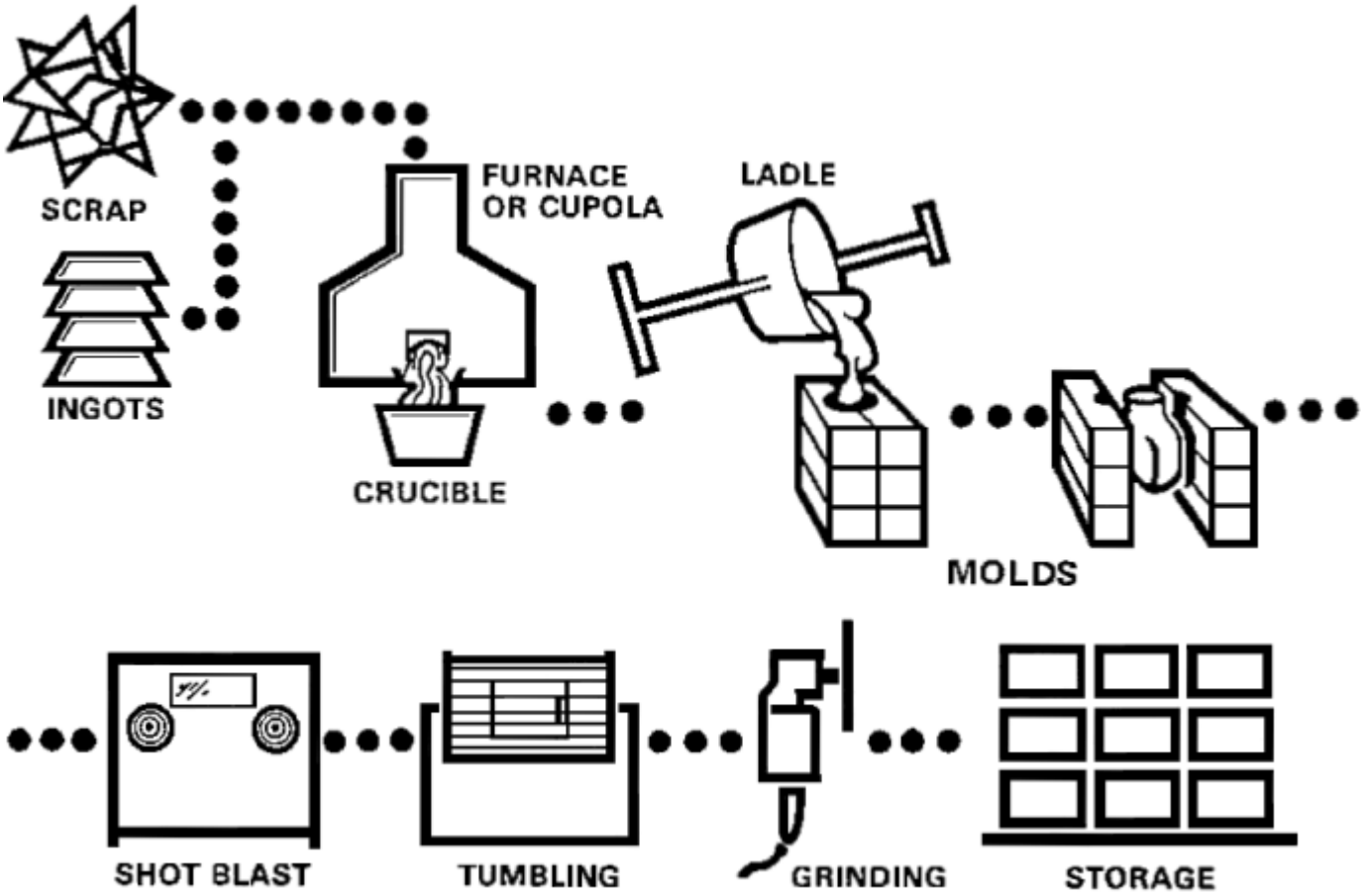
	NORTH CAROLINA DEPARTMENT OF LABOR	**No. 33-2**
	OSH DIVISION	**Date: 10/2009**
	OSHNC INDUSTRIAL DATA REPORT	**Pages: 3**

Industry: **Primary Metals Industry**	Sub-Group: **Iron and Steel Foundries**
SIC: **3321 and 3325**	NAICS: **331511 and 331513**

PROCESS DESCRIPTION: Castings composed of iron or iron mixed with other minerals to form steel alloys can be made in almost any form desired in either iron or steel. Carbon is added to both iron and steel and some steel contains manganese for hardness. Both are made by melting the raw metal in a furnace fueled by coke, gas or electricity. Coke is more common in small foundries. The furnace is lined with brick and mortar which must be repaired often. The molten metal is drawn off into a pot or crucible, conveyed or prepared molds and poured through a spout. When the metal has cooled the molds are removed. The castings are then placed in the cleaning shot blast cabinet or cleaning tumbler. After cleaning, the rough edges are removed by abrasive grinders. Some castings which are required to fit with precision are finished on milling machines. A few castings require painting, before they are stored or shipped.

PROCESS FLOW:



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Hazards Analysis

Major Hazards			Other Hazards		
Location	**Item**	**Hazard**	**Location**	**Item**	**Hazard**
Throughout scrap pile, ingot storage, casting room, cleaning room, storage area, shipping and furnace area	Handling heavy materials, crucibles, pots	Crushed limbs, injuries to hands and legs by slipping or falling objects	Mold and cleaning rooms Finishing area	Building and tearing down forms "Green" Sand (used in molds) Grinding precision milling using silica	Back injuries, hernia, crushed fingers, hands, feet between forms Formaldehyde exposure Eye injuries, back, hernia, hands and feet; silicosis
Furnace room	Furnace lining, fire brick and mud Coke Ovens	Dermatitis, any part of body struck by collapsing lining Coal tar pitch exposure	Throughout	Noise Housekeeping Powered Industrial Trucks	Hearing loss Slips, trips, and falls Carbon Monoxide exposure, accidents
Furnace area and molding room	Molten metal and containers (crucibles, pots)	Burns, carbon monoxide, lead and iron oxide exposure			
Molding room, cleaning room, finishing room	Molding and cleansing materials (sand)	Silicosis using silica cleaners and molding material			

Key OSHNC Standards

Reference	29 CFR 1910 — General Industry Standards
Subpart D	Walking and working surfaces
Subpart E	Means of Egress

SIC: 3321 and 3325
NAICS: 331511 and 331513

Subpart I	Personal protective equipment
Subpart O	Machinery and machine guarding
Subpart S	Electrical
1910.94	Ventilation
1910.147	Control of hazardous energy (lock-out/tag-out)
1910.176	Materials Handling
1910.178	Powered industrial trucks
1910.179	Overhead and gantry cranes
1910.1000	Air contaminants (federal and state specific PELs)
1910.1025	Lead
1910.1048	Formaldehyde
1910.1200	Hazard Communication

Inspection Analysis

The inspection should begin in the receiving area where heavy metal ingots, scrap metal and fuel (normally coke) are received and stored. Check for safe stock piling. The method of conveying to the furnace must be checked. Forklifts, front end loaders, chain conveyors or belt conveyors are used. Walking-working surfaces must be checked along with ladders and stairs to charging platforms. The process is drawing off liquid metals. The conveying vessels (pots, crucibles, etc.), personal protective equipment, walking working surfaces and height or pour spout into molds shall be inspected. Mold making involves heavy objects and presents back, hand and foot hazards. Inspect pattern making for use of woodworking tools and machines. Mold breakdown involves heavy objects. Shot blast or tumble cleaning may be enclosed and silica exposure evaluated. Grinding with abrasive wheels follows and presents material handling hazards, eye injuries and silica exposure Painting or dipping must be inspected for flammable liquid hazards and air contaminants. Hazards in the shipping area include unsafe stacking and unsafe material handling practices.

Other Pertinent Comments: Burns from molten metal constitute the most frequent serious injuries. These occur in the drawing off, conveying and pouring operations by splashing, spilling or cold foreign matter getting in the molten metal. Back, hand and foot injuries frequently result from handling heavy objects. Silicosis is less frequent but very serious, often fatal, where sand is used for molding or cleaning.