Environmental Data
& Governance Initiative

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COMMENT SUBMITTED TO

U.S. ENVIRONMENTAL PROTECTION AGENCY

For the Proposed High-Priority Substance Designations under the Toxic Substances Control Act (TSCA); Vinyl Chloride.

Docket ID EPA-HQ-OPPT-2018-0448-0591 (Submitted via Regulations.gov)

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By

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The Environmental Data & Governance Initiative (EDGI) is a research collaborative and network of diverse professionals promoting evidence-based policy-making and public interest science that advances the Environmental Right to Know (ERTK).

We document, contextualize, and analyze current changes to environmental data and governance practices through multidisciplinary and cross-professional collaborative work; foster the stewardship and expansion of public knowledge through building participatory civic technologies and infrastructures; create new communities of practice to enable government and industry accountability; and promote models and tools that emphasize community participation at all scales, both within EDGI and in our public-facing tools.

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1. Introduction

The U.S. Environmental Protection Agency (EPA) opened a public comment period on July 24, 2024 regarding the upcoming designation to rule on vinyl chloride as a high-priority substance for risk evaluation under the Toxic Substances Control Act. Vinyl chloride is one of five chemicals that the EPA is proposing to designate as such. It's past time for the EPA to ban vinyl chloride compounds.

This widely used and overproduced synthetic plastic polymer is a building block for polyvinyl chloride (PVC)—used in every U.S. household, from irrigation pipes to water lawns to flexible plastic film wraps used to cover lunch sandwiches and dinner leftovers. Red flags over the carcinogenic nature of vinyl chloride date back to at least the 1970s.[1] With increased testing proving that vinyl chloride harms human and environmental health and new demands on the EPA to follow the required cumulative risk imperative set under CERCLA, we encourage the EPA to right the course of this dangerous compound's use.

We support EPA's determination to reopen vinyl chloride's risk prioritization. We encourage the EPA to go further. The historical evidence shows that the industry has pushed against the known evidence of harm to communities, workers, and the U.S. public as vinyl chloride (especially given the replacement of lead piping in the U.S. over the next ten years, likely by plastic alternatives) enters every waste stream, water stream, and backyard, as "vinyl chloride can migrate to groundwater and can be in groundwater due to the breakdown of other chemicals."[2]

Furthermore, the concentration of vinyl chloride production in areas already burdened by multiple vinyl chloride facilities—and other chemical plants in close proximity—necessitates that the EPA develop and enforce more robust metrics to assess the cumulative risks faced by these communities. This is required by Executive Orders EO 13985 and EO 14008, signed by President Biden in January 2021, to advance racial equity, support underserved communities, and address the climate crisis. This includes an Agency-wide directive to prioritize historically marginalized communities through cumulative impact assessments.[3]

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[1] See Sass Jennifer Beth, Castleman Barry, and Wallinga David. "Vinyl Chloride: A Case Study of Data Suppression and Misrepresentation." *Environmental Health Perspectives* 113, no. 7 (July 1, 2005): 809–12. https://doi.org/10.1289/ehp.7716.

[2] See Agency for Toxic Substances and Disease Registry, "Public Health Statement: Vinyl Chloride, CAS#: 75-01-4, Division of Toxicology and Environmental Medicine, July 2006, p. 2.

[3] See Exec. Order 14008, Tackling the Climate Crisis at Home and Abroad, 86 Fed. Reg. 7619, 7629 (Jan. 27, 2021), https://www.federalregister.gov/documents/2021/02/01/2021-02177/tackling-the-climate-crisis-at-home-and-abroad (to "make achieving environmental justice part of their missions by developing programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts.")

2. Mounting Evidence of Vinyl Chloride's Harms

As early as 1974, vinyl chloride was known to induce angiosarcoma in humans and animals.[4] NIOSH epidemiologist Dr. Joe Wagoner's 1983 critical review of vinyl chloride and polyvinyl chloride additionally highlighted its links to its toxicity to the liver, brain, and lungs. His review documented how, even at lower concentrations, vinyl chloride exposure can result in a broad spectrum of cancers in both industrial and residential settings.[5] [6]

Knowledge of vinyl chloride's risks spread across various industries. In 1979, the FDA raised concerns about the chemical's animal carcinogenicity and potential to migrate into food packaging, warning that it "may reasonably be expected to become a component of food."[7] This was the beginning of concerns over how vinyl chloride migrates, leaching into materials such as water and soil. This is especially the case for PVC pipes, which have been increasingly common in residential, commercial, and urban water systems following lead pipe replacements.

One emerging issue is the increased frequency of wildfires across the U.S., exacerbated by climate change, which has heightened concerns over the melting of PVC pipes. Melting PVC increases the probability of leaching carcinogenic compounds that pose serious environmental and health risks.[8] This contributes to a vicious cycle as researchers at Lawrence Berkeley National Lab have estimated that plastic production contributes to between 21-31% of global carbon emissions.[9]

Despite concerns over the environmental and health impacts of vinyl chloride being raised over 40 years ago, corporate lobbying and limited funding for comprehensive research have perpetuated ignorance about its effects.

3. Lobbying and the Spread of Chemical Disinformation

For decades, industry lobbying groups and industry coalitions have been advocating for the use of vinyl chloride, providing misleading information despite growing evidence of its carcinogenicity and other health impacts. Organizations such as the Vinyl Institute and the

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[4] Ibid., Sass, et al., Creech JL, Makk L. 1975. Liver disease among polyvinyl chloride production workers. Ann NY Acad Sci 246:88-94 https://pubmed.ncbi.nlm.nih.gov/1054974/.
[5] Joseph K. Wagoner, "Toxicity of Vinyl Chloride and Poly(vinyl Chloride): A Critical Review." *Environmental Health Perspectives* Vol. 52, pp. 61-66, 1983.
[6] See Toxics Docs, https://www.toxicdocs.org/d/JNqM7GZo4yxname3jLKw663EK?lightbox=1. Chowkwanyun, M., Markowitz, G., Rosner, D. Toxic Docs: Version 1.0 [Database]. New York: Columbia University and City University of New York. 2018.
[7] See Toxics Docs: https://www.toxicdocs.org/d/G6ZgN9a7VdgEdZk6yeM4176rV?lightbox=1. Chowkwanyun, M., Markowitz, G., Rosner, D. Toxic Docs: Version 1.0 [Database]. New York: Columbia University and City University of New York. 2018.
[8] Isaacson, K.P., Proctor, C.R., Wang, Q.E., Edwards, E.Y., Noh, Y., Shah, A.D. and Whelton, A.J., 2021. Drinking water contamination from the thermal degradation of plastics: implications for wildfire and structure fire response. *Environmental Science: Water Research & Technology*, *7*(2), pp.274-284.
[9] Karali, N., Khanna, N., & Shah, N. (2024). Climate Impact of Primary Plastic Production. *Lawrence Berkeley National Laboratory*. Retrieved from https://escholarship.org/uc/item/6cc1g99q.

Manufacturing Chemists Association (MCA) Enterprises focused on offering strategies to convince politicians and the public of vinyl chloride's safety.

3.1 Concerns over industry transparency

During a 1974 Senate Subcommittee hearing, biomedical experts Dr. Wagoner and Dr. Irving Selikoff, whose research linked asbestos exposure to scarred lung tissue, testified on vinyl chloride's carcinogenic properties. Dr. Torkelson from MCA, who was also at the hearing, was questioned by Senator John Tunney for not informing NIOSH of crucial 1973 data relating vinyl chloride to cancer. Dr. Torkelson stated that there was indeed a close relationship with NIOSH, yet MCA wanted to validate the findings. This raised concerns about the transparency of the vinyl chloride industry and its efforts to downplay the risks, even with increasing evidence of harm.[10]

3.2 How the vinyl industry has sowed doubt

Industry efforts to block vinyl chloride regulations continued. In a memo from September 13th, 1990, the Vinyl Institute submitted a comment opposing the State of California Air Resources Board's (ARB) proposal to identify vinyl chloride as a "toxic air contaminant." This resistance came despite ARB's report citing studies from the South Coast Air Quality Management District that estimated 50 to 250 tons of cumulative vinyl chloride emissions annually from certain sites and documented its persistence in landfills and the atmosphere. This move followed an emerging pattern of industry pushback, with the Vinyl Institute's earlier 1989 comments offering a rebuttal to ARB's draft report on the risks of vinyl chloride.[11]

Dow Chemical also followed with concern about the cancer debates around vinyl chloride. In an August 27, 1991 memo from Dow Chemical scientist Peter Voytek to Vinyl Institute Executive Meredith Scheck, he raised significant issues and concerns about more stringent tests and "new data and risk modeling tools." The memo noted that it was a good time to act because "of EPA's current workload, they do not have the time or expertise to improve on the existing methodology and would be receptive to having an independent scientific assessment performed."[12]

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[10] Report on Hearing of the Senate Subcommittee on the Environment, Senate Commerce Committee, August 21, 1974. See Toxic Docs: https://cdn.toxicdocs.org/Xz/Xz8yywB4NVqeQ021GkGvXnw7d/Xz8yywB4NVqeQ021GkGvXnw7d.pdf Chowkwanyun, M., Markowitz, G., Rosner, D. Toxic Docs: Version 1.0 [Database]. New York: Columbia University and City University of New York. 2018.

[11] Memo to the Vinyl Institute Health, "Safety & Environment Committee." September 13,1990. Memo records the tracking and concern of the VI over the "toxic air contaminant," designation in California. See Toxics Docs https://www.toxicdocs.org/d/ZndKVV8Y3qXkLa13KQ2y7w1vp?lightbox=1; Chowkwanyun, M., Markowitz, G., Rosner, D. Toxic Docs: Version 1.0 [Database]. New York: Columbia University and City University of New York. 2018.

[12] Peter Voytek worked on controversial toxics like asbestos, benzine, etc. See Toxic Docs: https://www.toxicdocs.org/d/VKw6OawOXeQJnpreQXJDxMn98?lightbox=1 Chowkwanyun, M., Markowitz, G., Rosner, D. Toxic Docs: Version 1.0 [Database]. New York: Columbia University and City University of New York. 2018.

Despite decades of persistent and successful corporate efforts to limit vinyl chloride regulations, we believe that this opportunity to strengthen its regulation under TSCA can be a major turning point in protecting public and environmental health.

4. Call to Consider Lifecycle Emissions and Social Determinants of Health

PVC is not a monolithic material; it's a harbinger of toxic additives with vinyl chloride as its key building block. Vinyl chloride flows through lifecycles of plastics production that begin at oil and gas extraction, and these compounds aggregate over time and across neighborhoods. As social determinants of health combine with environmental exposures, communities are suffering. Yet, our current regulatory system and research tools are not conducive to readily analyzing, let alone addressing, these realities. Until vinyl chloride is completely banned, rigorous and comprehensive assessments and oversight of vinyl chloride require stringent regulations that allow government agencies, industry workers, and the general public to track its risks and impacts.

4.1. Lack of regulations means incomplete lifecycle analyses

Oil and gas lobbying and the legal ability to not disclose material constitution due to intellectual property laws have produced significant gaps in understanding the full chemical footprint of vinyl chloride as its lifecycle begins with oil and gas extraction. A 2005 Energy Policy Act provision colloquially termed the 'Halliburton Loophole' exempts hydraulic fracturing operations from Safe Drinking Water Act (SDWA) requirements to disclose chemicals injected into the ground. However, studies have linked residential proximity to fracking wells with a host of health problems, including increased hospital utilization, heart failure, and congenital defects.[13] As a result, the true chemical footprint of vinyl chloride remains largely unreported. Furthermore, vinyl chloride is used in these operations. The lack of federal reporting requirements means that much of the data on emissions is either proprietary or unavailable for public scrutiny, limiting research on the overall cumulative impacts.[14]

4.2. EDGI's analysis: Vinyl chloride as an environmental injustice

Here, we present our preliminary analysis of TRI, US Census, and other data available on EJScreen to show how vinyl chloride production consistently produces environmental injustices. Looking at the top 19 vinyl chloride emitters in the US according to 2021 TRI data, the areas where they emit are consistently over the 50th percentile threshold for key demographic and health vulnerabilities. For instance, these areas are in the top 69th percentile for residents under the age of five, 51st percentile for people of color, 59.4th percentile for low income, 76th percentile for low life expectancy, 66.5th percentile for heart disease, and 55.5th percentile of asthma hospitalizations (See Appendix 7.2). Additionally, researchers have thoroughly

[13] Underhill, V., Fiuza, A., Allison, G., Poudrier, G., Lerman-Sinkoff, S., Vera, L., & Wylie, S. (2023). Outcomes of the Halliburton Loophole: Chemicals regulated by the Safe Drinking Water Act in US fracking disclosures, 2014–2021. *Environmental Pollution*, *322*, 120552.
[14] ibid.

documented oil and gas extraction, which is at the core of vinyl chloride production, as a major contributor to environmental injustices nationwide.[15] While this comment only briefly touches on vinyl chloride production as disproportionately impacting already vulnerable communities, this remains a central issue.

5. Case Study: Cumulative Risk in Calvert City, KY

Although EPA regulates facilities and toxicants as individual entities, current assessments of vinyl chloride emissions do not account for the cumulative risk of chemical compounds in bodies and environments. Westlake Vinyls is one of the largest emitters of vinyl chloride in the US. Their two facilities in Calvert City, Marshall County, Kentucky, are only one mile apart and, along with Wacker Chemical Corporation's facility, have turned the region into a vinyl chloride hotspot. Here, we examine the impact of multiple vinyl chloride facilities in one region to highlight its dangers and the importance of cumulative risk assessments that move beyond single point source assessments while still holding these individual facilities accountable.

The Westlake facilities have Individually emitted an average of 42,411 pounds (Westlake Vinyls) and 51,891 lbs (Westlake Vinyls, Inc PVC Plant) of vinyl chloride per year for the past five years, according to TRI data. Collectively, this equates to an average of 94,302 lbs per year, according to TRI data (see Appendix 7.1). Over the past three years, Westlake Vinyls has had eight Clean Water Violations as the 2nd top emitter of TRI-regulated chemicals in the county, and Westlake Vinyls PVC plant has had seven violations as the 7th top emitter. Additionally, two disasters occurred at the Westlake Vinyls PVC plant in the past ten years, with a chlorine gas leak occurring over 15-20 minutes in August 2013 and a pipe leak in 2011 causing 11,000 pounds of vinyl chloride to be released.[16]

According to one EPA study in this region, even with only 13 months of aggregated data, areas are shown to be well above the cancer risk levels to protect human health. Under the Clean Air Act (CAA), the EPA tries to limit "individual lifetime risk level no higher than 1×10-6 (one in one million) and limiting to no higher than approximately 1×10-4 (one hundred in one million) as the estimated risk that a person living near a source would have if exposed to the maximum pollutant concentrations for 70 years." However, the four areas assessed in Calvert City have remained well above those baseline safety limits.

For example, according to this EPA risk assessment, Calvert City Elementary School had a "total or 'cumulative' risk of 6x10-5 (60 potential additional cancer cases in 1,000,000 exposed people), Johnson-Riley Road had a total or 'cumulative' risk of 1x10-4 (100 potential additional cancer cases in 1,000,000 exposed people), LWD had a total or "cumulative" risk of 1x10-3

[15] See Johnston, J. E., Werder, E., & Sebastian, D. (2016). Wastewater disposal wells, fracking, and environmental injustice in southern Texas. *American journal of public health*, *106*(3), 550-556., Malin, S. A. (2020). Depressed democracy, environmental injustice: Exploring the negative mental health implications of unconventional oil and gas production in the United States. *Energy Research & Social Science*, *70*, 101720.

[16] Material Research L3C. (2023, February 27). *Chronology of vinyl chloride / PVC related disasters*. Story Map / ArcGIS by Selena Sillari. Research led by Connie Murtagh with Jim Vallette, Verónica Odriozola, and Jill Weber. https://storymaps.arcgis.com/stories/c201c51292214b969a67e9d544a7bc3b.

(1,000 potential additional cancer cases in 1,000,000 exposed people), and Grayson Lake monitoring site had a total or 'cumulative' risk of 1x10-5 (10 potential additional cancer cases in 1,000,000 exposed people)."[17] The study showed the risk drivers and contributions to total risk came from the following compounds in the four areas monitored.[18] The study also highlighted "uncertainties" when assessing cancer risk this way. However, this does not reflect human exposure as monitors are often put at heights where exposure does not mirror human body scales (i.e., a monitor placed on a building at 20' does not offer the same exposure data as monitors placed at a human scale of 4' - 7)'.

6. Conclusion

Given the decades-long industry knowledge of the harms (and techniques to mask those risks) combined with the current imperative to account for the cumulative risk of vinyl chloride, we see each of these points (along with many other points not discussed in this public comment) as presenting an 'unreasonable risk' for those near and far from vinyl chloride facilities in the U.S. We ask that the EPA exercise its jurisdiction under TSCA and designate vinyl chloride as the toxic substance that it has always proven to be.

[17] Calvert City, Kentucky Volatile Organic Compound (VOC) Air Quality Risk Assessment, EPA Region 4 Report (Atlanta, GA). January 22, 2024.

[18] Ibid, Calvert City EPA Report, 2024. Chemical compounds and risk drivers accordingly to total cancer risk.

Calvert City Elementary:

Ethylene dichloride (80.77%), Carbon tetrachloride (5.52%), Benzene (5.37%), 1,1,2-Trichloroethane (2.85%), Vinyl Chloride (2.57%), 1,3-Butadiene (2.24%), Ethylbenzene (0.41%), and 1,1-Dichloroethane (0.28%)

Johnson-Riley Road:

Ethylene dichloride (61.15%), Vinyl chloride (27.25%), Benzene (3.38%), Carbon tetrachloride (2.79%), 1,1- Dichloroethane (2.45%), 1,1,2- Trichloroethane (1.95%), and 1,3-, Butadiene (1.04%).

LWD:

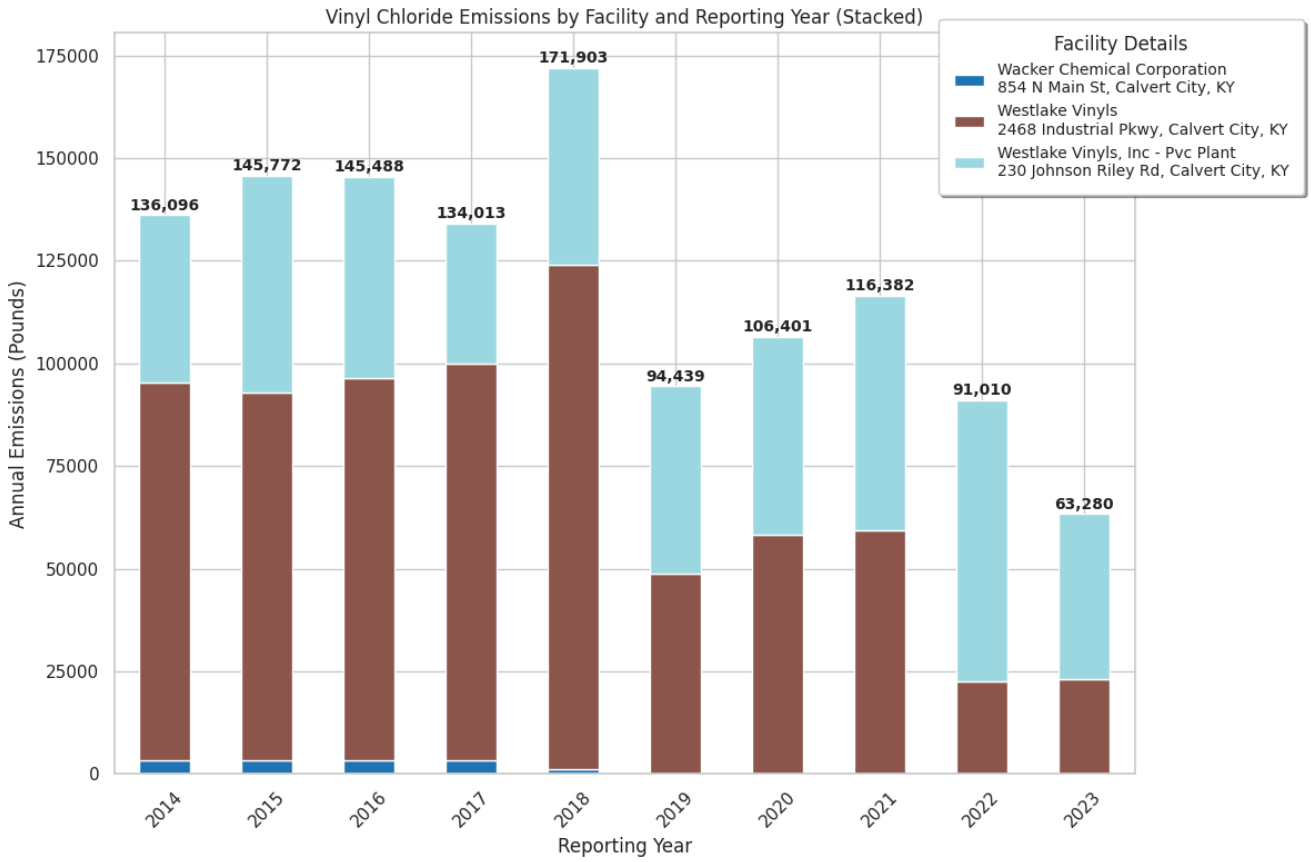
Ethylene dichloride (91.84%), Chloroprene (4.53%), 1,1,2- Trichloroethane (1.48%), Vinyl chloride (0.94%), Carbon tetrachloride (0.52%), Benzene, (0.31%), 1,1-Dichloroethane, (0.22%), 1,3-Butadiene (0.13%), and Trichloroethylene (0.03%)

Grayson Lake:

Carbon tetrachloride (31.09%), Benzene (29.70%), Ethylene, dichloride (17.45%), 1,3-, Butadiene (11.39%),and Hexachlorobutadiene (10.36%).

7. Appendix

7.1. Vinyl chloride emissions by facility and year in Calvert City, KY (TRI)



7.2. Key environmental and demographic factors (EJScreen) where top vinyl chloride polluters are located

Facility	TRI (2021) Total Pounds	Under Age 5 Percentile (US)	Over Age 64 Percentile (US)	Less Than High School Percentile (US)	Low Income Percentile (US)	People of color Percentile (US)	Supplemental Demographic IndexPercentile (US)	Demographic Index Percentile (US)	Cancer among Adults Percentile (US)	low life expectancy Percentile (US)	heart disease Percentile (US)	Asthma Percentile (US	Under Age 5 Percentile (US)	Over Age 64 Percentile (US)	Less Than High School Percentile (US)
Westlake – Calvert City, KY (including both Westlake Vinyl and Westlake PVC Plant, 1 mile apart)	116,382	N/A	87	92	79	3	89	49	91	86	92	77	N/A	87	92
Formosa – Point Comfort, TX	68,346	68	75	55	31	67	48	53	77	34	82	16	68	75	55
Westlake – Westlake, LA	21,137	55	95	N/A	N/A	62	N/A	N/A	63	88	67	N/A	55	95	N/A
Orbia (Mexichem) – Pedricktown, NJ	20,478	82	53	39	26	27	50	17	61	62	51	50	82	53	39
Westlake – Geismar, LA	19,300	55	95	N/A	31	62	41	48	63	88	67	43	55	95	N/A
Orbia (Mexichem) – Henry, IL	19,115	52	66	37	66	8	53	38	93	64	82	37	52	66	37
Westlake – Plaquemine, LA	18,914	86	40	50	85	83	82	89	48	92	79	82	86	40	50
Formosa – Baton Rouge, LA	18,249	35	9	93	90	91	90	94	2	91	25	97	35	9	93

Facility	TRI (2021) Total Pounds	Under Age 5 Percentile (US)	Over Age 64 Percentile (US)	Less Than High School Percentile (US)	Low Income Percentile (US)	People of color Percentile (US)	Supplemental Demographic IndexPercentile (US)	Demographic Index Percentile (US)	Cancer among Adults Percentile (US)	low life expectancy Percentile (US)	heart disease Percentile (US)	Asthma Percentile (US	Under Age 5 Percentile (US)	Over Age 64 Percentile (US)	Less Than High School Percentile (US)
Shintech – Freeport, TX	17,721	50	70	88	70	56	91	64	66	97	88	50	50	70	88
Shintech – Plaquemine, LA	16,265	86	40	50	85	83	82	89	43	59	61	65	86	40	50
Occidental – Pasadena, TX	15,598	N/A	N/A	N/A	N/A	N/A	7	N/A	59	82	77	46	N/A	N/A	N/A
Occidental – Ingleside, TX	15,008	91	15	61	72	68	75	73	30	87	42	31	91	15	61
Occidental – Deer Park, TX	14,557	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Shintech – Addis, LA	11,264	99	38	29	59	61	34	61	39	43	42	59	99	38	29
Occidental – La Porte, TX	7,347	N/A	N/A	N/A	N/A	N/A	7	N/A	59	82	77	46	N/A	N/A	N/A
Westlake – Westlake, LA	5,270	55	95	N/A	31	62	41	48	63	88	67	43	55	95	N/A
Westlake – Aberdeen, MS	4,779	74	37	71	81	6	67	53	63	59	90	62	74	37	71
Occidental – Pedricktown, NJ	3,929	82	53	6	26	27	50	17	61	62	51	50	82	53	6
Lubrizol – Louisville, KY	1,144	N/A	N/A	80	59	53	86	56	9	96	57	89	N/A	N/A	80

Facility	TRI (2021) Total Pounds	Under Age 5 Percentile (US)	Over Age 64 Percentile (US)	Less Than High School Percentile (US)	Low Income Percentile (US)	People of color Percentile (US)	Supplemental Demographic IndexPercentile (US)	Demographic Index Percentile (US)	Cancer among Adults Percentile (US)	low life expectancy Percentile (US)	heart disease Percentile (US)	Asthma Percentile (US	Under Age 5 Percentile (US)	Over Age 64 Percentile (US)	Less Than High School Percentile (US)
Average	21,832	69	58	58	59	51	58	57	55	76	67	55	69	58	58
Median	16,265	71	53	55	66	62	53	53	61	84	67	50	71	53	55
Minimum	1,144	35	9	6	26	3	7	17	2	34	25	16	35	9	6
Maximum	116,382	99	95	93	90	91	91	94	93	97	92	97	99	95	93