

**DPCAC Annual
Report on
Emissions from
Deer Park Plants
Presentation**

**Assessing emission reduction
efforts in the last 5 years.**

Deer Park Community Advisory Council
September 23, 2024

DPCAC EMISSIONS REPORT FILES

Orientation

General information on DPCAC plants and emissions, air quality and health
Why we review emissions reports and where emissions come from
Where emissions and data come from
Acronyms and terms

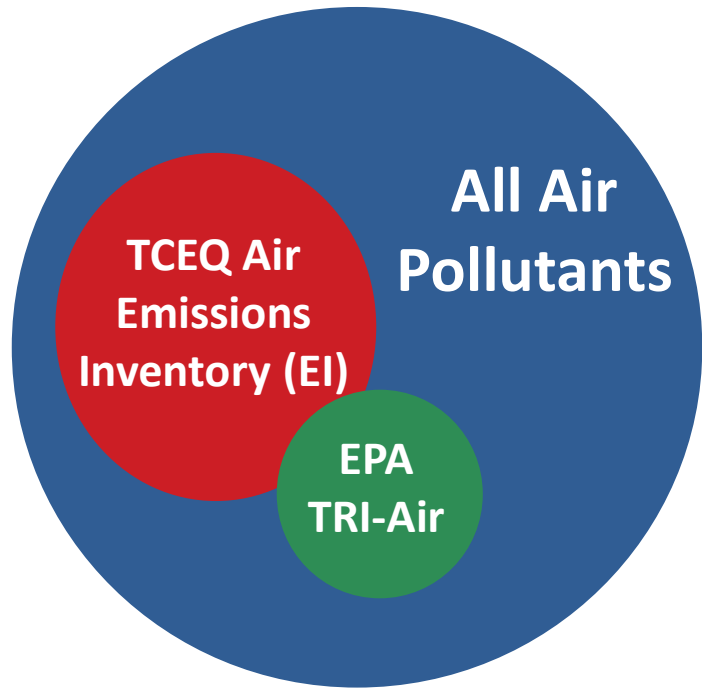


Presentation

Major reasons for change by plant, trend charts, and NOx and VOC comparisons to Harris County and the State of Texas.



Source of Air Pollution



**Industry/
Plants**



Transportation



Biogenic



Agriculture



**Residential
Heating &
Cooking**

Not to scale

Impact of Emissions

- ① Environment
- ① Health
- ① Air Quality

Plant Sources of Emissions

From:

- Boilers
- Heaters
- Cooling towers
- Process vents
- Tanks
- Pipes
- Wastewater treatment

During:

- Routine permitted activities, including maintenance startup ,and shutdown
- Loading and unloading of trucks and trains
- Upsets
- Spills
- Weather events

Shell Deer Park

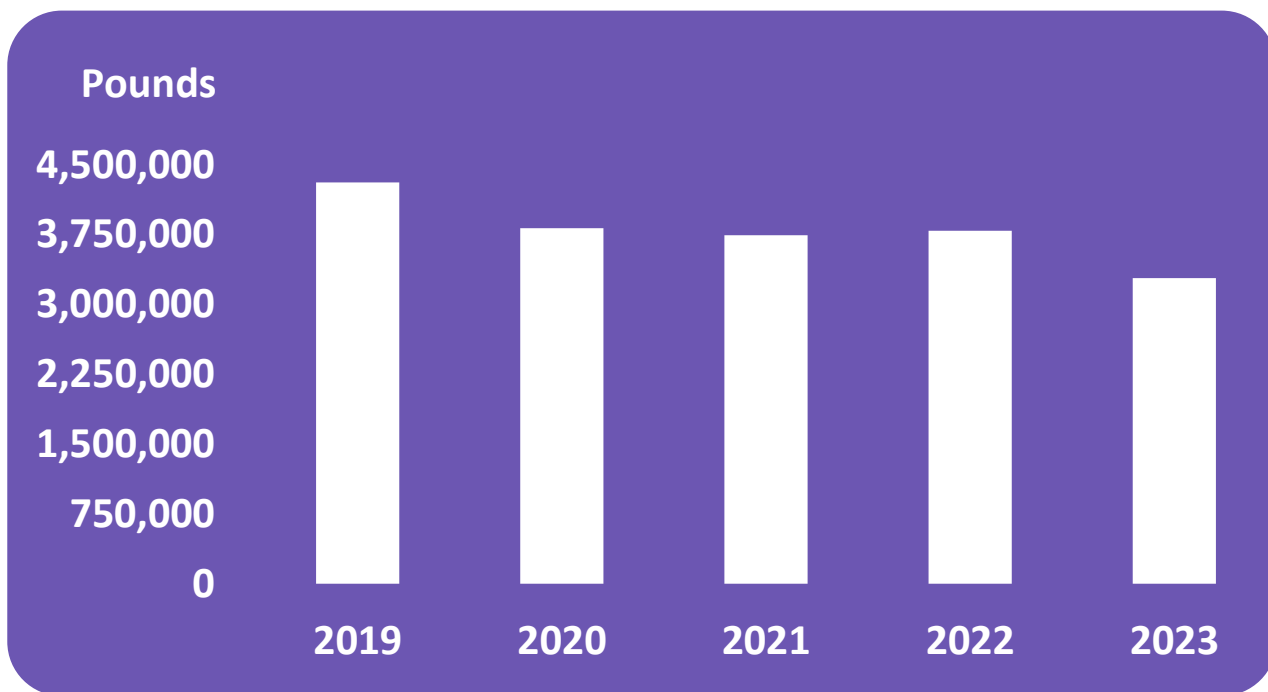
The information provided by Shell Deer Park Chemicals reflects abnormal operations of the site in 2023. In May, the site experienced a fire in the olefins unit which resulted in increased emissions and a shut down of that unit for the remainder of the year, while the remaining 70% of the site maintained safe and stable operations.

In May, the site employed the services of CTEH, an environmental monitoring firm, to conduct community air monitoring throughout the event response. The results were non-detect; air monitoring did not show any harmful levels of chemicals in our community. During the event, TCEQ, Harris County Pollution Control and the City of Deer Park also conducted air monitoring with similar results.

Shell remains committed to delivering energy responsibly and safely, with the priority of protecting people and respecting the environment. We employ highly trained individuals and promote continuous learning across our operations. All employees and contractors on our site are trained in the stop work authority which empowers them to stop work if they see unsafe behavior.

Air Emissions Inventory – Nitrogen Oxides (NOx)

2019-2023



Shell: Reduced NOx ~471,436 lbs due change in operations and product volumes in 2nd half of yr.

Dow: Reduced NOx ~91,930 lbs due to decreased production and use of flare gas in natural gas-fired equipment.

Other Significant Decrease of Nitrogen Oxides (NOx)

- PEMEX Deer Park (-25,652 lbs) due to production scheduling improvement.

Other Significant Increases of Nitrogen Oxides (NOx)

- Clean Harbors (+76,300 lbs) due to year-to-year variation of material received for incineration.
- Lubrizol (+14,056 lbs) due to maintenance activities.

Data From Two Inventories

TCEQ

Air Emissions Inventory (EI)

- Texas Commission of Environmental Quality
- Reported annually by major sources
- Just releases to **AIR**
- Required for permitting & compliance
- Almost all air contaminants

EPA

Toxics Release Inventory (TRI)

- Environmental Protection Agency
- Reported annually *if* plant has chemicals on TRI list above a certain amount
 - ~820 chemicals that exceed specific thresholds
- Releases to environment & transfers offsite for treatment or disposal
 - Contaminants to air, water, and land

Major Reasons for 2023 Changes

(+/- 10% or 10,000 lbs or more)

Clean Harbors

Varies from year-to-year based on material received for incineration

- Increase in TRI releases ~4,506 lbs
- Increased NOx ~76,300 lbs
- Increased VOCs ~2,048 lbs
- Reduced Benzene ~ 16 lbs

Major Reasons for 2023 Changes

(+/- 10% or 10,000 lbs or more)

Dow

Decreased production/use of flare gas in natural gas equipment

- Reduced TRI releases ~31,254 lbs
- Reduced NOx ~91,930 lbs
- Reduced VOCs ~75,322 lbs
- Reduced CO ~31,812 lbs
- Reduced SOx ~473,810 lbs
- Reduced TSP ~22,372 lbs

Major Reasons for 2023 Changes

(+/- 10% or 10,000 lbs or more)

Lubrizol

Maintenance Activities

- Increased NOx ~14,056 lbs
- Increased CO ~45,981 lbs

Change in production

- Reduced VOCs ~16,497 lbs
- Reduced SOx ~3,068 lbs

Major Reasons for 2023 Changes

(+/- 10% or 10,000 lbs or more)

OxyChem
PVC/KOH

Losses from refrigeration system

- Increased TRI releases ~12,737 lbs

Lower combustion products from natural gas burning sources

- Reduced SO_x ~96 lbs

OxyChem
VCM

New stack test results used in calculations

- Reduced TRI releases ~14,315 lbs

Decreased fugitive emissions

- Reduced VOCs ~2,603 lbs

Major Reasons for 2023 Changes

(+/- 10% or 10,000 lbs or more)

PEMEX Deer Park

Increased flaring due to tornado/freeze

- Increased VOCs ~97,614 lbs
- Increased CO ~90,958 lbs

Production scheduling improvement

- Reduced NOx ~25,652 lbs

Fewer Coker Outages in 2023

- Reduced SOx ~915,416 lbs

Reduced operating hours at Cogen Unit

- Reduced TSP ~21,840 lbs

Major Reasons for 2023 Changes

(+/- 10% or 10,000 lbs or more)

Shell
Chemical

Increases due largely to the May 2023 Olefins fire

- Increased TRI releases ~41,570 lbs
- Increased VOCs ~141,852 lbs
- Increased CO ~467,587 lbs
- Increased TSP ~57,588 lbs

Change due to operations and product volumes in the second half of year

- Reduced NOx ~471,436 lbs
- Increased SOx ~398,242 lbs
- Reduced Benzene ~1,351 lbs
- Increased 1,3-Butadiene ~39,411 lbs

Major Reasons for 2023 Changes

(+/- 10% or 10,000 lbs or more)

Vopak

Varies from year-to-year based on material received for storage

- Reduced TRI emissions ~9,323 lbs
- Increased VOCs ~14,320 lbs
- Increased TSP ~620 lbs

Reduced and optimized flaring

- Reduced NOx ~10,620 lbs
- Reduced CO ~90,640 lbs
- Reduced SOx ~2,500 lbs

Major Reasons for 2023 Changes

(+/- 10% or 10,000 lbs or more)

Westlake Epoxy

Unit shutdown while continuing recovery processes

- Reduced SOx ~3,521 lbs

Increased dissolved solids in cooling tower

- Increased TSP ~7,390 lbs

Air Emissions Inventory (EI) of Criteria Pollutants and Ozone Precursors

TCEQ Air Emissions Inventory (EI) Reporting

Exempt from Reporting

- Evonik
- NOVVI
- Texas Molecular
- Valvoline
- Vopak Moda

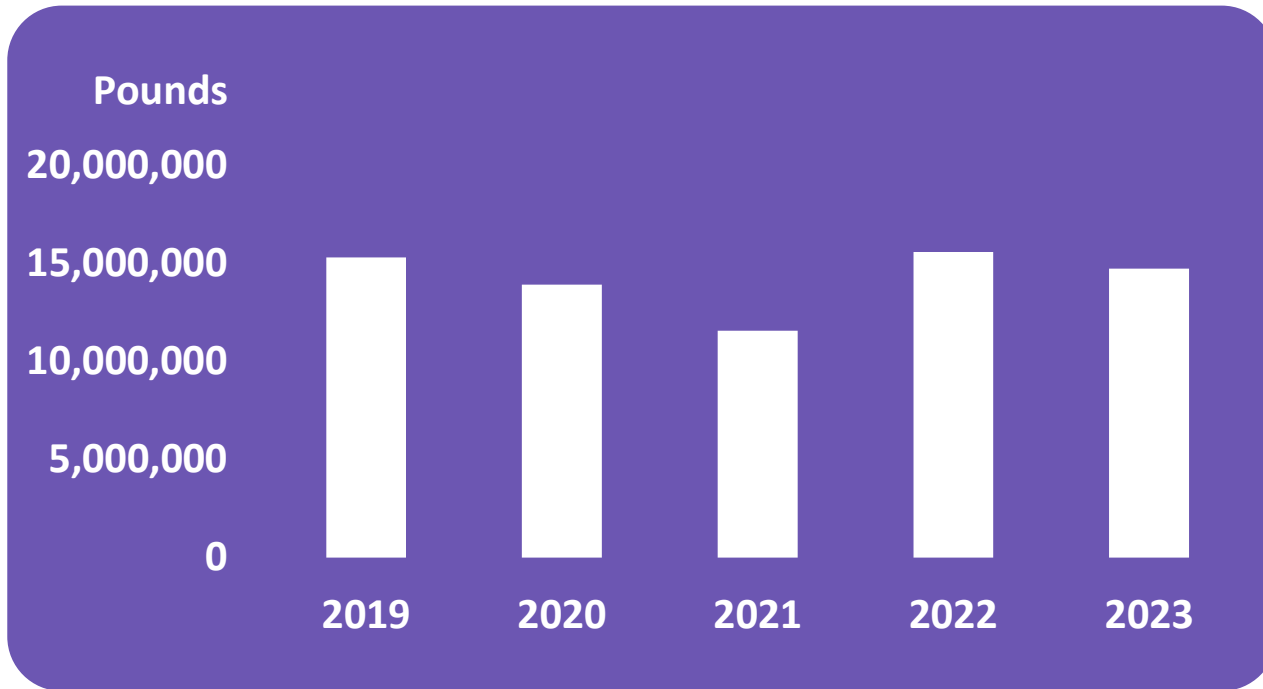
Included in DPCAC Emissions Inventory

- Clean Harbors
- Dow
- Geo Specialty Chem.
- Lubrizol
- OxyChem PVC/KOH
- OxyChem VCM
- PEMEX Deer Park
- Shell Deer Park
- Vopak
- Westlake Epoxy

****ITC has not submitted data since 2018**

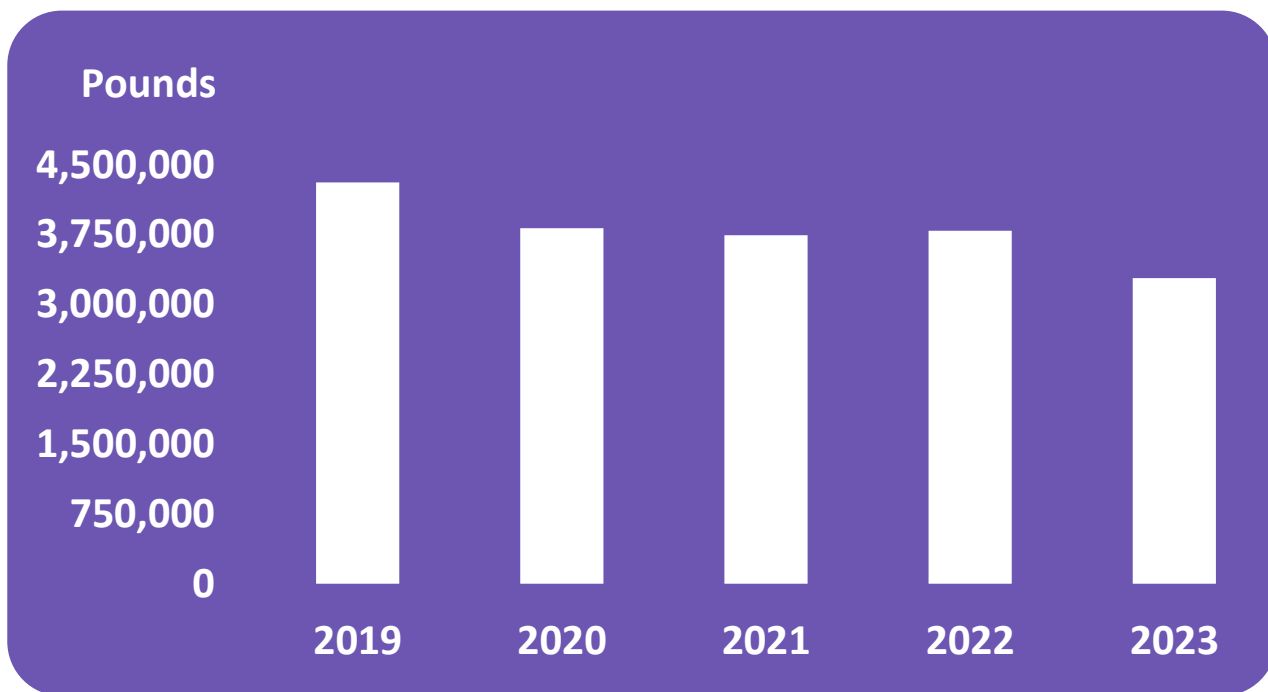
TCEQ Air Emission Inventory (EI) Totals

2019-2023



Air Emissions Inventory – Nitrogen Oxides (NOx)

2019-2023



Shell: Reduced NOx ~471,436 lbs due change in operations and product volumes in 2nd half of yr.

Dow: Reduced NOx ~91,930 lbs due to decreased production and use of flare gas in natural gas-fired equipment.

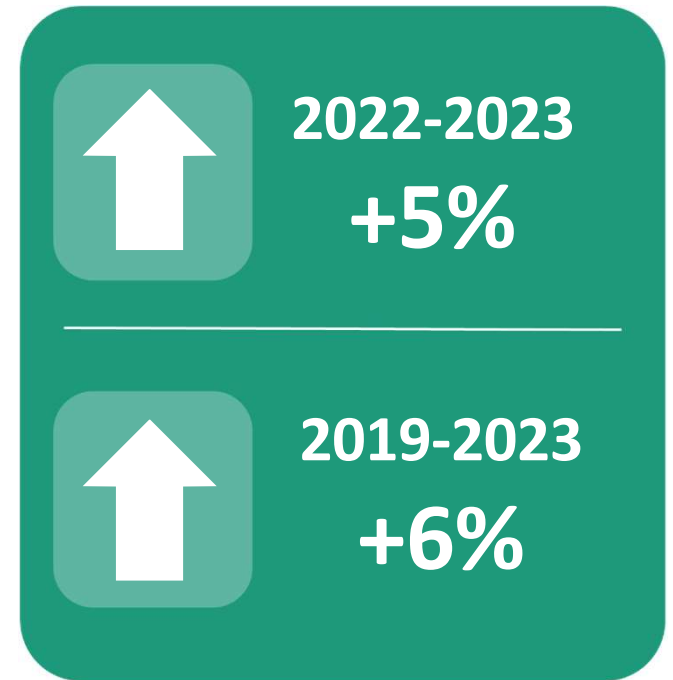
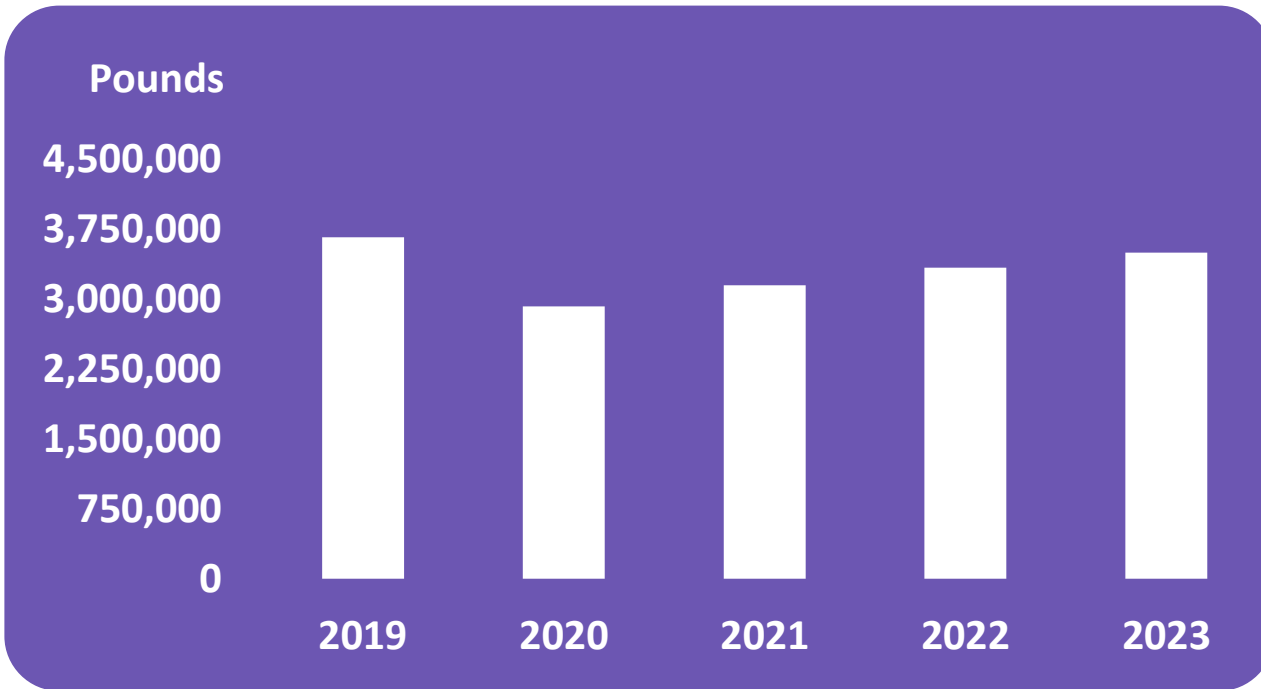
Other Significant Decrease of Nitrogen Oxides (NO_x)

- **PEMEX Deer Park (-25,652 lbs)** due to production scheduling improvement.

Other Significant Increases of Nitrogen Oxides (NO_x)

- **Clean Harbors (+76,300 lbs)** due to year-to-year variation of material received for incineration.
- **Lubrizol (+14,056 lbs)** due to maintenance activities.

Air Emissions Inventory – Volatile Organic Compounds (VOCs) 2019-2023



Shell: Increased VOCs ~141,852 lbs largely due to May 2023 Olefins fire

PEMEX Deer Park: Increased VOCs ~97,614 lbs from increased flaring due to tornado and freeze events.

Other Significant **Increase** of Volatile Organic Compounds (VOCs)

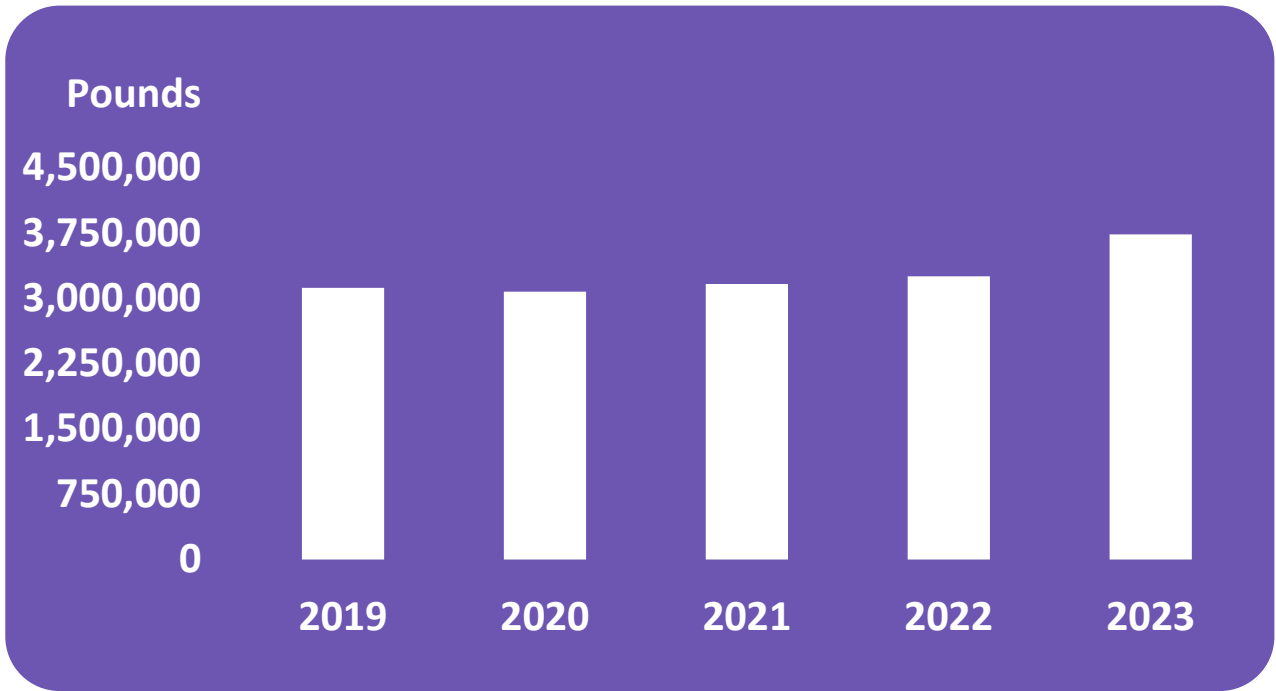
- **Vopak (+14,320 lbs)** due to year-to-year variation of material received for storage.

Other Significant **Decreases** of Volatile Organic Compounds (VOCs)

- **Dow (-75,322 lbs)** due to decreased production/use of flare gas in natural gas equipment.
- **Lubrizol (-16,497 lbs)** due to a change in production.

Emissions Inventory – Carbon Monoxide (CO)

2019-2023



 2022-2023
+15%

 2019-2023
+14%

 **Shell:** Increased CO ~467,587 lbs largely due to May 2023 Olefins fire.
PEMEX Deer Park: Increased CO ~90,958 lbs due to increased flaring resulting from tornado/freeze.

Other Significant **Increase** of Carbon Monoxide (CO)

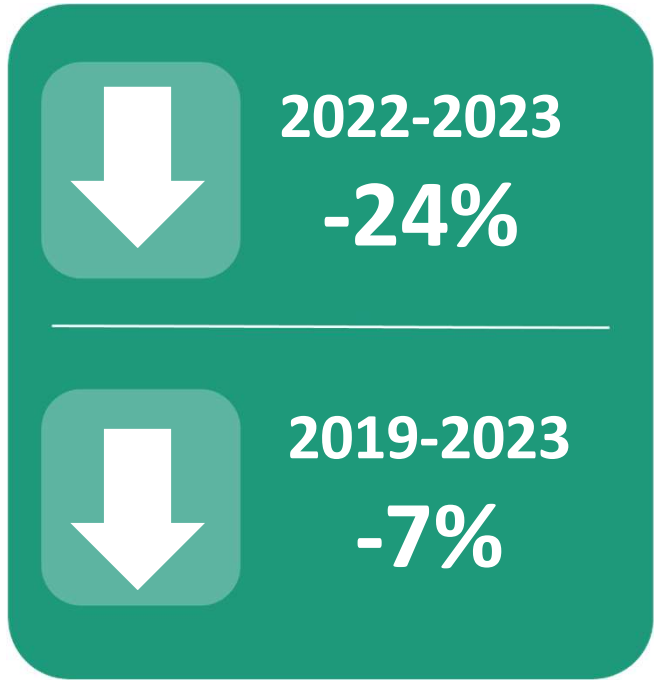
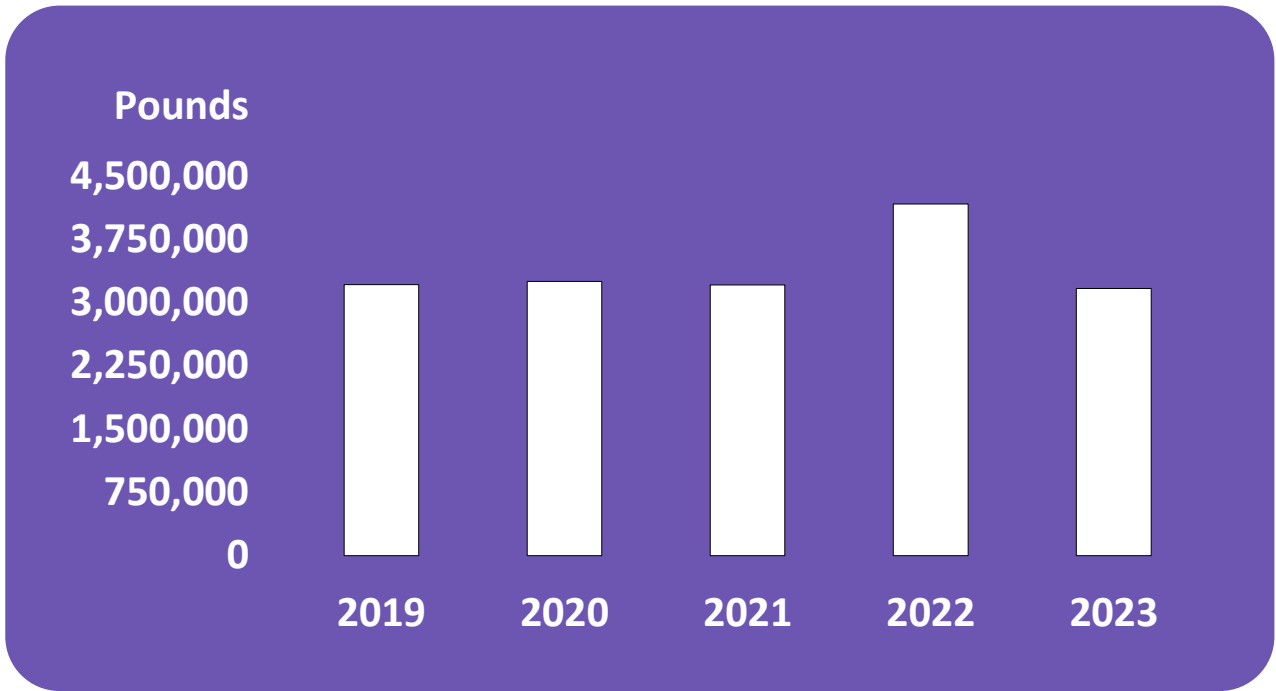
- **Lubrizol (+45,981 lbs)** due to increased maintenance activities.

Other Significant **Decreases** of Carbon Monoxide (CO)

- **Vopak (-90,640 lbs)** due to reduced and optimized flaring.
- **Dow (-31,812 lbs)** due to decreased production/use of flare gas in natural gas equipment.

Emissions Inventory – Sulfur Oxides (SOx)

2019-2023



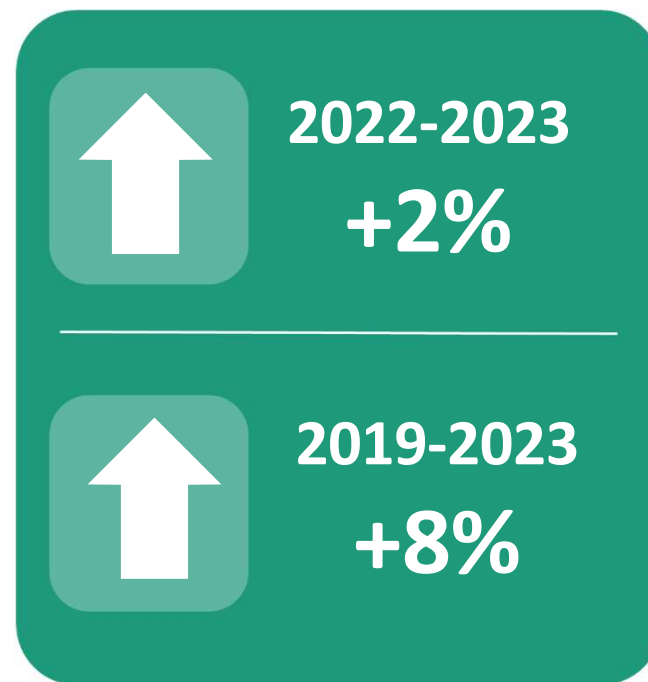
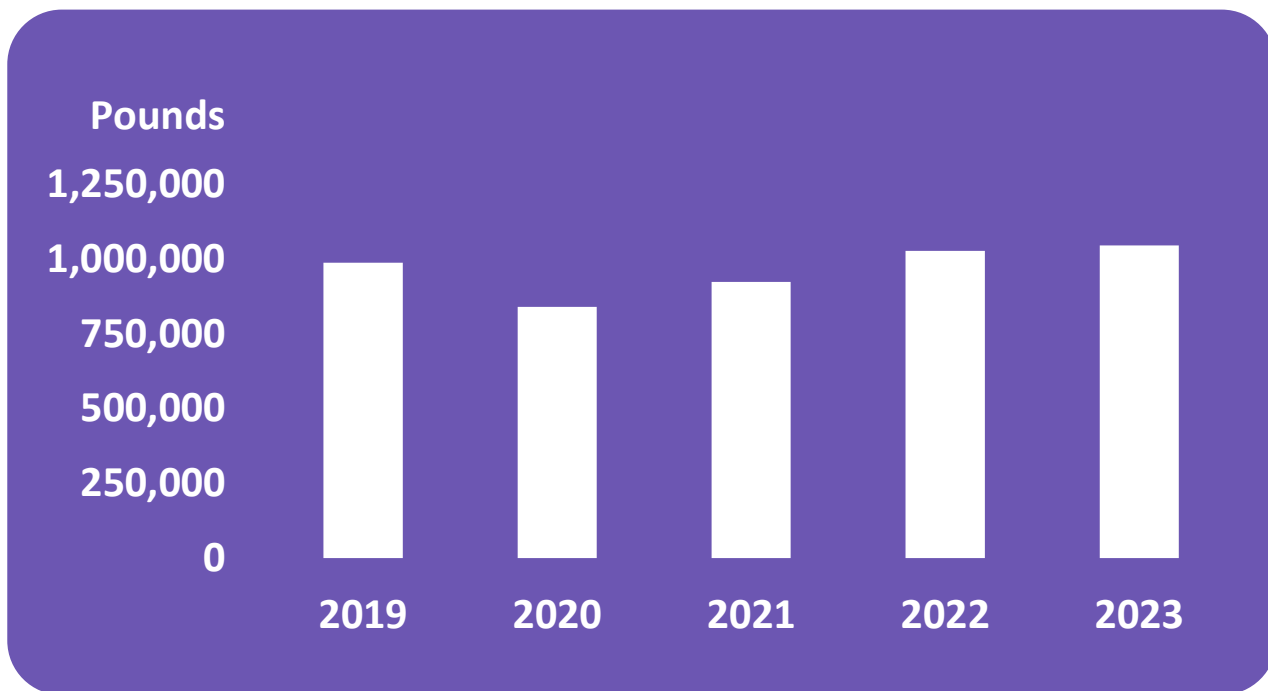
PEMEX Deer Park: Reduced SOx ~915,416 lbs due to fewer Coker outages in 2023.


Dow: Reduced SOx ~473,810 lbs due to decreased production/use of flare gas in natural gas equipment.

Other Significant **Increase** of Sulfur Oxides (SOx)

- **Shell (+398,242 lbs)** due to change in operations and product volume in 2nd half of the year.

Emissions Inventory – Total Suspended Particulates (TSP) 2019-2023



 **Shell:** Increased TSP ~57,588 lbs largely due to May 2023 Olefins fire.
Westlake Epoxy: Increased TSP ~7,390 lbs due to increased dissolved solids in cooling tower.

Other Significant Decreases of Total Suspended Particulates (TSP)

- **Dow (-22,372 lbs)** due to decreased production/use of flare gas in natural gas equipment.
- **PEMEX Deer Park (-21,840 lbs)** due to reduced operating hours at Cogen Unit

Toxics Release Inventory
Releases to Air

EPA Toxics Release Inventory Reporting

Exempt from Reporting

- Vopak Moda

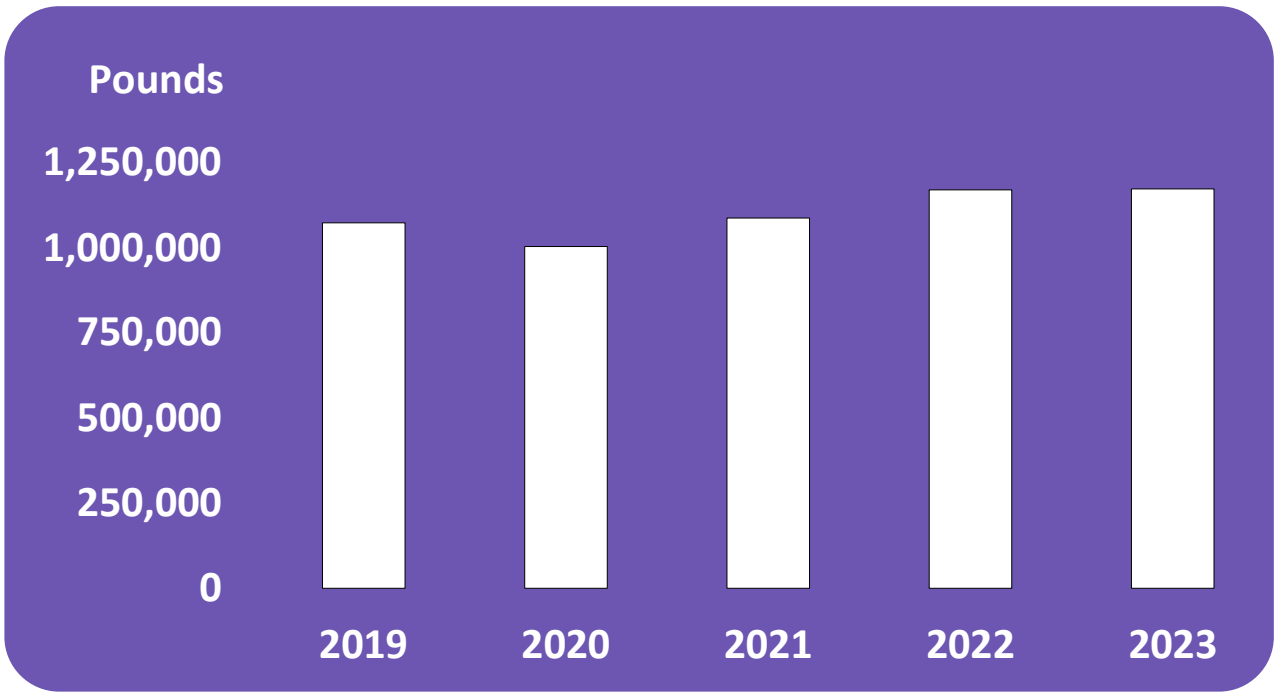
Included in DPCAC Emissions Inventory

- Clean Harbors
- Dow
- Evonik
- Geo Specialty Chem.
- Lubrizol
- NOVVI
- OxyChem PVC/KOH
- OxyChem VCM
- PEMEX Deer Park
- Shell Deer Park
- Texas Molecular
- Valvoline
- Vopak
- Westlake Epoxy

****ITC has not submitted data since 2018**

Toxics Release Inventory – Total Releases to Air

2019-2023



Summary callouts for the data series, each featuring a white upward-pointing arrow on a teal background.

- 2022-2023**
+0.2%
- 2019-2023**
+7%

Significant **Increases** of Toxics Release Inventory (TRI)

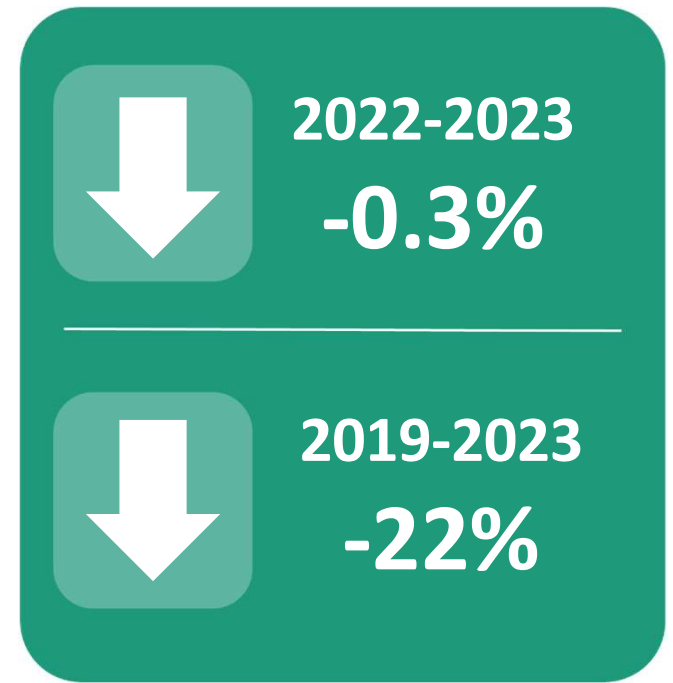
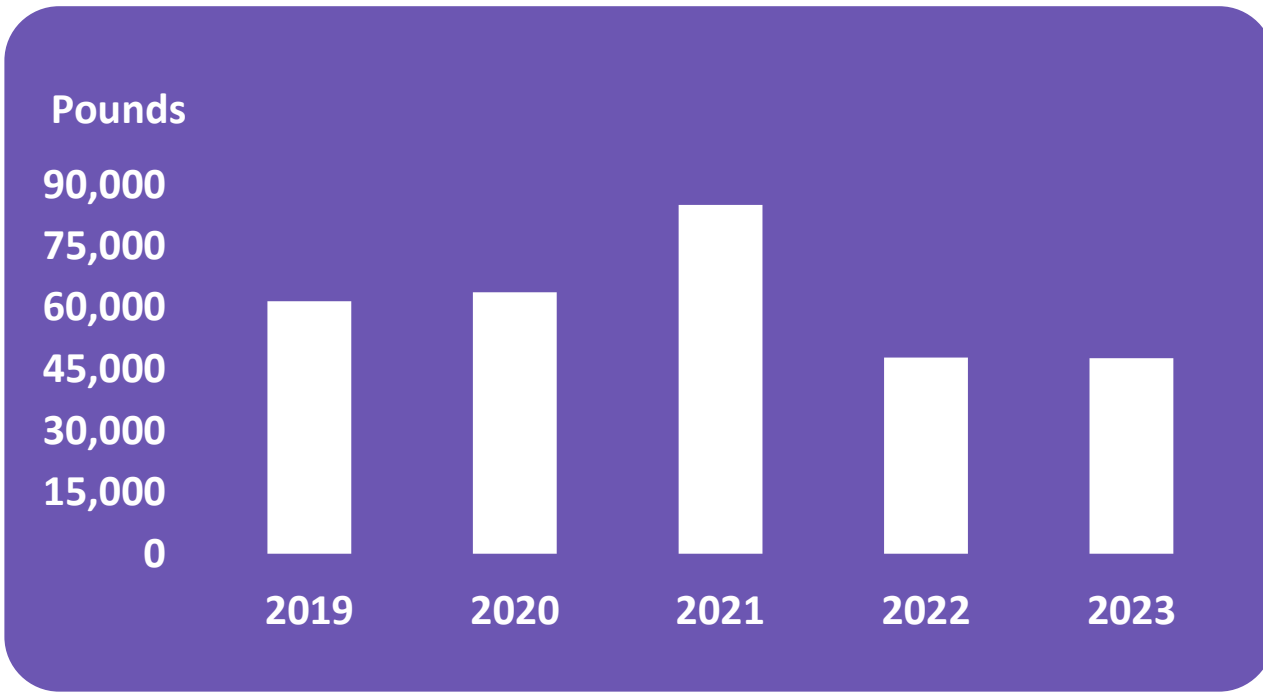
- **Shell (+41,570 lbs)** largely due to May 2023 Olefins fire.
- **OxyChem PVC/KOH (+12,737 lbs)** due to losses from refrigeration system.

Significant **Decreases** of Toxics Release Inventory (TRI)

- **Dow (-31,254 lbs)** due to decreased production/use of flare gas in natural gas equipment.
- **OxyChem VCM (-14,315 lbs)** due to new stack test results used in calculations.

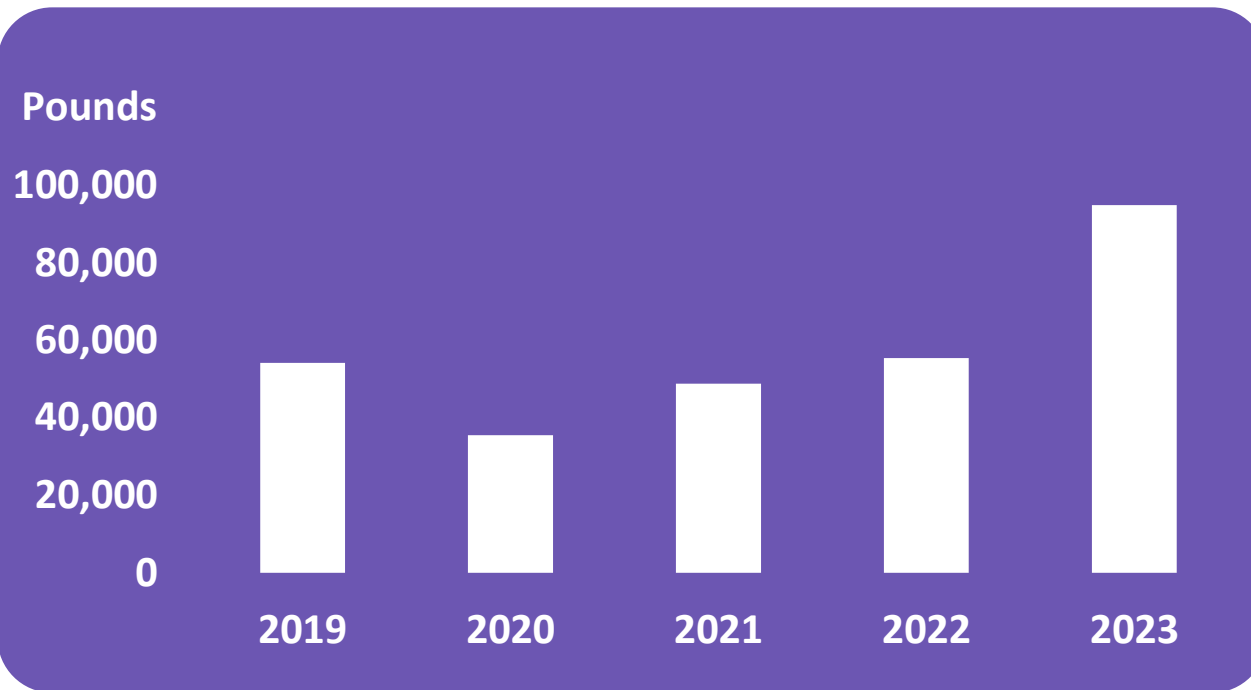
Benzene Releases to Air

2019-2023



1,3-Butadiene Releases to Air

2019-2023



2022-2023

+71%



2019-2023

+64%



Shell: Increased ~39,411 lbs due change in operations and product volume in 2nd half of the year.

2023 Summary for the Year

Decreased

SOx	24%
NOx	-13%
EI Totals	-5%
Benzene	-0.3%

Increased

1,3-Butadiene	+71%
CO	+15%
VOCs	+5%
TSP	+2%
TRI Air	+0.2%

2023 Summary for the Year

Emissions Inventory Decreased 5%

- ⦿ **Decreased** ~849,437 lbs from 2022-2023.
- ⦿ Emissions Inventory **total lbs** have decreased by 570,699 lbs over 5 years
- ⦿ 4 plants had overall increases:
 - Clean Harbors increases were due to the variability in waste received.
 - Lubrizol increases were due to maintenance activities.
 - Shell increases were largely due to the May 2023 Olefins fire.
 - Westlake Epoxy had increased TSP due to dissolved solids in cooling tower.

2023 Summary for the Year

Toxics Release Inventory Increased Only 0.2%

- ⦿ **Increased** ~2,720 lbs from 2022-2023.
- ⦿ **TRI total lbs** have been more than 1,000,000 lbs in last 5 years
- ⦿ 6 plants had overall increases, but only 3 had increases over 10%:
 - Shell increases were largely due to May 2023 Olefins fire.
 - OxyVinyls PVC/KOH increases were due to losses from refrigeration system.
 - Clean Harbors increases were due to the variability in waste received.

2022 State & County Comparisons

NOx

- Texas 444,000,000 lbs
- Harris Co. 34,000,000 lbs
- DPCAC 3,794,151 lbs
- **0.86%** of the NOx emissions in the Texas Emissions Inventory were from DPCAC plants
- **11%** of those emissions in Harris County were from DPCAC plants

VOCs

- Texas 169,000,000 lbs
- Harris Co. 15,000,000 lbs
- DPCAC 3,340,299 lbs
- **2%** of the VOC emissions in the Texas Emissions Inventory were from DPCAC plants
- **22%** of those emissions in Harris County were from DPCAC plants

2022 Emissions Inventory was reported by 1844 plants in Texas, 267 in Harris County, and 10 in DPCAC.

For More Information

- EPA website – Toxics Release Inventory

www.epa.gov/tri

- TCEQ website

www.tceq.texas.gov/airquality/point-source-ei

- Houston Regional Monitoring website

<http://hrm.aecom.com>

- Contact Anne Gowan at annelgowan@gmail.com or 281-787-9239.

Deer Park Emergency Notifications

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