

# Detroit Edison 2010 Toxic Release Inventory

*Community Right to Know*

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# Detroit Edison 2010 Toxic Release Inventory

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## About the Toxic Release Inventory

The Toxic Release Inventory (TRI) is a publicly available database of information on the release and transfer of nearly 650 chemicals by private companies and government facilities. Congress created TRI under the Emergency Planning and Community Right-To-Know Act of 1986 (EPCRA) and the U.S. Environmental Protection Agency (EPA) administers the program. Electric utilities were added to the list of manufacturing industries required to report to the TRI in May 1997. Reports are generated once per year for the previous year's emissions.

All TRI report data is available on the EPA's Web site: [www.epa.gov/tri](http://www.epa.gov/tri).

## How to Interpret the Data

### **Detroit Edison's emissions appear very large.**

- The emissions from Detroit Edison's electric power plants are reported in pounds, not in terms of the chemicals' concentrations in the environment. Due to the volume of coal required to generate power for 2.1 million households and businesses, the "pounds" numbers appear very large even though the release concentrations are very low. The TRI Reports do not include the data that would indicate these very low concentrations.
- While emissions of some TRI chemicals are up and others are down from year to year, Detroit Edison's emissions have always been well below the levels at which state and federal regulators may take some action to control emissions. None of the emissions reported in 2010 exceed 17.5 percent of an action level, and most are between 0 and 10 percent.

### **However, our emissions do not create significant environmental or health impacts.**

- Large numbers are not necessarily an indication of large health and environmental impact. The EPA conducted a study<sup>1</sup>, which considered concentration and exposure, on power plant emissions and provided the report's findings to Congress. The EPA concluded that power plant emissions pose minimal impacts on human health.
- The Electric Power Research Institute (EPRI) conducted a study<sup>2</sup> in 1994 which also concludes that power plant stack emissions pose minimal risks to public health.

*1 - Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units - Final Report to Congress, Vol. 1, EPA-453/R-98-004a, Feb. 1998.*

*2 - Electric Utility Trace Substances Synthesis Report, Vol. 1-4, Electric Power Research Institute, California, 1994.*

- The U.S. EPA has listed approximately 650 chemicals and chemical substances on the TRI list. These chemicals, like many others not on the list, can potentially cause harm depending on a person's exposure or dose. Dose relates to exposure time and concentration. For example, exposure to ultraviolet rays from the sun can be harmless, cause mild-to-serious sunburn or even a potentially fatal disease such as skin cancer.
- The U.S. EPA's TRI reports do not include dose information and therefore do not provide the public with health information. According to the EPA, "The TRI information is not designed to show if chemical releases pose potential health or environmental hazards. Rather, the reports divulge how many pounds of chemicals companies release, dispose, treat, recycle, etc."

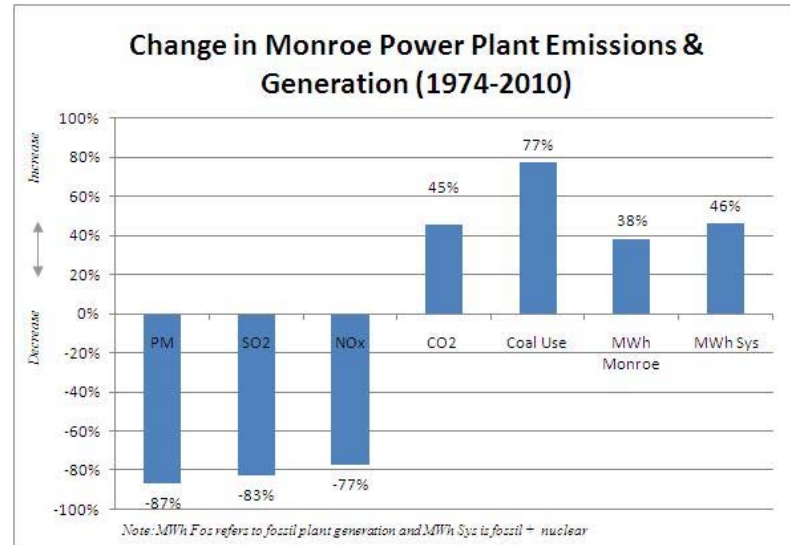
**Power plant emissions will vary from year to year based on coal consumption and TRI element concentrations in the coal.**

- Detroit Edison produces about 80 percent of the electricity needed for nearly 5 million people of Southeastern Michigan at six coal-fired power plants, with the remainder produced by nuclear power, oil, natural gas and renewable energy including wind and solar. The company relies heavily on coal because it has proven to be an economic, domestically available and abundant fuel.
- Detroit Edison obtains coal from dozens of mines, and the coal from each mine has a unique mix of trace elements that are the source for chemicals reported in the TRI data. Generally, TRI emissions at each plant will vary due to trace elements in coal and volume of coal burned each year.
- Power plants are taken in and out of service for repairs or to accommodate generation needs. Because releases are in pounds, not percentages of power produced, releases will fluctuate from year to year as each plant produces more or less power.

**Detroit Edison is committed to the generation of electricity in an environmentally responsible manner.**

- Detroit Edison has long been an innovator in using pollution control technologies. For example, the company used electrostatic precipitators as early as 1924 and is among the world leaders in blending low-sulfur coal. We continue to invest in new technology, and have spent \$1.7 billion to install equipment at the Monroe Power Plant to control emissions of sulfur dioxide, nitrogen oxide, mercury, and hydrogen chloride.
- The Toxic Release Inventory includes a category of releases to land. It's important to note that for Detroit Edison, these land "releases" involve disposal of material into engineered and licensed landfills. By-products from coal combustion are not released uncontrolled to the environment.
- In avoiding land releases, Detroit Edison also actively recycles fly ash from several power plants for use as a concrete additive.

**Working within Michigan's stringent environmental regulations, Detroit Edison has aggressively reduced air emissions by more than two-thirds in the past 35 years.**



## 2010 Summary

**Overall, Detroit Edison's 2010 emissions of chemicals reportable under the EPA's Toxic Release Inventory (TRI) decreased about 22 percent (6.4 million pounds) from 2009 total emissions. Total coal usage decrease about 4 percent (825,000 tons) from 2008.**

The reduced emissions result from lower levels of reportable chemicals in the coal burned at our six coal-fired power plants, reduced coal usage and the operation of new systems to control nitrogen oxide, sulfur dioxide, hydrogen chloride and mercury at our Monroe Power Plant.

## Looking to the Future

### Reducing Air Emissions at Monroe

TRI emissions at the Monroe Power Plant – the largest power plant in Michigan – were down significantly in 2010, due to a full year's operation of **selective catalytic reduction systems** and **flue gas desulfurization systems** working in tandem on two units. Together, these systems reduce air emissions of nitrogen oxide by about 90 percent, sulfur dioxide by about 97 percent, mercury by about 80 percent\* and hydrogen chloride (HCL) about 97 percent. The paired SCR/FGD systems on Units 3 and 4 began operation in June and November, 2009, and operated year round in 2010.

A dry fly ash system has also been installed on two units at Monroe Power Plant. The dry ash system will reduce the amount of ammonia available to release to the air. The dry ash system will initially result in the recycling of 50 percent of fly ash produced by the plant, with a goal of 100% recycling by 2012.

Further information about Detroit Edison's current and historical emissions data can be found on the Web at [dteenergy.com](http://dteenergy.com).



Monroe Power Plant, Monroe, Michigan

## 2010 Total Detroit Edison Releases by Chemical

| TRI Chemical                           | Total      | Air<br>(Pounds Emitted) | Land<br>(Pounds Managed) | Water<br>(Pounds Discharged) |
|--|------------|-------------------------|--------------------------|------------------------------|
| Ammonia                                | 8,100      | 7,700                   | 0                        | 400                          |
| Arsenic                                | 56,046     | 415                     | 53,400                   | 2,231                        |
| Barium                                 | 9,684,869  | 16,024                  | 9,644,000                | 24,845                       |
| Benzene                                | 130        | 130                     | 0                        | 0                            |
| Benzo(g,h,l)perylene                   | 6.01       | 0.57                    | 5.43                     | 0                            |
| Beryllium                              | 9,257      | 23                      | 9,200                    | 34                           |
| Chromium                               | 190,191    | 1,381                   | 187,000                  | 1,810                        |
| Cobalt                                 | 42,268     | 200                     | 42,000                   | 68                           |
| Copper                                 | 314,934    | 1,380                   | 313,000                  | 554                          |
| Dioxin <sup>1</sup>                    | 3.0727     | 3.0727                  | 0                        | 0                            |
| Hydrogen chloride                      | 8,470,000  | 8,470,000               | NA                       | NA                           |
| Hydrogen fluoride                      | 431,000    | 431,000                 | NA                       | NA                           |
| Lead                                   | 106,258.52 | 878.32                  | 105,282.63               | 97.57                        |
| Manganese                              | 364,171    | 2,091                   | 360,000                  | 2,080                        |
| Mercury                                | 2,364.96   | 1,555.89                | 753.60                   | 37.47                        |
| Nickel                                 | 163,681    | 1,510                   | 161,000                  | 1,171                        |
| PACs <sup>2</sup>                      | 501.65     | 15.71                   | 485.94                   | 0                            |
| Polychlorinated Biphenyls <sup>3</sup> | 0          | NA                      | NA                       | NA                           |
| Selenium                               | 17,000     | 5,000                   | 8,400                    | 3,600                        |
| Styrene                                | 17,000     | 17,000                  | NA                       | NA                           |
| Sulfuric acid                          | 1,281,000  | 1,281,000               | NA                       | NA                           |
| Vanadium                               | 417,613    | 1,399                   | 410,000                  | 6,214                        |
| Zinc                                   | 253,510    | 4,780                   | 246,000                  | 2,730                        |
| TOTAL TRI                              | 21,812,886 |                         |                          |                              |

<sup>1</sup> Dioxin emissions are reported to the EPA in grams

<sup>2</sup> PACs = Polycyclic Aromatic Compounds

<sup>3</sup> PCB use was greater than TRI threshold, but was not released to the environment

## 2010 Detroit Edison Releases by Plant

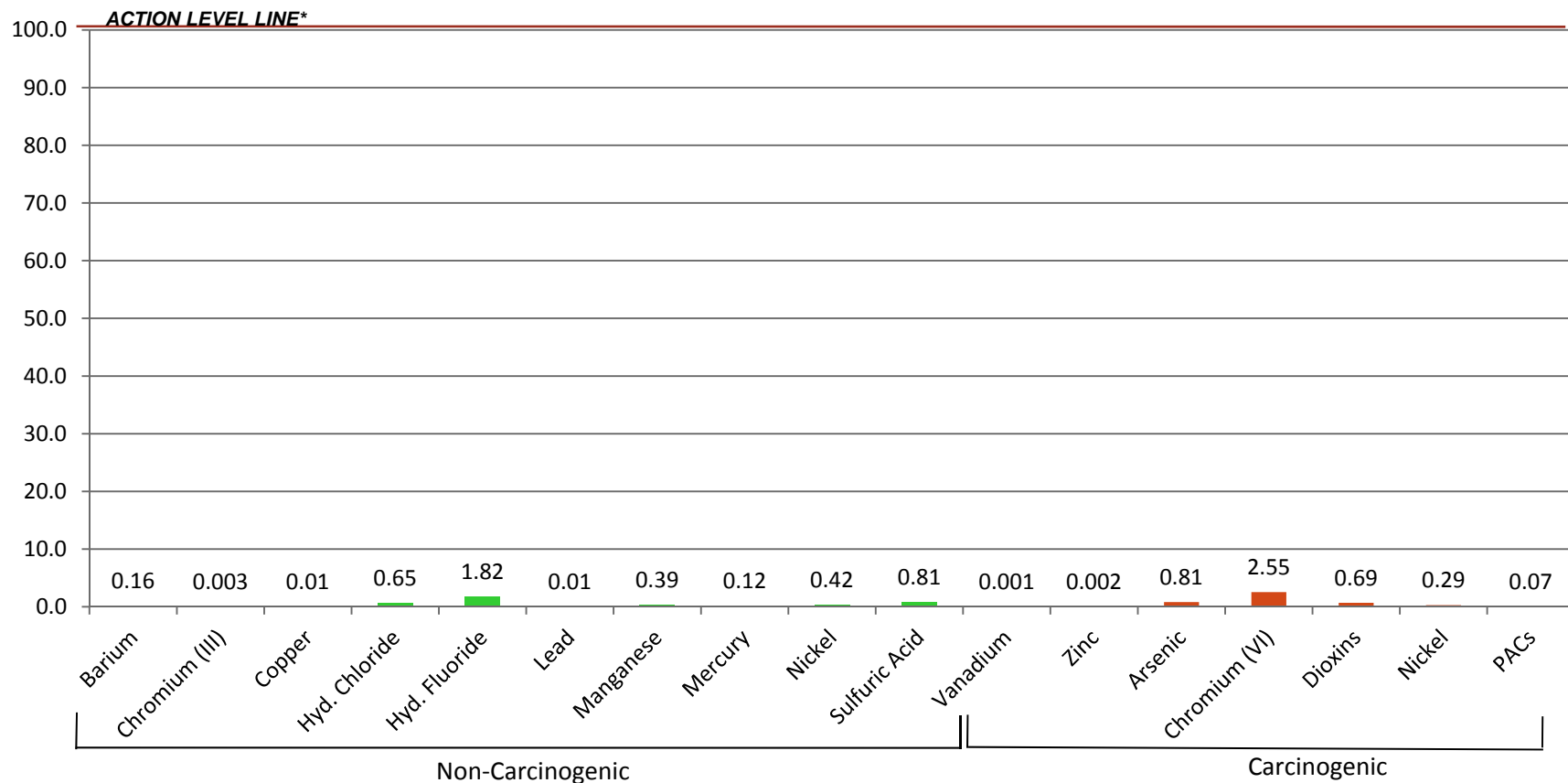
### BELLE RIVER POWER PLANT

| TRI Chemical         | Total     | Air<br>(Pounds Emitted) | Land<br>(Pounds Managed) | Water<br>(Pounds Discharged) |
|----------------------|-----------|-------------------------|--------------------------|------------------------------|
| Arsenic Compounds    | 5,507     | 16                      | 5,400                    | 91                           |
| Barium Compounds     | 2,107,130 | 730                     | 2,100,000                | 6,400                        |
| Benzo(g,h,l)perylene | 0.55      | 0.13                    | 0.42                     | 0                            |
| Chromium Compound    | 20,221    | 91                      | 20,000                   | 130                          |
| Copper Compounds     | 35,172    | 120                     | 35,000                   | 52                           |
| Dioxin <sup>1</sup>  | 0.6207    | 0.6207                  | 0                        | 0                            |
| Hydrogen chloride    | 120,000   | 120,000                 | NA                       | NA                           |
| Hydrogen fluoride    | 96,000    | 96,000                  | NA                       | NA                           |
| Lead Compounds       | 8,463.51  | 29.64                   | 8,415.74                 | 18.13                        |
| Manganese Compounds  | 63,550    | 180                     | 63,000                   | 370                          |
| Mercury Compounds    | 379.64    | 335.16                  | 38.44                    | 6.04                         |
| Nickel Compounds     | 16,188    | 120                     | 16,000                   | 68                           |
| PACs <sup>2</sup>    | 24.44     | 3.22                    | 21.22                    | 0                            |
| Sulfuric acid        | 38,000    | 38,000                  | NA                       | NA                           |
| Vanadium Compounds   | 46,060    | 56                      | 46,000                   | 4                            |
| Zinc Compounds       | 25,740    | 470                     | 25,000                   | 270                          |
| TOTAL TRI            | 2,582,437 |                         |                          |                              |

<sup>1</sup> Dioxin emissions are reported to the EPA in grams

<sup>2</sup> PACs = Polycyclic Aromatic Compounds

## Comparison of This Year's Modeled Ground Level Concentrations to Action Levels (Belle River Power Plant)

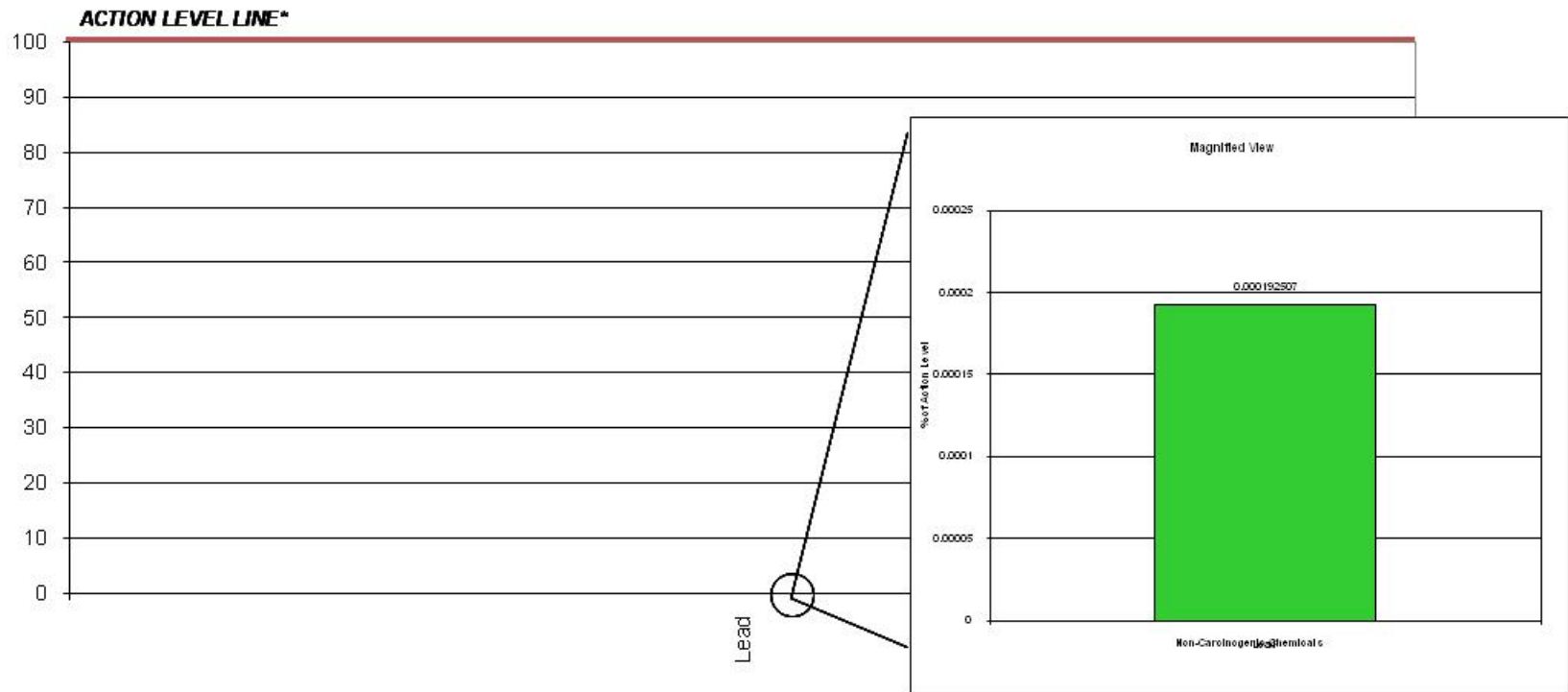


\* This line represents the level at which state and federal regulators may take some action to control emissions through permitting. The most sensitive individuals - pregnant women, children, the elderly - may have a reaction at levels varying from one to thousands of times greater than this level. Because action levels are different for each chemical, we chose to represent our concentrations as a percent of the "action level line".

## FERMI 2

| TRI Chemical | Total  | Air<br>(Pounds Emitted) | Land<br>(Pounds Managed) | Water<br>(Pounds Discharged) |
|--------------|--------|-------------------------|--------------------------|------------------------------|
| Lead         | 636.43 | .38                     | 636.05                   | NA                           |
|              |        |                         |                          |                              |
| TOTAL TRI    | 976.64 |                         |                          |                              |

## Comparison of This Year's Modeled Ground Level Concentrations to Action Levels (Fermi 2 Power Plant)



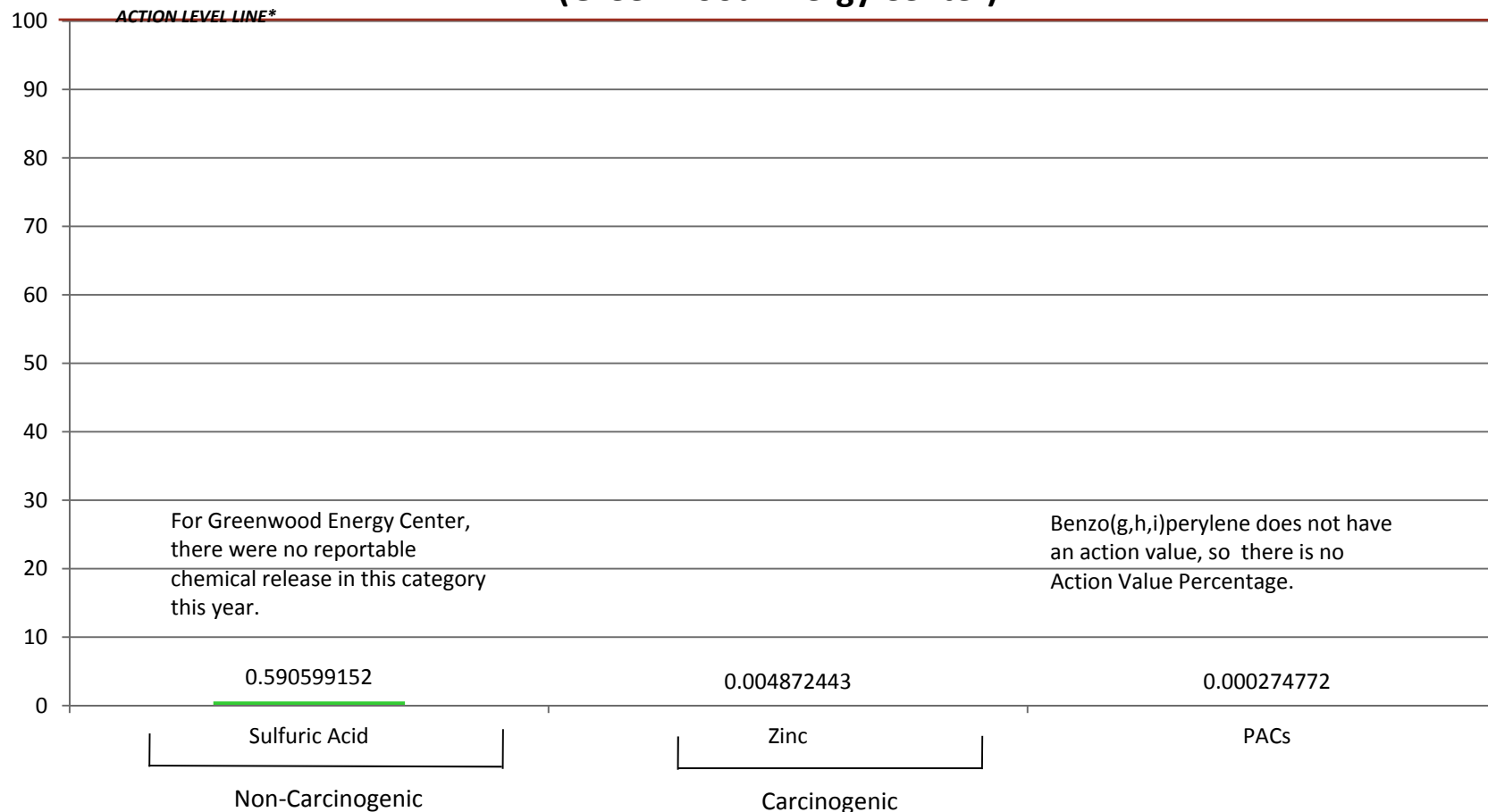
\* This line represents the level at which state and federal regulators may take some action to control emissions through permitting. The most sensitive individuals - pregnant women, children, the elderly - may have a reaction at levels varying from one to thousands of times greater than this level. Because action levels are different for each chemical, we chose to represent our concentrations as a percent of the "action level line".

## GREENWOOD ENERGY CENTER

| TRI Chemical         | Total          | Air<br>(Pounds Emitted) | Land<br>(Pounds Managed) | Water<br>(Pounds Discharged) |
|----------------------|----------------|-------------------------|--------------------------|------------------------------|
| Benzo(g,h,i)perylene | 0.12           | 0                       | 0.12                     | 0                            |
| PACs <sup>1</sup>    | 11.28          | 0.01                    | 11.27                    | 0                            |
| Sulfuric acid        | Not Reportable | NA                      | NA                       | NA                           |
|                      |                |                         |                          |                              |
| TOTAL TRI            | 11.40          |                         |                          |                              |

<sup>1</sup> PACs = Polycyclic Aromatic Compounds

## Comparison of This Year's Modeled Ground Level Concentrations to Action Levels (Greenwood Energy Center)

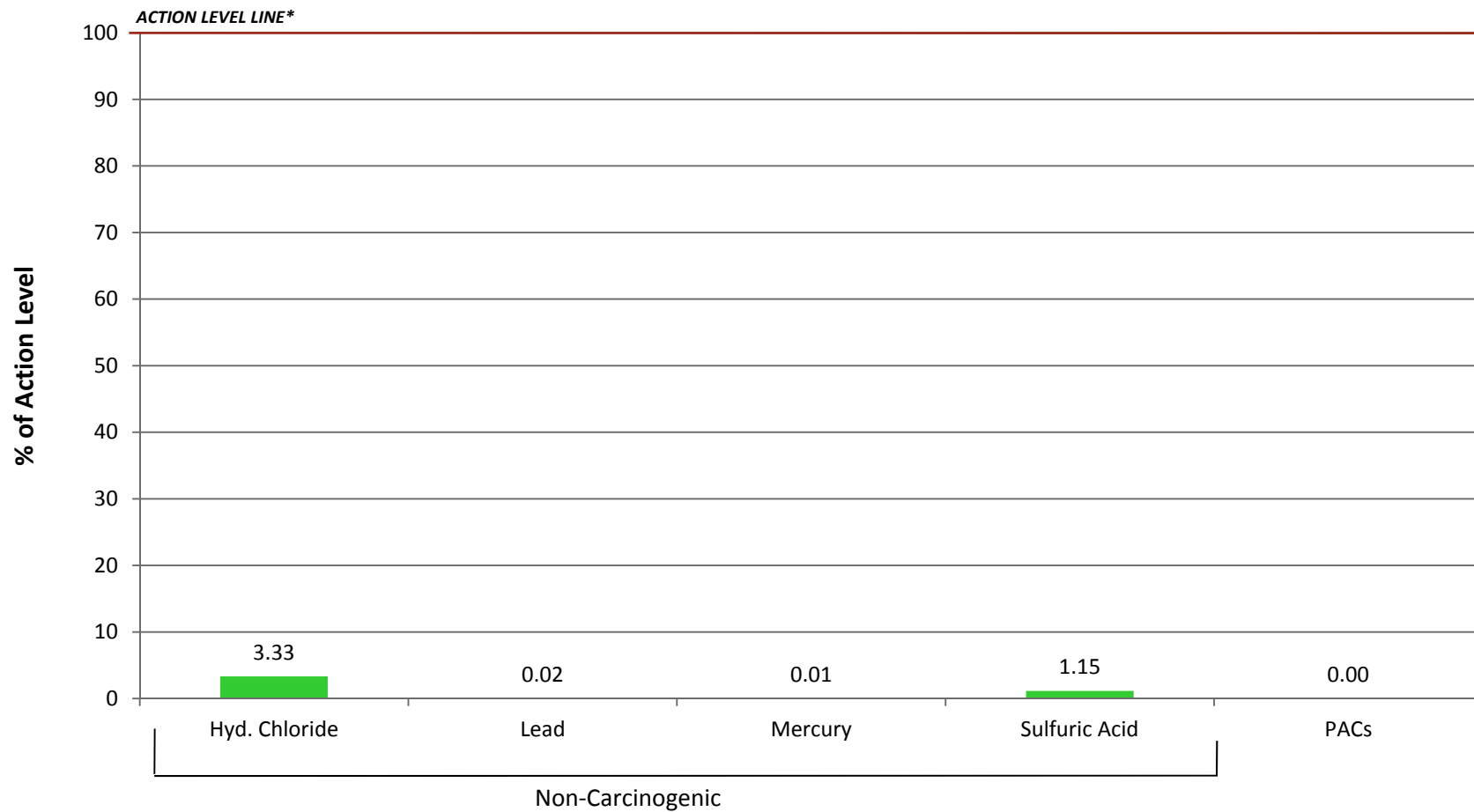


\* This line represents the level at which state and federal regulators may take some action to control emissions through permitting. The most sensitive individuals - pregnant women, children, the elderly - may have a reaction at levels varying from one to thousands of times greater than this level. Because action levels are different for each chemical, we chose to represent our concentrations as a percent of the "action level line".

## HARBOR BEACH POWER PLANT

| TRI Chemical      | Total    | Air<br>(Pounds Emitted) | Land<br>(Pounds Managed) | Water<br>(Pounds Discharged) |
|-------------------|----------|-------------------------|--------------------------|------------------------------|
| Barium            | 24,119   | 94                      | 24,000                   | 25                           |
| Hydrogen chloride | 160,000  | 160,000                 | NA                       | NA                           |
| Lead              | 1,154.44 | 15.34                   | 1,138.10                 | 0.00                         |
| Mercury           | 12.67    | 8.90                    | 3.77                     | 0.00                         |
| Sulfuric acid     | 14,000   | 14,000                  | NA                       | NA                           |
|                   |          |                         |                          |                              |
| TOTAL TRI         | 199,285  |                         |                          |                              |

## Comparison of this Year's Modeled Ground Level Concentrations to Action Levels (Harbor Beach Power Plant)



\* This line represents the level at which state and federal regulators may take some action to control emissions through permitting. The most sensitive individuals - pregnant women, children, the elderly - may have a reaction at levels varying from one to thousands of times greater than this level. Because action levels are different for each chemical, we chose to represent our concentrations as a percent of the "action level line."

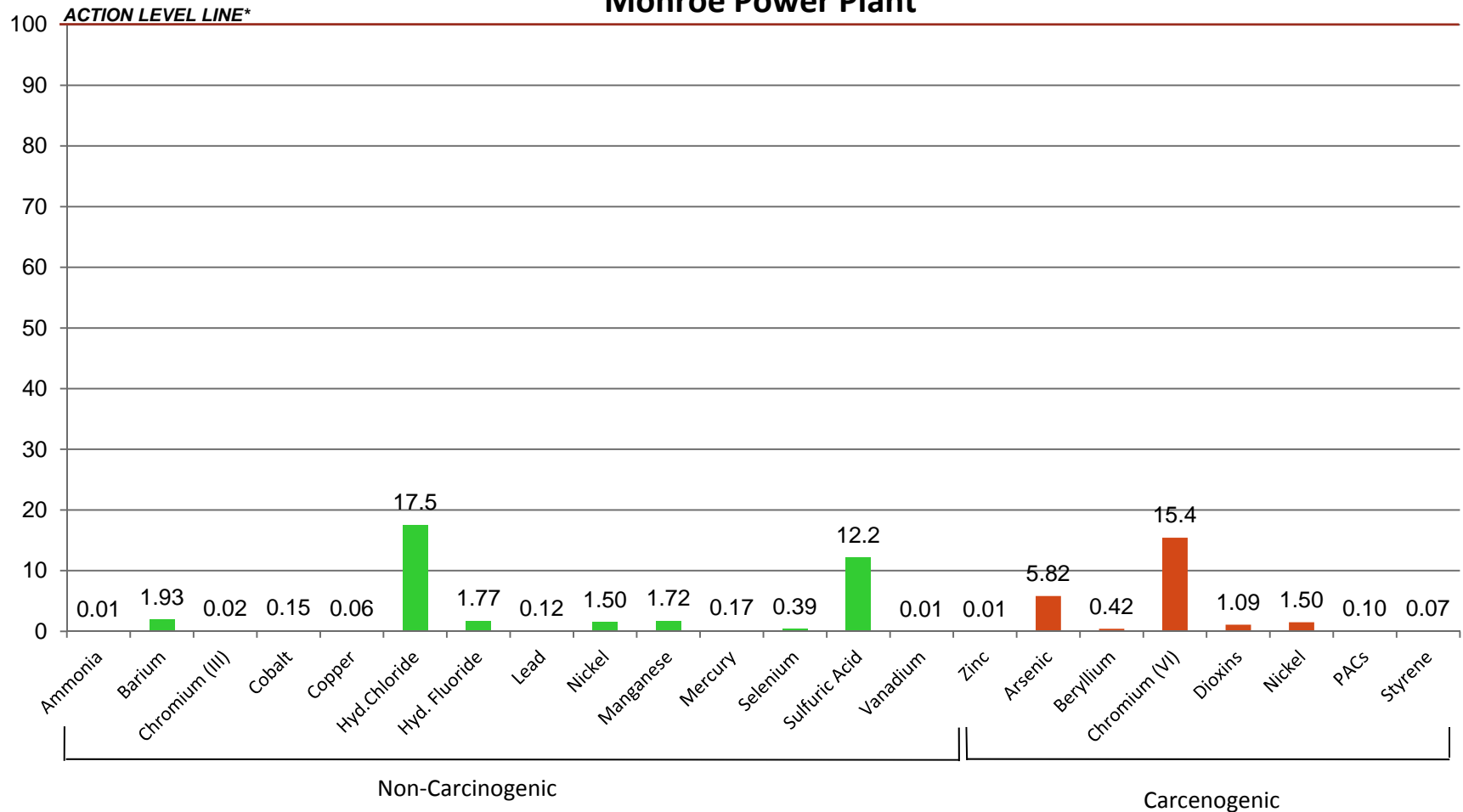
## MONROE POWER PLANT

| TRI Chemical         | Total            | Air<br>(Pounds Emitted) | Land<br>(Pounds Managed) | Water<br>(Pounds Discharged) |
|----------------------|------------------|-------------------------|--------------------------|------------------------------|
| Ammonia              | 8,100            | 7,700                   | 0                        | 400                          |
| Arsenic              | 39,430           | 330                     | 37,000                   | 2,100                        |
| Barium               | 3,119,400        | 6,400                   | 3,100,000                | 13,000                       |
| Benzo(g,h,l)perylene | 0.75             | 0.28                    | 0.47                     | 0                            |
| Beryllium            | 9,257            | 23                      | 9,200                    | 34                           |
| Chromium             | 98,070           | 770                     | 96,000                   | 1,300                        |
| Cobalt               | 42,268           | 200                     | 42,000                   | 68                           |
| Copper               | 161,160          | 740                     | 160,000                  | 420                          |
| Dioxin <sup>1</sup>  | 1.3670           | 1.3670                  | 0                        | 0                            |
| Hydrogen chloride    | 4,500,000        | 4,500,000               | NA                       | NA                           |
| Hydrogen fluoride    | 130,000          | 130,000                 | NA                       | NA                           |
| Lead                 | 55,986.02        | 492.71                  | 55,434.00                | 59.31                        |
| Manganese            | 151,690          | 1,100                   | 150,000                  | 590                          |
| Mercury              | 1,117.81         | 659.81                  | 426.91                   | 31.09                        |
| Nickel               | 96,870           | 870                     | 95,000                   | 1,000                        |
| PACs <sup>2</sup>    | 56.08            | 7.08                    | 49.00                    | 0                            |
| Selenium             | 17,400           | 5,000                   | 8,400                    | 3,600                        |
| Styrene              | 17,000           | 17,000                  | NA                       | NA                           |
| Sulfuric acid        | 790,000          | 790,000                 | NA                       | NA                           |
| Vanadium             | 216,480          | 780                     | 210,000                  | 5,700                        |
| Zinc                 | 133,080          | 2,600                   | 130,000                  | 480                          |
| <b>TOTAL TRI</b>     | <b>9,586,967</b> |                         |                          |                              |

<sup>1</sup> Dioxin emissions are reported to the EPA in grams

<sup>2</sup> PACs = Polycyclic Aromatic Compounds

## Comparison of This Year's Modeled Ground Level Concentrations to Action Levels Monroe Power Plant



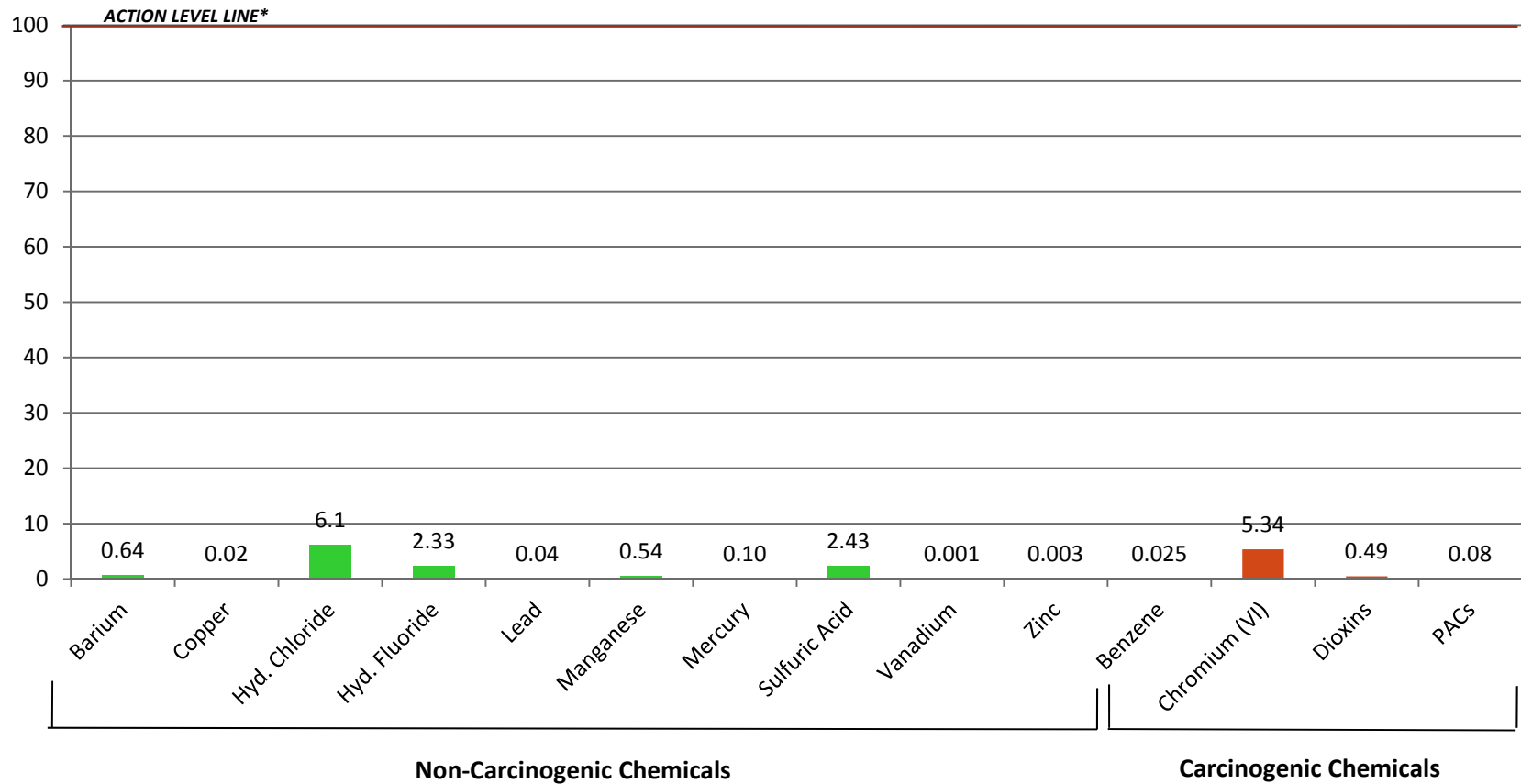
\* This line represents the level at which state and federal regulators may take some action to control emissions through permitting. The most sensitive individuals - pregnant women, children, the elderly - may have a reaction at levels varying from one to thousands of times greater than this level. Because action levels are different for each chemical, we chose to represent our concentrations as a percent of the "action level line".

## RIVER ROUGE POWER PLANT

| TRI Chemical        | Total     | Air<br>(Pounds Emitted) | Land<br>(Pounds Managed) | Water<br>(Pounds Discharged) |
|---------------------|-----------|-------------------------|--------------------------|------------------------------|
| Barium              | 751,000   | 800                     | 750,000                  | 200                          |
| Benzene             | 130       | 130                     | 0                        | 0                            |
| Chromium            | 21,100    | 100                     | 21,000                   | 0                            |
| Copper              | 31,102    | 100                     | 31,000                   | 2                            |
| Dioxin <sup>1</sup> | 0.2306    | 0.2306                  | 0                        | 0                            |
| Hydrogen chloride   | 590,000   | 590,000                 | NA                       | NA                           |
| Hydrogen fluoride   | 64,000    | 64,000                  | NA                       | NA                           |
| Lead                | 12,287.04 | 62.37                   | 12,224.50                | 0.17                         |
| Manganese           | 28,130    | 130                     | 28,000                   | 0                            |
| Mercury             | 199.99    | 143.32                  | 56.67                    | 0                            |
| Sulfuric acid       | 59,000    | 59,000                  | NA                       | NA                           |
| Vanadium            | 38,083    | 83                      | 38,000                   | 0                            |
| Zinc                | 26,350    | 350                     | 26,000                   | 0                            |
|                     |           |                         |                          |                              |
| TOTAL TRI           | 1,621,384 |                         |                          |                              |

<sup>1</sup> Dioxin emissions are reported to the EPA in grams

## Comparison of Modeled Maximum Ground Level Concentrations to Action Levels (River Rouge Power Plant)



\* This line represents the level at which state and federal regulators may take some action to control emissions through permitting. The most sensitive individuals - pregnant women, children, the elderly - may have a reaction at levels varying from one to thousands of times greater than this level. Because action levels are different for each chemical, we chose to represent our concentrations as a percent of the "action level line".

## ST. CLAIR POWER PLANT

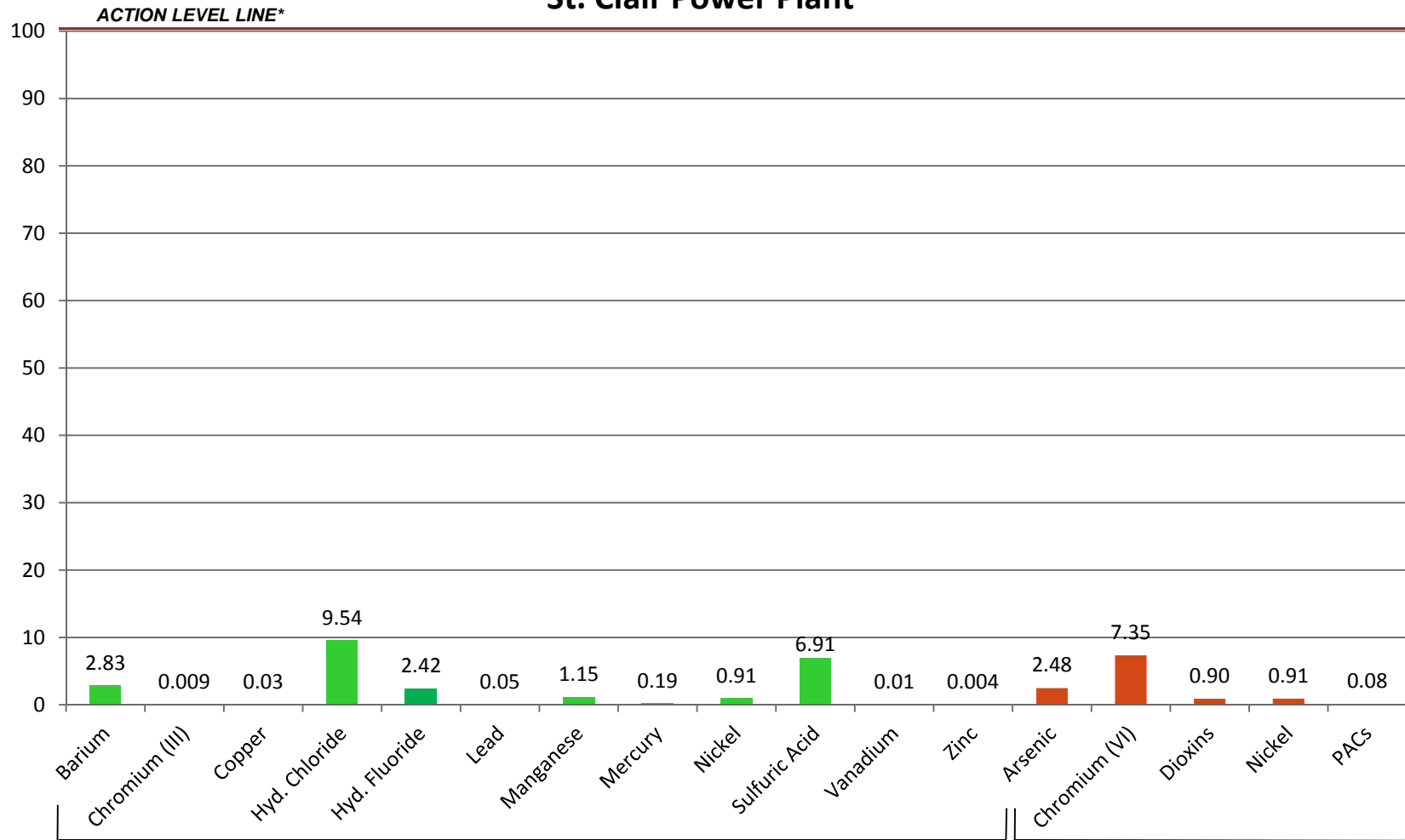
| TRI Chemical                           | Total     | Air<br>(Pounds Emitted) | Land<br>(Pounds Managed) | Water<br>(Pounds Discharged) |
|--|-----------|-------------------------|--------------------------|------------------------------|
| Arsenic Compounds                      | 11,109    | 69                      | 11,000                   | 40                           |
| Barium Compounds                       | 2,908,900 | 4,600                   | 2,900,000                | 4,300                        |
| Benzo(g,h,l)perylene                   | 0.27      | 0.11                    | 0.16                     | 0.00                         |
| Chromium Compounds                     | 29,360    | 180                     | 29,000                   | 180                          |
| Copper Compounds                       | 52,280    | 200                     | 52,000                   | 80                           |
| Dioxin <sup>1</sup> -like Compounds    | 0.5525    | 0.5525                  | 0                        | 0                            |
| Hydrogen chloride                      | 1,200,000 | 1,200,000               | NA                       | NA                           |
| Hydrogen fluoride                      | 87,000    | 87,000                  | NA                       | NA                           |
| Lead Compounds                         | 15,417.01 | 98.05                   | 15,299                   | 19.96                        |
| Manganese Compounds                    | 86,481    | 361                     | 86,000                   | 120                          |
| Mercury Compounds                      | 379.37    | 236.39                  | 142.65                   | 0.33                         |
| Nickel Compounds                       | 28,320    | 260                     | 28,000                   | 60                           |
| PACs <sup>2</sup>                      | 18.83     | 2.83                    | 16.00                    | 0                            |
| Polychlorinated Biphenyls <sup>3</sup> | 0         | NA                      | NA                       | NA                           |
| Sulfuric acid                          | 220,000   | 220,000                 | NA                       | NA                           |
| Vanadium Compounds                     | 70,300    | 200                     | 70,000                   | 100                          |
| Zinc Compounds                         | 40,760    | 680                     | 40,000                   | 80                           |
|  |           |                         |                          |                              |
| TOTAL TRI                              | 4,750,326 |                         |                          |                              |

<sup>1</sup> Dioxin emissions are reported to the EPA in grams

<sup>2</sup> PACs = Polycyclic Aromatic Compounds

<sup>3</sup> PCB use was greater than TRI threshold, but was not released to the environment

## Comparison of Modeled Maximum Ground Level Concentrations to Action Levels St. Clair Power Plant



### Non-Carcinogenic Chemicals

### Carcinogenic Chemicals

\* This line represents the level at which state and federal regulators may take some action to control emissions through permitting. The most sensitive individuals - pregnant women, children, the elderly - may have a reaction at levels varying from one to thousands of times greater than this level. Because action levels are different for each chemical, we chose to represent our concentrations as a percent of the "action level line".

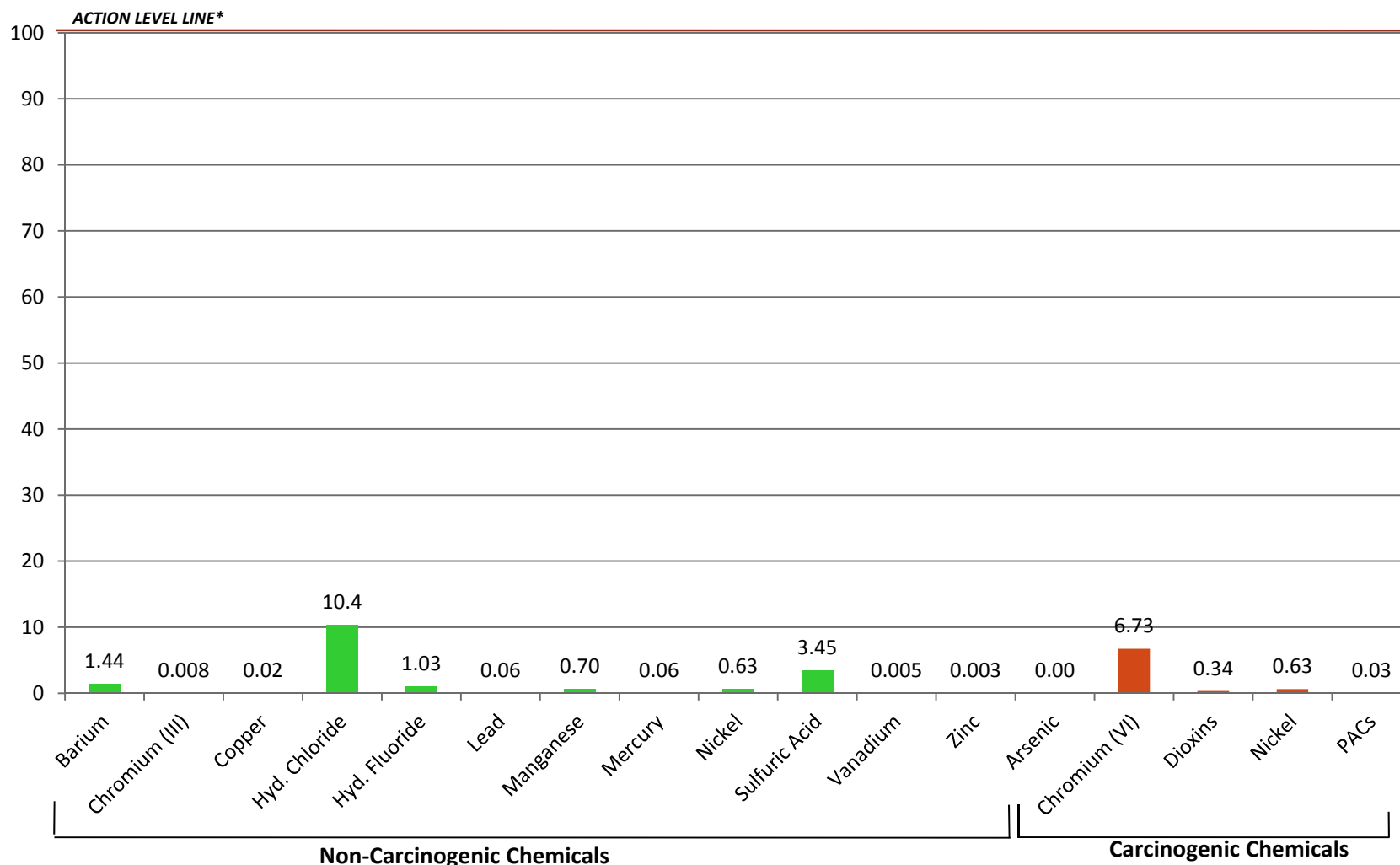
## TRENTON CHANNEL POWER PLANT

| TRI Chemical         | Total     | Air<br>(Pounds Emitted) | Land<br>(Pounds Managed) | Water<br>(Pounds Discharge) |
|----------------------|-----------|-------------------------|--------------------------|-----------------------------|
| Barium               | 774,320   | 3,400                   | 770,000                  | 920                         |
| Benzo(g,h,i)perylene | 4.32      | 0.05                    | 4.26                     | 0                           |
| Chromium             | 21,440    | 240                     | 21,000                   | 200                         |
| Copper               | 35,220    | 220                     | 35,000                   | 0                           |
| Dioxin <sup>1</sup>  | 0.3019    | 0.3019                  | 0                        | 0                           |
| Hydrogen chloride    | 1,900,000 | 1,900,000               | NA                       | NA                          |
| Hydrogen fluoride    | 54,000    | 54,000                  | NA                       | NA                          |
| Lead                 | 12,315.07 | 179.83                  | 12,135.24                | 0                           |
| Manganese            | 34,320    | 320                     | 33,000                   | 1,000                       |
| Mercury              | 257.47    | 172.31                  | 85.16                    | 0.01                        |
| Nickel               | 22,303    | 260                     | 22,000                   | 43                          |
| PACs <sup>2</sup>    | 382.82    | 1.37                    | 388.45                   | 0                           |
| Sulfuric acid        | 160,000   | 160,000                 | NA                       | NA                          |
| Vanadium             | 46,690    | 280                     | 46,000                   | 410                         |
| Zinc                 | 27,580    | 680                     | 25,000                   | 1,900                       |
|                      |           |                         |                          |                             |
| TOTAL TRI            | 3,088,840 |                         |                          |                             |

<sup>1</sup> Dioxin emissions are reported to the EPA in grams

<sup>2</sup> PACs = Polycyclic Aromatic Compounds

## Comparison of Modeled Maximum Ground Level Concentrations to Action Levels Trenton Channel Power Plant



\* This line represents the level at which state and federal regulators may take some action to control emissions through permitting. The most sensitive individuals - pregnant women, children, the elderly - may have a reaction at levels varying from one to thousands of times greater than this level. Because action levels are different for each chemical, we chose to represent our concentrations as a percent of the "action level line"