



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

March 14, 2013

**RE: MILLENNIUM LANDFILL  
GROUND WATER MONITORING  
RETURN TO COMPLIANCE**

Mr. Rick Hughes  
Millennium Inorganic Chemicals, Inc.  
2426 Middle Road  
Ashtabula, Ohio 44004

Dear Mr. Hughes:

The Ohio Environmental Protection Agency (Ohio EPA) has reviewed the *Response to Ohio EPA Notice of Violation-November 30, 2012*. The document is dated January 2, 2013 and was received by Ohio EPA on January 22, 2013. The document was prepared and submitted to the Ohio EPA by TM Engineering, Inc. on behalf of Millennium Inorganic Chemicals, Inc. (Millennium). Millennium is the owner of the Millennium Ashtabula Landfill (MAL). Millennium is conducting ground water detection monitoring in accordance with the site specific ground water detection monitoring plan (GWDMP) and Ohio Administrative Code (OAC) 3745-29-10 (A)(1), effective October 30, 2008 and OAC 3745-30-08, effective February 1, 2008.

Upon review of the document, Ohio EPA reviewed Millennium's response to previously cited violations.

1. Original NOV stated that Millennium remains in violation of OAC Rule 3745-30-08(C)(7), which requires the owner/operator to determine whether or not there are statistically significant differences from background values for each parameter or constituent required by paragraph (D), (E), or (F) of this rule. Millennium Landfill uses a Shewhart-CUSUM control chart approach that gives control limits for each parameter. Millennium is incorrectly performing the statistical analyses for the alternate parameter list, and it is unclear whether or not there is a statistically significant increase (SSI).

The statistical methodology Millennium employed for intrawell statistical analysis using the combined Shewhart-CUSUM control chart test was not completed and represented with actual parameter concentrations in  $\mu\text{g/L}$  or  $\text{mg/L}$  according to "*Statistical Analysis of Ground Water Monitoring Data at RCRA Facilities Unified Guidance*," March 2009 (EPA 530/R-09-007), Chapter 20.

***Current Response by Millennium:*** *The owner/operator supplied control charts where background data is demonstrated to be normal in accordance with the method in the Unified Guidance Document Chapter 20.*

**Current Response by Ohio EPA:**

Statistical analysis was completed and submitted in this report following the methodology in *“Statistical Analysis of Ground Water Monitoring Data at RCRA Facilities Unified Guidance,”* March 2009 (EPA 530/R-09-007) and statistically significant increases (SSIs) were correctly identified and submitted in Table 1 of this document. New background datasets were quantified and used in the control charts, and this is acceptable to Ohio EPA.

2. Original NOV stated that Millennium Ashtabula Landfill remains in violation of OAC Rule 3745-30-08(C)(5)(6) and (7), which requires the owner/operator to determine whether or not there are statistically significant differences from background values for each parameter or constituent required by paragraph (D), (E), or (F) of this rule. The owner/operator uses a Shewhart-CUSUM control chart approach that gives control limits for each parameter and Wilcoxon rank-sum test, the non-parametric counterpart. Millennium is incorrectly performing the statistical analyses for the alternate parameter list, and it is unclear whether or not there are statistically significant increases (SSIs) occurring.

Millennium did not properly follow the Shewhart-CUSUM Control Chart statistical methodology to completion. In addition, the issue of what constitutes or should constitute background has not been settled. It is not clear how Millennium evaluated the background data for trends and outliers before defining background and performing the Shewhart-CUSUM Control Chart method. Ohio EPA encourages Millennium to consult Chapter 20 of the *“Statistical Analysis of Ground Water Monitoring Data at RCRA Facilities Unified Guidance,”* March 2009 (EPA 530/R-09-007), for the latest guidance and instruction in utilizing the Shewhart-CUSUM Control Chart method. Ohio EPA would also like to encourage Millennium to consider using one of several statistical software packages that are available for assisting landfills in the structure and execution of statistical analysis of ground water data, including, but not limited to: DUMPStat®, Sanitas®, and AquaChem® to name a few.

Furthermore, the Wilcoxon rank-sum test was being used inappropriately. The test is to be used for comparing two datasets or groups of data. The Wilcoxon rank-sum test is better suited for use when conducting background update. Please consult Part III of the *“Statistical Analysis of Ground Water Monitoring Data at RCRA Facilities Unified Guidance,”* March 2009 (EPA 530/R-09-007) for

correct use of the procedure. In detection monitoring, we are comparing a single value against a group of background data to determine statistical significance. For non-parametric data, landfills generally use prediction limits to make this comparison.

***Current Response by Millennium:*** *The owner/operator does not understand the suggestion of not using the Wilcoxon rank-sum test as a non-parametric tool in detection and compliance monitoring. This is an acceptable method in the Unified Guidance Document for detection monitoring.*

**Current Ohio EPA Comment:** The Wilcoxon rank-sum test is an acceptable method for comparing two groups of data (each dataset comprised of four or more values). In detection monitoring, regardless of an interwell or intrawell type of testing format, a single value or concentration of each constituent at each downgradient well is compared to a background dataset typically made up of eight or more values of each constituent. Shewhart-CUSUM control charts are a parametric procedure with no existing non-parametric counterpart. Non-parametric prediction limit tests are still generally needed when the background data on which the control chart is constructed cannot be normalized. Control charts are mostly appropriate for analytes with a reasonably high detection frequency in monitoring wells. Millennium has returned to compliance with this violation, because the owner/operator states that control charts were completed with parametric background data only.

In addition, the letter addressed the following Ohio EPA recommendations:

1. Ohio EPA recommended that Millennium identify the source of the low levels of VOCs that were detected in November 2010 at monitoring well MW2-1: Benzene at 1.35 µg/L, and 1, 2-dichloroethane at 1.29 µg/L, and benzene in MW2-3 at 1.19 µg/L, and for May 2011, benzene was detected in monitoring well MW2-1 at a concentration of 5.47 µg/L, and in monitoring well MW2-3 at 1.03 µg/L, and determine the rate, extent, and concentration.

***Response by Millennium, July 10, 2012:***

*The source of low level VOCs is unknown to Millennium. The waste within the landfill contains none of the parameters. The constituents appear to be chemicals possibly used in the laboratory for testing and maintenance of equipment.*

**Response by Ohio EPA:**

Ohio EPA has reviewed Millennium's 2010 and 2011 annual reports and determined there are no VOCs present in the leachate. Please continue to note any VOCs present in the downgradient monitoring wells, and include field blanks for those wells with VOCs present in the ground water in the next sampling event.

**Response by Millennium:**

*Millennium will continue to note any VOCs present in the downgradient monitoring wells, and include field blanks for those wells with VOCs present in the ground water in the next sampling event for May 2013.*

**Current Response by Ohio EPA:** This is acceptable to Ohio EPA.

2. Ohio EPA recommended that Millennium Ashtabula Landfill refer to OAC Rule 3745-30-08(D)(8) when determining if there has been a statistically significant increase (SSI) which requires that if at any monitoring well, the owner or operator determines, for two consecutive semiannual statistical determination periods, that there has been a SSI from background values for one or more of the applicable indicator parameters specified in Appendix III of this rule according to the statistical method specified by the owner or operator pursuant to paragraphs (C)(5), (C)(6), and (D)(9) of this rule, the owner or operator shall notify Ohio EPA not later than 15 days after receiving the second period's statistical or analytical results which indicate a statistically significant change. The notification must indicate which parameters have shown a statistically significant change from background.

**Response by Millennium, July 10, 2012:**

*The background dataset selected will determine if an SSI occurred. If allowable background updates are incorporated or if the requested background data can be agreed upon, there are no SSIs. We look forward to the Agency's concurrence to proceed with the background update. Millennium agrees that when SSIs occur, demonstrations indicating a natural condition or errors in sampling or analysis will be submitted to the Agency as a separate document.*

**Response by Ohio EPA:**

It is recommended that the owner or operator evaluate potential background data prior to establishing or updating background. The background update should be in accordance with Solid Waste Rules 3745-30-08(C)(1), (C)(5) & (C)(6). After performing outlier tests, statistical

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Millennium Inorganic Chemicals, Inc.  
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trend analyses should be performed on background data, and background completed according to 3745-30-08 (C)(6)(g): 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.

**Response by Millennium:**

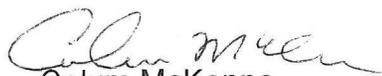
*The new background dataset will be employed from this point forward, and the owner/operator will follow the procedures outlined in OAC Rule 3745-30-08(D)(8) when determining if there has been a statistically significant increase (SSI), and will notify Ohio EPA in a separate letter within 15 days after receiving the statistical analysis.*

**Current Response by Ohio EPA:** This is acceptable to Ohio EPA.

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 the owner or operator, or others, from responsibility under Chapters 3704, 3714, 3734, or 6111 of the Ohio Revised Code or under the Federal Clean Water Act, Resource Conservation and Recovery Act, or Comprehensive Environmental Response, Compensation, and Liability Act for remedying conditions resulting from any release of contaminants to the environment.

Please contact Kay Springer Amey at (330) 963-1289 if you have any technical questions regarding this review. Otherwise, please submit all correspondence to Colum McKenna, Ohio EPA, Division of Materials and Waste Management, Northeast District Office, 2110 East Aurora Road, Twinsburg, Ohio 44087.

Sincerely,



Colum McKenna  
Environmental Specialist  
Division of Materials and Waste Management

CM/cl

cc: Katherine Springer Amey, NEDO-DDAGW  
Ray Saporito, Ashtabula County Board of Health  
Steve Kilper, ALMI  
File: [Singh/LAND/Millennium Landfill/GRO/04] DMWM #4050