United States Steel

Mon Valley Works Edgar Thomson Plant

Operations and Environmental Report 2020

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MESSAGE FROM THE PLANT MANAGER

Jon Olszewski
Plant Manager
Mon Valley Works – Edgar Thomson Plant

U. S. Steel – Edgar Thomson Plant has been an important part of our Mon Valley Works for nearly 150 years and has created steel made by generations of proud United Steelworkers and U. S. Steel management employees to build the foundation of America. We know that to be a good neighbor in our community, we must also continuously improve our environmental performance.

I am proud of the environmental progress and achievements described in this report, under U. S. Steel's commitment to its Comply, Lead, Educate, Allocate, and Never Stop Improving (CLEAN) program. However, we will never waver in our efforts to improve. We have embedded our environmental programs in our day-to-day operations as a commitment to environmental stewardship.

Our successes are a result of our resolve to always follow our S.T.E.E.L. principles – Safety First, Trust and Respect, Environmental Stewardship, Excellence and Accountability, and Lawful and Ethical Conduct, which will be discussed in more detail in this report.

2020 was a challenging year for all of us. As part of an essential industry, the Edgar Thomson team stepped up in the face of these challenges and continued to strongly forge ahead. Coke, iron, and steel are crucial to so many items in our everyday society. The steel production that the Edgar Thomson Plant supports is critical for essential industries, including the appliance, automotive, metal building and home construction industries. Domestic manufacturing has been particularly critical during the pandemic, supplying many products that support national, economic and health security.

In 2020, U. S. Steel's Edgar Thomson Plant reached many environmental milestones, which I am deeply proud of. The pages ahead summarize some of our major successes during the year. I am especially proud of our environmental compliance rates. In 2020, Edgar Thomson Plant's compliance with all Title V Air Operating Permit requirements was greater than 99 percent. This includes numerical mass emission limits and required continuous monitoring requirements. The Edgar Thomson Plant has also achieved greater than 99.9 percent compliance since 2016 with the NPDES water discharge permit limits. These achievements, as well as other environmental progress, are in no small part a result of U. S. Steel's continued commitment to environmental stewardship. U. S. Steel values our shared environment, our employees and the communities in which we live and operate. Several community projects are described in this report. Safety and environmental performance remain our top priorities, both now and in the future.

U. S. STEEL — **S.T.E.E.L.** PRINCIPLES

Our S.T.E.E.L. Principles are the foundation of a strong ethical culture at U. S. Steel. These five principles set forth clear ethical expectations for our Board of Directors, our leadership team and U. S. Steel employees worldwide. Conduct aligned with the S.T.E.E.L. Principles is essential to sustaining ethically and lawfully sound corporate citizenship, responsible environmental stewardship, and the principled management and leadership that are necessary for our continued success.

SAFETY FIRST U. S. Steel operates under the guiding principle that all safety-related incidents can be prevented and vests personal responsibility for operating under that principle in all its employees and contractors. Our company maintained an industry-leading safety program for many decades before the passage and implementation of government regulations, such as the Occupational Safety and Health Act and the Mine Safety and Health Act.

TRUST AND RESPECT The success of our company depends on all of us working together to achieve our common goals. We must build strong relationships with one another that are rooted in trust and respect while driving our culture of caring. By embracing the strengths and unique differences each of us brings to our work, we respect and learn from one another, foster a high-performance environment and encourage every employee to reach his or her full potential. We want all employees to trust that our diverse backgrounds are valued and celebrated. Our Employee Resource Groups, several of which focus on inclusion and allyship of historically underrepresented groups in the workforce, support our increasingly diverse workforce and strengthen employee engagement and connection. In addition, our Inclusion and Diversity Council, led by our CEO, drives our enterprise-level inclusion and diversity strategy across our company. Ultimately, our company is stronger – and we can serve our customers better – when we bring together our diverse experiences, backgrounds and perspectives to create inclusive, well-rounded and high-performing teams.

ENVIRONMENTAL STEWARDSHIP Environmental stewardship and "Safety First" are inextricably linked. Just like safety, environmental stewardship is a core value of our company that is incorporated into our day-to-day operations as well as our strategic corporate decisions. We must operate our facilities in an environmentally responsible manner and take steps to protect and preserve our shared natural resources. Doing what's right for the environment is also doing right for our business. Our commitment to environmental performance begins at the top with regular oversight by our senior leadership, and we continue to increase environmental awareness through regular training of our employees. Additionally, we are committed to establishing and maintaining documented environmental management programs that adhere to environmental laws and regulations, and many of our major facilities are ISO 14001-certified.

EXCELLENCE AND ACCOUNTABILITY Excellence and accountability are critical to sustaining our high-performance culture. Through our pursuit of excellence, we continue to challenge ourselves to build a better, more sustainable future for our employees, customers and communities. Accountability is critical to the success of our company. Accountability means taking initiative by proactively identifying what needs to be done, developing an action plan, and executing that plan. It also means aligning our actions to our goals, taking responsibility for our decisions, and executing on our commitments to our stakeholders in a timely manner.

LAWFUL AND ETHICAL CONDUCT Each of us has a duty to conduct business ethically and in compliance with all applicable laws and regulations, including when interacting with our customers, suppliers, competitors and other external parties. We must never take advantage of or provide special benefits to anyone – or even appear to do so – through manipulation, concealment, misuse of information, misrepresentation of material facts or any other unfair or improper practices. Fraud, theft, embezzlement, inflated billings, falsified expense reports and payment of kickbacks are all examples of illegal and unacceptable conduct.

These S.T.E.E.L. principles are the foundation on which we operate and are reflected in the environmental progress realized by the Edgar Thomson Plant operations as explained below.

OVERVIEW OF THE EDGAR THOMSON PLANT AND MON VALLEY WORKS

The Edgar Thomson Plant is the last integrated steel producer in Pennsylvania with blast furnaces and basic oxygen furnaces. The Edgar Thomson Plant operations have a tremendous impact on the local, regional and national economy. Its operations have a multiplier effect in supporting thousands of additional steel processor, energy, transportation and supplier jobs, not only in the Braddock area in Allegheny County and southwestern Pennsylvania region but also across the United States. Based on an American Iron and Steel Institute (AISI) study in 2012, each of the 650 direct manufacturing jobs at the Edgar Thomson Plant would support the need for approximately seven additional jobs. The Edgar Thomson Plant is an integral part of the four-plant steelmaking complex U. S. Steel calls the Mon Valley Works (Figure 2).

The Mon Valley Works consists of:

1) **Clairton Plant –** produces coke and coke byproducts;
2) **Edgar Thomson (ET) Plant –** produces hot iron in blast furnaces, which is then converted into steel at the Basic Oxygen Shop and then molded into slabs at the Caster;
3) **Irvin Plant –** finishes and processes steel slabs;
4) **Fairless Plant –** includes a finishing mill, located outside of Philadelphia.

The Clairton Plant relies on the Edgar Thomson Plant to consume its metallurgical coke in order to produce hot iron and steel, as well as its coke oven gas as a clean fuel. The Irvin Plant relies on the Edgar Thomson Plant for its steel slabs so they can be processed at the finishing plant.

Figure 1. The Edgar Thomson Plant sits on the banks of the Monongahela River and is located about 10 miles southeast of Pittsburgh in Braddock, Pa.

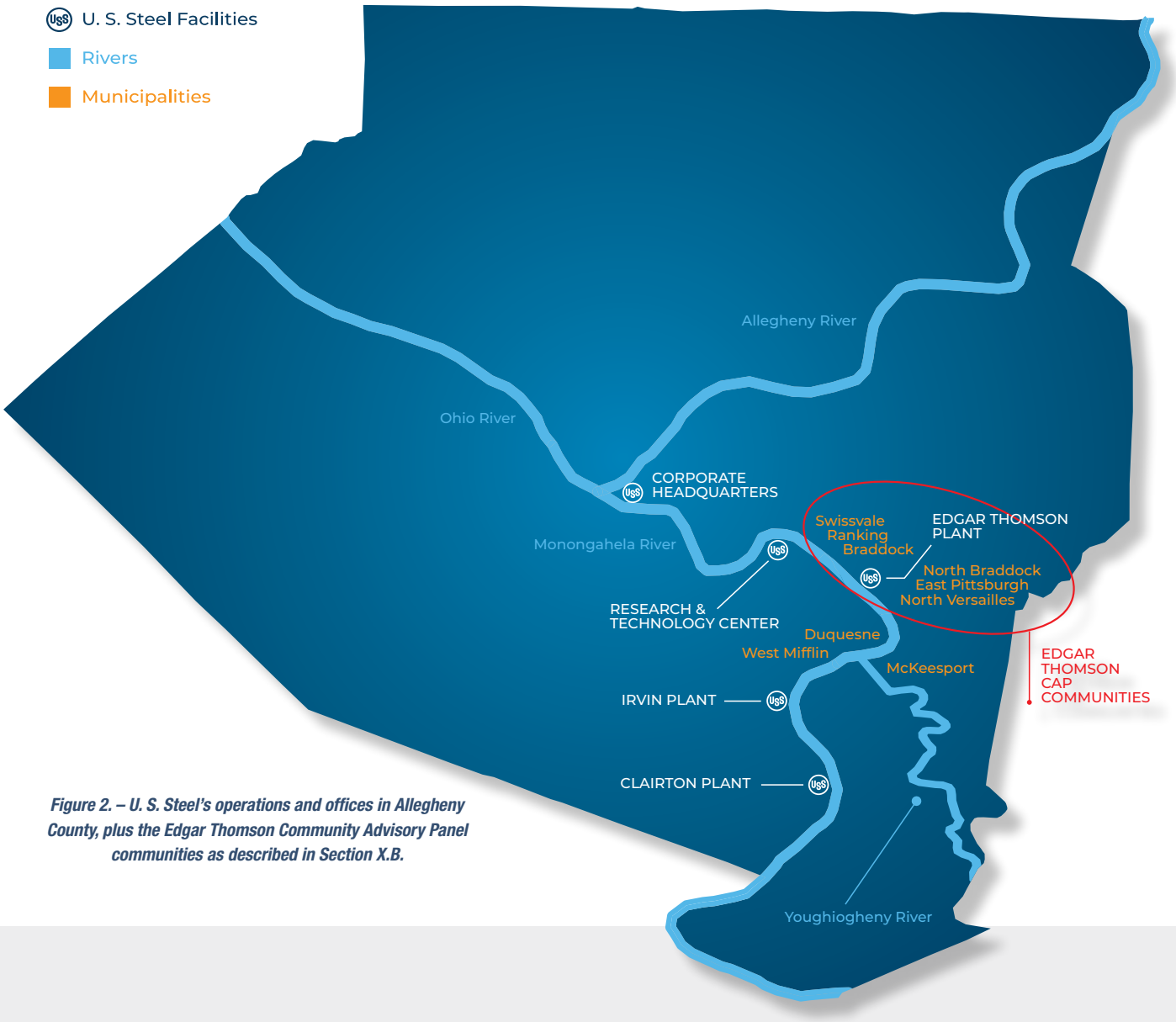


Figure 2. – U. S. Steel's operations and offices in Allegheny County, plus the Edgar Thomson Community Advisory Panel communities as described in Section X.B.

The economic impacts of the Mon Valley Works are significant on both the local and national level. Steel is a critical foundation for our nation's economy, security, infrastructure, energy independence, and downstream manufacturing capabilities. The United States must maintain the ability to mine, melt and make the steel needed to defend, build and power our country.

In 2018, the Federal government determined that domestic steelmaking is necessary for our nation's security production requirements. The government also determined that without domestic steel production, we run the risk of not being able to adequately respond to a national emergency. Furthermore, the U.S. Department of Homeland Security has designated steelmakers like U. S. Steel, including its Edgar Thomson Plant, to serve as a vital component of our nation's critical manufacturing sector, which is necessary for the economic prosperity, security and continuity of the United States. The COVID-19 pandemic has highlighted the importance of maintaining robust domestic manufacturing capabilities to supply important products that are essential to national, economic and health security.

HISTORY OF THE EDGAR THOMSON PLANT

While the Edgar Thomson Plant has been producing steel for over 100 years, the plant has evolved into a state-of-the-art manufacturing facility.

By the end of the Civil War, the railroad industry had become well-established in America, and the iron rails used in railroad tracks were commanding a hefty $100 per ton. In the summer of 1872, Andrew Carnegie observed during a trip to Europe how easily and inexpensively the Europeans were making steel rails. They were using the Bessemer method – forcing a blast of air through molten pig iron to burn out the impurities and change it into steel. He hurried back to Pittsburgh to search for a site on which to build his own Bessemer rail plant.

That same year, he secured an option on 107 acres of land along the Monongahela River. On this land, where the first settler's cabin west of the Allegheny had stood more than a century earlier, Carnegie initiated construction of a wharf to handle river freight. Carnegie and his partners invested $700,000 in the project. Their firm, Carnegie-McCandless & Co., decided to name the new plant after the president of the Pennsylvania Railroad – J. Edgar Thomson.

Ground was broken for the Edgar Thomson Plant's main building on April 13, 1873. The first Bessemer "blow" was made on August 26, 1875. Six days later, the first rail was rolled. The plant turned out 225 tons of steel per day – about two and a half percent of its 2020 operating capacity. In its first month of operation, Edgar Thomson produced 1,119 tons of rails and was able to sell them profitably at $66.50 per ton – thirty-three percent less than the competition.

In 1889, Carnegie opened the Braddock Library, his first philanthropic community library that cemented the connection between the mill and the community. A tunnel physically connected the mill to the library. Today, both the Braddock Library and Edgar Thomson Plant are National Historic Landmarks.

In 1901, the United States Steel Corporation (U. S. Steel) was organized and acquired all the stock of the Carnegie Steel Company. By April 1901, the Edgar Thomson Plant had already grown significantly since its opening, with the acquisition of new land, the erection of nine blast furnaces and the construction of two ingot mold foundries as well as other facilities. United States Steel Corporation became the first billion-dollar corporation in the world.

The connection continued when U. S. Steel designed the logo that would become the iconic logo of the Pittsburgh Steelers. The logo contains three hypocycloids (diamond shapes). The three hypocycloids mean: steel lightens your work, brightens your leisure and widens your world. They also represent the three materials used to produce steel: yellow for coal, orange for iron ore and blue for steel scrap.

While the Edgar Thomson Plant has been producing steel for over 100 years, the plant has evolved into a state-of-the-art manufacturing facility. The plant has experienced significant milestones over the last century, including, many recent environmental-related achievements, as highlighted on the next page:

History of Edgar Thomson *Significant Milestones*

YEAR	TIMELINE OF EVENTS
1755	Battle of the Monongahela during the French & Indian War at Braddock's Field
1872	Andrew Carnegie purchases 107 acres of Braddock's Field
1873	Ground was broken for the mill
1875	First heat of liquid steel
1901	Edgar Thomson becomes part of U. S. Steel, the first billion-dollar corporation
1913	First Open-Hearth heat tapped
1938	"44"-inch slab mill began operating to supply the new Irvin hot strip mill
1945	Andrew Carnegie's original rail mill shuts down
1964	Startup of Forging Mold Foundry
1972	Two Basic Oxygen Furnaces (BOP) vessels begin operation
1974	Installation of Mixer Baghouse
1980	Installation of Blast Furnace Baghouse
1992	Startup of Continuous Caster
1995	Edgar Thomson Plant is designated a historic landmark by ASM International
2007	Upgrades to BOP Secondary Baghouse are completed, which reduce emissions of particulate matter from the BOP Shop
2009	Upgrade to LMF Baghouse is completed, which reduces emissions of particulate matter from LMF operations
2012	Installation of new blowdown water treatment plant at BOP
2013	Upgrade to BOP Gas Cleaning system is completed, resulting in improved environmental performance
2016	Utilized Clairton coke oven gas in which sulfur content was significantly reduced due to vacuum carbonate tray upgrades, greatly reducing SO_2 emissions
2018	Installation of Boiler Stack and related utility infrastructure for improved dispersion

SAFETY

Safety Policy

U. S. Steel continues to develop and implement innovative ideas to improve the Safety & Industrial Hygiene processes and management systems which are the drivers of a sustainable culture. This culture incorporates a framework for setting and reviewing objectives and targets, which, like our commitment to environmental stewardship, go beyond mere compliance with applicable laws and regulations. Such programs require management to communicate pertinent job-related Safety & Industrial Hygiene requirements to an engaged and highly skilled workforce that is empowered with capabilities and resources needed to assess, reduce and eliminate workplace risks and hazards.

The following values guide the development of our Safety & Industrial Hygiene processes and programs and our Safety Management System:

Employee Engagement

U. S. Steel encourages, promotes and recognizes that employee engagement is a key factor in the success of our Safety Management System. We establish, implement and maintain processes for consultation and participation of employees at all levels and functions. Some of the in-plant safety engagement initiatives we've encouraged over the last year include:

- **STOP & ACT –** Every U. S. Steel employee is empowered to STOP work for conditions that endanger individuals, equipment or our work environment.
- **Annual Safety Commitment –** At the beginning of every year, all U. S. Steel employees are invited to give their commitment to safety by signing the plant safety banner.
- **Safety Conversations –** We have established a process through which all members of the organization can engage with one another about work practices, conditions and/or safety concerns about a job in a non-threatening and collaborative way.
- **Safety Baseball & Football –** Spring and Fall engagement competitions to encourage safety communication and the identification and elimination of hazards throughout our plants.
- **COVID Care Packages –** To encourage compliance with CDC and Commonwealth of PA coronavirus guidelines, care packages were sent out to all employees periodically throughout the year. These packages included various face coverings, individual hand sanitizers and other materials and communications to encourage safety precautions.

Mon Valley Works' Edgar Thomson Plant Holds Employee Appreciation Event

Mon Valley Works' Edgar Thomson Plant hosted their Employee Appreciation Day event (formerly known as Family Safety Day) on Saturday, Oct. 12, 2019. Unfortunately, the 2020 event did not occur due to the COVID-19 pandemic. The 2019 Appreciation Day saw employees and their family members gather at the plant for a day of fun and education – about what we do at the plant, how their loved one contributes to those efforts, and how seriously we take safety every day.

The event included a driving tour of the entire plant and a walking tour of the BOP shop and caster. Attendees also received information about the plant's storied past and bright future.

Overall, this was a unique opportunity for employees to share the sights and sounds of the plant with their family members, give them a peek into their home away from home and meet fellow members of the U. S. Steel/Edgar Thomson Plant family.

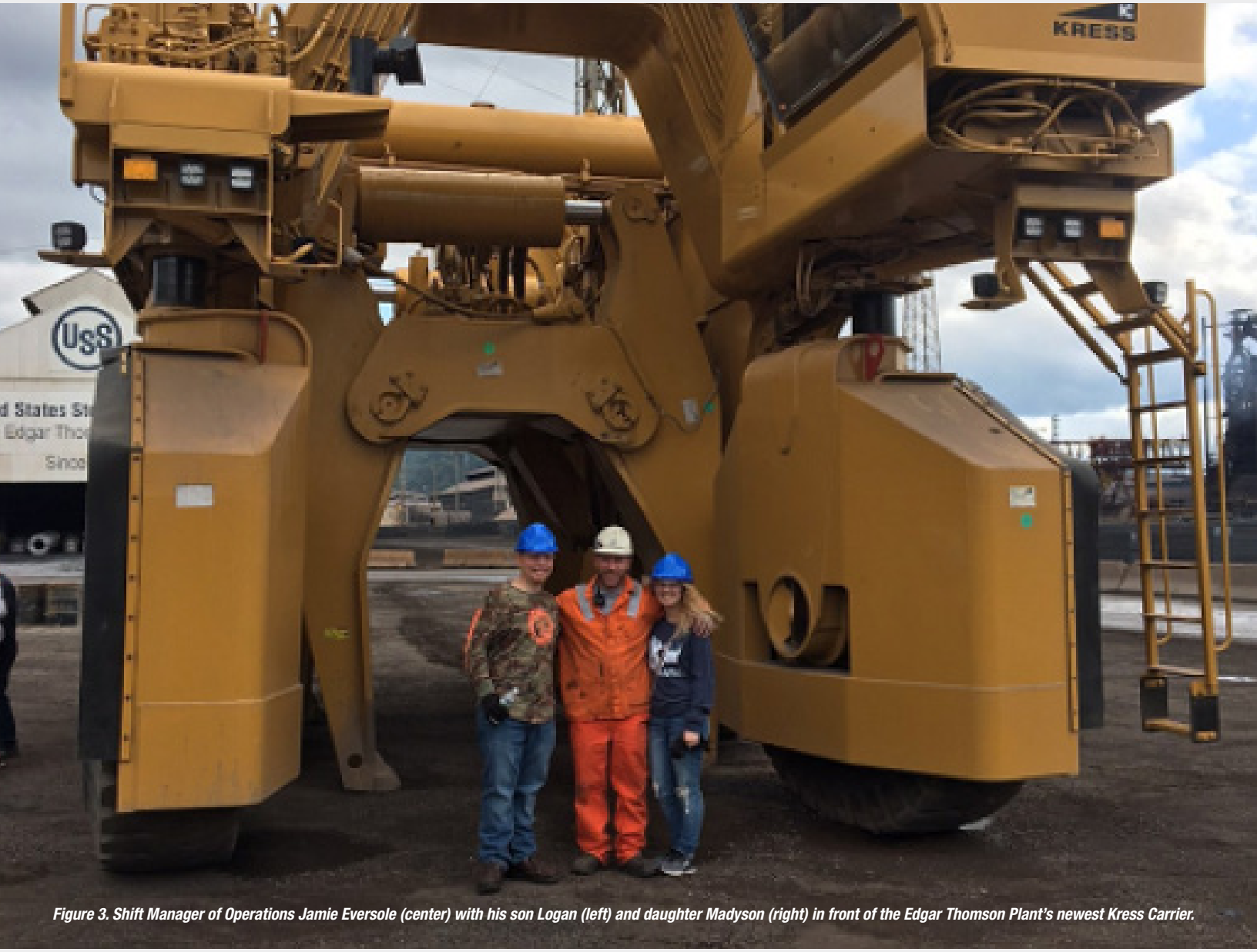


Figure 3. Shift Manager of Operations Jamie Eversole (center) with his son Logan (left) and daughter Madyson (right) in front of the Edgar Thomson Plant's newest Kress Carrier.

Figure 4. A tour group pauses in the BOP shop service aisle, watching operations.

Figure 6. Matt Trabbold (Safety & Industrial Hygiene Specialist, second from left) and his family (from left): his wife, Chrysten, his stepdaughters Alyssa Simon and Rachel Rowe, his mother-in-law, Martha Arko, and his stepson, Christopher Arko.

Figure 5. Mindy Buccicone's (Manager – Operational Excellence) son Cohen (left) and daughter Taylor.

Figure 7. Family of Matt Dudik (BOP Shift Manager): his father, Andy, his mother, Denise, and his sister, Sarah.

STATE-OF-THE-ART FACILITY

U. S. Steel Mon Valley Works Edgar Thomson Plant (ET) is an ironmaking and steelmaking facility that produces steel slabs (Figure 10). Raw materials such as coke, iron-bearing materials, and fluxes are charged to blast furnaces in the ironmaking process. Molten metal (iron) is tapped from the blast furnace at the casthouse into transfer ladles. The hot metal is then transferred to a hot metal mixer or direct pour station in preparation for desulfurization. For desulfurization, a reagent is added to the hot metal, causing sulfur and other impurities to form and rise to the surface. Desulfurized hot metal is then introduced into the basic oxygen process (BOP), where the hot metal is transformed into molten steel. Scrap, alloys, fluxes and oxygen are also introduced at the BOP. The liquid steel is tapped from the BOP vessels and transferred to the ladle metallurgy facility (LMF) or Vacuum Degasser, where the properties of the steel can be more precisely refined according to customer specifications. To achieve this additional refining at the LMF or Vacuum Degasser, specific alloying materials are added to the process. The refined liquid steel is then charged to the dual strand continuous caster mold. The steel slabs are formed in the continuous caster and are cut to length, ground, slit as necessary, and shipped offsite. There are three Riley boilers at ET, which are used to generate steam, heat and electricity for the plant. The three primary fuels for the boilers are blast furnace gas (BFG), coke oven gas (COG) and natural gas (NG).

The basic process for steelmaking at Edgar Thomson hasn't changed much for nearly 30 years, but this doesn't mean the plant has been standing still. As technologies advance, process controls have become more precise, giving operators real-time feedback for "eyes" in the process for better control. Equipment, especially environmental controls, has also been updated as new, more reliable technologies have become available, such as baghouse cleaning air systems and improved taphole material at the blast furnace.

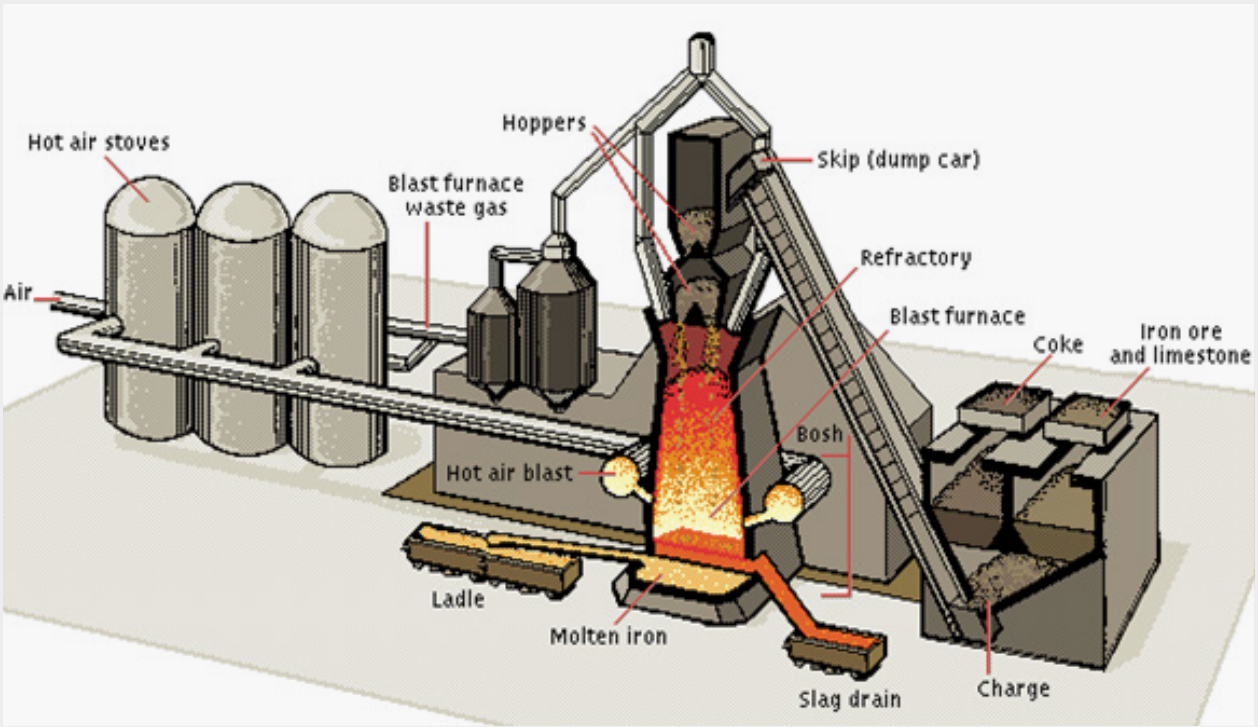


Figure 10. A blast furnace operations overview showing coke, iron ore, and limestone storage and charging into a blast furnace where molten iron is produced. The molten iron is then transferred to a basic oxygen process to be converted from iron to steel.

A. BLAST FURNACES

Figure 11. Edgar Thomson blast furnaces #1 and #3.

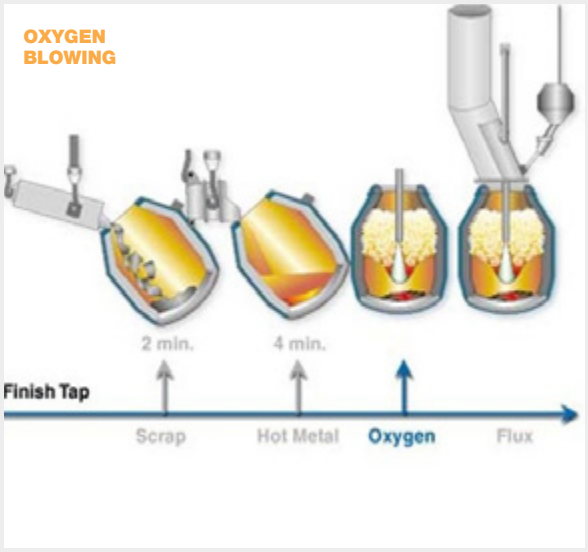
Edgar Thomson has two blast furnaces, blast furnace #1 (BF#1) and blast furnace #3 (BF#3) (Figure 11). The blast furnaces are of the same basic design and operated in a similar manner but run independently of each other. Raw materials, including iron-bearing material, coke and fluxes are charged from skip cars through the bells into the top of the furnace. A continuous blast of heated air from the stoves is injected through pipes called tuyeres, which are located just above the taphole near the base of the furnaces. Natural gas and coke oven gas are also injected through the tuyeres. The heated air burns the injected gases and coke to produce the heat required by the process to reduce the iron-bearing materials to molten iron. The raw materials, heated air and gases are continuously injected into the furnace during both periods of casting and non-casting. The iron becomes molten just above the tuyeres and is drained from the furnaces by casting through the taphole, which is drilled open. The molten iron is gravity-fed to sub ladles via troughs located in the casthouse floor. There are four sub ladles per furnace. A separate trough is utlilized to direct slag, which floats on the molten iron out of the casthouse and into an open slag pit. The length of the cast can vary from one to three hours. At the end of the cast, when all the available molten iron has been drained from the furnaces, the taphole is closed. While the furnace taphole is plugged, additional molten iron is formed. The time between casts is generally 30 to45 minutes. Blast furnace slag can be recycled as base material for building roads.

B. MIXER

Figure 12. Edgar Thomson BOP shop mixer.

The first ingredient for BOP steelmaking is iron, more commonly known as “hot metal”. The hot metal arrives at the BOP shop mixer in rail sub cars from the blast furnaces. Each car can hold approximately 180 tons of hot metal. After every cast at the blast furnace, two of these cars arrive at the mixer, where the mixer operator pours them into the 1,000-ton mixer vessel. The mixer operator also pours approximately 200 tons of hot metal into the iron ladle, which will become the hot metal charge for the next heat at the BOP. The next operation is the desulfurization of the iron. This is done by placing a desulfurization lance into the hot metal and blowing a magnesia material along with some inert gases into the iron. This creates a slag, which is removed at the deslag area by the deslag operator.

C BASIC OXYGEN PROCESS (BOP) SHOP



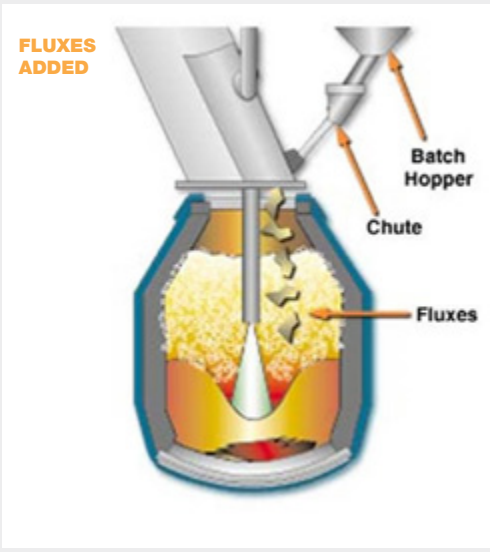


Figure 13. Edgar Thomson BOP shop and diagrams detailing the oxygen blow and added fluxes.

The hot metal produced at the blast furnace is converted to liquid steel in the BOP shop in a steelmaking furnace called a vessel (Figure 13). There are two vessels, identified as R and F, each with a capacity of 250 tons. A typical 250-ton heat requires the addition of 200 tons of hot metal, 60 tons of scrap and 15 tons of fluxes. The conversion of iron to steel is accomplished by injecting oxygen through a lance into the molten material. The fugitive baghouse collects secondary emissions from inside the BOP shop that are generated from various shop operations, including hot metal skimming, BOP vessel charging, tapping, and slag dumping.

gar Thomson Plant opened in 1875, 225 tons of steel could be produced in a 24-hour period. Today, 250 tons of steel are produced in under an hour! When it was first built, the mill consisted of Bessemer converters. These could produce between five to 30 tons of steel at a time. The two BOP vessels now produce 250 tons per heat.

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D. LADLE METALLURGICAL FURNACE (LMF)

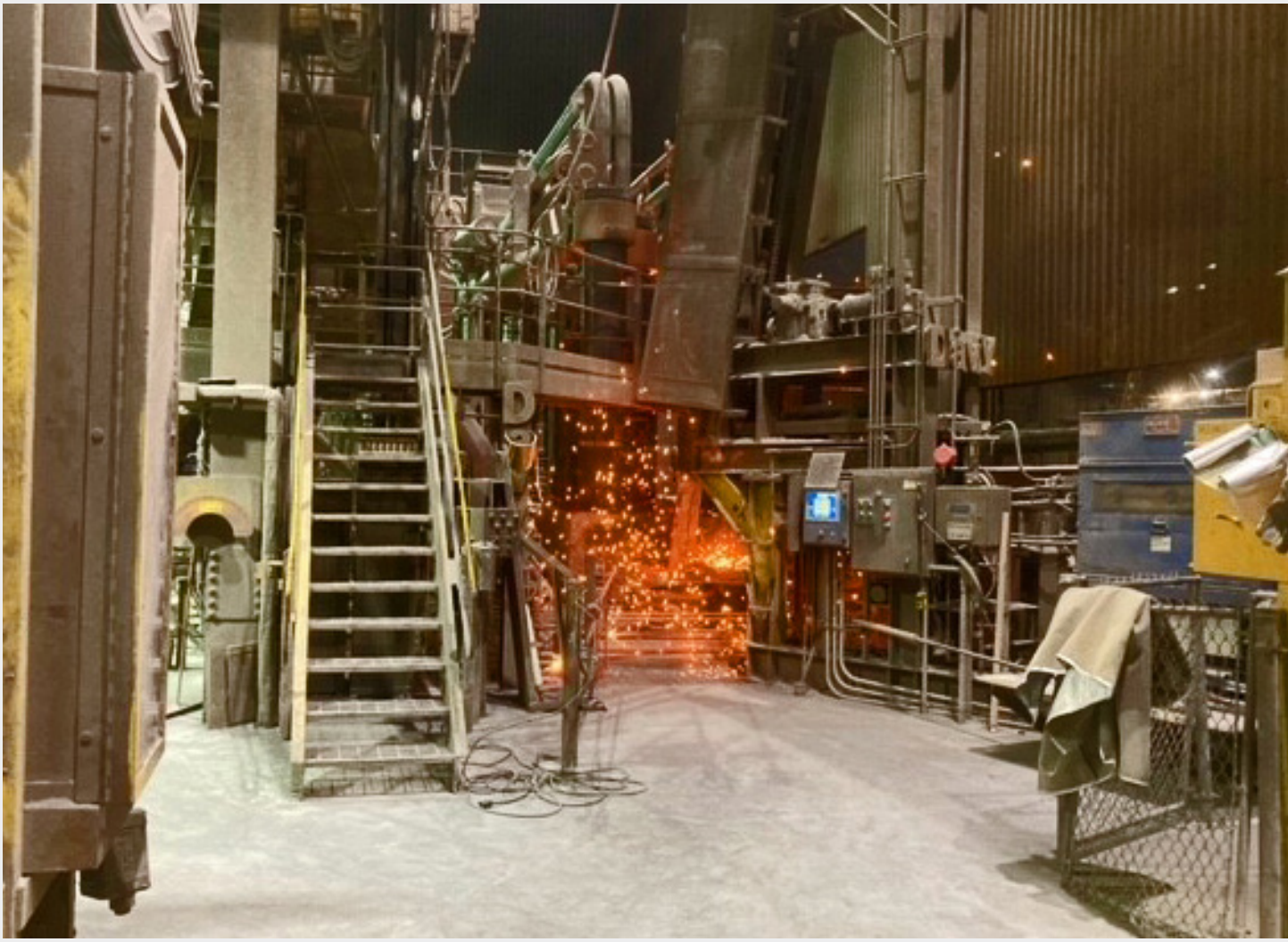

Figure 14. Edgar Thomson Plant LMF.

The Edgar Thomson Plant has one Ladle Metallurgical Furnace (LMF) where molten steel is refined into different grades by adding steel alloys and fluxes (Figure 14). The LMF contains a hood that is moved down over the steel ladle, which contains three carbon electrodes which sink into the steel bath. When power is switched on, the electrodes produce energy that is absorbed by the steel, causing heating. Argon is also bubbled through special tubes in the ladle, causing liquid metal recirculation. An alloy chute is used to introduce additional fluxes and alloys into the steel to produce the correct steel grade. The Level 2 computer system models predict the length of time required to heat, circulate argon and "kill" the heat (remove remaining oxygen). Temperature, oxygen and steel metal tests are taken at various intervals to assure that the steel is properly prepared for casting in the dual strand caster.

E CASTER

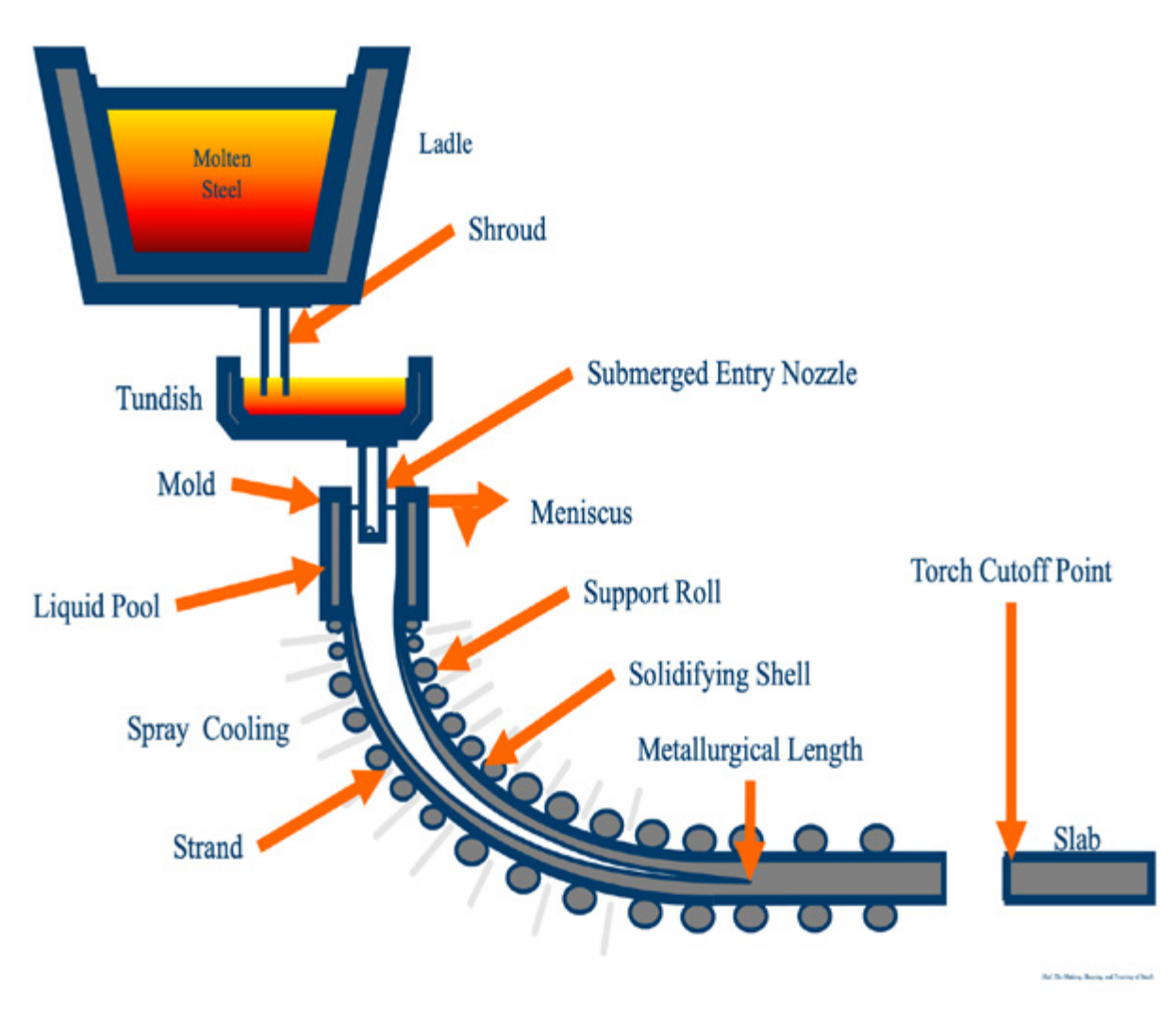

Figure 15. Schematic of the equipment at the caster.

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In 1992, the Edgar Thomson Plant commissioned the continuous caster (Figure 15) which replaced the 44-inch slab mill. The caster is more efficient to operate and produces a higher-quality slab than the slab mill. The caster also provides better yield and reduces natural gas and coke oven gas consumptions. Edgar Thomson's caster has the highest speed capability in the company at 80" per minute. The longest length ever produced without stopping at Edgar Thomson is 88.4 miles. That's long enough to cross the entire state of Vermont!

F. BOILER

The Edgar Thomson Plant operates three identical Riley boilers (Figure 16), each with a rated heat capacity of 525 million British thermal units per hour (mmBtu/hr). The majority of the steam produced from the boilers is used to drive two steam turbine generator sets and two turbo blowers for blast furnace use. The remaining steam is used as process steam in various units of the plant. Each boiler is equipped with three Peabody burners fueled by a mixture of blast furnace and mixed gas (coke oven gas and natural gas). Each burner has three pilots; one pilot uses natural gas and the other two use mixed gas. The boilers generally use low-NOx fuels such as blast furnace gas and coke oven gas. The boilers also have identical but independent NOx and oxygen (O_2) CEMs and data acquisition and handling system (DAHS). Fuel flow rate, molar composition and the heating value of each fuel are monitored and recorded on a real-time basis. This data is used to calculate emissions on a pounds-per-million British thermal unit (lb/MMBtu) basis.

Figure 16. The Edgar Thomson Plant boilers.

Environmental Control – Highlights

U. S. Steel continuously monitors many of its sources for environmental performance and compliance at the plant. U. S. Steel utilizes several emissions controls at the Edgar Thomson Plant that record thousands of compliance monitoring data values every day, such as baghouses that are installed, operated and maintained to minimize particulate matter (including PM, PM_{10} and $PM_{2.5}$) into the atmosphere, as well as scrubbers and gas lances:

1 BLAST FURNACE CASTHOUSE CONTROLS

Figure 17. Blast furnace casthouse controls.

The casthouse baghouse is a four-compartment positive pressure baghouse with separate inlet dampers and motors for each compartment (Figure 17). It controls air emissions generated from the taphole spout location from each blast furnace. Emissions are generated while the blast furnace is casting molten iron and slag. The system includes a collection hood that is located above each furnace taphole and a duct that connects the hood to the baghouse. The duct from each blast furnace contains a main damper that is open while casting and closed when not casting. This allows the baghouse to collect emissions from casting independent of the operation of the other furnace.

A separate emissions control system is in place at each casthouse to control emissions generated in the troughs and sub ladle areas while casting. The system consists of trough covers (runner covers), flame suppression for the open area around the sub ladle spouts, and an air curtain for the area just downstream of the taphole. The covers and flame suppression are used to reduce exposure of the molten iron to air, which minimizes the formation of iron oxide emissions. Since it is not feasible to have a cover or flame suppression in the area just in front of the taphole, an air curtain is utilized to direct emissions back to the hood.

Recent improvements to the blast furnace casthouse baghouse include replacement of the cleaning air system and baghouse filter bags with new membrane-style bags, cages, access doors, rotary valves, motors and fan sheaves. These improvements are aimed at reducing particulate matter emissions generated from the blast furnace casthouse operations.

2 BOP FUGITIVE BAGHOUSE *(also referred to as the "Secondary Emissions Baghouse")*

Figure 18. BOP fugitive baghouse.

The BOP fugitive baghouse system is divided into the collection system and the control system (Figure 18). The collection system consists of sixteen (16) hood off-takes located at the roof level in the furnace and charging aisles of the BOP shop. The off-takes are arranged in two rows of eight (8) hoods. Each hood is connected directly to the main duct with a short piece of ductwork and is equipped with individual isolation dampers. In addition, there is a hood located just above each vessel to collect hot metal charge emissions. The F vessel hood is connected to the main duct via two (2) ducts, and R vessel hood is connected to the main duct via one (1) duct. Each charge duct has an individual isolation damper located just before the main duct. The main duct is connected directly to the fan inlets plenum. The control system consists of a baghouse that collects and cleans emissions captured in the hood system. The baghouse consists of ten (10) positive pressure compartments, each with its own separate fan and motor. The system collects both secondary and hot metal charge emissions from the BOP shop operations.

Recent BOP fugitive baghouse upgrades include replacement of the cleaning air system and baghouse filter bags with new membrane-style bags, cages, access doors and rotary valves. These improvements are aimed at reducing particulate matter emissions generated from the BOP shop operations.

3 MIXER BAGHOUSE

Figure 19. Mixer baghouse.

The mixer baghouse is a 12-compartment negative pressure baghouse with separate inlet dampers and motors for each compartment (Figure 19). Normally, 10 compartments are operating at a time, with two offline for spares. The mixer baghouse controls air emissions that are generated from pouring hot metal from subs to the mixer, from the mixer to iron ladles, and the desulfurization of hot metal. It includes ductwork, dampers, a fixed hood and a moveable hood.

Recent BOP shop mixer baghouse upgrades include replacement/ repair of the cleaning air system, baghouse filter bags and access doors. These improvements are aimed at reducing particulate matter emissions generated from the BOP mixer operations.

4 LMF BAGHOUSE

Figure 20. LMF baghouse.

The LMF baghouse is a six-compartment negative-pressure baghouse with separate inlet dampers and motors for each compartment (Figure 20).

It controls air emissions that are generated at the LMF process. Emissions are generated when the following occur: flux material handling, adding fluxes to the steel ladle, argon stirring, arcing, and adding alloys. The system includes a collection duct, spark box and six compartment baghouse. Testing occurs only when the hood is in the down position and positioned over the steel ladle.

Recent BOP shop ladle metallurgy furnace baghouse upgrades include replacement of the cleaning air system and baghouse filter bags. These improvements are aimed at reducing particulate matter emissions generated from the LMF operations.

In addition to baghouses, a gas scrubber was installed at the BOP to clean process gas generated during steel production as explained below.

5 BOP SCRUBBER *(also known as the "Primary Emissions Control")*

Figure 21. BOP scrubber gas cleaning system.

The BOP gas cleaning system collects and cleans process gas laden with particulate matter generated during the oxygen blow portion of the steel production cycle (Figure 21). The gas cleaning system consists of a quencher, a Kinpactor, a gas cooling tower and a large, induced draft (ID) fan. The process gas is drawn from the operating BOP furnace or vessel into the system by means of a draft created by the ID fan, which is located at the tail end of the gas cleaning system. There are two ID fans, "A" and "B", but only one operates at a time while the other is a backup. The process gas continues to the quencher, which sprays a large volume of water onto the hot process gas to cool it and remove a large portion of the particulate matter. The water and the particulate matter flow to the water treatment system. The cooled process gas continues on to the Kinpactor, which contains three separate venturi throats with water sprays. These venturi throats reduce the size of the duct, which increases the velocity of the gas. Increasing the gas velocity and spraying it with water further cleans the process gas. The pressure drop across the venturi and the flow rates of the water sprays are closely monitored to achieve the required cleaning of the gas stream. In addition, the Iron and Steel MACT requires that a minimum hourly average Kinpactor pressure drop and water flow rate be established and adhered to when the system is operating. The current minimum Kinpactor pressure drop and water flow rate limits can be found in the Iron and Steel Operating and Maintenance Manual. After exiting the Kinpactor, the cleaned process gas enters the gas cooling tower, which cools the gas prior to exiting the stack.

6 WATER COOLING TOWERS AND TREATMENT FACILITIES

The steelmaking process is heavily dependent on cooling water. The Edgar Thomson Plant withdraws water from the Monongahela River via two intake structures. This water is transported to various areas in the plant for consumption and cooling. Eight cooling towers cool and recycle more than 100 million gallons of water every day, reducing the amount of water withdrawn from the river. Noncontact, non-recycled cooling water is discharged back to the river through four outfalls permitted by the PA DEP.

The Edgar Thompson Plant operates three water treatment facilities: Blast Furnace Gas Washer and Recycle System, BOP Gas Cleaning and Blowdown Treatment Facility, and Caster Water Quality.

The Blast Furnace Gas Washer and Recycle System includes an enclosed venturi scrubber and gas cooler, which removes solids from the blast furnace gas and cools it prior to use as a fuel in the blast furnace stoves and boilers. The water used in the system is sent to a clarifier for solids removal and is then cooled before being recycled in the system. There is no discharge from the system to the river. A blowdown stream is used as contact cooling water makeup at the blast furnace slag pits.

The BOP Gas Cleaning and Blowdown Treatment Facility receives contact water from the oxygen blowing process of the BOP and includes the Primary Emissions Control System scrubber and water used in the scrubbing process. It uses approximately 3700 gpm of recycled water to cool and clean the off gases from the process vessels. River water is used as the source of makeup water to the system. The recycle water treatment system includes clarification, including a classifier unit and a thickener for heavy metal removal, plus solids dewatering via belt press. The BOP thickener also receives blowdown from the BOP cooling tower. The Blowdown Treatment Facility includes chemical treatment, solids settling and removal, pH adjustment and filtration prior to being discharged to the Monongahela River.

The employees of Caster Water Quality operate several systems within the footprint of Caster Water Quality, including river water pretreatment, Mold Cooling Water Recycle System, Internal Machine/ LMF Cooling Water Recycle System, Spray Water or Contact Cooling Water Recycle System. The Mold Cooling Water Recycle System includes cooling and softening, while the Internal Machine/ LMF Cooling Water System consists primarily of a closed loop evaporative cooling tower and storage reservoir. The largest area of Caster Water Quality is the Spray Water Recycle System. This system consists of a scale pit for solids removal, missed media filters, backwash system with thickener, and an evaporative cooling tower. Blowdowns from the Mold Water and Internal Machine/ LMF systems are blowdown to the scale pit. A portion of the Spray Water recycle water is blowdown to the Monongahela River.

ENVIRONMENTAL TRAINING

U. S. Steel invests significant resources to ensure that its employees are properly trained in all aspects of their responsibilities to ensure, among other things, that environmental compliance is achieved. This is conducted in many different ways, including one-on-one training as well as more comprehensive training programs, such as those related to ISO14001.

Figure 22: U. S. Steel Edgar Thomson Plant's current ISO14001 Certificate of Registration.

A. ISO 14001 Certified Environmental Management System

The Edgar Thomson Plant is firmly committed to environmental compliance, beginning with the incorporation of the International Organization for Standardization (ISO) 14001 into our environmental management systems.

ISO 14001 standards seek to assist a company or organization to "minimize harmful effects on the environment caused by its activities, and to achieve continual improvement to its environmental performance."

The Edgar Thomson Plant has been certified in compliance with this standard since 2001.

There were two ISO 14001 surveillance audit events in 2020 – one in March and one in September – and the Mon Valley Works achieved unconditional approval of the ISO 14001 Environmental Management System because of each audit.

B. ET's Environmental Policy- CLEAN: Comply with the Regulations, Lead the Industry in Environmental Performance, Educate the Workforce, Allocate the Resources, Never Stop Improving

The Mon Valley Works produces world-class steel sheet that is used in demanding manufacturing applications such as the automotive, appliance and metal building industries.

At Mon Valley Works, we are committed to continually improve our environmental performance by establishing objectives that will reduce our impact on the air, water and land. To achieve prevention of pollution and protection of the environmental resources entrusted to us, we will:

Comply with environmental standards and regulations.
Lead the industry in environmental performance.
Educate the workforce on relevant environmental issues.
Allocate the resources needed to protect the environment.
Never stop improving.

U. S. Steel's Edgar Thomson Plant is committed to the prevention of pollution by seeking to achieve minimal adverse impact on the air, water and land through programs which incorporate responsible environmental management.

Environmental protection is a primary responsibility of every employee.

ENVIRONMENTAL PERFORMANCE – *AIR*

In addition to periodic monitoring, U. S. Steel **continuously monitors** many of its sources for environmental performance and compliance at the plant. These monitors include **continuous emissions monitors (CEMs)** and various continuous parametric monitoring systems throughout the plant, which read and record thousands of compliance monitoring data values every day.

The Edgar Thomson Plant is subject to federal, state and local (Allegheny County Health Department [ACHD]) air regulations. The ACHD regulates and closely monitors the environmental compliance of the plant.

A. NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)

National Ambient Air Quality Standards (NAAQS) were developed for pollutants considered, in certain amounts, harmful to sensitive populations and the environment. The EPA has set NAAQS for several pollutants, including particulate matter (including PM_{10}, and PM2.5), SO_2, NO_2, ozone, CO, and lead. These standards are developed to be protective of public health for the most sensitive populations. The EPA air monitors operated by ACHD and located in the North Braddock area measure the ambient air quality, which accounts for emissions attributable from a variety of background sources, mobile sources and the Edgar Thomson Plant. The Clean Air Act requires the EPA to set NAAQS as well as to periodically review the science upon which the NAAQS are based.. Reviewing the NAAQS generally takes years for each individual pollutant. While the air quality continues to improve, the EPA has recently lowered the NAAQS further for certain pollutants, including PM2.5, ozone and SO_2.

While air quality improves and the Edgar Thomson Plant continues to reduce emissions, the NAAQS continue to become more stringent. In response, each time a standard gets lowered, U. S. Steel, with its commitment to environmental progress and innovation of its employees, rises to the challenge.

PM_{10}, NO_2, Carbon Monoxide, Ozone and Lead NAAQS

Including 2020 monitor data, Allegheny County and the North Braddock area have now attained the PM_{10} NAAQS for 25 consecutive years; the NO_2 NAAQS for 36 years (including unclassifiable/attainment with the 2010 100 ppb NAAQS); the carbon monoxide (CO) standard for 32 consecutive years; the 2015 Ozone (O3) standard for four years; and the lead standard since its latest promulgation in 2008.

$PM_{2.5}$ NAAQS

2020 data from the North Braddock monitor continues to show attainment on the three-year (2018-2020) 98th percentile daily average (22 µg/m^3 vs. 35 µg/m3) and three-year annual average (9.7 µg/m^3 vs. 12 µg/m3) for the $PM_{2.5}$ NAAQS.

Figure 23 depicts how the $PM_{2.5}$ NAAQS has become more stringent over time. In 2006, the 24-hour standard was reduced from 65 µg/m^3 to 35 µg/m3. In 2012, the annual standard was reduced from 15 µg/m^3 to 12 µg/m3. Attainment of the annual standard had been achieved in 2012 before the limit was reduced in December 2012. Based on 2020 data, Allegheny County is attaining both the annual and 24-hour standards for $PM_{2.5}$.

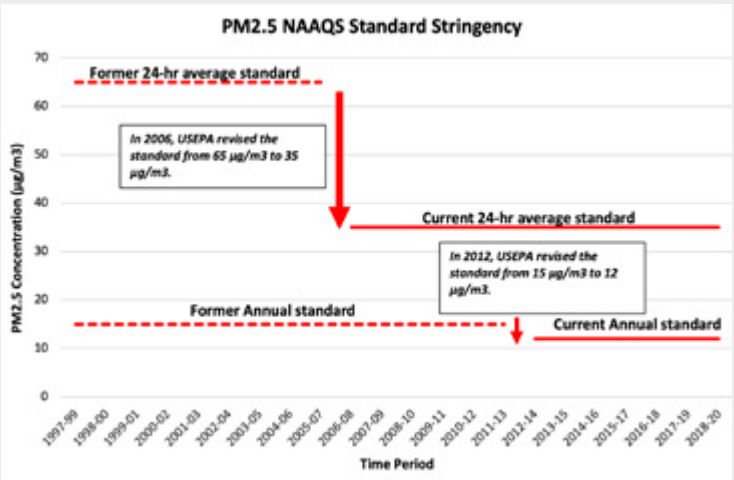


Figure 23: History of $PM_{2.5}$ 24-hour average NAAQS

While the North Braddock monitor continues to meet the $PM_{2.5}$ daily standard, Allegheny County is currently designated as nonattainment with the 2012 $PM_{2.5}$ annual NAAQS based upon older monitoring data, including periods of time before U. S. Steel's major investments, such as the Low Emission Quench Towers at the Clairton Plant. At Edgar Thomson, as noted above, U. S. Steel has recently completed upgrades to baghouses at the BOP shop, mixer and LMF aimed at reducing emissions from these operations. In addition, U. S. Steel added two new street sweepers at the Edgar Thomson Plant to better control fugitive emissions from plant roadways. The nonattainment designation was made in 2015. On September 11, 2019, the ACHD Board of Health unanimously approved the $PM_{2.5}$ State Implementation Plan (SIP) for Allegheny County. A SIP is a state plan created for a pollutant non-attainment area (i.e., PM2.5) intended for complying with the Federal Clean Air Act (CAA) by including new rules to reduce emissions. In this case, ACHD created the $PM_{2.5}$ SIP and shared it with the Pennsylvania Department of Environmental Protection (PADEP) for approval. The $PM_{2.5}$ SIP was then submitted to the EPA. On June 12, 2020, the EPA published a proposed rule in the Federal Register to fully approve most elements of the $PM_{2.5}$ SIP and conditionally approve others.

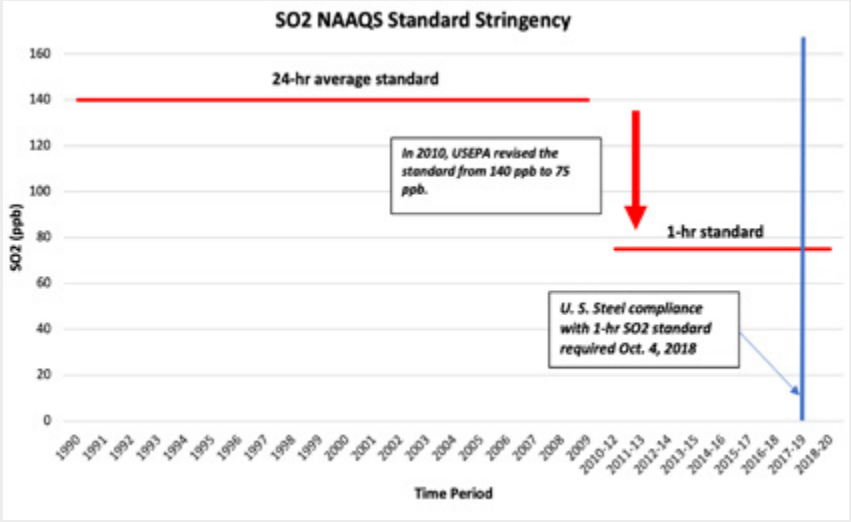


Figure 24: History of SO_2 NAAQS, demonstrating change from a 24-hour average to a much lower 1-hour standard.

2020 data demonstrated that for the first time, all ACHD monitors showed attainment on the three-year (2018-2020) 98th percentile daily average and three-year annual average for the $PM_{2.5}$ NAAQS. ACHD will submit early certification of data and request a clean data determination from the EPA. After the clean data determination is made by the EPA, ACHD will submit a redesignation request to the EPA for the area to be classified as attainment in 2021.

SO_2

Figure 24 depicts how the SO_2 NAAQS has become more stringent over time. In 1971, the SO_2 24-hour standard was 140 ppb. In 2010, a new 1-hour standard of 75 ppb was promulgated, and the 24-hour standard was revoked. Attainment had been reached for 10 consecutive years prior to the new 2010 primary 1-hour NAAQS. Allegheny County is partially designated nonattainment based upon pre-2010 ambient air quality data, although the controls currently in place have been shown to demonstrate attainment.

The EPA approved ACHD's SO_2 SIP in late April 2020, with the final rule becoming effective on May 26, 2020.

U. S. Steel implemented the following projects and restrictions to reduce SO_2:

- Installation of VCU trays at Clairton resulted in a direct reduction of SO_2 emissions from coke oven gas combusted at the Edgar Thomson Plant.
- Stack reconfiguration for better dispersion – combining the three current boiler stacks into one stack greater than 70 meters.
- Required to be and were in compliance with SOsub2 emission limits throughout the Mon Valley operations by October 4, 2019.

Data from the North Braddock monitor continues to show improvement and attainment based on the three-year (2018-2020) 99th percentile (64 ppb vs. 75 ppb standard). Because the county designation depends on more than the North Braddock monitor, the EPA reviews monitoring data from other county monitoring points. Using 2019, 2020 and 2021 data, U. S. Steel anticipates that Allegheny County will demonstrate attainment by the end of 2021.

Figure 25. The newly constructed Edgar Thomson boiler stack was built to improve dispersion.

U. S. Steel recently completed construction of a new stack and a combined flue system for the Riley boilers 1, 2 and 3 (Figure 25). All boilers exhaust to the new stack, constructed to a minimum release height of 70 meters, located adjacent to the boiler house on the northeast side of the building. Allowable and actual emissions for the boilers were reduced on an aggregate basis. Actual emissions were reduced, as the boilers use downriver COG in combination with other fuels. This taller boiler stack replaced the three separate and shorter boiler stacks, resulting in an improvement in dispersion of air emissions in the valley. Dispersion improvement is important, especially in an area with complex terrain like Mon Valley.

B. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS/MAXIMUM ACHIEVABLE CONROL TECHNOLOGY (NESHAP/MACT) REQUIREMENTS

The Federal Clean Air Act (CAA) requires the EPA to regulate emissions of hazardous air pollutants for listed sources via National Emission Standards for Hazardous Air Pollutants (NESHAP). Hazardous air pollutants are also known as toxic air pollutants or air toxics. They are pollutants that have been found to cause or may cause cancer, other serious health effects or adverse environmental and ecological effects. TheEPA is required to control 187 hazardous air pollutants, or HAPs.

40 CFR Part 63 Subpart FFFFF is a NESHAP, entitled “National Emission Standards for Hazardous Air Pollutants for Integrated Iron and Steel Manufacturing Facilities”, and is also applicable to the Edgar Thomson Plant. This rule is often called the Integrated Iron and Steel MACT. These standards are applicable to processes at the blast furnaces and BOP shop. The rule became effective May 20, 2003.

Subpart FFFFF applies to each integrated iron and steel manufacturing facility that is a major source of air toxic emissions. Major sources emit 10 tons of single toxic air pollutant per year or 25 tons or more of a combination of toxic air pollutants.

The two blast furnaces and the basic oxygen process furnace shop are subject to respective provisions of the rule. Blast furnace casthouses are required to meet certain emission limits, including particulate matter and opacity, as well as specific operating requirements. The basic oxygen process furnace shop is required to meet emission limitations for the basic oxygen process roof monitor and ancillary shop operation (hot metal transfer, hot metal desulfurization, slag skimming and ladle metallurgy). Capture systems and control devices are required to meet operating limits and operation and maintenance requirements. The monitoring requirements include bag leak

detection systems, continuous parameter monitoring systems and visual inspections. Performance tests are also required twice during each term of the facility's title V operating permit. The recordkeeping and reporting requirements in the rule are similar to those required for other EPA air toxics regulations.

In 2020, Edgar Thomson Plant's compliance with all Title V Air Operating Permit requirements was greater than 99 percent. This includes numerical mass emission limits and required continuous monitoring requirements.

The CAA requires the EPA to assess the risk remaining after application of the final air toxics standards. This is known as a residual risk assessment, or risk and technology review. Based on the completion of this risk assessment, including available health information and associated uncertainties, the EPA determines whether the risks from the source sector are acceptable and whether the current standards provide an ample margin of safety to protect public health. During the residual risk assessment and as required by the CAA, the EPA will review and revise the maximum achievable control technology (MACT) standards as necessary, considering developments in practices, processes and control technologies since the standards were first issued in 2003.

The Information Collection Request (ICR) from the EPA for the Iron and Steel MACT (Subpart FFFFF) Risk and Technology Review (RTR) was completed in June 2012. The EPA determined risks to be acceptable and that the current standards provide an ample margin of safety to protect public health. The technology assessment did not identify any developments that would further reduce hazardous air pollutant (HAP) emissions from point sources. The final rule was published July 13, 2020.

New provisions include:

- EPA proposed an emission limit for mercury that originates in scrap metal, with compliance by annual stack test or certification from scrap vendors with the National Vehicle Mercury Switch Recovery Program. All USS facilities will comply with certified scrap vendors.

- EPA revised requirements that limits must be met for periods of startup, shutdown and malfunction to be consistent with recent court decisions.

The Edgar Thomson Plant is in compliance with the rule, including the amendments that recently became effective.

While the new Iron and Steel MACT rule remains in effect, several petitions for review of the final rule were filed (by both industry and environmental advocates) with the District Of Columbia Circuit Court of Appeals. The legal proceedings remain stayed, as the EPA has agreed to reconsider certain parts of the rule, which is currently ongoing.

40 CFR Part 63 Subpart DDDDD is a NESHAP entitled "National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters", and is also applicable to the Edgar Thomson Plant. This rule is often called the Boiler MACT.

The EPA has promulgated national emission standards for hazardous air pollutants from three major source categories: industrial boilers, commercial and institutional boilers, and process heaters. The final emission standards for control of mercury, hydrogen chloride, particulate matter (as a surrogate for non-mercury metals), and carbon monoxide (as a surrogate for organic hazardous emissions)

from coal-fired, biomass-fired and liquid-fired major source boilers are based on the maximum achievable control technology.

In addition, all major source boilers and process heaters are subject to a work practice standard to periodically conduct tune-ups of the boiler or process heater.

The Edgar Thomson Plant is exempt from the requirements of this rule because the boilers receive 90 percent or more of their total annual gas volume from recycled blast furnace gas. In promulgating the blast furnace gas (BFG)-fired boiler exclusion, the EPA recognized the unique properties of BFG, in which little to no organic hazardous air pollutants are generated or emitted from the combustion of BFG.

C. ALLEGHENY COUNTY HEALTH DEPARTMENT (ACHD) STANDARDS

In addition to certain federal regulations, the Edgar Thomson Plant is subject to Allegheny County Health Department requirements, which include performance metrics that, in most instances, are much more stringent than the corresponding federal standards.

The Edgar Thomson Plant was issued a Title V operating permit from the ACHD on April 13, 2016, and amended on June 21, 2019. Title V permits are required for larger facilities by Title V of the Clean Air Act. The permit is enforceable by the ACHD and EPA. The comprehensive Title V permit is unique to Edgar Thomson and includes “all applicable requirements” under the Clean Air Act and underlying regulations that apply to the plant. The permit includes emissions limits, standards and work practice requirements, as well as air pollution control equipment, stack testing, monitoring, recordkeeping and reporting requirements. The current Title V permit has been administratively extended because U. S. Steel submitted a Title V Permit Renewal Application to ACHD on October 13, 2020. ACHD continues to work on updating the Title V Permit.

U. S. Steel is required to provide periodic monitoring reports to the ACHD and EPA and certify compliance at least annually, identifying any deviations from any of the applicable requirements. In addition to periodic facility inspections that are conducted throughout the year at the Edgar Thomson Plant, ACHD performs a comprehensive Title V inspection of the plant every two years. These inspections often consist of a thorough records review and site inspection. During stack testing, ACHD personnel are notified in advance and often observe the testing. Visible emission observations are frequently conducted either on-site or off-site.

ENVIRONMENTAL PERFORMANCE – *WATER*

The quality of water discharged into the Monongahela River is governed by a National Pollutant Discharge Elimination System (NPDES) Permit, which was issued on December 28, 2001. An application for renewal was submitted on June 27, 2006, and amended on October 30, 2020 and August 16, 2021, which administratively extends the permit until it can be reissued by the Pennsylvania Department of Environmental Protection (PADEP). There are four outfalls at the Edgar Thomson Plant that discharge a combination of process, noncontact cooling and stormwater. These discharges are sampled once a week at the outfalls associated with the processes. **The Edgar Thomson Plant has achieved greater than 99.9 percent compliance since 2016 with the NPDES permit limits.**

Process Water

Edgar Thomson Plant's blast furnaces, Basic Oxygen Process (BOP) steelmaking, caster and powerhouse require a significant amount of cooling water to protect equipment from the heat generated from producing molten metal. Of the approximately 300 million gallons of water used at the mill every day, more than 100 million gallons are recycled. The Edgar Thomson Plant is continuously upgrading its technology and improving operating practices with the goal of minimizing impacts from plant discharges. All the water treatment additives used in wastewater treatment are subject to PADEP approval before they are used. Edgar Thomson Plant operates three process water treatment facilities – two of which discharge to the Monongahela River after treatment for mainly heavy metals, such as iron, zinc, oils and greases, while the treated water from the third facility is recycled as process water for cooling of blast furnace slag. Removed solids and sludges are recycled where possible or landfilled.

A. STORMWATER MANAGEMENT

Stormwater at the site can carry solids and other materials to the nearby Monongahela River. To improve stormwater quality, Edgar Thomson employs several Best Management Practices (BMPs). Edgar Thomson utilizes two street sweepers to vacuum up roadway solids. Stormwater catch basins utilize filter inserts to collect solids before they can reach the river. Bulk storage areas are covered when possible and are bermed to contain impacted stormwater and prevent tracking by equipment.

ENVIRONMENTAL PERFORMANCE – *RECYCLING*

On April 22, 2021, U. S. Steel became the first steel company in North America to become a member of ResponsibleSteelTM, a global nonprofit forum for all members of the steel supply chain and civil society organizations to work together to promote steel's contribution to a sustainable future. Membership in ResponsibleSteel provides a framework, standard and certification process to drive the responsible sourcing, production, use and recycling of steel.

> "ResponsibleSteel is an important part of U. S. Steel's ESG commitments and the 2050 carbon neutrality goal that we just announced," said U. S. Steel President and Chief Executive Officer David B. Burritt. "By joining ResponsibleSteel, we are demonstrating our intent to take our efforts beyond goals and actually deliver profitable solutions for our stakeholders and the planet."

A. UTILIZATION OF CLEAN COKE OVEN GAS AND BLAST FURNACE GAS

We reduce the amount of waste generated and emissions produced by reusing the byproduct coke oven gas produced at our Clairton coke batteries and the blast furnace gas produced at Edgar Thomson. This reuse is good for the environment and good for business.

By using coke oven gas generated by our coke batteries and blast furnace gas generated at ET, approximately 130 million MMBtu from 2016-2020, we have avoided consuming enough natural gas and other fuels to heat nearly 1 million households each year for that five-year period.

Mon Valley Works as an "Alternative Energy System"

U. S. Steel Mon Valley Works is one of the most energy-efficient integrated iron and steel facilities in the world. The Mon Valley Works reuses gases from the blast furnaces and coke ovens to support combustion processes at Clairton, Edgar Thomson, and Irvin as well as to generate electricity at the Edgar Thomson and Clairton plants. We reduce the amount of waste generated and emissions produced in steelmaking by reusing the byproduct gases produced in our blast furnaces and coke ovens because it is beneficial to the environment and good for business. In Clairton alone, by using coke oven gas generated by our coke batteries (approximately 130 million MMBtu from 2016-2020), between 2018 and 2020 we have saved enough natural gas and other fuels to heat nearly 1 million households each year.

The Mon Valley Works is a certified Alternative Energy System recognized by the Pennsylvania Department of Environmental Protection (PADEP). Companywide, by using the blast furnace and coke oven gas generated in our cokemaking and steelmaking activities to power our facilities, we avoided consuming enough natural gas and other fuels from 2018 to 2020 to heat more than 3.4 million households each year.

The generation of electricity at the Clairton and Edgar Thomson facilities allows the Mon Valley Works to beneficially reuse coke oven gas and blast furnace gas and purchase less electricity, reducing its carbon footprint. Working with one of our largest electricity suppliers, U. S. Steel has secured Emission-Free Energy Certificates to meet all its purchased power needs through December 2024 for the three Pittsburgh-area Mon Valley facilities (Clairton, Edgar Thomson, and Irvin). A renewable energy certificate, or REC, is a market-based instrument that represents the property rights to the environmental, social and other non-power attributes of renewable electricity generation. RECs are issued when one megawatt-hour (MWh) of electricity is generated and delivered to the electricity grid from a renewable energy resource (source – www.epa.gov/greenpower/renewable-energy-certificates-recs).

B. RECYCLING

IEdgar Thomson produces several coproducts and byproduct materials from the ironmaking and steelmaking operations that are recycled (Figures 26 and 27). Iron-bearing air and water pollution control sludges from the blast furnaces and basic oxygen furnaces are used as feedstock to make briquettes that are then charged back to the process. From 2016 through 2020, 0.43 million tons of briquettes were used in the process, offsetting the need for equivalent iron units from mined iron ore mineral deposits and scrap steel.

Blast furnace and steel slag are also produced as coproducts of the ironmaking and steelmaking operations. From 2016 through 2020, 2.5 million tons of slag were produced and sold in place of naturally mined aggregates for use in asphalt, road construction, cement manufacturing, glass manufacturing and mineral wool production.

Lastly, ET recycled 3.7 million tons of scrap steel from 2016 through 2020 in our steelmaking process to create new steel without any loss in the material's mechanical properties because of the use of recycled steel.

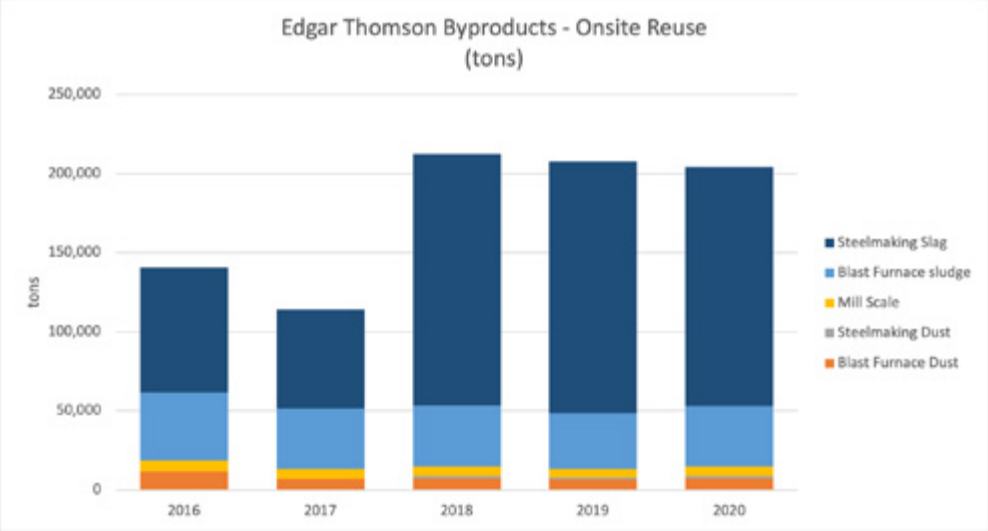


Figure 26. 2016-2020 Byproducts – onsite reuse in tons.

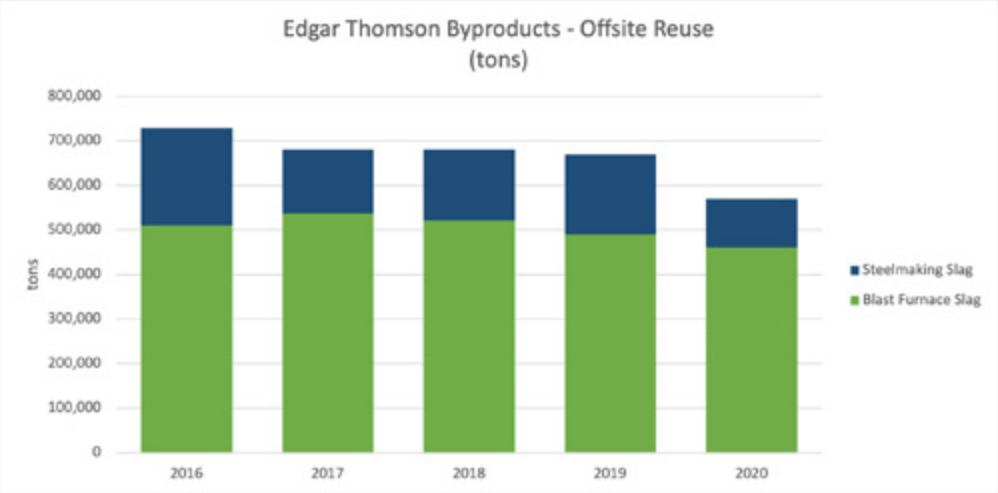


Figure 27. 2016-2020 Byproducts – offsite reuse in tons.

COMMITMENT TO COMMUNITY INVOLVEMENT

Figure 28. Former Edgar Thomson Plant Manager John Michaud (right) presents U. S. Steel's donation to North Braddock community leaders.

A. COMMUNITY PROJECTS

Employees Help Local Food Bank Bring "Produce to People"

More than 20 U. S. Steel employees, mostly from Mon Valley Works, and a few of their friends and family members spent time March 9 helping the Greater Pittsburgh Community Food Bank bring fresh, healthy produce to Mon Valley residents who may otherwise have gone without it. Read on for details and photos from the event.

The Greater Pittsburgh Community Food Bank opened the doors of its first location in 1980, and today it's the region's largest food bank with a mission to "feed people in need and mobilize our community to eliminate hunger." The food bank offers a variety of programs to support their mission, including "Produce to People", which is designed to help "increase nutritious and fresh food access for our neighbors … and connects individuals with important health, housing and employment resources offered by our partner organizations." The food bank estimates they serve approximately 8,000 households at 18 different southwestern Pennsylvania locations each month, distributing 30 to50 pounds of produce to each household.

U. S. Steel's 23 volunteers, nearly all from Mon Valley Works, participated in a "Produce to People" event in Braddock, Pa., home to the Edgar Thomson Plant. They joined other volunteers from the community to unload a large produce truck, bag produce for client pickup, create pickup stations by item, hand out produce to clients and help clients load their vehicles. By the end of the event, our volunteers had served 615 local households in need.

U. S. Steel Announces Sizable Contribution to Fund New Community Park in Mon Valley Area

On Sept. 6, 2020, U. S. Steel joined local and state officials to announce sizable contributions of volunteer time and corporate funding to support efforts in the Mon Valley area of Pittsburgh to build a new community park in the borough of North Braddock.

North Braddock is a financially distressed community confronting multiple challenges, but its residents and leaders are fiercely committed to revitalizing the borough and improving their quality of life, as explained in a recent Pittsburgh Post-Gazette article. Children in the borough long for a park in which to play since the closest park with playground equipment is more than a mile away. A North Braddock councilman has been working for five years to build a new park, but given the borough's financial challenges, progress has been slow.

Figure 29. On hand representing U. S. Steel at the event were: Mon Valley Works General Manager Kurt Barshick (fourth from left), former Edgar Thomson Plant Manager John Michaud (third from right), Director — State Governmental Affairs Chris Masciantonio (second from right) and Edgar Thomson Plant Environmental Coordinator Coleen Davis.

Recently, a coalition of community leaders, local companies, and a nearby Veterans of Foreign Wars (VFW) post has formed to try and complete the park. Significant land donations coupled with property the borough has provided moved this dream closer to reality. Thanks to ongoing outreach and dialogue between North Braddock elected officials and plant leadership at Mon Valley Works' Edgar Thomson Plant, our company became aware of this project and offered our assistance.

After weighing the remaining needs, U. S. Steel elected to make a financial contribution to fund the following for North Braddock's new Hawkins/Ajax recreation site:

- Construction of a 20-foot shelter with a concrete floor slab
- Construction of a basketball court with a 10-foot perimeter fence
- Purchase of park benches
- Purchase of picnic tables

In addition to the above, U. S. Steel has also participated in the following community involvement projects:

Community vaccine clinic

The vaccine clinic, held at the Woodland Hills Administration Building, was open to everyone age 12 and over. Community members from Braddock, North Braddock, East Pittsburgh, North Versailles, Rankin and Swissvale were invited, as well as Woodland Hills students.

Clean-up at the Saints Peter and Paul Byzantine Catholic Church

The Saints Peter and Paul Byzantine Catholic Church has been a pillar of the Braddock community for 125 years. With a vacant, abandoned property next door, the church reached out to U. S. Steel for help clearing and cleaning up the property. A plant team spent several days clearing dead trees, bushes, weeds, foundation remnants and more, working with other local businesses for donations of equipment rental, fill and topsoil. The church had worked out an agreement with the borough for use of the lot in exchange for a commitment to maintain it. Abandoned property is a challenge for the community, and U. S. Steel was happy to help make the property useable again.

Woodland Hills Foundation Gala and Virtual Job Fair

Support of future generations (and future employees) is important to U. S. Steel and the community. Our partnership with the Woodland Hills School District and supporting foundation is vital to securing the prosperity of the community and Edgar Thomson.

Donation for a playground in East Pittsburgh, a financially distressed community in the area

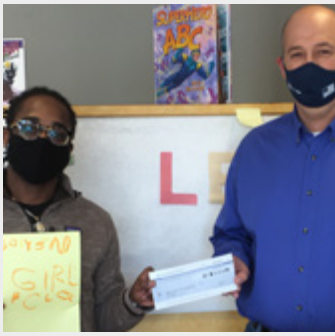
Green space is crucial to the health and wellbeing of today's youth and to ensure a strong, prosperous future for all. U.S. Steel is proud to be part of that commitment with this proposed playground in East Pittsburgh.

Braddock Free Store Toy Drive

Edgar Thomson employees teamed up to bring Christmas cheer to needy children in the community with these generous toy donations, delivered to the Braddock Free Store by our very own Santa and Elf.

Duquesne Boys and Girls Club

The Duquesne Boys and Girls Club has been stepping up during the pandemic by hosting and helping local children with homework and assignments when school is not in session. We were honored to help with a donation for electronic equipment to help simplify the experience.



Braddock Plaza Christmas Tree

Rankin Christian Center Turkeys

The Rankin Christian Center saw an increased need for food at their food pantry during the pandemic. Rankin Christian Center reached out to the Edgar Thomson Plant for a monetary donation and to partner with ET in purchasing over 250 turkey meals for their Thanksgiving Food Drive. The meals were distributed to very vulnerable and underprivileged individuals and families last Thanksgiving.

Woodland Hills Laptops

The closure of all Pennsylvania schools during the pandemic left many children in the Woodlands Hills School District without a means to "go virtual". Edgar Thomson donated money to give these students the tools they needed to continue learning.

Jimmy Johnston engaging with an attendee

Jodi McCallister and Jimmy Johnston at U. S. Steel's Braddock Community Day tent.

Steelers STEM Program Partnership

U. S. Steel continued its partnership with the Pittsburgh Steelers, providing the "Steelers STEM" program. The program is focused on helping local schools teach the basics of STEM education. STEM focuses on Science, Technology, Engineering and Math. Students from 52 school districts spoke with U. S. Steel professionals about experiences in STEM fields.

They've Got Spirit: Mon Valley Works Employees Participate in Recent Community Celebration

Representatives from Mon Valley Works' Pittsburgh-area facilities attended the 9th annual Braddock Community Day on August 10, 2020. This festive event is a great opportunity for residents and businesses in and around Braddock to gather for a day of fun, food and comradery.

Organizers once again created a fun, festive and family friendly atmosphere for all attendees. Jodi McCallister, department manager of employee services in Mon Valley's employee relations team, and Jimmy Johnston, joint effort coordinator with the United Steelworkers, teamed up to staff a U. S. Steel informational tent at the event. They spoke to numerous attendees about current job opportunities across our Mon Valley facilities, including the Edgar Thomson Plant just down the street. They also discussed recent community service projects undertaken by Mon Valley employees and handed out some U. S. Steel-branded merchandise.

Ms. McCallister reported high interest and engagement levels among attendees, many of whom simply stopped by to thank the company for taking part in the event.

(Left to right): Chris Masciantonio, Rep. Austin Davis and Kurt Barshick.

Mon Valley Works Scores a Touchdown with Recent Support of Local Youth Football Team

Mon Valley Works was recently approached by Pennsylvania state Rep. Austin Davis, whose district includes some Mon Valley communities, about contributing to a special recognition opportunity for a local youth football team that won their league title in fall 2019. U. S. Steel enthusiastically answered the call, making it possible for the entire team to take a field trip to the state capital.

Rep. Davis wanted to honor the Duquesne Dukes, who won the Western Pennsylvania Youth Athletic Association's Super Bowl event in fall 2019. He hoped to host the players and coaches on a visit to Harrisburg, Pa., where the team members would be recognized on the floor of the House of Representatives. Unfortunately, the Duquesne Youth Football program did not have the funds available to pay for the cost of transportation from Mon Valley to Harrisburg. That's where U. S. Steel took the ball and ran.

Kurt Barshick, general manager of Mon Valley Works, and Chris Masciantonio, director of governmental affairs, were pleased to accommodate Rep. Davis' request and met with him on Dec. 19 to present him with a check for $3,000 to cover the cost of bus rentals for the day. This donation was a welcome surprise to the team members and their parents, and further demonstrates U. S. Steel's continued support of the communities in which our employees live and work. Rep. Davis voiced his appreciation for the company's support of the communities and residents he represents in his legislative district.

The players and chaperones, as well as members of the Duquesne Youth Athletic Association, traveled to Harrisburg on Jan. 15. Team members were introduced on the floor of the House Chamber by Speaker of the House Mike Turzai and recognized for their athletic accomplishments by Rep. Davis. In addition to receiving this special recognition, players visited the state Capitol building to see firsthand how the legislative process takes place in Pennsylvania.

Duquesne Dukes coaches and players on the floor of the House Chamber with Speaker of the House Mike Turzai (kneeling, far left), Rep. Summer Lee (standing, far left, red jacket), Rep. Austin Davis (standing, far left, blue suit) and Rep. Bill Kortz (standing, far left, black suit).

Coaches and players with Rep. Davis on the steps of the Pennsylvania State Capitol rotunda.

Company Contribution to Fund Youth Programming at Andrew Carnegie's First Free Library

Representatives from Mon Valley Works' Edgar Thomson Plant paid a visit Jan. 21 to the nearby Braddock Carnegie Library to present library officials with a special gift on behalf of our company: funding to support youth programming, including events tied to the STEM (science, technology, engineering and math) fields that are vital to all aspects of the steelmaking process.

John Michaud (former plant manager – Edgar Thomson Plant), and Coleen Davis (coordinating manager – environmental at Edgar Thomson Plant) presented a $40,000 check to the Braddock Carnegie Library Association's (BCLA) leadership team to support youth programming for literacy, arts entrepreneurship, and civic engagement. Additionally, the BCLA offers daily "drop in" STEM programing at the library. A new "Pop Up Library" is also making stops in nearby communities to provide additional access to programming. In 2019, the BCLA served more than 1,500 local youths. This investment will ensure local children continue to have access to high-quality educational events and activities.

The BCLA was Andrew Carnegie's first library, built in 1889 for the managers of his first plant, the nearby Edgar Thomson Plant. Today, the BCLA serves residents of all ages living in many Mon Valley communities, including Braddock, North Braddock, East Pittsburgh, Turtle Creek and Chalfant. Some key partners of the BCLA include the Woodland Hills School District, Propel Schools, Heritage Community Initiatives' Out of School Time programs, and Head Start.

John Michaud (far left) and Coleen Davis (far right) presenting U. S. Steel's contribution to the representatives from the Braddock Carnegie Library Association (from left to right): Lauren Beachom (program manager), Latika Sewell (arts & culture facilitator), Mandee Williams (children's librarian), Rachel Brehm (library director), Alberta Certo (president, BCLA board of trustees) and Vicki Vargo (executive director).

John Michaud tries on an oversized puppet costume on loan to the library from local artist Cheryl Capezzuti as part of her Puppets for Pittsburgh program. Puppets like these are crafted in community workshops around the area under Capezzuti's supervision and lent to the community through the Braddock Carnegie Library or her studio. Capezzuti's puppets are star attractions in Pittsburgh's annual "First Night" festivities, a family friendly New Year's Eve celebration staged throughout the downtown area.

B. COMMUNITY ADVISORY PANEL (CAP)

In September 2020, Edgar Thomson Plant formed a Community Advisory Panel (CAP) modeled after the successful CAP formed by the Clairton Plant. The CAP's purpose is to proactively communicate with the public to foster a collaborative relationship and facilitate an understanding of community expectations and concerns. The quarterly meetings provide a forum for continued community outreach to build solid and lasting relationships. Plant leadership communicates important information about the safety and environmental operations of the plant. The CAP is comprised of influential leaders in the communities of Braddock, North Braddock, East Pittsburgh, North Versailles, Rankin and Swissvale

COMMITMENT TO THE ENVIRONMENT AND COMMUNITY – NOW AND IN THE FUTURE

As shown throughout this 2020 report, U. S. Steel is strongly committed to environmental stewardship and to serve the communities in which we operate.

As we enter 2021, we remain committed to:

- Our S.T.E.E.L. principles.
- Developing and implementing innovation projects to improve environmental performance.
- Providing support to the communities in which we operate.
- Assisting the company in achieving the Corporate GHG Reduction Goal to reduce its global greenhouse gas emissions intensity by 20 percent, as measured by the rate of carbon dioxide (CO_2) equivalents emitted per ton of finished steel shipped, by 2030 based on 2018 baseline levels.

United States Steel

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