

Man-Made Disaster: Texas's Failure to Protect Its Citizens from the Perils of the Houston Petrochemical Complex

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A Center for Progressive Reform White Paper

September 2006

Introduction

On January 16, 2005, the *Houston Chronicle* began a five-part series, entitled “In Harm’s Way,” on the extent of hazardous air pollution in the Southeast Houston and Port Neches, Texas. The result of an 18-month investigation, the series highlighted the health risks encountered by residents living near the huge plants that make up the Texas oil refining and petrochemical industries.¹ On March 23, 2005, a huge explosion at the British Petroleum Refinery in Texas City, Texas killed 15 people, injured over 170 others, many seriously, and shook homes for miles around.² The *Houston Chronicle* ran another series of articles on the investigations, possible causes and enormous human toll of the worst industrial accident in Texas in the last 15 years.³ During the summer of 2005, a second explosion and a leak at the BP plant within two weeks of each other caused a great deal of consternation among the residents of the neighboring communities,⁴ and the U.S. Chemical Safety and Hazard Investigation Board concluded from its investigation of the first explosion that management lapses by BP pose an “imminent hazard” to workers and the neighboring public.⁵

Public concerns about the perils of the Houston Petrochemical Complex receded in the wake of Hurricanes Katrina and Rita, two natural disasters that brought to the forefront the well-known risks that natural disasters pose to human health and welfare. Hurricanes Katrina and Rita precipitated a nationwide debate on the role that government must play in helping vulnerable citizens prepare for and respond to natural disasters. At the same time, that debate has focused public attention on steps, like sturdier levees and wetlands preservation, that government can take to protect against the consequences of natural disasters. The government was not able to protect the citizens of Louisiana and East Texas from the natural disasters of Hurricanes Katrina and Rita. But the government can protect its citizens from man-made disasters like the BP

explosion and the widespread health risks posed by airborne toxics.

It is time to take a step back to explore how the failures of the regulatory agencies responsible for protecting the public from hazardous air pollution represent a failure of government generally in an era of “hollow government” in which under-funded and under-staffed agencies must contend with recalcitrant industries and strong political pressures at both the state and federal level to provide “regulatory relief” to companies that threaten to take their plants and associated jobs overseas if they do not receive relief from “burdensome bureaucratic regulation.”

Since the late 1970s, conservative think tanks and politicians have been railing against “overly burdensome” health and safety regulation and they have pressed Congress, state legislatures and state and federal agencies for more “flexible” and “voluntary” regulatory approaches that save the industry money but ostensibly do not sacrifice health and safety protections. The Texas Legislature, the relevant state and federal agencies, and powerful political elites in the Houston region have in the past accepted these ill-advised think tank criticisms and have implemented laws and policies aimed at providing companies maximum discretion in deciding how to go about protecting their workers and the public from the risks posed by their plants’ operations.

For example, in response to the *Houston Chronicle* series, two of the plants that have been heavy contributors to Harris County’s 533,497 pounds of annual emissions of the highly carcinogenic chemical 1,3-butadiene (the most of any county in the United States)⁶ have agreed to a wholly voluntary program of enhanced monitoring and leak inspections. This unenforceable program will do little more than clarify what residents in the area already know – that the 533,497-pound estimate is probably grossly understated and that butadiene levels remain high in the surrounding neighborhoods. Narrow band-aid solutions like this one

are not going to solve the problems of the Houston Petrochemical Complex or any other heavily industrialized area of the country. The problems run much deeper to a political and regulatory culture that tolerates significant risks to human life to keep the large companies that make up the petrochemical complex happy.

The very real human cost of the ineffective regulatory policies that have been implemented as a result of industry influence over the institutions of government is now becoming manifest in the poisoning of nearby communities and the needless deaths of workers. For the first time in a long time, the local media have focused public attention on the nature and extent of hazardous air pollution in the Houston area, and the city government has begun to take much needed steps to do something about it, sometimes over the perverse resistance of the state agency that is supposed to be looking out for the welfare of Houston citizens.

This report will describe how the State of Texas has failed to protect its citizens from the man-made disasters of the Houston Petrochemical Complex and how corporate dominance of the regulatory process has contributed to that failure. It will then offer some suggestions for legislative changes that will yield better protections for workers and neighbors. But these changes will not be enacted until the affected citizens demand them and the state legislature and regulatory agencies are receptive to the voices of ordinary citizens.

The Houston Petrochemical Complex

According to EPA's latest analysis of the data that companies are required to submit under the Toxic Release Inventory program (TRI), Harris County is among the nation's top ten counties in releases of the air pollutants considered to be the most toxic to humans and the environment (known as "hazardous air pollutants" or "air toxics").⁷ Galveston County, where the Texas City BP explosion occurred, is among the top 100 out of 2,247 counties.⁸ In 2004, industries in Harris County reported releases of a staggering 31,560,235 pounds of hazardous air pollutants⁹—almost a quarter of the total toxic releases reported by industrial facilities throughout the entire state.¹⁰ With the 8,078,922 pounds released by Galveston County facilities,¹¹ the two counties account for slightly more than 30 percent of the toxic releases in Texas, which itself leads the nation in toxic releases.¹² Among 56 states, territories, and the District of Columbia, Texas ranks the fourth highest in releases of carcinogens, neurotoxins, and other

chemicals considered to be the most harmful to human health.¹³

The industrial facilities primarily responsible for the high levels of toxic pollutants in Texas air are oil refining and chemical facilities owned by major U.S. corporations that wield great political influence in both the state of Texas and the federal government. A number of these corporations' facilities are concentrated in three areas: Baytown/Lynchburg Ferry, Milby Park (both located in Harris County's southeast Houston area), and Texas City. As detailed in the following sections, state and private monitoring in these three regions has revealed particularly high levels of two hazardous air pollutants that are known carcinogens: benzene in Texas City and Baytown/Lynchburg Ferry, and 1,3-butadiene in Milby Park.¹⁴ In addition to cancer, chronic exposure to benzene through inhalation is associated with blood, neurological, and immune system disorders,¹⁵ and chronic exposure to 1,3-butadiene through inhalation with cardiovascular, respiratory, blood, and liver disorders.¹⁶ A review of the data that EPA compiled from the TRI reports submitted by the industrial facilities in these areas indicates that a relatively small number of large corporations own the facilities that are significant contributors to the areas' elevated levels of benzene and 1,3-butadiene.¹⁷

The oil-refining and petrochemical facilities in Texas City that reported the highest releases of benzene are owned by five corporations:

- (1) **BP**, which reported that its chemical facility and its oil refinery and associated docking facilities released a total of 108,102 pounds of benzene in 2004 (the most recent release year for which TRI data is publicly available),¹⁸ and 117,516 pounds in 2003¹⁹;
- (2) **Dow Chemical Company**, whose Union Carbide chemical facility and associated marine terminal (acquired by Dow when it bought Union Carbide in February of 2001²⁰) reported a release of 2,464 pounds of benzene in 2004,²¹ and 52,859 pounds in 2003²²;
- (3) **Valero Energy Corporation**, which reported that its oil refinery released a total of 13,205 pounds of benzene in 2004,²³ and 9,391 pounds in 2003²⁴;
- (4) **Marathon Oil Corporation**, which reported that its oil refinery released a total of 33,556 pounds of benzene in 2004,²⁵ and none into the air in 2003²⁶; and

(5) Sterling Chemicals, Inc., which reported that its chemical facility released a total of 25,341 pounds of benzene in 2004,²⁷ and 35,504 pounds in 2003.²⁸

In the Baytown/Lynchburg Ferry area of southeast Houston, the facilities that reported the highest releases of benzene are owned by four corporations:

(1) ExxonMobil Corporation, which reported that its oil refinery and two chemical facilities released a total of 207,346 pounds of benzene in 2004,²⁹ and 215,362 pounds in 2003³⁰;

(2) Chevron Corporation and ConocoPhillips, whose jointly-owned Chevron Phillips Chemical³¹ facility reported no releases of benzene in 2004,³² and 12,719 pounds in 2003³³; and

(4) DuPont Company, whose First Chemical Texas plant did not submit a TRI reported in 2004,³⁴ but reported a release of 1,412 pounds of benzene in 2003,³⁵

The facilities in Milby Park that reported the highest releases of 1,3-butadiene are owned by three corporations:

(1) Texas Petrochemicals, which reported that its facility released a total of 79,615 pounds of 1,3-butadiene in 2004,³⁶ and 143,048 pounds in 2003;³⁷

(2) Goodyear Tire & Rubber Company, which reported that its facility released a total of 10,830 pounds of 1,3-butadiene in 2004,³⁸ and 9,002 pounds in 2003³⁹; and

(3) ExxonMobil Corporation, whose chemical facility reported a release of 3,826 pounds of 1,3-butadiene in 2004,⁴⁰ and 2,305 pounds in 2003.⁴¹

These and the other corporations operating oil refining and chemical facilities pervade Texas society at multiple levels. The twisting pipes and flaring stacks of petrochemical plants dominate the landscape of communities living along the fenceline of industrial complexes; streets and buildings bearing the names of oil barons and industry CEOs are peppered throughout Houston's nationally-renowned medical center, universities, theaters, and museums. Less readily apparent to the general public, but impacting the daily lives of Houstonians to a much greater degree, are the thousands of pounds of noxious pollutants that the oil-refining and petrochemical facilities spew into Houston's air only because the state's notoriously lenient environmental laws and systematically lax enforcement permit the facilities to run in a state of chronic disrepair and with antiquated

equipment. Instead of investing in adequate maintenance and up-to-date monitoring and pollution-control technology that would significantly decrease the amount of toxic air pollutants released into the air—and thus the health risks to the surrounding community—the oil and petrochemical industries spend millions on campaign contributions, lobbying, and public relations campaigns to preserve their ability to operate their facilities with little regard for the environment and public health.

In the following sections, we (1) describe what is currently known about the dangerously high levels of benzene and 1,3-butadiene in the three communities of focus in this report, (2) provide a brief overview of the mechanics of the facilities' releases of toxic pollutants and the nature of their impact on air quality, and (3) explain the state's potentially inadequate regulatory regime. Against that background, we then describe in further detail the considerable influence that the economic power that these companies have at their disposal gives them over state policy-making.

Exposures to Hazardous Air Pollutants in the Houston Petrochemical Complex

One reason that the January 2005 *Houston Chronicle* series came as such a surprise to many Houstonians is that very little is known about the extent to which the citizens of the Houston Petrochemical Complex are exposed to toxic air pollutants. The primary reason for this dearth of information is that the Texas Commission on Environmental Quality (TCEQ), the agency with primary responsibility for protecting Houston citizens from air pollution hazards, has until fairly recently not had sufficient resources to conduct the extensive monitoring that is necessary to characterize hazardous air pollution and the toxic "hot spots" that plague the petrochemical complex. Appendix 1 to this Report relates the revealing, but also frustrating history of TCEQ stationary and mobile monitoring efforts in Texas City and in the Milby Park and Lynchburg Ferry areas of southeast Houston.

The few stationary monitors that TCEQ has put in place over the years are capable of detecting long-term concentrations of many toxic pollutants, but they are often located far away from the sources of the toxics and out of range of the "hot spots" that frequently migrate through nearby neighborhoods with the shifting winds. In recent years, the agency's very able mobile monitoring team has conducted numerous investigations in areas in close

proximity to the sources of the hazardous air pollutant emissions, and the results of these investigations have been very revealing. The mobile monitoring reports are analyzed by the agency's Toxicology and Risk Assessment Section, a group of toxicologists and others with training in hazard analysis. That group attempts to characterize in an accurate and comprehensible way the monitoring results from a human health perspective. This risk characterization is captured in a memorandum from the Section to upper level decision makers and the mobile monitoring staff. Many of these memos are summarized in Appendix 1.

The Toxicology and Risk Assessment Section's analyses of the results of both stationary and mobile monitoring invariably reference the ESLs that the Section has over the years established to provide guidance to permitting officials for determining when predicted ambient concentrations of toxic pollutants at the fence line may exceed acceptable levels in connection with permits for new and modified facilities. An ESL is expressed as a concentration of the pollutant in ambient air, and it is based upon a toxicological evaluation of scientific data concerning the health effects of the pollutant, the potential for odors to be a nuisance, effects on vegetation, and potential corrosive effects.⁴² Short-term ESLs apply to one-hour exposures and are intended to protect against acute effects. Long-term ESLs apply to annual exposures and are intended to protect against chronic effects.⁴³ For some hazardous air pollutants, the agency has developed 8-hour and 24-hour ESLs as well. The agency is at pains to caution that ESLs are tools for use in permitting proceedings and are not ambient air quality standards. In the agency's view ambient levels below the ESLs should not lead to acute or chronic adverse health effects, but a concentration that exceeds the relevant ESL "does not necessarily indicate a problem but rather triggers a review in more depth."⁴⁴ In particular, a concentration that exceeds an ESL does not necessarily imply that a condition of "air pollution" exists. TCEQ is in the process of reviewing the methodology that it uses for establishing ESLs.⁴⁵

TCEQ's extensive mobile and stationary monitoring efforts in Texas City reveal a pattern of observation and subsequent neglect. Over a period of ten years, the mobile monitoring teams have consistently identified benzene "hot spots" in and around residential areas, and the stationary monitors reveal persistent benzene levels in residential areas far downwind from any likely industrial sources. Over the years, the Toxicology and Risk Assessment Section has expressed its concern that not enough was being done to characterize the hot spots and to identify the sources of emissions contributing to those hot spots, but the response

of upper level management has almost always been to take no regulatory or enforcement action and to send the team back again in a couple of years for another look. Not surprisingly, the results are always the same — hot spots are detected and, with one exception, nothing has been done about them. The one exception was an effort to identify and address an API separator as a source of benzene emissions near the boundaries of two of the plants. When a Region 12 enforcement team was finally called in to conduct a full-fledged investigation after two monitoring trips had revealed very high benzene levels, an enforcement action resulted in the correction of the problem. It did not, however, solve the problem of persistent benzene concentrations at levels that threaten the public health of Texas City residents in other locations.

The less extensive Lynchburg Ferry monitoring exercises have been complicated to some extent by the fact that the stationary monitors are located 1-2 miles from the nearest residential neighborhoods. Thus, even though benzene concentrations at the stationary monitors are almost three times the "Effects Screening Level" (ESL) that TCEQ uses to determine when air toxics need further attention, the human health significance of those concentrations is not altogether clear.⁴⁶ The Toxicology and Risk Assessment Section noted in 2001 that "[a]dditional information" was needed "to appropriately evaluate human exposure levels."⁴⁷ The agency did conduct follow-up mobile monitoring efforts that did not thoroughly encompass nearby populated areas. Other than a single Notice of Violation for a possible leaking floating roof, the agency has undertaken no efforts to reduce benzene and 1,3-butadiene levels in the area, despite the Section's conclusion that "a reduction in ambient benzene levels is advisable."⁴⁸

If the results of the Texas City and Lynchburg Ferry monitoring are disturbing, the results of both the stationary and mobile monitoring that TCEQ has conducted at Milby Park cry out for forceful governmental action. Mobile monitoring investigations revealed 1,3-butadiene concentrations far in excess of the ESLs for that substance, which the Toxicology and Risk Assessment Section is frank to acknowledge will probably be revised downward in the near future. Based on the stationary monitoring alone, the Section calculated the cancer risk in the surrounding neighborhoods due to 1,3-butadiene emissions from two nearby plants at 3-4 in 100,000, a risk level that greatly exceeds the level (1 in 1,000,000) that Congress has identified as unacceptable for purposes of addressing the residual risks of human exposure to hazardous air pollutants.⁴⁹ These levels are especially alarming, because they most likely represent real-world exposures. Unlike the

Lynchburg Ferry monitoring exercises, the Milby Park monitoring has focused particularly on public and residential areas. Recently, TCEQ entered into a voluntary agreement with Texas Petrochemicals that gave the Toxicology and Risk Assessment Section some hope that significant emissions reductions would result in 2005 and 2006. The City of Houston has made that scenario much more likely by entering into an enforceable consent decree with Texas Petrochemicals.

Future mobile and stationary monitoring (which the consent decree greatly enhances) will reveal whether the emissions reductions efforts have been successful.

The monitoring exercises detailed in Appendix 1 demonstrate a rather clear pattern of investigation, detection, assessment and neglect. When concentrations of benzene or 1,3-butadiene exceeding the ESL's are first detected in an area, the Toxicology and Risk Assessment Section suggests that chronic exposures to the levels are of concern and should be investigated further. After the levels are identified in subsequent monitoring, the Section repeats its concern and urges continued investigation. After some occasions, the section has concluded that the hazardous air concentrations are so severe as to warrant further action and it calls for "emissions reductions." Unfortunately, these calls for action are seldom heeded by upper level decision makers in TCEQ, and the Section's reports begin to read like a broken record of ignored warnings.

Why the Houston Petrochemical Complex is So Dangerous

The limited stationary and mobile monitoring that has taken place in the Houston Petrochemical Complex over the past several years strongly suggests that Southeast Houston and Texas City may be dangerous places to live. The monitoring exercises alone, however, do not explain why the concentrations of benzene and 1,3-butadiene persist at such high levels, nor do they give any indication of the best way to go about making the Houston Petrochemical Complex a safer place to live. This section of the Report

will provide some answers to the question why the air toxics problem persists and may be getting worse. The next section will provide some suggestions for what can be done to address that problem.

The Problem of Hazardous Air Pollutants

Most public attention is focused on the conventional pollutants (referred to in the pollution control business as "criteria" pollutants) that cause the kind of air pollution that affects most people in urban areas. The "ozone action days" that are familiar to Houston residents occur when meteorologists predict that weather conditions will be such that photochemical oxidants (for which the single chemical ozone is a surrogate) will exceed the "ambient air quality standard" that the United States Environmental Protection Agency has established for that pollutant. Photochemical oxidants in turn are formed when oxides of nitrogen (NOx) and reactive volatile organic compounds (VOCs) combine in

the sunlight. The NOx and VOCs come from thousands of sources within the Houston area, including automobiles, power plants and, of course, the Houston Petrochemical Complex.

Hazardous air pollutants, by contrast, do not come from "numerous and diverse mobile or stationary sources," but are rather associated with particular industrial activities, like chemical plants and metal smelters. More importantly, whereas the criteria pollutants can endanger human health at the high concentrations addressed by the National Ambient Air Quality Standards, hazardous air pollutants are typically much more toxic at much lower concentrations. Unlike the criteria pollutants, however, EPA has not established ambient air quality standards for hazardous air pollutants. Consequently, even though the levels of benzene and 1,3-butadiene routinely encountered in the Houston Petrochemical Complex may be more dangerous than the ozone levels that precipitate "ozone action days," there are no "benzene" or "butadiene" action days.

TCEQ's extensive mobile and stationary monitoring efforts in Texas City reveal a pattern of observation and subsequent neglect. Over a period of ten years, the mobile monitoring teams have consistently identified benzene 'hot spots' in and around residential areas, and the stationary monitors reveal persistent benzene levels in residential areas far downwind from any likely industrial sources.

The Problem of Toxic ‘Hot Spots’

Pollution is not always evenly distributed throughout a given area. The location of pollution sources, wind conditions, and other factors all play a role in distributing pollution throughout a metropolitan area. Sometimes this distribution creates toxic “hot spots” – areas with considerably higher than average concentrations of pollutants. A “hot spot” is typically associated with a plume that develops downwind from an emissions source and migrates as the wind direction changes. It can also result from a combination of plumes from multiple sources of the toxic pollutant located in one or more industrial facilities.

It is often useful to distinguish between “continuous” hot spots and “intermittent” hot spots. Continuous hot spots result from continuous emissions or from a sufficiently large number of small sources of discontinuous emissions as to give rise to a plume that persists through time, though not necessarily at the same location because of shifting winds. A single source like a stack or an air/water separator could give rise to a continuous hot spot, but a continuous hot spot could also result from leaks from a large number of flanges, valves and similar sources of so-called “fugitive” emissions where the percentage of leaking sources remains roughly constant over time.

Intermittent hot spots result from normal, but discontinuous operations, such as batch processes or sumps that receive wastewater on an intermittent basis. Intermittent hot spots can also result from upsets and maintenance activities. Intermittent hot spots may be especially difficult to characterize. A “transitory” upset that is unique or that occurs only once in a great while will not result in chronic exposures and is therefore not of toxicological concern from a chronic health perspective. A transitory upset that results in the release of large quantities of an acutely hazardous substance puts exposed individuals at risk for acute adverse health effects, and such releases typically result in evacuations of schools and neighborhoods to avoid widespread incidence of acute illness. It is possible for facilities routinely to experience frequent, but intermittent upsets, each of which results in the release of only a relatively small quantity of a toxic pollutant. These “persistent” intermittent hot spots can give rise to both chronic and acute toxicological concerns.

Neither continuous nor intermittent hot spots are likely to result in continuous exposures to any individual or population. Continuous hot spots typically migrate with the winds and wax and wane in concentration as weather conditions change. Intermittent hot spots may subject

neighbors to brief, but intense exposures on many different occasions. Intermittent hot spots are thus of toxicological concern both because of their potential to cause acute adverse health effects in the case of large releases and because of their potential to contribute to cumulative exposures over time. Because continuous exposure is ordinarily assumed in chronic quantitative risk assessment, that tool may not be especially useful for characterizing either continuous or intermittent hot spots. Indeed, because TCEQ’s long-term ESLs are usually based upon risk assessment exercises that assume continuous exposure, they probably do not accurately reflect the long-term risks posed by intermittent hot spots, and they may not accurately reflect the risks posed by continuous, but frequently migrating hot spots.

For residents living in proximity to a hot spot, particularly one that recurs, the health effects can be profound. Many of the toxic chemicals that are emitted in the Houston Petrochemical Complex are carcinogens, and chronic exposures increase the risk that the neighbors will contract cancer. Residents of the vicinity frequently experience less serious, but nevertheless seriously annoying acute effects like nausea and burning eyes. Indeed, some TCEQ mobile monitoring exercises in or near adjacent neighborhoods have been interrupted because the staff became ill during the investigations and had to don protective gear.

An Aging Infrastructure that Has Been Steadily Expanded, Often Without Installing Modern Pollution-Control Technology

A new oil refinery has not been built in the United States for nearly thirty years, and, in fact, nearly 200 have closed down since 1989.⁵⁰ Nevertheless, the country’s oil-refining capacity has increased since the mid-1990s as a result of significant expansion of existing facilities,⁵¹ particularly those in Texas and Louisiana.⁵² For example, ExxonMobil’s Baytown refinery was constructed in 1919 by Humble Oil Company⁵³ and began processing crude oil the following year with a capacity of 260,000 barrels of oil a day.⁵⁴ In 1973, Humble Oil was acquired by Exxon (formerly Standard Oil), and extensive expansion of the Baytown refinery has made it the largest refinery in the United States, with a capacity of 557,000 barrels of oil per day.⁵⁵ BP’s Texas City refinery, which is also one of the oldest in the region, began operating in 1934 (under a different owner), and has been expanded over the years to attain its current capacity of 460,000 barrels of oil per day, making it the third largest in the United States and producer of around 2.5 percent of the nation’s gasoline

supply.⁵⁶ And Valero Energy's Texas City refinery has been considerably expanded since it began processing in 1951, with a current capacity of about 245,000 barrels per day.⁵⁷

Similarly, many petrochemical plants began operating in Texas during World War II (to meet the need for synthetic rubber and chemicals for explosives), and have been expanded over time.⁵⁸ The cores of the facilities now operated by Texas Petrochemicals and Goodyear Tire and Rubber near Houston's Ship Channel, for example, were built by the U.S. Department of Defense in 1943 to produce synthetic rubber for the war.⁵⁹ Since private companies purchased the sites in the mid-1950s, the plants have undergone significant expansions.⁶⁰

Aging infrastructure is more likely to leak pollutants and otherwise malfunction. The March 2005 explosion at the BP plant in Texas City, for example, was caused by accidental emissions of process liquids through an archaic emergency release vent (commissioned in the 1950s) that was part of the plant's control system for accidental releases of pollutants.⁶¹ Modern pollution control systems control such unplanned emissions by routing them to a flare far removed from any personnel on the ground.⁶² The old infrastructure is also limited in the degree to which it can be made safer because it is an anachronism in the world of pollution-control technology. For example, it is possible to make plants almost airtight, preventing the many leaks known as fugitive emissions that together make up a significant portion of the toxic releases in Texas.⁶³ Major petroleum companies have constructed such plants in Europe, but the technology cannot be adapted to old plants like many of those on the Texas Gulf Coast.⁶⁴

Further, increased production capacity means increased polluting capacity, but not necessarily an increase in the best currently available pollution-control technology. Although expansion does indeed provide the opportunity to incorporate pollution-control technology that was not available when the facilities first began operating, it has become apparent that companies often put their bottom line ahead of public health and safety when constructing new infrastructure or modifying existing parts of their facilities.⁶⁵ Consequently, the newer infrastructure and equipment of refineries and chemical plants are not necessarily much cleaner than their early-to-mid-century era counterparts.

That pollution control should improve with the construction or modification of plants was the idea that Congress had in mind when it enacted the "New Source Review" (NSR) provisions of the 1970 Clean Air Act.⁶⁶

Under these provisions, Congress exempted existing plants from the Act's standards, but, understanding that these older plants would eventually have to update their facilities or close down, required industry to install the appropriate technology to ensure that any emission sources constructed or significantly modified after enactment (i.e., "new sources") comply with the Act's pollutant limits.⁶⁷ Unfortunately, many companies that own polluting facilities, including those operating the nation's expanding refineries, have systematically violated and evaded NSR requirements.⁶⁸ As Sierra Club's Neil Carman stated, "Basically, refineries have been illegally expanding their plants, in some cases increasing the pollution or failing to reduce emissions they put out, with no check or oversight by state or federal agencies."⁶⁹ A 1999 study by EPA on various industries' compliance with environmental laws found that many refineries, which release more hazardous air pollutants than any other industrial sector, remained in "significant noncompliance" with Clean Air Act requirements, including those relating to NSR and leak detection and repair.⁷⁰

Among the Texas refineries EPA found to be in violation of NSR requirements is ExxonMobil's Baytown facility: EPA issued a notice of violations ("NOV") relating to expansions of the facility in the late 1980s without installation of required pollution-control technology.⁷¹ The agency issued the NOV in January of 2001, at which point the refinery had been in violation for over a decade.⁷² In the fall of 2005, ExxonMobil settled these and other Clean Air Act claims against it with EPA and the Department of Justice, agreeing, *inter alia*, to pay a fine of \$8.7 million and to spend \$571 million to install pollution-control technology at its Baytown refinery and six of its other U.S. refineries.⁷³ Earlier the same year, ConocoPhillips and Valero Energy agreed to spend \$525 million and \$700 million, respectively, on pollution-control technology to settle claims of violations at their refineries.⁷⁴ Among the pollution-control measures that the three companies agreed to implement were upgrades of their systems for leak detection and repair and reductions in emissions of hazardous pollutants from flares.⁷⁵

Complex Sources of Hazardous Air Pollutant Emissions

When most people think about air pollution, they think about "point sources" of pollution like tailpipes and smokestacks, and much conventional air pollution does in fact result from emissions from such point sources. Like most other industries, the petrochemical industry emits pollutants from point sources, and modern facilities are

designed to channel emissions from unplanned and non-routine events (discussed below) to flares, which are point sources that burn volatile organic gases high above the upper reaches of the plant's buildings and equipment. A large proportion of emissions of volatile organic compounds from petrochemical plants, however, results from so-called "fugitive emissions" from numerous valves, flanges, process vents and small leaks that typically characterize a refinery or chemical plant.

Fugitive emissions cannot be completely eliminated, but they can be reduced by ensuring that gaskets do not leak, that equipment is properly maintained, and that gaskets and equipment are replaced when they begin to leak. Even so, fugitive emissions represent a significant source of emissions of volatile organic compounds from the Houston Petrochemical Complex. For example, in 1999, roughly one-third of the total emissions of HAPs reported under EPCRA in Texas were from fugitive sources.⁷⁶ Because fugitive emissions are inevitable in large facilities and because the percentage of leaking valves, flanges, etc. can remain relatively constant over time, fugitive emissions tend to be continuous in nature and persistent over time. In the right meteorological conditions toxic "hot spots" can develop from such continuous emissions of hazardous air pollutants. So long as the company complies with regulations or permit conditions requiring periodic checks for and repairs of leaking equipment, fugitive emissions are not illegal.

Fugitive emissions are an especially likely source of toxic "hot spots" in the Houston Petrochemical Complex for several reasons. First, the applicable TCEQ rules do not establish a cap on the total amount of fugitive emissions at a facility so long as each major source of fugitive emissions meets prescribed technology requirements.⁷⁷ This means that a facility that meets the technology requirements can effectively increase fugitive emissions of hazardous air pollutants without any legal limitation. The emissions limit "is not fixed and can change as the emissions from each emission point change or as the number of emissions points in the source changes."⁷⁸ Second, operators are not

even required to undertake an accounting of the total fugitive emissions leaving the facility, either by actual monitoring or calculations based on process flows.⁷⁹ While the reporting requirements of the Emergency Planning and Community Right to Know (EPCRA) law require a source to take fugitive emissions into account in providing

"reasonable estimates" of the facility's overall annual emissions of listed hazardous substances, these estimates can be based on rough, back-of-the-envelope approximations and are therefore not a reliable proxy for a total accounting of fugitive emissions of particular hazardous air pollutants.⁸⁰ Third, the facility is required to self-inspect to ensure compliance with technology-based requirements for fugitive emissions sources only at specified intervals that are in some cases extend for as long as a year.⁸¹ Having detected a violation, the facility has a period of time, that can extend for as long as 45 days, during which it can repair the problem without being penalized.⁸²

When the operator shuts down one or more units at a facility for maintenance..., the pollution controls also typically cease to function. Volatile liquids...can evaporate into the ambient air as equipment is cleaned and repaired, and startups can produce bursts of emissions far in excess of normal amounts. Because they are not part of the facility's routine, shutdowns and startups are times when accidents are more likely to happen.

Ubiquitous Emissions from 'Excessive Emissions Events'

Upsets occur when there is a breakdown in pollution control equipment, a power failure or other condition at a plant that allows a large amount of pollution to escape unintentionally. Texas law does not authorize these upsets,⁸³ but some are excused if they are reported in accordance with the law and are unpreventable.⁸⁴ A series of upsets arising at the same location in a facility over a short period of time, however, begins to look suspiciously like careless plant maintenance rather than unpreventable events.⁸⁵ Even for unpreventable upsets, TCEQ can take additional enforcement action if it finds the emissions resulting from the upsets are excessive.⁸⁶ The operator of the facility has the burden of demonstrating not just that the event was unpreventable, but that it was not excessive.⁸⁷ If the emissions event is not excused, the facility can be fined. If TCEQ determines that the emissions event is excessive, the facility must either develop a correction plan or seek authorization for the additional, regularly intermittent emissions, as well as pay a fine.⁸⁸

These added preventative requirements for upsets, however, are not self-enforcing. TCEQ must affirmatively

take enforcement action to penalize reported upsets, and it has the burden of locating unreported upsets. Unless TCEQ seeks additional information or finds a facility emitting excessive emissions, facilities are only required to report (not monitor) the circumstances, nature of emissions and other features of a particular upset event.⁸⁹ If the pollutants do not appear to exceed reportable quantities, moreover, the facility need only record the upset condition on a plant log and make it available for inspection (presumably even if the upset was preventable).⁹⁰ Beyond these reporting requirements, the facility has no obligation to monitor the ambient air or source of emissions during the upset or to make any other demonstrations.⁹¹

When the operator shuts down one or more units at a facility for maintenance, repairs or other reasons, the pollution controls also typically cease to function. Volatile liquids within the system can evaporate into the ambient air as equipment is cleaned and repaired, and startups can produce bursts of emissions far in excess of normal amounts. Because they are by definition not part of the facility's routine, shutdowns and startups are also times during which accidents are more likely to happen. The March 2005 explosion at the BP plant in Texas City, for example, occurred during the startup operations following a scheduled shutdown for repairs and maintenance.⁹²

The applicable TCEQ regulations treat excess emissions from startups and shutdowns like upsets, except that the facility must provide prior notification for startups and shutdowns expected to release excess emissions greater than reportable quantities.⁹³ Since TCEQ has advance notice of the excess emissions, it may "specify the amount, time, and duration of emissions" that will be allowed during the scheduled maintenance, startup, or shutdown activities.⁹⁴ The facility must also minimize excess emissions during the startup/shutdown, as well as make the other ten showings in order to avoid having the unauthorized emissions from the maintenance activity identified as an "excessive emissions event."⁹⁵ The reporting requirements are apparently inapplicable to excess emissions that the operator expects to be less than the reportable quantity, but on-site recordkeeping is required because excess emissions resulting from maintenance are treated like unreportable upsets.⁹⁶

Over the last several years, it has become increasingly apparent that companies in the Houston Petrochemical Complex are not taking seriously their obligation to minimize the unauthorized emissions attributable to excusable upsets, startups and shutdowns. In a 2004 report on the upset-emissions problem throughout the country, the

Environmental Integrity Project (EIP) concluded that there is a systemic failure to control upset emissions that are "largely avoidable."⁹⁷ EIP found that 28 selected Texas facilities, including the BP refinery in Texas City and the Exxon complex in Baytown, reported 45,394,557 pounds of upset emissions.⁹⁸ This figure included 136,960 pounds of butadiene and 163,666 pounds of benzene.⁹⁹ EIP pointed out that, given that a few plants "appear to have minimized upset emissions," it is clear that "pollution from upsets is not an inevitable product of manufacturing."¹⁰⁰ For example, EIP pointed to a 2003 report by the Galveston-Houston Association for Smog Prevention that found that cooling tower leaks at fourteen plants in the region resulted in excusable upsets of 1,300 tons of volatile organic chemicals.¹⁰¹ According to EIP, "[g]iven the frequency of cooling tower leaks, their emissions are foreseeable and should not be excused as upsets."¹⁰²

Conclusion

The practical and institutional impediments to effective implementation of effective regulatory protections identified above help explain why the petrochemical industry has historically been one of the primary sources of hazardous air pollutants in Houston and elsewhere. Unlike ozone concentrations in nonattainment areas like Houston, toxic hot spots are not easily modeled, and in fact they are not even easily monitored. Like phantoms they come and go as fugitive emissions from aging pipes, gaskets and flanges combine with emissions from point sources and uncontrolled emissions from upsets, startups and shutdowns to produce a complex soup of toxic chemicals in the air of neighborhoods surrounding refineries and associated petrochemical facilities. With the shifting breezes they wax and wane and wonder in unpredictable ways. All of this makes it very difficult to conceive of strategies for reducing the number of toxic hot spots in any given area and for reducing the concentrations of the pollutants that create the hot spots. Nevertheless, a better understanding of the problem of toxic hot spots in a petrochemical complex should lead to more effective solutions than are now in place. The next section of this report analyzes the technical difficulties inherent in addressing toxic hot spots.

Weak Controls on Hazardous Air Pollution

TCEQ currently faces numerous impediments to identifying toxic hot spots, isolating the sources of the hot spots, and ensuring that those responsible for the sources take action to eliminate the hot spots. First, the state of ambient monitoring in heavily industrialized areas where hot

spots are likely to be located is not sufficient to identify all hot spots. Second, although air quality monitoring technologies have improved dramatically during the last decade, disputes can easily arise over TCEQ's characterization of air quality in a particular locale with respect to a particular toxic air pollutant. Third, when TCEQ concludes that there is a condition of air pollution in a certain location, the current legal and regulatory regime invites regulated industries to challenge TCEQ's enforcement authority absent some clear evidence that the industrial source is in violation of a term or condition of one of its many permits.

Difficulties in Identifying Locations with High Ambient Toxics Concentrations

TCEQ has established a Community Monitoring Network that is capable of monitoring for the presence of a large number of toxic substances in the ambient air at a very limited number of locations. With current resource limitations, the Commission can devote no more than one or two monitors to a single industrialized area. Since residential areas frequently lie between the industries and the monitors, the exposure of individuals living in those areas is probably higher than the monitors indicate. Stationary monitoring stations that are programmed to sample for toxic pollutants known to be emitted in an area (based upon permitted emissions or toxics release inventories) can provide an early indication that a "hot spot" containing an abnormally high concentration of a particular hazardous air pollutant has developed if they are strategically placed to be downwind from likely emissions sources and if they are located closely enough to those sources to be monitoring within toxic plumes. Since TCEQ lacks the resources to place stationary monitors at every location of a possible hot spot, however, the existing system of stationary monitors has a limited capacity to detect hot spots in the first instance, and they are not at all adept at tracking plumes of HAPs that migrate with varying wind speeds and directions.

The stationary monitors associated with TCEQ's Community Monitoring Network are generally not continuous monitors. They take samples over a prescribed period of time at periodic intervals. They may therefore miss a plume that moves with the wind, even when the plume migrates directly into the vicinity of the stationary monitor. If the monitor is not sampling during the time that the plume migrates across the area being monitored, the increased toxics concentrations caused by the emissions creating the plume will not be included in the long-term average concentrations measured at the stationary monitor. Similarly, when upsets are the source of toxics hot spots,

the increased concentrations caused by the upsets will not go into the average long-term concentration if the emissions resulting from the upsets dissipate before the monitor begins to operate.

Mobile monitoring can be exceedingly useful in identifying toxic hot spots in the first instance. TCEQ's mobile monitoring teams have proven quite adept at locating toxic plumes in heavily industrialized areas. In large part, this is attributable to the ability of the trained professionals on the mobile monitoring teams literally to "sniff out" toxic emissions. Having located potential hot spots with their noses, the mobile monitoring team can move the vans to positions within the suspected plumes and validate with scientifically verifiable air samples the team's observations. Mobile monitoring also allows a team to place a ring of monitors around a facility by relocating the monitors as winds shift directions, thus enhancing the likelihood that emissions that move off-site will be detected. In addition, instantaneous mobile monitors can help focus the attention of investigators on possible sources of toxic emissions within a facility.

Mobile monitoring does, however, have some disadvantages. Wind and weather conditions can hinder mobile monitoring efforts. Recent advances in monitoring technologies allow real-time monitoring, and this permits investigators to focus more quickly on suspect facilities before changing winds hamper the investigation. Even so, weather can produce poor sampling conditions that prevent consistent quantitative measurements even with sophisticated instantaneous monitors. More advanced technologies often require access to locations relatively close to the sources of the toxics emissions, and this usually requires access to property within the suspected plants. The monitoring team must therefore obtain permission in advance from the company. If the company resists, the investigators must undertake the legal steps necessary to obtain access to the property without the owner's permission. The request and follow-up provide time for the source to attempt to fix the problem (perhaps only temporarily) before the monitoring team begins its investigation.

Mobile monitoring is quite resource intensive. TCEQ's air toxics mobile monitoring team embarks upon 25-30 monitoring expeditions per year.¹⁰³ Many of these trips are follow-up visits to previously monitored areas to determine if hot spots persist and to characterize emissions more accurately.¹⁰⁴ The TCEQ monitoring team conducts extensive investigations only 2-3 times per year. These full-blown investigations require the full-time attention of 6-8

staff employees for two weeks prior to and three weeks after the actual trip. During the week-long monitoring effort, each member of the staff typically works for at least 80 hours. Per diem expenses for a typical trip run about \$11,000. The trip employs ten to twelve vehicles. The agency's four fully equipped monitoring vans cost about \$200,000 apiece, and the mobile laboratory costs about \$300,000. The vast majority of TCEQ monitoring trips, however, employ only two or three vans and are therefore much less expensive.

Continuous stationary monitoring networks installed at the monitored plant's fence line have considerable advantages over both mobile monitors and periodic continuous monitors. These monitors are especially adept at detecting elevated concentrations resulting from upsets as they migrate off-site.¹⁰⁵ Furthermore, the existence of such continuous monitors can operate as an incentive not to ignore upsets, because it is a violation of law to fail to report an upset. Finally, if a relatively stationary hot spot can be isolated, a continuous stationary monitoring network can track the progress of efforts to eliminate the hot spot. However, a continuous stationary monitoring program is a very expensive undertaking, and TCEQ does not have sufficient resources to establish such programs at even the very riskiest facilities. A stationary monitoring network installed at the Huntsman facility in Pt. Neches, Texas pursuant to a settlement agreement costs in excess of \$125,000 per year to operate. This sort of expense would put a considerable strain on TCEQ's limited monitoring resources, and it will not lightly be accepted by private companies.

Difficulties in Accurately Characterizing Ambient Air Quality in Areas that Appear to Be Hot Spots

TCEQ faces significant obstacles in attempting to describe ambient air quality in likely hot spots as a result of a combination of the inherent uncertainty of scientific data, industry's eagerness to resolve that uncertainty in favor of inaction, and a weak legal regime that is conducive to resolving such issues in industry's favor.

1. Difficulties with the Quality of the Data

Once TCEQ has identified abnormally high concentrations of a toxic pollutant in an area, it must be very careful to ensure that its characterization of the ambient air quality is accurate. Otherwise, companies implicated in any resulting enforcement action will predictably dispute the agency staff's conclusions about ambient concentrations of the

relevant toxic substance. Unless the agency monitoring staff has been very careful to document chain of custody and ensure that the monitoring equipment is carefully calibrated and "quality controlled," there will be room for debate about the accuracy of the reported results. Their intense desire to avoid mistaken characterizations of ambient air in industrialized areas leads the TCEQ mobile monitoring team to make multiple trips to an area before concluding that action is necessary. In many cases the health-based concerns raised by toxic hot spots are attributable to chronic exposures, and the results of short-term monitoring are not necessarily indicative of long-term exposures. Not surprisingly, repeat visits often find the same levels of toxic pollutants in the ambient air. For example, benzene levels in the areas to the north of the Texas City industrial area have changed little over the thirteen years during which fairly intense mobile monitoring efforts have focused upon the three plants that appear to be contributing to those emissions. Yet, even as monitoring over the lengthy time periods reveals persistently high levels of toxic pollutants in an area, the TCEQ staff frequently concludes that still more monitoring "is needed in order to assess long-term exposure."

2. The Debatable Health Effects of the Monitored Levels of Air Toxics

Once the staff has isolated an area of high toxics concentrations, it must still assess the hazard that those concentrations pose to exposed individuals before it can support action to limit the emissions that give rise to them. Risk assessment is an inherently controversial exercise, and large uncertainties are typically encountered in any attempt to estimate the health effects attributable to a potential toxic plume. An affected company can, and usually does, dispute any conclusion of TCEQ's Toxicology and Risk Assessment Section that the monitored levels are in fact dangerous.

TCEQ typically relies upon the ESLs (discussed above) for targeting "hot spots," but the agency is always careful to caution that the fact that an ESL is exceeded in a particular area does not mean that people who breathe the air are at risk. The Toxicology and Risk Assessment Section usually warns that the "ESL's are not standards, i.e., an exceedance does not automatically result in a violation. Nor would an exceedance automatically result in adverse health effects, as ESLs are not thresholds for effects."¹⁰⁶ When the agency employs the ESLs in characterizing ambient concentrations of toxic pollutants, it is always at pains to note that the ESLs are "set to provide a margin of safety and are well

below levels at which adverse effects are reported in the scientific literature.”¹⁰⁷ Companies are quick to bring this position to the attention of the agency when it appears to be relying upon ESLs for anything more than a “trigger for more in-depth review.”¹⁰⁸

The Toxicology and Risk Assessment Section rarely finds that short term exposures above the ESLs pose acute health risks. On the other hand, when cumulative short-term exposures could increase lifetime exposure and the Section is concerned about chronic health effects, it uses cautionary language like “[l]ong term exposure to concentrations of 1,3-butadiene significantly higher than the ESL may increase the risk of long-term effects.”¹⁰⁹ Thus, in characterizing benzene concentrations in Texas City, the Section stated: “While we would not expect these benzene concentrations to result in any immediate health effects, exposure to high benzene concentrations contributes to cumulative (lifetime) exposures.”¹¹⁰ The Section frequently concludes that “additional long-term air monitoring is needed to characterize” the levels of the toxic pollutant.¹¹¹

In the final analysis, the TCEQ appears reluctant to act when the Section’s health risk assessments are at all equivocal and even when the Section repeatedly suggests that emissions reductions are necessary. As explained below, this reluctance to take action based on uncertain scientific information is not easily explained as a legal matter in light of the precautionary language in the agency’s statute. Even less explicable is the agency’s reluctance to at least test its authorities in court to determine whether a precautionary reading of the statutory language is warranted. It is, of course, possible that the reluctance to act in the face of equivocal risk assessments is merely an excuse to avoid confrontation with powerful economic and political actors. If that is the case, then the solution may be for other governmental actors, like the City of Houston, to seize the initiative or for the Texas Legislature to enact strong citizen suit provisions that allow affected individuals to enforce the laws against violators.

3. Difficulties in Isolating Sources of Emissions

Once a toxic hot spot has been identified and the health hazard clearly established, it remains a challenge to isolate the sources of the emissions that caused the elevated concentrations at the hot spot. Stationary monitors are at the mercy of the winds, and a high reading at a stationary monitor can disappear if the wind shifts slightly to a different direction. Over time, mobile monitoring efforts

can point the finger in the direction of suspected sources, but data from mobile monitors can rarely support conclusions with a sufficient degree of certainty that TCEQ is willing to take legal action. At best, downwind monitoring can isolate units that are strongly suspected of being the source of hot spots. Consequently, once a hot spot is identified and characterized, a more intensive investigation is required to identify the particular source or sources of emissions that cause the high ambient levels of toxic chemicals. For example, although the Mobile Source Monitoring Team suspected that an API Separator at the Marathon Oil facility was responsible for a persistent benzene hot spot in Texas City, TCEQ could positively identify the separator as the source only after the Region 12 Fugitive Monitoring Team conducted an intensive investigation and discovered that the north side of the separator contained small cracks from which a variety of VOCs, including benzene, were being emitted. (See Appendix A for further details.) Such investigations are quite resource-intensive, and TCEQ lacks sufficient personnel to conduct many investigations with that degree of intensity.

Legal Difficulties

On those relatively rare occasions where the agency risk assessment staff ultimately concludes that a toxic hot spot requires further action to reduce emissions, the agency’s authority to require the companies to take action is not always clear. If the agency can prove that the hot spot has resulted from a violation by one or more facilities of a permit condition or a previously promulgated rule, the agency can require corrective action by filing an enforcement action and forcing the offending facility to come into compliance.¹¹² Otherwise, the agency faces a serious dilemma. The agency knows that emissions from one or more sources are contributing to ambient concentrations of a toxic pollutant that present unacceptable risks to public health, but it cannot prove in court that any one of them is in violation of any established rule or permit requirement. It is in this altogether too common scenario that existing enforcement authorities may be insufficient to ensure the quality of Texas’ air.

1. Permits for Stationary Sources of Hazardous Air Pollutants

The state agency with primary responsibility for protecting air quality in the Houston Petrochemical Complex is the Texas Commission on Environmental Quality (TCEQ).¹¹³ Its legal obligations and authority derive from the Texas Clean Air Act and its implementing regulations, but many

of those responsibilities reflect requirements of the Federal Clean Air Act and implementing regulations promulgated by the United States Environmental Protection Agency (EPA). Under both statutes, TCEQ imposes technology-based emissions limitations on stationary sources of hazardous air pollutants that are designed to reduce overall emissions of hazardous pollutants from these sources. TCEQ imposes these and other requirements through the various permitting procedures applicable to major sources of air pollution. Because they are not designed to achieve any particular target level of ambient air quality, technology-based standards applied to individual emission units within major sources may not always ensure that the air surrounding these sources is free of unhealthy concentrations of hazardous air pollutants. In fact, in areas where several major sources are clustered and are emitting similar types of air toxics, individual control technologies may not adequately protect local citizens from exposure to concentrations of air pollutants that could be hazardous to their health and welfare.

In Texas, all facilities or sources of air contaminants—no matter how big or how small—are required to obtain some form of authorization to operate, unless they belong to a dwindling class of grandfathered facilities.¹¹⁴ Although the permitting regime for air emissions in Texas consists of an especially (perhaps needlessly) complex array of general and specific legal requirements, the bottom line is that all unauthorized air emissions are unlawful. Authorization can take the form of a permit or a claimed exemption from permitting. Each permit contains a list of limitations on authorized emissions. These limitations are specified either *generally* in broadly applicable rules governing various types of sources or *particularly* in facility-specific permits. In either case, the permit or the exemption constitutes an authorization to operate, and the terms of the permit or the criteria for exemption constitute emissions limitations applicable to sources and facilities.

Most construction and modification of new and existing sources of air contaminants in Texas are authorized by *Permits by Rule* (PBRs).¹¹⁵ PBRs are available for facilities or sources that the agency has found will not significantly contribute to air contaminants when constructed and operated in accordance with conditions set out in the

general rules.¹¹⁶ TCEQ regulations also create PBRs for changes in otherwise permitted facilities as long as the new or increased emissions from the changes for which the PBR is sought do not exceed 6.0 pounds per hour and ten tons per year of certain air contaminants. Small facilities, like laundromats and beauty shops, that emit minimal amounts of air contaminants are authorized under separate rules exempting *de minimis* facilities from the permitting process.¹¹⁷

All facilities that are neither exempt nor permitted by rule must obtain authorization for their emissions under either

the *new source review* (NSR) program¹¹⁸ or the flexible permit program.¹¹⁹ NSR permits incorporate all applicable state and federal technology-based emissions limits, including those set out in the EPA-promulgated National Emissions Standards for Hazardous Air Pollutants (NESHAPS). In addition, NSR permits include general conditions specified in TCEQ regulations¹²⁰ and special conditions that are particular to each NSR permit.¹²¹ Special conditions may be more restrictive than the requirements otherwise

On those rare occasions where the agency risk assessment staff ultimately concludes that a toxic hot spot requires further action to reduce emissions, the agency's authority to require...action is not always clear. If the agency can prove the hot spot has resulted from a violation...of a permit condition or a previously promulgated rule, the agency can require corrective action.... Otherwise, the agency faces a serious dilemma.

specified in TCEQ regulations for the permitted facility.¹²² Applicants for NSR permits must publish notice of their intent to construct a new facility, modify an existing facility, or renew an NSR permit unless the TCEQ finds that the new facility or modification will not “significantly affect ambient air quality” or “cause a condition of air pollution.”¹²³

A facility may seek a *flexible permit* in lieu of an NSR permit. The purpose of flexible permits is to allow operational flexibility by establishing pollutant specific emissions caps for a facility and then allowing the operator to adjust and update its operations as it sees fit, as long as the facility's emissions stay within the emissions caps. Facilities operating under a flexible permit must comply with all applicable federal requirements, such as the federal NESHAPS,¹²⁴ but facility operators otherwise have extraordinary control over the terms of flexible permits. As with NSR permits, flexible permits may contain general and special conditions. In particular, the TCEQ may include in a flexible permit

special conditions that “may be more restrictive than the requirements of this title.”¹²⁵

In addition to the applicable technology requirements, TCEQ permitting officers must also ensure that emissions from a permitted facility do not cause or contribute to “air pollution,” a term that is defined to mean “the presence in the atmosphere of one or more air contaminants or combination of air contaminants in such concentration and of such duration that ... are or may tend to be injurious to or to adversely affect human health or welfare.”¹²⁶ In this connection, TCEQ and its predecessor agencies have developed the ESLs for particular toxic pollutants.¹²⁷

In addition to the state imposed authorization process for emitting air contaminants, Title V of the 1990 Clean Air Act Amendments requires all major stationary sources to obtain an operating permit to continue in operation. Title V was intended to enhance compliance with and enforcement of applicable state and federal pollution control standards, and to encourage and promote public participation in the permitting process. This was to be accomplished by requiring operating permits for all major stationary sources, as well as a variety of other significant operations, that incorporate all applicable standards in one document. Before the Title V program was implemented, it was often extremely difficult and time consuming to identify all applicable standards for any given facility, because major stationary sources are often very large, with a variety of process operations and potentially thousands of possible emissions sources, and a multitude of state authorizations available for each source. Title V operating permits must at a minimum include a comprehensive list of applicable standards, monitoring and reporting requirements, and compliance assurance certificates.¹²⁸

2. Available enforcement authorities

The Texas air pollution statutes provide TCEQ with several legal tools for protecting the public health from hazardous air pollutants. These authorities are applied in the first instance by TCEQ inspectors who may issue a Notice of Violation to sources that are out of compliance with a relevant permit requirement or are responsible for creating a condition of air pollution in areas outside the facility boundaries. If the source contests a notice of violation, the matter is referred to the Texas Attorney General for prosecution.

a. Section 382.085

In response to air toxics hot spots, TCEQ has in the past relied primarily on its authority under § 382.085 of the Texas Clean Air Act to prevent emissions of air contaminants that cause or contribute to “pollution.” That critical section provides:

(a) Except as authorized by a commission rule or order, a person may not cause, suffer, allow, or permit the emission of any air contaminant or the performance of any activity that causes or contributes to, or that will cause or contribute to, air pollution.

(b) A person may not cause, suffer, allow or permit the emission of any air contaminant or the performance of any activity in violation of this chapter or of any commission rule or order.

The term “air pollution” is defined to mean:

the presence in the atmosphere of one or more air contaminants or combination of air contaminants in such concentration and of such duration that:

(A) are or may tend to be injurious to or to adversely affect human health or welfare; or

(B) interfere with the normal use or enjoyment of animal life, vegetation or property.¹²⁹

When the agency attempts to rely upon § 382.085, however, the sources invariably maintain that the air pollution is not of “such concentrations and of such duration” as to adversely affect human health or welfare. In the alternative, companies have argued that § 382.085 is inapplicable because all emissions from their facilities are “authorized” and that it is up to the TCEQ to prove otherwise. Each of these responses poses a substantial impediment to effective enforcement in cases in which the agency cannot point to a specific violation of a permit or rule. The legal vitality of these arguments is addressed in more detail below.

Section 382.085(a) is triggered only when there is a condition “air pollution” that is “in such concentration and of such duration” that it is or “*may tend* to be injurious to human health” (emphasis added). The “duration” requirement could be read to require some sustained monitoring before TCEQ can establish that the requirement is met. On the other hand, if TCEQ detects high levels of a toxic pollutant over a day or more and there are no upset reports or other similar explanations

from nearby facilities indicating that the event was transient in nature, TCEQ could persuasively argue that the monitoring results are fairly representative of conditions at the location. The health effects requirement should also not impede too many enforcement claims. While TCEQ does need to show that the air pollution is significant enough to have the potential for harm, this definition does not require TCEQ to prove or even allege that the air contaminants are in fact causing health effects. If health-based ESLs are violated on a random sampling day,¹³⁰ TCEQ should be able to satisfy this precautionary requirement.

Under section 382.085(a), it is not clear who has the burden of proving whether the emissions contributing to the condition of air pollution are or are not authorized. One very logical interpretation of the statute is that it requires TCEQ to prove merely that a party is contributing to the relevant air pollution and that TCEQ has no evidence to suggest that the emissions are authorized. The defendant(s) would then have responsibility for accounting for the pollution emitted from each of their facilities and to prove that all such emissions were authorized. Under this interpretation of section 382.085, it should be a powerful tool in TCEQ's enforcement arsenal.

If, however, the statute is interpreted to place on TCEQ the burden of proving that the excessive emissions are in fact unauthorized, then the provision will only be available in extraordinary circumstances where TCEQ can point to evidence that a substantial portion of the problematic emissions are in violation of particular permit requirements. Even with unlimited resources, TCEQ could not use the provision to remediate hot spots if it needed to verify that the problem pollutants were unauthorized before filing an enforcement claim. Because compliance depends on detailed knowledge of the day-to-day operations inside the facility and of the sometimes very lengthy history of the source's permit applications, TCEQ will not be able to determine whether emissions are the result of noncompliance unless they occur suddenly and in such excessive concentrations that TCEQ can establish that the facility is in a state of virtual continuous noncompliance (e.g., a substantial unreported upset when the conditions lead to acute and sudden adverse health effects in surrounding communities).¹³¹

The legislative history of section 382.085(a) is insufficiently clear to determine whether the legislature intended to make the "except as authorized" an element of TCEQ's case or an affirmative defense.¹³² Likewise, there is no legislative history to indicate whether the legislature intended the provision to provide broad remedial enforcement powers

or, instead, to be available only for extraordinary circumstances where a polluter's lack of compliance with the standards is clear. The Texas courts have not clarified the ambiguity. Although section 382.085(a) is nearly thirty-five years old, only a few cases have been decided under the provision, and none have considered or resolved who has the burden of establishing that emissions are authorized or unauthorized.¹³³ TCEQ has not promulgated an interpretive rule or otherwise offered its own administrative guidance on who has the burden of proving that problematic emissions are or are not "authorized." In its hundred-plus administrative enforcement proceedings, however, TCEQ appears to have interpreted this provision to require, at most, only a general allegation of a violation to support a section 382.085(a) enforcement claim.

b. Nuisance Claims under 30 TAC 101.4

The agency has also relied on its regulatory authority to prevent nuisance conditions as an enforcement tool when faced with air toxics hot spots. TCEQ's common law authority to enforce against a nuisance is bolstered by 30 TAC 101.4. This rule states:

No person shall discharge from any source whatsoever one or more air contaminants or combinations thereof, in such concentration and for such duration as are or may tend to be injurious to or to adversely affect human health or welfare, animal life, vegetation, or property, or so as to interfere with the normal use and enjoyment of animal life, vegetation, or property."¹³⁴

While this provision still requires proof of concentration and duration, it applies to any discharge "whatsoever," not just to unauthorized emissions. Moreover, the standard of harm in this provision is similar to that employed in section 382.085(b) and is significantly lower than that required for enforcement under section 382.085(a). Emissions that cannot be proven to pose a risk to human health may nonetheless clearly interfere with the normal use and enjoyment of property in the vicinity of the facility. In Texas, a nuisance is a condition that substantially interferes with the use and enjoyment of land by causing unreasonable discomfort or annoyance to persons of ordinary sensibilities attempting to use and enjoy the land.¹³⁵

Whether TCEQ proceeds under section 101.4 or under the common law of public nuisance, compliance with a TCEQ permit is unlikely to be a defense to the action. In ruling on a private claim for common law nuisance, a Texas court of appeals held that even permitted emissions can constitute a

nuisance and that the permit is no defense to suit by a third party under the common law.¹³⁶ Although the TCEQ might be a less sympathetic plaintiff in a case in which it is alleging nuisance and the defendant is claiming compliance with a TCEQ permit as a defense, there is nothing in the court's opinion or reasoning that suggests that the defense should prevail even in a nuisance action brought by TCEQ. Perhaps more importantly, the fact that the facility has a permit should in no way limit the authority of a city, county or other entity with authority to bring a public nuisance action.

Texas courts have had very little opportunity to determine what constitutes conditions that “are or may tend to be injurious to or adversely affecting human health or welfare.” Whether hot spots that pose long-term but generally imprecisely quantified risks to health will meet that criterion remains an open question. The entity bringing the nuisance action would certainly have a strong *prima facie* case that repeated exceedances of short-term health-based or odor ESLs over long periods of time can sufficiently interfere with human health or welfare to constitute a nuisance.

Current TCEQ policy does not appear to require the identification of a complainant before TCEQ can proceed with a nuisance-based enforcement action, if the agency can establish that the discharge adversely affects human health. On the other hand, it is possible that current informal TCEQ policy does require a citizen complaint for nuisance-based enforcement of discharges that have the *potential* to adversely affect human health, or that implicate human welfare concerns. An interoffice memorandum dated December 8, 1993 establishes a two-tiered approach to enforcement against odors under section 101.4.¹³⁷ The primary enforcement concern is with odors that signify emissions that are determined to have an adverse impact on human health. For those odors, the memo states that TCEQ must require the company to remedy the problem immediately, and it should issue a notice of violation (NOV) under section 101.4 within five days, regardless whether there has been a citizen complaint about the odor. For odors that indicate a *potential* threat to human health or that implicate human

welfare concerns, the memorandum says that TCEQ should issue an NOV in citizen complaints only “if exceptional circumstances warrant.”

It is unclear why the Commission has so limited its staff's discretion to bring actions under its general nuisance powers, but it could easily amend this informal policy by writing a new guidance document that eliminates this questionable distinction, and it should do so as soon as possible. In any event, the internal guidance should in no way limit the power of a local governmental entity to bring a public nuisance action under its independent public nuisance powers.

c. Reopening and Revising Permits

One appropriate administrative response to monitored air toxics hot spots in an area where multiple facilities are permitted to emit the relevant pollutants would be to reopen and revise the facilities' permits to ensure that continued compliance with the permits will not result in hot spots in the future. TCEQ's authority to reopen permits is, however, quite limited. Chapter 7 of the Texas Water Code authorizes the TCEQ – after notice and hearing – to revoke, suspend, or revoke and reissue a permit issued under Chapter 382 of the Health and Safety Code (which applies to all air permits) if the permittee is violating any term or condition of the permit and the revocation is necessary to protect the quality of the air in the state or otherwise protect human health and the environment.¹³⁸ Because

TCEQ's authority to reopen permits is quite limited. If TCEQ wrote into each permit a general condition prohibiting all emissions that cause or contribute to a condition of air pollution, regardless of whether the emissions violate any applicable standard or provision of the permit, that requirement would permit the TCEQ to reopen permits of all facilities emitting the relevant pollutants in an area containing a monitored hot spot.

the power to revoke and reissue is limited to cases of permit violations, this provision constrains the TCEQ in substantially the same manner as the limiting interpretation of “authorized emissions” does. However, if the TCEQ wrote into each permit a general condition prohibiting all emissions that cause or contribute to a condition of air pollution, regardless whether the emissions violate any applicable standard or provision of the permit, that requirement would permit the TCEQ to reopen permits of all facilities emitting the relevant pollutants in an area containing a monitored hot spot.¹³⁹

3. Authorized Hot Spots

Air toxic hot spots can result from emissions that are authorized or excused in several ways. First, as part of the permitting process TCEQ does not require an accounting of the total hazardous air pollutants emitted from a facility. Since permit decisions typically do not turn on (or even attempt to quantify) the hazardous air pollutant emissions from an individual or multiple units at a permitted facility, unanticipated hot spots can easily result. Even in the rare cases in which TCEQ attempts to calculate concentrations of hazardous air pollutants at the fenceline, the modeling exercise could be erroneous. It is also possible that a company will err in calculating emissions for purposes of demonstrating that its facility falls below the thresholds applicable to permits by rule.¹⁴⁰

Second, TCEQ may underestimate the cumulative emissions that result from many small, but cumulatively important operations within a plant in the course of permitting the facility by source or by rule. For example, a process vent need not be addressed in the permit if the hazardous air pollutants from the vent do not exceed 0.005 percent by weight of the plant's total emissions of hazardous air pollutants.¹⁴¹ Oil-water separators are also exempted if the tanks meet specified conditions.¹⁴² Other categories of emissions are apparently exempted because the US EPA agreed to exempt certain problematic grandfathered sources.¹⁴³ Cumulatively, these permitted emissions may result in an authorized hot spot.

Third, hot spots may result from excused emissions events, such as upsets, startups, and shut downs, so long as the relevant facilities comply with the requisite laws. Because facilities are required to report an upset to TCEQ only when they estimate that it produced emissions that exceed reportable quantities, there is much room for undetected undercompliance. Upsets below the thresholds need not be reported even though they might cumulatively add considerable pollution to the air in a persistent way. A recent law passed by the Texas Legislature authorizing TCEQ to take action against emissions events that have an "impact on human health" broadens the range of actionable upsets, but it still requires TCEQ to define these terms on a case-by-case, a process that requires considerable resources.¹⁴⁴ Without some external means of validating compliance with upset reporting requirements (such as continuous or frequently recording ambient fenceline monitors), the reporting requirements may be unenforceable as a practical matter at most facilities. If TCEQ does not have the resources to review each of the

hundreds of upset reports to make "excess emissions event" determinations, or if the upsets do not meet the threshold reporting requirements, many upsets will probably fall through the cracks.¹⁴⁵ Since TCEQ has the authority to restrict emissions from startups and shutdowns regardless of whether the excess emissions cause or contribute to a condition of air pollution, TCEQ conceivably has the authority to restrict excess emissions for more significant startups and shutdowns in hot spot areas without a showing that they are technically necessary to protect public health.¹⁴⁶ However, limited agency resources and the absence of continuous ambient monitoring or some other external means of validating compliance limit the utility of these regulatory provisions as well.¹⁴⁷

Fourth, cumulatively significant sources of fugitive and otherwise exempted emissions can contribute to hot spots, and TCEQ's authorities appear insufficient to control these emission sources in hot spot areas. The facility operator is not required to provide an accounting of the emissions that are released from exempted, unspecified or fugitive sources within a plant. There is no cap or limit on the number of exempted and fugitive sources at a plant, even if that facility is operating in a hot spot area. Although there is considerable variability, the regulations governing some fugitive HAPs allow as much as one year between inspections, and they provide more than one month for subsequent repair. Since the generous inspection schedules for fugitives allow facilities to emit excess emissions without knowing that they are doing so, facilities are likely to record only any excess emissions from the time they first discover the fugitive emissions problem.

Finally, toxic hot spots can result from a combination of emissions from permitted sources, fugitive sources and upsets at more than one facility. In such situations, the operator of each of the relevant sources may take the position that its emissions are authorized and that section 382.085 is therefore inapplicable. Indeed, it is even possible in the case of some toxic pollutants like benzene that concentrations in a toxic hot spot are partially attributable to emissions from mobile sources. In the industries' view, toxic hot spots that result from such combinations of authorized emissions are not unlawful, and TCEQ is therefore powerless under § 382.085 to act, even where the toxic hot spot constitutes a "condition of air pollution."

4. Unauthorized, but Unprevented Hot Spots

Difficulties with enforcing emissions limitations in the petrochemical complex may also contribute to the existence of toxic hot spots. Most of the emission requirements for hazardous air pollutants are self-enforcing, which means that it is up to the facility to document and ensure compliance. Beyond the mandatory reporting requirements, TCEQ can discover that a facility is violating the applicable requirements only: (1) when TCEQ notices differences in air quality (i.e., odor, opacity, acute adverse health effects); (2) when TCEQ conducts mobile toxics monitoring at or near the fence line; or (3) when TCEQ conducts unannounced inspections of the facility. All of these activities are resource-intensive, and they are in any event incapable of detecting all, or even a large portion, of the unauthorized emissions that probably contribute to many of the toxic hot spots that plague the Houston Petrochemical Complex. Again, the primary culprits are fugitive emissions and emissions associated with upsets and maintenance events. Recently enacted legislation that strengthens TCEQ's authorities to address upset problems has done little to remedy this gaping hole in its enforcement capabilities.¹⁴⁸

In many situations that occur with some frequency in complex facilities, like spills of liquids onto the ground and overflows of tanks or barrels, the likelihood of TCEQ detecting a facility's failure to report one or more upsets is quite low because continuous emissions monitoring is not required (or in many cases impossible) and no one is conducting continuous air quality monitoring in the close vicinity of the plant where the resulting hot spot would occur. Facilities have little incentive to identify and report upsets in these situations because a pattern of upsets suggests that they were in fact preventable, and that may lead to fines and greater regulatory oversight. Complaints from neighbors about smoking flares and strong odors in the middle of the night are denied by the facility the next day, and there is rarely any tangible evidence to rebut the denial. It is also difficult for the agency to support a conclusion that an upset involved a reportable quantity, because the amounts involved are frequently based on little more than back-of-the-envelope company estimates. Since it is very difficult reliably to validate or disprove this estimate, the incentive to err on the side of underestimation is strong.¹⁴⁹ This incentive is only enhanced by the low penalties typically levied against the facilities that are caught in the act of underreporting.¹⁵⁰ Consequently, the

upsets that are reported may represent only a fraction of the total universe of significant upset events.

When companies do monitor emissions from particular units on a continuous basis, they record any upsets as they occur, and they must report upsets involving emissions of greater than a reportable quantity to TCEQ. When upsets are reported, however, they are almost always excused, because it is very difficult for TCEQ to demonstrate that any particular upset was preventable or excessive. It is hard to show that an upset was foreseeable without intimate knowledge of the facility's design and operations and considerable information regarding the events preceding the upset, much of which may not be documented. Only when it has evidence of repeated upsets from the same unit over a short period of time is TCEQ well situated to support a finding that the upsets were preventable or excessive.

TCEQ faces similar obstacles in monitoring compliance with startup and shutdown requirements. If anything, emissions from these non-routine events are monitored even less carefully because the emissions monitoring equipment is presumably shut down along with the relevant unit. Emissions from emptying tanks and cleaning out towers and equipment are not channeled through a monitorable emissions control system. Companies are only required to "estimate" the length of time for the maintenance, start-up, or shutdown and the quantities of unauthorized, but excused emissions that will occur during that period of time. Final records of "estimated" reportable and unreportable exceedances resulting from startups and shutdowns need only be prepared within 2 weeks of the operation and stored on-site.¹⁵¹ If a maintenance activity did cause an expected release of a reportable quantity, after-the-fact notification must be provided to the regional office.¹⁵² Unless a TCEQ inspector is located at the scene during shutdowns and startups, there is no practical way to refute a facility's estimates or determine whether it complied with the relevant requirements.¹⁵³

Compliance with fugitive emissions control requirements is generally determined by whether a number of separate technology-specific requirements are in place and operational. Since the performance of these requirements often varies over time (as equipment seals wear out, etc.) and might not be easy to detect through visual inspection, many of the enforcement difficulties outlined above for upsets also hamper TCEQ oversight of fugitive emissions compliance. Monitoring requirements in EPA's fugitive emission rules require, at best, periodic monitoring of the

plant's equipment to make sure it is operable.¹⁵⁴ For some fugitive control requirements (e.g., process vents), the facility can select from among several specified control technologies to establish compliance, and some of the regulatory requirements apply only at particular times during a process or industrial activity.¹⁵⁵ Requirements for internal inspections vary, but in many instances they are quite minimal.¹⁵⁶ It is also not clear from the regulations how thorough these inspections must be or how effective they are, even when done well. Once problems are detected under some regulations, the facility has forty-five calendar days to repair the problem.¹⁵⁷ Presumably excess emissions in the interim are considered “upsets” and exempted from penalties.¹⁵⁸

Conclusions

In attempting to control hazardous air pollutant emissions to control toxic hot spots, TCEQ faces formidable technical and legal difficulties. On the technical side, perhaps the greatest impediment is the absence of comprehensive monitoring. The stationary monitors in the Community Monitoring Network are too few and far between to be of much use in detecting toxic hot spots. TCEQ has a highly professional and well-equipped mobile monitoring team, and it makes good use of it in the Houston Petrochemical Complex. The industrial facilities in the area, however, are by-and-large unwilling to undertake significant emissions reductions actions based on the results of the sporadic visits that the mobile monitoring team can undertake with the limited resources available to them.

TCEQ's Toxicology and Risk Assessment Section also faces formidable technical challenges in characterizing the risks posed by toxic hot spots in the vicinity of large petrochemical facilities. It is, of course, critical that the mobile monitoring results be accurate and representative, and the mobile monitoring team is especially careful to ensure the quality of the monitoring data. Unfortunately, this sometimes means that otherwise disturbing results must be discounted because of the team's doubts about their accuracy. The Section also lacks adequate benchmarks for determining the extent to which the concentrations of toxic chemicals in hot spots pose a threat to human health. It is at great pains to caution observers that the ESLs that it has promulgated and is in the process of revising are not legally binding standards and that exceedances do not necessarily signal an unacceptable risk to exposed individuals. Lacking benchmarks, the Section seems quite reluctant to call for action beyond additional information gathering. On the relatively rare occasions in which it does recommend emissions reductions, its suggestions are generally ignored

by upper level decision makers who are in a position to take action.

One of the reasons that the agency may be reluctant to act to reduce emissions in the vicinity of hot spots is the difficulty that it faces in identifying particular sources of those emissions. Isolating emissions sources is a difficult and resource-intensive business when there is only a single suspect facility. When multiple facilities emit the same hazardous air pollutant, it can be virtually impossible to identify the culprit or culprits as the sources vigorously point the finger at one another.

Although the permit program that TCEQ administers encompasses nearly every significant source of hazardous air pollutants in the Houston Petrochemical Complex, it has proved incapable of preventing toxic hot spots that endanger the health of many members of the community. Doubts about the legal validity of relying on the agency's most effective enforcement authorities have to some extent paralyzed the agency from pursuing avenues outside of the fairly circumscribed permit process. The permit process itself appears incapable of preventing toxic hot spots for several reasons. For the many reasons discussed above, it is possible that emissions that permits authorize can result in hot spots. Unfortunately, the enforcement tools available to TCEQ, especially in the context of fugitive emissions and emissions associated with upsets and maintenance, are insufficiently robust to detect and prevent unauthorized emissions. Finally, TCEQ may reopen an existing permit only upon a difficult-to-support finding that the facility is violating one or more of its permit requirements. All of these impediments combine to yield a permit process that permits too many hazardous air pollutant emissions and inadequately addresses emissions that it does not permit.

An Industry-Dominated Political Culture

Texas officials charged with protecting the public from toxic air pollution do not have the most basic tools necessary to that task—such as monitoring resources and enforceable standards—primarily because the petroleum and chemical industries have a powerful influence over policy-making at the legislative and regulatory levels and have frequently attempted to hide or prevent the generation of information both on the amount of pollutants specific facilities release and on the health impacts of air toxics on the surrounding communities. Illustrative of the industry's power in Texas politics is the history of the ill-fated bill that the late Rep. Joe Moreno introduced in the Texas Legislature in the wake of the *Houston Chronicle's* January

2005 series of investigative articles on air toxics in southeast Houston neighborhoods. Moreno's bill was quite comprehensive, and it would have remedied many of the problems (highlighted in the previous section) that render state officials essentially powerless to hold companies accountable for endangering the public health with toxic releases. Most importantly, the bill would have:

- required facilities that release hazardous air pollutants to set up daily fenceline monitoring of all such pollutants and maintain records of the data recorded;¹⁵⁹

- authorized TCEQ officials to inspect facilities' monitoring equipment and monitoring records;¹⁶⁰

- directed TCEQ to adopt new ESLs that meet certain standards designed to provide a much higher margin of public safety by, *inter alia*, accounting for "all acute and chronic health effects" of exposure at the fenceline of emission sources and not increasing the cancer risk of exposed persons by more than one in one million;¹⁶¹

- made the ESLs enforceable standards and directed TCEQ to impose penalties or injunctions on companies that violate the standards and to publish an annual report cataloguing each violation;¹⁶²

- provided a clear definition of a "condition of air pollution" based on the acute and chronic health risks of exposure to one or more pollutants;¹⁶³

- prohibited any action that "either in isolation or in conjunction with air contaminants from other sources" causes or contributes to a condition of air pollution;¹⁶⁴ and

- where TCEQ initiated an enforcement action for a violation of air quality rules, placed the burden on the facility owner or operator to demonstrate that the facility was in compliance with the applicable requirements.¹⁶⁵

Thus, Moreno's bill would have finally put into place three elements essential to the an effective regulatory regime: definitions and standards that make clear the responsibilities

of regulated entities for minimizing the public health and environmental harms resulting from their business activities, a monitoring regime to determine whether regulated entities are fulfilling these responsibilities (through fenceline monitoring and reporting requirements), and enforcement mechanisms for punishing and deterring violations (by creating standards enforceable by penalties and placing the burden of proof on the regulated entity). But industry opposition to the bill ensured that this much-needed legislation was never considered by the full House of Representatives. In fact, the bill did not even receive a

hearing in the House Environmental Regulation Committee,¹⁶⁶ which, as Robin Schneider of the Texas Campaign for the Environment put it, "has become a graveyard committee where most bills go to die."¹⁶⁷ Ms. Schneider observed that "[m]oney talks over there, and the people that fight the polluters don't have nearly the money that they have."¹⁶⁸

In public statements, at the Senate committee hearing on a bill identical to Moreno's, and in all likelihood at meetings with government officials, industry representatives decried the bill on a familiar litany of grounds. Jon Fisher, a long-time lobbyist

for the Texas Chemical Council (the trade association for chemical manufacturers), testified before the Senate Natural Resources Committee that the bill was not based on "good science" and further stated in a subsequent interview that the bill was "ill-conceived" because industry is not the sole cause of air pollution.¹⁶⁹ Fisher's first argument was entirely beside the point, because the bill is not based on science—"good" or "bad." Rather, the bill requires companies to generate "good" scientific information on the nature and extent of their emissions, and it allows officials to rely on "good" science (such as toxicological and epidemiological studies on the health risks presented by different levels and durations of exposure to pollutants) in implementing its provisions. Presumably, industry would not (at least publicly) disavow the wisdom in relying on science in implementing a health and safety code.¹⁷⁰ Fisher's second argument is likewise misplaced. It is simply irrelevant that industry is not the sole cause of air pollution; it is

Industry representatives even went so far as to question the need for any reforms, insisting in light of manifest evidence to the contrary that the current system is working well. To be sure, the current system's weak or non-existent requirements and scant oversight are working quite well for the oil and petrochemical industries, at least so far as their profit margin is concerned. But as the Chronicle series made painfully apparent, the system has failed Texas residents.

undeniably a major cause with the ability to minimize its contribution to the problem.

The Texas Chemical Council further claimed that the bill's standards would be impossible to meet, and that its monitoring requirements would be too expensive.¹⁷¹ Both of those claims are highly questionable given that, as Representative Farrar, who co-sponsored the bill, pointed out, other states have similar rules and requirements in place.¹⁷² In fact, Texas's ESLs for some air toxics, including 1,3-butadiene, are hundreds of times higher than the limits imposed by other states.¹⁷³ For example, in New Jersey, which, like Texas, is home to many industrial complexes situated near residential areas, standards for levels of air toxics are based on the same cancer risk metric prescribed in the Moreno bill—i.e., one additional cancer case per 1 million people.¹⁷⁴ Texas's ESL for butadiene is over 300 times greater than New Jersey's standard for the chemical.¹⁷⁵

Industry representatives even went so far as to question the need for any reforms, insisting in light of manifest evidence to the contrary that the current system is working well.¹⁷⁶ To be sure, the current system's weak or non-existent requirements and scant oversight are working quite well for the oil and petrochemical industries, at least so far as their profit margin is concerned. But as the *Chronicle* series made painfully apparent, the system has failed Texas residents, particularly those living in fenceline communities over which toxic hot spots routinely migrate.

Ultimately, however, the merit of industry's justifications for its opposition to the reforms in Moreno's bill is undoubtedly not what led to the failure of the legislation: it is the fact of industry opposition and the significant amount of money that oil and chemical companies give to Texas legislators and the firms that lobby them. In 2004, the petrochemical industry contributed more than \$600,000 to the campaigns of Texas legislators and officials and, during the legislative session in which Representative Moreno introduced his bill, paid Texas lobbyists between \$1.2 and \$2.1 million.¹⁷⁷ Consequently, as Representative Farrar told a *Chronicle* reporter after it had become clear that Rep. Moreno's bill would die in committee, the Texas Legislature "has been very protective of industry at the expense of the health of its citizens."¹⁷⁸

Tellingly, while the House Environmental Regulation Committee permitted Moreno's bill to languish, the committee held hearings on and quickly reported to the full House an industry-friendly bill that had been referred to the committee at approximately the same time as Moreno's bill.¹⁷⁹ Authored by committee chairman Rep. Dennis

Bonnen and championed by oil and chemical industry lobbyists, the bill relaxes the requirements for reporting emission "upsets."¹⁸⁰ At hearings in both the House and Senate (in which Sen. Ken Armbrister introduced an identical companion bill), lobbyists representing ExxonMobil and three of the state's principal trade associations for polluting industries—the Texas Chemical Council, the Texas Oil and Gas Association, and the Texas Association of Business—testified in favor of the legislation.¹⁸¹

In the meantime, Sen. Mario Gallegos (who had proposed in the Senate a bill identical to Moreno's) attempted to salvage at least some of the crucial protections in Moreno's bill by offering a watered-down version that he thought the oil and petrochemical industries would be more likely to accept.¹⁸² In particular, this compromise version required that ESLs be set at a level that posed a 1-in-100,000 cancer risk (versus the 1-in-1-million risk provided for in the original bill).¹⁸³ Gallegos explained that, "[i]n the end, a less stringent bill is better than no bill, and we are running up against a number of legislative deadlines."¹⁸⁴ But the Texas Chemical Council's Jon Fisher made clear that the industry preferred no bill at all, stating that the much more lenient (and less protective) 1-in-100,000 cancer risk level remained unattainable for some chemicals.¹⁸⁵ In light of this and other "fundamental problems" that remained with the legislation, Fisher stated that it was doubtful that a consensus could be reached before the upcoming legislative deadlines.¹⁸⁶ "It's pretty late in the session for something like this," he said.¹⁸⁷ It was apparently not too late, however, for legislators to rush to meet the same deadlines for the industry-supported bill relaxing requirements for reporting of upset emissions, which passed the Senate with just minutes to spare.¹⁸⁸

Moreno's bill was certainly not the first legislation protective of public health and the environment to fall victim to attacks by the oil and chemical industry representatives that dominate the Texas Legislature.¹⁸⁹ But the mere existence of the bill—albeit brief—is nevertheless noteworthy because, as John Wilson, executive director of the Galveston-Houston Association for Smog Prevention, observed, "This is the first time a bill of this scope has been introduced into the legislature."¹⁹⁰ Although Moreno's bill may be the first of its kind in the Texas Legislature, the danger presented by air toxics, and thus the need for such legislation, have long been well understood by environmental groups and experts in the fields of public health and toxicology.¹⁹¹ As Neil Carman of the Sierra Club stated in stressing the importance of the bill, "We've been wanting to see something happen on this for a long

time.”¹⁹² “But,” he further explained, “until the *Chronicle* series, it wasn’t a big enough public issue.”¹⁹³

In addition to the *Chronicle* series, another recent phenomenon has helped to propel into the public sphere the problem of air toxics and the myriad failures of state officials to address it; namely, the willingness of Houston officials to use their authority to step into the state governmental void and hold industry accountable. After the *Chronicle* series on its monitoring of airborne toxics in Houston communities and a subsequent TCEQ report confirming the newspaper’s findings, Mayor William White convened a special session of the City Council attended by TCEQ officials and representatives of companies that own some of the worst-polluting facilities in the areas of concern.¹⁹⁴ Mayor White urged the state officials to act faster to protect the public from toxic pollutants and called on the companies to submit plans on emission reductions and the development of an enforceable system of accountability.¹⁹⁵ He subsequently presented a multi-year proposal that outlined initiatives the city would take to curb Houston’s air pollution, stating that “[t]his is a sea change in attitude”¹⁹⁶ for city officials. “We will make sure on our own that the air is safe.”¹⁹⁷

With true investigative reporting that serves as the public’s watchdog over government and industry, and local officials prepared to act in the public’s interest when state (and federal) officials permit profit-driven entities to dictate policy-making, Houston residents appear to have begun a promising effort to end the long-standing domination of the state’s political culture by the oil and chemical industries. This will, however, be a significant struggle given the financial clout that industry actors have long been wielding in this state to firmly entrench themselves in the centers of power. Before elaborating on efforts by *Chronicle* reporters, city officials and residents to make Houston’s air clean and safe to breathe, it is necessary to explain the current political context in which they are working.

The Current Dominant Political Actors and the Culture of Impunity

Texas is the nation’s leading producer and refiner of crude oil.¹⁹⁸ With a combined capacity of 4.6 million barrels per day, the state’s refineries account for about 26 percent of the nation’s total petroleum-refining capacity¹⁹⁹ and about 5.6 percent of world capacity.²⁰⁰ As the petroleum products that refineries make from crude oil are the raw materials for petrochemicals, it makes sense that Texas also leads the nation in production and export of chemicals.²⁰¹ In light of these statistics, it is not surprising that major

refining and chemical facilities of some of the most powerful corporations in the U.S.—and, indeed, the world—are located in Texas. Some of these major national operations are among those emitting the highest levels of benzene and 1,3-butadiene in the three areas of focus in this report—i.e., Texas City, Baytown/Lynchburg Ferry, and Milby Park. As noted at the beginning of this report, the most recent TRI data submitted by the facilities in these three areas indicates that:

- The petrochemical facilities in Texas City emitting the highest levels of benzene are owned by five corporations: (1) BP, (2) Dow Chemical Company, (3) Valero Energy Corporation, (4) Marathon Oil Corporation, and (5) Sterling Chemicals, Inc.
- The facilities emitting the highest levels of benzene in the Baytown/Lynchburg Ferry area of southeast Houston are owned by four corporations: (1) ExxonMobil Corporation, (2) Chevron Corporation, (3) ConocoPhillips, and (4) DuPont Company.
- The facilities in Milby Park emitting the highest levels of 1,3-butadiene are owned by two corporations: (1) Texas Petrochemicals and (2) Goodyear Tire & Rubber Company.

ExxonMobil is the world’s largest publicly traded oil company,²⁰² and its Baytown facility is the largest refinery in the United States.²⁰³ BP, the world’s second largest publicly traded oil company,²⁰⁴ runs the nation’s third largest refinery in Texas City.²⁰⁵ Last year ExxonMobil earned profits of \$36.13 billion,²⁰⁶ the highest in U.S. history, surpassing its own record in 2004 of \$25.33 billion.²⁰⁷ Chevron and ConocoPhillips, the nation’s second and third largest oil companies,²⁰⁸ made the fifth and sixth highest profits, respectively.²⁰⁹ The combined total 2005 profit of ExxonMobil, Chevron, and ConocoPhillips was \$63.87 billion—greater than the economies of 131 of the 184 countries ranked by the World Bank.²¹⁰ Within the oil-refining industry, Valero Energy and Marathon Oil ranked fourth and fifth in revenues and profits for 2005.²¹¹ And among chemical companies, Dow Chemical and DuPont captured the number one and two spots in revenues and profits.²¹²

In addition to profits, these corporations rank high in political spending at both the federal and state levels. Since 1990, oil and gas interests have given Republicans over \$139 million, representing 75 percent of the industry’s total contributions to federal parties and candidates.²¹³ In the current election cycle, 85 percent of the industry’s federal

contributions have gone to Republicans.²¹⁴ In the 2004 election cycle, ExxonMobil contributed more to federal politicians than any other oil and gas company, mostly to Republican politicians (specifically, 89 percent of its contributions).²¹⁵ The other oil and gas companies that own the facilities in Texas City, Baytown/Lynchburg Ferry, and Milby Park examined in the report — i.e., BP, Valero Energy, Marathon Oil, Chevron, ConocoPhillips—were all among the top twenty oil and gas company contributors to federal candidates and parties for the 2004 election cycle.²¹⁶

The chemical industry, closely tied to the oil and gas industry because so many chemicals are petroleum-based as well as because of their common interest in weak environmental and public health protections, is also a key contributor to candidates and parties at the federal level. From 1990 to the current election cycle, the chemical industry has given Republicans 76 percent of its nearly \$56 million in federal contributions.²¹⁷ For each of the last four elections cycles, Dow Chemical and DuPont were among the top ten chemical industry contributors, and Goodyear Tire & Rubber was in the top twenty.²¹⁸

Governmental deference to industry has long been a defining feature of the political landscape in Texas, and it is the primary reason that the state's residents remain essentially unprotected from airborne toxics and other dangers of industrial activity.²¹⁹ The corporations that own the highest emitters of benzene and 1,3-butadiene in Texas City, Baytown/Lynchburg Ferry, and Milby Park and other oil and petrochemical companies contribute large amounts to Texas politicians as well federal politicians. Over the past three election cycles—the period from 1999 to 2004—the oil and gas industry contributed significantly more money to Texas candidates and party committees than those of any other state.²²⁰ Specifically, oil companies gave Texas candidates and party committees over \$15 million, representing over one-quarter of the total \$60 million that the industry spent in all fifty states.²²¹ In the 2002 and 2004 election cycles, the nation's three largest oil companies gave Texas legislators, other candidates for statewide office, and party committees around \$382,000, with ExxonMobil contributing nearly \$137,000, ChevronTexaco over \$135,000, and ConocoPhillips almost \$110,000.²²² Over the same time period, BP contributed \$173,000 and Marathon Oil almost \$96,000.²²³ Valero Energy made a particularly steep investment in Texas politics during the two election cycles, contributing \$493,000.²²⁴ Dow Chemical contributed \$170,500, and DuPont contributed \$65,400.²²⁵ In the 2002 election cycle alone, executives and other employees of Sterling Chemicals contributed an astonishing \$1,082,350.²²⁶

Although sizeable, these direct political contributions are only one of the ways that companies use their wealth to exert influence over state policy-making. In fact, companies increasingly use trade associations and other front groups to obscure the extent of their political spending and influence. Three of Texas's most prominent industry associations are the Texas Chemical Council (TCC), the Texas Oil and Gas Association (TXOGA), and the Texas Association of Business (TAB). As noted above, lobbyists for these three industry groups strongly opposed Representative Moreno's bill containing meaningful protections against air toxics as well as Senator Gallego's weakened version, both of which failed, and supported Representative Bonnen's bill relaxing requirements for reporting upset emissions, which sailed through both legislative chambers to the governor's desk. Unfortunately, this extraordinary degree of industry influence is the norm in Texas. As recently noted by Chris Mahon of the *Texas Observer* in his article on the influence of the lobbyists for these three trade groups over legislation, "[t]heir position—for or against a bill—can often determine its fate."²²⁷

In the 2002 and 2004 election cycles, TXOGA made approximately \$647,000 in Texas political contributions,²²⁸ TCC nearly \$89,000,²²⁹ and TAB over \$156,000.²³⁰ Furthermore, all three associations and their corporate members pay lobbyists significant amounts to push the corporate policy agenda. In its study of lobbying expenditures in Texas during 2001, Texans for Public Justice (TPJ) found that the energy and natural resources industry spent a maximum of \$36.2 million and a minimum of \$17.8 million on lobbying contracts, accounting for 17 percent of the state total—more than any other interest category (such as agriculture, single issue, and financial).²³¹ With contracts worth a maximum of nearly \$2 million, DuPont was the number one spender in this interest sector (and third among all companies), and ExxonMobil ranked fifth (and sixth among all companies), spending a maximum of \$1.3 million.²³²

The oil and petrochemical companies and their trade associations employ lobbying firms that wield tremendous political clout in their own right. According to the TPJ report, the lobbyist with the highest maximum income was Baker Botts's Pamela Giblin, who, as a former general counsel of a TCEQ predecessor agency, is in high demand by the petroleum and chemical industries.²³³ Giblin raked in a maximum of over \$2 million in 2001, which includes a maximum of \$25,000 each from almost all of the companies owning the facilities highlighted in this report—ExxonMobil, then-Phillips Petroleum (now ConocoPhillips), then-BP Amoco, then-Chevron, Valero

Energy, Dow Chemical, DuPont, Texas Petrochemicals, Sterling Chemical and Goodyear Tire & Rubber.²³⁴ Baker Botts has long been among the most powerful political players in Texas.²³⁵ One of the founding partners of the law firm is Judge James A. Baker, great-grandfather of James A. Baker III, who was President George H.W. Bush's Secretary of State and, more recently, President George W. Bush's Special Envoy on the issue of Iraq's foreign debt.²³⁶ He is now a senior partner at Baker Botts.²³⁷

As at the federal level, the vast majority of the oil and chemical industries' political spending in Texas goes to Republican candidates and party committees. From 1999 to 2004, oil and gas companies gave the Texas Republican Party more than \$500,000, the third highest among all state parties.²³⁸ The industry spends much more, however, on individual Republican candidates. From 2003 to 2004, eight of the top ten state candidate recipients of oil and gas industry contributions were Texas Republicans, who received a combined total of \$2,748,734.²³⁹ Two chemical companies that own facilities in the areas of focus in this report—Dow Chemical and DuPont—also devote the great bulk of their Texas political spending to Republicans. Dow gave 91.8 percent of its Texas contributions to Republicans in the 2004 election cycle, and 88.7 percent to Republicans in the 2002 election cycle.²⁴⁰ DuPont spent 87 percent of its contributions on Republicans in 2004, and 74.4 percent in 2002.²⁴¹ In these last two election cycles, TXOGA, TCC, and TAB, the three trade associations discussed above, each gave over 85 percent of its Texas political contributions to Republican candidates and party committees.²⁴²

The oil and chemical industries' political contribution strategy appears to be extremely effective. After it became clear that Moreno's bill would not survive committee, some legislators attempted to get the most important parts of the bill enacted in the form of amendments to Bonnen's industry-friendly bill.²⁴³ The House summarily rejected the amendments, with the representatives from Harris County divided along party lines.²⁴⁴ In the last election cycle before this legislative session, the Harris County Republicans who

voted against the amendments received 3 ½ times more in contributions from the oil and gas and petrochemical industries than the Democratic representatives who supported the amendments.²⁴⁵

Emerging Political Actors

In the wake of the *Chronicle* series and the TCEQ report on toxics in Houston's air, Mayor White's office vowed to make protecting the city's residents from this danger a

priority. In his January 2005 State of the City address, he stated that "[c]lean air is a moral and ethical issue, because no one should have the right to make risky chemical alteration to air which they don't own and others must breathe."²⁴⁶ He outlined the city's plan for curbing air toxics, which consisted of three principal initiatives: (1) the generation and maintenance of information on the levels of air toxics and on the health implications of those levels, (2) the formulation of emission-reduction goals based on "objective public health standards," and (3) the readiness of city, county, and other local government officials to enforce

those goals through legal action against the companies that own non-complying facilities.²⁴⁷ The provisions in Representative Moreno's bill requiring companies to conduct fence-line monitoring and TCEQ to develop enforceable emission standards based on health risks would have taken significant steps toward realizing this plan for Houstonians and residents throughout the state. Indeed, such state-wide, extensive legislation is ultimately essential to providing Texans with adequate protection against air toxics.²⁴⁸ Faced with the Texas Legislature's refusal to enact the necessary legislation, however, Mayor White's office and Houston residents have sought protection through other channels.

1. The call for publicly available information on air toxics

Initially, White called for full disclosure to the public of existing information on air toxics and further development of such data to provide the foundation for the city's "battle plans" against air toxics.²⁴⁹ Given that information on air toxics levels and their health impacts is a prerequisite of the

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public's ability to "battle" air toxics in any meaningful way—including the development of enforceable, health-based emissions standards—polluting industries have great incentive both to suppress and to prevent generation of such information. The extraordinary dearth of information on air toxics is among the most deleterious symptoms of the petroleum and chemical industries' pervasive influence at the state level.

a. Information on air toxics levels

Houston industries currently possess a large amount of valuable information on air toxics levels in Houston but have refused to make it available to the public in an unadulterated form. A number of corporations with facilities in the Houston area, including ExxonMobil, ChevronTexaco, BP, Texas Petrochemicals and Valero, fund the Houston Regional Monitoring Corporation (HRM), which has been collecting data on air quality in the Houston region for over twenty years²⁵⁰—longer than any other group in the state.²⁵¹ The corporations have been allowed to withhold this vital data from the public because the state has never required industry to release such information. White's office, however, has publicly called on industry to release the information it already collects as well as to conduct on-site, real-time monitoring and provide the results to the public.²⁵² Although HRM continues to refuse to release the raw data from its monitoring,²⁵³ the city's demand for the information is itself important as a step toward breaking the silence in Texas on air toxics. Further, the city's basis for this demand—that the public has a right to know—assumes that Texas residents—and not the polluting companies—are the ultimate authority regarding air quality in the state. As Mayor White stated, these corporations "don't own the air and they don't own the information."²⁵⁴

Houston residents have also worked to obtain information on air-pollutant levels. For more than a decade, a local group known as the Texas Bucket Brigade has been providing the public with such information using its own "bucket" monitors.²⁵⁵ City officials' strong response to the air-pollution crisis prompted the group to donate to the city and county 28 high-quality monitors that the group bought with money it received from a lawsuit against a Houston refinery.²⁵⁶ Worth over \$25,000, the donated monitors more than doubled the number of city and county monitors.²⁵⁷ At the City Hall meeting in which LaNell Anderson, the group's founder, announced the donation, she told city officials that the group donated the monitors "so that finally someone will hold polluters

accountable and the public can access real data about the health damaging air we breathe."²⁵⁸

b. Information on the health impacts of air toxics

In addition to information on concentrations of air toxics, there is a curious absence of information on the observed health impacts of these pollutants on Texas residents. Maria Morandi, a scientist at Houston's University of Texas School of Public Health, told a *Chronicle* reporter that "when you compare the number and size of studies (on the health impacts of hazardous air pollutants) we're doing with what other states are doing, we are really, really a minor player in this area."²⁵⁹ Several other Houston medical researchers interviewed for an investigative article by the Natural Resources Defense Council (NRDC) agreed that the Texas Medical Center "has taken a hands-off approach to community toxics exposure."²⁶⁰ Particularly in light of the top-notch facilities and research institutions that make up the Medical Center and the concentration of plants emitting toxic chemicals in Houston area, this failure to produce a large body of quality health studies is simply hard to explain. As the NRDC article pointed out, the Medical Center's "see-no-evil attitude stands in contrast to that of other medical research institutes around the country, including Harvard, Johns Hopkins, and Columbia, all of which have undertaken significant research programs in the urban and toxics-exposed communities that surround them."²⁶¹

The fact that the Texas Medical Center lags far behind the nation's other leading medical research centers when it comes to air toxics studies may to some extent be explained by the long-standing ties between the petroleum and chemical industries and the city's premier medical institutions. Oil companies paid for the first facilities of the Medical Center and continue to fund new infrastructure and equipment.²⁶² The president and CEO of the Medical Center, the president of M.D. Anderson (one of the nation's top cancer treatment and research institutions), the president of the University of Texas-Houston Health Science Center, and the president and CEO of Baylor College of Medicine sit next to energy-industry executives on the board of the Greater Houston Partnership (GHP), a large business association.²⁶³ And two oil-industry executives sit on Baylor College of Medicine's board of trustees.²⁶⁴ Lovell Jones, an M.D. Anderson researcher, stated, "There are those who would love to do [air toxics research], including some in industry. But they fear for their careers."²⁶⁵

Thirty years ago, before the harmful health consequences of exposure to air toxics was widely understood, there was apparently a window of opportunity for Houston researchers to initiate studies related to air toxics. In 1976, Eleanor MacDonald, a cancer researcher working for M.D. Anderson, conducted a study of close to 200,000 cancer deaths in the city over a 30-year period and found that the incidence of death from lung cancer was higher in communities downwind of the industrial corridor along the Houston Ship Channel than in other areas.²⁶⁶ When asked about the lack of similar studies over the last three decades, Dr. MacDonald responded that:

When we first began, there was no question, we did what we felt like doing. I never thought to ask anybody if it was alright to go out and do these studies. I went out and did them. But if you had to go and do them now you'd have to do a lot of public relations work first, because some (industry officials) are alert to what it might mean if you stir up something unsavory about their situation.²⁶⁷

Given the gravity of her findings, MacDonald stressed in her 1976 report the need for further studies of the “carcinogenic potential ... of the environment.”²⁶⁸ For the following 30 years, that call has remained effectively unanswered in a city with a world-renowned medical center. A full 20 years after MacDonald’s study, a similar study was conducted, but it was publicly issued only in an “industry-approved” form that obscured its findings indicating significant increased cancer risk due to toxics exposure. More specifically, this 1996 study concluded that elevated levels of air toxics in Harris, Brazoria, and Galveston Counties could cause 12 to 73 people a year to contract cancer.²⁶⁹ The report on the study released to the public “led to none of the town hall meetings, city council hearings and public outcry that have come after recent findings that toxic air pollutants in some communities could increase cancer risk.”²⁷⁰ That is not surprising, given that the study’s conclusions were buried in a 460-page report on a number of environmental issues in Houston.²⁷¹ According to James Kachtick, a committee member who was Occidental Chemical Corporation’s environmental manager, “our goal was ... not to alarm the public on anything.”²⁷² But the 1996 data on air toxics *was* alarming, just as the confirmation of that data by recent TCEQ monitoring is. The difference is that, as Houston’s major print news source, the *Chronicle* disseminated the results of its air toxics monitoring widely without any prior vetting by the companies responsible for the emissions.

To begin to fill the information gap on the health impacts of air toxics exposure in Houston, Mayor White’s office marshaled the expertise of the Texas Medical Center and assembled a Task Force on the Health Effects of Air Pollution in the spring of 2005.²⁷³ In announcing the creation of the task force, Mayor White stated,

Our region is blessed with great scientists, and we need their advice on health risks of pollution, so we have a road map to reduce those risks. We’re going to take on this problem and this is exactly the kind of expertise to help us draw up our battle plans.²⁷⁴

Comprised of eight local public-health and medical experts, the task force evaluated the health risks posed by estimated or measured levels of 176 hazardous air pollutants, ozone, fine particulate matter and diesel particulate matter in and around Houston.²⁷⁵ In its report on its findings, the task force placed the pollutants in one of five risk categories, including “definite risk,” “probable risk,” and “unlikely risk.”²⁷⁶ Benzene and 1,3-butadiene are both among the 12 pollutants that the scientists determined to be “definite risks,” i.e., “substances for which there was compelling and convincing evidence of significant risk to the general population or vulnerable subgroups at current ambient concentrations.”²⁷⁷ Importantly, the task force pointed out that East Houston communities located near many of the region’s industrial sources bear a disproportionate burden of the health risks associated with air pollution.²⁷⁸ A greater percentage of residents in these communities are minorities and poor than residents in the surrounding area.²⁷⁹

The core of any effective “battle plan” against air pollution must be a set of effective and enforceable standards for the industries that are contributing to the problem. As Ira Perry, a spokesman for the GHP (the large business association mentioned above) acknowledged, “If you have standards and guidelines, industry has to respond.”²⁸⁰ Although Texas sorely needs more information about the toxins in its air, there has long been enough information in existence to make clear the need for standards and enforcement.

1. The call for health-based standards and effective enforcement

Fortunately for Houston residents, Mayor White’s office has not waited for the state government to promulgate the much-needed enforceable, health-based standards for air toxics. While Representative Moreno’s bill and its

prescription for such standards remained sequestered in the House Environmental Regulation Committee during the spring of 2005, the city began negotiations with Texas Petrochemicals with the goal of securing a legally binding agreement to reduce emissions to levels considered safe by public health standards.²⁸¹ In explaining the city's motivation for seeking the agreement with Texas Petrochemicals and other emitters of air toxics within the city's jurisdiction, Mayor White stated: "We do not believe the laws, rules and regulations are sufficiently strong to protect human health in all cases. Our interest in entering these agreements is to ...

reduce emissions of a specific pollutant, *above and beyond what is legally required today.*"²⁸²

In December of 2005, the city and Texas Petrochemicals signed such an agreement.²⁸³ David Berg, the attorney who represented the city in negotiations with the company, stressed the significance of this accomplishment, stating to the *Chronicle* that "[t]his is a one-of-a-kind agreement [that] gives us tools that I don't think any other municipality has."²⁸⁴

In exchange for the city's release of the company from legal claims relating to prior emissions,²⁸⁵ Texas Petrochemicals committed to reduce its

emissions of butadiene by 50 percent within the next two years,²⁸⁶ to implement specified technological improvements and leak detection and repair practices to achieve that goal,²⁸⁷ and to monitor emissions of certain equipment and at the facility's fence line and provide the data to the city in a timely manner.²⁸⁸ Most importantly, the agreement gives the city the power to enforce these obligations in court in the event that Texas Petrochemicals fails to meet them.²⁸⁹ Given that Texas Petrochemicals owns the plant with the highest butadiene emissions near a Houston neighborhood where both the *Chronicle* and TCEQ's ambient air monitors measured dangerously high levels of that chemical,²⁹⁰ the city's agreement with the company represents a significant step toward making the air safer to breathe for these Houston residents. According to Berg, the agreement "gets [butadiene] down to a point where the health hazards are almost gone."²⁹¹ The city has every reason, as Elena Marks, the mayor's Director of Health Policy concludes, to be "very proud."²⁹²

The city persisted in its pursuit of the Texas Petrochemicals agreement on behalf of Houston residents notwithstanding what appear to be subtle attempts at intervention by TCEQ on behalf of the company. According to Marks, when the city and Texas Petrochemicals began negotiations, the company's representatives told city officials that one of TCEQ's commissioners was advising the company.²⁹³ Subsequently, in June 2005, TCEQ and Texas Petrochemicals entered into an agreement that, while containing emission-reduction, technological, and monitoring commitments beyond current legal

requirements, is merely voluntary and thus unenforceable by the state.²⁹⁴

After signing this agreement with TCEQ, Texas Petrochemicals cut off negotiations with the city.²⁹⁵ Given Texas Petrochemicals's extensive history of violations, city officials and environmental advocates questioned TCEQ's decision to enter into an agreement with the company that the agency was powerless to enforce.²⁹⁶ Arturo Blanco, director of Houston's Air Quality Bureau, explained his misgivings to the *Chronicle*: "We've had compliance issues with this company, relating to

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leaks, cooling towers and the like, and those didn't happen once, they didn't happen twice, they happened several times.... There have been improvements, but every time we have been there we have uncovered violations."²⁹⁷ Thus, Mayor White sent a letter to the president and CEO of Texas Petrochemicals stating that the company's agreement with TCEQ did not change the city's desire to continue negotiations and enter into an *enforceable* agreement.²⁹⁸ However, according to Marks, Texas Petrochemicals refused, saying "they'd cut a deal with TCEQ and they considered the matter closed."²⁹⁹ "Needless to say," Marks continued, "we didn't consider the matter closed."³⁰⁰ The city then asked Berg, a Houston lawyer who has been nationally recognized for his civil-litigation skills, to represent the city in air-pollution lawsuits, but did not specify any particular company as a potential defendant.³⁰¹ "Within a week of his retention," Marks said, Texas Petrochemicals contacted Berg and reopened negotiations with the city.³⁰²

In response to the concerns raised about TCEQ's failure to insist upon an enforceable agreement, state officials pointed to their ability to police violations of existing regulations and permits.³⁰³ However, according to Blanco, whose Air Quality Bureau inspects plants within the city's jurisdiction, over the past few years city inspectors have reported to the state numerous cases of violations that TCEQ officials dropped.³⁰⁴ Furthermore, agreements outside of the state's regulatory regime are necessary because existing regulations and permits are not sufficient to protect against the health risks of air toxics. As Neil Carman, director of the Sierra Club's Texas chapter and former state air pollution control official, stated, "The whole [permit system] is a house of cards. Otherwise, we wouldn't be seeing these problems after all these years."³⁰⁵

Given the continued failure of the state government to put an effective structure in place to protect the public against air toxics, the city hopes to continue plugging in the holes by entering into additional enforceable agreements with other companies that contribute to the air toxics problem. According to Marks,

We have made, and continue in all forums to make, an open invitation to all industry to enter into [Texas Petrochemicals]-like agreements. Our criteria are (1) commitments to reductions of specific pollutants; (2) commitment of capital and operating expenses to enable the reductions on an agreed timeline; (3) monitoring of emissions and reporting of monitoring data to the City in as close to real time as possible; and (4) legal accountability for failure to meet the commitments.³⁰⁶

At the same time it is seeking enforceable emission-reduction agreements with polluting companies, the city has boosted its enforcement of existing regulatory and common-law obligations. Mayor White declared in his 2005 State of the City address that "if plants have no realistic plans to reduce emissions of air toxics to levels found acceptable by objective public health standards," the city intended to collaborate with other local governments to bring legal actions.³⁰⁷ Since then, in addition to retaining Berg, the city has added two lawyers to its staff to review emission permits and pursue pollution cases.³⁰⁸ At the end of 2004, the city successfully renegotiated its inspection-funding contract with TCEQ to secure an amendment providing the city with authority to bring civil suits against companies that own plants that city inspectors have found to be in violation of pollution control laws.³⁰⁹ Under the contract, the state provided the city with funding to inspect plants within the city and to respond to complaints about

air pollution.³¹⁰ Before the amendment, the city had to refer cases of non-compliance to TCEQ so it could determine whether to pursue enforcement action.³¹¹ The city sought the amendment because of its frustration with TCEQ's slow response and frequent dropping of violations reported by the city.³¹² Marks explained that "[w]e've felt for a long time we couldn't do anything, and yet we have continuous violations and know there's stuff in the air."³¹³

Shortly after the city obtained the amendment affording it a greater enforcement role, Mayor White's spokesman stated that "[t]he mayor believes the state should do a better job of enforcement or give the cities authority to do more enforcement."³¹⁴ The state's willingness to amend its inspection-funding contract with the city could be understood as a recognition that, given inevitable resource limitations (and perhaps not so inevitable political obstacles), effective enforcement sometimes requires pooling the efforts of various levels of government. John Steib, TCEQ deputy director for compliance and enforcement, described the decision to amend the contract as "a common-sense move" because the previous clause was "unnecessarily restrictive."³¹⁵ "We don't ever want to restrict a local entity from using statutory authority," he further stated.³¹⁶

Seven months later, however, when the city's contract was up for renewal, TCEQ apparently changed its mind. Although initial negotiations between city and state officials resulted in an agreement containing the enforcement-authority provision, TCEQ removed the provision from the signed agreement that the agency sent to the city.³¹⁷ The city resumed negotiations over the provision, and ultimately Mayor White and Commissioner Chairwoman Kathleen White reached an impasse over the issue of the city's ability to initiate cases without the state's approval.³¹⁸ In explaining the city's refusal to give up the enforcement authority, Marks stated: "We do not believe it is in the best interest of our citizens for us to give up a powerful enforcement tool. All of the other work we do is only as good as our ability to hold polluters accountable."³¹⁹ Although the city may still inspect plants and bring cases for violations of air pollution rules, it was forced to forgo a funding source for an important part of its air quality program.³²⁰

While the state's refusal to continue providing the city with funding for inspection unless the city conceded enforcement authority is extremely unfortunate, the city's refusal to make that concession because it considers enforcement fundamental to its battle against air pollution represents a positive change in Texas politics. Similarly, the

city's insistence on reaching an enforceable agreement with Texas Petrochemicals indicates that city officials are unwilling to cede to the petrochemical industry exclusive responsibility for protecting Houston's citizens. Given that it appears that the specter of litigation brought both Texas Petrochemicals and, more recently, Valero Energy, to the negotiating table with the city,³²¹ it appears that the city is using its enforcement authority to protect its residents from illegal and irresponsible industrial activities. This potential is particularly likely to be realized if the *Chronicle* continues fulfilling the media's proper role as the public's watchdog over government and industry.

Proposals for Reform

Although the City of Houston's recent initiatives are commendable, the ultimate solution to toxics air pollution in the Houston Petrochemical Complex and in other similarly industrialized areas in Texas will require a major overhaul of the current regulatory regime for hazardous air pollutants in Texas. This will in turn require a more proactive implementing agency and a legislature that is willing to put the health needs of its urban citizens ahead of the economic demands of one of the state's most important and powerful industries. While TCEQ has the necessary authority to promulgate many of the following recommendations as rulemaking exercises,³²² the Texas Legislature could provide TCEQ with much needed political support and legal direction by enacting these reforms into law.

1. Give TCEQ the Authority It Needs to Require Companies to Participate in Monitoring

In the final analysis, TCEQ will never have sufficient monitoring resources to do an adequate job of characterizing toxic hot spots and identifying the sources that contribute to them in the comprehensive way that it did when it isolated sources of a benzene hot spot in Texas City as the Marathon and Amoco separators. TCEQ currently supports a Community Monitoring Network that places monitors in highly industrialized communities, and it conducts 25-30 mobile monitoring investigations per year in places that are suspected to harbor toxic hot spots. But these monitoring efforts, standing alone, are rarely sufficient to support a reasonably accurate assessment of the ambient levels of toxic air contaminants over time. As a practical matter, any additional monitoring will have to be provided by the companies that own the industrial facilities that are the sources of the relevant emissions subject to proper quality control procedures and TCEQ oversight.

When a potential toxic hot spot has been identified (e.g., through a TCEQ monitoring exercise that detects levels of a HAP above a relevant ESL), TCEQ (with the input of the Toxicology and Risk Assessment Section) typically determines that additional monitoring is necessary to characterize the hot spot and to locate potential emissions sources. As detailed in Appendix 1, the Toxicology and Risk Assessment Section concluded that additional monitoring was necessary after the March, 1988, the March, 1996, the June 1997, and the September/October, 1998 monitoring exercises in Texas City. Apparently, the additional monitoring that TCEQ was able to accomplish on its own, however, was not enough. For example, although TCEQ had operated two long-term monitoring stations in Texas City for several years, the Toxicology and Risk Assessment Section's report for the 1998 monitoring event concluded that further long-term monitoring was necessary because its monitors were too far away from the probable sources to be of any use. This is not at all atypical of stationary monitors in the Community Monitoring Network.

Therefore, once TCEQ has determined that further characterization of a potential hot spot is necessary, it should have the authority to require all companies in the area that either emit or have the potential to emit the relevant toxic ("potentially responsible companies") to participate in the agency's subsequent short-term and long-term efforts to characterize the emissions contributing to the hot spot. As discussed above, the agency's ESLs, which are now undergoing a much needed revision, may serve as an appropriate "Action Level" for imposing monitoring requirements on sources of emissions of the relevant toxic pollutant. Since it is by no means clear that Texas companies will accept TCEQ's authority to use ESLs as "Action Levels," the legislature should give the agency the authority to use ESLs as triggers for additional monitoring. The action levels could, for example, consist of a single risk-based trigger like the Target Risk Levels established by Tri-State Geographic Initiative, or they could consist of some specified number of exceedances of an ESL or some multiple of that ESL over a prescribed time period. In addition, the legislature should require TCEQ to act on its own if the potentially responsible companies fail to contribute to the monitoring effort. In particular, the legislature should require TCEQ to conduct its own investigation, including establishing its own fence-line monitoring network, and to send the potentially responsible companies the bill.

2. Require that the Sources of Emissions Be Isolated

A monitoring network should enable the agency to determine with a fair degree of accuracy the fenceline concentrations of the relevant toxics, but it will not, standing alone, ensure that the sources of the emissions are identified, nor will it ensure that action is taken to reduce emissions when necessary. Thus, the legislature should require that whenever fenceline monitors in one of the monitoring networks described above determines that ambient levels exceed one-half (or some other fraction of) the Action Level on more than a predetermined number of occasions during a prescribed time period (e.g., one month), a further “source investigation” must be undertaken to identify the sources of the emissions resulting in those ambient concentrations. Potentially responsible facilities should be allowed to avoid the investigation upon a showing that the exceedance of the Action Level “may not tend to cause” adverse or other injurious effects on the public health or welfare and therefore did not create a “condition of air pollution.”

When one or more potentially responsible facilities undertakes a source investigation, they should be required to provide periodic reports to TCEQ detailing exactly what efforts they undertook to identify the likely sources of emissions. If these efforts prove routinely unavailing, TCEQ should require the company to come up with an “emissions investigation plan” for conducting an intensive investigation of potential sources of emissions, including fugitive emissions and emissions during upsets and maintenance. This investigation would be in the nature of an internal audit, but it should not be subject to the Audit Privilege statute. The agency should require the company to provide, within a prescribed time period, a report to the agency detailing the results of the emissions investigation program undertaken pursuant to the plan.

3. Strengthen the Prohibition on Emissions that Cause or Contribute to Air Pollution

Section 382.085(a) provides that “[e]xcept as authorized by a commission rule or order, a person may not cause, suffer, allow, or permit the emission of any air contaminant or the performance of any activity that causes or contributes to, or that will cause or contribute to, air pollution.” This section rather clearly places the burden on the polluter affirmatively to establish that any pollutants that it emits are in fact “authorized,” but some companies apparently disagree. Although TCEQ would probably prevail in a

civil enforcement action if it took the position that the burden of proof is on the defendant to show that problematic emissions are authorized by a permit or rule or are otherwise legal, the Texas Legislature should clarify the issue once and for all by amending section 382.085 to eliminate the exception for authorized emissions from the prohibition on creating conditions of air pollution.

Several states prohibit the emission of air pollutants that create conditions of air pollution regardless whether those emissions are permitted by the responsible agency. For example, Title 7 of the New Jersey Administrative Code states that “Notwithstanding compliance with other subchapters of this chapter, no person shall cause, suffer, or allow or permit to be emitted into the outdoor atmosphere substances in quantities which will result in air pollution.”³²³ Similarly, Massachusetts Department of Environmental Policy regulations prohibit any emissions that cause, “by themselves or in conjunction with other air contaminants,” a condition of air pollution, without regard to whether the emission is permitted under state and federal law.³²⁴ The Texas Legislature should amend section 382.085 to clarify that sources are prohibited from creating unauthorized emissions *and* from creating emissions that cause, either in isolation or in conjunction with emissions from other sources, a condition of air pollution.

4. Fix the Permit System

The Texas Legislature should amend the permit program to require facilities to calculate total emissions loads of hazardous air pollutants for all operations within a contiguous facility. In addition to aiding TCEQ in identifying probable sources of emissions associated with toxic hot spots, this change would also help the agency predict the ambient concentrations of HAPs that should be expected at the fenceline when a facility is in compliance with all of its authorizations. This requirement, which could be accomplished by amending the permit requirements by rule or by operation of law, should not be especially onerous because most facilities should already be making these calculations to comply with the Toxic Release Inventory requirements of the Emergency Planning and Community Right to Know Act. If an emissions accounting suggests that fenceline concentrations or multiple facility fenceline concentrations will exceed action levels when the facility is in compliance, then the permits should be pulled and toxics emissions reduced to the extent necessary to bring ambient concentrations below the action levels.

If a toxic hot spot threatens public health and welfare, the law should not permit new sources to contribute to the already existing health threat. Thus, when a company proposes to construct a new source or modify an existing source in a way that would contribute additional emissions of the relevant toxic pollutant to the already existing hot spot, the Texas Legislature should by statute require TCEQ to deny that permit. At present, it is not at all clear that TCEQ has the legal authority to deny an application for a permit that by itself would not threaten public health but would add to a hot spot that already threatens public health. Likewise, the Texas Legislature should explicitly empower TCEQ to limit the applicability of flexible permits when conditions of pollution exist. When the monitoring network indicates that fence-line ambient levels exceed a health-based threshold, a company should not be allowed to subject neighboring communities to the additional emissions that NSR permits, permits by rule, and General Operating Permits may allow.

TCEQ regulations permit the agency to include “special conditions” in permits that require written authorization for the permittee to construct any facility under a standard permit or a permit by rule if it finds that a particular air contaminant may result in a significant impact on the air environment. Whether or not the legislature acts, TCEQ permitting officers should include this special condition in all NSR and flexible permits issued in the vicinity of previously detected hotspots in the Houston Petrochemical Complex. In addition, before granting a request for written authorization to proceed under a standard permit or a permit by rule in these areas, TCEQ should prepare an ambient air quality impact analysis, and provide public notice of the request for authorization. The agency should deny the request if the analysis suggests that any additional emissions would exacerbate existing hotspots or could result in the creation of a new hot spot.

Flexible permits offer many advantages for operators, and they may in fact lead to decreases in actual emissions as a result of these operational advantages. In many situations, however, the emissions decreases documented in flexible permits are illusory – existing on paper only. In particular, flexible permits allow operators to move emissions sources around the facility as long as their total emissions for any given air contaminant are maintained under the established emissions cap. Over time, given all of the operational changes allowed in the permit, it becomes difficult or impossible for the agency (let alone the public) to know exactly what emissions are occurring in the facility. Moreover, because the cap is a calculated cap, not a performance based standard, it is virtually impossible to

determine whether emerging constellation of emissions sources actually complies with the cap. Because enforcement is problematic enough in situations where multiple sources are contributing to conditions of air pollution, TCEQ should restrict the availability of flexible permits in areas where industrial clusters make hotspots likely.

5. Require Companies to Take Meaningful Corrective Action

In the final analysis, the problems that are identified with enhanced monitoring and increased attention to the permit process will be unavailing if the companies responsible for the hot spots are not required to take corrective action to eliminate them. Several changes in the existing regulatory regime are therefore necessary to provide residents and workers with adequate protection from the dangers of air toxics, including the following.

a. Eliminating Unlawful Emissions

When a company’s emissions investigation plan identifies emissions that are not authorized by permit or rule, those emissions should be eliminated. The emissions investigation report should therefore propose a compliance schedule detailing how and when any such unlawful emissions will be eliminated. TCEQ should then either approve the compliance schedule and assess appropriate fines or disapprove the compliance schedule and issue such orders and assess such fines as are necessary to achieve compliance within a reasonable time. The compliance schedule that ultimately results should become condition to the facility’s permit or a part of legally enforceable order.

b. Reducing ‘Authorized’ Emissions

Insofar as the emissions investigation report concludes that the emissions contributing to fence-line levels above the target level are authorized by permit or rule, permits may have to be modified to bring about sufficient emissions reductions to meet appropriate fence-line action levels. The Tri-State Geographic Initiative, developed to address risks to human health from cross-border, multi-facility pollution among Ohio, Kentucky, and West Virginia provides a model for establishing triggers and concomitant risk reduction actions. The Initiative calls for the establishment of various Target Risk Levels (TRLs), corresponding to the relevant hazardous air pollutants in the area. Each TRL will trigger an appropriate risk reduction action.³²⁵ One available risk reduction action is to review the permits of suspected sources and reopen them if necessary to reduce

the permitted emission levels.³²⁶ TCEQ could implement a similar approach, using ESLs or some more explicitly risk-based variant like the TRLs used in Ohio, Kentucky and West Virginia.

The Tri-State Geographic Initiative also offers a model for apportioning emissions reductions among multiple emitters of the same pollutant using computer models to “finger print” emissions from particular sources.³²⁷ Whether this approach will work for hotspots identified in the Houston Petrochemical Complex will depend on the range of source categories in a given cluster of facilities. At the very least, TCEQ should explore the available source apportionment modeling options. Alternatively, the agency should consider apportioning responsibility in accordance with permitted emission levels, past compliance practice, frequency of upsets or some more sophisticated combination of these factors.

c. Reforming the Response to Emissions Events

As discussed above, existing regulations governing upsets, startups, shutdowns, and fugitive sources are not up to the job of preventing the formation of hot spots. Current regulations governing these “emissions events” remain incomplete in important ways, and enforcement to ensure compliance with existing regulations is severely impeded by the facilities’ superior control over vital information regarding their operations. These regulatory programs can be improved with specific amendments and changes that are detailed below.

1. Expanded Reporting Requirements. Currently, upsets, startups and shutdowns are reported only if the source’s estimate of the amount of emissions associated with such events exceed the specified reportable quantity. Since these estimates generally involve considerable room for judgment and consequently for underestimation, TCEQ should require that estimates of emissions be reported for all of these atypical emission events regardless of their significance. In the alternative, lower thresholds should be set to trigger reporting requirements in areas where toxic hotspots are likely to arise. This seems particularly appropriate in hot spot areas after the legislature’s recent enactment of a law that authorizes TCEQ to take action against emissions events that may have an “impact on human health.”

2. Compliance Assurance. Absent a mobile monitoring trip or onsite inspection, TCEQ has no way to ensure that a

facility is complying with reporting requirements under the emission event rules or under the fugitive source requirements. Periodic ambient monitoring should therefore be conducted at random and unannounced intervals at each major facility emitting hazardous air pollutants. For example, TCEQ could conduct the monitoring at the fenceline and charge the costs through to the company as one of the annual expenses associated with its permit. Facilities found to be seriously out of compliance with any of the applicable requirements could be required to finance onsite monitoring for a period of several years as an appropriate penalty.

3. Corrective Action Requirements Should be Routinized. Rather than requiring TCEQ to preside over each upset report and startup and shutdown application, the legislature should provide for the promulgation of standard corrective action requirements that apply regardless of whether TCEQ takes separate or additional action.³²⁸ The emission event itself, rather than a TCEQ order, should trigger a string of regulatory requirements that could be based on the significance of the event and the pre-existing ambient concentrations. For example, facilities in hot spot areas could be required to offset all excess HAPs emissions from startups and shutdowns by reducing other emissions in that plant during that time and/or by paying a fee for each pound of excess HAPs emitted.

4. Fugitive Emission Allowances. For some fugitive emission sources, noncompliance is excused for a considerable length of time (more than a year in some cases). The legislature should eliminate these allowances in hot spot areas and require regular weekly (or at most monthly) inspections of all fugitive sources. Furthermore, facilities should have no more than a week to correct violations (unless a shutdown is necessary to make the repair, in which case the facility would be required to offset the excess fugitive emissions until the next regulatory scheduled shutdown and/or pay a fee for each pound of excess hazardous air pollutants emitted). Where possible, external means of validation (like ambient monitors) should be used to verify visual inspection reports.

5. Fugitive Emissions Accountings and Caps. Under many of the technology-based requirements in permits and regulations, it is virtually impossible to determine the extent of emissions from compliant sources, much less to estimate the emissions from sources in violation of permits or rules, because under current regulations, there is neither an accounting of the cumulative fugitive emissions nor any limit to how many fugitive sources of hazardous air pollutants a facility can maintain. The legislature or TCEQ

should require a facility-wide accounting of the total hazardous air pollutant emissions (broken down by pollutant) for all fugitive and exempted sources. TCEQ should also be empowered to establish facility-wide limits or caps for fugitive of emissions if they are likely to contribute in a significant way to potential hot spots.

6. Allow Citizen Suits to Enforce the Law

At the outset of the environmental movement, ordinary citizens were often frustrated by the failure of appointed officials in regulatory agencies to enforce the environmental laws against scofflaws who were effectively allowed to pollute the nation's air and water with impunity. Congress responded by adding provisions to the modern federal environmental statutes that allowed individual citizens to sue polluters in federal court for violations of federal requirements promulgated under those laws, subject only to the right of EPA to take over the litigation if it was prepared to pursue the citizen's complaint diligently.³²⁹ In the intervening years, the "citizen enforcement action" has become a staple of environmental law, and most states have enacted similar provisions allowing their citizens to sue in state courts to enforce state environmental requirements. The state of Texas, however, is a rare exception.

Effective citizen enforcement can help close the "gap between promise and performance."³³⁰ Citizen enforcement gives affected communities the power to affect their own destinies when an overworked or unduly timid TCEQ elects not to pursue a legal action. Indeed, the mere possibility that citizens will file their own enforcement actions if it does not may give TCEQ more incentive to do its job. Perhaps most importantly, the citizen enforcement fall-back give otherwise helpless citizens an option when TCEQ becomes "captured" by powerful economic interests. The legislature should enact a strong citizen enforcement provision modeled on section 304 of the federal Clean Air Act.³³¹

Conclusions

Although the conventional wisdom is that air quality in Houston is slowly but steadily improving, that assessment may be limited to such conventional air pollutants as ozone and particulate matter. When it comes to hazardous air pollutants, the assessment is less straightforward. It is in fact much less clear that Houston's air quality is improving, and it may well be that it is getting worse. The tools for controlling hazardous air pollutants are in some ways similar (and occasionally identical) to the techniques for controlling conventional pollutants, but the air quality

problems are very different. Emissions of ozone precursor compounds at one end of Harris County from refineries are for all practical purposes fungible with emissions of different precursors from automobiles at the other end of the county, because they all combine with oxides of nitrogen in the upper atmosphere over Houston to form photochemical oxidants. As we have seen, hazardous air pollutants are emitted by relatively few sources and the migrating "hot spots" that pose the greatest threat to human health can be attributable to a single large source or hundreds of tiny sources in one or more, but typically not dozens, of petrochemical facilities. Because the problem of hazardous air pollution is different, the solutions will have to be different.

One absolutely critical aspect of any genuine solution to the problem of hazardous air pollution in Harris County is to put into place a much more extensive hazardous air pollutant monitoring regime. The current stationary monitoring program, the Community Monitoring Network, is simply not capable of detecting and assessing the toxic hot spots that migrate through communities in the vicinity of large petrochemical facilities. TCEQ's mobile monitoring team, which is well-trained and well-equipped, can to some extent fill the gap left by the existing stationary monitoring network, but it is stretched very thin. The team's sporadic trips to the same area to locate hot spots is undoubtedly needed, but it is not enough to permit an accurate assessment of chronic exposures. In the final analysis, more stationary monitors will be needed to monitor continuously at or near the fenceline. This will cost money, but it is money that the sources should have to expend in order to retain the privilege of emitting toxic pollutants into Houston's air.

TCEQ should not allow its ESL reassessment program to languish in the ongoing process of analysis and response to comments. It should in the near future promulgate robust ESLs and use them to establish "action levels" for identifying hot spots. It should then be prepared to exercise its existing authority under section 382.085(a) to require emissions reductions in facilities contributing to hot spots. If that authority is challenged, it should clarify it either by promulgating an interpretive rule or by filing a test case in court. The agency should also change the way that it administers the permit system to prevent future hot spots. In particular, it should rely much more heavily on "special" conditions in permits for facilities in heavily industrialized areas and limit permittee reliance on otherwise available "flexibility" in meeting permit requirements. It should attempt to fix individual permits to limit authorized emissions that contribute to potential hot spots, perhaps

along the lines adopted by the Tri-State Geographic Initiative described above. Finally, the agency should take more vigorous action to reduce fugitive emissions and emissions from upsets and maintenance events in areas where toxic hot spots are likely to develop.

Although TCEQ has done a good job of identifying the problem of toxic hot spots in the Houston Petrochemical Complex, it has in many ways failed the citizens of Houston over the past decade in its failure to act decisively on the basis of that information. The Texas Legislature has likewise failed the citizens of Houston. Having passed a protective clean air statute and having assured the public that effective controls on hazardous air pollutants will be implemented, the legislature has tolerated the

underperformance of reluctant regulators at TCEQ, failed to provide adequate funding for enforcement, and, worst of all, declined to allow citizens to take action on their own against polluters that are unlawfully emitting hazardous air pollutants that threaten their health. The legislature's failure to pass the Moreno bill in the most recent full legislative session and its enactment of still another deregulatory measure in its stead is merely the most recent manifestation of that body's inclination to elevate the economic interests of the oil and chemical industries over the interest of the citizens of Texas in protecting their health from hazardous air pollution. It is becoming increasingly apparent that to clean up the air in Houston and the rest of the state, it will be necessary to clean up Texas politics.

About the Center for Progressive Reform

Founded in 2002, the Center for Progressive Reform is a 501(c)(3) nonprofit research and educational organization dedicated to protecting health, safety, and the environment through analysis and commentary. CPR believes sensible safeguards in these areas serve important shared values, including doing the best we can to prevent harm to people and the environment, distributing environmental harms and benefits fairly, and protecting the earth for future generations. CPR rejects the view that the economic efficiency of private markets should be the only value used to guide government action. Rather, CPR supports thoughtful government action and reform to advance the well-being of human life and the environment. Additionally, CPR believes people play a crucial role in ensuring both private and public sector decisions that result in improved protection of consumers, public health and safety, and the environment. Accordingly, CPR supports ready public access to the courts, enhanced public participation and improved public access to information. Direct media inquiries to Matthew Freeman at mfreeman@progressivereform.org. For general information, email info@progressivereform.org. Visit CPR's website at www.progressivereform.org. The Center for Progressive Reform is grateful to the Bauman Foundation, the Beldon Fund, the Deer Creek Foundation, and to anonymous and individual donors for their generous support of CPR's work.



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APPENDIX

Hazardous Air Pollutant Monitoring in Texas City and Southeast Houston

This Appendix describes the history of recent TCEQ stationary- and mobile-monitoring efforts in Texas City and in the Milby Park and Lynchburg Ferry areas of southeast Houston. All three of these areas are highly industrialized, and they in fact contain some of the highest concentrations of petrochemical-plant activity in the world. At the same time, they are also residential areas with homes, parks, and schools within eyesight of some of the tall fractionating towers and storage vessels. Because TCEQ has during the past decade acquired and put to good use very sophisticated mobile-monitoring equipment in these areas, we are learning a lot more about the nature of hazardous air pollutants in a petrochemical complex. This Appendix attempts to capture some of that learning.

A. Texas City

From the birth of the petrochemical industry, Texas City has been the home of many petrochemical facilities. Texas City is the location of the third-largest refinery in the country—the British Petroleum refinery, formerly operated by Amoco Oil Company.³³² Because of its high

concentration of refineries and chemical plants, Texas City was a prime candidate for TCEQ's early mobile-monitoring efforts. It therefore offers a good introduction to the nature of TCEQ mobile monitoring and reporting and to the Toxicology and Risk Assessment Section's risk-characterization reports.

1. Early Mobile-Monitoring Efforts

One of TCEQ's earliest mobile-monitoring efforts for toxics in the Texas City area was conducted over a six-day period in March 1988 and focused on six sites in the vicinity of the boundary between the Amoco refinery (now the BP refinery) and the Union Carbide facility (now the Dow Chemical facility) at the northwestern end of the Texas City petrochemical complex where it adjoins a residential area.³³³ The monitoring revealed concentrations of benzene in the ambient air were in fact 5-10 times higher than the health-based Effects Screening Levels (ESLs) for benzene.³³⁴ In a preliminary review of the monitoring data, the head of the TCEQ's Health Effects

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Evaluation Section concluded that “[b]ecause benzene is a known human carcinogen, I feel that the data from this trip are certainly of enough concern to conclude that further characterization of public exposure at this site is necessary.”³³⁵ Follow-up mobile monitoring conducted on August 1, 1988, revealed that average concentrations remained in the 50-100 ppb range except for a period of time when an upset at one of the Amoco units caused them to go much higher.³³⁶ More than a year later, the Health Effects Evaluation Section (now the Toxicology and Risk Assessment Section) analyzed a year’s worth of data from a long-term stationary monitor situated across the street from the northeast end of the Amoco refinery, and it concluded that the monitored levels were “well within the range of mean annual benzene concentrations measured in other urban areas of the state.”³³⁷ This was apparently enough to satisfy TCEQ officials, and the agency did not pursue the matter for another five years.

2. Mobile Monitoring: August 19-25, 1995

In August 1995, the mobile-monitoring unit began what was to become a series of mobile-monitoring exercises in Texas City. The monitoring efforts focused upon SO₂ and hydrogen sulfide and a number of volatile organic compounds (VOCs), including benzene, styrene, and 1,3-butadiene.³³⁸ During the August 19-25 trip, sampling conditions were “poor” because the winds were gusty and from the northwest.³³⁹ This meant that any benzene emissions from the northwest corner of the facility had to travel across the entire Amoco complex before they reached the monitors. Of the 1000 samples, 260 detected benzene at above the limits of detection of the sampling device. The highest one-hour level was thirteen times the one-hour ESL for benzene.³⁴⁰ High hourly concentrations exceeded the one-hour ESL during 16 of the 22 relevant sample periods in the two vans.³⁴¹ The monitoring team speculated that “the probable toluene and benzene emission points originate from two separate sources within the Amoco Oil Company complex.”³⁴² The Toxicology and Risk Assessment Section concluded that human exposures were not likely to result in any acute adverse health effects and that short-term exposure to the levels of benzene observed “would not contribute significantly to long-term exposure levels.”³⁴³ However, the section concluded that “[f]urther investigation is needed to more completely characterize emissions, as sample conditions were not ideal.”³⁴⁴

3. Mobile Monitoring: June 21-27, 1997

The next Texas City mobile-monitoring effort took place almost two years later on June 21-27, 1997.³⁴⁵ Since the winds were from the southeast this time, the team was able to locate two vans on the street just across from the northwestern edge of the Amoco Oil refinery. The monitoring team concluded that “the Amoco Oil Corporation appears to have a continuous and persistent benzene emission source near its northwestern property line” and that “there is seemingly another benzene source located near the southwestern portion of the Amoco facility.”³⁴⁶ An analysis of the monitoring data by the Toxicology and Risk Assessment Section noted that “elevated concentrations of benzene were measured for extended periods of time,” and the ESLs were exceeded “by as much as a factor of five.”³⁴⁷ The memo noted that chronic exposure to “concentrations of benzene significantly above the ESL may increase the risk of the development of chronic health problems, such as leukemia.”³⁴⁸ This time, the Section appeared somewhat more concerned. Its analysis cautioned that “[w]hile we would not expect these benzene concentrations to result in any immediate health effects, exposure to high benzene concentrations contributes to cumulative (lifetime) exposures.”³⁴⁹

4. Mobile Monitoring: September 26-October 2, 1998

During the last week of September 1998, the mobile-monitoring group undertook a much more extensive mobile-monitoring effort, employing seven sampling vehicles.³⁵⁰ Benzene was again detected at levels that greatly exceeded the time-adjusted ESLs for benzene.³⁵¹ This time both the Amoco Oil and Marathon Oil facilities were identified as the probable emitters.³⁵² The Toxicology and Risk Assessment Section reached the same conclusion with respect to the northwest corner of the Amoco refinery that it reached for the 1997 trip. The Section further concluded that additional investigation was needed downwind of the Marathon Oil facility.³⁵³ It attributed the extraordinarily high levels of benzene and other VOC emissions on September 29-30 to an “upset” condition at the Marathon plant that the company reported after TCEQ’s monitoring revealed the extraordinarily high levels.³⁵⁴ It further noted that the levels detected during an apparent “upset” at one point exceeded even the Occupational Safety and Health Administration’s permissible exposure limit for benzene.³⁵⁵ The Section concluded that the agency needed to conduct “[a]n assessment of air quality over a longer period of time than can be represented during short-term mobile

monitoring events” in order to “protect public health in the area.”³⁵⁶ In other words, sporadic mobile-monitoring visits of the kind that the agency had been conducting thus far were inadequate to protect the public health.

5. Mobile Monitoring: September 25-October 1, 1999

The 1998 monitoring results inspired the Galveston County Board of Health to pass a resolution requesting that TCEQ conduct an “intensive, community-wide mobile monitoring trip to determine pollutant concentrations in the neighborhoods downwind of the Texas City Petrochemical Complex.”³⁵⁷ The monitoring team returned in late September 1999 to conduct further mobile monitoring. Once again, elevated levels of benzene were detected near the Amoco Oil refinery (now owned by BP), and the team focused upon sources in the northwest and southwest portions of the facility.³⁵⁸ Noting that TCEQ had measured comparable elevated levels on its previous trips in 1995, 1997 and 1998, the Toxicology and Risk Assessment Section now ominously predicted that “a potential increased cancer risk may be present in adjacent residential areas.”³⁵⁹ The Section noted that TCEQ operated two long-term monitoring stations approximately 1/2 mile to the north of the Amoco refinery and that it had measured average annual benzene concentrations as high as 1.2 ppb, which was still much lower than the ESLs. The Section concluded once again that “additional long-term air monitoring is needed to characterize potentially higher long-term benzene levels in the residential areas nearer to this facility.”³⁶⁰

The monitoring exercise also focused on the area downwind of the corner where the Marathon plant adjoined the Amoco Chemical A facility.³⁶¹ High benzene levels downwind of an API/DAF Wastewater Unit at the Marathon plant and an Oil/Water Separator and Wastewater Pit at the Amoco Chemical A facility confirmed suspicions that benzene was being emitted in the area.³⁶² An attempt to distinguish between the two sources using canister samples taken along the fence line “strongly suggest[ed] that the benzene levels observed . . . in 1998 originated from the Marathon API/DAF Wastewater Unit.”³⁶³ In addition, monitoring in the residential area just to the north of the Marathon plant detected a high one-hour benzene concentration of 31 ppb, which was slightly above the short-term ESL of 25 ppb. Later monitoring in the neighborhood continued to detect benzene but at levels below the ESL.³⁶⁴ Although “[a]vailable data [we]re not adequate to fully assess long-term exposure in the residential area located to the north

of Marathon and Amoco Chemical Company A,”³⁶⁵ the Toxicology and Risk Assessment Section was “concerned that if measured concentrations of benzene are typical, residents may be at increased risk of cancer.”³⁶⁶ Ultimately, the Section concluded that “[l]ong-term air monitoring in the residential area adjacent to Marathon and Amoco Chemical Company A is needed in order to assess long-term exposure.”³⁶⁷ Once again, the message between the lines was that sporadic mobile monitoring would not do the job.

6. Mobile Monitoring: November 4-11, 2000

The mobile-monitoring team returned to Texas City on November 4, 2000, to conduct additional monitoring for toxics.³⁶⁸ The monitoring effort focused again on the by-now familiar sites at the southwest and northwest areas of the BP refinery (formerly the Amoco refinery) and immediately to the north of the property line between the Marathon Ashland facility and the BP Chemical A facility (formerly the Amoco Chemical A facility). Once again, benzene levels downwind from the northwest persistently exceeded the ESLs.³⁶⁹ The repeated observations of high benzene levels from 1995 through 2000 led the Toxicology and Risk Assessment Section to conclude that “elevated benzene concentrations are recurrent.”³⁷⁰ This was “of concern because long-term exposure to elevated concentrations of benzene can cause an increased risk of leukemia.”³⁷¹ Since the winds in Texas City blew benzene emissions from this area to a nearby residential area, the Section concluded that “a potential cancer risk may be present in the residential areas adjacent to the BP refinery.”³⁷² Unfortunately, the two permanent stationary monitors that were in place in Texas City did “not provide an adequate characterization of exposures in this area as they are not in the predominant downwind direction of the benzene source(s) and are located approximately 1/2 and one mile away.”³⁷³ For the first time, the Toxicology and Risk Assessment Section concluded that “emissions reductions are necessary.”³⁷⁴

The investigators focused particularly on the BP Chemical A Oil/Water Separator and the Marathon API Separator and associated slop tanks.³⁷⁵ The Marathon API Separator was covered except during maintenance, but the BP Chemical A facility was an open cement-lined holding tank. When the monitoring team first arrived at the site, the BP Chemical A tank contained 3-4 feet of liquids and uncontrolled volatilization was occurring.³⁷⁶ After one staff member experienced adverse health effects, the remaining staff employed respirators to prevent their recurrence.³⁷⁷ Extensive monitoring downwind of the two facilities

detected levels of benzene that were consistently higher than the ESLs. In particular, monitoring in the residential area north of the facilities revealed benzene concentrations above the ESLs.³⁷⁸ The monitoring team arranged with TCEQ Region 12 investigators to take samples of the liquids in the BP Chemical A tank, but the results of that effort were questionable because BP employees added water to the tank prior to sampling.³⁷⁹

On the basis of this and previous monitoring efforts, the Toxicology and Risk Assessment Section concluded that “[e]missions such as these need to be controlled to protect the public health from effects such as irritation, dizziness, and nausea from short-term exposure.”³⁸⁰ The staff further noted that “[i]f these benzene emissions occur repeatedly, they can contribute to long-term cancer risk, as benzene is a human carcinogen.” Because the 2000 monitoring confirmed early monitoring exercises, the staff concluded that “it is likely that these emissions are recurrent.” However, the existing data were “not adequate to fully assess long-term exposure in this residential area.”³⁸¹ Therefore, “[l]ong term monitoring in the residential area to the north of Marathon and to the west of BP Chemical Company A is needed in order to assess long-term exposure.”³⁸²

The November 2000 mobile-monitoring results inspired TCEQ’s Houston Regional Office to conduct an Upset Maintenance Level One Investigation (UML1) of the Marathon Ashland refinery on November 7 and 13, 2000.³⁸³ When the Houston Regional Office’s investigator informed Marathon’s representatives that the reason for the investigation was to locate the sources of the emissions that had been detected during the mobile-monitoring trip, Marathon’s representative stated that the plant had been operating normally at the time and noted that he had received no reports of problems.³⁸⁴ A careful investigation of the Marathon API Separator revealed that volatile organic compound (VOC) emissions from 15 of the 25 hatch seals exceeded the 500 ppm level allowed by TCEQ’s fugitive-emissions regulations.³⁸⁵ This constituted a violation of both EPA’s National Emissions Standards for Hazardous Air Pollutants and TCEQ’s fugitive emission regulations.³⁸⁶ Four days later, Marathon offered a solution to the problem under which Marathon would inspect the hatches on a quarterly basis, rather than a yearly basis as required by TCEQ’s fugitive-emission regulations. In addition, Marathon agreed to initiate an “engineering project to improve the reliability and performance of the hatch seals.”³⁸⁷ A follow-up inspection conducted on

April 27, 2001, revealed that the promised actions had been taken.³⁸⁸

7. Mobile Monitoring: November 3-9, 2001

The mobile-monitoring team and two members of the Houston Regional Sulfur Source Identification Team conducted another extensive mobile-monitoring investigation in Texas City on November 3-9, 2001. In addition to following up on the previous mobile-monitoring exercises that TCEQ had conducted in 1995 and subsequent years, an important purpose of this investigation was to isolate as precisely as possible the sources of the excess toxics emissions that contributed to the previously documented elevated benzene levels in the residential area just north of the Marathon refinery and BP Chemical A facility.³⁸⁹ Once again, the team detected elevated levels of benzene in the vicinity of the Marathon API Separator and a BP Chemical A Oil/Water Separator, including residential areas. A closer analysis the next day by the Region 12 Fugitive Monitoring Team discovered that the north side of the Marathon API Separator contained small cracks from which a variety of VOCs, including benzene, were being emitted. Air samples collected at the separator confirmed that the API Separator leaks were “a significant benzene source.”³⁹⁰

The monitoring team also investigated the northwest portion of the BP oil refinery, another persistent source of benzene in the Texas City area. The 2001 investigation again detected persistent benzene concentrations during southerly and easterly winds. Elevated benzene levels were also detected in residential areas downwind of the BP facility. The investigators determined that the probable sources were processing units and/or storage tanks at the BP refinery.³⁹¹ Unlike in the similar case of the Marathon API Separator, however, the monitoring team did not request the aid of the Region 12 Fugitive Monitoring Team in an attempt to isolate particular leaks that might account for the emissions.

8. Mobile Monitoring: October 3-7, 2004

Although TCEQ initiated and settled an enforcement action against Marathon Oil in the wake of the 2000 monitoring exercise, no additional mobile monitoring was conducted in Texas City until October 2004, when the team initiated an investigation of emissions of sulfur compounds at the behest of TCEQ Region 12 and the Galveston County Health District.³⁹² Although the investigation focused primarily on hydrogen sulfide and sulfur dioxide levels, it did measure hydrocarbons,

including benzene. Two monitoring vehicles briefly sampled the air downwind of the BP refinery after sampling personnel detected sulfur odors north of the facility.³⁹³ Heavy rains and shifting winds, however, hampered the sampling.³⁹⁴ The team's report did not mention any elevated levels of benzene in the vicinity of the BP plant.

9. Stationary Monitoring: 2003

Stationary monitors have a great advantage over mobile monitors in that they can measure concentrations at a single location over a sustained period of time. Stationary monitors are therefore much more useful than mobile monitors in determining chronic exposures to toxics in the air. They are not, however, as effective in locating and measuring toxic hot spots, in following toxic plumes, and in locating the source or sources of the plumes.

During the 1990s, TCEQ maintained two stationary-monitoring stations in residential areas to the north of the petrochemical complex at the Texas City Ball Park and at the Nessler public swimming pool. The Toxicology Section concluded in 1999, however, that “concentrations measured at [the stationary] monitoring stations do not likely characterize maximum community exposures due to their location, approximately one mile from the industrial facilities.”³⁹⁵ A third stationary monitor (EISM U25) was installed in the early 2000s some distance to the north of the other two monitors and therefore even farther away from the industrial facilities.

The annual average benzene concentration for 2003 at the stationary monitor at the Ball Park was 1.2 ppb, which exceeded the annual ESL for benzene of 1.0 ppb.³⁹⁶ The Toxicology Section concluded that the theoretical cancer risk at this site was 3 in 100,000. This exceeded the Toxicology Section's “acceptable risk goal” of 1 in 100,000 for individual chemicals.³⁹⁷ The annual benzene concentrations at the other two monitors did not exceed the ESL for benzene.

In 2004, the annual concentration of benzene at the newer monitor (EISM U25) to the north of the Ball Park Monitor was 1.6 ppb, which again exceeded the ESL for benzene. The maximum cancer risk resulting from this exposure was somewhat higher than the 2003 concentration, but still below 10 in 100,000.³⁹⁸ Of some concern to the Toxicology Section, however, was the fact that the maximum hourly average of benzene concentrations at the monitor were 177 ppb—113 times higher than the short-term ESL for benzene.³⁹⁹ The

Toxicology Section noted that the monitor was located within approximately 1/10 to 1/2 mile from residences.⁴⁰⁰

10. Conclusions

TCEQ's mobile- and stationary-monitoring efforts in Texas City reveal a pattern of observation and subsequent neglect. The mobile-monitoring teams have consistently identified benzene “hot spots” in and near residential areas, and the stationary monitors reveal persistent benzene levels in residential areas far downwind from any likely industrial sources. Over the years the Toxicology and Risk Assessment Section expressed its concern that not enough was being done to characterize the hot spots and identify the sources of emissions contributing to the hot spots, but the response of upper-level management was to take no regulatory or enforcement action and to send the team back again in a couple of years. Not surprisingly, the results were always the same—hot spots were detected and, with one exception, nothing was done about them.

The one exception was an effort to identify and address the API Separator as a source of benzene emissions near the boundaries of the BP and Marathon plants. When a Region 12 enforcement team was finally called in to conduct a full-fledged investigation, an enforcement action resulted in the correction of the problem. It did not, however, solve the problem of persistent benzene concentrations at levels that threaten the health of Texas City residents.

B. Milby Park

TCEQ has also conducted extensive stationary- and mobile-monitoring in the southeast-Houston area. The monitoring efforts accelerated after the *Houston Chronicle* series in January 2005, which reported the results of a 72-hour monitoring exercise that the newspaper had conducted with the assistance of the University of Texas School of Public Health.⁴⁰¹ The *Chronicle's* stationary monitoring was administered by trained volunteers in the Milby Park neighborhood.⁴⁰² The following description will focus on stationary monitoring conducted during 2003-04 (the most recent years for which data are available) and on the trip that the mobile-monitoring teams took to the Milby Park area during the period from January to April 2005.

1. Stationary Monitoring: 2003-04

The annual average of 1,3-butadiene detected at the Milby Park stationary monitor did not exceed the ESL for

butadiene in 2003, but the Toxicology Section believed that it was possible that the ESL would be reduced during the ongoing process of reevaluating ESLs. In January 2005, the Section noted that the annual averages for 1,3-butadiene at the Milby Park monitor ranged from 2.1 to 4.4 ppb during the years 1999 through 2003 and that the 24-hour concentrations at that monitoring site were trending upwards.⁴⁰³ The emissions giving rise to those levels appeared to be coming from the direction of the “Texas Petrochemical/Goodyear/Mobil industrial complex.”⁴⁰⁴ The concentrations of 1,3-butadiene were much higher than at other sites in the Houston area.⁴⁰⁵ The maximum theoretical risk associated with the 2003 annual concentration ranged from 3 in 1 million to 4 in 100,000, and the latter level exceeded the Section’s “acceptable risk” level of 1 in 100,000. However, the theoretical cancer risk associated with the five-year average concentration of 3.2 ppb was 2 in 10,000, an order of magnitude higher than the “acceptable risk” level and a matter of genuine concern.⁴⁰⁶ These high levels were consistent with mobile-monitoring exercises conducted in April and May of 2001 and in May of 2002.⁴⁰⁷ On the basis of all of this information, the Toxicology Section concluded that “a reduction in ambient 1,3-butadiene levels is necessary because continuous lifetime exposure to the long-term 1,3-butadiene level monitored at Milby Park would represent a theoretical cancer risk that is higher than both the federal limit and our acceptable goal.”⁴⁰⁸ This is as strong a recommendation as the Toxicology Section ever makes in the context of chronic exposures to carcinogens.

The stationary monitoring for 2004 also raised concerns about the exposure to 1,3-butadiene of people in the neighborhoods near the Milby Park monitor. The 2004 average for 1,3-butadiene was 4 ppb, a level that raised the six-year average at the site to 3.3 ppb.⁴⁰⁹ The risk level associated with this exposure was 3 in 10,000.⁴¹⁰ In addition, the highest 24-hour concentrations were trending upwards. The Toxicology Section believed that “special reviews of air permit applications involving 1,3-butadiene, and agreements with and inspections of the major 1,3-butadiene emissions sources are expected to result in decreased ambient 1,3-butadiene levels.”⁴¹¹ In fact, it appeared that the 2005 annual average would be significantly lower, which might have been attributable to an agreement that TCEQ entered into with the two largest sources of butadiene, the Texas Petrochemicals and Goodyear plants.⁴¹²

2. Mobile Monitoring: January 26-February 6, 2005 and February 16-March 1, 2005

In response to the *Houston Chronicle* series in mid-January, 2005, TCEQ’s executive management initiated an extensive mobile-monitoring exercise in the Milby Park and Manchester neighborhoods.⁴¹³ Previous mobile monitoring during 2002 in the area had detected maximum ambient 1,3-butadiene levels of 1700 ppb, far in excess of the 50 ppb ESL. The early 2005 trip, however, was marred by weather conditions that were not at all conducive to mobile monitoring. A persistent upper-level low-pressure center produced an almost constant stream of moisture over the area. Because of the “unstable” weather conditions, “downwind sampling was often either hampered or completely stopped due to rain, insufficient wind speeds, or restricted sampling locations because of ground conditions.”⁴¹⁴ The monitoring detected only one butadiene reading that was of real concern, a 14.75-hour average concentration of 26 ppb with a maximum concentration of 170 ppb at the intersection of Micheal and Ruell Roads.⁴¹⁵ The Toxicology Section concluded that “[e]xposure to these concentrations and durations of 1,3-butadiene would not be expected to cause adverse health effects,” but “these are the kind of persistent off-property levels that could adversely influence long-term average concentrations depending on wind direction.”⁴¹⁶ By the time that the Toxicology Section’s report was completed, “a variety of emissions reductions and air monitoring requirements” were being implemented at the Texas Petrochemicals and Goodyear plants, which were the most likely sources of the 1,3-butadiene emissions that gave rise to the detected ambient air concentrations.⁴¹⁷

3. Mobile Monitoring: April 24-28, 2005

The mobile-monitoring team returned to the Milby Park area on April 24-28 as a result of a TCEQ executive-management initiative to aid Goodyear and Texas Petrochemicals in their investigations into the possible causes of elevated 1,3-butadiene levels in that area.⁴¹⁸ The weather was much more cooperative for this trip. The team attempted where possible to accommodate specific requests from the companies for monitoring in particular areas.⁴¹⁹ The staff met with representatives from the companies twice daily during this trip “to discuss various topics including daily coordination of monitoring activities.”⁴²⁰ Apparently, no representatives of the neighbors or public-interest groups were present at these meetings.

The team detected ambient concentrations of 1,3-butadiene at levels of 70 and 71 ppb in the vicinity of the Goodyear plant.⁴²¹ It also detected elevated levels of 1,3-butadiene, including a maximum of 340 ppb, which was

associated with a one-hour concentration of 150 ppb and a 4.5-hour average concentration of 53 ppb, in the neighborhoods and at the property line between the Goodyear plant and the Texas Petrochemicals plant. A set of railcar loading racks was located as a possible source of the emissions contributing to these ambient levels.⁴²² The Toxicology Section has not yet prepared an assessment of this monitoring exercise.

4. Conclusions

The results of both the stationary and mobile monitoring that TCEQ has conducted at Milby Park cry out for forceful governmental action. The cancer risk in the surrounding neighborhoods due to 1,2-butadiene emissions from the Texas Petrochemical and Goodyear plants far exceeds the 1-in-1,000,000 level that Congress has identified as unacceptable for purposes of addressing the residual risks of human exposure to hazardous air pollutants.⁴²³ As noted above, TCEQ entered into a voluntary agreement with Texas Petrochemicals that gave the Toxicology and Risk Assessment Section some hope that significant emissions reductions would result in 2005 and 2006. The City of Houston has made that scenario much more likely by entering into an enforceable consent decree with Texas Petrochemicals. Future mobile and stationary monitoring (which the consent decree greatly enhances) will reveal whether the emissions-reductions efforts have been successful.

C. Baytown/Lynchburg Ferry

TCEQ has also conducted extensive stationary and mobile monitoring in the southeast-Houston area during the past five years. The following description will focus on stationary monitoring conducted during 2003-04 (the most recent years for which data are available) and on the mobile-monitoring exercises undertaken in July 2004 and June 2005.

1. Stationary Monitoring: 2003-04

The annual concentration of benzene at the Baytown-Lynchburg Ferry monitor, which is located 1-2 miles from the nearest residential area, was 2.8 ppb during 2003, which was almost three times as higher than the ESL of 1.0 ppb. The maximum lifetime-exposure cancer risk attributable to this benzene level is approximately 7 in 100,000.⁴²⁴ Noting that mobile monitoring at the intersection of Battleground Road and Tidal Road near residences had detected excess levels of benzene in 2002 and 2003, the Toxicology Section concluded that “[c]ontinuing evaluation of source

directionality and identification of sources is needed to determine how ambient levels in residential areas would be expected to compare with measured levels at” the stationary monitor.⁴²⁵ In the meantime, however, the Toxicology Section recommended “that any proposed increases in benzene emissions in this area be evaluated cautiously and that reductions be encouraged.”⁴²⁶ TCEQ took no action in response to this rather tepid recommendation.

The 2004 monitoring data once again focused the Toxicology Section’s attention on the Baytown-Lynchburg Ferry monitor for two reasons. The average benzene concentration of 1.7 ppb exceeded the ESL of 1.0 ppb, but not by as much as the 2003 annual average of 2.9 ppb. However, for the first three quarters of 2004, the levels were comparable, and more troubling was the fact that the average through the first three quarters of 2005 was back up to 2.9 ppb.⁴²⁷ Second, some hourly concentrations of benzene, while not entirely relevant to chronic cancer risk, were “notable because of their magnitude and frequency.”⁴²⁸ The highest hourly concentration was 1,552 ppb. While this was lower than the concentrations needed to cause acute adverse health effects, it was “notably high and contributed to the annual benzene average exceeding the long-term ESL at the Baytown-Lynchburg Ferry site along with the other 85 hourly ESL exceedences for benzene.”⁴²⁹ The Toxicology Section concluded that “a reduction in ambient benzene levels is advisable” in the vicinity of the Baytown-Lynchburg Ferry site because the 2004 average level “would represent a theoretical upper-bound cancer risk range that is higher than our target risk goal.”⁴³⁰ Once again, no action resulted from this somewhat more disturbing assessment of the public-health threat.

2. Mobile Monitoring: April 8-12 and June 3-6, 2001

In the late spring and early summer of 2001, the TCEQ mobile-monitoring team conducted monitoring in the vicinity of Tidal Road, Miller Cut-Off Road and Battleground Road in Deer Park and LaPorte, Texas. The area that produced the highest levels of toxic air pollutants was located near the large Rhom & Haas facility. One-hour benzene levels in that area ranged from 35 to 95 ppb, which in many cases greatly exceeded the one-hour short-term ESL of 25 ppb.⁴³¹ A 4.5-hour average concentration of 36 ppb exceeded the three-hour ESL of 9 ppb, a nine-hour average concentration of 27 ppb exceeded the eight-hour ESL of 7 ppb and a 21-hour average concentration of 26 ppb exceeded the 24-hour ESL of 4 ppb.⁴³² The

Toxicology and Risk Assessment Section concluded that short-term health effects “would not be expected to occur as a result of exposure to these benzene levels,” but the levels were “of potential concern due to their contribution to long-term (i.e., lifetime) cumulative exposure levels.”⁴³³ The Section concluded, however, that “chronic exposure of the general public to the measured levels is unlikely as the reported benzene levels were collected in a non-residential (i.e., industrial) area.”⁴³⁴ Therefore, “[a]dditional information would be needed to appropriately evaluate community exposure levels.”⁴³⁵

Three of the one-hour concentrations of 1,3-butadiene downwind of the Rohm & Haas facility, which were measured at 93, 170, and 230 ppb, greatly exceeded the one-hour ESL of 50 ppb.⁴³⁶ A 4.5-hour concentration of 67 ppb and a 6-hour concentration of 66 ppb exceeded the eight-hour ESL of 35 ppb, and a 21-hour concentration of 67 ppb exceeded the 24-hour ESL of 20 ppb.⁴³⁷ Because of the possibility that two other chemicals may have erroneously contributed to these concentrations, however, the Toxicology and Risk Assessment Section determined that the butadiene concentrations “could not be evaluated.”⁴³⁸

3. Mobile Monitoring: June 22-28, 2002

On June 22-28, 2002, the mobile-monitoring team returned to the Tidal Road, Battleground Road area to follow up on the previous not-entirely-successful trip. This time high levels of benzene and 1,3-butadiene were detected downwind of the Intercontinental Terminals facility, which is located immediately to the east of the Rohm & Haas facility. In that location one-hour average benzene levels ranged from 31-170 ppb and exceeded the one-hour ESL of 25 ppb on nine occasions. The three-hour ESL of 9 ppb was exceeded twice (33 and 98 ppb), and the eight-hour ESL of 7 ppb was exceeded on four occasions (levels ranging from 21 to 48 ppb).⁴³⁹ Once again, the Toxicology and Risk Assessment Section was concerned about the potential for chronic exposure to these levels of benzene, but once again it concluded that chronic exposure to the general public at these levels was “unlikely” because the area was industrial and not residential.⁴⁴⁰ The Section reached the same conclusion concerning vinyl chloride levels in the vicinity of the Oxy Vinyl facility. A one-hour average sample at that location of 390 ppb greatly exceeded the one-hour ESL of 50 ppb, and a 4.5-hour average sample of 110 ppb exceeded the ESL of 45 ppb.⁴⁴¹

4. Mobile Monitoring: January 25-31, 2004

A mobile-monitoring exercise conducted in the Tidal Road/Battleground Road area in late January of 2004 detected only a single one-hour average concentration of 1,3-butadiene at 78 ppb, which was slightly in excess of the one-hour ESL of 50 ppb. The Toxicology and Risk Assessment Section did not think that this was of any great health significance.⁴⁴²

5. Mobile Monitoring: July 17-23, 2004

In response to a request from Region 12, the mobile-monitoring team conducted ambient air sampling in the east-Houston area from July 17-23, 2004.⁴⁴³ One primary purpose of the trip was to identify the source of benzene detected by the stationary monitor at the nearby Lynchburg Ferry North Landing site.⁴⁴⁴ Since a previous mobile-monitoring exercise in June 2002 had, among other things, detected 1,3-butadiene at 360 ppb and benzene at 380 ppb near the intersection of Tidal Road and Battleground Road, the 2004 exercise focused particularly on that vicinity.⁴⁴⁵

During this investigation, “consistent levels of benzene (including up to approximately 5.1 parts per billion by volume)” were detected near the Tidal Road/Battleground Road intersection.⁴⁴⁶ In addition, one-hour average 1,3-butadiene levels ranging from 52 ppb to 220 ppb were detected in the same vicinity.⁴⁴⁷ The four-hour average associated with the 220 ppb one-hour average was 150 ppb. On July 22, the nine-hour benzene average was 290 ppb at one monitor, and the six-hour benzene average at a nearby monitor was 280 ppb.⁴⁴⁸ On July 24, the four-hour benzene averages were 440 ppb and 550 ppb at the two locations.⁴⁴⁹ The company that was suspected of causing the emissions giving rise to the elevated benzene levels suggested that the cause may have been an “isolated incident related to railcar loading,” but the leader of the mobile-monitoring team concluded that the levels were too persistent to support that theory.⁴⁵⁰ After investigating the matter further, the company concluded that the leak resulted from a leak in an internal floating roof on a large storage tank, and TCEQ subsequently issued a Notice of Violation to Intercontinental Terminals.⁴⁵¹

The Toxicology Section concluded that benzene levels at the site exceeded the short-term ESL for benzene. Although the concentrations were generally lower than the levels that caused acute adverse effects in laboratory animals, the Section was concerned. It noted that “because benzene is a known human carcinogen, elevated short-term

levels are of potential concern due to their contribution to long-term (i.e., lifetime) cumulative exposure levels.⁴⁵² Although the nearest residential area was 2 miles from the monitoring site, “because of the magnitude and persistence of the benzene levels measured, [the Toxicology Section] believes a reduction in the emissions which resulted in the monitored levels is advisable.”⁴⁵³ Although this was as strong a call for action as the Section ever makes, TCEQ took no action in response to this recommendation. As of mid-2006, TCEQ had conducted no follow-up monitoring to determine whether any corrective action by Intercontinental had resulted in reduced ambient levels of benzene.

With respect to 1,3-butadiene, the Toxicology Section did not expect the monitored levels to cause short-term adverse health effects, despite the fact that the one-hour levels frequently exceeded the long-term ESL.⁴⁵⁴ Nevertheless, because 1,3-butadiene is a “suspected human carcinogen, recurrent short-term levels are of potential concern due to their contribution to long-term (i.e., lifetime) exposure levels.”⁴⁵⁵ The Section concluded that emissions reductions would be advisable, but only “if the measured 1,3-butadiene levels are recurrent or persistent.”⁴⁵⁶

6. Mobile Monitoring: June 2-8, 2005

The mobile-monitoring team returned to the Lynchburg Ferry North Landing site on June 2-8, 2005, in an effort to determine the sources of benzene and 1,3-butadiene concentrations detected at the stationary monitor and during previous mobile-monitoring exercises.⁴⁵⁷ The exercise focused particularly on the Jacintoport neighborhood west of the Lynchburg Ferry stationary-monitoring site, and approximately 80 hours of sampling were conducted at several sites downwind of the K-Solv facility that recovers organic materials from the insides of

barges.⁴⁵⁸ The samples consistently detected benzene at levels exceeding the ESL. At one location the 18.75-hour average was 23 ppb with a maximum concentration of 76 ppb. At another location, the 10.25-hour average was 22 ppb with a maximum concentration of 81 ppb.⁴⁵⁹ The team concluded that “the measured concentrations likely originated from K-Solv, however, barges docked behind K-Solv may also have contributed to the measured levels.”⁴⁶⁰ The Toxicology Section has not yet prepared an assessment of this monitoring exercise.

The June 2005 exercise also focused again on the Tidal Road/Battleground area downwind of the Intercontinental Terminals facility. Both benzene and 1,3-butadiene were detected in this area. The maximum concentration of benzene was 130 ppb, and the maximum concentration of 1,3-butadiene was 43 ppb.⁴⁶¹ The Toxicology Section has not yet prepared an assessment of this monitoring exercise, and no action has been taken.

7. Conclusions

The Baytown/Lynchburg Ferry exercises have been complicated to some extent by the fact that the stationary monitors are located 1-2 miles from the nearest residential neighborhoods. Thus, even though benzene concentrations at the stationary monitors are alarmingly high, the human health significance of those concentrations is not altogether clear. The Toxicology and Risk Assessment Section noted in 2001 that “[a]dditional information” was needed “to appropriately evaluate human exposure levels,” but the follow-up mobile monitoring efforts did not thoroughly encompass nearby populated areas. Other than a single Notice of Violation for a possible leaking floating roof, the agency has undertaken no efforts to reduce benzene and 1,3-butadiene levels in the area, despite the Section’s conclusion that a “reduction in emissions” was necessary.

Endnotes

- 1 See *In Harm's Way: A Special Report, Dangers in the Air They Breathe*, HOUS. CHRON., Jan. 16, 2005, at A1.
- 2 See Anne Belli, *The BP Explosion: BP Nears Deals on Civil Suits*, HOUS. CHRON., June 8, 2005, at A1; Kevin Moran, *15th Body Pulled from Refinery Rubble*, HOUS. CHRON., Mar. 24, 2005.
- 3 See, e.g., Lise Olsen, *Inside the BP Investigation*, HOUS. CHRON., Oct. 2, 2005 (reporting on an interview conducted with the regional director of the Occupational Safety and Health Administration about the agency's investigation of the explosion at BP's Texas City refinery, conducted shortly after OSHA ordered BP to pay \$21 million for workplace safety violations, the largest fine in the agency's history); Lise Olsen, *BP Leads Nation in Refinery Fatalities*, HOUS. CHRON., May 15, 2005 (reporting on the paper's analysis finding that "BP leads the U.S. refining industry in deaths over the last decade, with 22 fatalities since 1995—more than a quarter of those killed in refineries nationwide"); Lynn J. Cook & Terri Langford, *Location of Trailer Didn't Meet Guidelines*, HOUS. CHRON., Apr. 9, 2005 (reporting that the temporary trailer where most of the deaths occurred was too close to the unit that exploded according to industry guidelines and practice and BP's internal documents); Tom Fowler et al., *Witnesses Saw Gas Eruption Before Blast*, HOUS. CHRON., Apr. 7, 2005 (describing witnesses' account of the blast as having involved liquid and vapor shooting out of and then cascading down a ventilation tower, and then ignited by something on the ground); Mary Flood & Terri Langford, *Investigators Finally Inside Texas City Refinery*, HOUS. CHRON., Apr. 7, 2005 (contrasting the practice in Texas of leaving sites of industrial accidents largely in control of the company with that of other states, where local officials take control of the site immediately as a possible crime scene); Dina Cappiello et al., *Dangerous Fumes Delay Blast Probe*, HOUS. CHRON., Mar. 30, 2005, at A1 (reporting on progress of the U.S. Chemical Safety and Hazard Investigation Board's investigation, noting that its staff was conducting interviews and reviewing company data but was unable to enter the blast site because of concerns about contaminated air from a damaged tank of benzene); Kevin Moran et al., *Blast Probe Focuses on Blaze a Day Before*, HOUS. CHRON., Mar. 26, 2005 (describing company and federal investigators' initial speculations about the cause of the blast, noting that the FBI and Department of Homeland Security had ruled out terrorism, and reporting on identification of the dead, condition of the injured, Allan Turner et al., *Flash Fire Broke Out at Blast Site the Day Before the Explosion*, HOUS. CHRON., Mar. 25, 2005 (describing immediate aftermath of explosion, noting its severity relative to other industrial accidents, and discussing possible causes and planned investigations).
- 4 See *Explosion at BP Plant Near Alvin Comes on Heels of Texas City Closing*, HOUS. CHRON., Aug. 11, 2005; Dina Cappiello et al., *Federal Investigators Begin Probe of Latest BP Explosion*, HOUS. CHRON., July 29, 2005. Later the same day that the unit at the Texas City refinery leaked 100 barrels of gas oil and 100 pounds of hydrogen sulfide into the air, a plastics manufacturing unit at BP's petrochemical plant south of Alvin exploded. *Explosion at BP Plant Near Alvin Comes on Heels of Texas City Explosion, supra*.
- 5 Anne Belli, *BP Must Fix Its Safety Culture, Board Says*, HOUS. CHRON., Aug. 18, 2005. The agency announced this conclusion when it issued an "urgent safety recommendation" to the company urging it to commission an independent panel to scrutinize the safety culture at all of BP's U.S. refineries. *Id.* This was the first time the agency had ever issued such a recommendation, which is issued before the investigation is complete in cases where "an issue is considered to be an imminent hazard and has the potential to cause serious harm unless it is rectified in a short time frame." *Id.*
- 6 EPA, TRI Explorer, *Releases: Geography County Report for 1,3-Butadiene*, <http://www.epa.gov/triexplorer/geography.htm> (generate geography report for 2004, by county, for specific chemical 1,3-butadiene, for all industries, limited to 2004 Public Release data set frozen on Nov. 18, 2005 and released to the public on Apr. 12, 2006). This is the amount of 1,3-butadiene that Harris County facilities reported releasing in 2004, the latest year for which data from EPA's Toxic Release Inventory program is publicly available.
- 7 EPA, TRI Explorer, *Releases: Geography County Report for Hazardous Air Pollutants*, <http://www.epa.gov/triexplorer/geography.htm> (generate geography report for 2004, by county, for chemical group of hazardous air pollutants, for all industries, limited to 2004 Public Release data set frozen on Nov. 18, 2005 and released to the public on Apr. 12, 2006) [hereinafter *2004 TRI Releases by County*]. Harris County ranks number seven among 2,247 counties. *Id.*
- 8 *Id.* Galveston County ranks number 51, *id.*, which is considerably higher than its ranking of 85 the previous year, see EPA, TRI Explorer, *Releases: Geography County Report*, <http://www.epa.gov/triexplorer/geography.htm> (generate geography report for 2003, by county, for chemical group of hazardous air pollutants, for all industries) [hereinafter *2003 TRI Releases by County*].
- 9 *2004 TRI Releases by County, supra* note 7. It should be noted that companies are not required to monitor their emissions for the the TRI; they need only report paper estimates. A recent report by the Environmental Integrity Project and the Galveston-Houston Association for Smog Prevention determined that companies systematically understate their TRI emissions estimates. See ENVTL. INTEGRITY PROJECT & GALVESTON-HOUS. ASS'N FOR SMOG PREVENTION, WHO'S COUNTING? THE SYSTEMATIC UNDERREPORTING OF TOXIC AIR EMISSIONS 1-4 (2004). More specifically, the groups concluded "that releases of carcinogens such as benzene and butadiene may be four to five times higher than what is reported in the national TRI." *Id.* at 2.
- 10 See EPA, TRI Explorer, *Releases: Geography State Report*, <http://www.epa.gov/triexplorer/geography.htm> (generate geography report for 2004, by state, for chemical group of hazardous air pollutants, for all industries, limited to 2004 Public Release data set frozen on Nov. 18, 2005 and released to the public on Apr. 12, 2006) (showing a total release of 129,184,842 pounds of hazardous air pollutants reported by Texas facilities for 2004) [hereinafter *TRI Releases by State*].

11 2004 TRI Releases by County, *supra* note 7. That is almost 2.9 million more pounds of toxic releases than the 5,186,126 pounds that Galveston County reported the previous year. See 2003 TRI Releases by County, *supra* note 8.

12 See TRI Releases by State, *supra* note 10.

13 *Id.*

14 See NAT'L TOXICOLOGY PROGRAM, DEP'T OF HEALTH & HUM. SERVS., 11TH REPORT ON CARCINOGENS 26, 37 (2005) (listing benzene and 1,3-butadiene among 58 known human carcinogens), available at <http://ntp.niehs.nih.gov/index.cfm?objectid=32BA9724-F1F6-975E-7FCE50709CB4C932>. EPA currently classifies 1,3-butadiene as a probable human carcinogen, but is reevaluating that classification. EPA, 1,3-BUTADIENE: HAZARD SUMMARY (2000), <http://www.epa.gov/ttnatw01/hlthef/butadien.html>.

15 See EPA, BENZENE: HAZARD SUMMARY (2000), <http://www.epa.gov/ttn/atw/hlthef/benzene.html#ref1>.

16 See EPA, 1,3-BUTADIENE: HAZARD SUMMARY (2000), <http://www.epa.gov/ttnatw01/hlthef/butadien.html>.

17 As explained in the following sections on monitoring in these three areas, it is difficult to demonstrate definitively that certain facilities are responsible for high levels of hazardous air pollutants because the state's environmental agency does not have sufficient resources to establish a more comprehensive monitoring program, and the petrochemical companies are required neither to monitor the air around their facilities for toxic pollutants nor to disclose the results of any monitoring they nevertheless perform. However, the TRI reports submitted by the facilities located in areas in which monitoring has established unacceptably high levels of pollutants provide strong evidence of a link between the facilities and the toxic air plaguing the surrounding community. The evidence is particularly strong in the case of Milby Park, as the limited number of facilities in the area releasing 1,3-butadiene and the astonishingly large size of the releases render implausible any attempts by the companies to evade responsibility for the pollution. See Dina Cappiello, *State Finds Toxics Imperil Ship Channel Neighbors*, HOUS. CHRON., Jan. 11, 2006 ("At Milby Park, the large sources of butadiene were obvious. But benzene, formaldehyde and some of the compounds responsible for odors in the (Houston) region are being emitted by a plethora of sources, including industry, cars, even household products.").

18 See EPA, TRI Explorer, *Releases: 2004 Facility Report for Galveston County, Texas*, <http://www.epa.gov/triexplorer/facility.htm> (generate facility report for 2004, by county and for Galveston County, Texas, for all chemicals and all industries, limited to 2004 Public Release data set frozen on Nov. 18, 2005 and released to the public on Apr. 12, 2005) [hereinafter *2004 TRI Facility Report for Galveston County*]. The amounts of benzene and 1,3-butadiene presented here for the individual companies are limited to the amounts they reported releasing into the air, i.e., through point sources and fugitive emissions. The total amounts of hazardous air pollutants given above for Harris and Galveston Counties and for the entire state include all reported releases, i.e., air, water, and land.

19 See EPA, TRI Explorer, *Releases: 2003 Facility Report for Galveston County, Texas*, <http://www.epa.gov/triexplorer/facility.htm> (generate facility report for 2003, by county and for

Galveston County, Texas, for all chemicals and all industries) [hereinafter *2003 TRI Facility Report for Galveston County*]. As pointed out *supra* note 9, companies are not required to provide EPA with release data based on actual monitoring, but rather need submit only paper estimates based on "emissions factors" and other variables. Consequently, while TRI data provides the public with an important indication of the amount and types of hazardous air pollutants released by industry, TRI estimates are often highly variable from year to year, and the extent to which this is an accurate reflection of reality remains unclear in the absence of monitoring of emission sources. For example, BP reported that its Texas City refinery released three times more toxic pollutants in 2004 than it released in 2003. Dina Cappiello, *BP Plant Top U.S. Polluter*, HOUS. CHRON., May 7, 2005. In response, BP announced that it intends to conduct an investigation that includes actual measuring of its emissions and reviewing its methods of calculating emission estimates. *Id.* According to TCEQ's spokesman, "the TRI data was skewed by a huge increase in reported emissions, not actual emissions from BP Texas City." *Id.* But Eric Schaeffer, former EPA air pollution enforcement official and now head of the Environmental Integrity Project, stated: "It's real, it just never got reported before. . . . You can argue it's not an increase, but the next sentence has to be 'we've always been bad.'" *Id.*

20 Union Carbide Corporation Website, *History*, <http://www.unioncarbide.com/history/index.htm>.

21 See 2004 TRI Facility Report for Galveston County, *supra* note 18.

22 See 2003 TRI Facility Report for Galveston County, *supra* note 19.

23 See 2004 TRI Facility Report for Galveston County, *supra* note 18.

24 See 2003 TRI Facility Report for Galveston County, *supra* note 19.

25 See 2004 TRI Facility Report for Galveston County, *supra* note 18.

26 See 2003 TRI Facility Report for Galveston County, *supra* note 19. Marathon Oil did report that in 2003 its Texas City refinery released 3,173 pounds of benzene in surface water discharges. *Id.*

27 See 2004 TRI Facility Report for Galveston County, *supra* note 18.

28 See 2003 TRI Facility Report for Galveston County, *supra* note 19.

29 See EPA, TRI Explorer, *Releases: 2004 Facility Report for Harris County, Texas*, <http://www.epa.gov/triexplorer/facility.htm> (generate facility report for 2004, by county and for Harris County, Texas, for all chemicals and all industries, limited to 2004 Public Release data set frozen on Nov. 18, 2005 and released to the public on Apr. 12, 2005) [hereinafter *2004 TRI Facility Report for Harris County*].

30 See EPA, TRI Explorer, *Releases: 2003 Facility Report for Harris County, Texas*, <http://www.epa.gov/triexplorer/facility.htm> (generate facility report for 2003, by county and for Harris County, Texas, for all chemicals and all industries) [hereinafter *2003 TRI Facility Report for Harris County*].

31 In July of 2000, Chevron and ConocoPhillips merged their petrochemical operations and created Chevron Phillips

- Chemical, of which they each own 50 percent. Chevron Phillips Chemical Company L.L.C. Website, *About Us*, http://www.cpchem.com/enu/about_us.asp.
- 32 See 2004 TRI Facility Report for Harris County, *supra* note 29
- 33 See 2003 TRI Facility Report for Harris County, *supra* note 30.
- 34 See 2004 TRI Facility Report for Harris County, *supra* note 29.
- 35 See 2003 TRI Facility Report for Harris County, *supra* note 30.
- 36 See 2004 TRI Facility Report for Harris County, *supra* note 29.
- 37 See 2003 TRI Facility Report for Harris County, *supra* note 30.
- 38 See 2004 TRI Facility Report for Harris County, *supra* note 29.
- 39 See 2003 TRI Facility Report for Harris County, *supra* note 30.
- 40 See 2004 TRI Facility Report for Harris County, *supra* note 29.
- 41 See 2003 TRI Facility Report for Harris County, *supra* note 30. ExxonMobil has since closed down this facility. See E-mail from Elena M. Marks, Director of Health Policy, Houston Mayor's Office, to Karen Sokol, CPR Policy Analyst (Mar. 23, 2006) (on file with authors).
- 42 TCEQ, About Effects Screening Levels, available at <http://www.tceq.state.tx.us/implementation/tox/esl/ESL.Main.html>.
- 43 TCEQ, About Effects Screening Levels, available at <http://www.tceq.state.tx.us/implementation/tox/esl/ESL.Main.html>.
- 44 TCEQ, About Effects Screening Levels, available at <http://www.tceq.state.tx.us/implementation/tox/esl/ESL.Main.html>.
- 45 TCEQ, About Effects Screening Levels, available at <http://www.tceq.state.tx.us/implementation/tox/esl/ESL.Main.html>.
- 46 See *infra* text accompanying notes 106-07.
- 47 Memorandum to Leonard H. Spearman from Joseph T. Haney, Jr. re: Toxicological Evaluation of Mobile Air Monitoring and canister Results for Volatile Organic Compounds In the vicinity of Tidal Road, Miller Cut-Off Road, and battleground Road, Deer Park and Laporte, Harris County, Texas, April 8-12 and June 3-6, 2001, dated November 8, 2001, at 3.
- 48 Memorandum to Don Thompson, et al. from Joseph Haney re: Health Effects Review of Air Monitoring Data Collected in TCEQ Region 12-Houston during 2004, dated January 6, 2006, at 9.
- 49 42 U.S.C. § 7412(f)(2)(A).
- 50 See Energy Information Admin., Dep't of Energy, *Country Analysis Briefs: United States*, <http://www.eia.doe.gov/emeu/cabs/Usa/Oil.html> (Nov. 2005). As of January 1, 2005, there were 148 refineries in operation in the United States, down from 324 in 1981. *Id.*
- 51 See *id.* Specifically, U.S. refining capacity has increased from 15 million barrels per day in the mid-1990s to 17.1 million barrels per day as of September 2004. *Id.*
- 52 Press Release, Tex. Sustainable Energy and Econ. Dev. Coal., Bush Energy Plan Is Dirty, Dangerous, and Doesn't Deliver for Consumers (May 16, 2001), available at <http://www.seedcoalition.org/pc010516.htm> [hereinafter Press Release, SEED Coal.].
- 53 See UNIV. OF TEX. AT AUSTIN, HANDBOOK OF TEXAS ONLINE, *Exxon Company*, <http://www.tsha.utexas.edu/handbook/online/articles/EE/doi4.html> [hereinafter UNIV. OF TEX. HANDBOOK OF TEXAS, *Exxon*].
- 54 See Official Tourism Site of Baytown, Texas, *History: Humble Oil and Refining Company*, <http://tourismprod.baytown.org/History/Humble+Oil+and+Refining+Company.htm>; UNIV. OF TEX. HANDBOOK OF TEXAS, *Exxon*, *supra* note 53.
- 55 See UNIV. OF TEX. HANDBOOK OF TEXAS, *Exxon*, *supra* note 53; Energy Information Admin., Dep't of Energy, *U.S. Refineries Operable Atmospheric Crude Oil Distillation Capacity as of January 1, 2005*, <http://www.eia.doe.gov/ncic/rankings/refineries.htm>.
- 56 See Shannon Buggs & Lynn J. Cook, *Refinery First Went Online 71 Years Ago*, HOUS. CHRON., Mar. 24, 2005; Allan Turner et al., *Flash Fire Broke Out at Blast Site the Day Before Explosion*, HOUS. CHRON., Mar. 25, 2005; BP U.S. Website, *Texas City Refinery*, <http://www.bp.com/sectiongenericarticle.do?categoryId=9005029&contentId=7010402>.
- 57 Valero Energy Corp. Website, *Texas City Refinery*, <http://www.valero.com/Visit+Our+Refineries/Texas+City>.
- 58 See UNIV. OF TEX. AT AUSTIN, HANDBOOK OF TEXAS ONLINE, *Petrochemical Industry*, <http://www.tsha.utexas.edu/handbook/online/articles/PP/dop11.html>; Dina Cappiello, *Unseen Dangers*, HOUS. CHRON., Jan. 18, 2005 [hereinafter Cappiello, *Unseen Dangers*].
- 59 Telephone Interview with Kurt Zeller, Engineering Dep't, Texas Petrochemicals (May 8, 2006).
- 60 *Id.* Texas Petrochemicals bought the facility in 1984. Texas Petrochemicals Website, *Corporate Information: History*, <http://www.txpetrochem.com/ci/history.htm>.
- 61 See BP, FATAL ACCIDENT INVESTIGATION REPORT: ISOMERIZATION UNIT EXPLOSION INTERIM REPORT, TEXAS CITY, TEXAS 7, 15, 24 (May 12, 2005) (concluding that "the explosions were most likely the result of ignition of hydrocarbon vapors released from the [ventilation stack]" and that such stacks "have been recognized as potentially hazardous . . . with the industry moving towards closed relief systems to flare") [hereinafter BP, TEXAS CITY EXPLOSION INTERIM REPORT]; see also Dina Cappiello, *OSHA Issued Warning about Dangerous Ventilation Stack in 1992*, HOUS. CHRON., Apr. 8, 2005 (noting that, according to the American Petroleum Institute, ventilation stacks like the one involved in the BP Texas City explosion "are older technology being slowly phased out because of environmental constraints on air pollution") [hereinafter Cappiello, *OSHA Issued Warning*].
- 62 See BP, TEXAS CITY EXPLOSION INTERIM REPORT, *supra* note 61, at 24 ("Conversion to a flare system would have reduced the severity of the incident."); Cappiello, *OSHA Issued Warning*, *supra* note __ (quoting an industry experts' opinion that "[h]ad there been a true flare system, those guys would be alive").
- 63 See Cappiello, *Unseen Dangers*, *supra* note 61.

64 *Id.*

65 *See, e.g.*, Press Release, SEED Coal., *supra* note 52 (summarizing the findings of a 1999 EPA study that refineries have been expanding in violation of Clean Air Act pollution control requirements); *cf.* Bruce Barcott, *Changing All the Rules*, N.Y. TIMES, Apr. 4, 2004, at sec. 6, p. 38 (describing EPA officials' discovery that coal-fired power plants had been flouting NSR requirements for decades).

66 Clean Air Amendments of 1970, Pub. L. No. 91-604, 84 Stat. 1676 (codified as amended at 42 U.S.C. §§ 7401-7641 (2000)).

67 *See* 42 U.S.C. §§ 7411, 7475(a), 7503.

68 *See supra* note 65.

69 Press Release, SEED Coal., *supra* note 52.

70 *See* ENVTL. PROTECTION AGENCY, ANNUAL REPORT ON ENFORCEMENT AND COMPLIANCE ASSURANCE ACCOMPLISHMENTS IN 1999, at 26, A-12- A-13 (2000), available at <http://www.epa.gov/compliance/resources/reports/accomplishments/oeca/fy99accomplishment.pdf>.

71 *See* TEX. SUSTAINABLE ENERGY AND ECON. DEV. COAL, MORE MONEY THAN GOD: EXXONMOBIL AND THE OIL BARONS OF HOUSTON, TEXAS 7, available at <http://www.refineryreform.org/downloads/moremoneythangod.pdf>; *see also* Statement of Eric Schaeffer, Director, Envtl. Integrity Project Before the H. Subcomm. on Energy and Air Quality, tbl. B (July 15, 2004), available at <http://www.environmentalintegrity.org/pubs/ESTestimony.pdf> (providing a list of oil refineries with outstanding notices of NSR violations, among which are three of ExxonMobil's refineries in addition to the Baytown facility).

72 *See* TEX. SUSTAINABLE ENERGY AND ECON. DEV. COAL, *supra* note 71, at 7; Statement of Eric Schaeffer, *supra* note 71.

73 *See* David Ivanovich, *Exxon Mobil Settles Case*, HOUS. CHRON., Oct. 12, 2005. These seven refineries operated by ExxonMobil account for approximately 11 percent of U.S. refining capacity. *Id.*

74 *See* Dina Cappiello, *Oil Refiner Valero Must Make Upgrades*, HOUS. CHRON., June 17, 2005 [hereinafter Cappiello, *Valero Must Make Upgrades*]; Steve Cook, *ConocoPhillips to Spend \$525 Million to Cut Emissions at Nine Refineries by 47,000 Tons*, 36 Env't Rep. (BNA) 209 (Feb. 4, 2005). Along with ExxonMobil, ConocoPhillips, Valero Energy, 14 other companies that operate oil refineries reached settlement agreements with EPA, including BP, Marathon, and ChevronTexaco. *See* Ivanovich, *supra* note 73.

According to an official with EPA's Office of Enforcement and Compliance Assurance, the settlements together will "bring more than three-quarters of the refining capacity in this nation under legally binding agreements to reduce their harmful emissions." *Id.*

75 *See* Ivanovich, *supra* note 73; Cappiello, *Valero Must Make Upgrades*, *supra* note 74; Cook, *supra* note 74.

76 The search was done by requesting details on air emissions through EPA's TRI Explorer Data base which can be accessed at <http://www.epa.gov/tri/>.

77 Under fugitive emission requirements, the facility can elect not to have a "cap" on the total amount of fugitive emissions, as long as they meet the specifications for technology-based standards set forth from 40 C.F.R. §§ 63.113 through .149.

An alternative method of compliance available only to existing sources, *id.* at § 63.112(c), allows the source to identify a

subset of fugitive emissions, calculate an annual emissions rate for the cumulative sources based on the technological limits for each individual source, and allows the facility to comply with the cap without retrofitting the technology through a debit/credit calculation (overcomplying with some sources and undercomplying with others). The existing facility then has a choice of whether to comply by each individual source or by satisfying a cap. *Id.* at § 63.112(c). If the cap method is selected, compliance is still based on estimates based on compliance and not ambient monitoring. The difference is simply that the facility can trade credits and debits among sources within the plant. These are based on rather complicated equations. *Id.* at § 63.150.

78 40 C.F.R. § 63.112(a).

79 40 C.F.R. § 63.112(e)(2) (organic chemical industry); *see also id.* at 63.642(g) (oil refineries).

80 42 U.S.C. § 11023(g)(2) (requiring a covered facility only to make "reasonable estimates of the amounts involved" when data is unavailable and clarifying that "[n]othing in this section requires the monitoring or measurement of the quantities, concentration, or frequency of any toxic chemical released into the environment").

81 30 TAC 115.354.

82 *Id.*

83 All upsets, regardless of whether they meet compliance requirements, are considered "unauthorized" emissions. 30 TAC § 101.221(e) *see also* 30 TAC 101.1(83), (104), (105) (defining "reportable emission event", "unauthorized emission", and "upset"); 382.0215(a) (defining upsets as "unauthorized").

84 TCEQ differentiates between preventable and unpreventable upsets. Unpreventable upsets are excused if they are not excessive, if the owner complies with reporting requirements, and if they are "sudden" and "beyond the control of the owner or operator." 30 TAC § 101.222(b)(2). They must not "stem from any activity or event that could have been foreseen and avoided and could not have been avoided by good design, operation, and maintenance practices." *Id.* at § 222(b)(3) (TCEQ seems to interpret the provision as not allowing grandfathered emissions to actually become worse over time. (#15)). "[T]he unauthorized emissions [also can not be] part of a recurring pattern indicative of inadequate design, operation, or maintenance." *Id.* at § 101.222(b)(9).

85 If TCEQ suggests that the emission event is excessive, the facility has the burden of showing that their upset is "nonexcessive" under these regulations. There are eleven requirements for establishing this, including demanding that the owner demonstrate that the "unauthorized emissions were caused by a sudden breakdown of equipment or process, beyond the control of the owner or operator" and "the unauthorized emissions did not stem from any activity or event that could have been foreseen and avoided". 30 TAC § 101.222(b)(2) and (3).

86 *See* Section 382.0216(b)(1), (4), and (5); 30 TAC § 101.222(a)(1), (4), and (5). The TCEQ is required under § 382.0216 to require corrective action for facilities that have a recurring pattern of upsets that release reportable quantities of contaminants ("excessive emission events"). Among the considerations TCEQ is instructed to consider in determining whether emissions events are "excessive" are (1) the frequency of the facility's emissions events; . . . (3) the quantity and impact on human health or the

environment of the emissions event; [and] (4) the duration of the emissions event . . .” 382.0216(b). If the upsets do not amount, in the TCEQ’s view, to an “excessive emission event”, reporting is still required but it is not substantially more detailed than the TCEQ’s requirements. 382.0215(b)(3).

87 *Id.* at 221(e); *see also* 382.0216(g) (“The burden of proof in any claim of a defense to commission enforcement action for an emissions event is on the person claiming the defense”). The facility may also be required to show that it acted promptly and minimized the emissions, *id.* at § 101.222(b)(5) and (6), and that it documented these efforts. *Id.* at 222.(b)(8) When in doubt, TCEQ can order a “technical evaluation of the upset event.” *Id.* at § 201(f).

88 30 TAC § 101.223. This is also true for the upset of many fugitive sources. *See also* 40 C.F.R. § 63.152 (f)(7) (exempting from emission average requirements fugitive HAPs emissions resulting from start-ups, shutdowns, malfunctions, and monitoring system breakdowns). The Texas legislature has reinforced this requirement. 382.0216(c) (“The commission shall require a facility to take action to reduce emissions from excessive emissions events[,]” which include preparing a corrective action plan).

89 If the upset releases one or more toxic pollutants that appear to exceed the reportable quantity established for that substance, the facility must estimate the release and report it to the TCEQ regional office. TCEQ tiers the compliance requirements based on the significance of the upset events, requiring notification to the regional office only when the upset releases more than a reportable quantity of a pollutant. 30 TAC § 101.201(a). Although TCEQ regulations are silent on the subject, presumably the facility must also report the release under section 103(a) of CERCLA. 42 U.S.C. § 9603 (unless the release is considered “federally permitted,” which seems unlikely). Duplicative CERCLA reporting requirements apply only to those toxins that have been identified as “hazardous substances.” 40 C.F.R. § 302.4.

Reportable quantities are generally those established under CERCLA, 30 TAC § 101.1(82)(A)(i)(I), although reportable quantities are also specified for other substances, *see id.* at 101.1(82)(A)(i)(II-III), (A)(ii), and B). The air toxic list is also more inclusive than the CERCLA and includes categories for mixtures of compounds, 30 TAC § 101(82)(B), and for individual air contaminant compounds not otherwise listed, *id.* at § 101.1(82)(A)(ii).

Excess emissions of extremely hazardous substances could necessitate additional reporting requirements under the Clean Air Act. 42 U.S.C. § 7412(r)(7). EPA’s regulations implementing these requirements only appear to require prevention plans and do not appear to require enhanced notification requirements for releases of these substances (listed at 40 C.F.R. 68.130). *See generally* 40 C.F.R. Part 68.

90 The company must keep a log of these “unreportable” upsets on site for a five year period. 30 TAC § 101.6(b)(5). Although TCEQ can inspect these logs during full inspections and during special upset/maintenance-only inspections, it is not clear that the public at large may inspect or even be aware of these smaller upsets. It also makes it more difficult for TCEQ to take

enforcement action when smaller upsets occur with regularity at a facility: TCEQ is only alerted to these upsets after they inspect on-site plant logs. Thus, although in theory upsets are only authorized if they are “unpreventable,” in practice, because there is no reporting requirements for smaller upsets, even the preventable upsets might not reach the attention of the regulators unless they inspected the plant’s upset logs. It is not clear what the site logs might look like on unreportable upsets, or how often TCEQ investigates these logs for evidence of careless maintenance, etc. or for an indication of general compliance with the notification requirements. Despite this potential advantage to smaller upsets, facilities do sometimes report upsets that are less than the reportable quantity.

91 Unvalidated estimates of the amounts released suffice under both the regulations and legislation governing upsets. 382.0215(b)(3)(E).

92 *See* Dina Cappiello & Lynn Cook, *Plant Turnarounds Proven Dangerous*, HOUS. CHRON., Mar. 25, 2005, at A18 (reporting that the isomerization unit that exploded “had been shut down for maintenance, company officials said, and was coming back online when it exploded”). The article further points out: Five incident investigations conducted by the U.S. Chemical Safety and Hazard Investigation Board during the past seven years at refineries and chemical plants all occurred when part of the plant was under repair, being turned off or turned on “All the refinery actions we have done have occurred during maintenance or start-up and shutdown,” said Stephen Selk, an investigations manager with the U.S. Chemical Safety and Hazard Investigation Board. “Nothing we have investigated has been done under regular operations.”

Id.
93 30 TAC § 211. Excess emissions from maintenance, et al. require prior notification, but only if the emissions exceedances are expected to exceed reportable quantities. *Id.* at § 211(a). (Notification of regional office “prior to any scheduled maintenance . . . which is expected to cause an unauthorized emission which equals or exceeds the reportable quantity . . . in any 24-hour period.”). While the notification is supposed to be given at least ten days prior to the maintenance event, the regulations provide that where this notice “cannot be given” it “shall be given as soon as practicable.” *Id.* If notification is not given, the maintenance is treated as a generic emission event. *Id.*

94 30 TAC § 101.211(e).

95 30 TAC § 101.222(b).

96 *See, e.g.*, 382.0215(a); 30 TAC § 101.211(b).

97 ENVTL. INTEGRITY PROJECT, *GAMING THE SYSTEM: HOW OFF-THE-BOOKS INDUSTRIAL UPSET EMISSIONS CHEAT THE PUBLIC OUT OF CLEAN AIR 2* (2004).

98 *Id.* at 124.

99 *Id.* EIP cautioned that the facilities may be underreporting their excess emissions, as “[s]ome reports suggest that emissions from maintenance activities may either be underestimated, or simply not reported at all.” *Id.*

100 *Id.* at 2.

101 *Id.* at 24-25.

102 *Id.* at 25.

103 Interview with David Brymer, TCEQ, on September 11, 2002 [hereinafter cited as Brymer Interview 9/11/02]; Telephone

interview with Torin McCoy, August 14, 2002 [hereinafter cited as McCoy Interview 8/14/02].

104 Telephone interview with Torin McCoy, August 14, 2002.

105 Mobile monitors can detect apparent upsets that might otherwise go unreported. However, mobile monitoring is only capable of detecting upsets that occur during the monitoring trips, which typically take place no more often than once per year.

106 Memorandum from JoAnn Wiersema to the TCEQ Commissioners, dated January 23, 1997, quoted in LeBlanc/Everhart Letter 6/18/97, at 2.

107 Pichette/Parker Memo 3/6/96, at 1.

108 Quoted in LeBlanc/Everhart Letter 6/18/97, at 2.

109 Memorandum to Vic Fair from Charles Wheat and Laurel Carlisle, dated August 5, 1999. In some cases (e.g., butadiene), the short-term ESL is intended not so much to protect against acute health risks as it is to protect against exceedances of the associated long-term ESL.

110 Memorandum to Leonard Spearman from J. Torin McCoy and Allison Jenkins, dated January 8, 1998.

111 Memorandum to Leonard Spearman, Jr. from Allison Jenkins, dated March 8, 2000.

112 This Report will not discuss further the issue of enforcement for noncompliance with permits when the noncompliance is evident and TCEQ has sufficient proof to establish the violation. This situation, however, is not unusual because the agency is not able to devote scarce enforcement resources to every violation of a permit that it detects. See Dina Capiello, Council Delays Decision of Valero Suit, *Houston Chronicle*, April 13, 2006, at A1.

113 The TCEQ has at times relevant to this report been known as the Texas Air Control Board (TACB) and the Texas Natural Resources Conservation Commission (TCEQ). In this report, we will refer to the agency as the TCEQ for present and future purposes, but will use the name under which the agency was operating at the time in question when describing past events.

114 Grandfathered facilities present a substantial air quality problem in Texas. When the Texas Clean Air Act was enacted in 1971, it expressly exempted from state air permitting requirements facilities that were in existence or under construction at the time. It was assumed that these facilities would engage in modifications that would require them to obtain air permits over time. By 1999, however, many facilities remained grandfathered, and in 1997 these facilities emitted almost 900,000 tons of air contaminants – approximately 35 percent of air emissions in Texas. Several legislative and regulatory initiatives are currently underway to reduce emissions from and encourage permitting of grandfathered facilities. While air toxics hotspots might be attributable, in part, to emissions emanating from grandfathered facilities, this report will not address that problem specifically.

115 See <http://TCEQ.state.tx.us/permitting/airperm/index.html>. Emissions at some facilities may be authorized by registration if the facility satisfies the conditions for one of seven available Standard Permits, none of which are relevant to the hazardous air pollutants discussed here. 30 TAC 116.611.

116 30 TAC 106. Facilities or groups of facilities that would constitute a new major stationary source and modifications that would constitute a major modification cannot qualify for a PBR.

117 30 TAC 116.119.

118 30 TAC 116.111.

119 30 TAC 116.710.

120 30 TAC 116.111.

121 30 TAC section 116.1115(c)(2)(B)(I).

122 30 TAC section 116.115 (c)(1).

123 30 TAC section 116.130(b).

124 See 30 TAC sections 116.711(3), (4), (5), (6), (8), and (9).

125 30 TAC 116.111.

126 Texas Health & Safety Code § 382.003.

127 See the description of ESLs *supra*, pp. 11-12.

128 A site is defined as that total of all stationary sources located on one or more contiguous or adjacent properties, which are under common control of the same person or persons under common control. 30 TAC section 122.10(3).

129 Texas Health & Safety Code § 382.003.

130 Texas Health & Safety Code § 382.003(3)(A).

131 Since ambient monitors are not required, compliance with permits and rules is based in large part on whether dozens of tanks inside facilities are “sealed,” whether individual process vents are properly maintained; whether upsets have occurred, etc.

132 There is no legislative history available at all (recorded or written) for the 1967 passage of the original text at section 382.085.

133 See *U.S. v. Chevron U.S.A., Inc.*, 639 F.Supp. 770 (W.D. Tex. 1985); *Texas Pet Foods, Inc. v. State*, 578 S.W.2d 814 (Civ.App. 1979), affirmed in part, reversed in part 591 S.W.2d 800.

134 The authority for this rule may be called into question. The Federal Clean Air Act expressly saves private law remedies, including nuisance. See 42 U.S.C § 7604(e) (“Nothing in this section shall restrict any right which any person (or class of persons) may have under any statute or common law to seek enforcement of any emission standard or limitation or to seek any other relief . . .”). Until 1997, the Texas Clean Air Act contained a provision identical to this rule. That provision was repealed in 1997. The effect of that repeal on the validity of the current rule is unknown.

135 *E.g.*, *Holubec v. Brandenberger*, 111 S.W.3d 32, 37 (Tex. 2003).

136 *Manchester Terminal Corp. v. Texas Tx Marine Transport., Inc.*, 781 S.W.2d 646, 651 (Ct. App. Houston 1989).

137 TCEQ, ODOR COMPLAINT HANDLING PROCEDURES (December 8, 1993).

138 Chapter 7 Tex. Water Code section 7.02(b)(1).

139 Another provision in Chapter 7 provides somewhat more liberal authority, allowing the TCEQ to revoke and reissue permits if the permittee is “causing a discharge, release, or emission contravening a pollution control standard set by the commission *or contravening the intent of a statute or rule described in Subsection (a).* (emphasis added). Chapter 7 Tex. Water Code section 7.302(b)(3). Subsection (a) references all permits issued under Chapter 382 of the Health and Safety Code, which is the Texas Clean Air Act. Arguably, TCEQ could invoke this authority to reopen permits that contain applicable standards and other authorizations which, even if not violated, will result in emissions that cause or contribute to a condition of air pollution in an area because the “intent” of the Clean Air Act, as broadly set out in

Section 382.002, is to safeguard the “state’s air resources from pollution.”

140 TCEQ informally classifies air emissions into three general categories – authorized; unauthorized but excused; and unauthorized and unexcused. “Authorized” emissions are those that are in compliance with emissions limitations established in a permit or by a rule. Compliance with an approved facility-control plan for maintenance, startups, and shutdowns may also be considered “authorized” emissions. “Unauthorized, but excused emissions” also fall into two general categories. First, emissions that comply with regulations that are not “permit by rule” limits; that fall under threshold limits; or that are exempted as de minimis sources are considered “unauthorized, but excused” emissions. Excess emissions from upsets are also “unauthorized, but excused” if the facility meets specified conditions and complies with all other relevant regulatory requirements. While “unauthorized, but excused” emissions can technically be subject to enforcement proceedings, their “excused” status means that TCEQ generally will not seek sanctions. “Unauthorized and unexcused” emissions do not fit into either of the two previous categories. As discussed above, hot spots that are attributable to “authorized” emissions or to a mix of “authorized” and “unauthorized but excused emissions” are difficult to remediate with TCEQ’s existing enforcement authorities. The ways that hot spots might fall into these two legally permissible categories are detailed below.

141 See NESHAPs for Source Categories: Organic HAPs from the Synthetic Organic Chemical Manufacturing Industry and Other Processes Subject to the Negotiated Regulation for Equipment Leaks, 59 Fed. Reg. 19,402, 19,406 (Apr. 22, 1994) (to be codified at 40 C.F.R. pt. 63) [hereinafter Final Rule].

142 40 C.F.R. §§ 61.342(c)(1)(iii); 61.342(c)(2), 61.342(c)(3)(i).”

143 New sources must satisfy compliance requirements for wastewater tanks that have an annual average concentration of 10 ppm by weight of any individual compound listed in a table 8, while existing sources need to satisfy various compliance requirements only once the streams contain 10,000 ppm at any flow rate (or 1000 ppm at a specified flow rate) of table 9 compounds (which includes table 9 compounds as well as other toxic substances). *Id.* at § 63.132(c) and (d).

144 TCEQ must not only determine whether upsets are excessive, but once it makes that determination it must preside over the facility’s submission of either a corrective action plan or a request to increase its authorized emissions. 30 TAC § 101.223.

145 If a facility provides an emissions event report with the showings required in § 222(b), and TCEQ does not follow up by identifying the event as excessive, the upset is excused. *Id.* at § 222(b). One TCEQ document suggests that TCEQ undertakes onsite or offsite investigations for roughly half of the upset reports. See *supra*.

146 30 TAC § 101.211(e). TCEQ appears to impose these requirements in some cases. Additionally, TCEQ may require in its discretion the owner/operator to “submit a technical plan for any start-up, shutdown, or maintenance.” *Id.*

Since unreported startups are treated like upsets, however, it is not clear why a facility might provide TCEQ with advanced notification unless the startup or shutdown is subject to

planning that makes it difficult to argue that they did not anticipate the excess emissions more than seven days in advance.

147 A recent report documenting TCEQ’s ability to pursue enforcement actions for excess emissions confirms both that these actions are resource-intensive and that TCEQ has limited resources to pursue them. In a recent TCEQ memorandum, Michael Freer reports that only about half of the reportable and reported upsets and maintenance reports ended with an in house or on site investigation by TCEQ and that only about 5 percent of the reports resulted in a pending enforcement action. He concludes that “[t]he administrative burden of simply receiving and entering the u/m report data into a database is onerous.” Michael Freer, TCEQ Interoffice Memo on “Summary of Significant Events from March 1, 2000 through Dec. 31, 2000 for the Gulf Coast Upset Maintenance Pilot Project” at page 7 & Att. 3.

148 Indeed, the requirements that TCEQ develop rather extensive electronic data tracking systems only further dissipates TCEQ’s scarce resources in discovering violations of upset reporting. 382.0215(d) and (e). While collecting and tracking upset reporting is, in theory, valuable to assessing the upset problem, it neglects the much more substantial problem: determining whether facilities are in fact reporting upsets in the first place. As described below, this seems to be the main problem with upset compliance.

149 30 TAC § 101.201(b)(H). The facility must record upsets on its on-site plant log; excess emissions above reportable quantities must be reported to TCEQ, which then puts that upset condition on the “enforcement radar”, making subsequent upsets from the same condition appear preventable. *Cf.* EPA, Data Quality Report on EPCRA at vii (suggesting that facilities tend to overlook releases from storage tanks) (available at http://www.epa.gov/triinter/tridata/data_quality_reports/1995/toc-ovr.pdf).

150 TCEQ’s penalties are based on the extent of the release and its potential impact on human health and the environment. 30 TAC § 7.053. The difficulty of detecting violations are not included in the penalty amounts, even though a low probability of detection affects compliance. S. Shavell, *The Optimal Structure of Law Enforcement*, in A READER ON REGULATION 307 (R. Baldwin ed., 1998) (observing that deterrence is achieved only when the economic benefit of noncompliance is less than the penalty amount multiplied by the probability of catching the violation). In fact, TCEQ’s emphasis on the gravity of the release further discourages prompt detection and accurate reporting estimates, since it only increases the possible penalties.

151 30 TAC § 101.201(b) and 101.221(b).

152 *Id.* at § 101.211(c).

153 There are, of course, not enough TCEQ inspectors to be present at all of the shutdowns that occur even at major facilities.

154 See, e.g., 40 C.F.R. §§ 63.114, .117, and .118 (process vents monitored for equipment, not emissions).

155 See, e.g., 40 C.F.R. § 63.113(a) (providing alternative technologies to satisfy requirements, including the use of flares). Requirements for emissions control technology for transfer operations, like process vents, specify several technological alternatives and allow the facility to select the best one. *Id.* at 63.126(b). For other fugitive emissions (storage vessels), the technologies are much more constrained and presumably easier to

inspect. *id.* at § 63.119(a) (specifying internal and external floating roof requirements, etc). Some requirements only apply at the time of certain internal activities, like the emptying of tanks. *See, e.g., id.* at § 63.119(c)(1)(iv) (applying technology requirements only when tanks are “emptied and degassed”).

156 For example, only annual visual inspections are required for storage vessels. *See, e.g., id.* at § 63.120(a) (setting out only general requirements).

157 *See, e.g., id.* at § 63.120(a)(4)

158 The facility does need to keep records of inspections at the site, but this seems only partly helpful if the facility makes the decision about when to inspect and can report information based on an unvalidated visual inspection. *See, e.g., id.* at § 63.123(c).

159 H.B. No. 2792, 79th Leg., Reg. Sess. § 382.0161(a) (Tex. 2005) (amending TEX. HEALTH & SAFETY CODE ch. 382).

160 *Id.* § 382.061(d).

161 *Id.* § 382.042.

162 *Id.* § 382.043.

163 *Id.* § 382.085(c).

164 *Id.* § 382.085(a) (emphasis added).

165 *Id.* § 382.085(d).

166 *See* Janet Elliott, *Move to Fine Plants for Pollution Is Snuffed Out*, HOUS. CHRON., May 4, 2005.

167 Chris Mahon, *A Toxic Trifecta*, TEX. OBSERVER, June 24, 2005, at 8.

168 *Id.* An identical bill that Sen. Mario Gallegos introduced in the Texas Senate met the same fate; it stalled in the Senate’s Natural Resources Committee. *See id.* at 8-9.

169 *Id.* at 8-9.

170 Instead, many corporations have attempted to undermine or suppress scientific studies indicating a need for public health and environmental protections. For example, four of the corporations that own facilities emitting the highest levels of benzene in the areas of focus in this report—BP, ChevronTexaco, ConocoPhillips, and ExxonMobil—contributed \$27 million to fund a study designed to counter findings by a Chinese cancer research institution that workers exposed to average benzene concentrations were four times more likely to develop non-Hodgkin’s lymphoma than the general population. *See* Dina Cappiello, *Oil Industry Funding Study to Contradict Cancer Claims*, HOUS. CHRON., Apr. 29, 2005. Funding requests sent to oil companies by the American Petroleum Institute, which heads the industrial consortium funding the study, promised results contradicting the Chinese study in advance. *See id.*

171 Elliott, *supra* note 166.

172 *d.*

173 *See* Dina Cappiello, *In Harm’s Way: Making It Easy?*, HOUS. CHRON., Jan. 16, 2005.

174 *See id.*

175 *See id.*

176 Dina Cappiello, *Groups Criticize Bill on Toxics*, HOUS. CHRON., Mar. 12, 2005.

177 Elliott, *supra* note 166.

178 *Id.*

179 Moreno’s bill (HB 2792) was referred to committee on March 16, 2005, Texas Legislature Online, Bill Status, Actions on HB 2792, <http://www.capitol.state.tx.us/cgi-bin/db2www/tlo/>

[billhist/actions.d2w/](http://www.capitol.state.tx.us/cgi-bin/db2www/tlo/billhist/actions.d2w/)

[report?leg=79&sess=r&chamber=h&billtype=b&billsuffix=02792](http://www.capitol.state.tx.us/cgi-bin/db2www/tlo/report?leg=79&sess=r&chamber=h&billtype=b&billsuffix=02792), and the industry-friendly bill (House Bill 1900) was referred on March 14, 2005, Texas Legislature Online, Bill Status, Actions on HB 1900, <http://www.capitol.state.tx.us/cgi-bin/db2www/tlo/billhist/actions.d2w/report?leg=79&sess=r&chamber=h&billtype=b&billsuffix=01900>.

180 *See* Texas Legislature Online, Text of H.B. 1900, <http://www.capitol.state.tx.us/cgi-bin/tlo/textframe.cmd?leg=79&sess=r&chamber=h&billtype=b&billsuffix=01900&version=1&type=b>.

181 *See* Texas Legislature Online, House Committee Report for H.B. 1900, Witness List, <http://www.capitol.state.tx.us/tlo/79R/witbill/HB01900H.HTM>; Texas Legislature Online, Senate Committee Report for S.B. 928, Witness List, <http://www.capitol.state.tx.us/tlo/79R/witbill/SB00948S.HTM>. A

representative of Valero Energy Corporation registered that company as supporting the bill, but did not testify. *See id.*

182 *See* Dina Cappiello, *‘Less Stringent’ Measure on Air Pollution Offered*, HOUS. CHRON., MAY 11, 2005.

183 *Id.*

184 *Id.*

185 *Id.*

186 *Id.*

187 *Id.*

188 Mahon, *supra* note 167, at 9.

189 yists successfully derailed).

190 Dina Cappiello, *Groups Criticize Bill on Toxics*, HOUS.

CHRON., Mar. 12, 2005 [hereinafter Cappiello, *Groups Criticize Toxics Bill*].

191 *See infra* Subsection VI.B.1.b.

192 Cappiello, *Groups Criticize Toxics Bill*.

193 *Id.*

194 *See* Dina Cappiello, *Mayor’s Plan Takes Aim at Air Pollution*, HOUS. CHRON., Nov. 15, 2005, at A4 [hereinafter Cappiello, *Mayor’s Plan*]; Dina Cappiello, *Council Asks Agency to Act Sooner*, HOUS. CHRON., Mar. 2, 2005.

195 *See* Dina Cappiello, *Council Asks Agency to Act Sooner*, *supra* note 194.

196 Cappiello, *Mayor’s Plan*, *supra* note 194.

197 *Id.*

198 *See* Energy Information Admin., Dep’t of Energy, *Basic Petroleum Statistics* (2004 data, reviewed Apr. 2006), <http://www.eia.doe.gov/neic/quickfacts/quickoil.html> [hereinafter Energy Information Admin., *Basic Petroleum Statistics*].

199 U.S. Energy Information Admin., Dep’t of Energy, *Petroleum Profile: Texas* (Jan. 2006), <http://tonto.eia.doe.gov/oog/info/state/tx.html>.

200 *See* U.S. Energy Information Admin., Dep’t of Energy, *World Crude Oil Refining Capacity, 1970-2004* (showing a world oil refining capacity of 82.26 million barrels per day for 2004).

201 *See* Texas Chemical Council, *Our Industry: Economic*, <http://www.txchemcouncil.org/>. Texas’s “petrochemical industry, closely tied technologically and economically to refining, developed principally in already established refining centers.” UNIV. OF TEX. AT AUSTIN, HANDBOOK OF TEXAS ONLINE, *Chemical*

- Industries, <http://www.tsha.utexas.edu/handbook/online/articles/CC/dmc1.html>.
- 202 Joe Carroll, *Profit Soars at Exxon Mobil*, WASH. POST, July 29, 2005, at D2.
- 203 See U.S. Energy Information Admin., Dep't of Energy, *Top U.S. Refineries: U.S. Refineries Operable Atmospheric Crude Oil Distillation Capacity (Barrels per Calendar Day) as of January 1, 2005*, <http://www.eia.doe.gov/neic/rankings/refineries.htm> [hereinafter Energy Information Admin., *Top U.S. Refineries*] (ranking ExxonMobil's Baytown refinery number one among U.S. refineries with a capacity of 557,000 barrels per calendar day). A barrel of oil is equivalent to 42 gallons. Energy Information Admin., *Basic Petroleum Statistics*, *supra* note 198.
- 204 Carroll, *supra* note 202.
- 205 See Energy Information Admin., *Top U.S. Refineries*, *supra* note 203 (ranking BP's Texas City refinery number three among U.S. refineries with a capacity of 437,000 barrels per calendar day). The Texas City facility is BP's largest of all its refineries throughout the world. BP Website, *Texas City Refinery*, <http://www.bp.com/sectiongenericarticle.do?categoryId=9005029&contentId=7010402>.
- 206 Fortune 500 2006, CNNMONEY.COM, <http://money.cnn.com/magazines/fortune/fortune500/performers/companies/profits/index.html>.
- 207 Simon Romero & Edmund L. Andrews, *At Exxon Mobil, A Record Profit But No Fanfare*, N.Y. TIMES, Jan. 31, 2006. ExxonMobil's total revenue for 2005 of \$371 million, also record-breaking, "surpassed the \$245 billion gross domestic product of Indonesia, an OPEC member and the world's fourth most populous country, with 242 million people." *Id.*
- 208 Carroll, *supra* note 202.
- 209 Fortune 500 2006, *supra* note 206.
- 210 Reuters, Deepa Babington & Ben Berkowitz, *Record Profits Spark New Backlash Against Big Oil*, available at <http://abcnews.go.com/Business/wireStory?id=1558610>.
- 211 Fortune 500 2006, *Industry: Petroleum Refining*, CNNMONEY.COM, http://money.cnn.com/magazines/fortune/fortune500/industries/Petroleum_Refining/1.html.
- 212 Fortune 500 2006, *Industry: Chemicals*, CNNMONEY.COM, <http://money.cnn.com/magazines/fortune/fortune500/industries/Chemicals/1.html>.
- 213 Center for Responsive Politics, *Oil & Gas: Long-Term Contribution Trends*, <http://www.opensecrets.org/industries/indus.asp?Ind=E01>.
- 214 *Id.*
- 215 Center for Responsive Politics, *Oil & Gas: Top Contributors to Federal Candidates and Parties (2004 Election Cycle)*, <http://www.opensecrets.org/industries/contrib.asp?Ind=E01&Cycle=2004>.
- 216 *Id.* And, like ExxonMobil, these other companies gave the bulk of their contributions to Republicans: Valero Energy, the third highest contributor, gave 86 percent to Republicans; Chevron, number five, gave them 83 percent; ConocoPhillips, number 9, gave them 84 percent; BP, number 10, gave them 62 percent, and Marathon Oil, number 11, gave them 80 percent. *Id.*
- 217 Center for Responsive Politics, *Chemical & Related Manufacturing: Long-Term Contribution Trends*, <http://www.opensecrets.org/industries/indus.asp?Ind=N13&cycle=2004>.
- 218 Center for Responsive Politics, *Chemical & Related Manufacturing: Top Contributors to Federal Candidates and Parties (2000 Election Cycle)*, <http://www.opensecrets.org/industries/contrib.asp?Ind=N13&Cycle=2000>; *Chemical & Related Manufacturing: Top Contributors to Federal Candidates and Parties (2002 Election Cycle)*, <http://www.opensecrets.org/industries/contrib.asp?Ind=N13&Cycle=2002>; *Chemical & Related Manufacturing: Top Contributors to Federal Candidates and Parties (2004 Election Cycle)*, <http://www.opensecrets.org/industries/contrib.asp?Ind=N13&Cycle=2004>; *Chemical & Related Manufacturing: Top Contributors to Federal Candidates and Parties (2006 Election Cycle)*, <http://www.opensecrets.org/industries/contrib.asp?Ind=N13&Cycle=2006>.
- 219 As Ed Vulliamy stated in his 2002 *Observer* article about the conflation of government and the energy industry in Texas, "a power machine perfected in Texas" has been "elevated to rule the nation," "[a] machine that operates in perpetual motion—an equilibrium of interests—between industry and politics." Ed Vulliamy, *Dark Heart of the American Dream*, OBSERVER (LONDON), June 16, 2002.
- 220 See SUE O'CONNELL, INST. ON MONEY IN STATE POLITICS, OIL & GAS GIVING IN THE STATES 2 (2005), available at <http://www.followthemoney.org/press/Reports/200510031.pdf>.
- 221 *Id.*
- 222 Contribution data compiled by Texans for Public Justice from their database, which was created from contributors' reports filed with the Texas Ethics Commission (on file with authors) [hereinafter Texans for Public Justice Contribution Data]. Individuals employed or otherwise associated with ExxonMobil contributed an additional \$36,275 to Texas candidates in the 2002 and 2004 election cycles. Texans for Public Justice Contribution Data, *supra*. Chevron Texaco gave an additional \$11,000 to the Texas Oil and Gas Association's PAC, and ConocoPhillips gave the same PAC \$10,000. *Id.* ConocoPhillips officials, other employees, and other individuals associated with the corporation contributed \$7550 in the 2002 election cycle. *Id.*
- 223 *Id.* In the 2004 election cycle, BP gave an additional \$3,000 to the Texas Oil and Gas Association's PAC. *Id.*
- 224 *Id.* Employees and other individuals associated with Valero contributed about \$23,000 during the two election cycles. *Id.*
- 225 *Id.*
- 226 *Id.*
- 227 Mahon, *supra* note 167, at 8.
- 228 See Inst. on Money in State Politics, Texas 2004 Contributors, Texas Oil & Gas Assoc., <http://www.followthemoney.org/database/StateGlance/contributor.phtml?si=200443&d=7077786> (showing \$264,541 in contributions to Texas political candidates); Inst. on Money in State Politics, Texas 2002 Contributors, Texas Oil & Gas Assoc., <http://www.followthemoney.org/database/StateGlance/contributor.phtml?si=200243&d=8258944> (showing \$382,500 in contributions to Texas political candidates).
- 229 See Inst. on Money in State Politics, Texas 2004 Contributors, Texas Chemical Council/Texas Free Enterprise PAC/TCC/ACIT FREEPAC, <http://www.followthemoney.org/>

database/StateGlance/contributor.phtml?si=200443&d=7081520 (showing a total of \$19,273 in contributions to Texas political candidates and parties in the 2004 election cycle); Inst. on Money in State Politics, Texas 2002 Contributors, Texas Chemical Council/ Assoc. of Chemical Industry & Texas Free Enterprise PAC TCC/ ACIT FREEPAC, <http://www.followthemoney.org/database/StateGlance/contributor.phtml?si=200243&d=5664274> (showing a total of \$69,491 in contributions to Texas political candidates in the 2002 election cycle).

230 See Inst. on Money in State Politics, Texas 2004 Contributors, Texas Business & Commerce/BACPAC, <http://www.followthemoney.org/database/StateGlance/contributor.phtml?si=200443&d=7139745> (showing \$30,120 in contributions to candidates in the 2004 election cycle), Texas Business PAC, <http://www.followthemoney.org/database/StateGlance/contributor.phtml?si=200443&d=7929248> (showing \$1250 in contributions to candidates in the 2004 election cycle), Texas Assoc. of Business & Chambers of Commerce PAC, <http://www.followthemoney.org/database/StateGlance/contributor.phtml?si=200443&d=7946991> (showing \$765 in contributions to candidates in the 2004 election cycle), Texas Assoc. of Bus., <http://www.followthemoney.org/database/StateGlance/contributor.phtml?si=200443&d=7946993> (showing \$523 in contributions to candidates and parties in the 2004 election cycle); Inst. on Money in State Politics, Texas 2002 Contributors, Texas Assoc. of Business & Chambers of Commerce, <http://www.followthemoney.org/database/StateGlance/contributor.phtml?si=200243&d=5665413> (showing \$23,100 in contributions to candidates and parties for the 2002 election cycle), Texas Business PAC, <http://www.followthemoney.org/database/StateGlance/contributor.phtml?si=200243&d=569172> (showing \$13,000 in contributions to candidates for the 2002 election cycle), Texas Business & Commerce PAC BACPAC, <http://www.followthemoney.org/database/StateGlance/contributor.phtml?si=200243&d=562728> (showing \$87,508 in contributions to candidates for the 2001 election cycle).

231 TEXANS FOR PUBLIC JUSTICE, AUSTIN'S OLDEST PROFESSION: TEXAS' TOP LOBBY CLIENTS & THOSE WHO SERVICE THEM 6 (2002). Under Texas law, lobbyists are not required to report the exact value of their contracts, but rather only ranges of the values. See *id.* at 3.

232 See *id.* at 5, 7.

233 See *id.* at 12. Two-thirds of Gibling's clients are in the energy, chemical, or waste business. *Id.*

234 See *id.*

235 See Robert Bryce, *It's a Baker Botts World*, THE NATION, Oct. 11, 2004.

236 See Baker Botts L.L.P. Website, *Our History*, <http://www.bakerbotts.com/about/history/> & *Lawyers: James A. Baker III*, <http://www.bakerbotts.com/lawyers/detail.aspx?id=a1789334-3f27-48d5-b844-211455e4beff>; Bryce, *supra* note 235.

237 See Baker Botts L.L.P. Website, *Lawyers: James A. Baker III*, <http://www.bakerbotts.com/lawyers/detail.aspx?id=a1789334-3f27-48d5-b844-211455e4beff>.

238 See O'CONNELL, *supra* note 220, at 5. The California and Florida Republican Parties were numbers one and two, respectively.

Id.

239 See *id.* at 4. Republican candidates from Missouri and Oklahoma ranked numbers five and six. See *id.* From 1999 to 2000, four out of the five Texas candidates who ranked among the top ten recipients were members of the Republican party, receiving a combined total of \$882,649. See *id.* From 2001 to 2002, five out of the seven Texas candidates in the top-ten list were Republicans. See *id.* The top candidate was Governor Rick Perry, who alone received over \$1.7 million from the industry, and the remaining four candidates together received \$2,649,724. See *id.*

240 Inst. on Money in State Politics, Texas 2004 Contributors, Dow Chemical, <http://www.followthemoney.org/database/StateGlance/contributor.phtml?si=200443&d=7079363>; Inst. on Money in State Politics, Texas 2002 Contributors, Dow Chemical, <http://www.followthemoney.org/database/StateGlance/contributor.phtml?si=200243&d=7208229>.

241 Inst. on Money in State Politics, Texas 2004 Contributors, EI DuPont Nemours & Co., <http://www.followthemoney.org/database/StateGlance/contributor.phtml?si=200443&d=7077369>; Inst. on Money in State Politics, Texas 2002 Contributors, EI DuPont Nemours & Co.,

See *supra* notes 228-30.

242 See Jim Getz, *House to Weigh Emissions Amendment*, DALLAS MORNING NEWS, May 1, 2005; R.G. Ratcliffe, *Air Quality Bill's Backers Take Amendment Route*, HOUS. CHRON., Apr. 29, 2005.

244 See Elliott, *supra* note 166.

245 See Dina Cappiello, *5 Chances to Control Pollution Kept at Bay*, HOUS. CHRON., Dec. 26, 2005, at A1 (listing the Harris County representatives and their voting record on the amendments); Inst. on Money in State Politics, State at a Glance: Texas 2004, http://www.followthemoney.org/database/state_overview.phtml?si=200443 (generate each representative's contribution record by inserting name in "candidate" space in the column on the right). The Republican legislators from Harris County received a total of \$119,575 from oil and gas and chemical companies, while their Democratic colleagues received \$34,700. See Inst. on Money in State Politics, State at a Glance: Texas 2004, *supra*. The oil and gas industry provided the bulk of these contributions: \$101,075 of the payments to Republicans and the entire \$34,700 given to Democrats. See *id.*

246 Mayor Bill White, 2005 State of the City Speech (Jan. 2005) (transcript available at <http://www.houstontx.gov/mayor/2005stateofthecity.html>).

247 See *id.*

248 See *infra* Section VII.

249 *Houston Mayor Taps Air Pollution Task Force*, HOUS. CHRON., Apr. 23, 2005.

250 See Houston Regional Monitoring Corporation Website, Homepage, <http://hrm.radian.com/> [hereinafter HRM Homepage]; *id.*, Our Membership, <http://hrm.radian.com/member.htm>.

251 Cappiello, *Mayor's Plan*, *supra* note ____.

252 See *id.* ("We are an advocate for full public disclosure of all data collected. . . . Every major plant ought to have real-time monitors that are shared with the plant manager and ultimately the public.") (quoting Mayor White); Susanne Pagano, *Study by State*

- Finds Excess Cancer Risks Near Chemical Plants in Houston Area*, 36 Env't Rep. (BNA) No. 3, at 143 (Feb. 4, 2005) ("It's no secret that the mayor believes we should have on-site monitoring, real-time monitoring, and that the monitoring done by industry should be shared with the public.") (quoting Frank Michel, spokesman for Mayor White).
- 253 E-mail from Elena M. Marks, Director of Health Policy, Houston Mayor's Office, to Karen Sokol, CPR Policy Analyst (May 3, 2006) (on file with authors) [hereinafter May 3, 2006 E-mail from Marks]; Cappiello, *Mayor's Plan*, *supra* note ___. In response to the mayor's call for release of HRM's monitoring data, a spokeswoman stated, "We recognize that our data is important to understanding air quality in the region," but "we need to understand how data will be used and what data you need." Cappiello, *Mayor's Plan*, *supra* note ___. To the extent that HRM does make information available to the public, it is in a tightly controlled manner. For example, although on its website the industry consortium touts its monitoring network as "a recognized, proven source of scientific information" on levels of air pollutants, including 150 volatile organic compounds (many of which are hazardous air pollutants), HRM Homepage, *supra* note ___, its 2002 report on air pollutant levels in the Houston area provides limited data on only a few "selected" hazardous pollutants, *see* HRM, AIR QUALITY TRENDS IN THE HOUSTON-GALVESTON AREA 3-9 (2002), available at <http://hrm.radian.com/hrmpub/Trends/FinalAQTrends2002.pdf>. Specifically, HRM restricts the emissions data it provides on the selected chemicals to the paper estimates that companies submit to EPA's TRI (which is already publicly available) and annual averages measured by HRM monitors. *See id.* at 1-8, 3-8, 3-10.
- 254 Cappiello, *Mayor's Plan*, *supra* note 194.
- 255 Dina Cappiello, *Pollution Monitors Donated to County and City Agencies*, HOUS. CHRON., Mar. 2, 2005.
- 256 *Id.*
- 257 *Id.*
- 258 *Id.*
- 259 Leigh Hopper & Dina Cappiello, *In Harm's Way: The Burden of Proof*, HOUS. CHRON., Jan. 18, 2005, at A1.
- 260 Natural Resources Defense Counsel, *The Silent Treatment*, ONEARTH at 14, 16 (Spring 2002).
- 261 *Id.*
- 262 *Id.* at 17.
- 263 *See* Greater Houston Partnership Website, Board Members, <http://www.houston.org/boardMembers/BoardMembers.asp>. Also on GHP's board are the presidents and CEOs of the Medical Center's major healthcare institutions, including St. Luke's Episcopal Hospital, Methodist Hospital, Memorial Hermann Hospital, and Texas Children's Hospital. *See id.* In a *Texas Observer* article about the GHP's derailing of environmental protection initiatives in Texas, Brad Tyler describes the GHP as "basically a high-octane chamber of commerce." Brad Tyler, *Harris County Hijacking*, TEX. OBSERVER, May 10, 2002.
- 264 *See* Baylor College of Medicine Website, Board Members, <http://www.bcm.edu/about/trustees.cfm>.
- 265 Natural Resources Defense Counsel, *supra* note 260, at 16.
- 266 Dina Cappiello, *In Harm's Way: She Charted a Course Few Have Followed*, HOUS. CHRON., Jan. 18, 2005, at A8.
- 267 *Id.* (alteration in original).
- 268 *Id.*
- 269 Dina Cappiello, *'96 Report Did Little to Better Area's Air*, HOUS. CHRON., Feb. 20, 2005, at B1.
- 270 *Id.*
- 271 *See id.*
- 272 *Id.*
- 273 *See Houston Mayor Taps Air Pollution Task Force*, HOUS. CHRON., Apr. 23, 2005.
- 274 *Id.*
- 275 *See* MAYOR'S TASK FORCE ON THE HEALTH EFFECTS OF AIR POLLUTION, A CLOSER LOOK AT AIR POLLUTION IN HOUSTON 3, 8-12 (2006), available at <http://www.houstontx.gov/environment/UTreport.pdf>.
- 276 *See id.* at 12-13.
- 277 *Id.* at 13.
- 278 *See id.* at 22-23.
- 279 *See id.*
- 280 Dina Cappiello, *What's in the Air Today? No One Knows*, HOUS. CHRON., Mar. 4, 2005.
- 281 *See* E-mail from Elena M. Marks, Director of Health Policy, Houston Mayor's Office, to Karen Sokol, CPR Policy Analyst (Mar. 23, 2006) (on file with authors) [hereinafter Mar. 23, 2006 E-mail from Marks].
- 282 Dina Cappiello, *Plant Will Cut Emissions of Toxic by Half*, HOUS. CHRON., June 15, 2005 (emphasis added) [hereinafter Cappiello, *Plant Will Cut Emissions*].
- 283 Mar. 23, 2006 E-mail from Marks, *supra* note 281.
- 284 Dina Cappiello, *Plant Agrees to Halve Its Toxic Emissions*, HOUS. CHRON., Dec. 10, 2005, at B1 [hereinafter Cappiello, *Plant Agrees to Halve Toxics*].
- 285 Settlement Agreement between the City of Houston and Texas Petrochemicals (on file with authors), §§ VII, 12 [hereinafter Houston-Texas Petrochemical Agreement].
- 286 *See id.* §§ 1, 2(d), 3(f); *see also* Cappiello, *Plant Agrees to Halve Toxics*, *supra* note 284.
- 287 *See* Houston-Texas Petrochemical Agreement, *supra* note 285, §§ 1, 2(a)-(b), 3-5.
- 288 *See id.* §§ 7, 10.
- 289 *See id.* § 11.
- 290 *See* Cappiello, *Plant Agrees to Halve Toxics*, *supra* note 284; *supra* Part II.
- 291 Cappiello, *Plant Agrees to Halve Toxics*, *supra* note 284.
- 292 Mar. 23, 2006 E-mail from Marks, *supra* note 281.
- 293 Mar. 23, 2006 E-mail from Marks, *supra* note 281. Specifically, Marks said, "I do know that one of the TCEQ Commissioners had advised TPC as they began their negotiations with us, because TPC told us so." *Id.* Three TCEQ commissioners are appointed by the governor and approved by the Senate for six-year terms. Tex. Comm'n on Env'tl. Quality, *Office of the Commissioners*, <http://www.tceq.state.tx.us/AC/about/organization/commissioner.html>. The commissioners "establish overall agency direction and policy" and "make final determinations on contested permitting and enforcement matters." *Id.* When told about the city's account of Texas Petrochemicals representatives' claim that a commissioner advised the company, TCEQ Executive Director Glenn Shankle stated: "I can assure you that none of the

three commissioners would have ventured into that activity. Those are private matters as far as they're concerned." Telephone Interview with Glenn Shankle, Executive Director, TCEQ (June 22, 2006).

294 See Bi-Lateral Voluntary Emission Reduction Agreement between the Executive Director of the Texas Commission on Environmental Quality and Texas Petrochemicals L.P. (June 2005) (on file with authors); see also Dina Cappiello, *Plant Will Cut Emissions*, *supra* note 282 (describing the provisions of the agreement).

295 Mar. 23, 2006 E-mail from Marks, *supra* note 281; Cappiello, *Plant Will Cut Emissions*, *supra* note 282.

296 Cappiello, *Plant Will Cut Emissions*, *supra* note 282.

297 *Id.*

298 *Id.*

299 Mar. 23, 2006 E-mail from Marks, *supra* note 281.

300 *Id.*

301 *Id.*

302 *Id.*; see also Cappiello, *Plant Agrees to Halve Toxics*, *supra* note 284 ("Berg said that negotiations began in earnest after he was hired on a pro bono basis in August to explore legal remedies to the city's air pollution problem.").

303 See Dina Cappiello, *Goodyear Plant to Cut Emissions*, HOUS. CHRON., Aug. 20, 2005 [hereinafter Cappiello, *Goodyear to Cut Emissions*].

304 Dina Cappiello, *City Loses State Contract to Inspect Area Plants for Bad Air*, HOUS. CHRON., Aug. 23, 2005, at A1 [hereinafter Cappiello, *City Loses State Inspection Contract*].

305 Cappiello, *Goodyear to Cut Emissions*, *supra* note 303.

306 Mar. 23, 2006 E-mail from Marks, *supra* note 281.

307 Mayor Bill White, *supra* note 246.

308 Cappiello, *City Loses State Inspection Contract*, *supra* note 304.

309 Dina Cappiello, *City Gains Weapon in Air Quality Fight*, HOUS. CHRON., Jan. 23, 2005 [hereinafter Cappiello, *City Gains Weapon*].

310 *Id.*

311 *Id.*

312 See *id.*; Cappiello, *City Loses State Inspection Contract*, *supra* note 304.

313 Cappiello, *City Gains Weapon*, *supra* note 309.

314 Pagano, *supra* note 252.

315 Cappiello, *City Gains Weapon*, *supra* note 309.

316 *Id.* Further, as the *Chronicle* pointed out in its analysis of the amendment: "[T]he change will allow local officials who represent constituents in the most polluted areas of the city to initiate court action on their behalf. That's a welcome addition of power to the governmental body most sensitive to the problem." *Words into Action*, HOUS. CHRON., Jan. 25, 2005, at B8.

317 See Mar. 23, 2006 E-mail from Marks, *supra* note 281.

318 See *id.*

319 Cappiello, *City Loses State Inspection Contract*, *supra* note 304.

320 *Id.*

321 After the city made preparations to file suit against Valero Energy based on regulatory violations and the common-law theory of nuisance, Valero agreed to enter negotiations with the city on an

emissions-reduction agreement. See Dina Cappiello, *City Backs Off Suing Valero Over Local Pollution Violations*, HOUS. CHRON., Apr. 20, 2006; Dina Cappiello, *Council Delays Decision on Valero Suit*, HOUS. CHRON., Apr. 13, 2006, at B1.

322 See, e.g., Sections 5.103 (general rules); 5.105 (general policy); 5.130 (consideration of cumulative risk); 382.017 (authorizing TCEQ to promulgate rules consistent with the TCAA); 382.002 (policy and purpose of TCEQ); and 382.011 (general powers and duties of TCEQ).

323 7 N.J. ADMIN. CODE ch. 25-5.2.

324 310 CMR 7.00 (defining air pollution) and 7.01 (prohibiting emissions that cause air pollution).

325 See <http://www.epa.gov/region5/air/tristate/rmp.htm>.

326 *Id.*

327 According to the risk assessment plan for the Tri-State Geographic Initiative:

The source apportionment process attempts to identify what percentage of the measured ambient air concentrations of pollutants is attributable to specific air pollution source categories or sources. One method uses a computer model to match source category emission profiles or "finger prints" to the ambient air concentrations. A pollutant source typically emits pollutants in a specific ratio as a "fingerprint" of emissions. For example, the ratio and type of pollutants emitted from a chemical factory are different from a refinery, which are different from highway vehicles. The computer model, sometimes labeled as a "chemical mass-balance model" manipulates the various "fingerprints" of potential source categories to fit the pollutant patterns present in analyzed ambient air. When the fingerprints are compared to the ambient air pollutant concentrations, a percentage contribution from each source category can sometimes be estimated.

Id.

328 This could link to a "condition of air pollution," a term that TCEQ should define as precisely as possible with respect to HAPs.

329 Clean Air Act § 304, 42 U.S.C.A. § 7604 (West, Supp. 1991); Clean Water Act § 505, 33 U.S.C. § 1365 (1988); Jeannette L. Austin, *The Rise of Citizen-Suit Enforcement in Environmental Law: Reconciling Private and Public Attorneys General*, 81 NORTHWESTERN U. L. REV. 227 (1987); Clifford Rechtschaffen, *Deterrence vs. Cooperation and the Evolving Theory of Environmental Enforcement*, 71 S. CAL. L. REV. 1182 (1998).

330 Austin, *supra* note 330, at 247.

331 42 U.S.C. § 7604.

332 The refinery was originally built in 1934. See Shannon Buggs & Lynn J. Cook, *Refinery First Went Online 71 Years Ago*, HOUS. CHRON., Mar. 24, 2005; Allan Turner et al., *Flash Fire Broke Out at Blast Site the Day Before Explosion*, HOUS. CHRON., Mar. 25, 2005.

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334 Memorandum from JoAnn Wiersema to Doyle Pendleton (May 15, 1988).

335 *Id.*

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- 341 Memorandum from Janet Pichette to Allen Parker (Mar. 6, 1996) [hereinafter Pichette/Parker Memo 3/6/96].
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- 344 *Id.*
- 345 Memorandum from Tim Doty to JoAnn Wiersema (Dec. 1, 1997).
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- 347 Memorandum from J. Torin McCoy and Allison Jenkins to Leonard Spearman, at 1 (Jan. 8, 1998).
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- 350 Memorandum from Tim Doty to JoAnn Wiersema (Dec. 1, 1998) [hereinafter Doty/Wiersema Memo 12/1/98].
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- 354 *Id.*
- 355 *Id.*
- 356 *Id.* at 7.
- 357 Galveston County United Board of Health, Resolution (Mar. 31, 1999).
- 358 Memorandum from Tim Doty to JoAnn Wiersema (Jan. 5, 2000), at 9-12 [hereinafter Doty/Wiersema Memo 1/5/00]; Memorandum from Allison Jenkins to Leonard Spearman, Jr., at 2 (Mar. 8, 2000) [hereinafter cited as Jenkins/Spearman Memo 3/8/00].
- 359 Jenkins/Spearman Memo 3/8/00, *supra* note 27, at 3.
- 360 *Id.*
- 361 Doty/Wiersema Memo 1/5/00, *supra* note 27, at 13.
- 362 *Id.*; Jenkins/Spearman Memo 3/8/00, *supra* note 27, at 3-4.
- 363 Doty/Wiersema Memo 1/5/00, *supra* note 27, at 15.
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- 367 *Id.*
- 368 Memorandum from Allison Jenkins and Laurel Carlisle to Leonard Spearman, Jr. (Apr. 20, 2001) [hereinafter Jenkins & Carlisle/Spearman Memo 4/20/01]; Memorandum from Tim Doty to JoAnn Wiersema (Feb. 20, 2001) [hereinafter Doty/Wiersema Memo 2/20/01].
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- 410 *Id.* at 10.
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