Ohio EPA
40 years and moving forward

John R. Kasich, Governor
Mary Taylor, Lt. Governor
Scott J. Nally, Director

December 7, 2012

CERTIFIED MAIL 7010 1060 0000 0089 9678

Stanley Rihtar
Environmental Engineer
ArcelorMittal Cleveland, Inc.
3060 Eggers Avenue
Cleveland, OH 44105

RE: ArcelorMittal Cleveland, Inc.
ArcelorMittal Cleveland, Inc. Landfill, Area C
Response to Comments – Notice of Violation

Dear Mr. Rihtar:

The Ohio Environmental Protection Agency (Ohio EPA) has reviewed the following document for Area C of the ArcelorMittal Cleveland, Inc. Landfill, an industrial solid waste disposal facility:

- Response to Ohio EPA Comment Letter Dated September 23, 2010, Dated October 19, 2010

The document is dated October 19, 2010. It was received on October 20, 2010 and reviewed for compliance with Ohio Administrative Code (OAC) 3745-30-08.

Ohio EPA has reviewed the above referenced document and noted the following rule remains in violation:

Violation:

1. OAC Rule 3745-30-08(C)(6)(g): Any statistical method chosen in accordance with paragraph (C)(5) of this rule shall comply with the following performance standards as appropriate. Background data can be added only in blocks of data resulting from the analysis of four or more statistically independent samples after the data have been statistically compared to the current background data and no statistical differences are detected, unless another method is deemed acceptable to the director.

The owner/operator remains in violation of this rule because Ohio EPA does not agree with the arguments presented by the owner/operator in response to Ohio EPA's notice of violation with respect to improper use of two statistical methods (substitution and T-test) in attempting to fit new data to the existing background data.

Moreover, the owner/operator should receive Director approval to include statistically different data into the background dataset.

OAC 3745-30-08(C)(1) states that the owner or operator shall use methods documented in the sampling and analysis plan. However, when parts of this plan become obsolete, they should be changed. OAC 3745-30-08 is a self-implementing plan. Previous regulatory responses do not necessarily take precedence.

As stated in page six of the owner/operator response, according to Section 15.2 of the *Unified Guidance*, substituting half the PQL is appropriate for datasets with 15% non-detects or less. However, in the case of benzene, where more than 50% of the data are non-detect, substituting half the PQL is not appropriate. Also, using a two-sample t-test is appropriate only if the data are normal or log normal as it is a parametric method.

The owner/operator improperly utilized two statistical methods in attempting to fit the new data to the existing background data as follows:

A) Substitution: the owner/operator substituted ½ practical quantitation limit (PQL) for all 50 non-detects among the existing and proposed benzene data, despite the fact that the high percentage of non-detects among the data (87% of all data; 71% if <2's are deleted) is inappropriate for using substitution. The USEPA document EPA 530/R-9-007, *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance, March 2009* (Unified Guidance) and several statistical literature sources can be cited to show that using substitution is only appropriate when non-detects make up less than about 15% of the data. For example:

- Unified Guidance page 6-36: "Simple substitution is not recommended in the Unified Guidance unless no more than 10-15% of the sample observations are non-detect."

- Unified Guidance page 15-5 - the Unified Guidance recommends imputation by simple substitution only in select circumstances described below:

- When the sample size is too small to do anything else.
- When non-detects comprise no more than 10-15% of the total sample.
- When non-detects are generated by a different physical process than the detected values, and thus represent a distinct statistical distribution.

Therefore, the owner/operator should cease using substitution when the percentage of non-detects is so high.

B) T-test: the underlying assumption of normality in the t-test was overlooked. As described on page 16-3&4 of the Unified Guidance, "all t-tests assume that the underlying data are approximately normal in distribution." The benzene data from the facility, whether or not the older higher PQL data (<2) are included, whether per well or pooled is a highly skewed, left-censored, non-normal data set and thus makes it inappropriate for a t-test.

The combined use of substitution and t-test thus produced an inappropriate and invalid statistical comparison.

The owner/operator should have instead utilized a distribution free test such as a simple comparison of the data points to the non-parametric prediction limit based on the existing background or use a rank-based test to compare the two data sets. The Unified Guidance provides further insight on page 6-37:

> "When the sample data are non-normal and may contain non-detects, the Unified Guidance provides alternative two-sample tests to the parametric t-test. The Wilcoxon rank-sum test (Section 16.2) requires that the combined samples be sorted and ranked. This test evaluates potential differences in population medians rather than the means. The Tarone-Ware test (Section 16.3) is specially adapted to handle left-censored measurements, and also tests for differences in population medians."

And, further on page 16-17:

> "Because non-detects generally prevent a complete ranking of the measurements, the Wilcoxon rank-sum test is not recommended for most censored data sets. Instead, a modified version of the Tarone-Ware test (Hollander and Wolfe, 1999) is presented in Section 16.3. The Tarone-Ware test is essentially a generalization of the Wilcoxon test specifically designed to accommodate censored values."

To return to compliance with this rule, the owner/operator needs to re-evaluate the proposed background updates using a valid statistical method(s). If the owner/operator determines that there is a statistically significant difference, and still wishes to add the data to background, the owner/operator will need to request and receive director's approval pursuant to OAC 3745-30-08(C)(6)(g).

Please submit a response within 60 days of receipt of this letter indicating how the facility will return to compliance with OAC Rule 3745-30-08(C)(6)(g).

Nothing in this letter shall be construed to authorize any waiver from the requirements of any applicable state or federal laws or regulations. This letter shall not be interpreted to release ArcelorMittal from responsibility under Chapters 3704, 3714, 3734, or 6111 of the Ohio Revised Code or under the Federal Clean Water or Comprehensive Environmental Response, Compensation, and Liability Acts for remedying conditions resulting from any release of contaminants to the environment.

If you have any technical questions regarding this review, please contact Kathryn Epp of the Division of Drinking and Ground Waters at (330) 963-1233. Please submit all correspondence to Jennifer Carlin, Division of Materials and Waste Management, NEDO, Ohio EPA, 2110 East Aurora Road, Twinsburg, OH 44087.

Sincerely,

Jennifer Carlin

Jennifer Carlin
Environmental Specialist
Division of Materials and Waste Management

JC/cl

cc: Kathryn Epp, NEDO-DDAGW
Dane Tussel, Cuyahoga County General Health District
Gerald Murphy, Cleveland City Health Department
File: [Sowers/LAND/ArcelorMittal Landfill/18]
DMWM ID #: (766)