Winnebago Energy Center, LLC

Winnebago Energy Center, LLC
1716 Lawrence Drive
De Pere, WI 54115

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AIR ENFORCEMENT BRANCH
U.S. EPA. REGION 5

April 6, 2010

Mr. Joseph Ulfig
U.S. Environmental Protection Agency
Region 5
77 West Jackson Blvd.
Chicago, IL 60604-3590

Re: Notice and Finding of Violation EPA-5-10-06-IL

Dear Mr. Ulfig,

Winnebago Energy Center, LLC ("WEC") is in receipt of the above Notice and Finding of Violation dated February 4, 2010. On March 11, 2010, WEC representatives met with you and members of the Agency to discuss the violation notice.

This letter provides the additional information requested during our meeting, and also provides WEC's response to the alleged violations. Enclosed at Attachment A are calculations used by WEC to determine SO_2 emission rates and concentrations from the WEC engines. Attachment B contains a summary of the sequence of events that have transpired related to the SO_2 issue at the facility.

Allegation 1: By emitting sulfur dioxide in concentrations greater than 2,000 ppm from its engines at the facility, WEC is in violation of Condition 2(b) of its Construction Permit and 35 IAC § 214.301.

WEC Response: WEC disagrees with the alleged violation. While landfill gas ("LFG") samples analyzed have shown total reduced sulfur concentrations above 2,000 ppm, WEC is certain that the concentration of sulfur dioxide emitted from the affected engines has not exceeded the emission limitation. As noted above, calculations demonstrating compliance with the emission limitation are enclosed at Attachment A.

Sulfur contamination of the landfill gas is a byproduct of anaerobic decomposition of sulfur containing compounds. In this case, we understand from William Charles, owner and operator of the landfills, that calcium sulfate (commonly found in drywall) which has been placed on the landfills is the source of the sulfur contamination. Total reduced sulfur in the landfill gas (primarily as hydrogen sulfide) is converted to sulfur dioxide during the combustion process:

$$2\,H_2S + 3\,O_2 \Leftrightarrow 2\,SO_2 + 2\,H_2O$$

In order for combustion of the landfill gas to occur in the WEC engines, oxygen must be introduced. For proper combustion of landfill gas in the WEC engines, air and fuel are combined in the engine cylinders at an air to fuel ratio of approximately 10:1 (based upon manufacturer technical information available).

The maximum total reduced sulfur concentration observed to date was 3,353 ppmv. Using the calculations found in Attachment 1 and assuming the maximum fuel consumption rate of 650 scfm (100% engine load, per the engine manufacturer), the corresponding emission rate would be 21.6 lbs/hour at a concentration of 423 ppmv SO_2. Accordingly, WEC has not exceeded the 2,000 ppmv SO_2 emission limitation in the construction permit.

Allegation 2: By failing to undertake further actions as may be needed to eliminate air pollution from the Facility, WEC is in violation of Condition 4(b)(ii) of its construction permit.

WEC Response: See WEC Response to Allegations 3. In addition, except as noted in WEC Response to Allegation 3, all of the facility air emissions are within permitted levels.

Allegation 3: By emitting sulfur dioxide in excess of 0.28 pounds per hour and 1.23 tons per year from each engine, and 4.94 tons per year in aggregate from all four engines at the facility, WEC is in violation of Condition 6(b) of its construction permit.

WEC Response: Beginning in June 2009, WEC notified the Illinois EPA ("IEPA") about this issue. As was discussed during the March 11th meeting, the application to construct an air emission source for the Winnebago Energy Center was submitted to the IEPA on March 5, 2007. The SO_2 emission rates calculated for the affected engines in that application were based upon an assumed total reduced sulfur concentration of 40 ppm. This was the concentration identified in landfill gas samples collected prior to project development.

Landfill gas analyses conducted after the facility began operation have revealed that the total reduced sulfur concentration is higher than anticipated; consequently, the mass emission rates for the affected engines have been higher than the levels set forth in the construction permit.

WEC promptly reported the deviation to the IEPA permit compliance staff on July 7, 2009. As a means to address the increased total reduced sulfur concentrations observed in the landfill gas combusted by the affected engines, WEC filed an application to modify the construction permit with the IEPA on August 7, 2009 in order to correctly reflect emissions from the affected units. WEC is currently working with IEPA permitting staff on the modification of the construction permit.

Allegation 4: By causing, threatening, or allowing the discharge or emission of any contaminant into the environment so as, either alone or in combination with contaminants from other sources, to cause or tend to cause air pollution in Illinois, WEC is in violation of 35 IAC § 201.141.

WEC Response: See WEC Responses to each of the U.S. EPA allegations herein.

Allegation 5: The Facility's violation of its construction permit and the SIP constitutes a violation of section 502 of the CAA and 40 CFR §70.7(b).

Response: See WEC Responses to each of the U.S. EPA allegations herein.

WEC appreciates the opportunity to meet with you on this issue. If you have any questions about the information contained in this submittal, please feel free to contact Mr. Mark Metcalf at (920) 617-6046.

Sincerely,

Daniel J. Verbanac
Vice President – Winnebago Energy Center, LLC

Attach.

Cc: Mr. Scott Johnson – Integrys Energy Services, Inc.
Mr. Tom Hilbert – William Charles Waste Companies
Mr. Evan Buskohl – William Charles Waste Companies
Mr. Jeff Gregory – William Charles Energy, LLC
Ms. Linda Benfield – Foley & Lardner
Mr. Mike Jouras – Integrys Business Support, LLC

Attachment A

Sulfur Dioxide Emission Calculations

35 IAC 214.301 requires that sulfur dioxide (SO_2) emissions from any process emission source must not exceed 2,000 ppm. The following calculation methodology demonstrates that for each of the four (4) Caterpillar Model G3520C LFG fueled generator sets at the Winnebago Energy Center facility, the resulting SO_2 concentrations in the exhaust stack flue gas are less than the maximum allowable 2,000 ppm limitation.

The hourly mass SO_2 emission rate for each engine is calculated as follows:

$$(\text{LFG Fuel Flow}) \times \left(\frac{\text{TRS}}{1{,}000{,}000}\right) \times \left(\frac{64\ \text{lb}\ SO_2}{\text{lb - mole}}\right) \times \left(\frac{\text{lb - mole}}{387\ \text{scf}}\right) \times \left(\frac{60\ \text{min}}{\text{hour}}\right) = SO_2\ \frac{\text{lbs}}{\text{hour}}$$

The resulting SO_2 concentration (ppmv) in the engine exhaust stack flue gas is calculated, using the SO_2 mass emission rate (above) and the engine exhaust mass flow rate, as follows:

$$\left(SO_2\ \frac{\text{lbs}}{\text{hour}}\right) \times \left(\frac{1}{\text{Exhaust Mass Flow}}\right) \times \left(\frac{28\ \text{lb}}{\text{lb - mole}}\right) \times \left(\frac{\text{lb - mole}}{64\ \text{lb}\ SO_2}\right) \times 1{,}000{,}000 = SO_2\ \text{ppm}$$

where:

Engine LFG Fuel Flow	= 650 scfm (maximum engine design capacity)
Engine Exhaust Mass Flow	= 22,318 pounds/hour (design at 100% engine load)
TRS (Total Reduced Sulfur)	= Total sulfur concentration in the LFG fuel (ppmv)
Exhaust Gas Molecular Weight	= 28 lb/lb-mole (typical for combustion of gaseous fuel)
Sulfur Dioxide Molecular Weight	= 64 lb SO2/lb-mole Sulfur
Molar Gas Volume of Gas	= 387 scf LFG/lb-mole SO2(at 70°F and 14.7 psi)

Total Reduced Sulfur Concentrations in the LFG Fuel

And the Resulting SO_2 Emissions at the Engine Exhaust Stack

TRS (ppmv)	SO_2 (lb/hr)	SO_2 (ppmv)
200	1.3	25
1,000	6.4	126
2,000	12.9	253
4,000	25.8	506
8,000	51.6	1,011
15,000	96.7	1,896

Attachment B

Summary of Events Related to SO_2 Emissions From Winnebago Energy Center

Date	Event
03/05/2007	Application for construction of an air emission source filed with IEPA.
05/07/2007	Construction Permit issued to Winnebago Energy Center.
12/17/2007	Winnebago Energy Center began operation.
09/01/2008	Received first Landfill Gas (LFG) analysis indicating total reduced sulfur (TRS) concentrations were above 40 ppm in each landfill. The TRS concentration discrepancy between the construction permit submittal was not identified.
10/31/2008	Submitted an application for a Clean Air Act Permit Program (CAAPP) permit with IEPA.
11/07/2008	Received a CAAPP Application Completeness Determination from IEPA.
03/2009	The discrepancy between the construction permit TRS levels and LFG analysis results was identified. WEC began an investigation into TRS levels.
04/06/2009	Collected LFG samples.
04/22/2009	Received an analytical report for samples collected on 04/06/09 from Analytical Solution, Inc. indicating TRS concentrations were over 40 ppm in both landfills.
04/30/2009	LFG samples were collected and sent to an alternate laboratory to confirm 04/22/09 sample results.
06/06/2009	Results from 04/30/09 sampling received.
06/08/2009	Contacted IEPA permitting section to inform the Department of the TRS issue. Began process for submitting a construction permit modification request to address the TRS concentrations observed.
06/18/2009	Received analytical results from samples collected on 06/11/09. Results confirmed upward trend in TRS concentration.
07/07/2009	WEC filed a written confirmation with IEPA Compliance Section of the potential deviation from certain terms of the construction permit due to TRS concentrations observed in the LFG, as previously discussed with IEPA on 06/08/2009.
07/28/2009	Provided additional information on LFG analytical results and potential SO_2 emissions to Ms. Yasmine Keppner of IEPA.
08/07/2009	Submitted an application for a revision of the construction permit for WEC to address the TRS concentrations in the LFG observed.
09/25/2009	Provided LFG analytical reports for samples collected in July and August 2009 to Ms. Yasmine Keppner of IEPA.

12/11/2009	Received draft version of the revised construction permit from IEPA. The revised draft version included increased hourly SO_2 emission limits and annual SO_2 emission limitations.
02/03/2010	Provided comments to IEPA on the draft revised construction permit for WEC.
02/04/2010	Received Violation Notice from IEPA regarding SO_2 emissions.
02/05/2010	Provided information to IEPA regarding total reduced sulfur concentrations observed in the LFG.
02/08/2010	Received Notice and Finding of Violation From U.S. EPA regarding SO_2 emissions.
03/02/2010	Met with IEPA permitting staff to discuss construction permit modification.
03/11/2010	Met with EPA Region 5 staff to discuss the Notice and Finding of Violation received 02/08/2010.
03/12/2010	Provided IEPA updated SO_2 emission calculations demonstrating compliance with the 2,000 ppm emission concentration limit in the construction permit.
03/18/2010	Submitted a written response to IEPA regarding the Violation Notice dated 02/04/10.