



Verso Corporation

Quinnesec Mill
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Ms. Janis Ransom
Air Quality Division
Michigan Department Environmental Quality
1504 W. Washington St., Suites A & B
Marquette, MI 49855

Subject: Verso Corporation Quinnesec, MI-ROP-B7192-2013, Recovery Furnace SO₂ Deviation – Corrective Action Plan

Dear Ms. Ransom,

Verso Corporation's Quinnesec mill reported deviations from the facility's ROP SO₂ 12-month rolling permit limit of 19.06 tons per year during 2015 and 2016. The increased SO₂ emissions were the result of several operational factors which the mill has identified and taken steps to address to ensure ongoing compliance with the SO₂ limit. Because of the success of this action plan, it was determined that a previously submitted PTI application to increase the SO₂ limit was not necessary. The actions taken to reduce SO₂ emissions are summarized below.

Background

The Recovery Furnace plays an important role in the Kraft pulping process. Spent cooking liquor (black liquor) from the pulping process is concentrated and burned in the Recovery Furnace where the organic portion of the black liquor is readily combusted and inorganic portion is reclaimed and returned to the pulping process. The Recovery Furnace produces a significant amount of steam that is used throughout the mill. SO₂ is formed during the oxidation of black liquor sulfur compounds. Pollutant emission levels are impacted by many factors including, but not limited to, black liquor characteristics/chemistry, combustion air flow and temperature, and liquor spray pattern. Operational conditions which are favorable for lower emissions of one pollutant are often unfavorable for another and a balance must be found. It was determined through investigation and trials that the major contributors to increased Recovery Furnace SO₂ emissions were related to low combustion air temperatures and changes in the black liquor chemistry.

Recovery Furnace SO₂ emission limits are detailed below:

- 50 ppmvd (@ 8% O₂) – 24 hour daily average
- 110 pph – 24 hour daily average

- 19.06 TPY – 12-month roll (determined at the end of each month)

The 19.06 TPY limit was incorporated into the current ROP from PTI 55-12, which was issued in May 2012.

Action Plan

The following actions were taken to reduce SO₂ emissions and ensure ongoing compliance with the 12-month rolling average SO₂ limit:

1. It was determined through trials that the combustion air temperature, particularly the secondary air, had a major impact on SO₂ emissions. Operational modifications were made and maintenance was performed to improve the performance of the steam coil air heaters (SCAH). A procedure was developed to more effectively clean and perform maintenance on the SCAH coils. Centerlining alarms were put in place to ensure air temperatures remain within the optimal range.
2. It was determined through trials that increased combustion air flow to the lower furnace (below the liquor guns) resulted in a hotter lower furnace, reducing SO₂ emissions. Combustion air splits were adjusted and centerlining alarms were put in place to ensure that the air splits remain within the optimal ranges.
3. It was also determined through trials that increasing the % solids of the fired black liquor resulted in lower SO₂ emissions by increasing the lower furnace temperatures. The liquor solids target was increased and centerlining alarms were adjusted to ensure optimal liquor solids.
4. Training was conducted to educate operators on the principles of SO₂ control. Centerlining alarms were put in place to proactively alert operators when SO₂ emissions are above established levels. An operator guideline (SOP) was developed for operators to respond to high SO₂ events.

The above actions have been successful in reducing Recovery Furnace SO₂ emissions and maintaining SO₂ emissions at levels below the 12-month rolling average limit. If you have any questions, please contact me at (906)779-3494.

Sincerely,



Paula LaFleur
Environmental Engineer

cc: Joel Asher – MDEQ, Marquette Office

Mike Glodowski, Jeff Maule, Sarah Blanzky, Greg Kulas, Sam Miller, Alex Claverie
– Verso

