck remarks that:

> [T]he political dynamism of the ecological issue is not a function of the advancing devastation of nature; rather it arises from the facts that, on the one hand, institutions claim to provide control and security falls short and, on the other hand, in the same way, devastation is normalized and legalized (1995:128).

It is under such social conditions that a reflexive awareness of risk is said to arise in contemporary society. For Beck (1994:6), the manifestations of this reflexive orientation take the forms of public responses to environmental risks and disasters, as newly politicized issues are brought to the fore, including (among others): the issue of self-limitation of development, the public questioning of science, a public rethinking of the amount of trust invested in technical and political elites to manage environmental risks, and the redetermination of standards of responsibility, safety and monitoring.[1] Spurred by public responses initiated by this "political reflexivity of threat," Beck, Giddens, and Lash (1994) argue that reflexivity becomes the key motive force for social change as more and more people are forced to confront issues related to environmental risks. According to Beck, however, a major obstacle to such social change is that:

> On the one hand, society still makes decisions and takes actions according to the pattern of the old industrial society, but on the other, the interest organizations, the judicial system and politics are clouded over by debates and conflicts that stem from the dynamism of risk society (1994:5).

Most importantly for the purposes at hand, however, is the tendency of the risk society/reflexive modernization conceptualizations to gloss over questions related to *how exactly the "pattern of old industrial society" with its established economic institutions, influences the advent of contemporary environmental risks and disasters.* Consequently, the important processual and historical developments that underlie the onset and distribution of modern environmental risks remain an important issue for analysis.

In contrast to the risk society emphasis on the "democratizing" impact of modern environmental risks, research on environmental justice directs explicit attention to those issues related to the unequal distribution of risks and environmental racism (see for example, Bullard 1990; Bryant and Mohai 1992; Cable and Benson 1993; Capek 1993; Hofrichter 1993). However, Szasz and Meuser comment that:

> Powerful as these studies are, they suffer from the same shortcoming: they document the relationship between social and toxic geographies at one moment in time. Even when serious inequities are found, such work is of little help in explaining *how it happened* (1997:107).

For Szasz and Meuser therefore, there is a need to consider how the unequal distribution of risk, "might reflect a pattern of inequity *inherent in the structure* and a pattern of growth of urban areas" (1997:104, citing Anderton, et al. 1994:239; emphasis added). Environmental inequality and disaster vulnerability are of course interrelated, as those who are most susceptible to environmental risks and technological disasters tend also to be the least powerful (Gould 1998)—the fundamental issue is then, how are they interrelated? A preliminary clue to addressing this issue is offered by Couch and Kroll-Smith (1985, 1991) who note that technological disasters are more likely to occur in communities that have highly adapted cultures

1. For Beck, reflexive awareness was largely absent from the past because the politicization of environmental risks was curtailed, normalized and cushioned by the material prosperity and the dominant logic of the emerging welfare state in advanced industrial nations of the post-war era. Environmental risks did not therefore become high profile public issues (or the center of intense political conflicts at any rate) because they were simply "naturalized," legitimized and tolerated as the costs of pursuing the Enlightenment inspired ideal of "progress" (Beck 1994:5). For a critique of this position, see Wynne 1996 and Alexander 1996.

with a narrow economic base—an industrial profile that, as will be discussed shortly, clearly describes the North End Hamilton Harbor area. To consider how this type of profile is associated with community vulnerability to disasters, therefore requires an historical investigation into how the locale developed its particular industrial profile as well as a consideration of how its local industrial history conditioned the nature and types of activities taking place there. As Vaughan (1999:20), and Beamish (2001) note, history matters in the analysis of disasters since that the factors that lead to disasters often accumulate unnoticed over an extended period of time, during what a time Barry Turner (1976) refers to as the disaster "incubation period."

A Brief Industrial History of Hamilton, Ontario

Szasz and Meuser (1997:112) note that local histories can show dynamically and in detail how inequalities are generated over the span of several decades, and several authors have produced some notable work in this vein—see for example, the histories of steel towns such as Pittsburgh, Pennsylvannia (Hersh 1995) and Gary, Indiana (Hurley 1994), and Eric J. Krieg's (1995) study of industrialization in and around the city of Boston, Massachusetts. The focus for this paper, however, is not on the relationship between industrial development and inequality *per se*, but rather, on the relationship between *industrial development and disaster incubation.* The disaster vulnerability of a locale will vary with the types of development decisions made during critical periods in the local history of the community. For this reason, the descriptive history of industrial development in Hamilton presented below will be guided by research from urban political economy perspectives. Specifically, Logan and Molotch's (1986) urban growth model and David Harvey's (1985) notion of "spatial fix," will be drawn upon to help understand how urban development decisions in the North End were greatly influenced (if not determined) by a select group of "growth machine" entrepreneurs who involved themselves with political decisions related to local infrastructure and land use. After that, I will discuss how these political-economic machinations essentially established the general social and organizational preconditions conducive to the development of technological disasters in the North End.

For Logan and Molotch (1986), cities act as "growth machines" because local elites focus exclusively on economic development with little regard for any other considerations. Further, these local elites often form a coalition of interlocking pro-economic groupings and government agencies, that essentially serve as "growth machine entrepreneurs" who support only those development decisions that will increase their personal wealth or benefit their local real estate or commercial holdings. Consequently, growth machine entrepreneurs may significantly influence the industrial trajectory of a city (see for example, the cases of Ventura and Santa Barbara, California analyzed by Molotch, Freudenberg, Pausen, 2000). The following historical overview of industrial development in Hamilton highlights the role of growth machine entrepreneurs in laying the foundation for potential disasters to occur in the North End area of the city.

The city of Hamilton encircles the western tip of Lake Ontario and its north end Harbor represents a crucial waterways link between the St. Lawrence River and the American heartland (see Figures 1 and 2). Historically, as late as the 1930s, the Harbor area was used for recreational purposes such as picnics, fishing, and swimming. However, the Harbor also allowed bulk carriers to move raw materials and products in and out of the industrial sites in a relatively expedient manner. As a result, Hamilton's Harbor soon became recognized as a strategically important site for industry, and the city quickly established itself as the undisputed steel capital of Canada in the early period before the First World War (Proulx 1971). Molotch, Freudenberg, and Pausen (2000:807–808) note that the question of "how the natural environment operates as an amenity or financial resource or both, turns on the cultural, political, and organizational context that interprets and shapes its meaning." Thus, to investigate how industrial

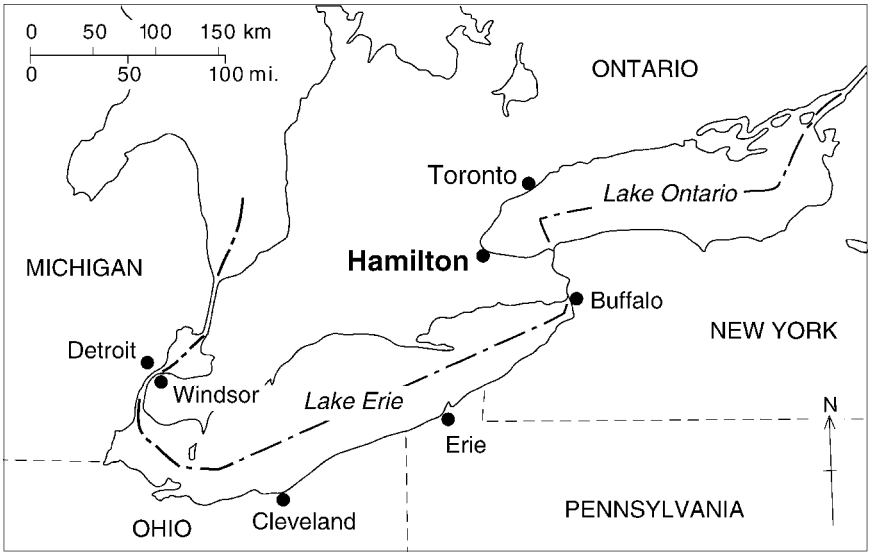

Figure 1 • ***The Location of Hamilton, Ontario, Canada***

uses came to dominate other possible uses of the Hamilton Harbor area requires an examination of the political economic context of the locale in which the land use decisions were made.

During the early 1900s, Hamilton preferentially received tax concessions in order to establish an industrial infrastructure for steel making, and included in this strategy was the municipality's successful petitioning of the Dominion of Canada to allow it to operate its own ports in Hamilton Harbor—free from external federal or provincial influences. To assist in the pursuit of this objective, the Hamilton Harbor Commission (HHC) was established in 1912 (Sproule-Jones 1986:25). Consequently, the industrial development of the North End Hamilton Harbor area was rather unique in the Canadian context because, unlike all other major Canadian harbors, Hamilton Harbor did not fall under the jurisdiction of the National Harbors Act, and did *not*, therefore, fall under the *direct* and exclusive jurisdiction of the federal government. Instead, the exclusive overseer of Harbor development and management was the Hamilton Harbor Commission itself (Hewitt 1979:150) and, as will be discussed shortly, the HHC essentially offered the opportunity for local growth machine entrepreneurs to strengthen their hold on urban land use and regulatory developments in the North End.

The HHC, itself, is comprised of three members, two political patronage appointments by the federal government, and one appointed by the municipal government. What is notable is that the HHC commissioners essentially have a virtual license to do as they please with Harbor development because they are not accountable to any level of government, including (ironically) the municipal government of the City of Hamilton (Hewitt 1979:150). The HHC, therefore, has considerable autonomy in industrialization in the North End because:

> [T]he Commissioners have authority to appoint and fix renumeration of their own personnel, borrow and spend, and acquire, own, sell and lease land. They are within the limits of their Act, "masters of their own house" (Sproule-Jones 1986:12).

As a result, any harbor construction, dredging or other activities must first be approved by the HHC through the issuing of permits (Sproule-Jones 1986:12). Such political-economic cir-

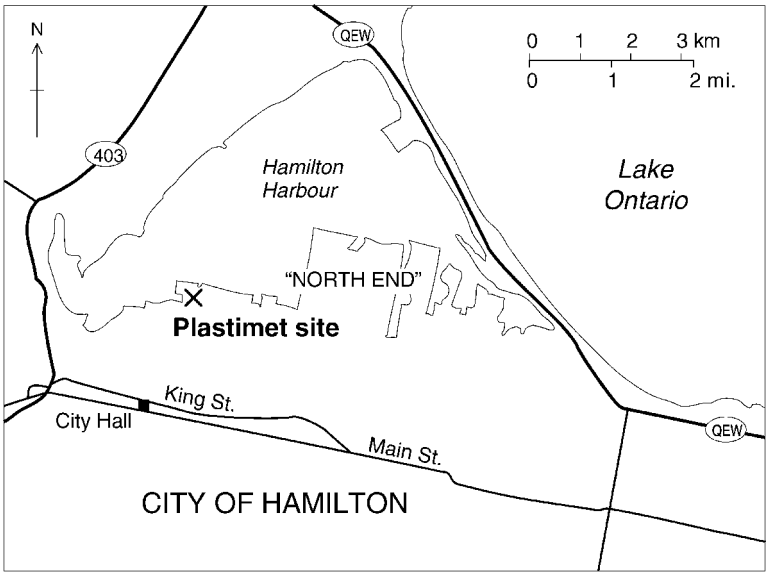

Figure 2 • ***The Location of the Plastimet Site within the Hamilton Harbor Area***

cumstances ultimately led to the abuse and exploitation of the harbor environment, both in the past and in the present, as a market value orientation based on profit maximization came to completely dominate use-value orientations related to the individuals' biological and social needs such as: subsistence (e.g., clean air, water, and soil); cultural (e.g., open space); and recreational uses (Weinberg, Pellow, and Schnaiberg, 2000:34). In fact, this was clearly exemplified by the land use laws and regulations put in place by the HHC, as they explicitly gave highest priority to shipping and port activities, followed by waste disposal, and lastly, fishing and recreational use; the latter uses, however, were banned altogether by the commission in 1948 (Sproule-Jones 1986:2).

Without any consultation with the municipal government, or a transparent public tenders process, the Hamilton Harbor Commission permitted one-third of the bay area to be landfilled by selling a large number of water lots (at bargain prices) to the two major steel companies, as well as Canadian National Railways, and Otis Elevators. These sales were based on an aggressive policy of the commission to expand the metals sector in the late 1960s and 1970s, and as Mark Sproule-Jones (1986:27) observes, "Once again, political institutions proved accessible and generous to Hamilton's economic elites."

In the 1970s, Royal Canadian Mounted Police (RCMP) investigations into the use of Hamilton Harbor for an illegal drug distribution network led to revelations about the politics of harbor development (Palango 1994:120; Freeman 1979:75). It was found that the municipal appointed member of the HHC was accepting kickbacks from businesses in the Harbor area in return for ignoring business and industrial violations in the area.[2] This particular member of the Harbor Commission was also discovered to be an employee of USARCO—the scrap metal

2. This Hamilton Harbor Commissioner was convicted of keeping a common betting house in 1943 and again in 1948 (Palango 1994:106).

company that was located on the site that was later to host the Plastimet recycling facility. The commissioner's involvement in the landfilling of water lots for the major steel company was therefore a serious conflict of interest (Hewitt 1979). Without going into a full-fledged network analysis (which is beyond the scope of this paper), the discussion of the early industrial developments in the North End outlined above, generally reveals how "growth machine entrepreneurs"—in this case, members from the steel companies and the shipping industry—were in a particularly ideal position to influence land use decisions in an expeditious and non-transparent manner by dealing directly with the Hamilton Harbor Commission behind closed doors.

After the Second World War, the City of Hamilton experienced a major economic reorganization as its two major steel companies (Stelco Inc. and Defasco Inc.) underwent meteoric expansions based on the development of new product lines. The unprecedented expansion of one industrial sector and the comparative or absolute decline of others essentially meant that Hamilton could be described as a "company town," and as historian John Weaver notes:

> The fact that steel, of all the manufacturing sectors in Canada, is the most concentrated in terms of corporate control of production and that two of the big three companies are centered in Hamilton confirms the company-town image (1982:161).

During this same period of time, spin-off industries that were dependent on the local steel manufacturing sector, such as scrap metal yards and chemical factories, proliferated in the immediate area and contributed to the general economic prosperity of Ontario's "Golden Horseshoe" region. While historically strengthening the mid-twentieth century regional economy, Hamilton's harbor area is now recognized as one of the most contaminated areas in the Great Lakes region (Gould 1993), and it is worth noting that Hamilton is located only about 50 miles north-west of another contaminated region that is known for hosting similar heavy industries, namely Love Canal in Niagara Falls, New York—a community whose experiences with environmental risks directed national attention to the magnitude and urgency of the problem of toxic waste in the United States (Szasz 1994; Gibbs 1998).

Transformation of the Spatial Fix: From Metals Manufacturing to Materials Recycling

The metals sector historically dominated the industrial landscape of the North End. The pattern established there was one typical in many other industrial areas where a trading network is built around a few "core" firms that are supplied by many smaller "peripheral" establishments (as described by Romo and Schwartz 1995:886). In the case of the North End, this was based on the two core steel companies that were supplied by the many peripheral scrap metal dealers in the area. The North End could therefore be described as a "spatial fix" (Harvey 1985) in which land use catered to the needs of the metals industry and their "growth machine entrepreneurs."

According to the critical social geographer David Harvey (1982:176), the spatial fix is an emergent spatial development that arises from the dynamics of capitalism as a system and relates to the establishment of a fixed and secure spatial infrastructure. Notably, the spatial fix represents one way in which the capitalist class can deal with the crisis of capital overaccumulation—that is, to deal with such problems as: under-employment, unemployment, excessive inventories, idle money capital, and a revolving financial and investment emphasis on different economic sectors and deindustrialization. Under these circumstances, the establishment of a "spatial fix" provides a mechanism through which the ever changing (and temporary) needs of capital can be met, at least for some period of time (Harvey 1985:148). The establishment of spatial fix cannot, however, be maintained indefinitely because at some point in time, the dynamics (i.e., the contradictions) of capitalism will trigger changes in the requirements necessary for the continued existence of capitalism as a whole. For example, if a

local economy is to continue to exist (and grow), then certain areas within the locality can no longer be used exclusively to host those industries associated with a declining economic sector. Under such circumstances, the original spatial fix essentially becomes a spatial barrier for the development of capital because that same space is needed for new industries that will more actively contribute to the continuing expansion of capitalism as a system. Under these systemic pressures, it is necessary that the original spatial fix be altered so that a new spatial fix can be established in its place (Harvey 1985). Such a transformation occurred in the North End as the materials recycling sector rose to prominence in a space that was previously devoted primarily to the metals industry, but as we shall see, such change occurred with little alteration of the existing industrial culture or practices already in place there.

In the 1980s through to the 1990s, a series of political, economic and social crises impacted urban areas throughout North America (Sassen 2000:121; Smith and Feagin 1987; Weinberg, Pellow, and Schnaiberg, 2000:13). As a consequence, many inner-city areas underwent a process of dismantling as the effects of deindustrialization—contractions (partial closings), complete factory shut downs and industrial migration, all of which led to job losses—became more and more prevalent (Romo and Schwartz, 1995:890; Perry 1987; see especially Prechel 1990 for an analysis of the impact of economic recession on the U.S. steel industry). Such a situation described Hamilton, as the consequences of economic dependence on the metals industry became glaringly evident, with the onset of economic recession of the early 1980s and the temporary decline of the steel industry. The seriousness of the situation was further intensified with the subsequent economic recession in the early 1990s, as this particular recession developed into one of the worst economic crises ever experienced in Southern Ontario (Desfor and Keil 1999:347). The magnitude of the negative effects of the two successive recessions on the local metals sector was indicated, for example, by a government finding that, "although Hamilton still produces 40% of Canada's steel, the industry has shed over 50% of its jobs since 1980" (Human Resources Development Canada 1998). Indications of the negative economic impacts at the community level are revealed by considering the fact that the 1991 unemployment rate in the North End community was 10.9%, while the average household income for this census tract area was $31,187 (CDN). In comparison the unemployment rate for the larger metropolitan Hamilton area was lower (9.8%), while at the same time, the average household income was much higher at $49,784 (CDN; Source: Statistics Canada 2001). What is notable, however, is that as the steel industry went into decline in the early 1990s, the spatial fix began to change as the locally-based materials recycling industry burgeoned and became an increasingly important economic force in the city.

With the rise of about seventy recycling centers in Hamilton, the city soon became *the* major materials recycling center in Canada, with almost all of these facilities being located in the North End (McNeil and Pike 1997). As a consequence, the North End presently consists of block after block of sites littered with scrap metal, plastics, and other materials. According to one observer:

> The city's north end is filled with scrap-metal yards, dozens of acres piled with appliances, girders, car parts, batteries, pots and pans, all the inflexible detritus of modern life. . . . "There's no way that any land north of Barton Street is not contaminated," says one scrap dealer. "Hamilton is like Love Canal. If you've got a problem material, dump it in Hamilton. That's the word out there" (Gillmor 1998:90).

In line with Alfred Weber's (1909) classical industrial location theory, several physical factors also contributed to the rapid rise of the recycling-based spatial fix in the North End, including: the availability of industrial properties abandoned by the recession-prone metals industry, proximity to the traditional industries that could serve as markets to buy and sell recyclables, and a good transportation network. As a result, vast amounts of undesirable waste materials were brought into Hamilton from outside the city (McNeil and Pike 1997). In effect,

therefore, the infrastructure established to support the traditional metals industry also served as the foundation for the rise of the newer spatial fix based on materials recycling.

Similar to the rise of the two major steel companies after the Second World War, the early 1990s witnessed the dramatic rise of two major Hamilton-based recycling and waste management companies of international repute: Laidlaw Environmental Services Ltd. and Philip Environmental Services Corp.—representing the core of the emergent recycling-based spatial fix. Laidlaw, until very recently, was North America's third largest solid waste disposal company and its second largest hazardous waste company (Crooks 1993:35), while Philip, again until recently (when it became involved in a stock scandal), was the first and largest North American industrial waste recycling company (Nicol and Nolen 1998:52). Both of these major companies were located within the north end Hamilton Harbour area. Local political elites were quick to embrace these companies because they appeared to offer a "green solution" to the problem of industrial waste while at the same time "dangling the promise of new jobs in Hamilton, a city struggling with huge industrial layoffs" (Nicol and Nolen 1998). Thus, as Fitzpatrick and LaGory (2000:11) observe, private industry and government are able to frame the acceptance of environmentally destructive industries in terms of the economic benefits while down-playing the associated environmental health risks. Consequently, the materials recycling industry became well established in Hamilton in the relatively short span of about fifteen years; a process that was very likely bolstered by the public realization of the "landfill crisis" and the widespread popularity of the recycling movement among North American municipalities during the 1980s (Denison and Ruston 1999; Weinberg, Pellow, and Schnaiberg, 2000). Thus, for example, a municipal government publication proudly noted that:

> Greater Hamilton is recognized as the Canadian centre of environmental excellence. The Region's employment in this sector exceeds 4,000 demonstrating a growth rate of 62.5% over the last five years. Canada's fastest growing company, the Philip Environmental Group, is head-quartered in the Hamilton-Wentworth Region (City of Hamilton and the Regional Municipality of Hamilton-Wentworth 1997).

Brownfields and the Transformation of Spatial Fix

One particularly important facilitating factor in the rapid ascent of the recycling spatial fix in the North End was the availability of vacant industrial properties as a result of the effects of deindustrialization and the decline of the metals sector. In essence, these vacant industrial sites exist during the dormancy period between the fall of an old spatial fix and rise of its replacement (in this case, from one based predominantly on the metals sector to one based on materials recycling). Known as "brownfields," these abandoned and contaminated industrial sites are usually located within distressed urban areas and tend to be disproportionately concentrated in communities in which people of color and lower-income groups reside (Shutkin and Mares 2000:59). Brownfields not only expose residents in the area to environmental and public health hazards, but the possibility of environmental liability represents a significant obstacle to their redevelopment, thereby preventing the possibility for environmentally benign industrial development in the future (Pellow 2000). Therefore, it becomes difficult for municipalities to find developers who are willing to fund the site clean-up while assuming the liability if toxic exposure occurs. Moreover, areas that have a history of contamination may be socially stigmatized, thereby decreasing the number of alternative land uses that could occur on these sites. Because of these inhibiting circumstances, localities containing brownfield sites are less likely to attract better paying high tech industries and are consequently forced to accept environmental risk-producing industries that offer only low wage employment—as illustrated, for example, by Krieg's (1998) findings concerning the prevalence of asphalt production and metal plating plants in Boston's Roxbury area.

Storper and Walker (1989:194) observe that, "the decline of some sectors is often hidden by the vigorous expansion of others—even to the point of taking over recently shut plants." Owing to the nature of metals operations and materials recycling activities, this "hidden" quality of the spatial fix transformation is particularly relevent to the case of the North End. Scrap metal operations typically involve localized firms with large plots of land available to store the metal (Weinberg, Pellow, and Schnaiberg, 2000:45), and the use of such properties to store other types of materials may pose a particularly attractive option to certain types of growth machine entrepreneurs—such as materials recyclers.

According to Shutkin and Mares (2000:58), "in essence, all brownfield sites tell a story about the history of a community and a place. . .," and the history of the Plastimet site clearly represents a case in point with reference to the North End Hamilton Harbor area. In a similar light, Molotch, Freudenberg, and Pausen (2000:792) note that the etiology of place distinctiveness may be analyzed by considering the character and tradition of the particular locale in question. As such, a consideration of the history of the Plastimet site itself will help us understand how the etiology of place distinctiveness may also reflect the etiology of a technological disaster.

As alluded to previously, from 1925 to 1990, the Plastimet site was itself host to a metals operation, namely, the United Steel and Refining Co. (USARCO, Ltd.); a company owned by the grandfather of the present day Plastimet owner. USARCO's main activities included the collection and smelting of scrap metal from old war ships and the legacy of this previous land use was quite evident at the Plastimet site. According to a provincial Ministry of Environment report released in April 1993, the front of the Plastimet property was found to be covered in waste oil from ships that were brought onto the site, while refractory bricks used to line the furnace of the facility's smelting operation were simply dumped all around the property (Humphreys 1997). Significantly, the government report went on to note that such an assortment of chemicals, if mixed, could cause violent reactions. In response to the possibility of illegal on-site dumping by the smelting facility, the internal Investigations and Enforcement Board of the Ministry of Environment conducted a month long investigation and concluded that "[t]here was insufficient evidence to show illegal practices within the statute of limitations [2 years]" (Ontario Ministry of Environment and Energy 1997). The subsequent toxic fire perhaps revealed that this statute of limitations was too lenient for such industrial contamination situations: it was suspected that the 20 to 50 burned-out industrial drums discovered in the rubble after the plastics fire contained highly flammable (and toxic) zinc oxide and lead dust from the previous smelting operations. Further, it was apparent that this chemical dust collected on the bales of plastics stored in the Plastimet facility, thereby serving as a chemical accelerator that allowed the toxic blaze to develop very rapidly and uncontrollably during the initial stages of the conflagration (Galloway and McNeil 1997).

A further illustration of the hazardous nature of the site occurred during the brownfield period between the closing of USARCO and the start-up of Plastimet. It was during this time (September 1992) that a serious lack of security at the site enabled children from a nearby school to break into the abandoned industrial site and run off with handfuls of liquid mercury. These children and their friends unknowingly endangered themselves by passing around the toxic mercury in a nearby school yard and the incident itself led the mayor of Hamilton to declare that city's first ever state of emergency (Kilpatrick 1997).[3]

Fitzpatrick and Lagory note that the hazards present at a particular place can only be understood as being a direct outcome of particular "collections of situations and circumstances" (2000:10) and the institutionalized pattern of environmentally destructive land use

3. Aside from the numerous violations of environmental regulations, it is also worth noting that the USARCO/Plastimet owner was also involved with financial irregularities. About a year after the plastics fire, the Toronto Dominion Bank launched a $21 million lawsuit against the facility owner for deliberately over-valuing the worth of USARCO's scrap metal inventory by 10 times its true value in order to obtain loans valuing $20 million (Gillmor 1998:86).

and the tradition of corporate crime in the North End essentially contributed to this ensemble. In fact, as will now be discussed, these historical situations and circumstances represent the formative forces that constitute, characterize and structure the disaster incubation process that may unfold in a particular place.

Materials Recycling or Waste Storage? The Local Production Culture and the Practice of Sham Recycling

The potential for disastrous consequences arising from the interaction between industrial and regulatory processes can be reinforced by the passive toleration (and therefore perpetuation) of certain untoward industrial activities that were historically carried out in a particular place. For this reason, it is useful to consider how the local production culture associated with the particular industry that defines the spatial fix can contribute to the toleration and perpetuation of certain potentially dangerous industrial practices. In this connection, Storper and Walker note that a spatial fix (they use the term "territorial production complex") not only gives industrial firms certain economic advantages (such as lower transportation and communication costs, a stable physical infrastructure, and a readily available labor pool), but also "generates distinct cultural practices over time" (1989:139). The resultant culture of production essentially serves as a "repository of social practices and attitudes" that inform or influence what workers consider as legitimate habits and expectations (Storper and Walker 1989:82). A specific example of this is exemplified by the historically-based North End practice of "sham recycling."

During the 1970s, Royal Canadian Mounted Police investigations into business activities in the North End area found that many scrap metal facilities seemed to be stockpiling metals:

> [T]here was so little turn-over in some of the city's scrap-yards the inventory was rusting away, which didn't seem to matter to the operators (Palango 1994:110).

This practice of stock piling metal without concern for transporting it to market was a historically based industrial practice that continues to be carried out locally in the emergent materials recycling sector. And, the disastrous consequences of this practice were evident at Plastimet, where the amount of plastics material stored on-site was actually about four times more than the site's official storage capacity.[4] This suggests that the plastics material at Plastimet was essentially being stored instead of recycled. To understand how this tradition of stock piling materials was allowed to continue in the local materials recycling industry requires a more detailed examination of the regulatory structures governing waste management and recycling, notably the ambiguity in the regulatory distinction between "waste management" activities and "recycling" activities in the Province of Ontario.

The Plastimet fire brought the practice of "sham recycling" to the fore; a practice also quietly pursued for some time by the corporate giants Laidlaw and Philip Environmental Services (Nicol and Nolen 1998). In "sham recycling," a recycling facility will make the official declaration that it will recycle a particular material which will then exempt the facility from the normal environmental regulations that would apply to that material if it were classified as a *waste* material instead of a *recyclable* material. As such, the exemption legally allows the recycling facility to store, transport, and alter the "recyclable" material without following any of the regulations that would normally apply to that material if it were being processed as waste. In effect therefore, recycling companies were able to circumvent the more stringent provincial environmental regulations required of waste disposal facilities by simply classifying them-

4. Specifically, although 400 tons of plastic burned inside the Plastimet building, 500 tons of unburned plastic remained stockpiled on the outside. The maximum storage capacity was 250 tons, while the maximum time for on-site storage of any plastic was listed as three weeks (Hughes 1997; Gleeson 1997).

selves as "resource recovery" businesses, as opposed to waste disposal businesses (McNeil 1997). Thus, the fire marshal's report on the Plastimet fire notes that with reference to recycling in the North End:

> While there are many reputable operators in this industry, there may be some opportunities for unscrupulous persons to simply rent a large warehouse, collect money to stockpile waste plastics, tires, drums of liquid wastes, etc. in the warehouse, then disappear with the proceeds. Operators of waste transfer stations charge a fee to receive and collect waste materials. However, they usually must pay for final disposal. Therefore, huge storage piles sometimes result (Office of the Ontario Fire Marshal 1997).

Furthermore, the market dynamics of recycling was such that, although Plastimet could sell its ground-up plastics for two cents a pound, it was paid up to ten times that amount to take the plastics away from their customers, consequently, "the incentive to process and resell was low, while the temptation to store and abandon was high" (Gillmor 1998:91).

The fire marshal's report also found that many operators of recycling facilities in Hamilton allowed their insurance policies to lapse, or did not purchase them at all. At the same time, the buildings which housed the recycling operations were frequently found to be in poor condition with many years of municipal back-taxes owed, thus, for example, Plastimet Inc., itself, owed $800,000 (CDN) in municipal tax arrears on its land (Humphreys 1997). Furthermore, soil contamination on the Plastimet recycling facility property was so severe that huge costs would be incurred by industrial property-owners pursuing on-site environmental remediation (as discussed previously in the section on brownfield sites). All of these factors may in fact encourage the "unscrupulous" recycling operators to simply walk away in those cases where the cumulative costs become too high, thereby adding to the number of brownfield sites in the locale.

The Regulatory Framework Governing Materials Recycling

The development of a technological disaster often involves decisions that were made to allow certain potentially dangerous activities to go forward, or at least not to oppose them (Gramling and Krogman 1997:41) and this is especially pertinent in light of Vaughan's (1999:29) observation that mistake and misconduct often occur in the pre-history of the disaster. For these reasons, to understand the broader forces at work during the incubation period of a disaster also requires an examination of the regulatory context in which decisions were made, including an understanding of how policy decisions evolved in a direction that favored unfettered economic growth over environmental and health concerns.[5] In this connection, Colin Diver (1980) notes that the analysis of regulatory failure should consider both the policymaking phase of the regulatory process as well as the enforcement function (and notes that the analysis of the latter is usually overlooked). This section will deal with the policymaking phase of the regulatory processes related to the governance of materials recycling, while subsequent sections will deal with the enforcement of building codes and property use requirements in the North End.

In Ontario, the provincial Ministry of Environment must first approve those land uses that may have potentially negative effects on the surrounding environment. If the environmental assessment by the ministry deems the proposed land use as acceptable, then a "certificate of approval" is issued and permission for the proposal is officially granted. However, the certificate of approval includes specified environmental requirements that must be

5. Vaughan (1999:30) notes that the regulatory environment receives more attention from socio-legal scholars than disaster specialists and there is a need therefore to consider how the regulatory environment can contribute to the development of disasters.

met for the operation to continue and includes the condition that the ministry may monitor on-site operations to ensure that the regulatory requirements are met, and if they are not, the ministry then has the power to shut the operation down. Notably, a certificate of approval is required for waste disposal activities (such as landfill operations), *but not for recycling operations.*

The above discussion highlights the importance of distinctions made between different types of materials within the regulatory framework. In this connection Andrew Szasz observes that in the United States:

> By legally distinguishing hazardous waste from other wastes and by directing that such wastes be treated differently from municipal solid waste, the new regulations dramatically increased, almost overnight, the demand for hazardous waste hauling and disposal services (1986:2).

The distinction between hazardous and other wastes in the United States led, therefore, to the introduction of new regulations. In stark contrast, in Ontario, the differentiation between recyclable from non-recyclable materials did not lead to a tightening of the regulatory structure; in fact, there appeared to have been a *lack of regulations* in regard to recyclable materials. Moreover, it was apparent that the potential problems associated with recycling were not even recognized. The emerging sector was free to develop in an essentially non-regulated manner, free from public or private scrutiny. It is under just such circumstances that the potential for disaster greatly increases, because as Gramling and Krogman note:

> [T]he activities that can potentially cause chronic technological disasters vary widely in the extent to which they are the focus of deliberate explicit policy, and in the extent to which they are recognized as dangerous. . . . Activities that have not yet resulted in disasters may be subject to little policy, planning or oversight, even though they may have greater potential for damage than some activities that are highly regulated (1997:44).

Furthermore, any rudimentary regulations related to recycling that did exist were usually ambiguous and circumvented relatively easily. This was especially the case after a legal ruling that had important implications for the recycling activities in the province. In 1997, the Hamilton-based company Philip Environmental Services Corp., the largest industrial "resource recovery" firm in North America, was taken to provincial court under the charge of storing illegal industrial waste in violation of the Environmental Protection Act. The material in question was a lead-drenched plastic coating material that remained after the company extracted the valuable copper from discarded electrical wiring. Philip Environmental successfully argued that this plastic material should not be considered waste because it could *theoretically* be recycled. The resultant precedent-setting court decision had important implications for industrial practices in the recycling sector because it meant that virtually all recycling activity was legally considered to fall outside the purview of the more stringent waste-management regulatory provisions of the Environmental Protection Act (Nicol and Nolen 1998:55). The context was thereby established for the exploitation of a regulatory loophole that in essence allowed the practice of sham recycling carried out in scrap metal yards to be extended to the numerous materials recycling facilities then proliferating in the North End.

Land Use Regulation and Technological Disasters

According to Logan and Molotch (1986:153), from their inception, systematic land use controls such as zoning and planning functioned in the service of "growth machines." In the case of the North End, the ability of the municipal government to employ land use and zoning controls to regulate the emergent recycling industry was effectively limited by the legal complications that arose when a new business relocated to an already existing business facility, or purchased an existing operation and changed the nature of the business that was to be done on the premises. As discussed above, such situations were common in the North End in the early 1990s

because of the availability of brownfield sites that could be used for materials recycling. Frequently, the managers of these new industrial operations would ignore the current and newly applicable building codes and property use designations while continuing to use the outdated lower standards from the past land use of the site (Nicol and Nolen 1998). This was the situation at Plastimet, where the previous on-site activities warranted a building and fire code classification applicable to the metal salvage operations of the former USARCO plant. Once the building was to be used for the purposes of recycling plastics, however, the classification needed to be changed to account for the possibility of combustible materials. The change in classification, in turn, required changes to the physical layout of the building such as: ensuring proper access to fire exits, the establishment of reserve areas to store materials, and the installation of a sprinkler system; with all of these physical modifications to be monitored by the local fire department through on-site inspections. In the case of Plastimet, the fire department did issue the appropriate change in classification, but the recycling facility was slow to make the required changes to meet the new and appropriate building and fire code regulations. Although Plastimet did comply with several of the fire and building code requirements, notably absent were the preparation of a fire safety plan and the installation of an automatic sprinkler system. The facility did not, however, face any fines or other consequences for this neglect. It was common practice in this municipality for industrial facilities to delay the implementation of legally required adjustments to operations until they were subject to a series of follow-up inspections (Kelly 1997:33). Moreover, local businesses could further delay the implementation of the required adjustments by challenging the provincial Ministry of Environment field orders through the court system. Consequently, Plastimet had a history of noncompliance with fire and building code violations (in fact, Hamilton firefighters were called to the site 26 times over the previous 10 years), yet the recycling facility was able to continue its operations because of relatively light penalties and long lengths of time between regulatory inspections by municipal officials (Kilpatrick 1997). The Plastimet case, therefore, typifies the lax regulatory environment that informed the political economy of place and local production culture present in the North End. In accord with the dictates of the city as a growth machine, the lax regulatory environment essentially removed obstacles for economic growth, and in this connection, one local observer noted that:

> The Plastimet fire exposed, in the most dramatic fashion imaginable, the blatant disregard and utter contempt for authority that exists in Hamilton, an all-too-pervasive attitude that has left honest citizens and taxpayers at the mercy of anyone wishing to enrich themselves. Hamilton is the community of choice by fly-by-night operators, who feel free to violate fire and safety codes, and ignore taxes (Kelly 1997:33).

Further compounding the problems emanating from the lax regulatory environment, the Office of the Ontario Fire Marshal (1997) noted that many recycling facility operators did not feel that the material they had on site was of sufficient value to encourage thieves. As a result it was not uncommon for Hamilton recyclers to store materials in unsecured areas that were easily accessible to vandals and such conditions may have led to the Plastimet fire—the Fire Marshal suspected the cause of the fire to be arson.[6]

Concluding Remarks: Spatial Fix, Organizational Misconduct and Disaster Vulnerability

If Ulrich Beck and Anthony Giddens characterize contemporary society as a "risk society," Richard Hofrichter contends that we live in a "toxic culture," while Diane Vaughan (1999)

6. The practice of unsecured industrial facilities in the North End was evidently not uncommon in the previous spatial fix as well. For example, recall that it was a lack of attention to security that allowed school children to break into the abandoned USARCO building and obtain handfuls of liquid mercury (Kilpatrick 1997).

draws attention to still another negative dimension of modernity, namely the "dark side of organizations"—that is, the unanticipated outcomes of organizational activities that adversely impact the public. Vaughan raises the question of how socially organized circumstances can produce outcomes that are harmful to the public and she makes the case that:

> Studying the dark side of organizations exposes the operational inadequacy of society's institutional bases. It increases our understanding of social structure, showing routine nonconformity, mistake, misconduct, and disaster are not anomalous events, but systematic products of complex structures and process (1999:35–36).

This paper argues that the structure and processes that lead to disaster are very much influenced by the political economic setting in which the organization is situated. In the case of the Plastimet recycling facility, the general character of the North End setting was greatly influenced by its deep historical roots that could be traced to the turn of the century. Thus, the corrupt workings of the Hamilton Harbor Commission and the growth machine entrepreneurs associated with the steel and shipping industries, established the structural framework for the genesis and continued existence of deviant industrial practices that still flourish in the North End. The North End was host to various types of environmental corporate crimes and shoddy industrial practices throughout its history, including: the illegal dumping of toxic materials; financial irregularities; the violation of building codes and property use designations; and most notably, sham recycling. These deviant practices continued despite changes in the specific industrial activity that took place in the locale—that is, despite the change in spatial fix from metals processing to materials recycling.

Molotch, Freudenberg, and Pausen note that the influence of "tradition" on urban development may be thought of in terms of "how a mode of conjuncture at one point constrains or enables a particular mode of conjuncture at the next" (2000:793). This conceptualization of "tradition" is particularly apt and useful because it gives us a vantage point from which to characterize the transformation of the North End spatial fix and to identify the implications that this transformation had for increasing the potential for disaster to occur there. As we have seen, it was clear that the rapid emergence of the North End recycling sector was not only facilitated by the existent physical infrastructure (i.e., transportation corridors, access to markets, availability of labor, etc.), or simply by economic factors such as recession, deindustrialization and the market dynamics of recycling, but also by the locally established industrial culture. As such, what is particularly crucial for the analysis of spatial fix transformation and its connection to technological disaster potential is the inertial character of the economic culture of the previous spatial fix. In this connection, Storper and Walker (citing Nelson and Winter 1982) observe that:

> Once set into place, any territorial-organizational framework of production has an inertia that sustains it in a self-reinforcing way. Institutions are established, rules and behavior take on the weight of tradition, and cumulative causation takes its course (1989:149).

The continuity of deviant industrial practice can be accounted for by two key factors. First, as Arthur Stinchombe (1965:148, cited by Vaughan 1999) notes, there are certain liabilities associated with the start-up of new enterprises, such as the costs associated with the generation and learning of new industrial roles, the absence of standard routines and the necessity of relying on social relations among strangers. By maintaining at least some continuity in industrial practice and culture, industrialists are able to minimize such costs. Second, according to the new institutionalism perspective (Powell and DiMaggio 1991), organizational forms and behaviors reflect institutionalized sets of prevailing values and beliefs. If the local production culture of a particular spatial fix institutionalizes certain values and organizational activities, then there will be an inherent pressure for such values and activities to be carried over into the new spatial fix (if at all possible)—especially if the old and new spatial fixes share structural similarities, such as those requirements common to the steel and materials

recycling industries (for example, physical requirements such as infrastructure and large lots). The capacity to minimize the "liabilities of newness," as well as the tendency to augment the inertial quality of a deviant industrial practices in a locality, may be further encouraged and reinforced by an ineffective regulatory and enforcement framework, such as the legal loophole that permitted sham recycling and the lax enforcement of building and land use codes to deal with changes in the spatial fix in the North End situation.

The North End case illustrates that a spatial fix not only holds constant the industrial uses of properties in the area, but that it may also fix the general underlying production culture associated with that place—notably, the propensity for corporate environmental crime and shoddy industrial practices. In this way, routine organizational practices such as sham recycling can become "normalized" (Vaughan 1996) and taken-for-granted within a particular area. Under these types of social conditions, the potential for disaster may increase because the generalized rules of the institutionalized production culture associated with the old spatial fix may very well be inappropriate for the new spatial fix, thus, leading to unpredictable and sub-optimal outcomes such as technological disasters. This emergence of sub-optimal results as a function of changes in the spatial fix, was well illustrated by the Plastimet case in two ways. First, residual products from industrial activities from a previous spatial fix dangerously interacted with products present in the new spatial fix, as exemplified by the interaction of the highly flammable zinc oxide powder from the previous scrap metal/smelting operations with the recyclable plastics of the emergent spatial fix. It should also be noted that, normally, the types of plastic stored at the Plastimet site does not burn easily or efficiently, but the chemical dust present at the site allowed the toxic blaze to spread quickly and uncontrollably. Secondly, although the building code and land use designations for facilities within the old spatial fix may very well have been appropriate for the previous industrial activity, they were clearly not appropriate for the new one. Consequently, the change in spatial fix interacted with a lack of change on the level of regulation and enforcement in such a way as to promote the potential for disaster. This was illustrated by the fact that the recycling facility lacked an appropriate sprinkler system and other physical features related to layout (including a secured area for the storage of combustible plastic materials). Past industrial practices, particularly the stockpiling of metals, may have represented less of a potential fire hazard as compared to the stockpiling of plastic materials, but the regulatory enforcement structure did not adapt to reflect the changes in land use.

According to Weinberg, et al. (2000:35–36), underlying all political economic analyses are the following basic assumptions about social process: (i) that local actions are to be understood only within larger regional and local processes; (ii) that the driving force of action is conflict among social groups over scarce resources; and (iii) that political and economic processes are not analytically separate. The analysis presented here implicitly addresses each of these features in an attempt to develop what Krieg (1995) calls a "political economy of place." For example, the historically-based development of the North End as the "recycling center of Canada" demonstrates the complexity of interactions between larger forces brought on by economic recession and deindustrialization, the conflict over scarce resources (i.e., the use of Hamilton Harbor area for industrial, shipping and waste disposal, rather than recreational purposes), and the political and economic coalitions formed by the Hamilton Harbor Commission and the growth machine entrepreneurs from the metal industry. All these interactions essentially established the preconditions for disaster by facilitating the development of a particular production culture that tolerated certain untoward industrial practices and environmental corporate crimes in the area. The influence of the political economic context on disaster vulnerability in the North End therefore illustrates the principle that, "being in the wrong place is not a matter of time or accident, but rather a function of the social structure" (Fitzpatrick and LaGory 2000:4).

Finally, I would like to conclude by noting some of the advantages of utilizing a political economic approach in the analysis of disasters. First, such an approach provides an analytical

entry point into the investigation of the process by which the "unanticipated side-effects of industrialization" noted by the risk society thesis become latent, and therefore unforeseen. By considering the influence of the broader forces at work in a locality, the analysis will be directed towards the "process" involved in making communities vulnerable to disaster. This is beneficial because it will enable the identification of those dynamic factors that ultimately contributed to the disaster onset—but are usually overlooked (i.e., unanticipated) because of their gradual and incremental accumulation during the disaster incubation period (Beamish 2000, 2001; Turner 1976; Vaughan, 1996, 1999). Second, a political economic approach will help ensure that appropriate attention is given to the role of "place" (such as the particularities of the urban setting) in the analysis of disasters—an emphasis supported by many environmental sociologists concerned with the tendency to "oversocialize" the analysis of environmental problems (Buttel 1987; Canan 1996; Dunlap and Catton 1994; Freudenberg, Frickel, and Gramling, 1995; Hannigan 1995; Murphy 1994, 1997; Schnaiberg 1980). Third, in a related manner, the political economic approach encourages the adoption of a more holistic perspective—a perspective that is particularly important in dealing with the inherent complexity and multi-dimensionality of the society-environment relationships associated with environmental problems in general, and technological disasters in particular.

In sum, the adoption of a "processual" model—that is, one that takes into account the complex interactions between local historical circumstances, broader social and political-economic forces, as well as the regulatory setting associated with the governance and enforcement of land use and industrial practices—will help shed some light on the actual mechanisms that make certain places more vulnerable to disasters. Such knowledge will better enable us to deal with, and hopefully prevent, those technological disasters that are still "waiting to happen" in our so-called risk society.

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