COMMON GROUND II

WHY COOPERATION TO REDUCE ACCIDENTS AT LOUISIANA REFINERIES IS NEEDED NOW

Dedicated to Shonda Lee, Roberta Johnson, Gregory Starkey, Jr.
and others whose lives have been impacted by refinery accidents.

THE BP OIL DISASTER OF 2010 was tragic for public health, the economy and the environment of Louisiana. Despite billions of dollars in profits, BP's failure to properly manage its offshore oil rig resulted in 400 million gallons of oil spilled in the Gulf of Mexico.

There are similar problems at refineries on shore.

Reports submitted by refineries to the Louisiana Department of Environmental Quality document 2,607 accidents from 2005 - 2009. This is an average of 10 chemical accidents every week. The purpose of this report is to raise an alarm about the accident trend at Louisiana's 17 oil refineries so that potential catastrophes can be prevented.

More than 200,000 people live within two miles of these refineries. These accidents must be reduced now to protect public health, our environment and our economy.

About the Refinery Efficiency Initiative

Common Ground II is the second publication of the Refinery Efficiency Initiative, a program to reduce chemical exposure by preventing accidents at Louisiana refineries. This Initiative is a collaboration of the Louisiana Bucket Brigade, the Environmental Working Group, the Environmental Integrity Project, the United Steelworkers and community groups from parishes where the refineries are located, including Community Empowerment for Change (Baton Rouge), Residents for Air Neutralization (Shreveport), Concerned Citizens Around Murphy (Meraux), St. Bernard Citizens for Environmental Quality (Chalmette) and Concerned Citizens and Youth of Highway 44 (Convent).

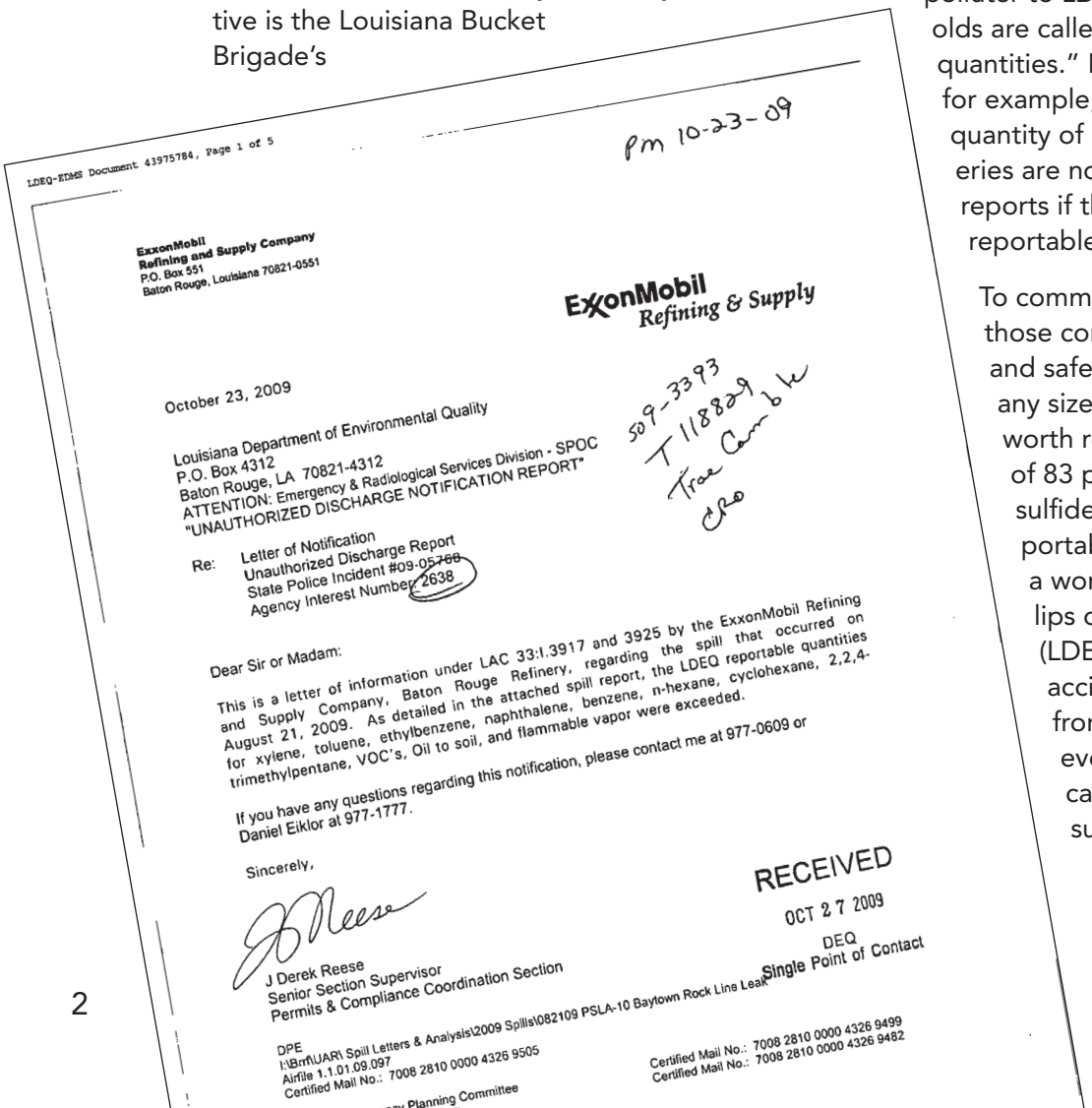
Research Methodology

At the heart of the Refinery Efficiency Initiative is the Louisiana Bucket Brigade's investigation of what the industry calls "upset reports" — oil refineries' letters to the Louisiana Department of Environmental Quality (LDEQ) describing their accidents. These reports are made in compliance with the Emergency Planning and the Community Right to Know Act. Industry calls these problems "upsets", "incidents" or "unplanned events." We call them accidents.

The Louisiana Bucket Brigade obtains these accident reports through public records requests in order to gain a comprehensive understanding of refinery accidents and what can be done to prevent them. Five years of refinery accident data is now available via our Refinery Accident Database at www.labucketbrigade.org.

Each chemical release has a threshold that triggers a reporting requirement from the polluter to LDEQ. These thresholds are called "reportable quantities." Hydrogen sulfide, for example, has a reportable quantity of 100 pounds. Refineries are not required to file reports if the total is below reportable quantities.

To communities, workers and those concerned with health and safety, accidents of any size are important and worth reporting. A release of 83 pounds of hydrogen sulfide — below the reportable quantity — killed a worker at ConocoPhillips on October 22, 2007 (LDEQ #100322). Our accident total differs from the refineries and even the LDEQ because we include all such accidents.



LDEQ-EDMS Document 43975784, Page 1 of 5

pm 10-23-09

ExxonMobil
Refining and Supply Company
P.O. Box 551
Baton Rouge, Louisiana 70821-0551

ExxonMobil Refining & Supply

October 23, 2009

509-3393
T 118829
Tree Cons Inc
CRO

Louisiana Department of Environmental Quality
P.O. Box 4312
Baton Rouge, LA 70821-4312
ATTENTION: Emergency & Radiological Services Division - SPOC
"UNAUTHORIZED DISCHARGE NOTIFICATION REPORT"

Re: Letter of Notification
Unauthorized Discharge Report
State Police Incident #09-05766
Agency Interest Number 2638

Dear Sir or Madam:

This is a letter of information under LAC 33:I.3917 and 3925 by the ExxonMobil Refining and Supply Company, Baton Rouge Refinery, regarding the spill that occurred on August 21, 2009. As detailed in the attached spill report, the LDEQ reportable quantities for xylene, toluene, ethylbenzene, naphthalene, benzene, n-hexane, cyclohexane, 2,2,4-trimethylpentane, VOC's, Oil to soil, and flammable vapor were exceeded.

If you have any questions regarding this notification, please contact me at 977-0609 or Daniel Eiklor at 977-1777.

Sincerely,

RECEIVED
OCT 27 2009
DEQ
Single Point of Contact

J Derek Reese
Senior Section Supervisor
Permits & Compliance Coordination Section

DPE
I:\Brnf\UAR\ Spill Letters & Analysis\2009 Spills\082109 PSLA-10 Baytown Rock Line Leak
Airfile 1.1.01.09.097
Certified Mail No.: 7008 2810 0000 4326 9505
Certified Mail No.: 7008 2810 0000 4326 9499
Certified Mail No.: 7008 2810 0000 4326 9482
Planning Committee

Findings

1. Refinery accident data is underestimated; the number of accidents is likely far higher than detailed in this report.
2. Accident reduction is an opportunity for job creation and economic growth. Hiring more workers and adding maintenance programs will make a refinery safer. Emissions control technologies can save corporations money and product in the long term.
3. Refineries do not have sufficient storm and hurricane preparedness plans. Twenty-seven percent of all emissions to the air and 64% of emissions to the ground and water between 2005 - 2009 occurred during bad weather like storms or hurricanes. Many of these accidents could have been prevented if storm preparedness plans were followed, facilities invested in back up power systems and wastewater treatment capacities were increased to handle Louisiana rains.
4. Refineries are not being thorough in their investigations of the accident causes; from 2005 - 2009, 20% of all accidents had no information about the cause.
5. Management trends — including laying off workers and deferring maintenance — may result in short-term profits for the parent corporation but are generally making refineries more dangerous.
6. ExxonMobil's two refineries (Baton Rouge Refinery and Chalmette Refining) have the most frequent accidents and the largest emissions from accidents.
7. The refining industry is not capitalizing on this opportunity to collaborate to solve the accident problem.

   Twelve of the state's 17 refineries — including worst offenders ExxonMobil, Calumet Lubricants and CITGO — have refused repeated invitations to collaborate in good faith. ConocoPhillips, Valero Refining, Marathon Petroleum and Pelican Refining have responded positively. The Louisiana Mid-Continental Oil and Gas Association, while somewhat responsive, is ultimately ineffective since it cannot speak for the corporations involved.

Evidence suggests that the refinery accident rate is actually higher than refineries are reporting.

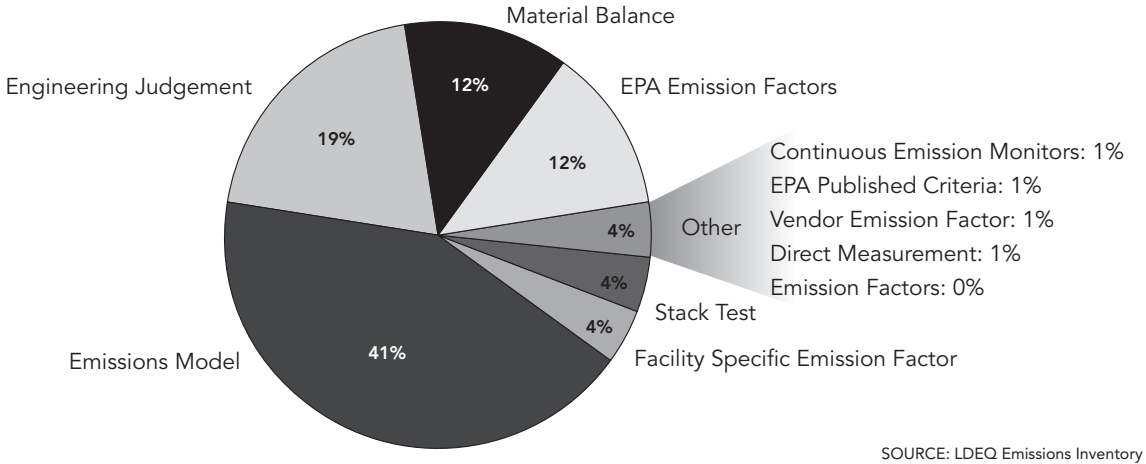
Problems with Emissions Factors

Fuzzy Math: Refineries report emissions to the flare using calculations that may not be consistent or accurate.

The graph below shows the calculation methods in use by the state's refineries. Some of these factors, like engineering judgment, are vague. The majority of emissions are reported based on engineering judgment and emission models that are not approved by the Environmental Protection Agency (EPA) or independently verified. In the Marathon DIAL study, EPA found a dramatic example of underreporting because a refinery had misapplied emissions factors known as AP-42 factors.[1]

A more accurate approach would be to actually measure — rather than estimate — what is being released.

Emission Factors Used by Louisiana Oil Refineries



SOURCE: LDEQ Emissions Inventory

1 Office of Air Quality Planning and Standards, EPA, Review of Dial Emission Test Data and AP-42 Emission Estimation Procedures for BP Petroleum Refinery in Texas City Draft (July 2010)

Overestimation of combustion rate: Flares do not combust 98% of vented gas.

The flare is an important piece of equipment at a refinery; it acts like a relief valve. When accidents happen, chemicals are sent to the flare to be incinerated, thus preventing harmful releases to the air. This is the point — incineration to the flare during accidents — at which Louisiana refineries seem to be inaccurately measuring emissions.

One of the emissions factors Louisiana refineries use is called the AP-42. This calculation refers to the flare incineration rate.

Refineries routinely overestimate the efficiency of flare incineration rates. Refinery accident reports show the plant environmental managers make assumptions that the flares will incinerate 98 or 99% of chemicals. This calculation would be good news if it were true; only 1 or 2% of the chemicals would be going into the neighboring community.

There is, however, no engineering proof to support these calculations. The evidence shows that actual combustion efficiency of the flare can be as low as 50%. The Marathon Passive FTIR study study demonstrated that the high incineration rates of 98 or 99% are achieved only under perfect conditions – when the weather is good and the refinery is functioning well. Accidents, by nature, are not perfect conditions. They occur during storms and when the refinery has problems.

Three studies have concluded that emissions from flares can be up to six times greater than what is reported to EPA and state agencies.[1] In practical terms, this means that the total refinery accident releases from flares to the air from 2005 - 2009 are likely much greater than the 21.8 million pounds reported to LDEQ.

SOLUTION: The best way to understand emissions from the flares is to actually measure those emissions through continuous emissions monitoring on the stack. According to the studies cited here, Louisiana refineries routinely fail to use this technology and instead simply estimate emissions based on false assumptions. Louisiana refineries' failure to modernize and use the best technology provides inaccurately low emissions numbers in refinery accident reports.

1 RTI International, Review of DIAL Emission Test Data and AP-42 Emission Estimation Procedures for BP Petroleum Refinery in Texas City, Texas DRAFT; Marathon Petroleum Company, LLC; Performance Test of a Steam-Assisted Elevated Flare with Passive FTIR; Industry Professionals For Clean Air – Houston, REDUCING EMISSIONS FROM PLANT FLARES

Refineries in Louisiana

THERE ARE 17 REFINERIES in Louisiana. They are listed here in order of refining capacity. The demographic data provided in the table below is the population by census tract within two miles of a refinery from the 2000 Census.

REFINERY, CITY	Refining Capacity (Barrels Per Day)	Accidents 2005 - 2009	Emissions (Pounds)
ExxonMobil Refining and Supply, Baton Rouge	504,500	569	4,187,339
Marathon Petroleum, Garyville	436,000	115	161,127
CITGO Petroleum, Lake Charles	429,500	386	3,062,135
ConocoPhillips, Belle Chasse	247,000	112	2,650,410
ConocoPhillips, Westlake	239,400	243	423,327
Motiva Enterprises, Convent	235,000	159	870,706
Motiva Enterprises, Norco	234,700	135	1,414,563
Chalmette Refining, Chalmette	192,500	419	6,221,685
Valero Refining, Norco	185,003	155	292,094
Murphy Oil, Meraux	120,000	122	1,074,392
Alon Refining, Krotz Springs	80,000	24	28,290
Calcasieu Refining, Lake Charles	78,000	19	344
Calumet Lubricants, Shreveport	57,000	69	281,400
Placid Refining, Port Allen	57,000	45	170,864
Shell Chemical, St. Rose	55,000	21	913,798
Calumet Lubricants, Cotton Valley	13,020	1	0
Calumet Lubricants, Princeton	8,300	13	25,471
Total	3,109,926	2,607	21,777,945

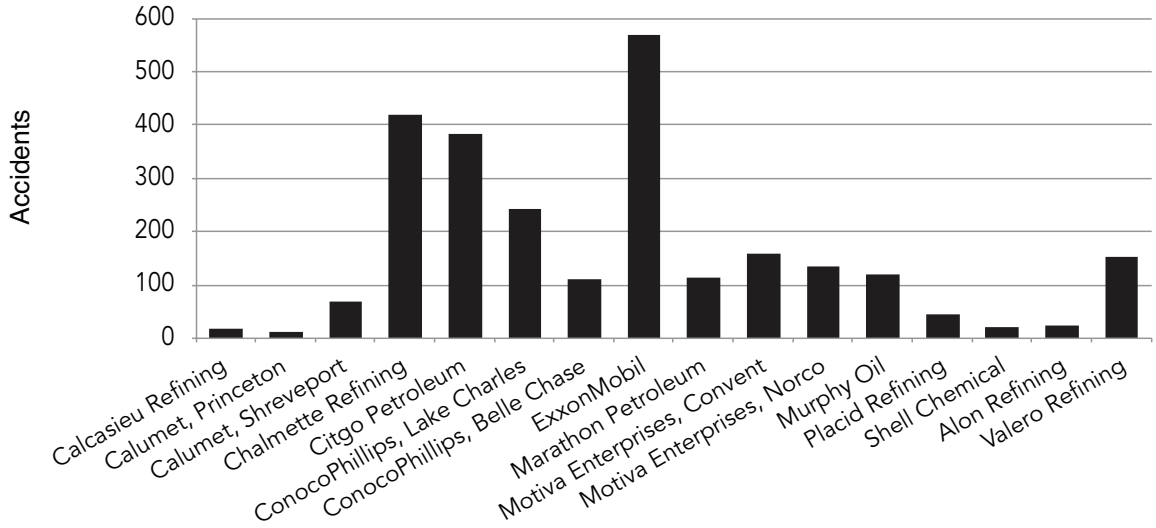
"Bad air emissions from plant. Difficulty breathing at night and early mornings."

— Princeton Citizen Report to LDEQ #83652; November 4, 2005

Emissions (Gallons)	Population Within 2 Miles	% African American	% Children in poverty
35,611	55,303	86.7%	45.3%
1,220	4,706	66.2%	37.9%
2,329,469	2,918	0%	6.6%
78,110	2,270	29%	24.3%
373,059	8,308	18.1%	17.1%
12,548	2,393	69%	33.2%
18,825	5,147	29.5%	17%
11,679,706	59,584	0%	18.6%
2,116,693	11,454	21.8%	14.7%
5,436,277	33,766	7.1%	13.4%
255	1,242	0%	25.2%
66,116	1,019	0%	0%
60,303	49,920	84.7%	48.2%
53,120	10,355	56.3%	39.2%
26,662	6,036	26.5%	21%
42	798	47.7%	44.5%
3,667	2,059	20.3%	15.5%
22,291,683	257,278		

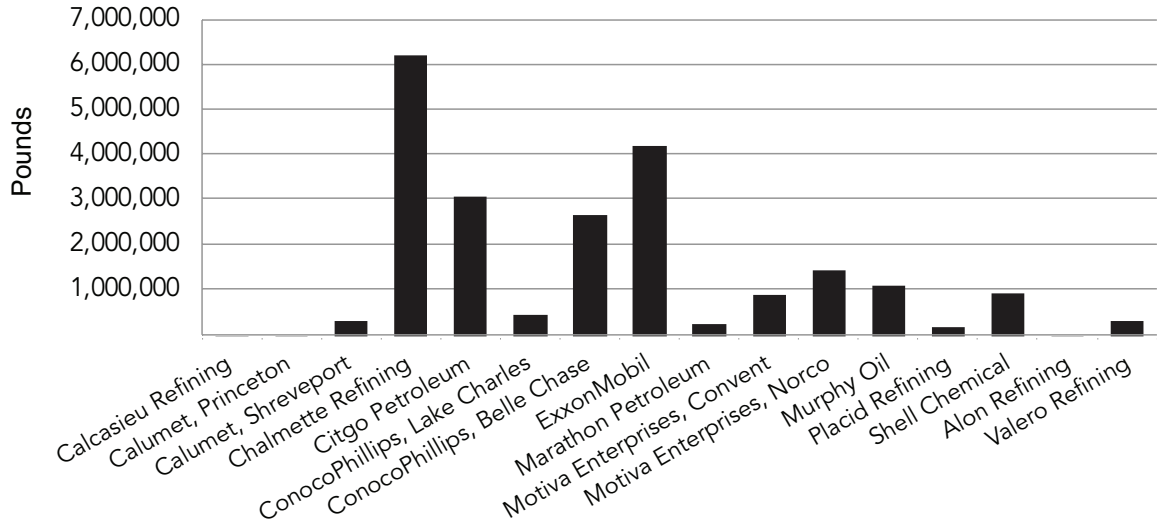
Refinery Accident and Pollution Totals 2005 - 2009

Figure 1: Louisiana Oil Refinery Accidents from 2005 - 2009



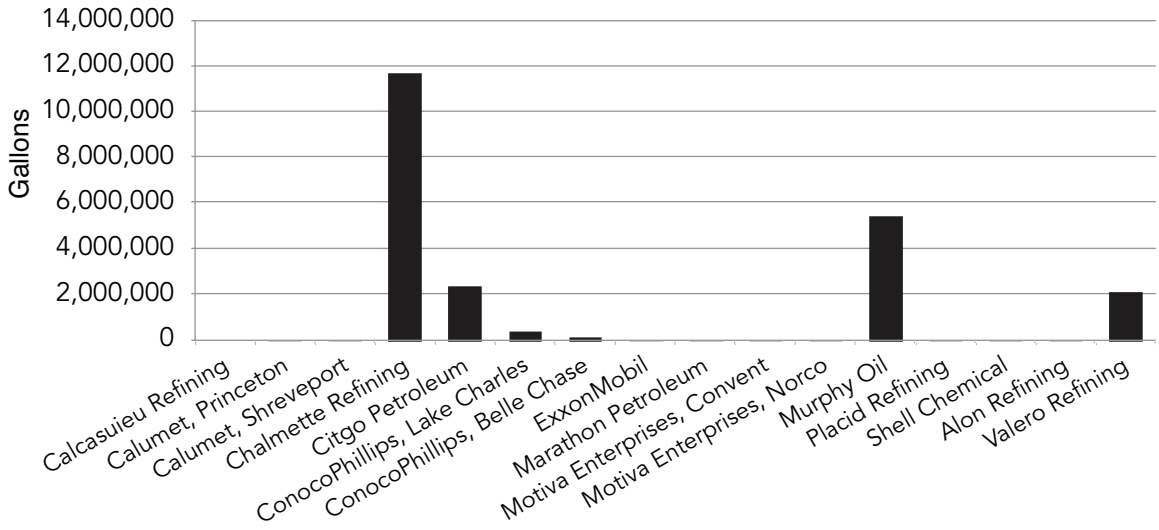
ExxonMobil's Baton Rouge and Chalmette facilities top the state in the number of accidents.

Figure 2: Accident Emissions Released to the Air From 2005-2009



ExxonMobil's Chalmette Refining, the state's worst polluter via accidents, is responsible for 28% of all emissions to the air.

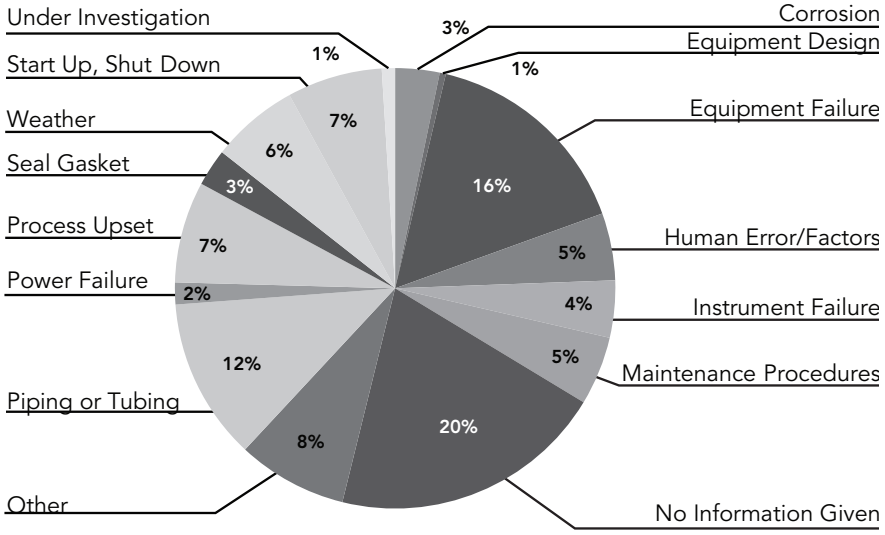
Figure 3: Accident Emissions Released to the Ground and Water From 2005-2009



Most of the refinery ground and water pollution is from a few sources, namely Chalmette Refining, CITGO, Murphy Oil and Valero Refining. The majority of pollution released to the water is from a single accident: Chalmette Refining's 11.6 million-gallon dump of wastewater into neighborhood canals that drain into Lake Borgne in 2008.

Causes of accidents

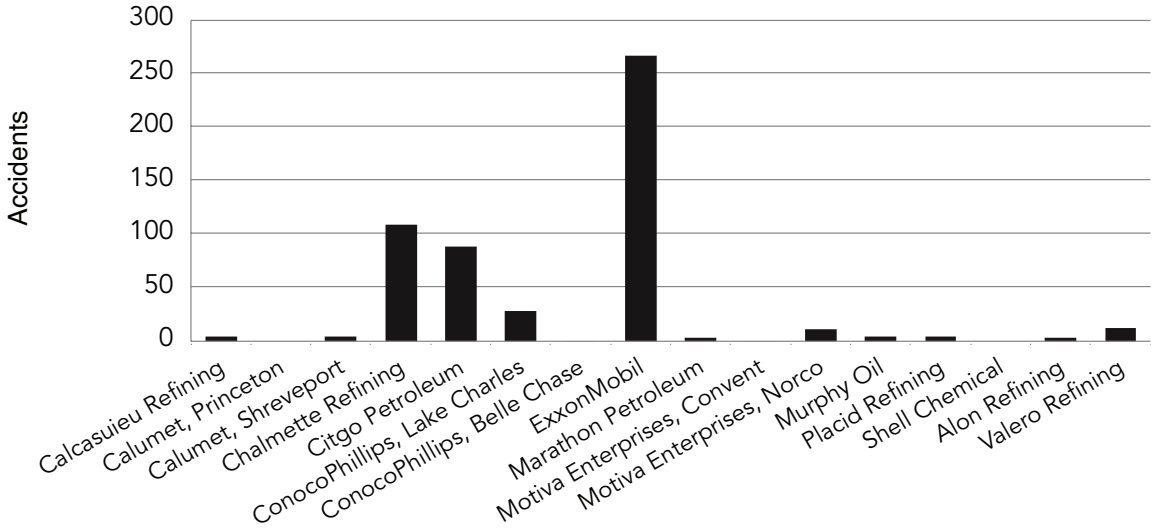
Figure 4: Causes of Accidents 2005 - 2009



The most common causes of accidents were No Information Given, Equipment Failure and Piping or Tubing. In explaining the cause of an accident, the most common response given by Louisiana refineries was "No Information Given." Such imprecise reporting is not only evidence of a poorly run refinery, but also inhibits understanding of the cause and potential solutions of accidents.

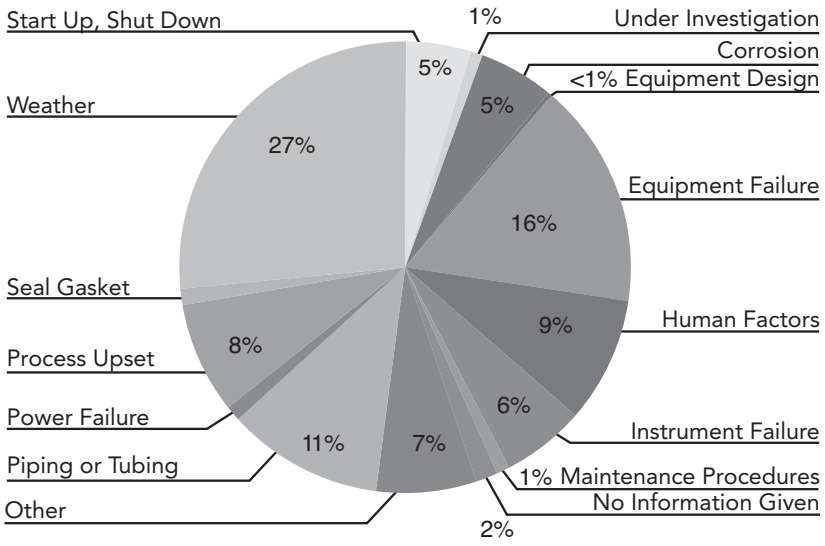
ExxonMobil's Baton Rouge and Chalmette facilities frequently do not provide information on the causes of accidents.

Figure 5: Accidents Without Causal Explanation



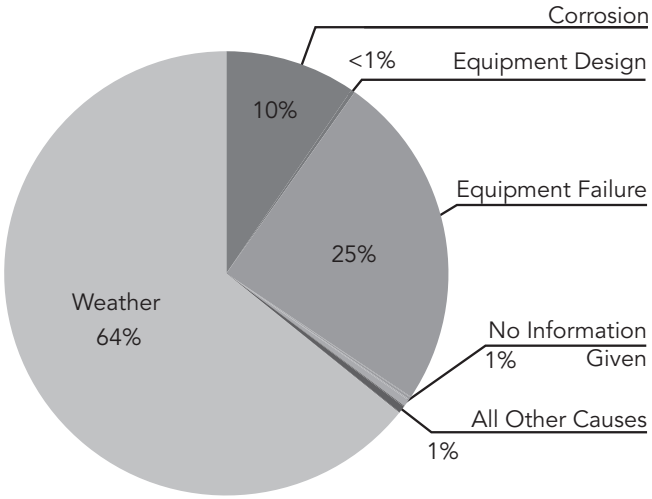
Certain types of accidents, most notably those caused by bad weather, cause more pollution than others.

Figure 6: Causes of Accident Emissions to the Air From 2005-2009



Weather related accidents are the single largest cause of emissions to the air by Louisiana refineries.

Figure 7: Causes of Accident Emissions to the Ground or Water From 2005-2009



The majority of the emissions to the ground and water caused by weather are from an oil spill at CITGO Petroleum and from an accident at Chalmette Refining during Hurricane Gustav.

ANALYSIS

Inadequate storm preparation

BAD WEATHER is the leading cause of accident emissions. Bad weather events include rainstorms, wind, lightning and freezing temperatures.

Among bad weather events that disrupt the refinery's production, hurricanes are the most significant problem. Hurricanes were the reported cause of 55% of all weather-related accident emissions to the air and 84% of emissions to the ground and water.

Facilities usually deem these releases "unpreventable" because bad weather is an act of God and beyond human control. However, storms and hurricanes in South Louisiana are predictable. Refineries need to improve their hurricane preparedness.

"Rotten eggs smell from Exxon. Particularly bad when it's overcast or rainy. Can see visible plumes of materials in the air."

— Baton Rouge Citizen Report to LDEQ #115633; July 11, 2009

Hurricane Gustav, ExxonMobil and the Neighborhood of Istrouma, Baton Rouge

When Hurricane Gustav made landfall in September 2008, Baton Rouge residents witnessed some of the worst winds the city had ever experienced. Most businesses and government buildings remained closed for several days.

In North Baton Rouge's Istrouma neighborhood, residents were without power for almost two weeks. They sat on their front porches or in their backyards, seeking relief from the heat indoors. But outside they faced another problem: ExxonMobil. Because of improper hurricane preparedness, the refinery was spewing pollutants over the already ravaged city.

Exxon failed to properly shut down the facility before Gustav made landfall. Because the facility was not shut down, the cooling tower was operating when winds knocked it over, releasing 599,122 pounds of pollutants for what residents say was 12 days of flaring. Most of the emissions were sulfur dioxide, a chemical known to cause respiratory problems.

"We had to sit outside all day and all night breathing in some of the worst pollution I have ever experienced. On top of the stress from the hurricane, we were all sick from

"Fumes in the air after Hurricane Gustav. Observed numerous flare ups and black plumes of smoke from Murphy Oil."

— Meraux Citizen Report to LDEQ #108958 9/12/2008

chemical exposure," said Seabell Thomas, leader of Community Empowerment for Change and an Istrouma resident.

After the storm, the Occupational Safety and Health Administration fined ExxonMobil $5,000 for this incident, stating that the delay in shutting down the plant until after the hurricane made landfall endangered workers. According to OSHA, "ExxonMobil exposed its employees at the second-largest oil refinery in the nation to life-threatening conditions by failing to implement an emergency plan when Hurricane Gustav struck."[1]

1 http://online.wsj.com/article/SB123758642112499625.html

Deferred Maintenance

Poorly Maintained Pipes at ExxonMobil's Chalmette Refining

ExxonMobil's Chalmette Refining is a case study for a recurring cause of accidents: repeated quick fixes instead of proper maintenance. The refinery's accident data clearly demonstrates a need for an improved preventative maintenance program: 11% of accidents and emissions to the air are the result of problems with piping or tubing.

In 2009, the Occupational Safety and Health Administration cited Chalmette Refining for ignoring nine safety recommendations on piping. The OSHA investigators found that problems with pipes "were still not resolved six years later."[1]

This deferred maintenance has real implications. Problems with the pipes were involved with the death of Gregory Starkey October 6, 2010. The pipe Starkey was working on had been clamped for two weeks, as shown in Chalmette Refining's report to the state.

"Gas line … started leaking sour gas to the atmosphere through a previously installed clamp."[2]

A safer scenario for workers would have been to repair the pipe under controlled conditions, not during an accident. Chalmette Refining management, however, made a decision to leave the clamp on the leak for an extended period, perhaps creating a tragedy that might have been avoided.

This is a corporate culture of lean management. Companies try to save money by cutting preventative maintenance and safety programs. This may result in short-term savings for the refineries, but the long-term costs are higher for all parties — the workers, the communities and the refinery.

Motiva Enterprises, Norco

Motiva's Norco Facility was cited by OSHA in 2006 and 2008 for having "no written emergency shut down and operation procedures" and "a lack of routine inspections and tests on process equipment" endangering workers with "exposure to highly hazardous chemicals," "inhalation of toxic vapors" and "serious injury and death."[3]

Calumet Refining, Shreveport

Calumet's Shreveport refinery has had consistent problems with leaks from its tank farm. In 2009 alone, Calumet had six accidents (LDEQ #s 117003, 117485, 118112, 119092, 119349, 120035) involving the tanks in the tank farm including an asphalt fire and the collapse of a floating roof releasing more than 32,000 gallons of oil products spilled to the ground and water and 193,000 pounds of Volatile Organic Compounds released into the air. The October 29, 2009 incident report (LDEQ #119092) detailing the floating tank collapse states "Plans were in place to move the contents of T-44 [Tank 44] to the other gasoline storage tank T-68 [Tank 68] when the floor of T-68 developed a leak." Since 2005, there have been a total of 16 accidents in Calumet's tank farms resulting in more than 58,000 gallons of oil products spilled.[5]

1 United States Department of Labor, Occupational Safety and Health Administration. "Freedom of Information Act-files.' U.S.C.552(b), Public Law 93-502.
2 Letter from Chalmette Refining to LDEQ #126868, 10.11.10
3 U.S. Department of Labor, Ibid.
4 Incidents from 1/11/05, 78/22/05, and 1/05/2008 do not have LDEQ#s
5 LDEQ #s 76443, 76500, 78362, 79672, 93398, 97165, 99432, 102405, 106519, 107039, 107617[4]

Slashing the workforce

Lean management also includes an attempt to save money by laying off full-time workers — often well-trained, long-time union members — and replacing them with contract labor. Fewer workers mean there is less time for maintenance.

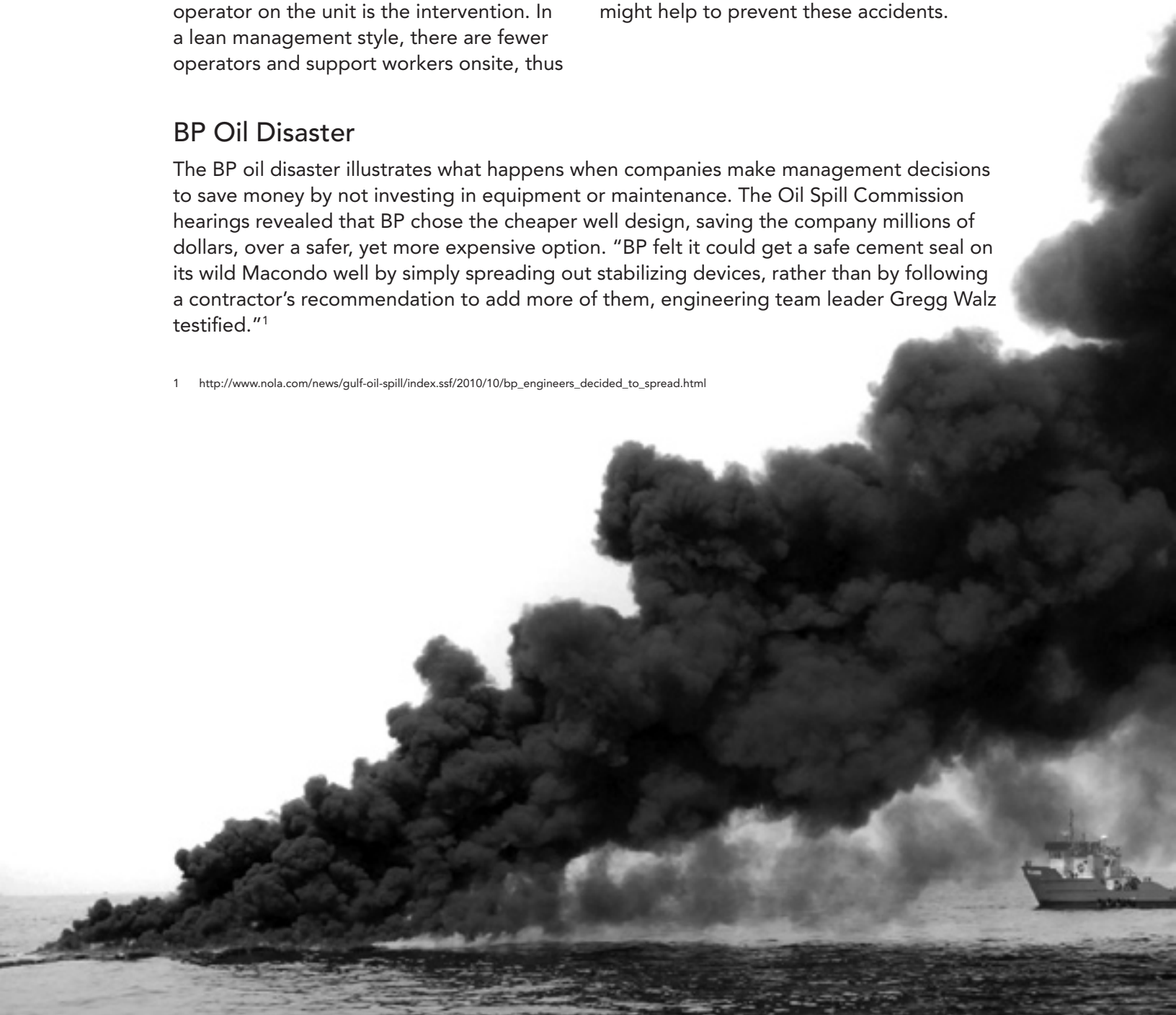
A smaller workforce also means there are not as many people on hand during an emergency. When a malfunction occurs, the operator on the unit is the intervention. In a lean management style, there are fewer operators and support workers onsite, thus fewer people to act in an emergency response capacity.

A lean staff is particularly disastrous during startup and shutdown of a unit. According to workers, starting up a unit is the most dangerous time in a facility. The accident reports support this claim. More than 195 accidents (7% of the total) involved the startup or shutdown of refinery units. More workers might help to prevent these accidents.

BP Oil Disaster

The BP oil disaster illustrates what happens when companies make management decisions to save money by not investing in equipment or maintenance. The Oil Spill Commission hearings revealed that BP chose the cheaper well design, saving the company millions of dollars, over a safer, yet more expensive option. "BP felt it could get a safe cement seal on its wild Macondo well by simply spreading out stabilizing devices, rather than by following a contractor's recommendation to add more of them, engineering team leader Gregg Walz testified."[1]

1 http://www.nola.com/news/gulf-oil-spill/index.ssf/2010/10/bp_engineers_decided_to_spread.html



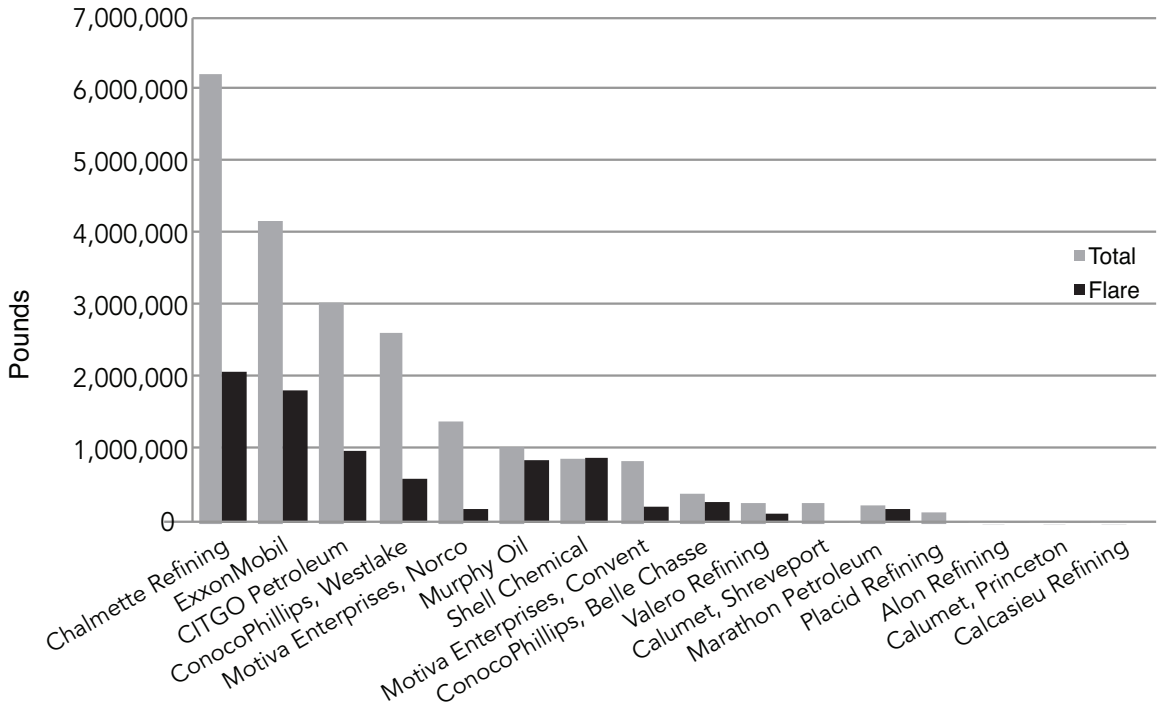
"Smells like rotten eggs. Headache, nausea and nasal passages burning. Murphy Oil's flare has been burping all weekend."

— Report to LABB Crisis Map; May 13, 2010

Flaring

As the graph illustrates, 38% of accidental emissions from Louisiana refineries are sent to the flare. Some neighbors call it the midnight sun because it burns all night. If refineries can reduce their flaring through flare gas recovery systems (see Recommendations page), a significant percentage of emissions can be cut.

Figure 8: Total Accident Emissions to the Air and Accident Emissions Sent to the Flare From 2005-2009



"The flaring at Calumet is causing my house to shake."

— Shreveport Citizen Report to LDEQ #102197; January 10, 2008

REFINERY ACCIDENTS AND PUBLIC HEALTH

LOUISIANA REFINERIES report the release of up to 80 different chemicals during accidents in any given year. These releases create chemical emergencies, defined as "any actual or imminent threat of a hazardous chemical release that has the potential for causing harm to people, property or the environment."[1]

Carbon Monoxide

Carbon monoxide is considered a Criteria Pollutant by the EPA and "reduces the amount of oxygen reaching the body's organs and tissues. Cardiovascular patients may experience chest pain or other symptoms. Carbon monoxide affects mental alertness and vision, causes dizziness and can lead to unconsciousness or death."[2] It is particularly dangerous for pregnant women and children. High exposure in children can lead to delayed mental development.[3]

Motiva enterprises

Convent

At Motiva's Convent Refinery in December 2009, a temperature drop during a thunderstorm caused the Fluid Catalytic Cracking Unit's wet gas compressor to shut down, releasing 214,000 pounds of carbon monoxide into the air. According to the refinery report, "Severe weather is beyond Motiva's control and considered an act of God."

But Motiva had consistent problems with the FCCU wet gas compressor various times before the thunderstorm. There were at least five accidents (LDEQ #s 85744, 116576, 117144, 119480, 119481) leading up to the December 2009 incident highlighting the recurring problem with the unit.

Carbon monoxide was not the only pollutant released during these accidents. About 170,548 pounds of sulfur dioxide were also released.

Norco

At Motiva's Norco Refinery in October 2008, the refinery released more than 800,000 pounds of carbon monoxide as well as more than 40,000 pounds of nitrous oxides, sulfur dioxide and particulate matter because of tube leaks in the Residual Catalytic Cracking Unit. According to the report, personnel found 76 tubes in the unit that needed to be replaced. The unit leaked carbon monoxide into the surr ounding environment for more than five days.

1 Chemical Emergencies Draft Report, National Conversation on Public Health and Chemical Exposures, September 2010
2 http://www.capcoa.org/health-effects/#AIR_QUALITY_GUIDE_FOR_CARBON_MONOXIDE
3 http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=1163&tid=253

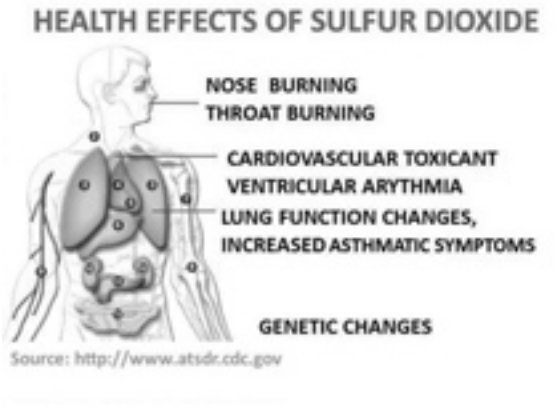
EPA Takes Action on Sulfur Dioxide

A new rule issued by EPA in June 2010 places stricter regulations on sulfur dioxide pollution. Industry — including refineries — must comply with a stricter one-hour air quality standard to protect people from short-term exposure. The EPA estimates that the rule will save between $13 billion and $33 billion a year in health care costs, prevent 2,300 to 5,900 900 premature deaths as well as 54,000 asthma attacks a year. This rule took effect on June 2, 2010.

Sulfur Dioxide

According to refinery reports, sulfur dioxide is by far the biggest problem from refinery accidents. From 2005 - 2009, Louisiana refineries reported releasing 8,737,103 pounds via accidents.

Sulfur dioxide is a known trigger of asthma and respiratory problems. Children, the elderly and those with existing cardiovascular and respiratory problems are at a higher risk for health issues if exposed. Sulfur dioxide is also a major component of acid rain.[1]



"Strong sulfur odor from Exxon gives me a headache."

— Baton Rouge Citizen Report to LDEQ #99847; September 28, 2007

"Sulfur smell from Murphy Oil is so strong you cannot go outside. Children cannot go out and play."

— Meraux Citizen Report to LDEQ #117632; August 31, 2009

ExxonMobil's Chalmette Refining

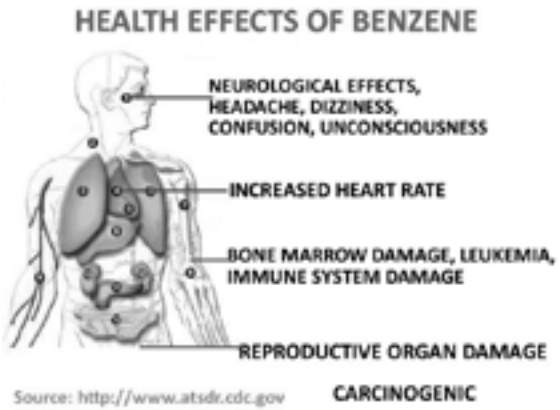
Chalmette Refining has by far the largest sulfur dioxide releases via accidents in the state. On October 10, 2006 (LDEQ #91273), the refinery released 1,068,405 pounds of sulfur dioxide during a single accident that lasted more than 78 hours. The report states under the "Health Risks" section: "No evacuations or road closures occurred. A few potential acute health effects were reported by community members."

1 http://www.epa.gov/air/sulfurdioxide/

Benzene

Louisiana refineries emitted 134,558 pounds of benzene, a known carcinogen, via accidents from 2005 - 2009. According to the EPA, benzene is the most significant toxic air pollutant by which to measure cancer risks.

A 2008 report by EPA's Air Quality Planning and Standards calculated the benefits of a regulation for benzene, *Health Benefits of Benzene Reductions in Houston, 1990 - 2020*, quantifies the economic benefits of reducing benzene emissions. The Houston-based study concluded that the new regulation will result in nine avoided fatal and non-fatal leukemia cases by 2020, with a total health benefit of $9 - $13 million.



CITGO Petroleum, Lake Charles

On December 18, 2008 (LDEQ #111417), CITGO Petroleum in Lake Charles reported a release of 92,578 pounds of benzene into the air. The reportable quantity for benzene is 10 pounds due to its hazardous nature. The ref inery's report states "the entire spill vaporized into the air." There were no evacuations or road closures as a result of this release.

Oil Spills

Refineries in Louisiana have spilled more than 5.4 million gallons of oil into the environment via accidents in the last five years.

The two largest oil spills reported from refineries onshore were 2.2 million gallons from CITGO Petroleum in Lake Charles in 2006 (LDEQ #100322) and 2.1 million gallons from Valero's Norco Refinery in 2008 (LDEQ #109833). "Crude oil has many highly toxic chemical ingredients that can damage every system in the body."[1]

Oil spills vaporize, but many of the emissions to the air from vaporization are not measured or reported.

1 http://www.sciencecorps.org/crudeoilhazards.htm

Smog

Refineries released 6,561,994 pounds of ground-level ozone-producing chemicals to the air via upsets from 2005 - 2009. Ground-level ozone-producing chemicals include Volatile Organic Compounds, hydrocarbons, flammable gas and particulate matter.

Ground-level ozone is smog caused by industrial and vehicular emissions. The effects include: "induction of respiratory symptoms, decrements in lung function, and inflammation of airways." The term "respiratory symptoms" includes: "coughing; throat irritation; pain, burning, or discomfort in the chest while taking a deep breath; and chest tightness, wheezing, or shortness of breath."[1]

On March 2, 2010, the Rand Corporation released a study showing the link between ozone and particulate matter air pollution and health problems such as asthma attacks, pneumonia, heart attacks and bronchitis. The study examined air pollution and hospital admissions trends in California from 2005 - 2007.

Rand concluded "improved air quality would have reduced total spending on hospital care by $193,100,184 in total."[2]

1 http://www.epa.gov/o3healthtraining/population.html
2 http://www.rand.org/pubs/technical_reports/TR777/

Who pays for the health costs of air pollution?	
Medicare	> $100 million
Medicaid and Medi-Cal	> $27 million
Private insurers	> $55 million

http://www.rand.org/pubs/technical_reports/TR777/

Air Quality Index

The EPA developed the following scale that relates short-and long-term exposure to the ambient ozone concentrations, in parts per billion (ppb), to health risk. To get up-to-the-minute air quality readings for your area, visit www.airnow.gov.

Air Quality Index for Ozone

Air Quality Index (AQI) Values	Levels of Health Concern	Colors	Cautionary Statements for Ozone
When the AQI is in this range:	*...air quality conditions are:*	*...as symbolized by this color:*	
0 to 50	Good	Green	No health impacts are expected when air quality is in this range.
51 to 100	Moderate	Yellow	Unusually sensitive people should consider limiting prolonged outdoor exertion.
101 to 150	Unhealthy for Sensitive Groups	Orange	Active children and adults, and people with respiratory disease such as asthma, should limit prolonged outdoor exertion
151 to 200	Unhealthy	Red	Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children should limit prolonged outdoor exertion
201 to 300	Very Unhealthy	Purple	Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children should limit prolonged outdoor exertion

High Ozone Days Louisiana 2006 - 2008 (American Lung Association)

The following chart correlates refinery releases of ozone-producing chemicals to the number of ozone days by parish.

PARISH	AIR QUALITY GRADE	Orange Days	Red Days	Purple Days	REFINERY CONTRIBUTION TO SMOG POLLUTION FROM 2005 - 2009
Caddo Parish	F	20	0	0	192,956 pounds and 52,580 gallons (Calumet Refining)
Calcasieu	F	14	1	0	590,771 pounds and 20,575 gallons (CITGO and ConocoPhillips)
East Baton Rouge	F	37	5	0	1,969,448 pounds and 1,072 gallons (ExxonMobil)
Plaquemines	*	*	*	*	502,596 pounds and 25,148 gallons (ConocoPhillips)
St. Bernard	*	*	*	*	1,927,080 pounds and 20,376 gallons (Chalmette Refining and Murphy Oil)
St. Charles	F	11	0	0	1,190,576 pounds and 336 gallons (Motiva, Shell and Valero)
St. James	F	12	0	0	37,722 pounds and 965 gallons (Motiva)
St. John the Baptist	F	17	0	0	36,569 pounds and 284 gallons (Marathon)
West Baton Rouge	F	18	2	0	23,794 pounds and 52,500 gallons (Placid)

*Do not report to American Lung Association

RECOMMENDATIONS FOR LOUISIANA REFINERIES

1. Apply the lessons from this report to refinery operations.

The data in this report comes from the refineries' own reports. Instead of wasting time arguing with this report's findings, refineries should apply the information to their operations. A consultant would charge refineries tens of thousands of dollars — if not more — for this information.

2. Accept the standing invitation to collaborate on accident reduction.

3. Implement flare minimization programs.

Flare recovery systems should be a requirement for all flares in the refineries. Flare gas recovery technologies allow plants to recover gases, which are valuable products, rather than simply burning them off. It makes business sense. By recycling the gases recovered through these important emissions control technologies, companies can recover the costs of the systems and make a profit off the gases captured. The systems pay for themselves within a few years.

- California's Bay Area Quality Management District found that adding compressor capacity and instituting better flare management practices resulted in an 85% reduction in emissions of Volatile Organic Compounds from 2002 - 2005.[1]

- Lion Oil Company's El Dorado refinery in Arkansas installed two flare gas recovery systems, which "reduced flaring to near-zero levels, thereby achieving the refinery's emission reduction objectives and conserving facility resources."[2]
- From 2001 - 2003, Dow Chemical Company in Freeport, Texas, reported a 54% reduction in emissions from startup, shutdown and off-specification incidents through a flare minimization strategy. In doing so, Dow documented savings of $2.5 million.[3]
- South Coast Refineries in California reduced sulfur dioxide emissions by 73% (from 2,633 tons to 735 tons).[4]
- Flint Hills Resources has reduced its annual flaring time by 88% at its Pine Bend, Minn and Corpus Christi, Texas plants.[5]

For many accidents, safer technologies and management procedures can remove the possibility, or significantly reduce the potential, of a chemical emergency.

1 BAAQMD, *Staff Report, Proposed Regulation, regulation 12, Miscellaneous Standards of Performance, Rule 12, Flares at Petroleum Refineries* (July 8, 2005) p. 1.
2 Hydrocarbon Processing, Minimize Flaring with Flare Gas Recovery (June 2002), pp.83 - 85.
3 Krietenstein, S., Dow Chemical Co., Flare Minimization Strategy During Plant Upsets: Freeport (April 12, 2005).
4 Industry Professionals for Clean Air. *Reducing Emissions from Plant Flares.*
5 Ibid.

4. Improve storm preparedness

Refineries should implement a number of measures to reduce accidents caused by weather. Sufficient backup power systems should be a necessity to handle fluctuations during bad weather. Many of these facilities are decades old, some nearly a century. In addition to implementing new technologies for pollution reduction, infrastructure at refineries should be improved to a storm and wastewater capacity level that is appropriate for local weather conditions. Guidelines on the time of shutdown prior to hurricanes should be created and enforced for worker and community safety. Also, practices like allowing more time for the shutdown of a plant — the largest source of hurricane accident pollution — can help reduce pollution and a potentially hazardous situation. Emergency shutdowns cause large amounts of pollution, increase flaring at startup and create dangerous conditions for workers. Enforcing a longer time guideline for shutdown procedures could significantly mitigate emissions from hurricanes.

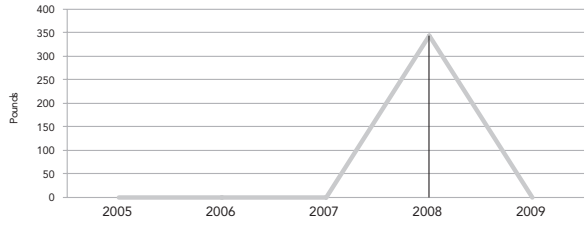
5. Improve emergency response

First responders are "individuals who in the early stages of an incident are responsible for the protection and preservation of life, property, evidence and the environment." (OSHA 2007). Those who live closest to a petrochemical facility — the neighbors — are the de facto first responders to public health emergencies that occur during accidents at the plants.

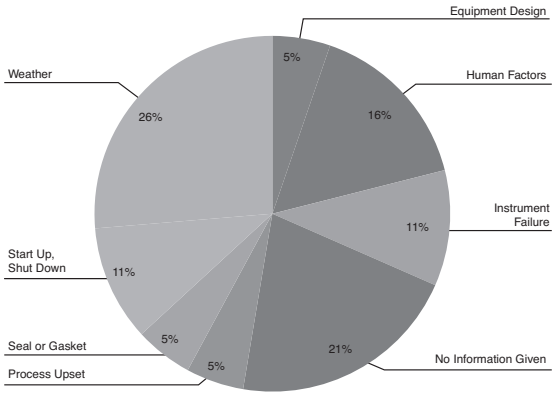
Current chemical emergency response operations in the state are completely dependent on information (or the lack thereof) from the company and do not involve citizen groups in the response. Refineries must immediately disclose all details of accidental releases to the public in order for first responders to do their job to prevent chemical exposures in the community as a result of an accident.

CALCASIEU REFINING

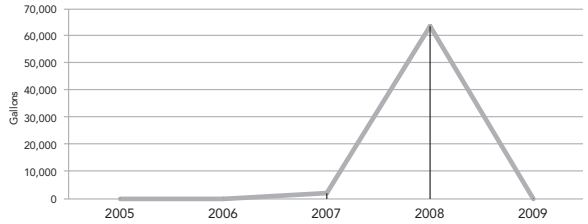
Accident Emissions to the Air



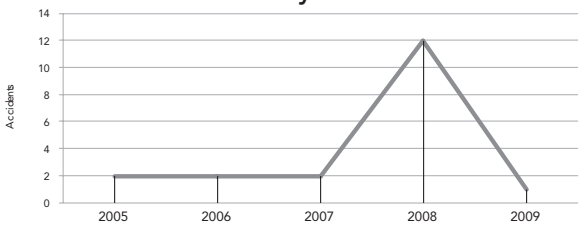
Causes of Accidents 2005–2009



Accident Emissions to the Ground or Water

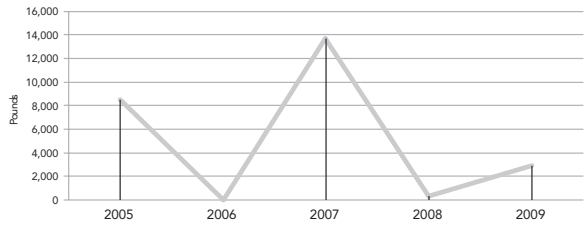


Oil Refinery Accidents

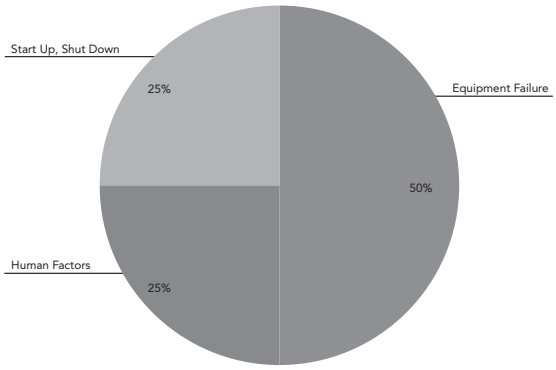


CALUMET
PRINCETON

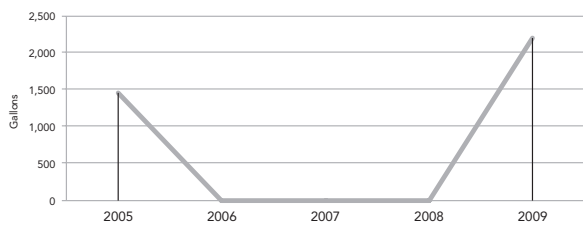
Accident Emissions to the Air



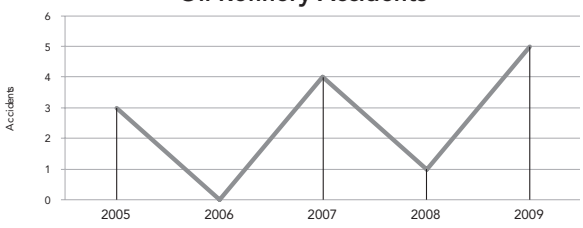
Causes of Accidents 2005-2009



Accident Emissions to the Ground or Water

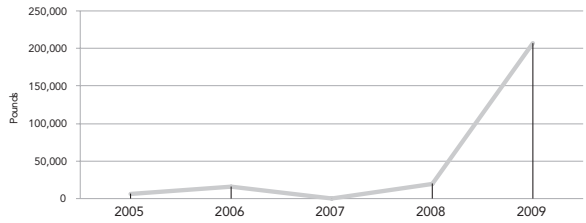


Oil Refinery Accidents

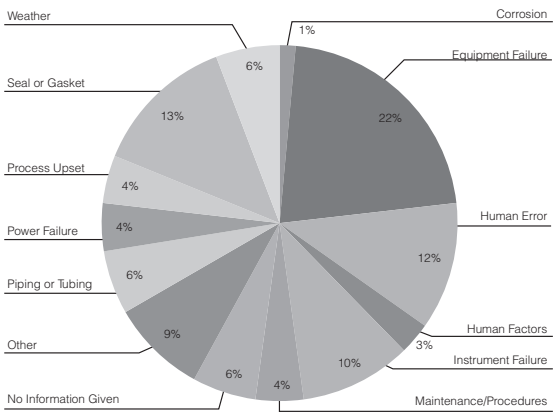


CALUMET
SHREVEPORT

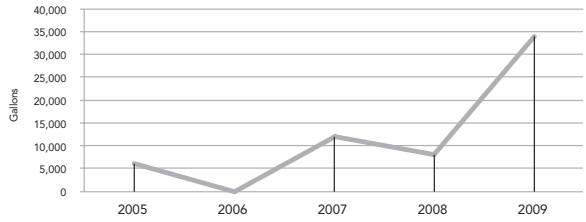
Accident Emissions to the Air



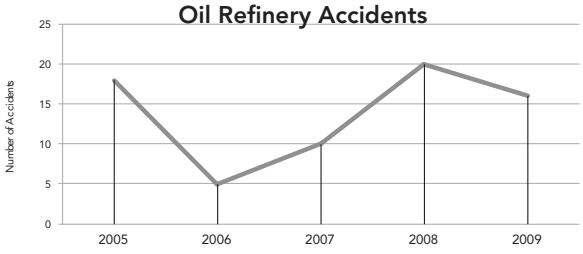
Causes of Accidents 2005–2009



Accident Emissions to the Ground or Water

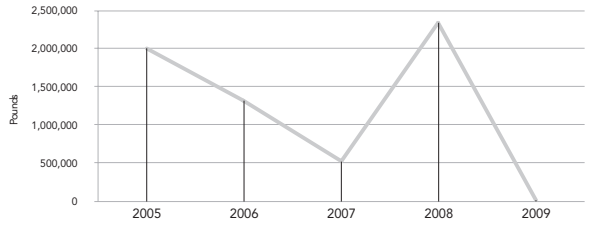


Oil Refinery Accidents

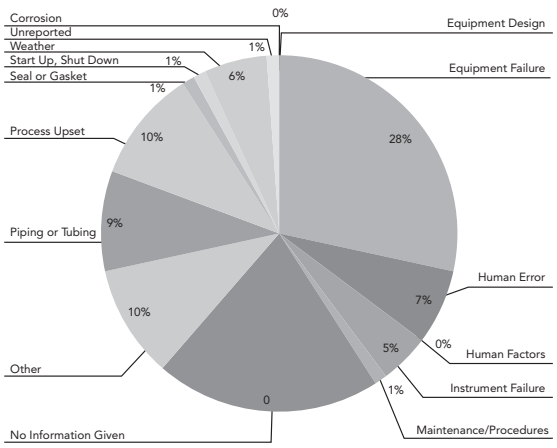


CHALMETTE REFINING
CHALMETTE

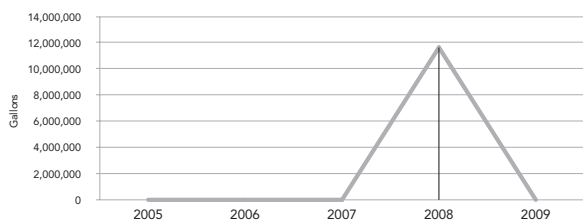
Accident Emissions to the Air



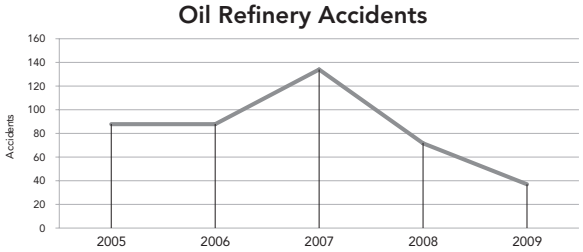
Causes of Accidents 2005–2009



Accident Emissions to the Ground or Water

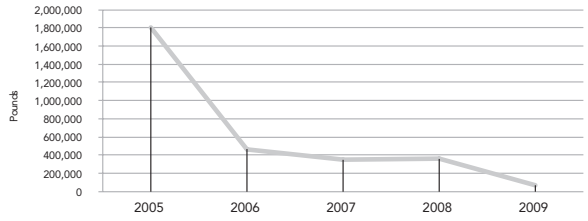


Oil Refinery Accidents



CITGO PETROLEUM
LAKE CHARLES

Accident Emissions to the Air



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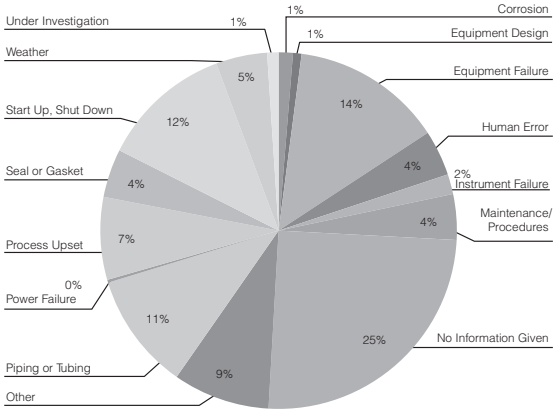

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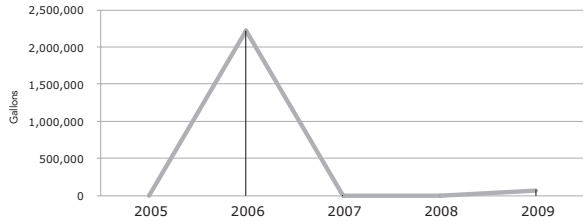

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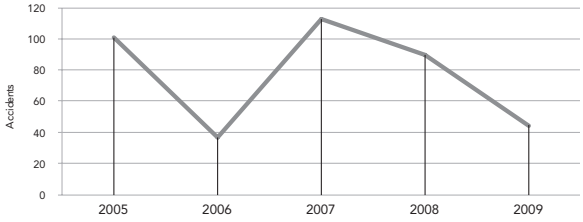
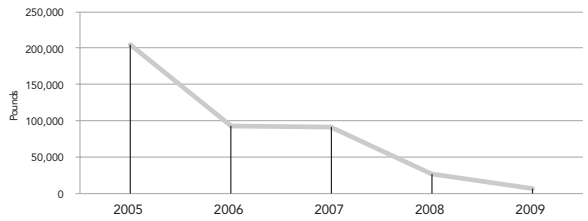
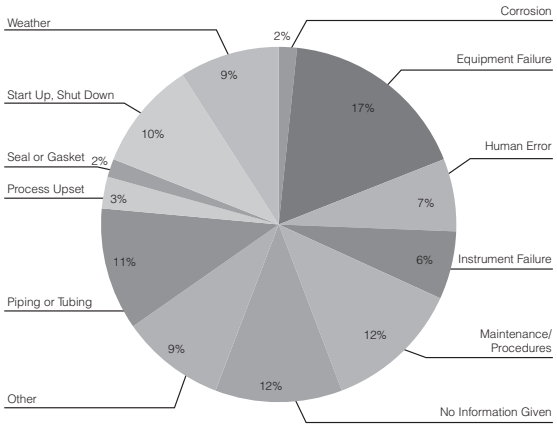


CONOCOPHILLIPS
LAKE CHARLES

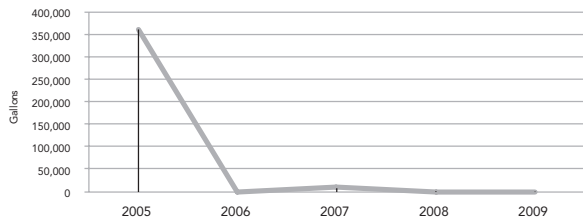
Accident Emissions to the Air



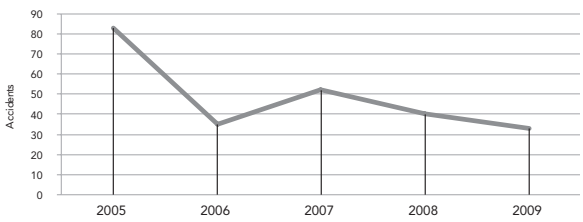
Causes of Accidents 2005–2009



Accident Emissions to the Ground or Water

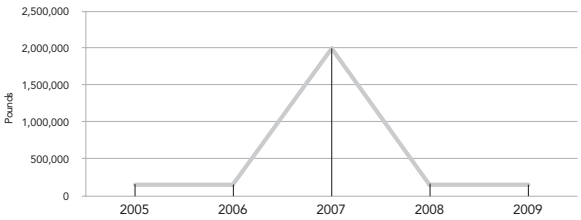


Oil Refinery Accidents

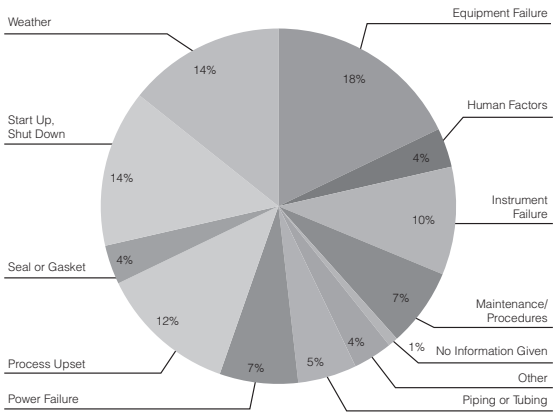


CONOCOPHILLIPS
BELLE CHASSE

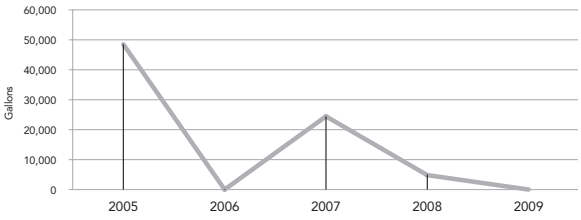
Accident Emissions to the Air



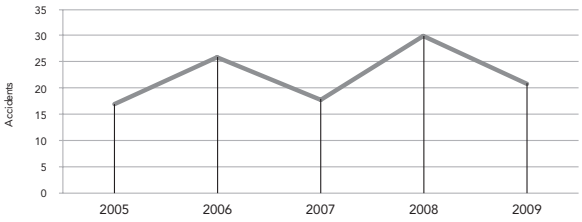
Causes of Accidents 2005–2009



Accident Emissions to the Ground or Water

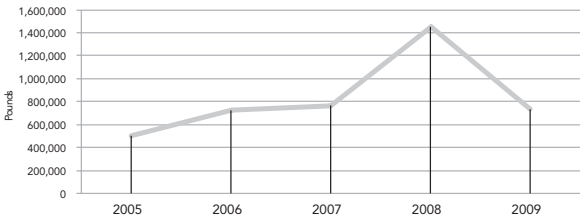


Oil Refinery Accidents

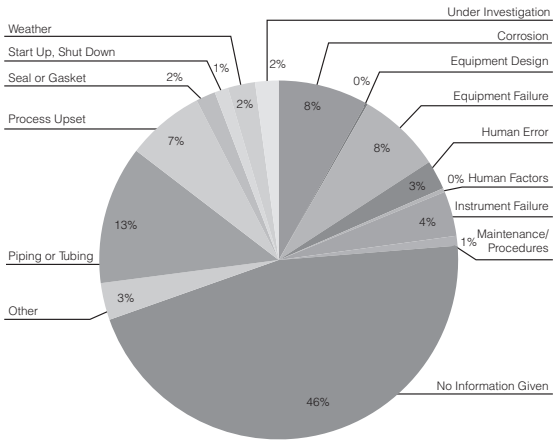


EXXONMOBIL
BATON ROUGE

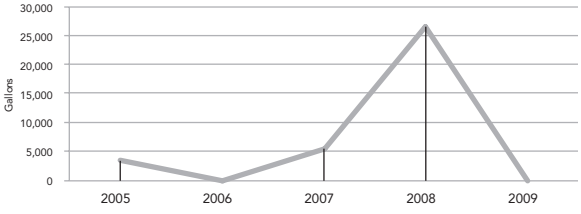
Accident Emissions to the Air



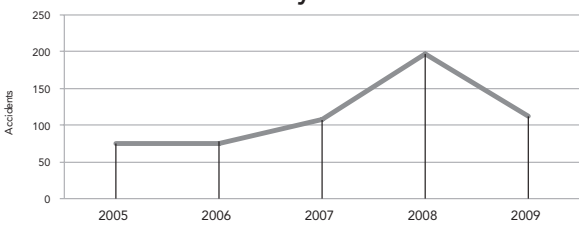
Causes of Accidents 2005–2009



Accident Emissions to the Ground or Water

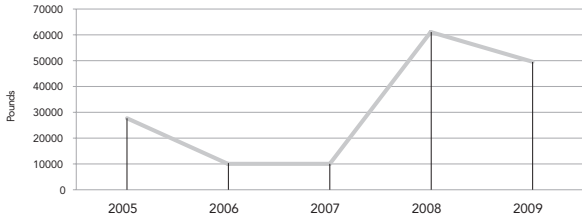


Oil Refinery Accidents

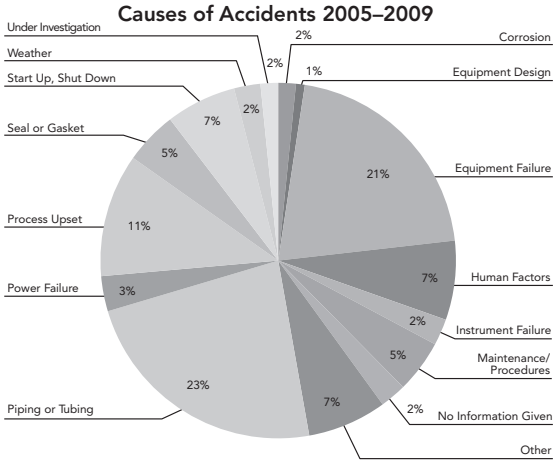


MARATHON OIL
GARYVILLE

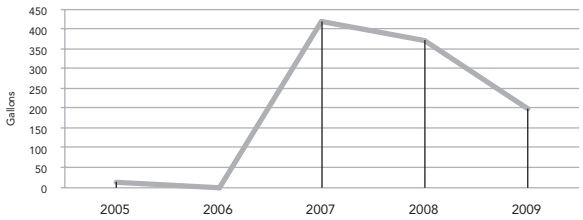
Accident Emissions to the Air



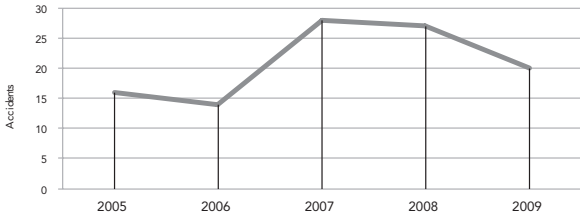
Causes of Accidents 2005–2009



Accident Emissions to the Ground or Water

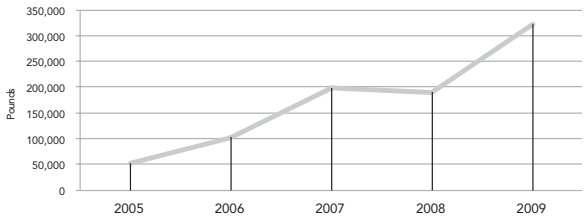


Oil Refinery Accidents

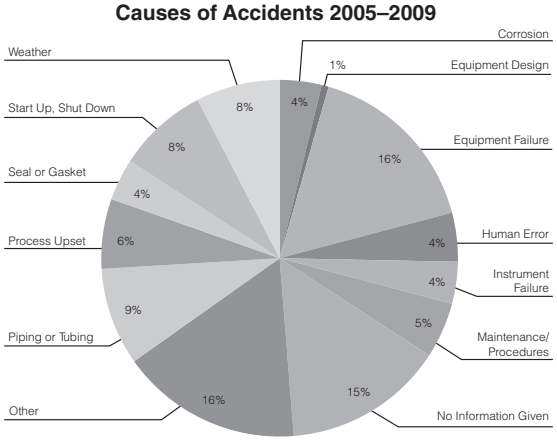


MOTIVA ENTERPRISES
CONVENT

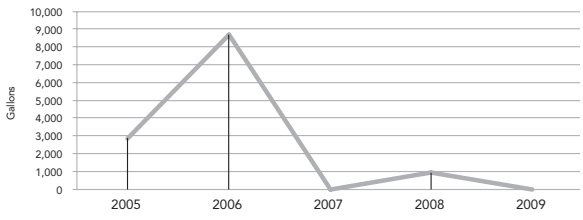
Accident Emissions to the Air



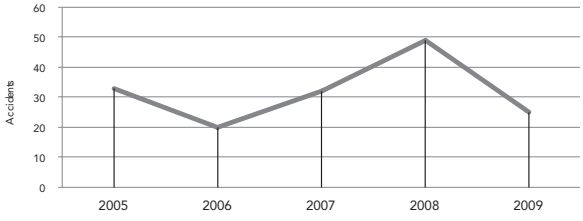
Causes of Accidents 2005–2009



Accident Emissions to the Ground or Water

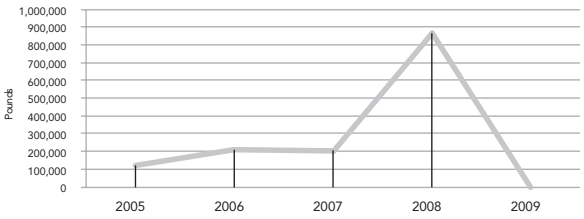


Oil Refinery Accidents

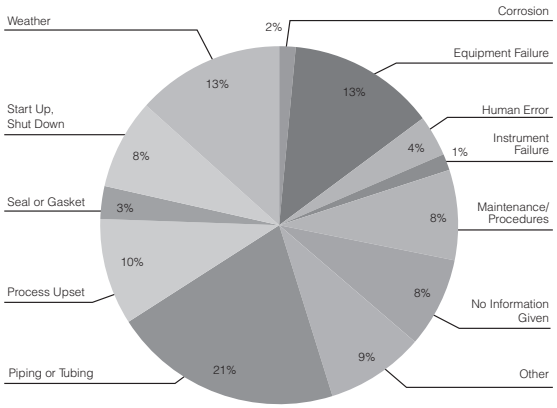


MOTIVA ENTERPRISES
NORCO

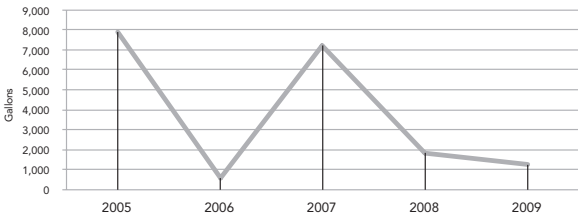
Accident Emissions to the Air



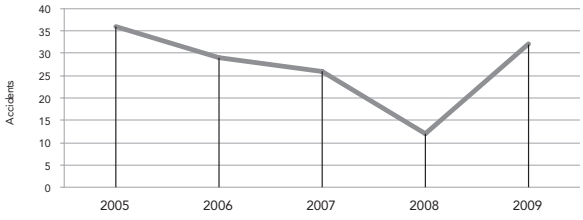
Causes of Accidents 2005–2009



Accident Emissions to the Ground or Water

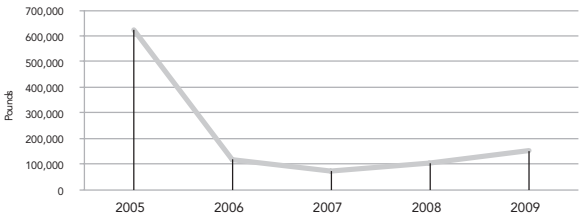


Oil Refinery Accidents

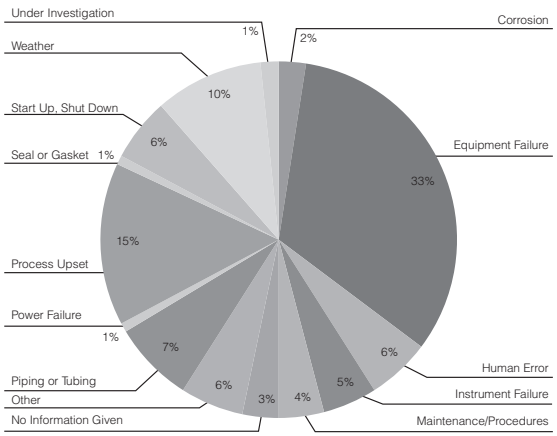


MURPHY OIL
MERAUX

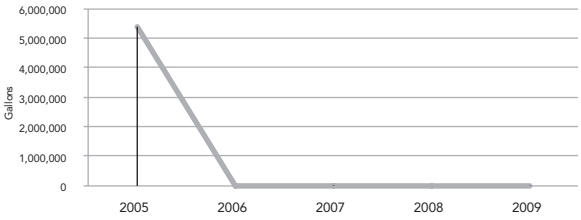
Accident Emissions to the Air



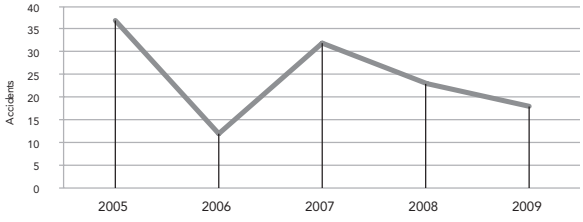
Causes of Accidents 2005–2009



Accident Emissions to the Ground or Water



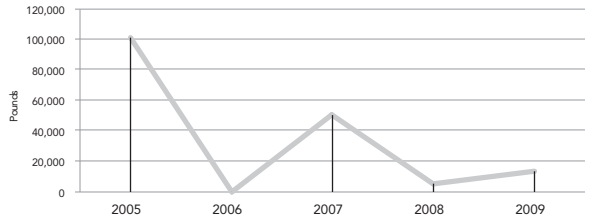
Oil Refinery Accidents



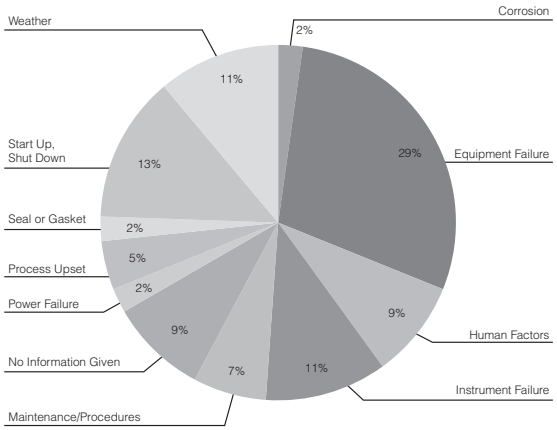
PLACID REFINING

PORT ALLEN

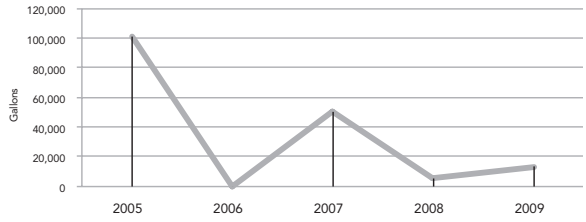
Accident Emissions to the Air



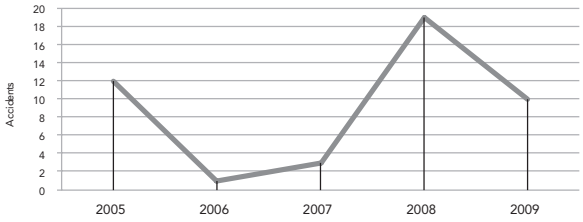
Causes of Accidents 2005–2009



Accident Emissions to the Ground or Water



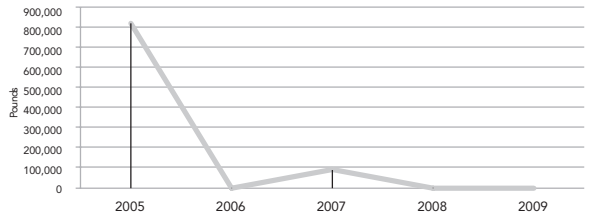
Oil Refinery Accidents



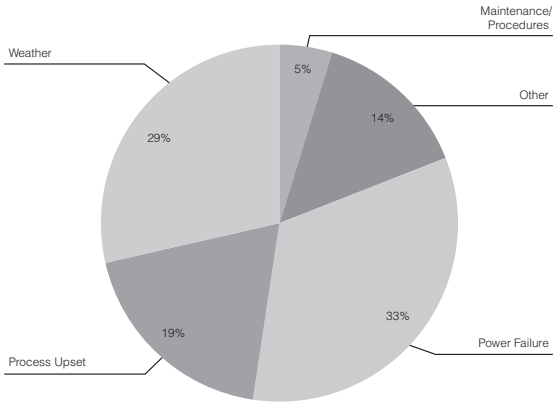
SHELL CHEMICAL

ST. ROSE

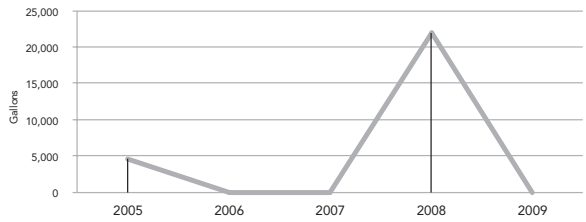
Accident Emissions to the Air



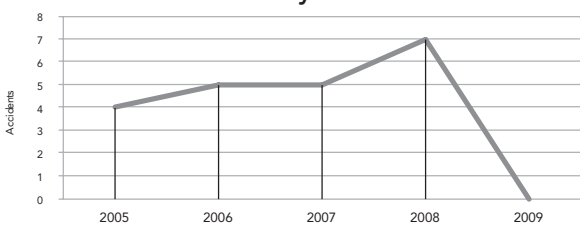
Causes of Accidents 2005–2009



Accident Emissions to the Ground or Water

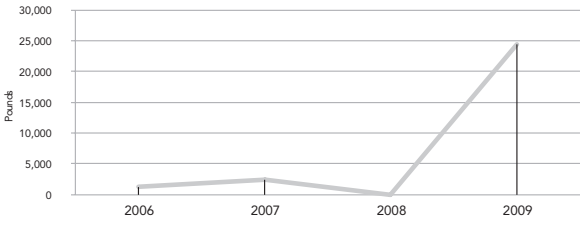


Oil Refinery Accidents

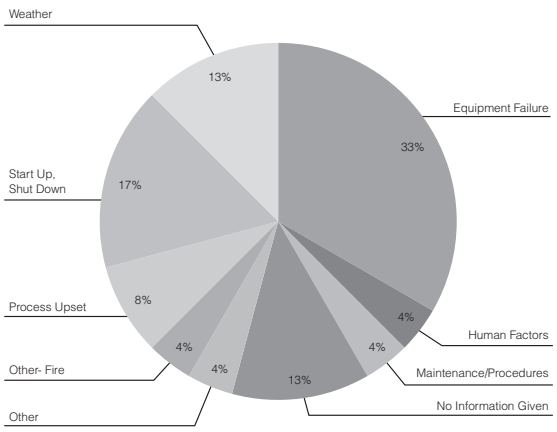


ALON REFINING
KROTZ SPRINGS

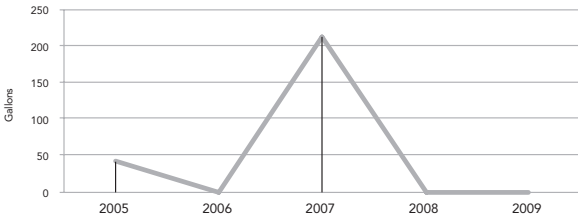
Accident Emissions to the Air



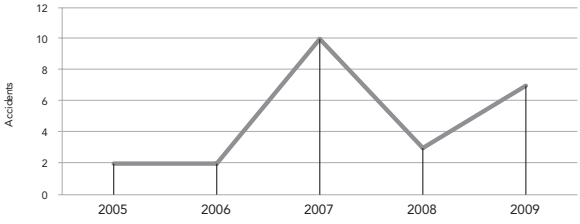
Causes of Accidents 2005–2009



Accident Emissions to the Ground or Water

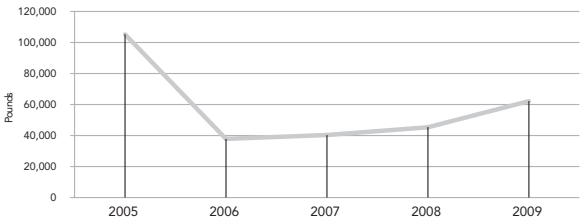


Oil Refinery Accidents

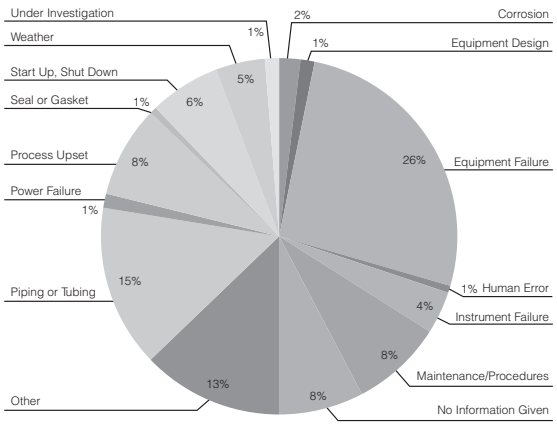


VALERO
NORCO

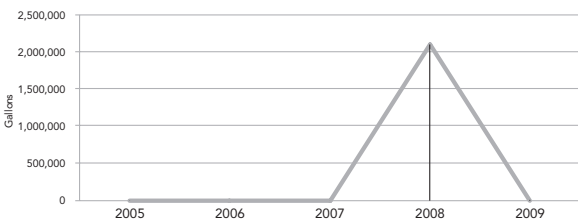
Accident Emissions to the Air



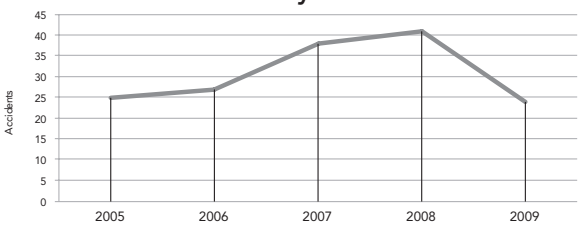
Causes of Accidents 2005–2009



Accident Emissions to the Ground or Water



Oil Refinery Accidents



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LOUISIANA BUCKET BRIGADE

Clean Air. Justice. Sustainability.