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By Overnight and Electronic Mail

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U.S. Environmental Protection Agency
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Re: NT-NW Hourly Meteorological Data June 11 – November 22, 2014

Dear Mr. Czerniak and Ms. Cantello:

I write on behalf of KCBX Terminals Company to share with you the results of KCBX's recent review of its meteorological data pursuant to the requirements of the United States Environmental Protection Agency ("EPA")-approved "Quality Assurance Project Plan for the KCBX Terminals Company – Revision 1.1 (October 15, 2014)" ("QAPP"). Under Section D1 of the QAPP, KCBX conducts data reviews and examines PM₁₀ and meteorological data for measurement values that appear incongruous with normal measurement ranges and variations. Recently, we determined that a coding error in the data loading script for the database resulted in slight differences in the hourly meteorological data reported for the North Terminal-Northwest ("NT-NW") meteorological station from June 11 through November 22, 2014.

The underlying meteorological data collected from the NT-NW meteorological station were not affected, and no data from any other monitor were affected by the data loading script issue. Specifically, the data collected by the BAM-1020 PM₁₀ monitors (including the NT-NW PM₁₀ data), PartisolPlus 2025i filter-based air samplers, and meteorological instruments at the South Terminal, loaded to the database, and reported were not affected by this issue. The data loading script issue involved only the NT-NW meteorological data loaded to the database and subsequently reported. As a result, we are enclosing substitute hourly meteorological data files for the NT-NW meteorological station. A description of the data loading script issue is provided below.

During a review of network meteorological data in the wake of recent strong fronts passing through the Chicago area, we observed a difference between the meteorological data loaded to the database for the North and South Terminals. In view of prevailing weather patterns for the area, typically we would expect a drop in temperature at the North Terminal followed closely by a drop in temperature at the South Terminal. However, during a recent data review, we observed a drop in temperature at the South Terminal an hour before a corresponding drop in temperature at the North Terminal. The difference in the meteorological data between the North and South Terminals was not noticeable to data reviewers earlier in the year and only became apparent when the strong winter cold fronts, involving temperature drops of 8-10 degrees in an hour, began just a few weeks ago. Following an investigation into the root cause of the difference in meteorological data between the North and South Terminals, we determined that there was an issue with the data loading script for the NT-NW meteorological data.

The data loading script issue stems from two factors. First, all of the meteorological data (including ambient temperature, barometric pressure, wind speed, and wind direction) are collected in five-minute increments, and the data must be averaged to produce the hourly data sets that the U.S. Environmental Protection Agency (“EPA”) requested. Meanwhile, the BAM-1020 PM₁₀ monitor co-located at the NT-NW site collects PM₁₀ data on an hourly average basis. At the NT-NW site, one data logger records both the meteorological data and the PM₁₀ data—an arrangement unique to the NT-NW site where the two monitors are co-located—and the data loading script must be written to load the two types of data, hourly average PM₁₀ data and five-minute meteorological data that must be averaged to produce hourly data, correctly to the database. Second, monitoring equipment manufacturers vary in their data time stamp labeling of averages by start time or end time of the average (*i.e.*, some label the 09:00-09:59 hour as 09:00 by start time, while others label the same hour 09:01-10:00 as 10:00 by end time). Some of the monitoring equipment at the NT-NW site, including the meteorological instruments, use “end-time” stamps, rather than the “start-time” stamps preferred by EPA. The data loading script must also account for these differences among the monitoring equipment and reassign the data time stamps to start times when loading the data to the database.

On June 11, 2014, a network upgrade of the data loggers was performed to replace the previous data loggers. Because the data file format for the new data logger was different, a new data loading script was required. An error was made by our contractor in entering the code for the script, resulting in the difference in the meteorological data loaded to the database for the North and South Terminals described above. Instead of shifting all of the five-minute meteorological data increments for each hour from the end-time stamp to the start-time stamp, only the first five-minute increment from each hour was shifted. The first five-minute increment was then averaged with the remaining eleven five-minute increments that had not been shifted, resulting in slight differences in the meteorological data not readily identifiable by a data reviewer. As shown in the attached example (Attachment A), the temperature values differ modestly—by a few tenths of a degree up to approximately one degree. Similarly, wind speed differs modestly within a few tenths of a meter/second, and wind direction differs by a few degrees but the prevailing wind directions were not affected. These slight differences were not identified until the recent strong fronts highlighted the difference in the meteorological data between the North and South Terminals, bringing it to the data reviewers’ attention.

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The quality of the meteorological data collected was not affected by the data loading issue. The original data logger files are correct, and we have reloaded and validated all of the NT-NW meteorological data from June 11 through December 2 when the data loading script was corrected. We have also confirmed that there are no similar issues with the data loading scripts for the data loggers associated with all of the other monitors at the North and South Terminals. We are continuing to evaluate the data collected and reported at the North and South Terminals as part of the data review associated with our identification of the data loading script issue.

Enclosed are updated hourly data files for June 8 – November 22, 2014, containing the substitute meteorological data for the NT-NW meteorological station. The NT-NW meteorological data for November 23-29, 2014, were substituted prior to submission on December 9, 2014. The data loading issue had no impact on the data reported from any other monitoring site. Consequently, no changes have been made to data other than the meteorological data for the NT-NW meteorological station as a result of the data loading script issue. Please contact us should you have any questions or comments regarding this substitution of NT-NW meteorological data.

Sincerely,

/s/ Adam M. Kushner
Adam M. Kushner

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Enclosure

Cc: Ray Pilapil, Illinois Environmental Protection Agency

Attachment A

Table 1. Example of originally reported data affected by data loading script issue.

North Terminal Northwest Site										
DATE TIME	APM10 ug/m3	PRESS mmHg	TEMP DEG C	WSPD m/s	WDIR deg	HZD-S deg	GUST m/s	RESSP m/s	RESDR deg	HZD-V deg
10/19/14 0:00	19	751	3.33	1.1	277	11	1.5	1.1	277	11
10/19/14 1:00	17	750.7	2.7	1	261	15	1.3	0.8	261	15
10/19/14 2:00	16	750.7	2.05	0.6	248	16	0.9	0.5	244	16
10/19/14 3:00	19	750.6	1.79	0.8	244	13	1	0.6	244	12
10/19/14 4:00	32	750.7	1.32	0.8	242	13	1.2	0.7	244	13
10/19/14 5:00	20	751.1	1.99	1.5	251	10	2	1.5	249	10

Table 2. Example of substitute data for same time period after data were reloaded and validated.

North Terminal Northwest Site										
DATE TIME	APM10 ug/m3	PRESS mmHg	TEMP DEG C	WSPD m/s	WDIR deg	HZD-S deg	GUST m/s	RESSP m/s	RESDR deg	HZD-V deg
10/19/14 0:00	19	751	4.44	1.1	274	13	1.6	1	276	13
10/19/14 1:00	17	750.9	3.14	1.1	278	10	1.5	1.1	278	10
10/19/14 2:00	16	750.7	2.6	0.9	259	15	1.3	0.8	259	15
10/19/14 3:00	19	750.7	1.97	0.5	253	12	0.8	0.5	246	11
10/19/14 4:00	32	750.6	1.69	0.8	246	21	1.1	0.6	244	19
10/19/14 5:00	20	750.7	1.32	0.9	247	11	1.3	0.9	248	11