

Integrated Iron and Steel MACT (II&S) RTR
Summary of US Sinter Plant Operations/Recycling Value/Lead & Arsenic Emissions

Environmental group commenters have raised concerns with fugitive hazardous air pollutant (HAP) emissions from the iron and steel industry, and also potential exposure to lead and arsenic from sinter plant stack emissions. In his testimony at the II&S MACT RTR public hearing on August 15, 2023, for example, James Pew of EarthJustice claimed a lack of available lead emissions data to appropriately evaluate risks, and artificially assumed a high percentage of lead, arsenic, and other HAP constituents in steel plant emissions. Mr. Pew also asserted that sinter plants are unnecessary “hazardous waste burning operations.” These facilities do not burn “hazardous waste.” This comment, assumption and concern is simply wrong.

The two remaining sinter plants in operation¹ in the United States provide a valuable recycling benefit to not only the facilities at which they are located, but also by taking in other intra-company recyclable iron-bearing materials, which conserves natural resources and ultimately reduces the amount of taconite mined, processed, and shipped to produce a ton of steel. Actual lead and arsenic air quality monitoring data collected by US EPA and the relevant states over many years confirm that ambient concentrations near sinter plant operations are very low.² This operation presents a level of risk that is protective of public health with an ample margin of safety, while also providing an environmental benefit by recycling millions of tons of iron bearing materials that would otherwise be landfilled.

I. Sinter Plants Provide Valuable Recycling Benefit

US sinter plants recycle valuable iron bearing materials to conserve natural resources, reduce landfill disposal, and avoid substantially increasing reportable Toxic Release Inventory (TRI) “releases to land” due to increased landfilling of valuable reverts. Both U. S. Steel and Cleveland-Cliffs have modernized the operating philosophy of the process and switched from using sintering ores (low grade ore) to using only valuable iron bearing reverts which optimizes the recycling benefits and reduces consumption of “new” mined taconite pellets in the blast furnace. As such, these operations should now be considered and referred to as “Recycling Plants.”³ The Recycling Plants continue to provide recycling benefits today.

In US integrated steel plants, significant quantities of iron-bearing pellet fines are generated in the screening processes because of the size fraction required for charges into blast furnaces. Daily, coke fines and iron ore fines are generated in the handling and processing of these inputs to the furnace. Iron-bearing slag fines, and scale (oxide from hot rolling and casting that is collected in process water settling pits) are also generated. Finally, iron-bearing dusts and sludges are also generated as part of operating air emissions control equipment at the steel shops and blast furnaces. These types of materials cannot be charged directly back into the iron and steelmaking process because of their small particle size. Recycling Plants take all these materials and create a valuable agglomerated iron unit also

¹ The two remaining Recycle Plants operate at Cleveland-Cliffs Burns Harbor and USS Gary Works. Cleveland-Cliffs

² See December 20, 2021 Letter from AISI to Dr. Donna Lee Jones, PhD., US EPA, <https://www.regulations.gov/document/EPA-HQ-OAR-2002-0083-1327>, incorporated by reference.

³ When sintering ores were removed from the mix, a decision was made to consolidate recycling operations using the Recycle Plant at Burns Harbor to serve other intra-company operations to further optimize efficiency allowing the indefinite idling of the recycle plant at Indiana Harbor.

known as “clinker” that can be charged back into the blast furnace, thereby recycling these valuable iron and carbon units back to the process.

Both the Burns Harbor and Gary Works Recycling Plants also take in other intra-company steel mills’ recoverable iron-bearing materials for processing at their Recycle Plants, further saving precious taconite ore reserves; subsequent mining, processing, and shipping of pellets; and substantially reducing landfill costs and space. While it may be true that not all integrated iron and steel mills include onsite sintering operations, each company has optimized the recycling process around a single location within their respective footprints (Burns Harbor for Cleveland-Cliffs and Gary Works for U. S. Steel) and no company which operates an integrated iron and steel mill in the US does so without utilizing the sintering process to recycle revert materials.

On an annual basis, the Burns Harbor and Gary Works Recycling Plants recycle 2.4 million tons of reverts. Should the Recycle Plants be forced to close the following economic and environmental impacts would occur:

Economic Impacts

- Shutdown of the Recycle Plants would increase operating costs by approximately \$206 million/year to replace loss of iron units, increase coke consumption, and increase landfilling of up to 2,400,000 tons/year of iron bearing reverts.

Natural Resource Impact

- Premature depletion of taconite ore reserves would occur to make up the loss of iron containing reverts, which would require additional mining, processing, and shipping of an additional 1,800,000 tons/year of taconite pellets.
- Clinker consumed in blast furnaces reduces the overall fuel rate. Removing this clinker would require additional mining of metallurgical coal reserves to produce an additional 86,000 tons of metallurgical coke to offset the loss of the clinker produced in the Recycle Plant.

Landfill Impacts

- Up to 2,400,000 tons/year of iron bearing reverts would be required to be landfilled which would require 120,000 truck-loads to haul this material off-site, consuming 2,250,000 gallons of diesel fuel and increasing transportation-related criteria pollutants and GHG emissions.
- The additional material to be landfilled will rapidly consume valuable landfill space, driving up conventional landfill tipping fees.

TRI Reportable Releases

- Landfilling up to 2,400,000 tons/year of iron bearing reverts will dramatically increase the reportable TRI “releases to land”, at a minimum, at least doubling the TRI reportable releases to land unnecessarily.

II. Lead Emissions from Sinter (Recycling) Plant Stacks Have Decreased Significantly and Do Not Present Adverse Impacts

In their written comments, Earthjustice among others inaccurately claim that sinter plants emit 10.7 tons per year of lead from their stacks.⁴ U.S. Steel and Cleveland-Cliffs have substantially reduced air emissions from Recycling Plant operations by 76% since 2018, and currently emit only 1.5 tons per year of lead.

Further, during the 2022 ICR fence line ambient air monitoring program for the current Technology Review, detectable lead levels at the fenceline of the Cleveland-Cliffs and U. S. Steel facilities with operating sinter plants, including Burns Harbor and Gary Works, were extremely low, with maximum average being less than 13.8% of the Lead National Ambient Air Quality Standard (NAAQS). Furthermore, in the July 31, 2023, proposed II&S rule, US EPA states: “We compared the average 6-month fenceline measurements at each of the 16 monitoring locations to the Pb National Ambient Air Quality Standard (NAAQS), which is 0.15 ug/m³ (based on a three-month rolling average). For all locations at all facilities, the averages were well below the NAAQS level, with the highest average only 20 percent of the NAAQS, indicating that lead concentrations are below levels of concern at the fenceline for this source category.” (88 FR 49414, emphasis added). Earthjustice claims in its comment letter that this data should not be relied upon because actual lead concentrations “are almost certainly greater than those indicated by its fenceline monitoring.”⁵ This statement is not based on actual ambient monitoring data obtained during the ICR or historically, as explained further below.

III. Long-Term Ambient Air Monitoring Around the Perimeter of Steel Mills and Sinter Plants Confirms Lead and Arsenic Concentrations are Extremely Low

States have been monitoring ambient concentrations of metals next to II&S facilities for many years. All II&S facilities are located in areas where the PM_{2.5} concentrations are demonstrating attainment of the PM_{2.5} NAAQS of 12 µg/m³. Further, publicly available ambient air quality data shows a downward trend in particulate matter and lead concentrations over the past five years. In fact, PM_{2.5} ambient air data compiled by EPA has documented that PM_{2.5} concentrations from monitors located near Integrated Iron and Steel facilities have decreased 37% based on the most current 2020-2022 published design value data compared to the 2005-2007 levels. The United States has more stringent PM_{2.5} national standards as compared to other key competitor countries, including China and India, as well as Europe. A review of state monitor data confirms that lead concentrations near U.S. II&S facilities are well below (less than 10%) the NAAQS and arsenic concentrations are below risk levels and near background levels of other, non-II&S areas.⁶

A. Lead Monitoring Data

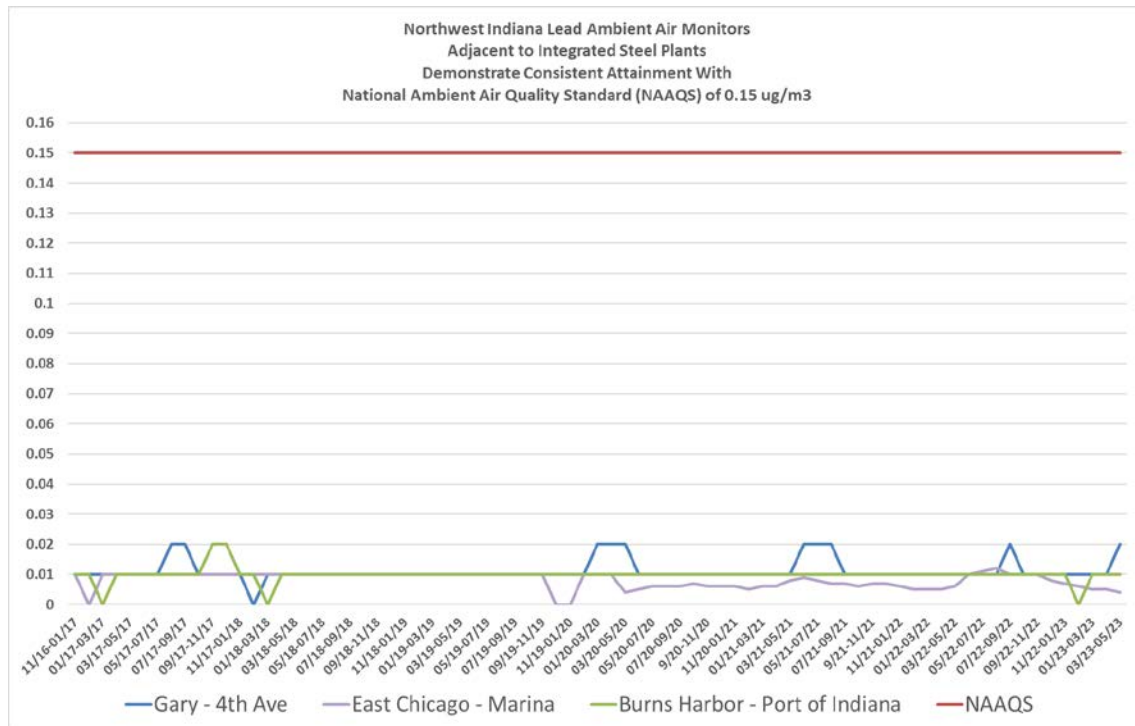
The applicable NAAQS standard for lead was established by US EPA in October 2008. The 2008 lead standard is 0.15 µg/m³, which must not be exceeded on a rolling 3-month (Jan-Mar, Feb-Apr, Mar-May,

⁴ Comments of Sierra Club, Clean Air Council, Buckeye Environmental Network, and Earthjustice (Oct. 25, 2023), for Docket No. EPA-HQ-OAR-2002-0083, p. 2

⁵ Id. at p. 37.

⁶ See [IDEM: Air Monitoring: Air Quality Data](#) for IDEM Northwest Indiana lead monitors adjacent to USS Gary, Cleveland-Cliffs Indiana Harbor, and Cleveland-Cliffs Burns Harbor facilities.

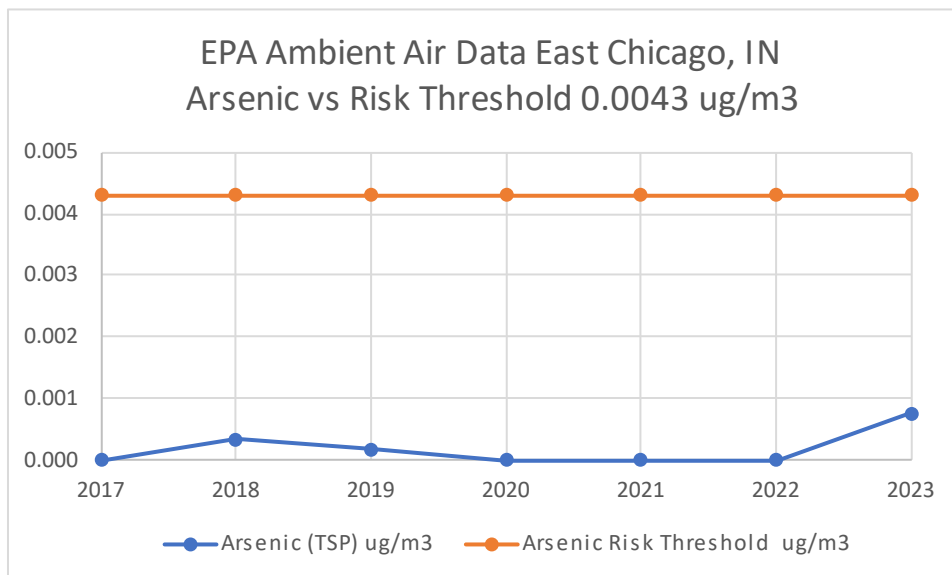
etc.) average basis.⁷ The Northwest Indiana area has ambient air monitors, placed by the Indiana Department of Environmental Management (IDEM) with US EPA approval and meeting US EPA criteria, that are located adjacent to Cleveland-Cliffs Burns Harbor (with a Recycle Plant), U. S. Steel Gary Works (with a Recycle plant), and Cleveland-Cliffs Indiana Harbor (with a now-indefinitely idled Recycle Plant). Lead monitoring data from November 2017-May 2023 shows that the ambient air concentrations around the perimeter of these facilities has consistently been a small fraction of the NAAQS, with the highest single average value in this period of only 0.02 $\mu\text{g}/\text{m}^3$, and the vast majority of data being 0.01 $\mu\text{g}/\text{m}^3$ or lower.



⁷ Attainment is determined by evaluating the design value, which is based on a rolling 3-month average for the 38-month period consisting of the most recent 3-year calendar period plus two previous months (i.e., 36 3-month periods).

B. Arsenic Monitoring Data

US EPA AirData Air Quality Monitors provide relevant arsenic ambient concentration data near steel facilities to compare against arsenic cancer risk thresholds. The most recent data, from January 2017-May 2023, shows that the ambient air concentrations of arsenic around the perimeter of these facilities has consistently been a small fraction of the arsenic concentration that corresponds to a cancer risk level of one in one million ($0.0043 \mu\text{g}/\text{m}^3$, shown by the red line in the below chart).⁸



As described above, existing data show that the arsenic and lead ambient air concentrations near iron and steel manufacturing facilities with sinter plants are well below applicable NAAQS and exposure levels of concern. The weight of this evidence, especially actual ambient air data from monitoring sites in place for a number of years located near IIS facilities with sinter plants, confirm that Recycling Plants present a level of risk that is protective of public health with an ample margin of safety, while also providing an environmental benefit by recycling materials that would otherwise be landfilled. Significant adverse impacts would occur if these important recycling operations are forced to shut down. Costly additional emission controls are not necessary to further reduce such low ambient levels of lead and arsenic to protect public health or the environment.

⁸ See also US EPA Region 5 portable arsenic ambient air monitoring data summarized in December 20, 2021 Letter from AISI to Dr. Donna Lee Jones, PhD., US EPA, <https://www.regulations.gov/document/EPA-HQ-OAR-2002-0083-1327>, incorporated by reference.

December 5, 2023

