



Emissions Events Affecting Southeast Houston

By Sarah Perelstein, Community Organization Intern, Summer 2005

Summary

The neighborhoods in Southeast Houston's 77017 zipcode are affected by pollution from one of the largest petrochemical complexes in the country, as well as from other mobile and area sources. The community is vulnerable to emissions from the approximately 100 industrial sources along the Houston Ship Channel. Specifically, the 77017 community is on the fenceline of three major industrial facilities, including Texas Petrochemicals, ExxonMobil Chemical Company and Goodyear Tire & Rubber Co., and is also affected by emissions from Lyondell-Citgo Refining, Rhodia, and Valero Refining. Many of these industries have ranked in 2003 and 2004 as the top ten emitters in Harris County for releasing the confirmed carcinogens benzene and 1,3-butadiene.

In addition to enduring the facilities' regular release of permitted amounts of pollutants, Southeast Houston residents are subject to exposure to toxic chemicals from emissions events that occur with surprising frequency at the neighboring facilities. Emissions events are unpermitted releases of chemicals that may occur during the plants' start-up, shut-down, and maintenance activities, or from unplanned industrial accidents related to equipment failures, leaks, or human error. While the Texas Administrative Code characterizes most emissions events as unforeseeable or unavoidable, the resulting emissions still have a significant impact on the environment and the 77017 community by contributing hundreds of thousands of pounds of additional toxic chemicals into the already polluted air each year.

Mothers for Clean Air spent nearly three months during the summer of 2005 acquiring data on all of the reported emissions events that occurred at the six facilities in Southeast Houston between January 2000 and July 2005. Industry is required to report emissions events within twenty-four hours and is given the incentive of receiving an affirmative defense (not being subject to penalties although the release was unpermitted) for events deemed to be non-excessive. Although industries often underestimate the amount of chemicals released during emissions events and on occasion neglect to report accidental releases at all, Mothers for Clean Air was able to compile a database containing information about 441 emissions events that occurred during this time period.¹ The database contains

information on the dates, durations, causes and releases (including the quantity of each chemical released) for each emissions event. The sources for this information were the Texas Commission on Environmental Quality's (TCEQ's) Air Emission Event Online Database, the National Response Center Website, the Southeast Regional LEPC and the TCEQ's file room for emissions events before 2003.

Data was originally entered into Microsoft Excel and later transferred into Microsoft Access in order to sort the data and look for trends across the facilities during the five and a half year period. An analysis of trends in the data appears in the first section of this report.

After acquiring data on 441 emissions events, Mothers for Clean Air conducted a survey of eleven 77017 residents to find out community members' experiences with industrial accidents in the past five years. The survey asked about the community's perception that an accident was occurring, and whether the community had received any notification about the release. Respondents felt that the community does not receive warnings or information despite the frequency of emissions events that have the potential to affect them, and that they generally feel abandoned by the City of Houston, which is supposed to be protecting them.

From researching emissions events affecting the community and speaking with residents, the report concludes that:

1. The community needs an effective emergency notification system. There is currently no established emergency notification system to warn the 77017 community when a harmful release occurs. The Right-To-Know Act makes it possible for citizens to get information about upsets long after the fact (after they've been reported), but the community really has a right to know when an emissions event is occurring so that residents can choose to protect themselves.
2. The community should use MfCA's comprehensive database of 441 emissions events to confront industry about their pattern of unpermitted, harmful emissions and to push for better enforcement.

¹ While Mothers for Clean Air found 441 emissions events, the ambiguity in the definition of an emissions event might cause other researchers to come up with a slightly different number. MfCA decided on a concrete beginning and end of many incidents, which caused some events to occasionally be split into two despite reporting as a single incident. Opacity exceedences were counted as separate from emissions events.

Emissions Events from January 2000-July 2005

By integrating data from the Texas Commission on Environmental Quality's (TCEQ's) Air Emission Event Online Database, the National Response Center Website, the Southeast Regional LEPC and the TCEQ's file room, MfCA found that 441 unplanned emissions events occurred between January 2000 and July 2005 among six facilities—Valero Refining, Lyondell-Citgo, Texas Petrochemicals, Rhodia, ExxonMobil and Goodyear—whose emissions impact the communities in Southeast Houston (specifically within zipcode 77017).

Types of emissions events

Of the 441 emissions events, 335 were characterized as accidental, 53 were opacity exceedances and 53 were related to startup, shutdown and maintenance (Figure 1). These 441 emissions events caused 3,420,007 pounds (1710 tons) of excess pollutants to be released throughout the past five and a half years.

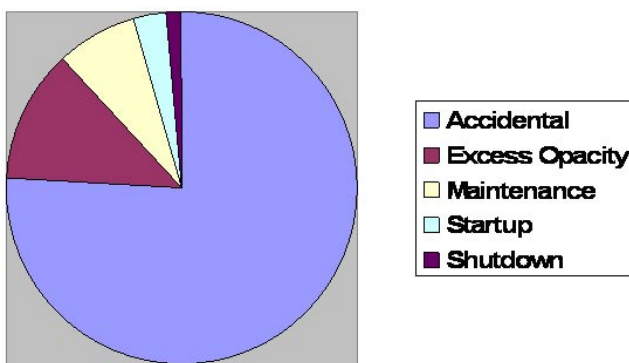


Figure 1: Type of Incident

Facilities' individual contributions to total emissions events

Houston's Valero Refining had the largest number of upset events that had the potential to affect the air in zipcode 77017. In fact, Valero was responsible for more than a third of the emissions events occurring during the five and a half year time period. A break down of each facility's contribution to the 441 incidents over the five and a half year period is as follows (Figure 2):

- 39.5% of the incidents (or 174) occurred at Valero Refining
- 30% (or 132) occurred at Lyondell-Citgo Refining
- 11% (or 49) occurred at Texas Petrochemicals
- 7.5% (or 33) occurred at Rhodia Inc
- 7% (or 31) occurred at ExxonMobil
- 5% (or 22) occurred at Goodyear Houston Chemical Plant

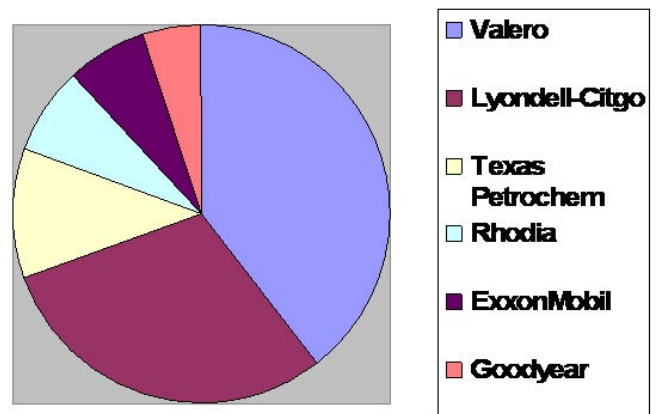


Figure 2: Incidents by Company 2000-2005

It is significant to note that the total number of emissions events experienced by these six facilities was nearly cut in half over a five year period, from 2000-2004. In 2000 and 2001, 109 and 108 emissions events occurred respectively. However, only 56 emissions events took place in all of 2004. Between 2001 and 2002, it appears that Lyondell-Citgo was successful at reducing their emissions events (from 46 in 2001 to 10 in 2002) and this had a major impact in reducing the number of total upsets from 108 in 2001 to 62 in 2002. Fluctuations in the annual number of emissions events between 2002 and 2004 seem to have been determined to a large degree by Valero.

While none of the facilities have demonstrated a consistent reduction in emissions events over the five year period, it is evident that ExxonMobil and Lyondell-Citgo are showing a trend of reducing their emissions events. Valero's emissions events have been highly inconsistent. In every year except 2001, Valero has been responsible for the greatest number of emissions events. In fact, between 2002-2005, Valero has had between 14 and 31 more upsets than the facility with the next greatest amount. Goodyear has almost consistently experienced the least number of emissions events per year, followed by Rhodia, which reported no upsets for 2004.

Trends by month, year, season, and incident duration

Goodyear, ExxonMobil, Rhodia, and Texas Petrochemicals average less than one emissions event per month, Lyondell-Citgo averages two and Valero averages almost three. The average number of annual emissions events experienced at each facility is listed below:

- Valero Refining averages 32/year
- Lyondell-Citgo averages 24/year^{*2}
- Texas Petrochemicals averages 9/year
- Rhodia averages 6.5/year
- ExxonMobil averages 6/year
- Goodyear averages 4/year

² This calculation is skewed by Lyondell-Citgo's performance in 2000 and 2001, and is significantly less (closer to 10/year) since 2002.

Although MfCA tried to assess whether seasonal trends could explain the facilities' emissions, we found that any broad assessment is skewed by Valero's pattern of emissions events. For example, a graph of the number of incidents occurring per month over the five and a half year period shows a distinct peak in June and a low in September, although closer analysis reveals that the graph is entirely driven by Valero. However, some seasonal trends become apparent when examining the number of emissions events per month separately by facility. ExxonMobil typically experiences a peak during March and April, while it has a clear low throughout the winter. Similarly, Goodyear also experiences a peak during March and April, while it experiences its lows in the fall and winter. For Texas Petrochemicals, the greatest number of emissions events take place during the spring (between March and May), while those numbers drop during the fall (between September and November/December). Valero's pattern of emissions events is more inconsistent, although it experiences the most accidents in the summer (May until August) and has a low in September. It is difficult to discern any regular pattern from Lyondell-Citgo and Rhodia's emissions events.

It is possible, however, to see patterns about when the facilities typically perform routine maintenance, startups and shutdowns. The facilities undergo maintenance most often during July, followed by October. Almost all shutdowns occur in January, resulting in a lot of startups during February, although the most startups tend to occur in May.

While an examination of seasonal releases produces some interesting data, an examination of the duration of the releases does as well (Figure 3). Most of the emissions events at the six facilities—47 percent—lasted for less than 15 minutes. Opacity exceedances, of which there were 53 reported, contribute to this percentage because they are averaged over six minute periods. However, a full 6 percent of the incidents lasted for longer than one day, with 4 percent lasting for longer than two days.

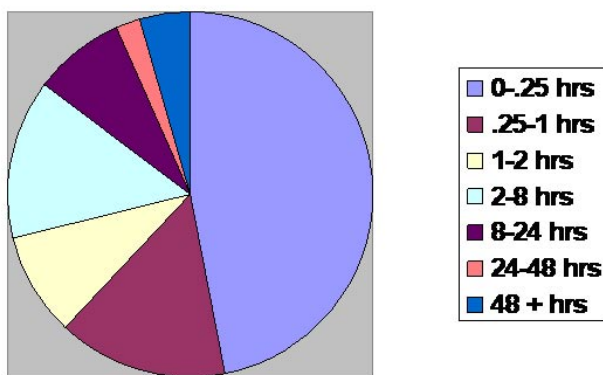


Figure 3: Incident Duration

Causes associated with the emissions events

The causes that the facilities attribute to each emissions event can be broken down into several categories, including equipment failure, equipment leak, human error, power failure, and those incidents associated with startups, shutdown or maintenance (Figure 4). MfCA has categorized those events that do not fit neatly into any category as "other," and there are also some events for which the cause is either unknown or was under investigation at the time the data was compiled. Equipment failures account for the greatest number of emissions events by far; 234 of the emissions events, or 56 percent, were a result of an equipment failure. Some of these reflect a recurring pattern of equipment failures for a single piece of equipment—malfunctioning valves and unexpected compressor shutdowns in the sulfur recovery unit and fluidized catalytic cracking unit are a few recurring examples. Emissions events that can be associated with a facility performing startup, shutdown or maintenance account for 14 percent of events reported, while equipment leaks make up 8 percent, operator error makes up 6 percent and upsets resulting from a power failure accounts for 4 percent. Another 4 percent fall into the "other" category, and for 9 percent of all events reported, a cause was never confirmed.

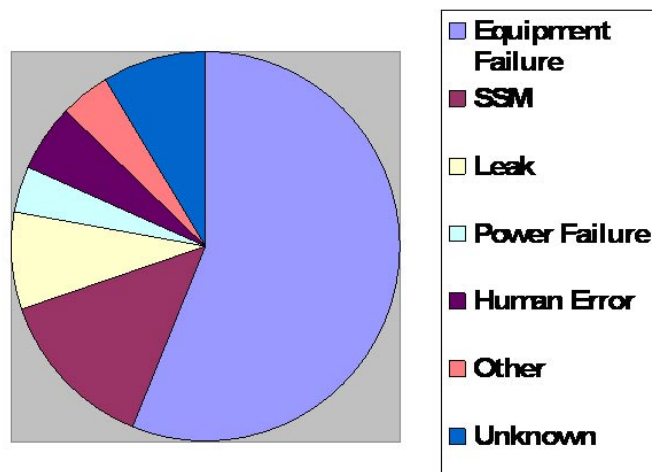


Figure 4: Cause of Incident

Penalties associated with the emissions events varies by cause

TCEQ enforces regulations through a procedure that starts with Notices of Violation (NOV) and Notices of Enforcement (NOE). An NOV is a written notification prepared when a violation is observed during an inspection. If the violation is not corrected within the prescribed time period, an NOE may be written. An NOE is written notification that formal enforcement proceedings are being initiated.

One-hundred thirty-one NOVs and 68 NOEs were issued to the six facilities for the 441 emissions events. All six plants have been issued NOVs for some emissions events occurring during the five and a half year period, although ExxonMobil and Goodyear each received a total of 3 NOVs compared with Valero's 58 NOVs. Valero received 27 NOVs in 2003 alone—more in a single year than the total number issued to any other facility in five and a half years. Goodyear is the only facility which did not receive a single NOE for its upset events. ExxonMobil received 1 NOE in 2001, while Lyondell and Texas Petrochemicals each received a total of 9 NOEs and Valero received 46. The majority of NOEs issued to Valero Refining—27 out of 46— were resolved through its June 16, 2005 Consent Decree with the US EPA and the US Department of Justice.

MfCA found that most upsets resulting from human error resulted in penalties, while very few of those associated with maintenance activities did. These results are consistent with the Texas Administrative Code's rules for Emissions Events, under which human error should not typically qualify for an affirmative defense. Although many equipment leaks are preventable, only 18 percent of upsets caused by equipment leaks resulted in NOVs. Similarly, although plants are required to have back up plans in the case of a power failure, only 19 percent of emissions events related to power failures resulted in an NOV. And while the majority of upset events were caused by an equipment failure, MfCA noticed that the facilities received NOVs for these events only a third of the time. A chart relating penalties to the cause of the incident is depicted below:

Cause of Upset	% resulting in NOVs	% resulting in NOEs
Equipment failure	34	18
Human error	83	21
Leak	18	3
Unplanned SSM	9	5
Power failure	19	13
Other	41	41
Unknown	17	11

Industry and citizen's reporting of emissions events do not coincide

Even after exhausting three reporting sources and devoting three months to documenting 441 emissions events affecting the 77017 community, MfCA is not convinced that its database is complete. Despite federal and state regulations, emissions events still go unreported. One 77017 resident has strong evidence of this. From September until early October of 2004, this resident kept an incident report of events she smelled or felt to be occurring outside her home. Although she documented instances when "the air smelled like sulfur" or her house was "vibrating from chemical plant" on eight separate occasions, not a single event in

her log corresponded to a reported emissions event. There are often large inconsistencies between industry's reporting of emissions events and the perceptions of affected residents as to how often industrial accidents occur at the facilities in their community.

Survey of the Southeast Houston Community

Methodology

Mothers for Clean Air conducted a telephone survey of eleven Southeast Houston residents to learn how the community has been affected by industrial accidents, whether they were satisfied with the ways the accidents have been reported, and to gauge perceptions about safety in the community. Many of the interviewees had previously expressed an interest in environmental issues, although two were referred by neighbors or surveyed at random. The background of the interviewees ranged from two civic club presidents to a middle school teacher, a former plant worker, and a student.

One distressed resident said that emissions from the facilities cause a nuisance every day of her life. She thinks about what is in the air constantly, especially when she steps outside. She has air purifiers all over her house and car in an attempt to over-compensate for the heavily polluted air that surrounds her.

In order to assess whether the residents recalled any of the 441 industrial accidents that MfCA documented for the past five years, MfCA triggered most residents' memories by characterizing industrial accidents as "an upset or release that causes noticeable odors, heavy smoke or other unusual conditions."

Survey results

Most residents admitted that they were affected by chemical releases on a regular basis, with four claiming to be affected every day. Three residents said that they were not regularly affected, and one mentioned that she seemed to be affected most whenever it rains.

Many residents admit to being scared or angry when these releases occur. While ten out of eleven interviewees said that industrial accidents and other releases from neighboring facilities is something that seriously concerns them, they expressed the greatest concern about health effects and the future of their children. One community member expressed concern that the

facilities are a target for terrorist attacks. Four residents cited the fear, odors and inconveniences caused by the facilities' air pollution as grounds for moving out of the community, although two of the four cannot afford to do this.

Based on comments and concerns of the residents we interviewed, MfCA drew the following conclusions:

- *The community is not being informed.*

Only two residents stated that they had ever been notified that an industrial accident had occurred. They found out through the TV news later that evening or in the next day's newspaper. Nine out of ten responding residents answered "No" to the question, "Is the community usually notified about accidents that affect them?"

The consensus among community members is that they usually get information from the television, newspapers, community meetings and Mothers for Clean Air. Five residents have made efforts to solicit information from outside authorities, including the Texas Commission on Environmental Quality, Harris County Pollution Control, City of Houston Office of Emergency Management, the CAER line, firefighters, the police and the plant suspected to be

To one resident interviewed, the most tragic consequence of the frequent, unauthorized emissions by local plants is that the kids in the neighborhood can't be kids. She recounts a near-daily battle with her children, who want to go outside and play with water guns in the backyard. In response to this innocuous request, she has to tell them that they can't; they have to stay inside until the smell is gone, or until the air isn't so heavy.

causing the emissions.

- *Community members' feel that their health may be at risk.*

Seven residents believe that either themselves, or a member of their family has experienced health problems as a result of industrial accidents. Most of the residents who responded affirmatively to this question prefaced their answer by saying that while they suspect a link between the chemicals and their health problem, it is hard to establish a clear connection. Some of the health problems the eleven interviewees listed include acute lymphocyte leukemia in an eight year old boy, the autoimmune disease lupus, emphysema, chronic upper respiratory congestion, skin saryosis, and difficulty breathing. One interviewee mentioned that it is not just human beings who are affected by the quality of the air—her

three horses experienced runny noses, sneezing, swollen and draining eyes, and refused to drink their water until it was moved into a covered stall.

- *Government agencies & industry should both play a role in community safety.*

There was some disagreement among community members surveyed about who should be responsible for keeping the community informed and protected from industrial accidents. Most interviewees agreed that both government agencies and local industries have the responsibility to keep the community informed, although more believed that the government agencies must be the ones to act to protect the community. Many residents recognize that government is needed to regulate industry and make them pay if they violate state or federal regulations, because they believe that the companies are in business to make money, not to be good neighbors. (However, one resident interviewed claimed that the refineries are as concerned about the environment as anybody else, citing the industry's donation of a softball field and their efforts to plant a lot of trees.) None of the respondents felt that the plants or the local government agencies were doing a good job of keeping the community informed and protected.

- *Respondents have suggestions for improvement.*

Residents interviewed in zip code 77017 came up with a variety of suggestions that could be implemented to make the community feel safer, although two members surveyed don't believe that the community's proximity to the plants makes it unsafe. Community members interviewed are in unanimous agreement that information is needed to make the residents feel safer. One interviewee pleaded that residents of her neighborhood be made aware that they are living in a high-risk area, because she had no idea that she was until surveyed about it by MfCA. Another resident said she had to beg for information because it was not at all easy to come by. Two residents think that educating the community about health risks alone will make residents feel safer. Newsletters and pamphlets at schools are among the suggested methods for communicating pertinent information. Three residents look to efforts from the agencies to enhance perceptions of safety in the community—the agencies can start by providing an easy-to-remember number for citizens to call for information, and by providing reliable data collected through effective air monitors. One community member believes changes must come at a legislative level.

Affected by pollution from six major industries that are part of the country's largest petrochemical complex, as well as various other point and non point sources, residents of 77017 are rightfully concerned. However, they are unsure how to protect themselves since they have yet to receive adequate notification and struggle to obtain any kind of information about the chemicals being released into the air they breathe.

The Houston Chronicle's series In Harm's Way looked at how fence-line communities like Southeast Houston's 77017 were affected by air pollution from neighboring facilities. The article titled "Troubled Neighbors" contains a description that aptly characterizes this community:

"Few are more in the dark about these numbers than the people living in industry's shadows, who typically are not told when high levels are found and who do not have ready access to the data the state collects at the 76 monitoring stations across Texas."

Lack of Information & Emergency Notification

Southeast Houston residents do not believe that an effective emergency notification system is in place in their community. The City of Houston Office of Emergency Management confirmed the residents' perceptions, explaining that 77017 has no outdoor fixed sirens, but that emergency information could be broadcast over the radio and cable TV. A few residents mentioned that nearby plants such as Texas Petrochemical, ExxonMobil & Goodyear have alarm systems which they test weekly at a specified time, yet those alarm systems are designed for the safety of plant workers rather than community members.

MfCA researched a specific type of emergency warning called a "shelter-in-place" in which the entire community would be notified as a form of protection against a release of toxic emissions. In response to a shelter-in-place, residents are supposed to shelter inside an enclosed structure, close all windows, turn off air conditioning or heating systems, stay off the telephone and listen to the radio for further instructions. In March of 2002, a shelter-in-place was called when Rhodia released forty seven pounds of sulfur trioxide. Nine months later, in December of 2002, a shelter-in-place was called for Galena Park when Lyondell-Citgo released over one hundred three thousand pounds of sulfur dioxide into the community's air.

However, it is nearly impossible to get information about a systematic procedure for calling a shelter-in-place, or to find records of past shelter-in-places having been called. Neither Fire Depart-

ment records, City of Houston public records, the Greater Houston Local Emergency Planning Committee (LEPC), the Southeast Regional LEPC, the East Harris County Manufacturer's Association nor the Texas Commission on Environmental Quality have kept any records of shelter-in-places. Upon calling the Office of Emergency Management, MfCA was given a disappointing explanation: industry can't call a shelter in place, so the first responder on the scene, usually the Incident Commander of the Fire Department, will be the one to call for it.

When ten Southeast Houston residents were asked whether they have experienced a shelter-in-place, none recalled that it has ever been used in an emergency situation. (One resident said she recalled having practiced it in a school drill.) Seven residents were either unfamiliar with the term shelter-in-place, or had never been instructed how to do it. Of the three residents surveyed who knew how to shelter in place, two learned it at school, and one learned it from working at a chemical plant.

Nine out of eleven 77017 residents said that they have never been notified—via shelter-in-places, community alarms or a telephone notification system— about any release that may affect them. One citizen said that the community never receives information that an industrial accident is occurring; they just smell to know that something is going on. Another citizen added that she occasionally reads about upsets at the neighboring facilities in the newspaper, but at that point it is "too little, too late." Others hear about major events when they are reported on television. Many residents concurred that there is no one looking out for the community, which is evident because they have never been notified or informed of releases.

The only way the community will get information is if residents take the initiative to call for it ("beg for it" is the term one community member used). But many 77017 residents found that when they did try to call for information, they were either given a run-around or ended up speaking with local authorities who were as uninformed about the situation as they were. One resigned citizen used to be proactive about calling the TCEQ for information, but has since stopped calling because "no one ever did anything." This resident had kept an odor log of events outside her home for over a month in 2004, yet her willingness to take action in response to the plants' harmful emissions waned because she received no response. One citizen tried to call the City of Houston Office of Emergency Management and was referred to the CAER line, an emergency hotline operated by the plants. Another citizen said she preferred to call the plants responsible for the pollution

before she would call the CAER line or a local agency. Another called the City of Houston Fire Department twice in one month, but was transferred back and forth multiple times because no one had any information that an incident was occurring. Since the city could not assure her of her safety with any certainty, she made a personal decision to leave the community on this occasion.

Three residents interviewed had experience calling the CAER line. None of them believed it to be a satisfactory source of information: one found that the emergency information posted on the CAER line did not match up with his experience, another found that information on the CAER line was not timely (the emergency message was not available until hours after the incident) and the third interviewee said that the CAER line never had information when an industrial accident was occurring.

***A survey conducted by the Center for Process Safety at Texas A&M University found that between 50 and 67 percent of people living within a one mile radius of facilities covered by risk management plans were unaware of the existence of the facility.
–The Safe Hometowns Guide***

Three residents described Citizen Advisory Panel (CAP) meetings where they received information from local industries. CAP meetings are sponsored by industry and are intended to facilitate discussions between industry representatives and community members on relevant issues. The residents' evaluations of CAP meetings indicate that such a forum is ineffective in getting industry to take responsibility for industrial accidents or answer the community's concerns.

One resident also recalled receiving an update on Texas Petrochemicals' (TPC's) activities in the Oak Meadows Civic Club's December 2004 newsletter. The Senior Vice President of Texas Petrochemical authored the four paragraph informational piece entitled "A message from your neighbor." The update reinforced Texas Petrochemicals' importance as a dependable job source for the community, reiterated their corporate philosophy to "operate safely to protect our employees, our neighbors and the environment," asserted that they experienced no reportable environmental events for the month of September, and concluded by informing citizens that they "welcome...comments, suggestions & feed-

back" on TPC's performance. The resident complained that the message served to underscore the ways in which TPC supports the community, but did not scratch the surface of whether the plant was cleaning up its operations to reduce the community's exposure to toxic chemicals.

Despite evidence of 441 accidents that have affected this community over the past five years, one resident expressed great surprise at MfCA's survey questions, as she was not aware of any industrial accidents and had no idea that her community could be considered "high-risk." She recalls pungent smells, smoky flares and sticky residue on her car's windshield, but she had never received any information other than her husband's reassurances that these unusual events "didn't mean anything." While the Southeast Houston community is affected on a regular basis by emissions from six petrochemical facilities, vehicles on three major freeways, marine vessels on the Houston Ship Channel and a large airport within four miles, these residents are perhaps most endangered by a lack of information.

Although one resident claimed that it "just isn't realistic" to think that notifications will happen in the community, and another hypothesized that there was a lack of funding to support an emergency notification system, the Southeast Houston community needs the security of knowing that they will be effectively notified whenever a chemical release occurs that may affect them. Residents in Southeast Houston are overlooked by both city officials and regulatory agencies, neither of whom makes it their responsibility to notify the community or develop a contingency plan for them. By contrast, community officials in nearby Pasadena and Deer Park take responsibility for informing and protecting residents from chemical releases. The cities of Deer Park and Pasadena each have an emergency notification network that should be evaluated when developing a model for Southeast Houston.

- In Pasadena, industry officials are responsible for notifying the Local Emergency Planning Committee (LEPC) of any release that may affect the community. Then, community officials are responsible for warning nearby residents, and taking appropriate steps to protect the public.
- In Deer Park, industry officials are also responsible for notifying the LEPC. City officials are responsible for warning nearby homes, schools and business, and recommending appropriate protective actions. Police dispatchers will activate the city's Outside Alarm System, sounded only for chemical emergencies.³

³ The City of Deer Park has a working Outside Alarm System which is activated only for chemical emergencies. Eight siren-type alarms mounted on utility poles throughout the city can be sounded citywide or just in the geographic area affected by the release.

Residents' Perceptions and Potential Long-term Health Effects of Exposure to Toxic Chemicals

In the past five years, the Southeast Houston community has been exposed to permitted emissions from the six facilities in their neighborhood, as well as unpermitted emissions resulting from upsets and industrial accidents. A recent report by Public Citizen maintained that air emissions from upset events are often more harmful to local communities than emissions from routine operations because "upsets release large amounts of concentrated toxic pollutants in short periods of time."⁴

The chemicals manufactured by the six facilities neighboring the 77017 community have been associated with many types of health effects, ranging from reproductive and respiratory problems to developmental delays and cancer. In the past five years, unpermitted emissions from upsets, startups, shutdowns and maintenance repairs have resulted in the release of 152 tons (304,744 lbs) of air toxics, 104 tons (208,183 lbs) of carcinogens, 1431 tons (2,862,775 lbs) of respiratory toxics. While frequent exposure to these quantities of toxic chemicals could pose health risks, it is important to remember that just because chemicals are released into the air in certain quantities doesn't mean the public is breathing them in at that concentration.

The facilities have also jointly released 243.5 tons (487,040 lbs) of highly reactive VOCs during the past five years. Highly reactive VOCs contribute to the formation of ozone, which aggravates asthma and other respiratory diseases. Lyondell-Citgo, ExxonMobil and Valero Refining are considered to be three of the top ten VOC emitting-facilities in Harris County.

Among the most dangerous chemicals produced by the facilities are sulfur dioxide, sulfur trioxide, benzene, 1,3-butadiene, styrene, toluene, hydrogen sulfide and NOx. These chemicals can trigger diseases of the heart and blood vessels, behavioral and autoimmune diseases and have been associated with decreased fertility. All except hydrogen sulfide and sulfur trioxide are suspected developmental toxicants, which can cause harm to fetuses and impair normal physical and behavioral development in children.

Exposure to any of these chemicals can impair respiratory function and lead to diseases such as emphysema and cancer. Chemically-induced cancer has been shown to develop many years after a person has been exposed to toxic chemicals. Benzene and 1,3-butadiene are examples of known carcinogens, meaning they are capable of inducing cancer in humans after prolonged or excessive exposure. Both are associated with causing leukemia.

Lyondell-Citgo, ExxonMobil and Valero Refining all make the list of Harris County's top ten benzene emitters, and Texas Petrochemicals ranks as one of the largest 1,3-butadiene emitters in the state. In the past five years, industrial accidents at the six facilities have caused more than 40,000 pounds of these two chemicals to be released. The TCEQ concluded in their 2003 report on the health effects of ambient air monitoring data collected at Milby Park that "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 federal limit and our acceptable risk goal," and thus it is necessary to pursue a reduction in 1,3-butadiene emissions for this area of Southeast Houston.

Styrene and toluene are also reasonably anticipated to be human carcinogens, and excess emissions of these two chemicals have contributed another 27,000 pounds of carcinogens to Southeast Houston's air in the past five years. Highly toxic, styrene has been linked to breast cancer and is suspected of causing every category of adverse health effect. The 77017 community has also been exposed to an additional 2,362,000 pounds of sulfur dioxide resulting from upsets. Sulfur dioxide contributes to respiratory disease (especially in children and the elderly) and aggravates existing heart and lung conditions.

While many concerns may be attributed to living on the fenceline of a major petrochemical complex, MfCA found that Southeast Houston residents are most preoccupied with the risks associated with exposure to toxic chemicals. In a recent public health survey of zipcode 77017, concern about the health effects of chemicals ranked second out of twenty environmental issues affecting the community. One citizen interviewed believes that the community is most in need of education about health effects. Another resident is a proponent for studies on health effects, although he believes these studies can only take place if researchers collect good data from reliable monitoring.

When asked by MfCA if they had experienced any health effects as a result of emissions, many residents listed members of their families, as well as friends and neighbors, who suffer from strange diseases or conditions. One resident told me of a neighbor who had been keeping track of cancer deaths on her block, the recent total of which was seven. Another resident recalled two community meetings this past year in which "tons" of citizens came up to the microphone to reveal chronic health problems which they attribute directly to where they live.⁵

One resident's eight year old son is in remission from acute lymphocyte leukemia, which she says is just one of "so many cancers here in the neighborhood." She has done some research on her

⁴ "Industrial Upset Pollution: Who Pays the Price?" *Public Citizen*. August 2005.

⁵ The meetings were a Town Hall meeting at Milby High School and a specially-called City Council meeting.

son's disease, and found studies linking childhood leukemia to benzene exposure, a chemical manufactured by the neighboring Texas Petrochemicals, Lyondell-Citgo and ExxonMobil facilities. A study published in 2002 by Physicians for Social Responsibility entitled "Cancer and the Environment" cited evidence that there is a higher risk of leukemia and lymphoma among Americans—especially children—living near industrial facilities. The study also highlighted several reasons why children are particularly vulnerable to carcinogens: children often spend more time outside, their rapidly developing systems have greater difficulty detoxifying many chemicals and they breathe more air (including associated contaminants) than adults do, relative to their body weight.⁶

While health studies such as those published by the late Dr. Marvin Legator (formerly of UTMB Galveston) and Physicians for Social Responsibility have made strides at uncovering links between industrial emissions and human health risks, such studies are sporadic at best and cannot claim to be conclusive on the matter. Health studies of communities like Southeast Houston's 77017 could serve as a real impetus for change, although there are currently no plans (and very limited funding) for such studies to be conducted.

Recommendations: How the 77017 Community Can Act to Protect Itself

Empowered by information, the community can take several steps to ensure they are informed and protected by pressuring neighboring industries to reduce their frequent upsets and excess emissions.

While the database MfCA has compiled contains evidence of 441 unpermitted emissions events at six facilities, over five and a half years, updated information can still be collected as the plants continue to experience emissions events on a fairly regular basis. Members of the community can help monitor a plant's activities by:

- Becoming aware of warning signs such as smoky flares, unusual odors and residue on cars that indicate an industrial accident is taking place
- Calling a local agency such as the City of Houston Bureau of Air Quality Control (BAQC) at (713) 640-4200 to report unusual odors or events
- Keeping "odor logs" recording the date and time when a suspected industrial accident is taking place, telltale odors and other warning signs associated with it, and how they are being affected

Data contained in citizen odor logs can be matched with the facility's TCEQ upset report. Many of the chemicals manufactured by neighboring facilities and consequently released during upset events have telltale odors. For example, sulfur dioxide smells like

a burnt match, hydrogen sulfide smells like rotten eggs and benzene smells like paint thinner. Residents can ask the agencies to conduct workshops to teach them how to identify the chemicals associated with the regular odors that persist in the community so

When MfCA conducted its survey of the community, one resident asserted her belief that the only way the situation will get better is if the community gets educated and starts asking some hard questions. While she doesn't know who should have the responsibility for educating the community, she is sure that it shouldn't be industry.

they can become better "reporters."

Concerned residents should bring up local air quality issues at town hall meetings, civic club meetings, health fairs and other appropriate venues in order to attract neighbors who share their concern. Because there is power in numbers, the most effective strategy to seek a reduction in toxic chemical emissions is for motivated 77017 residents to come together and organize around this issue. A network of concerned citizens can start by asking organizations such as Mothers for Clean Air and local agencies such as the BAQC to educate them about the risks industrial accidents pose to the community, and ways that plants can adopt safer operating practices to reduce those risks. A Corpus Christi citizen's group formed by the mayor exemplifies successful efforts by citizens to obtain important information. The Corpus Christi citizen's group has demanded and now receives regular updates from both state and industry officials on air pollution.⁷

This same network of concerned citizens can also form a "Bucket Brigade," in which members of the community would take their own air samples to monitor levels of industrial pollution in the neighborhood. The Refinery Reform Campaign—a nonprofit citizens group at the forefront of establishing bucket brigades in fenceline communities across the U.S.—has committed to helping communities like Southeast Houston start a Bucket Brigade to "fight back for clean air."

Citizen monitoring would be especially pertinent for the 77017 community since all of the residents MfCA interviewed expressed the opinion that local environmental agencies are not informing or protecting the community. By taking a sample of the air on a consistent basis or after a suspected accidental release, residents can ensure that they are informed by finding out for themselves the chemicals that are in the air they breathe. Citizen monitoring

⁶ "Cancer and the Environment." *Physicians for Social Responsibility* (2002).

⁷ From "Texas' toxics problem appears widespread." *Houston Chronicle*. January 2005.

also makes industry aware that they are being watched. The Louisiana Bucket Brigade agrees that bucket samples not only allow their community to “watchdog industrial pollution,” but also coerces government agencies into taking their own measurements, thus bringing an additional measure of protection to active fenceline communities.

Organizing citizen monitoring in zipcode 77017 may be the first step to implementing adequate monitoring of air pollution levels in the community. By working with government agencies, or even the media, the community can pressure decision-makers to require some of the worst industrial polluters to install fenceline monitoring on their property. Fenceline monitoring of local facilities like Valero Refining and Lyondell-Citgo would serve to warn the community when they are being impacted by a release of hazardous chemicals. Refinery Reform’s website depicts the success of a community in Rodeo, California, which fought to achieve an air monitoring system that instantly reports on the web what refinery air pollution is crossing the fenceline.

A network of concerned 77017 citizens can also organize for a reduction of toxic emissions by going public with a record of past emissions events affecting the community. MfCA’s database which includes information on the dates, durations, causes and releases associated with 441 emissions events can be compiled into one of several forms to earn attention from the offending local facilities, the media, local regulatory agencies, and even the legislature.

One effective method might be to attempt to compile data on the emissions patterns of six local facilities into a report.

- In Richmond, CA, community members joined with a local and a statewide environmental organization to investigate industrial polluters. They published the report *Richmond at Risk*, which served to initiate a discussion with Chevron Oil Refinery, the area’s top industrial polluter. (Chevron earned this distinction through the research that led to the report.) As a result of the ensuing discussions between Chevron, the community and local environmental organizations, the company agreed to shut down older portions of the plant and install pollution prevention equipment.⁸
- Several small communities in the area of Louisiana known as “Cancer Alley” collaborated with public interest organizations on a report, *Breathing Poison: The Toxic Costs of Industries in Calcasieu Parish, Louisiana* which they used to confront

industrial facilities about their toxic chemical releases and the correlation between the releases and the residents’ adverse health effects.⁹

Residents could also put the database into a useable form to increase knowledge and awareness among the community as well as legislators.

- The Louisiana Environmental Action Network (LEAN) publicizes information about local facilities’ toxic emissions in the form of “briefing books,” which it presents to members of the Louisiana House and Senate environmental committees. The US Environmental Protection Agency (EPA) has assessed LEAN’S efforts and attests that because these reports help build a knowledge base for legislators of local environmental problems, they can often function as the starting points for change.¹⁰

Ultimately, the community should seek to use the information they have acquired and compiled to begin dialogues with local facilities such as Valero Refining, Lyondell-Citgo, Texas Petrochemicals, ExxonMobil, Rhodia, and Goodyear. With the assistance of local environmental groups such as MfCA and perhaps a technical expert, the community could present the database of the industries’ prominent roles in 441 recent emissions events to the appropriate representative at each offending facility. In addition to confronting the facility about their toxic chemical releases, the community could use this conversation to convey their concerns (about health effects, etc) so that industry can begin to understand the impact of its releases on the residents living on their fenceline. Finally, citizens could attempt to work with the facility to come up with a plan to reduce toxic chemical use and emissions, thereby enhancing community safety.

Sources on how the public can use information to seek change from industry:

“The Safe Hometowns Guide.” The Safe Hometowns Initiative. www.safehometowns.org

“How are the Toxics Release Inventory (TRI) data used? -- government, business, academic and citizen uses.” US Environmental Protection Agency. May 2003. EPA-260-R-002-004.

⁸ “How are the Toxics Release Inventory (TRI) data used? -- government, business, academic and citizen uses.” US Environmental Protection Agency. May 2003, pg. 9.

⁹ “How are the Toxics Release Inventory (TRI) data used? -- government, business, academic and citizen uses.” US Environmental Protection Agency. May 2003, pg. 11.

¹⁰ “How are the Toxics Release Inventory (TRI) data used? -- government, business, academic and citizen uses.” US Environmental Protection Agency. May 2003, pg. 6.



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