

# Cherokee Forest Environmental Data

Cherokee Concerned Citizens, the EPA, and MDEQ have all conducted some environmental testing in the Cherokee Forest subdivision. Some of the tests have shown normal pollution levels, while others have shown high levels of contamination. None of the environmental testing in the area has been comprehensive enough to draw final conclusions about the environmental quality in the Cherokee Forest subdivision. Instead, the monitoring may be treated more as a screening tool to identify further testing needs.

Shared here are some of the concerning findings that suggest a need for further, more comprehensive environmental monitoring.

## Dust

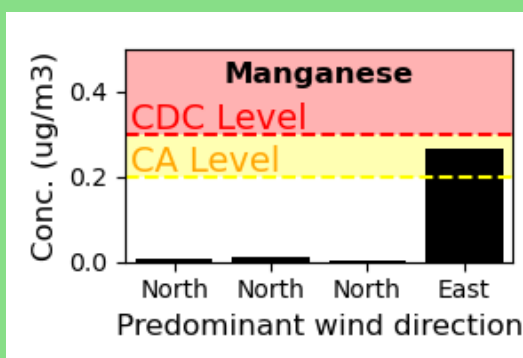
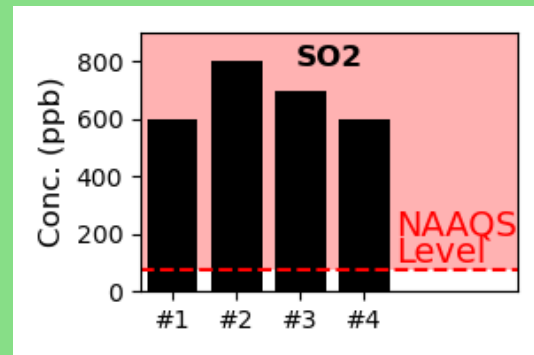
Residents frequently report dust that coats their cars and homes. Lab testing from a particularly dusty day confirmed that sandblasting materials like those used at shipbuilding yards were a major component of the gritty dust.



In addition to the sandblasting material, sometimes the dust instead has a sticky, oily consistency that coats cars and must be scrubbed off. Breathing in small particles from dust is damaging to the lungs and can irritate eyes, noses, and throats.

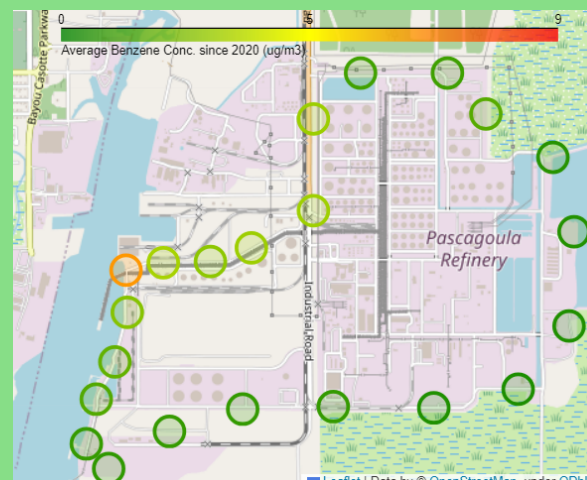
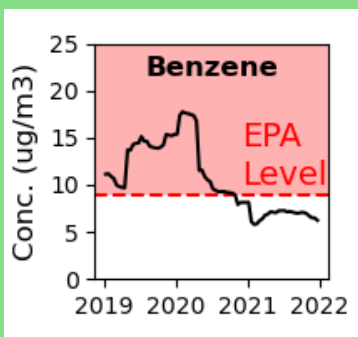
## Air

Sulfur dioxide ( $\text{SO}_2$ ) was far above the National Ambient Air Quality Standards (NAAQS) level in all community air samples collected by MDEQ. Sulfur dioxide has a pungent, stinging odor similar to a burnt match. High concentrations can irritate the nose, eyes, throat, and lungs. MDEQ did not conduct further  $\text{SO}_2$  testing because they compared levels to OSHA standards, which are only appropriate for pollution levels in workplace settings.



Manganese levels were elevated in the only sample that was collected when the wind was blowing from the east, suggesting that the pollutant is coming from the direction of the Bayou Cassotte Industrial Park. Lower levels of manganese

were present when the wind came instead from the north. Exposure to high levels of manganese inflames the lungs and is associated with some neurological impacts. It can cause a metallic taste and numb feeling in the mouth, symptoms that have been reported by residents. Manganese is emitted from welding and steel making activities.

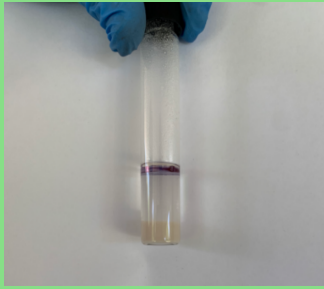


Concentrations of cancer-causing benzene at the Chevron Refinery fenceline were above the EPA limit for an entire year in 2019. Benzene levels are now below this limit. However, the highest levels of benzene from the refinery are still transported towards Cherokee Forest, according to the fenceline monitors shown above. In addition to its carcinogenic effects, benzene weakens the immune system and can cause headaches, dizziness, and a rapid heart rate.

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## Soil

Soil from the Cherokee Forest subdivision contained petroleum oil residue at a concentration 5 times higher than the soil test's screening level, indicating a need for follow-up testing.



## Water

Residents have reported seeing what appears to be an oily substance come up from the ground after a rain. This is likely a biofilm, which does not indicate the presence of oil.



## Noise

Noise is a sometimes overlooked form of pollution. Noise pollution can lead to serious physical and mental health issues, including heart disease, sleep disturbances, stress-related illnesses, and cognitive impairment in children. In a 2014 Cherokee Forest health survey, 40 out of 70 respondents specifically reported significant noise concerns, especially at night.

*"The noise is so loud that it rattles and shakes the house."*

*"The noise is so loud I cannot focus."*

*"The noise wakes me up at night."*

This document was prepared by community scientists Dr. Katharine Duderstadt and Caroline Frischmon, through the American Geophysical Union's Thriving Earth Exchange program, in partnership with Cherokee Concerned Citizens.

## What's missing?

Most of the air quality data comes from short, disparate air samples that are only a snapshot in time. Other monitoring has only shown average concentrations over long periods of time, such as over 2 weeks. This monitoring cannot tell the full story of air quality in the neighborhood, since pollution often reportedly comes in short, intense spikes. **Continuous, high-time resolution air monitoring**, particularly of VOCs and particulate matter, is instead needed to capture the full nature of air pollution in the neighborhood.

Air monitoring must also use sensors with **appropriate detection limits for a neighborhood setting**. Our report titled "Review of Recent Monitoring" highlights the recent use of insufficient sensors in Cherokee Forest.

Two of the common odors reported in the subdivision are a rotten egg smell and a urine-like smell. The pollutants associated with these odors (hydrogen sulfide and ammonia) have had minimal monitoring, especially with instruments sensitive enough to capture exceedences of health guidance levels. **Odor-based monitoring** can help address this major community concern.

Refineries are a notable source of PFAS, toxic chemicals found in firefighting foam and many other products. As concern grows over the health effects of these "forever chemicals," we suggest **PFAS testing of water supplies** near the refinery.

**Noise monitoring** should be conducted to better understand the serious reports of noise pollution from residents of the Cherokee Forest subdivision.

Finally, neighbors in Cherokee Forest have shared many health concerns and diagnoses. A **comprehensive health screening and survey** would help us better understand the full extent of health impacts in the community.

# Noise, dust, and odor health impacts in Cherokee Forest

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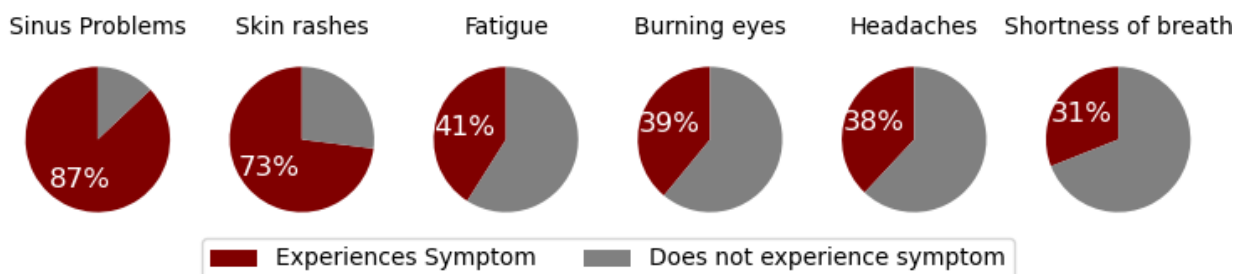
## Overview

Noise, dust, and odors trespassing into residents' homes and yards can cause significant health impacts for those chronically exposed to the pollution. We outline some potential health risks collectively faced by Cherokee Forest residents from these pollutants in the following document. Some of these health risks are already reported at high levels by residents of Cherokee Forest. Based on this information, we call on public officials to identify opportunities to better protect this community.



of households reported dust, loud noises, and/or strong odors in a 2014 survey

## 2021 Health Survey



## 2014 Survey Quotes

"I can't let my grandchildren play outside."

"I got really sick after mowing my lawn"

"We just want to sit outside and breathe air!"

"I have to pick the days I can go outside. When I am away, I feel better."

"I have noticed an increase in sinus problems since moving here."

"Please help!"

"Please clean up this mess. We in this neighborhood cannot escape from this. We are exposed to the hazards 24-7."

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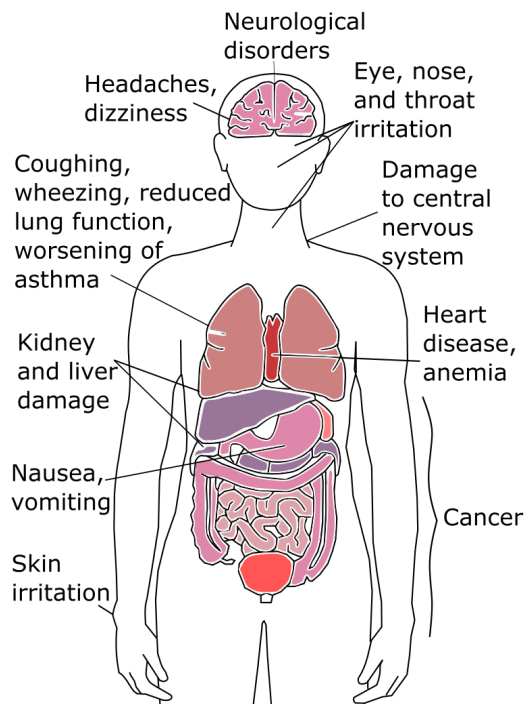
*Survey note: Out of the ~130 households in Cherokee Forest, 97 responded to the 2014 health survey. 80 individuals responded to the 2021 survey*

## Odors

Odors are more than just an annoyance for Cherokee Forest residents; they are sometimes the only clue that otherwise invisible air toxins are present in the area. The smell has been so overwhelming that residents have been occasionally forced to leave their homes, even over the holidays when they would otherwise be celebrating at home. The most frequently reported odors in the neighborhood are a sweet, fuel-like smell, a smell of rotten eggs, and a smell of ammonia or cat urine. All three odors indicate the presence of pollutants that make humans sick.

In 2021, 96% of Cherokee Forest survey respondents reported strong odors. They were bothered by the odors an average of 22.6 days of the month prior to the survey.

### Health impacts of chemicals related to odors



Sweet, fuel-like	Rotten eggs	Cat urine
<p>Likely caused by a group of chemicals known as volatile organic compounds, or VOCs</p> <p>VOCs are emitted from cars, industrial plants, refineries, chemical products, and more.</p>	<p>Likely caused by hydrogen sulfide (H<sub>2</sub>S), which can also smell like cooked cabbage.</p> <p>H<sub>2</sub>S is emitted from refineries, wastewater treatment plants, and more.</p>	<p>Likely caused by ammonia (NH<sub>3</sub>)</p> <p>Ammonia is emitted from agriculture, fuel combustion, fertilizer, coke production, and more.</p>

### 2014 Survey Quotes

"It smells like gas and burns my eyes, nose, and throat."

"The odor makes me dizzy."

"The smell takes my breath away."

"I ride daily through the neighborhood. The smell is so bad I wear a respirator."

"The ammonia smell is so strong I can smell it in my house."

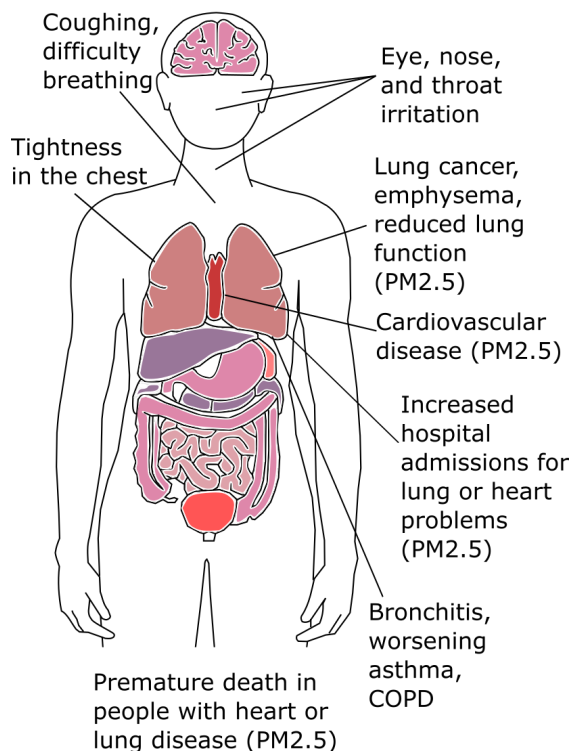


## Dust and PM<sub>2.5</sub>

Residents frequently find their cars and homes coated in dust. Sometimes the dust has a sticky, oily consistency, and other times it is rough and sandy. Lab testing from a particularly dusty day confirmed that sandblasting materials like those used at shipbuilding yards were a major component of the rough, sandy dust.

Dust is a major source of small particles in the air, which are also called PM<sub>10</sub>. These particles can cause health problems when inhaled. Particles in the air that are even smaller than dust, called PM<sub>2.5</sub>, can pass through the lungs and lead to even more serious health issues. Major sources of PM<sub>2.5</sub> include metals and smoke from combustion (burning processes).

### Health impacts of dust and PM<sub>2.5</sub>



### 2014 Survey Quotes

"My car is covered in dust."

"The dust comes in through the vents."

"My shed is covered with dust."

"I have to change the air filters every two weeks."



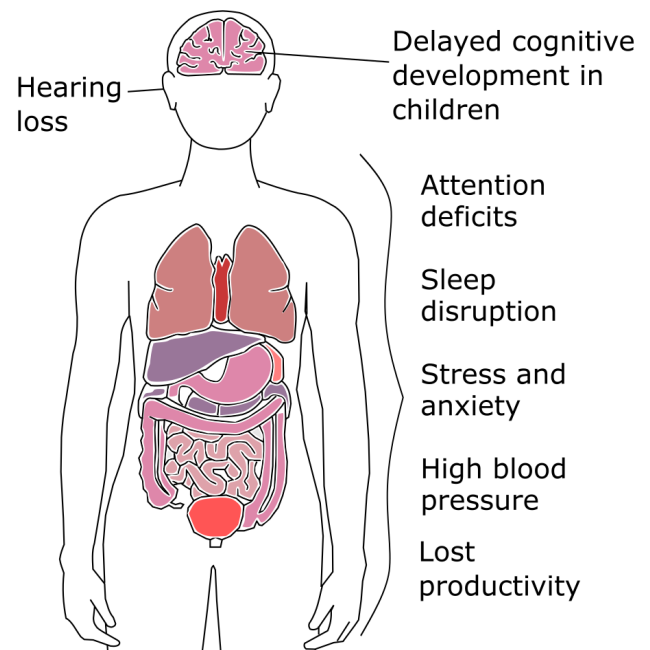
*Dust on the hood of a car in Cherokee Forest*

# Noise

Noise is an often overlooked form of pollution. Our thoughts, attention, and sleep are interrupted in noisy environments. Noise pollution can lead to serious physical and mental health issues, including heart disease, sleep disturbance, stress-related illness, and cognitive impairment in children. The World Health Organization has found that noise pollution is the second-leading environmental cause of human health problems, behind only air pollution.

Industrial noise reportedly reaches the Cherokee subdivision 24 hours a day and frequently wakes residents up in the middle of the night. In a 2021 survey in the subdivision, 41% of respondents reported increased fatigue and 23% reported sleep disturbances. We all deserve a restful night's sleep, and Cherokee Forest residents are suffering without it.

## Health impacts of noise pollution



## 2014 Survey Quotes

"The noise wakes me up at night."

"The noise is so loud that it rattles and shakes the house."

"The noise is so loud I cannot focus."

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## Timeline of Cumulative Air Pollution affecting the Cherokee Subdivision

The Cherokee subdivision was built in the mid-1960s at the same time as the construction of the Bayou Casotte Industrial Complex. Residents initially enjoyed living in the neighborhood.

Over the decades, industries expanded and changed ownership and additional industries have emerged, resulting in a dramatic increase in air pollution impacting the residents of the Cherokee subdivision. Legacy pollution from prior industry has accumulated in the land and waters, from discarded toxic materials (including mounds of radioactive gypsum declared an EPA Superfund site), chemical spills (from leaks, explosions, and releases), and contamination from extreme weather events (heavy rains, floods, and hurricanes). Residents can no longer safely plant gardens and are concerned about letting their children and pets play in their yards. They live in constant fear of catastrophic, compound, and cascading disasters (explosion of tanks of highly toxic chemicals, oil and chemical spills, hurricanes, flooding, etc.).

Residents experience continuous elevated dust, chemical, noise, and light pollution. Spikes in industrial emissions causing occasional plumes of pollution to travel into the neighborhood, especially when winds are from the east, the atmosphere is stable, and there is no rain. These episodic releases of pollutants lead to multi-day pollution episodes throughout the year, affecting the health of residents. A consistent and timely measurement response is still needed to alert the community to these polluted plumes, including identifying their sources and anticipating extent and duration.

The combination of legacy pollutants, continued expansion of industry, noise distress, odors, respiratory health effects, and heightened threat of chemical disaster make the Cherokee neighborhood no longer a healthy and safe place to live. With little hope for industrial remediation in the coming century, the most viable solution is to pursue a buyout of this fenceline subdivision in order to steward the land and its ecosystems to become a natural buffer to prevent further progression of pollution into the newer residential areas to the west. Following is a timeline demonstrating the growing industry and cumulative pollution affecting the Cherokee neighborhood since its development in the 1960s.

Definitions	<p><b>Legacy pollution</b> - pollution that remains after the industry has left or changed its methods. Often involves chemicals emitted before people were aware of their harmful effects and before government bans, limits, and regulations.</p> <p><b>Multi-hazard disaster risks</b></p> <ul style="list-style-type: none"><li>• <i>Compound</i> - when extreme events occur at the same time or one after another.</li><li>• <i>Cascading</i> - extreme events that generate cascading unexpected secondary effects.</li><li>• <i>Systemic</i> - when an event disrupts the balance of a system.</li></ul>
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## Timeline

Prior to 1950 - Chicago Bridge & Iron built ships and oil rigs. (Grew to Halter Marine, Friede Goldman Halter, Signal International, VT Halter, World Marine, Bollinger)

1940s WWII  
expanded shipbuilding  
and population



1956 Jackson County Port Authority  
Developed Bayou Casotte industrial complex  
and dredged the deep-water channel.

1950s Mississippi Phosphates – fertilizer

1959 H.K. Porter Co., Inc. (refractories)  
(site now a part of Chevron)

1962 Standard Oil Refinery  
(now Chevron)

1963-1971 Cherokee  
subdivision built



1965 (1967?) First Chemical Corporation

1968 Lipps Propeller Company  
(now Rolls Royce Naval Marine)



1969 Hurricane Camille



1979 Hurricane Frederic

1970s – neighborhood  
expands to Ruland St, Sea  
Cove, Bluefish





1980 Chevron \$1.3 million expansion to process lower-grade crude oil

1980s – Neighborhood expands west to Roswell and south to Washington and Shadow Wood Cir



1985 Hurricane Elena

1986 Port of Pascagoula Special Area Management Plan (primarily for wetlands)

1992 Chevron begins producing benzene



1990s – neighborhood continues to grow (Galley St., etc.)

1996 Chevron double capacity of paraxylene and begin producing ethylbenzene

1998 Chevron flooded 4 feet by Hurricane George and shut down for 3 months



1998 Hurricane Georges

2002 First Chemical explosion

92% of Pascagoula flooded by storm surge including Industrial sites



2005 Hurricane Katrina



Post-Katrina recovery  
~36 lots now vacant in Cherokee subdivision and neighborhood listed in FEMA flood zone.

*Natural forest buffer was removed when constructing Bayou Casotte Pkwy.*

2010 Chevron installed new CCR unit,  
replacing 30 year-old equipment

*Starting in 2011 pollution became  
much worse according to  
residents.*

In 2011 VT Halter missions shifts from  
building new to **servicing used ships and rigs**,  
hiring 400 more workers.

2014 Mississippi Phosphates declared a  
Superfund Site by EPA

2013 Cherokee Concerned Citizens  
formed

2014 Odor logs collected by Cherokee  
Concerned Citizens (Sep/Oct)

2014 Health Survey Report by  
Cherokee Concerned Citizens and  
LEAN (Dr. Subra)

2014 Chevron adds Base Oil Plant.

2015 Chevron tank roof collapsed  
during storm (Sep)

*After industry boom in 2014,  
living in neighborhood became  
worse day-by-day according to  
residents.*

2015 MDEQ VOC sampling  
(Oct/Nov)

2015-2017 ALS VOC (Nov 2015);  
EPA VOC (Jan 2017)

2014-2017 CCC soil and dust  
sampling. PM metals (Chester Labs)

2016 BP Natural Gas Plant explosion  
(now Enterprise).

2020. First Chemical closes

2021 Buffer Project proposed  
CCC response and testimonials

2019 (Apr/May) – Chevron  
fenceline monitoring (Aerodyne)

2020 CCC conducts Hanby Soil  
tests with Public Lab

2021 (April) EPA NEIC GMAP  
monitoring industrial sites

2022 EPA grants \$500 for air  
monitoring study

2022. Bollinger purchases shipyards  
(VT Halter, Globe Marine, etc.)

2023 (Feb) CTEH responses  
monitoring of Cherokee  
neighborhood (MDEQ)

## Expected Emissions

### **Chevron Products Co Pascagoula Refinery**

NO<sub>x</sub>, SO<sub>x</sub>, VOCs, CO, particulates, etc.

VOCs (benzene, ethylbenzene, 1,3-butadiene, Cyclohexane, glycol ethers, n-hexane, o-xylene, Traracholoroethylene, toluene, biphenyl, polycyclic aromatic compounds, m-xylene, benzene, benzo(G,H,I)perylene, nitrate compounds, HCL (acid aerosols), 1,2,4-trimethylbenzene, hydrogen sulfide, propylene, phenol, ethylene, methanol, Isoprene, p-xylene, dioxin, carbonyl sulfide, hydrogen cyanide, 1,2-dibromoethane, ethylene glycol, cresol, ammonia, diethanolamine, 2,4-dimethylphenol, naphthalene, sulfuric acid (acid aerosols), carbon disulfide, mercaptan (methanethiol), mercury, vanadium, copper, zinc, chromium, cobalt, lead, nickel, molybdenum trioxide

Other: Continual threat for disaster, explosions, hurricane damage.

Potential future emissions from plastic-based fuel for Cogen power plant

### **Bollinger (Vt Halter Marine Pascagoula Operations\_**

Sandblasting, welding, surface coating (paint, solvents)

Particulates, VOCs, crystalline silica, metals, VOCs – n-hexane, 1,2,3-Trimethylbenzene, xylene, ethylbenzene, metals (arsenic, cadmium, hexavalent chromium, lead, nickel, manganese, copper)

24-hour noise and light pollution

### **Rolls Royce Naval Marine Inc**

metals (e.g., **chromium, nickel, copper**)

### **Bayou Concrete**

????

### **Enterprise Gas Processing (BP)**

Flares release methane, NO<sub>x</sub>, SO<sub>2</sub>, VOC<sub>x</sub>

### **Gulf LNG Energy**

Planned Liquefaction Project adding export capabilities to the existing terminal

### **Closed**

Mississippi Phosphates Corp

Closed 2014 – now a Superfund site, gypsum mounds covered 2017

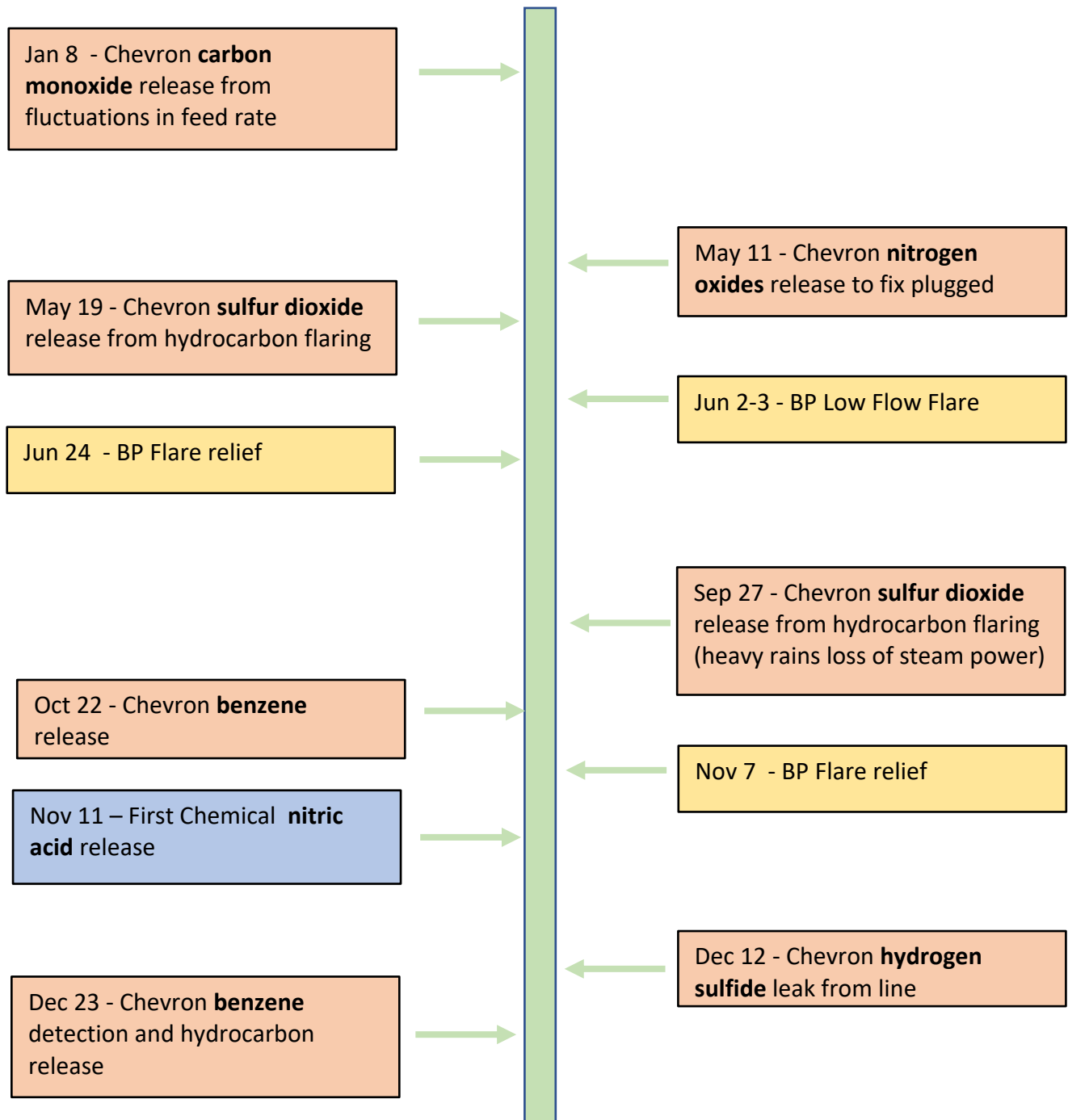
First Chemical Corp

Closed 2020

Signal International

Closed 2015, guilty of labor trafficking

**Example of frequency of Releases and  
Incident Reports during one Year  
2015**



Pascagoula residents experience many other pollution events unrelated to these reported deviations.