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west virginia department of environmental protection

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## ENGINEERING EVALUATION/FACT SHEET

### B BACKGROUND INFORMATION

Application No.:	R13-0032B
Plant ID No.:	029-00001
Applicant:	ArcelorMittal Weirton Inc.
Facility Name:	Weirton
Location:	Weirton
NAICS Code:	331110
Application Type:	Modification
Received Date:	June 25, 2014
Engineer Assigned:	Edward S. Andrews, P.E.
Fee Amount:	\$1000.00
Date Received:	June 27, 2014
Complete Date:	July 25, 2014
Due Date:	October 23, 2014
Applicant Ad Date:	July 3, 2013
Newspaper:	<i>Weirton Daily Times</i>
UTM's:	Easting: 533.7 km      Northing: 4,474.5 km      Zone: 17
Description:	The application is for the replacement of an existing HCl storage tank at the facility.

### DESCRIPTION OF PROCESS

The new hydrochloric acid (HCl) storage tank will be located at the South side of the Tin Mill on an elevated steel structural support. The new fiberglass double walled, self-contained, 8,700 gallon tank will be filled by an Ansi-Mag close-coupled pump from the chemical supplier tankers which will off-load on a concrete pad to contain any drips and/or spills. The tank will have a level transmitter for remote indication and overflow protection, combination pressure/vacuum relief valve, and will be vented thru a Bionomics wet fume exhaust scrubber to control the breathing and working losses from the tank.

The tank will store HCl at a concentration of 36% in aqueous solution. HCl will be gravity fed from this new storage tank to each one of the pickling tanks for the three electroplating lines (#2 Electroplater, #4 Electroplater, #6 Electroplater).

## SITE INSPECTION

On June 27, 2014, Mr. Alfred Carducci, a compliance inspector assigned to the Northern Regional Panhandle Office, conducted a routine compliance inspection of Weirton Works. As result of this inspection Mr. Carducci determined that the facility has been operating within compliance of their current permits and applicable rules. During this inspection, Mr. Carducci took several photos for the writer, which are included in the file of the existing tank and proposed site for the new tank. The new vessel will be located next to a sulfuric acid tank on an elevated platform. Mr. Carducci did not identify any issues with this new proposed location for an HCl storage tank.

## ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

The main pollutant released from this storage tank is hydrochloric acid. Hydrochloric acid is an inorganic compound that the Clean Air Act classifies as a Hazardous Air Pollutant (HAPs). HCl is one of the few non-organic and non-metal HAPs that is regulated under the Clean Air Act.

The applicant used U.S. EPA's TANKs computer program and set the vapor pressure of the acid at a constant vapor pressure of 2.1 psia in the model. This approach yielded an estimate of 321 pounds of HCl loses on an annual basis of which 145 pounds were working losses.

Looking at the TANKs program, the user's manual does not specifically recommend not using it for inorganic compounds but notes that results have not been confirmed with actual measurements. In addition, specific data on the liquid would have to be entered into the database by the user to predict emissions from that liquid.

The writer was able to obtain/determine the necessary data of 36% HCl solution, which includes partial pressures of 36% HCL at several temperatures (40<sup>0</sup>F to 100<sup>0</sup>F increments of 10<sup>0</sup>F), density, liquid and vapor molecular weights. The writer estimated the uncontrolled potential of HCl from the tank to be 325 pounds per year with the working losses counting for only 95.2 pounds of the 325 pounds.

This vessel will be subject to the mineral acid standard of Rule 7, which is a concentration based standard. Therefore, the writer conducted several additional Tank runs to determine the maximum losses or the maximum potential of HCl emissions during filling operations. The key months that were examined were June, July and August as the highest average ambient temperature occurs during these months out of the year. The results of these

Engineering Evaluation of R13-0032B  
ArcelorMittal Weirton Inc.  
Weirton Works  
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additional runs yielded a maximum predicted working loss of 11.2 pounds which occurred in July with an average working loss of 10.91 pounds per month. These losses are from the filling of the vessel.

The writer compared the results and inputs of both estimation methods and found the difference between the estimates could be explained by the temperature inputs used to determine the vapor pressure of the acid solution. The applicant assumed a worst case temperature of 45<sup>0</sup>C for short and long term emissions estimates. The TANKs calculated the average vapor pressure of the acid based on changes of actual ambient temperatures of the local area as defined by the user.

The losses that were listed in this section were uncontrolled losses or emissions. The applicant proposes to install a packed bed counter-flow scrubber with a minimum expected removal efficiency of 90 percent for HCl. With this type of control, the maximum potential emissions would be 32.5 pounds per year.

## REGULATORY APPLICABILITY

The Weirton Works is an existing major source of HAPs. This proposed modification will not change this status. The facility operates Tin Mill which this proposed vessel will be supporting.

The new HCl tank is subject to the mineral acid standard of 45CSR7 because the vessel emits HCl. According to 45 CSR §7-4.2 and Table 45-7B, no vent is allowed to release HCl in concentrations greater than 210 mg/m<sup>3</sup> (138.3 ppmv). The writer looked at this source in two different modes which are storing and filling.

Assuming the filling operation would take 80 minutes to fill the vessel with 6,667 gallons, the HCl concentration was predicted to be 2,013 mg per cubic meter. Since the scrubber for this proposed application was sized based on the maximum fill rate for the vessel, the writer used the higher expected efficiency rating of 95% since the scrubber would be seeing the higher concentration of HCl. This yielded a concentration of 122 mg per cubic meter of HCl.

For the working losses, the uncontrolled concentration of HCl was 350 mg per cubic meter. Because the initial concentration of HCl is low going into the scrubber, the 90% control efficiency for the scrubber is deemed to be appropriate. After the scrubber, the HCl concentration is reduced to 35 mg per cubic meter. The information on the proposed scrubber for this new tank indicates that the mineral acid standard of Rule 7 will be achieved.

This vessel is not a manufacturing process; it is simply supporting a manufacturing process. Thus, the vessel is not subject to visual emission standard of 45 CSR §7.3.1.

Because this HCl storage tank does not feed or support the pickling lines at the facility, this vessel is not subject to Steel Pickling MACT (40 CFR 63, Subpart CCC). The electro-

Engineering Evaluation of R13-0032B  
ArcelorMittal Weirton Inc.  
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plating lines that this vessel supports have pickling sections as part of the electro-plating. However, this pickling process does not meet the definition of *steel pickling* in 40 CFR §63.1156. The last sentence in the *steel pickling* definition specifically notes that the activation of the metal surface prior to plate or coating does not meet this definition under Subpart CCC. Thus, this tank is not an affected source under Subpart CCC by definition.

No other rules or regulations are applicable to this modification. This modification is not a major modification because the project increases of the New Source Review (NSR) pollutants are below the significance level as prescribed in Rule 14 (i.e. CO less than 100 tpy, NO<sub>x</sub> less than 40 tpy, CO<sub>2</sub> less than 75,000 tpy). The permittee filed a complete application, paid the appropriate fees, and published a class I legal ad to satisfy the modification permit requirements under Rule 13. ArcelorMittal has filed to have this modification be incorporated into the facility Title V Operating Permit. The Weirton Works will remain a major source subject to Title V as a “3A Source – Chemical Manufacturing with Indirect Heat Exchangers greater than 350 MMBtu/hr”.

### TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Even with the new tank, the facility would not be either emitting a new HAP or toxic air pollutant other than what is currently being emitted. Thus, no information about the toxicity of the hazardous air pollutants (HAPs) is presented in this evaluation.

### AIR QUALITY IMPACT ANALYSIS

The writer deemed that an air dispersion modeling study or analysis was not necessary, because the proposed modification does not meet the definition of a major modification of a major source as defined in 45CSR14.

### MONITORING OF OPERATIONS

The writer recommends the following monitoring requirements:

- Check the flow rate of the water/liquor in the scrubber for the 24 hours prior to conducting loading operations.
- Monthly Measurement of the ph of the water/liquor in the scrubber.
- Monthly check of Water level in the sump.

The vessel is subject to a concentration based standard. The writer does not see any value establishing a throughput limit since the vessel will be equipped with the scrubber to meet the concentration standard regardless of throughput.

Engineering Evaluation of R13-0032B  
ArcelorMittal Weirton Inc.  
Weirton Works  
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## CHANGES TO PERMIT R13-0032

Permit R13-0032 currently covers the HCl regeneration units and HCl storage tanks that are used for the pickling lines at the facility. Because these units are clearly used for the pickling lines and are subject to the Pickling MACT Standard, the writer developed a separate section for this new HCl Tanks. There were no changes made to the current conditions that are applicable to these regeneration units.

## RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates the proposed modification of the facility will meet all the requirements of the application rules and regulations when operated in accordance to the permit application. Therefore, this writer recommends granting ArcelorMittal Weirton Inc. a Rule 13 modification permit for their replacement HCl storage tank located at the Weirton Works in Weirton, WV.

Edward S. Andrews, P.E.  
Engineer

October 22, 2014  
Date

Engineering Evaluation of R13-0032B  
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