# EPA DATA GUIDEBOOK

TOXIC FOOTPRINTS

## EXPLANATION

This report should be read in conjunction with the main report Toxic Footprints: Exposing the investors behind petrochemical toxicity in the US Gulf States and its Methodology Annex.

There is also a dashboard available on the Planet Tracker website to enable access to the data.

This paper provides a guidebook for users of two important EPA datasets:

1 Toxics Release Inventory (TRI)

2 Risk-Screening Environmental Indicators (RSEI)

## THE DATA SOURCES

### Overview

The Planet Tracker report Toxic Footprints: Exposing the investors behind petrochemical toxicity in the US Gulf States sourced petrochemical facility and associated pollution data from two United States Environmental Protection Agency (EPA) datasets:

1 Toxics Release Inventory (TRI)[i]

2 Risk-Screening Environmental Indicators (RSEI)[ii]

We discuss each in more detail below...

### Toxics Release Inventory (TRI)

The TRI dataset comprises facility-level disclosures of toxic releases from 1987 through to, the latest dataset available at the time of writing. Facilities self-report to the TRI if they meet certain disclosure requirements, such as whether they manufacture or process TRI listed toxic chemicals over specific thresholds. The TRI contains release data on approximately 790 chemicals and chemical groups, which are classified according to the method of release, where they are released, and the waste management route.

### Risk-Screening Environmental Indicators (RSEI)

The RSEI dataset builds upon the TRI data by providing two main metrics to users – **RSEI Hazard and RSEI Score**. The former provides an indication of the relative potential toxicity of the chemical release, which is specific to the method of release (air, land, or water). The latter goes one step further and estimates the potential relative risk-related impact on human health by modelling how these chemicals travel through the environment and accounts for the size and locations of potentially exposed people - see Figure 1.

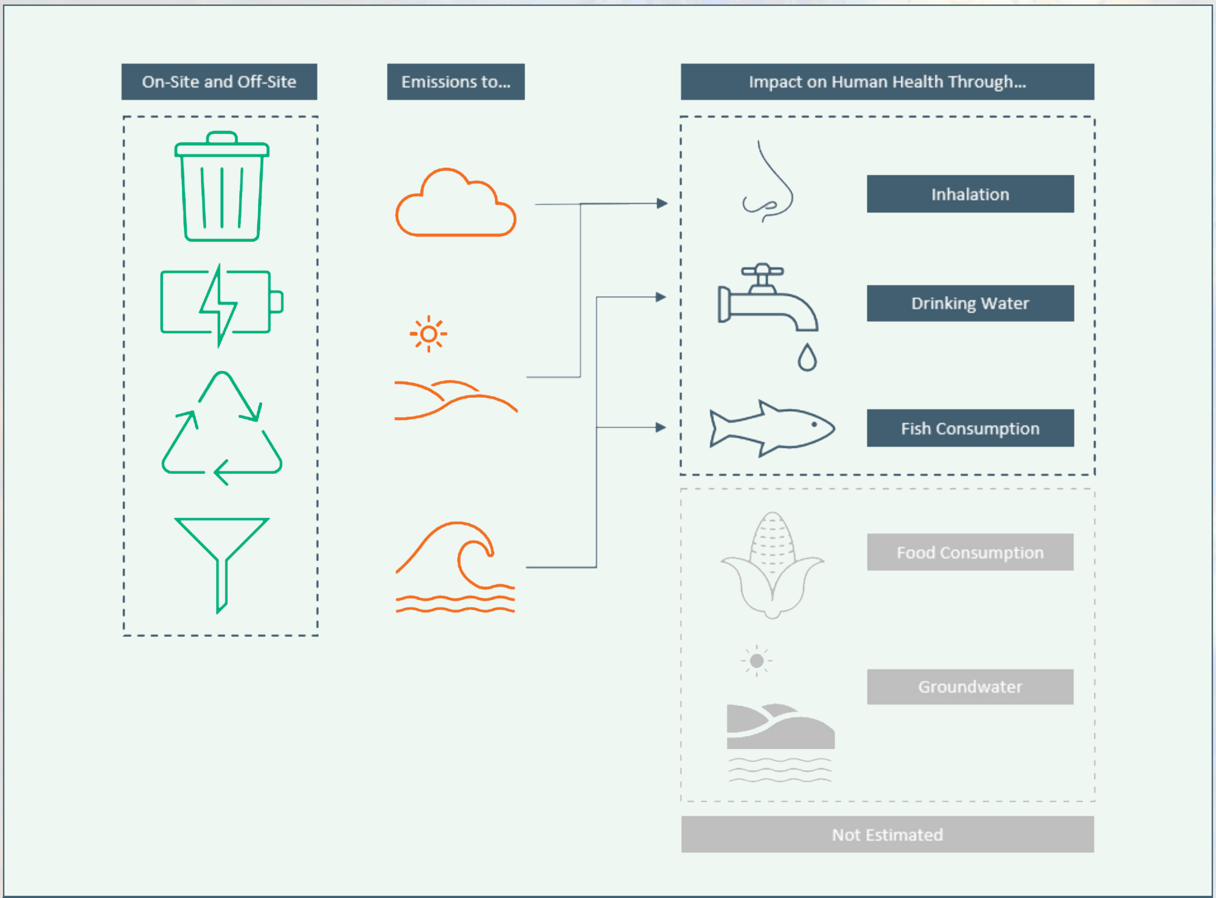


*Figure 1: How Chronic Human Health Impacts of Toxic Releases are Modelled to produce RSEI metrics. Source: Planet Tracker.*

## Measuring Chemical Releases

There are three main metrics provided by the EPA that we use to measure the impact of chemical releases: the physical **quantity** of the chemical released, the relative potential **hazard** posed by that release and the estimated potential **risk** it poses to human health. These are respectively called TRI Pounds, RSEI Hazard and RSEI Score. Each metric tells us something different.

Comparing the physical quantities of different chemical releases can be done using TRI Pounds, which we refer to as “chemical quantity” in the main report.

However, this is of limited use as one pound of mercury released to water causes a very different impact compared to one pound of asbestos sent to landfill, for instance. But when we examine the RSEI Hazard, which we also call the “chemical hazard” in the report, it provides an idea of the potential impact on human health from the release. RSEI Score, referred to as “chemical risk” in the report, models how that chemical release travels through the environment and impacts human health.

However, there are trade-offs to be made. For instance, chemical quantities are available for all chemical releases, whereas the chemical hazard and risk data covers approximately two-thirds of chemicals, or less. Table 1 outlines the advantages and disadvantages of using each metric.

*Table 1: Metrics Provided by the US EPA to Assess Toxic Chemical Releases. Source: Planet Tracker.*

| | Chemical Quantity (TRI Pounds) | Chemical Hazard (RSEI Hazard) | Chemical Risk (RSEI Score) |
|---|---|---|---|
| + | • 1987 to 2019<br>• Available for all chemicals | • 1988 to 2019<br>• Meaningful comparison between chemical releases<br>• Can differentiate between cancer and non-cancer effects | |
| − | | • RSEI release categories do not match TRI release categories<br>• The location of the impact is not always known | |
| − | | • Available for 67% of chemicals | • Available for less than 67% of chemicals<br>• Does not consider acute human toxicity or ecotoxicity<br>• Does not consider impact from food consumption<br>• Not calculated for all media |

In the Planet Tracker research report Toxic Footprints: Exposing the investors behind petrochemical toxicity in the US Gulf States **we have used chemical hazard as the main metric for our analysis**. This allows us to identify chemicals that would not appear using chemical risk, because the EPA does not currently estimate the impact of all releases on human health via all release pathways. Chemical risk is used at various points throughout the study when assessing potential human health impacts. The metrics used to generate each table and figure are provided in the corresponding description and labelled as either chemical quantity, chemical hazard, or chemical risk throughout the report.

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# A GUIDE TO USING EPA DATA

## Data Access

Bulk access to TRI data can be accessed from three main sources, known as the Basic files, Basic Plus files and through the Envirofacts API. TRI data is available for all states, for all years between 1987 and 2020, from all three sources. Other TRI data and tools can also be found here.

A complimentary dataset on the relative toxicity and potential human health impacts of the TRI chemicals, called Risk Screening Environmental Indicators (RSEI), is available from the EasyRSEI dashboard. This allows a user to directly compare release of different chemicals based on their potential impact. This can produce completely different results when comparing chemicals based only on the physical quantity released. RSEI Hazard and RSEI Score are calculated once per year and released around February. This is a few months after the latest year of data is released by the TRI. RSEI Hazard and RSEI Score values can be broken into two sub-categories - cancer and non-cancer results.

**Chemical Releases** - measured in grammes for dioxins or in pounds for all other chemicals. Releases are disclosed according to one of 48 categories which capture the waste management activity (release, treatment, energy recovery, or recycling), the location of release (on-site or off-site), the media the chemical was released to (air, land, or water) and if the chemical was released as part of normal business operations or not (production or non-production related).

**RSEI Hazard** - calculated by multiplying the physical quantity of a chemical released by its toxicity factor, this measure communicates the magnitude of the potential impact of a toxic release on human populations. This is calculated for around two-thirds of the TRI chemicals.

**RSEI Score** - estimates the amount of a toxic release that may reach human populations and quantifies its potential impact by modelling how the chemical travels through the environment.

Table 2 shows the top five releases for all facilities in Planet Tracker's research report Toxic Footprints: Exposing the investors behind petrochemical toxicity in the US Gulf States that correspond to the three main metrics provided by the EPA.

*Table 2: Largest Releases by Petrochemical Facilities in Louisiana and Texas since 2015. Source: US EPA.*[i,ii]

| | Chemical Quantity (TRI Pounds) | Chemical Hazard (RSEI Hazard) | Chemical Risk (RSEI Score) |
|---|---|---|---|
| 1 | Ethylene | Asbestos | Ethylene Oxide |
| 2 | Propylene | 1,2,3-Trichloropropane | 1,3-Butadiene |
| 3 | Toluene | Diaminotoluene | Chloroprene |
| 4 | Hydrochloric Acid | Cobalt Compounds | Propyleneimine |
| 5 | Ammonia | Nickel Compounds | Benzene |

## Toxics Release Inventory (TRI)

### *Reporting Criteria*

Facilities only report to the TRI if they meet certain criteria. These include if the NAICS code is covered by the TRI, if the facility employs more than 10 FTE[1] and factors such as the facility manufactures or processes any EPCRA Section 313 chemical above stated thresholds. GuideME provides useful and more detailed information on reporting requirements for facilities.

Facilities that report to the TRI are classified according to the North American Industry Classification System (NAICS). One facility can report up to six NAICS codes. These are self-assigned based on the volume or value of goods produced at the site.

The NAICS classification undergoes a revision approximately every five years, the latest being in 2022. The TRI officially adopted the NAICS classification in 2007, so you may see a change in how facilities report their activities around this time.

Facilities reporting to the TRI can be made up of many establishments that are classified under many different NAICS codes. Facilities with multiple establishments may report separate and unique TRI reporting forms under the same TRI facility ID. This can make it seem that there are duplicate entries in the Basic data files where, in fact, the entries need to be aggregated in order to attain an accurate value for its releases.

If the entire facility meets a TRI chemical reporting threshold, disclosures to the TRI must include all chemical releases from each establishment, even from those establishments with NAICS codes not covered by the TRI.

Facilities disclose their releases to the EPA using the TRI Form R report, or under limited conditions using the optional Form A Certification. The forms submitted by individual facilities can be found here.

Chemical releases in the TRI for the most recent year are likely to increase in the following year due to resubmissions and late filings made by facilities. The TRI release data are at least 10 months behind calendar dates, as data is released in October for the previous calendar year.

### *Data Qualities*

The following section is useful for interpreting the downloaded TRI data.

**Section 8** - Totals for the releases of chemicals can be found in Section 8 of TRI Form R. This section contains the total on-site and off-site chemical releases, including the chemicals disposed of, treated, recovered for energy, and recycled. Releases are categorised as production- and non-production-related. Non-production-related releases are chemical releases that do not occur as part of the usual operation of the facility.

Non-production-related waste refers to quantities of TRI chemicals released as the result of one-time events, rather than due to standard production activities. These events may include remedial actions, catastrophic events such as hurricanes, or other one-time events not associated with normal production processes, such as company negligence in maintaining and running a facility which causes a chemical release.

[1] Full time employees.

The rest of the dataset contains a mixture of sub-totals and individual measurements of chemical releases. For instance, transfers or discharges sent to publicly owned treatment works (POTWs) and direct releases to surface water bodies. These transfers to POTWs are complicated as they are further broken into subcategories which are not available in the Basic files.

Six quantities in the dataset are only provided up until 1995 or 2002 as they are subsequently replaced by newer categories.

**Media** - It is not always known to which media (air, land, or water) chemicals are released. This is the case for five categories that classify off-site disposal or other releases. Example categories include "Other Off-Site Management" and transfers sent to waste brokers.

**Trade Secrets** - companies can conceal the exact toxic chemical identity by classifying the chemicals as "trade secrets". These chemicals do not have toxicity factors so their impact on human health remains unknown.

**Parent Companies** - The EPA has attempted to standardise parent company names to account for errors or irregularities in spelling names between different facilities owned by the same company.

## Toxics Release Inventory (TRI)

### *RSEI Metrics*

The RSEI dataset provides two main metrics to communicate the potential hazard and risk of chemical releases to human health - **RSEI Hazard and RSEI Score**. The EPA has toxicity information for over 400 of the roughly 600 chemicals and chemical categories on the 2019 TRI Chemical List in order to calculate RSEI Hazard values. RSEI Score values require further complex modelling to estimate the intake of chemicals and their impact on chronic human health conditions. Both metrics can be viewed in terms of their potential hazard and risk to cancer and non-cancer effect on chronic human health conditions.

Chronic human toxicity includes developmental toxicity, reproductive toxicity and neurotoxicity, which is associated with long-term chemical exposure and does not address concerns for either acute human toxicity or environmental toxicity.

The RSEI dataset assigns one set of NAICS codes for each TRI facility. For multi-establishment facilities, as explained earlier, the EPA uses the Form R reported NAICS code provided by each establishment, which means that different releases for the same TRI facility can appear under different NAICS codes. To analyse the RSEI data using the same NAICS codes as reported for facilities in the TRI, the user will need to merge to the TRI and RSEI datasets together.

### *Data Qualities*

The RSEI Hazard and RSEI Score metrics are useful relative risk-related indicators and can be used to compare facilities and companies within the dataset. They should not be used outside of this dataset and compared with other toxicity or impact analysis.

The RSEI Hazard value is calculated by multiplying the physical quantity of the chemical release by its toxicity weight. RSEI Score is calculated by multiplying the estimated dose, potentially exposed population receiving the dose, and toxicity weight of the chemical.

It is important to note that when chemicals are removed from the TRI chemical list, RSEI's chemical database is modified to remove all results for these chemicals from previous years. RSEI results are then recalculated for all years so that changes in RSEI Hazard and Score values can be compared using a consistent set of chemicals.

## Combining the Datasets

### *Merge Datasets with Caution*

In order to combine the TRI and the RSEI datasets, be aware that:

1. The same facility can report a chemical release under different NAICS codes for the same year.
2. A facility can report the same chemical being emitted to the same media in the same year. This can be due to multiple Form R reports being submitted by the facility for the same year.
3. Chemical names do not all match between the TRI and RSEI datasets, and chemical identification (CAS) numbers are not available in RSEI datasets.
4. There are some entries in the TRI that do not exist in RSEI. This is because RSEI Hazard or Score metrics are not calculated for that particular release, or because the RSEI dataset has not been updated. The TRI dataset is updated multiple times throughout the year, whereas the RSEI datasets are updated once per year.

## Example Outputs

### *Identifying Facilities*

By combining the TRI and RSEI datasets, Planet Tracker has been able to identify relevant issues that investors may otherwise have been unable to uncover. Figure 2 shows the most hazardous petrochemical facilities in Louisiana based on production-related chemicals releases.

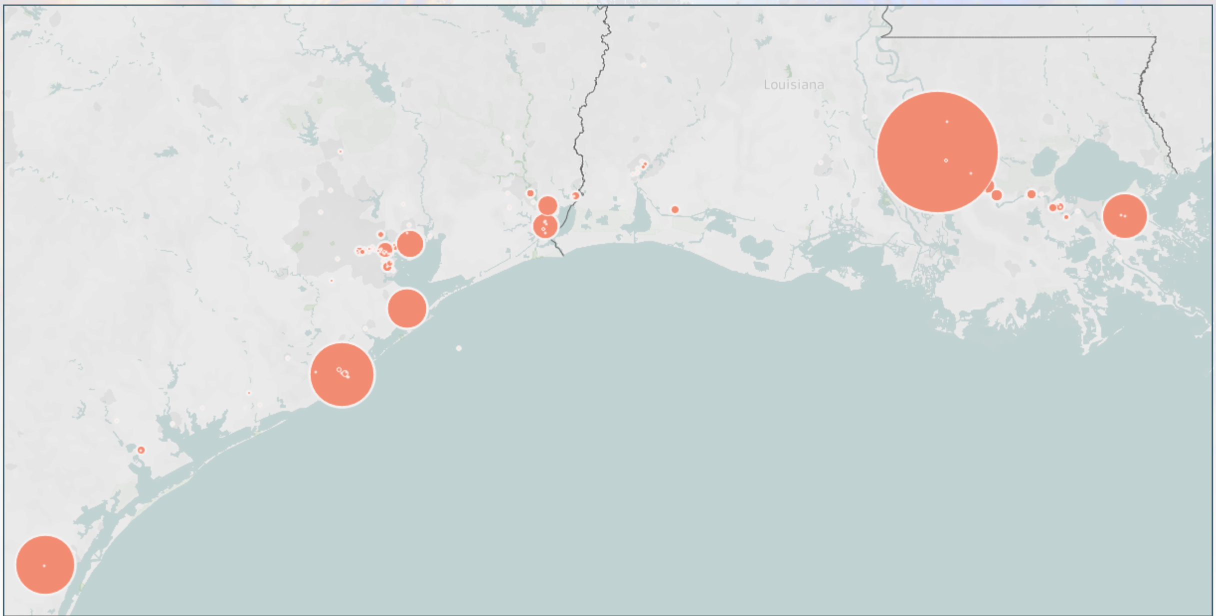


*Figure 2: Locations of Petrochemical Facilities Financed by BlackRock. Source: US EPA.* [i,ii]
*Metric: Chemical Hazard. Key: The size of the circles relate to the quantity of toxic chemicals released.*

Olin Corp's Cube Operations, the facility run by Blue Cube Operations LLC at the Plaquemine site, produce hazardous chemicals accounting for 74.78% (three quarters) of the total releases in Louisiana. Olin's operation consists of one chlor-alkali facility, one ethylene dichloride facility and supporting assets, which it acquired in 2015.[iii]

### *Identifying Toxic Chemicals*

**Asbestos is the main contributor to Olin Corp's hazardous chemical releases in Plaquemine.**

Asbestos is used throughout the chlor-alkali industry to produce chlorine. There are three main methods to produce chlorine; one using asbestos; one using mercury; and another using a polymer membrane. Chlorine and its co-products (caustic soda and hydrogen) are produced by electrolysing a salt solution and asbestos is used to separate the cathode and anode in this process. In 2017, 15 plants were reported as using asbestos to produce chlorine and a typical plant will consume between five and 25 tonnes of asbestos per year.[iv]

There are six main forms of asbestos - chrysotile, crocidolite, amosite, tremolite, actinolite and anthophyllite. All forms are banned in the EU and by more than 70 countries worldwide. The reason for its continued use in the U.S could be the cost to convert plants to using safer methods, which could take up to 2.5 years and up to 50% the cost of opening a new plant.[iv] The EPA has a risk evaluation page here for asbestos which provides more information on its background and uses.

Chrysotile asbestos is used in the chlor-alkali industry and imports of the material mainly arrive in Houston, Texas and New Orleans, Louisiana. It is used in cement, plastics, resins, friction materials and in textiles.[v]

Any ban on asbestos use would significantly impact Olin's chlor-alkali operations. Investors should be aware of the cost of upgrading or even closing the facility and the potential hit the company could take to its production and revenue. The cost of upgrading the plant could cost between USD 500-700 per tonne of chlorine produced.

**For further analysis of individual facilities, toxic pollutants and the investors financing these operations, please visit the Toxic Footprints Dashboard and the Planet Tracker report Toxic Footprints.**

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# REFERENCES


i US EPA (2021) **Toxics Release Inventory**. United States Environmental Protection Agency. See here for Programme homepage

ii US EPA (2021) **Risk-Screening Environmental Indicators**. United States Environmental Protection Agency. See here for EasyRSEI Data Dashboard

iii Olin Corp (2021) **Olin Chlor Alkali Logistics**. [Accessed on 02/12/2021] Available from [https://olinchloralkali.com/about-us/locations/]

iv Mesothelioma (2017) **How Asbestos Invaded the Chlorine Industry**. [Accessed on 02/12/2021] Available from [https://www.mesothelioma.com/blog/how-asbestos-invaded-the-chlorine-industry/]

v WHO (2014) **Chrysotile Asbestos**. World Health Organisation. See here for the full report