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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-2532H
Plant ID No.:	011-00007
Applicant:	Huntington Alloys Corporation
Facility Name:	Huntington Facility (A Metal Rolling Mill Facility)
Location:	Cabell County
NAICS Code:	331491
Application Type:	Class II Administrative Update
Received Date:	October 6, 2015
Engineer Assigned:	Caraline Griffith
Fee Amount:	$300.00
Date Received:	October 8, 2015
Complete Date:	November 5, 2015
Due Date:	December 30, 2015
Applicant Ad Date:	August 31, 2015
Newspaper:	*The Herald-Dispatch*
UTM's:	Easting: 379.2 km Northing: 4,252.3 km Zone: 17
Description:	Installation of a new Viking Belt Blaster (TP-19-P) in the internal baghouse.

PROCESS DESCRIPTION

This new Viking Belt Blaster (TP-19-P) will be installed in then Thistle Processing building, which prepares scrap material by sizing, cleaning, and drying available metal alloy pieces for internal use and resale. This belt blaster will be used to clean metal alloy scrap before being melted and used in the manufacturing operations.

PREVIOUS EVALUATION'S (R13-2532D) WARNING

The writer reviewed the warning section given in the previous evaluation (R13-2532F), which was taken from evaluation R13-2532D, and concluded that it did not apply to the current permit application (R13-2532F) because the crusher hourly and annual scrap metal processing rates are not being increased. The warning is given below for the reader's information:

NEXT MODIFICATION OR UPDATE

Closely review application(s) submitted after R13-2532D.

Class II Administrative Update versus a Modification Permit

Application R13-2532D was processed as a class II administrative update. During the course of the review, Huntington Alloys Corporation wanted to increase the processing rate of metal through the crusher. In doing this, the annual HAP emission limit for the scrap metal process would have exceeded 5.0 ton/yr which would have caused the application to become a modification application requiring two 30 day public comment periods, *i.e.*, the company and the DAQ would have had to each run a legal ad, instead of just the company. Also, because of the crusher's increase in annual processing rate, the total process PM and HAP emission rates advertised by the company in their legal ad would have under-estimated emissions and would have had to have been corrected in the DAQ's legal ad. Because the second public comment period would have extended the processing period for the application by 30 additional days, the company decided just to double the crusher's hourly rate and leave the annual crusher rate alone. The hourly HAP emission rate for the scrap metal process increased from 1.22 lb/hr to 1.96 lb/hr, but did not exceed the 2.0 lb/hr HAP trigger for a modification permit. To avoid any appearance of having purposely under-estimating HAP emission to the public in the event that the company later requested that the processing rate of the crusher be increased, the following footnote was added to Section 5.1.4. (Scrap Metal Processing Rates) of permit R13-2532E:

> Crusher hourly and annual scrap metal processing rates can not be increased for five (5) years from the date of issuance for R13-2532D. These rates were set here such that the 45CSR13 Modification Permitting Threshold limits of 2 lb/hr and 5 ton/yr for HAP emissions were not crossed.

SITE INSPECTION

The writer did not inspect Huntington Alloys. The facility was last inspected by DAQ Enforcement Inspector James Robertson on September 26, 2013 at which time it was given the inspection code of 30 which means that no violations were found.

The Directions to the facility as given in the permit application are:

Interstate 63 W to 29th Street Exit, go towards Huntington on Route 60 to Washington Blvd intersection. Make a right and go across Washingto Blvd Bridge. Right turn of Riverside Drive. Enter plant through Main Gate.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

The PM10 emissions for this Belt Blaster was done using engineering estimate calculations with AP-42 and with the following formula:

$$MaxDustEscaping(\frac{mg}{m^3}) \times FaxCapacity(\frac{m^3}{hr}) \times 0.00267\frac{lb}{g} = PM10(\frac{lb}{hr})$$

HAPs were also calculated using AP-42.

Emission Point ID	Emission Unit Description	Pollutant	lb/hr	TPY
TP-19-P	Viking Belt Blaster in Baghouse	PM10	0.05	0.19
		HAPS	0.04	0.01

REGULATORY APPLICABILITY

No new regulations are required for this permit update, however the current regulations, both state and federal, are listed below for convenience and reference.

The facility is a major source of criteria pollutants emitting more than 100 ton/yr of PM_{10} (and CO and NO_x). It is also a major source of hazard air pollutants (HAPs) emitting over 10 ton/yr of a single HAP (Nickel and Chromium) and over 25 ton/yr of aggregate HAPs (Nickel and Chromium), i.e., it is a major Title V source (Permit No. R30-01100007-2008).

State Rules

45CSR2 - To Prevent and Control Particulate Air Pollution From Combustion of Fuel in Indirect Heat Exchangers

This rule establishes emission limitations for smoke and particulate matter which are discharged from fuel burning units.

5.1.16. **Fuel Burning Equipment Opacity Limit – NG Burner: Wash Water, Rinse Water, Kiln 1, Kiln 2.** No person shall cause, suffer, allow or permit emission of smoke and/or particulate matter into the open air from any fuel burning unit which is greater than ten (10) percent opacity based on a six minute block average. **[45CSR§2-3.1.]**

5.1.18. **Fuel Burning Unit Emission Rate Limitation – NG Burner Equipment: Wash Water, Rinse Water, Kiln 1, Kiln 2.**

No person shall cause, suffer, allow, or permit the discharge of particulate matter into the open air from all fuel burning units located at one plant, measured in terms of pounds per hour in excess of the amount determined as follows:

For Type 'b' fuel; burning units, the product of 0.09 and the total

design heat inputs for such units in millions B.T.U.'s per hour, provided however that no more than six hundred (600) pounds per hour of particulate matter shall be discharged into the open air from all such units. **[45CSR§2-4.1.b]**

[45CSR§2-4.1.]

45CSR7 - To Prevent and Control Particulate Matter Air Pollution From Manufacturing Processes and Associated Operations

The purpose of this rule is to prevent and control particulate matter air pollution from manufacturing processes and associated operations.

5.1.19. **Process Opacity Limitation – Plasma Cutter, Arc-Cutting, Arc-Slicing, Crusher, Shot Blaster, Kiln 1, and Kiln 2.**

No person shall cause, suffer, allow or permit emission of smoke and/or particulate matter into the open air from any process source operation which is greater than twenty (20) percent opacity, except as noted in subsections 3.2, 3.3, 3.4, 3.5, 3.6, and 3.7.
[45CSR§7-3.1.]

5.1.21. **Process PM Emission Weight Limitation – Plasma Cutter, Arc-Cutting, Arc-Slicing, Crusher, Shot Blaster, Kiln 1, and Kiln 2.**
No person shall cause, suffer, allow, or permit particulate matter to be vented into the open air from any type source operation or duplicate source operation, or from all air pollution control equipment installed on any type source operation or duplicate source operation in excess of the quantity specified under the appropriate source operation type in Table 45-7A found at the end of this rule. **[45CSR§7-4.1.]**

45CSR10 - To Prevent and Control Air Pollution From Emission of Sulfur Oxides.

The purpose of this rule is to prevent and control air pollution from the emission of sulfur oxides.

5.1.22. **Sulfur Dioxide (SO_2) In-stack Concentration Limitation – Kiln 1 and Kiln 2 Exhausts.**
No person shall cause, suffer, allow or permit the emission into the open air from any source operation an in-stack sulfur dioxide concentration exceeding 2,000 parts per million by volume from existing source operations, except as provide in subdivisions 4.1a. through 4.1.e.

[45CSR§10-4.1.]

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Chromium and Compounds, Hexavalent Chromium

Hexavalent Chromium was identified as a toxic air contaminant under California's air toxics program (AB 1807) in 1986.

Chromium compounds are federal hazardous air pollutants and were identified as toxic air contaminants in April 1993 under AB 2728.

CAS Registry Number: Chromium = 7440-47-3, Chromium VI = 18540-29-9

Molecular Formula: Chromium: Cr; Chromium VI: Cr^{+6}

Chromium is an odorless, steel-gray, hard metal that is lustrous and takes a high polish. It is extremely resistant to corrosive agents. Chromium can exist in water in several different states but under strongly oxidizing conditions, may be converted to the hexavalent state and occurs as chromate anions. Chromium is soluble in dilute hydrochloric acid and sulfuric acid but not nitric and strong alkalies and alkali carbonates (Merck, 1989).

Chromium metal is not found in nature, but is produced principally from the mineral chromite (chrome ore). Chromite contains chromium in the +3 oxidation state, or chromium (III). Chromium combines with various other elements to produce compounds, the most common of which contain either chromium (III), which is trivalent (the +3 oxidation state) or chromium (VI), which is hexavalent chromium (the +6 oxidation state) (ARB, 1986d). Chromium (III) compounds are sparingly soluble in water, while most chromium (VI) compounds are readily soluble in water (U.S. EPA, 1994a). Chromium forms a number of compounds in other oxidation states, however, those of +2 (chromous), +3 (chromic) and +6 (chromates) are the most important (HSDB, 1995).

Thousands of chromium (III) compounds exist, exhibiting a wide range of colors, structures, and chemical properties. Chromium (VI) compounds are produced industrially by heating chromium (III) compounds in the presence of mineral bases (such as soda ash) and atmospheric oxygen. Most chromium (VI) solutions are powerful oxidizing agents under acidic conditions, but much less oxidizing under basic conditions. Depending on the concentration and acidity, chromium (VI) can exist as either chromate ion (CrO4-2), or as dichromate ion (Cr2O7-2) (ARB, 1986d).

Chromium (III) is the most stable oxidation state, forming coordination complexes which are exclusively octahedral, with ligands such as water, urea, sulfates, ammonia, and organic acids. Stable complexes can thus be formed with anions, acids, peptides, proteins, nucleic acids, and other macromolecules.

Chromium (VI) is virtually always bound to oxygen in ions such as chromates (CrO4-2) and dichromates (Cr2O7-2). Chromium (VI) ions are strong oxidizing agents and are readily reduced to chromium (III) in acid or by organic matter.

Physical Properties of Chromium

Atomic Weight	51.966
Atomic Number	24
Valences	1-6
Boiling Point	2642 °C

Melting Point	1900 °C
Density/Specific Gravity	7.14
Vapor Pressure	1 mm Hg at 1616 °C

(HSDB, 1995; Merck, 1989; Sax, 1989; U.S. EPA, 1994a)

From Wikipedia: **Chromium**

Water insoluble chromium(III) compounds and chromium metal are not considered a health hazard, while the toxicity and carcinogenic properties of chromium(VI) have been known for a long time.[1] An actual investigation into hexavalent chromium release into drinking water was used as the plot-basis of the motion picture Erin Brockovich.

Because of the specific transport mechanisms, only limited amounts of chromium(III) enter the cells. Several in vitro studies indicated that high concentrations of chromium(III) in the cell can lead to DNA damage.[2] Acute oral toxicity ranges between 1500 and 3300 µg/kg.[3] The proposed beneficial effects of chromium(III) and the use as dietary supplements yielded some controversial results, but recent reviews suggest that moderate uptake of chromium(III) through dietary supplements poses no risk.[2]

World Health Organization recommended maximum allowable concentration in drinking water for chromium (VI) is 0.05 milligrams per liter. [4] Hexavalent chromium is also one of the substances whose use is restricted by the European Restriction of Hazardous Substances Directive.

The acute oral toxicity for chromium(VI) ranges between 50 and 150 µg/kg.[3] In the body, chromium(VI) is reduced by several mechanisms to chromium(III) already in the blood before it enters the cells. The chromium(III) is excreted from the body, whereas the chromate ion is transferred into the cell by a transport mechanism, by which also sulfate and phosphate ions enter the cell. The acute toxicity of chromium(VI) is due to its strong oxidational properties. After it reaches the blood stream, it damages the kidneys, the liver and blood cells through oxidation reactions. Hemolysis, renal and liver failure are the results of these damages. Aggressive dialysis can improve the situation.[5]

The carcinogenity of chromate dust is known for a long time, and in 1890 the first publication described the elevated cancer risk of workers in a chromate dye company.[6][7] Three mechanisms have been proposed to describe the genotoxicity of chromium(VI). The first mechanism includes highly reactive hydroxyl radicals and other reactive radicals which are byproducts of the reduction of chromium(VI) to chromium(III). The second process includes the direct binding of chromium(V), produced by reduction in the cell, and chromium(IV) compounds to the DNA. The last mechanism attributed the genotoxicity to the binding to the DNA of the end product of the chromium(III) reduction.[8]

Chromium salts (chromates) are also the cause of allergic reactions in some people. Chromates are often used to manufacture, amongst other things, leather

products, paints, cement, mortar and anti-corrosives. Contact with products containing chromates can lead to allergic contact dermatitis and irritant dermatitis, resulting in ulceration of the skin, sometimes referred to as "chrome ulcers". This condition is often found in workers that have been exposed to strong chromate solutions in electroplating, tanning and chrome-producing manufacturers.[9][10][10]

In some parts of Russia, pentavalent chromium was reported as one of the causes of premature dementia.[11]

Nickel

Web address http://www.autismtoday.com/articles/heavymetals.html

Website Name:	Autism Today
Title:	Heavy Metals: What you can do to protect your child with Autism
Author of Article:	Linda G. Shepard

Nickel; Symbol: Ni
Nickel is widely used in consumer products including buttons, zippers, coins, dental braces, orthodontic appliances, household appliances, tools, artificial joints, jewelry, faucets, batteries, hairspray, cold-wave permanent solutions, shampoos, paint, spray paint, varnish, pipes, and many products made of stainless steel. Nickel occurs naturally in some foods and manufacturers use it in the hydrogenation process. Nickel exposure also occurs from both first and second-hand tobacco smoke. The Food and Drug Administration (FDA) considers nickel safe as a direct human food ingredient. Nickel co ntact dermatitis affects an estimated 2.5 to 5% of the population, with women more affected than men. A family sensitivity to nickel raises one's risk factor.

Cancers of the lung, nasal passage, and possibly the larynx may occur from occupational exposure. Metal refineries and municipal solid waste incinerators release nickel into the air, soil, and water. The U.S. has not had any active nickel-producers since 1985 but soil from or near the former sites may continue to pose a source of exposure. Nickel accumulates in aquatic food chains with freshwater organisms more sensitive than ones from saltwater. The 1990 Clean Air Act lists nickel as a hazardous air pollutant. (21)

(21) John Harte, Cheryl Holdren, Richard Schneider, Christine Shirley, (1991). Toxics A to Z: A Guide to Everyday Pollution Hazards.

From Wikipedia - **Nickel Toxcity**

Exposure to nickel metal and soluble compounds should not exceed 0.05 mg/cm^3 in nickel equivalents per 40-hour work week. Nickel sulfide fume and dust is believed to be carcinogenic, and various other nickel compounds may be as well.[47][48] Nickel carbonyl, $[Ni(CO)_4]$, is an extremely toxic gas. The toxicity

of metal carbonyls is a function of both the toxicity of the metal as well as the carbonyl's ability to give off highly toxic carbon monoxide gas, and this one is no exception. It is explosive in air.[49][50] Sensitized individuals may show an allergy to nickel affecting their skin, also known as dermatitis. Sensitivity to nickel may also be present in patients with pompholyx. Nickel is an important cause of contact allergy, partly due to its use in jewellery intended for pierced ears.[51] Nickel allergies affecting pierced ears are often marked by itchy, red skin. Many earrings are now made nickel-free due to this problem. The amount of nickel which is allowed in products which come into contact with human skin is regulated by the European Union. In 2002 researchers found amounts of nickel being emitted by 1 and 2 Euro coins far in excess of those standards. This is believed to be due to a galvanic reaction.[52]

It was voted Allergen of the Year in 2008 by the American Contact Dermatitis Society.[53]

AIR QUALITY IMPACT ANALYSIS

No modeling study was performed for the proposed updates.

RECOMMENDATION TO DIRECTOR

Permit application R13-2532H submitted by Huntington Alloy Corporation has been reviewed and determined to meet all applicable requirements. It is therefore recommended that the resulting permit be approved.

Caraline Griffith
Permit Engineer

12/7/15
DATE