

◆ **Torch bag house.** This portion of the dust and containment control system included power and control wiring for fans, screw conveyors, and shaker controls.

◆ **General and ancillary equipment.** All areas requiring future maintenance were illuminated with industrial sodium vapor lighting fixtures. A Gai-tronics communication system was installed for communications between system operators and crane operators. Also included was wiring for a pneumatic steel sample transport system that sent samples from the skimming area to the remote metallurgy laboratory.

All work on the electrical portion of this project was completed with Tri-M Electrical Construction personnel. No subcontractors were used.

**Cover Photo: Conveyors, vibratory feeders and load cells of the Ferro alloy system that feed the additional chemical components into the stainless steel making process.**



**Bag house dust collector system that contains solid particulates removed from steel making process.**



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*Bringing You  
the Power to Achieve*

***Tri-M Electrical Construction***

# ***Lukens Steel***

Coatesville, Pennsylvania  
Vacuum Oxygen Degassing Unit



*Design and construction of state of the art electrical installations - from sophisticated manufacturing and process control systems to high voltage power lines and substations - all in close cooperation with the design and construction teams of industrial and commercial clients.*

This project consisted of all required electrical power and control wiring for the installation of a vacuum oxygen degassing (VOD) unit located in the Lukens Steel Company, Electric Melt Facility, Coatesville, Pennsylvania. This VOD unit produces high quality stainless steel and is the largest stainless steel melt furnace in the United States.

The complete scope of this project was compressed into a very tight construction schedule of four months. This schedule required a team of highly skilled industrial tradespeople to work ten hour per day shifts, seven days a week. All work was performed in a very difficult environment due to the intense heat level, excessive noise and extremely dirty conditions generated by the active steel melting process in very close proximity to the VOD construction area.

The project required the highest level of safety awareness and safety policy compliance of any Tri-M project to date. Extensive pre-project hazard evaluation was conducted in order to assure compliance with Lukens Steel strict safety requirements and to engineer out as many safety hazards as possible prior to personnel starting construction activities. These concerns and evaluations were necessary due to the unique nature of the work site environment:

- ◆ Working at heights approaching 100 feet above the mill floor.
- ◆ Working in close proximity to large (150 ton) ladle cranes carrying ladles of molten steel.
- ◆ Working within 50 feet of stationary ladles of molten steel that were being processed.
- ◆ Working in excessive heat.
- ◆ Working in excessive noise.
- ◆ Working in excessive steel and dust.
- ◆ Working in areas of toxic fumes.

The multiple facets of this project consisted of the following:

◆ **Installation of power and control wiring for the vacuum tank, cover and cover car that transports the multi-ton cover for the VOD.** This vessel is the main component of the system process that removes the carbon from the carbon steel in order to create a highly refined stainless steel product. The VOD vessel is capable of holding a 100 ton ladle of molten steel. The cover, which contained may control devices and power connections, had a travel distance of approximately twenty feet and required special high heat-resistant festoon wiring with the flexibility to allow for cover travel.



**Vacuum tank, cover and cover car that transports the multi-ton cover. The cover is the portion of the equipment that contains all control devices and power connections required to produce stainless steel.**

◆ **Vacuum system, flare stack and hot well; installation of all required power and control wiring for this containment reduction system that removes solid particulates and volatile gases from the stainless steel making process.** This phase of the installation required working at heights of one hundred feet in toxic atmospheres, which necessitated the use of full-face respirators.

◆ **Motor control center room and ancillary equipment.** A new motor control center room was constructed by others at a level of approximately fifty feet above the mill floor. The electrical contract required us to install the MCC for the VOD motors and ancillary equipment, the VOD DC 1/0 panel, the VOD AC 1/0 panel, and the computer console with keyboard and monitor.

◆ **Operator pulpit modifications.** The existing operator control pulpit had to be enlarged to accommodate the control functions for the VOD process. This involved extensive new control wiring modifications to existing control wiring without interrupting the ongoing steel manufacturing process. In addition to industrial control wiring, this installation included the installation and wiring for crane communication systems, closed circuit television (CCTV) camera monitors, and instrumentation recorders.

◆ **Alloy system and scrap hopper modifications.** This segment of the project included power and control wiring for the alloy system diverter, conveyors, scrap holder load cells, and electro-mechanical vibrating conveyors.

◆ **Flux addition system.** This system, along with the alloy system, adds required ingredients to the steel-making recipe. It consisted of wiring for diverter valves, flux hopper, load levels, and screw conveyors.

**Motor control center and control panel for hydraulic pumps that maintain hydraulic pressure for tilting, rotating and skimming of the 100 ton ladle of steel.**



◆ **Ferro alloy system.** This phase of the project involved the removal of existing MCC and replacement with new Ferro alloy MCC that controlled conveyors, batch hoppers and load cells. This could only be done during a short local power outage during which the steel making process was shut down. A significant amount of work had to be performed in a short period of time.

◆ **Skimming station.** This aspect of the project involves all power and control wiring for a hydraulically operated slag skimming system. This operation has the capability of tilting and rotating a one hundred ton ladle of molten steel and using a hydraulically operated skimmer rake to remove unwanted slag from molten steel. This is accomplished by an operator located in an air-conditioned control room located in close proximity to the ladle of steel. The electrical installation included wiring for the hydraulic room, control pulpit and a Gai-tronics industrial phone system for operator communications.

**Electronic gas analyzers that monitor and control the fumes generated by the VOD process.**

