


Attachment 3

Pennsylvania Coal Plant Hourly Operations

June 29, 2018 through July 14, 2018

For the Record / OTC Public Hearing
August 16, 2019

Overview

Attachment to DEP's OTC Testimony – Information for the Record

DEP is providing data and a summary of coal unit operations, as identified by Maryland's petition to the OTC for additional control measures, for the ozone episodic periods from June 29, 2018 through July 14, 2018. CAMD NOx hourly data was reviewed from June 29, 2018 through July 14, 2018. The summary is based upon graphs of that CAMD data starting on Slide 4. The graphed time period is based on hourly data over the entire period. Hour #1 is 12:00 a.m. on July 29, 2018 and hour #384 is 11:00 p.m. on July 14, 2018. Emission limit means the limit when the unit is operating at a high enough catalyst temperature (Temp) to inject ammonia into the SCR (600 Degrees Fahrenheit). Capacity is the percentage of max capacity divided by 100 and is reflected by a decimal number on the graph. Thus, 25% capacity is represented by 0.25 on the graph. A unit reaches temperature when it is operated at approximately 60% or more of its maximum rated capacity. Pennsylvania units are operating in accordance with RACT II requirements and no additional emissions reductions are available based upon Maryland's analysis for optimizing SCRs.

Regular Coal Units Summary of Operations and NOx Emission Rates for June 29 through July 14, 2018.

- **Bruce Mansfield Unit 1:** The unit operated below 45% of its rated capacity for each hour of operation during the ozone episode. At this capacity, the SCR unit did not reach temperature. Additionally, the unit has since been deactivated.
- **Bruce Mansfield Unit 2:** Did not operate during this ozone episode. The unit has since been deactivated.
- **Bruce Mansfield Unit 3:** For the majority of its operation, emissions were approximately **0.08 LBS/MMBTU**. It exceeded 0.1 LBS/MMBTU around hour 141. The unit never exceeded 0.12 LBS/MMBTU. This unit has announced shut down in 2021.
- **Cheswick Unit 1:** This unit cycles from high to low capacity. At capacities near 30% of rated capacity, emissions rise to roughly 0.35 LBS/MMBTU. At high capacities, the unit operates just under **0.12 LBS/MMBTU.**
- **Conemaugh Unit 1:** This is a coal unit operating at or near **0.05 LBS/MMBTU** with few exceptions for capacity changes.
- **Conemaugh Unit 2:** This is a coal unit operating at or near **0.05 LBS/MMBTU** with few exceptions for capacity changes.

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Overview

- **Keystone Unit 1:** The operations for this unit typically emit below **0.10 LBS/MMBTU.** Commonly, the unit is operated at an NOx rate of 0.08 LBS/MMBTU. Spikes up to 0.35 LBS/MMBTU occur but only during periods of low operating capacity.
- **Keystone Unit 2:** Operations are typically below **0.08 LBS/MMBTU.** Spikes typically up to 0.35 lbs/mmbtu during periods of lower capacity.
- **Montour Unit 1:** Operations are typically below **0.08 LBS/MMBTU**. Occasional spikes up to 0.38 lbs/mmbtu during periods of lower capacity and load changes. Cycles between loads with relatively consistent emissions rates. Facility working on natural gas line connection. OS capacity factor 32% in 2018.
- **Montour Unit 2:** Operations are typically at and below **0.10 LBS/MMBTU.** Occasionally spikes up to 0.45 lbs/mmbtu during periods of lower capacity and load changes. Cycles between loads when operating. Facility working on natural gas line connection. OS capacity factor 14% in 2018.
- **Homer City Unit 1:** Baseload coal unit typically operating at near 50% capacity. Interim limit of 0.22 lbs/ mmbtu until SCR upgrades are complete. Typical emissions less than **0.15 LBS/MMBTU** with operation spikes. SCR upgrades will be complete by the end of the year.
- **Homer City Unit 2:** Baseload coal unit typically operating at near 50% capacity. Interim limit of 0.22 lbs/ mmbtu until SCR upgrades are complete. Typical emissions less than **0.15 LBS/MMBTU** with operation spikes. SCR upgrades will be complete by the end of the year.
- **Homer City Unit 3: :** Baseload coal unit with cycling capacity and emissions typically below **0.11 LBS/MMBTU**. Little variation in emissions rates over range of capacities at which it is operated. Variations in NOx lbs. per hour is proportional to capacity.

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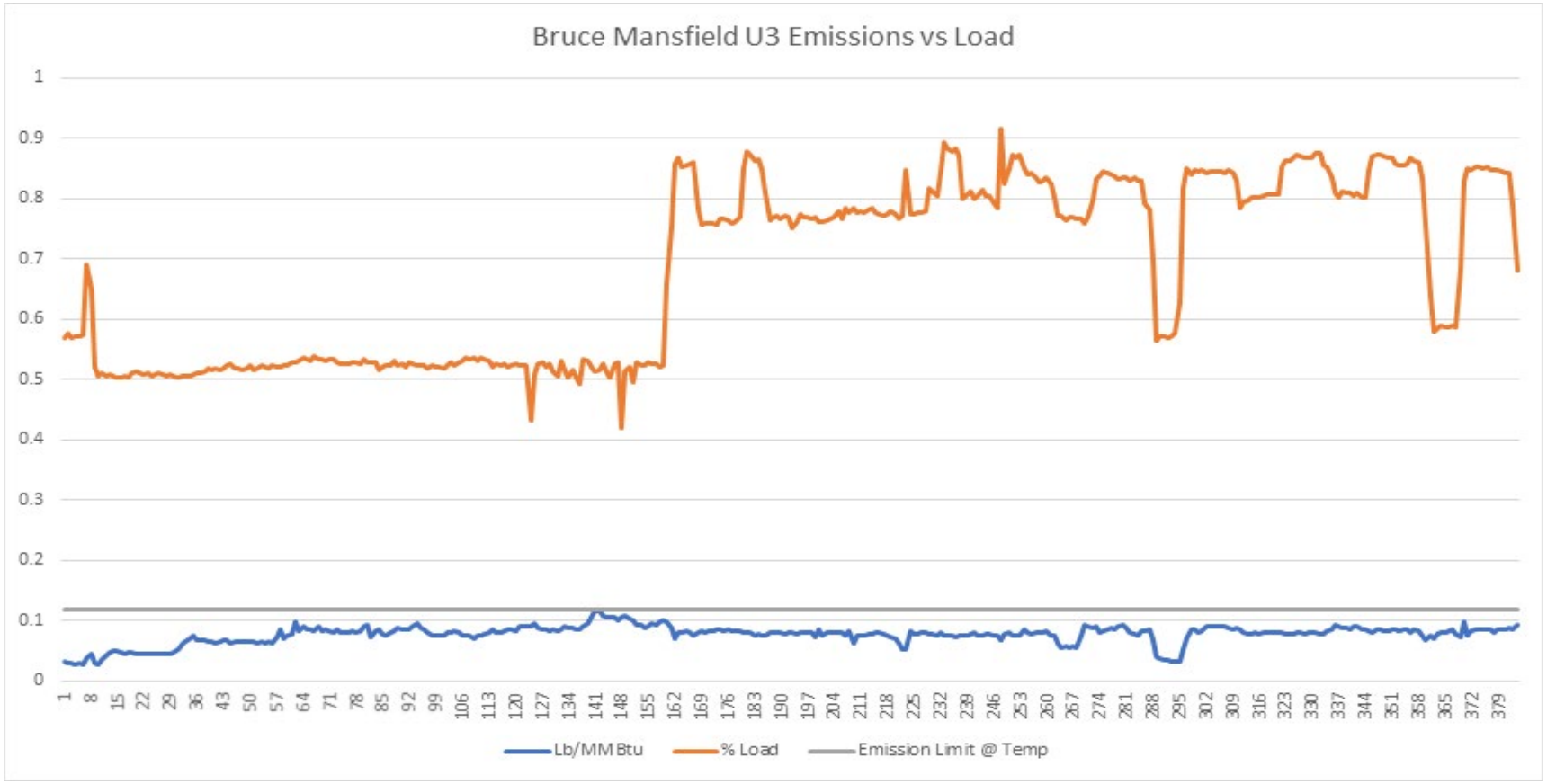
Bruce Mansfield Unit 3

Unit 3



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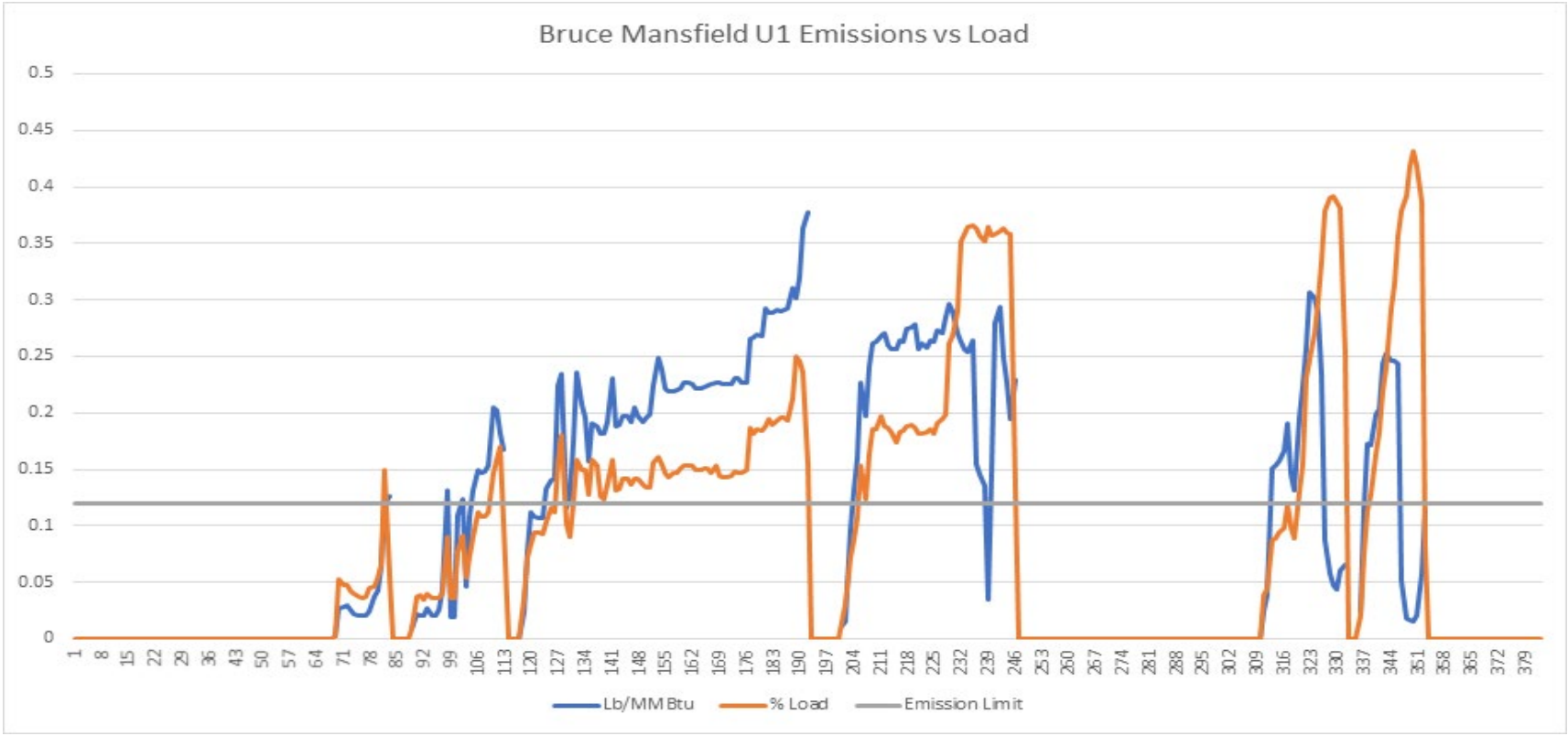
Bruce Mansfield Units 1 and 2

Unit 2 - Did not operate during episode. Deactivated in 2018.

Unit 1 - Deactivated in 2018. (Did not reach 60% capacity.)



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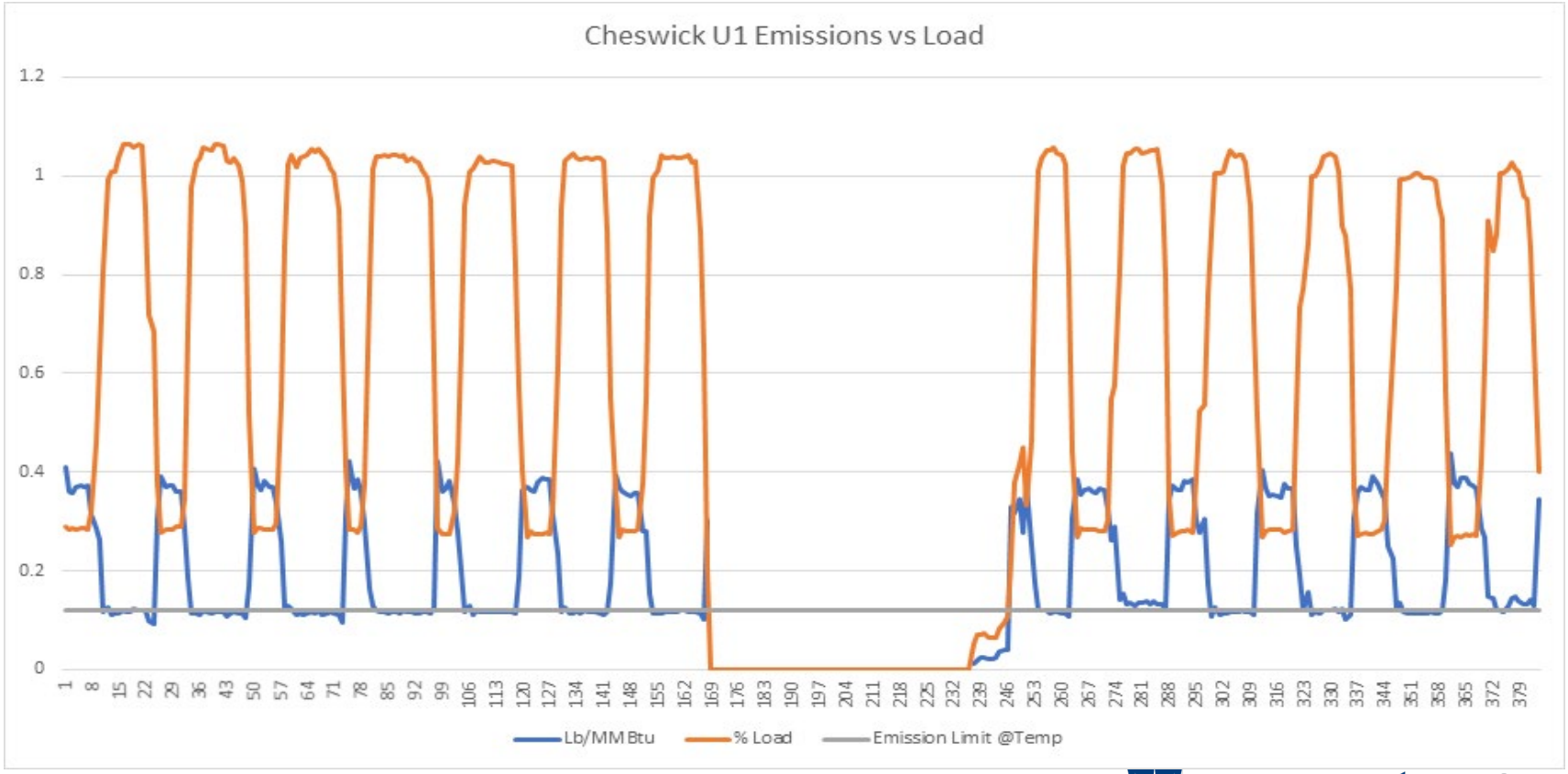
Cheswick Unit 1

Unit 1 - (Unit cycles between low and high capacity due to market demand. The unit's emission rate also cycles with capacity changes.)



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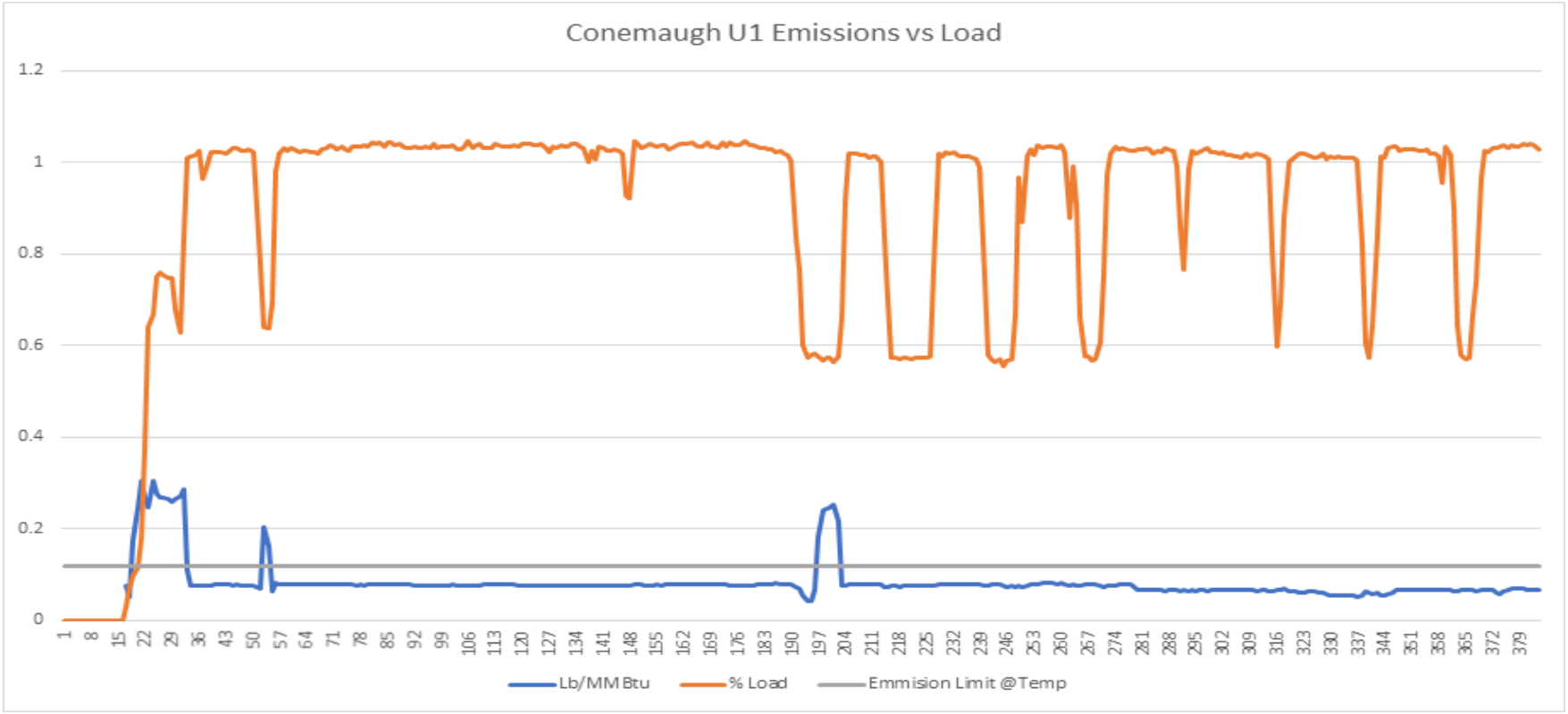
Conemaugh Unit 1

Unit 1- Unit's emission rate increase rarely during capacity transitions and start-ups, but mostly remain low and constant.



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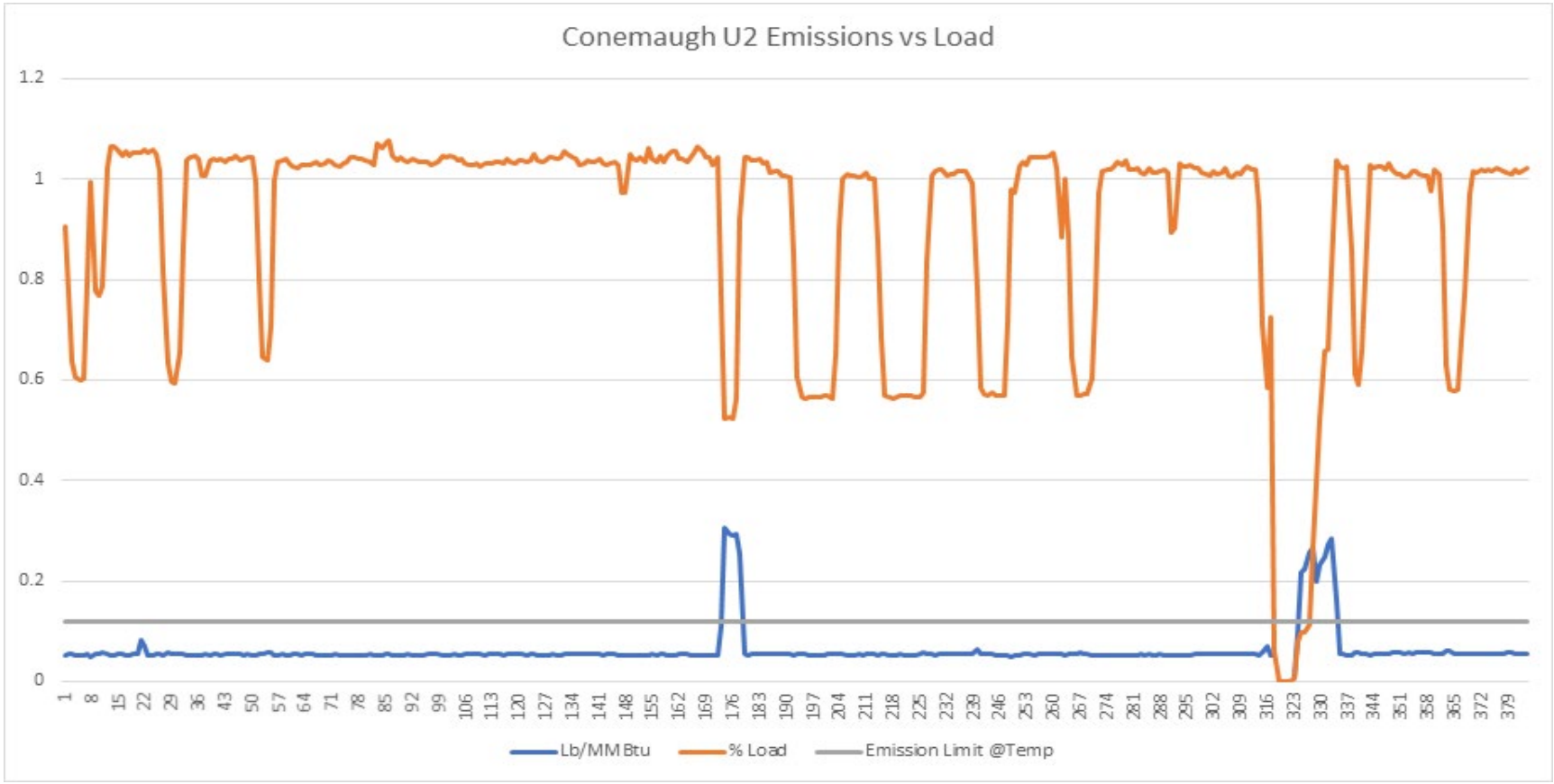
Conemaugh Unit 2

Unit 2 - Unit's emission rate increase rarely during capacity transitions and start-ups, but mostly remain low and constant.



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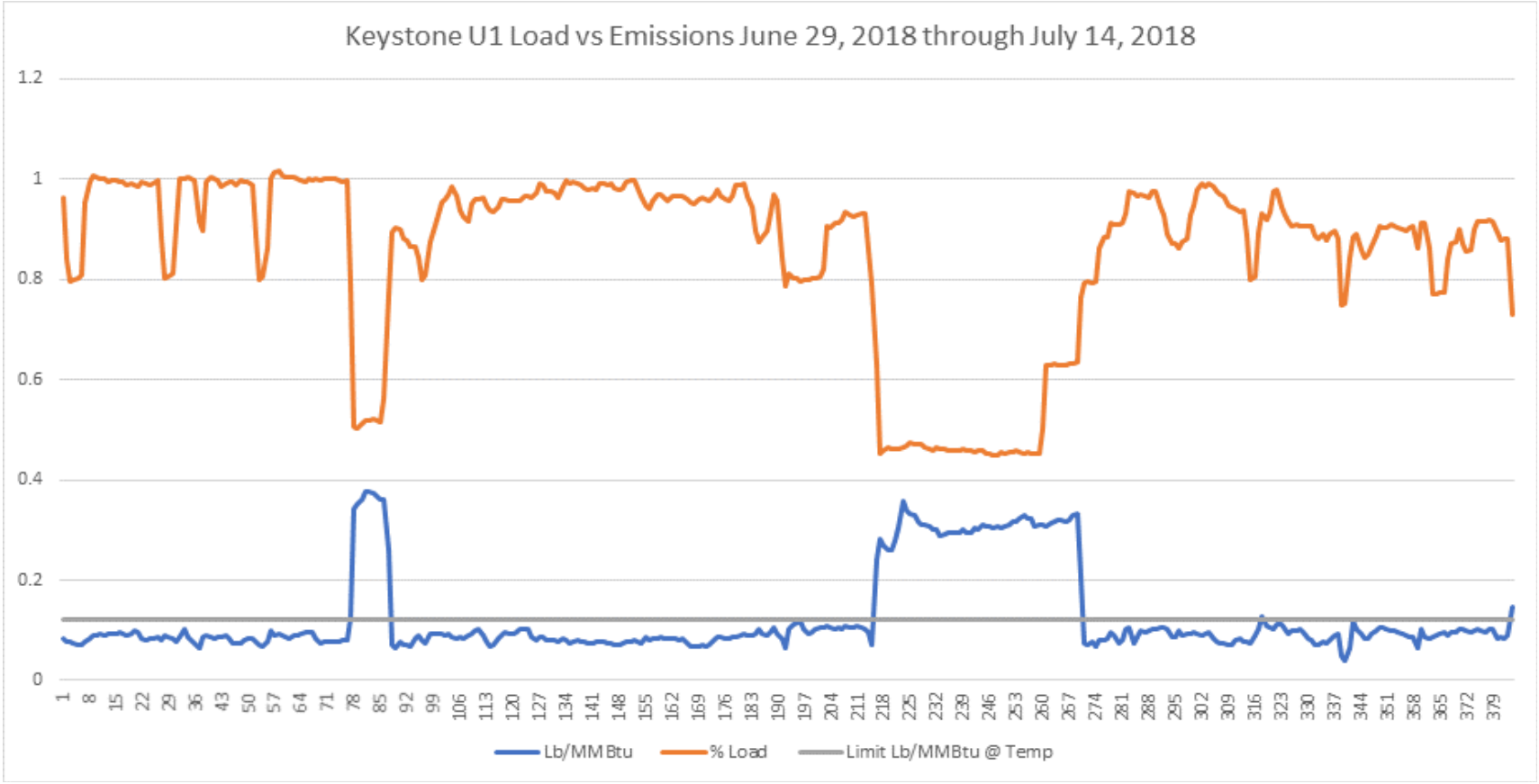
Keystone Unit 1

Unit 1 – Emissions remain below RACT limits. Higher emissions occur during periods of low capacity.



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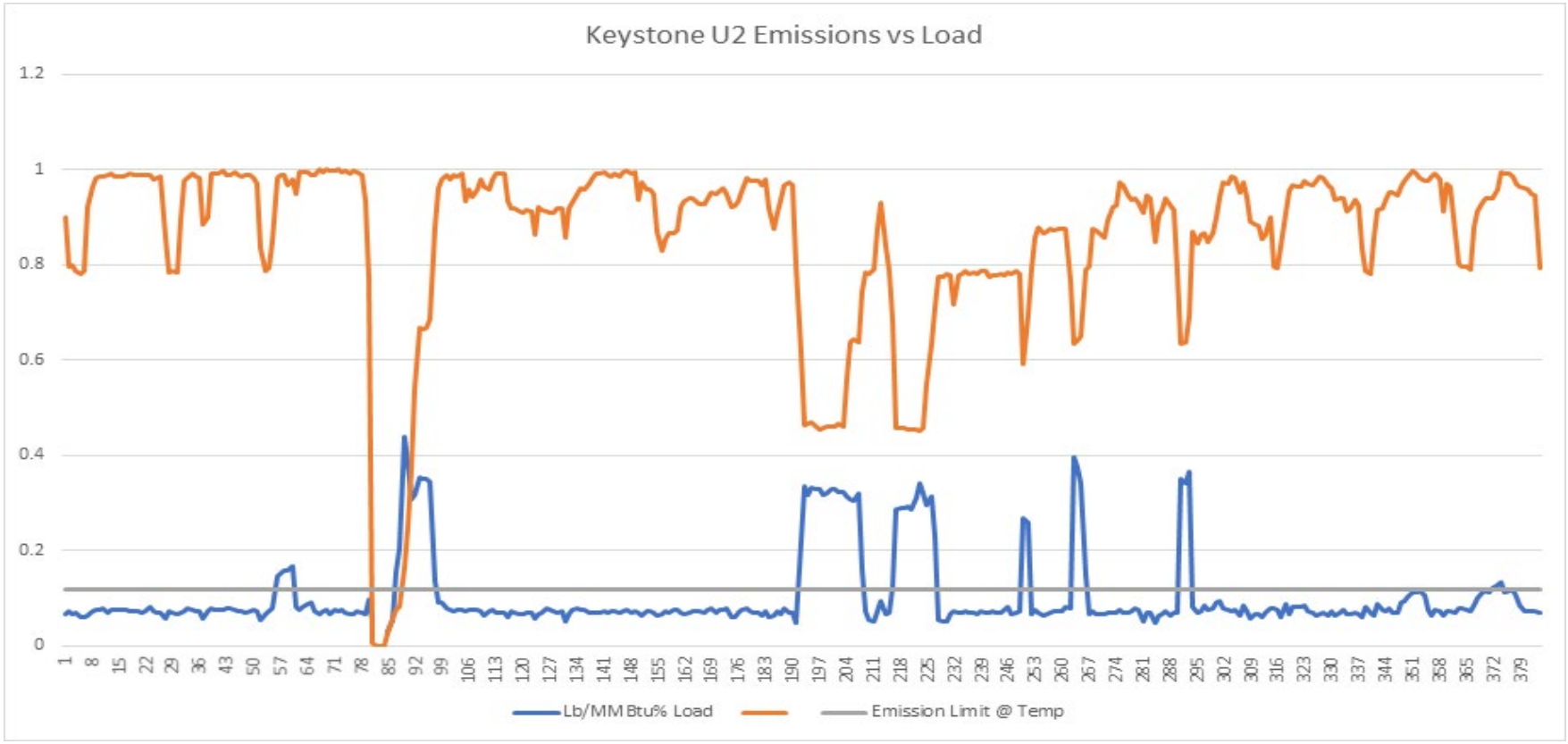
Keystone Unit 2

Unit 2 - Emissions remain below RACT limit. Higher emission rates occur during periods of low capacity and capacity transitions.



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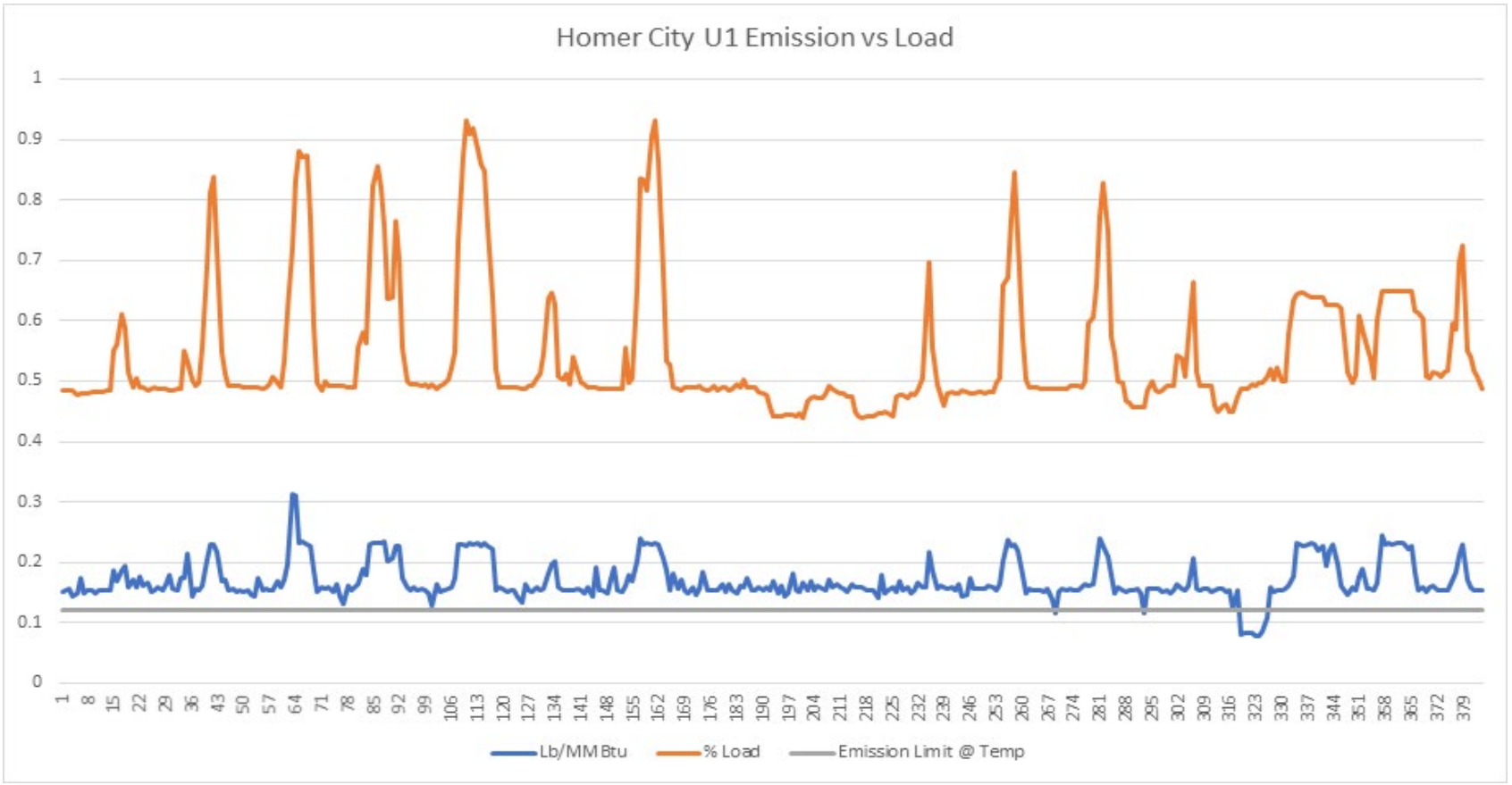
Homer City Unit 1

Unit 1 – Upgraded SCR to be completed in 2019. Interim Limit 0.22 LBS/MMBTU.



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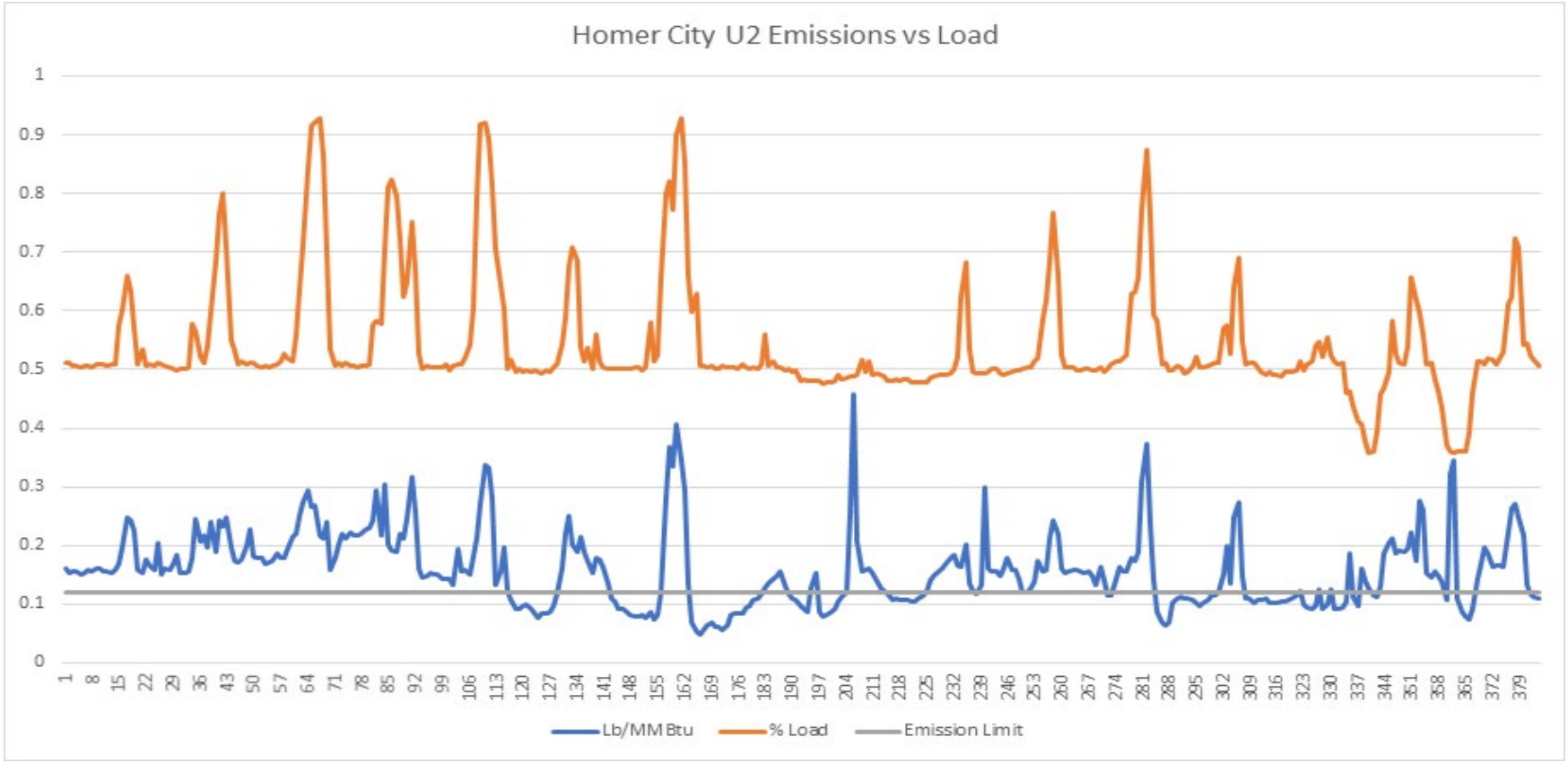
Homer City Unit 2

Unit 2 - Upgraded SCR to be completed in 2019. Interim Limit 0.22 LBS/MMBTU.



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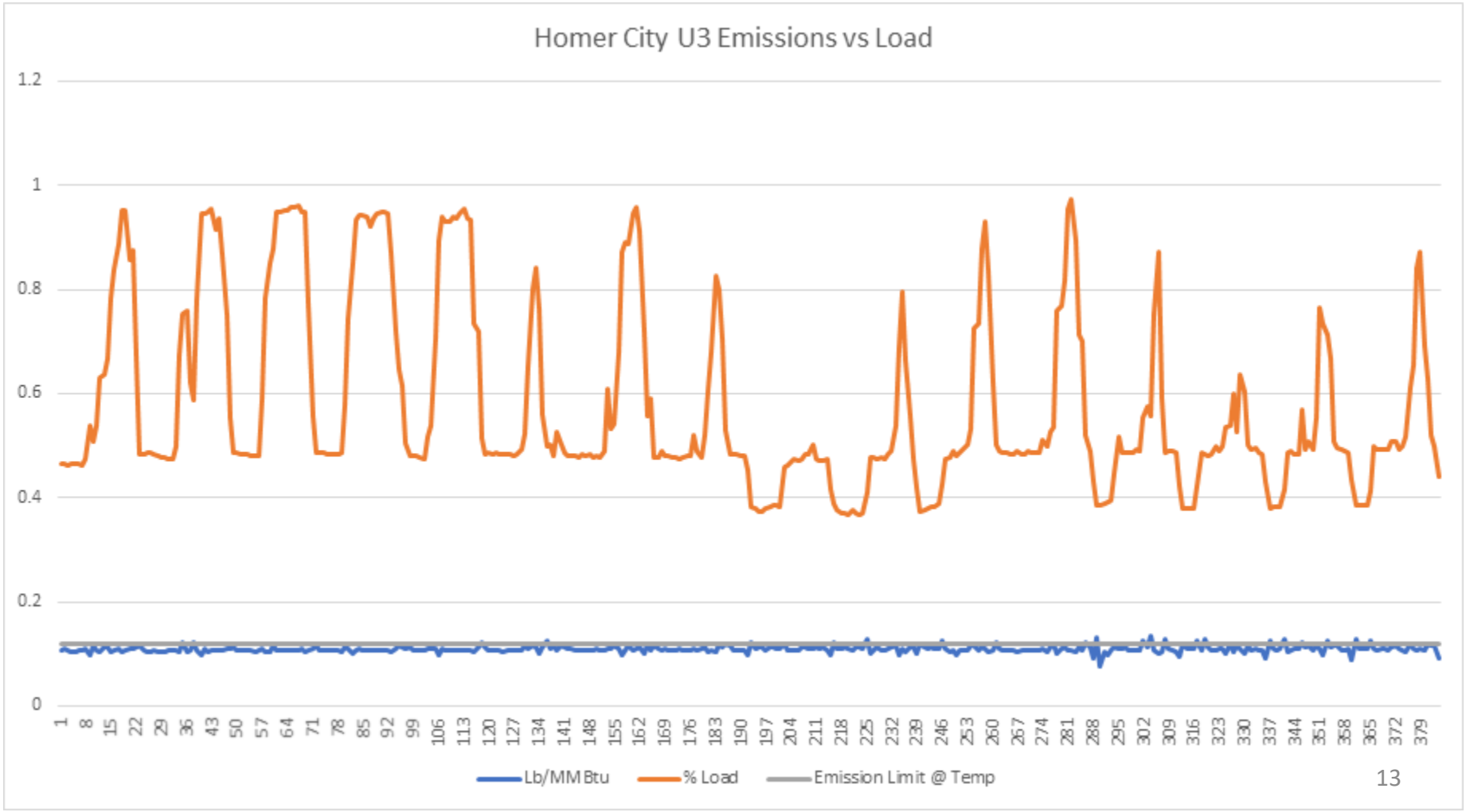
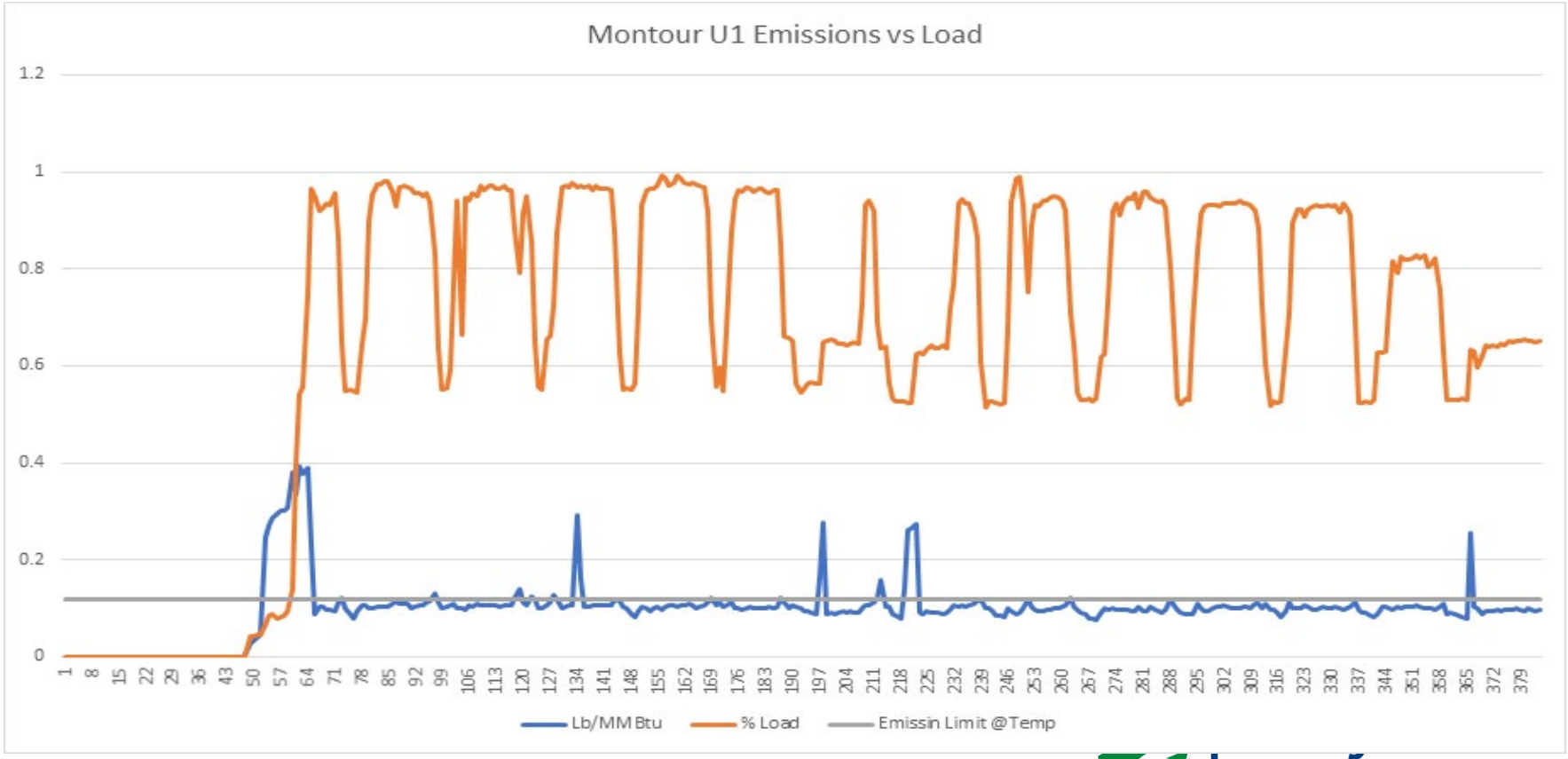
Homer City Unit 3

Unit 3 – Unit cycles but operates consistently below RACT limit. Unit maintains temperature through cycles.



Montour Unit 1

Unit 1 – Installing natural gas pipeline for 2020. Capacity cycles but remains below emission limit of 0.12 LBS/MMBTU with a few exceptions for capacity transitions and start-up.



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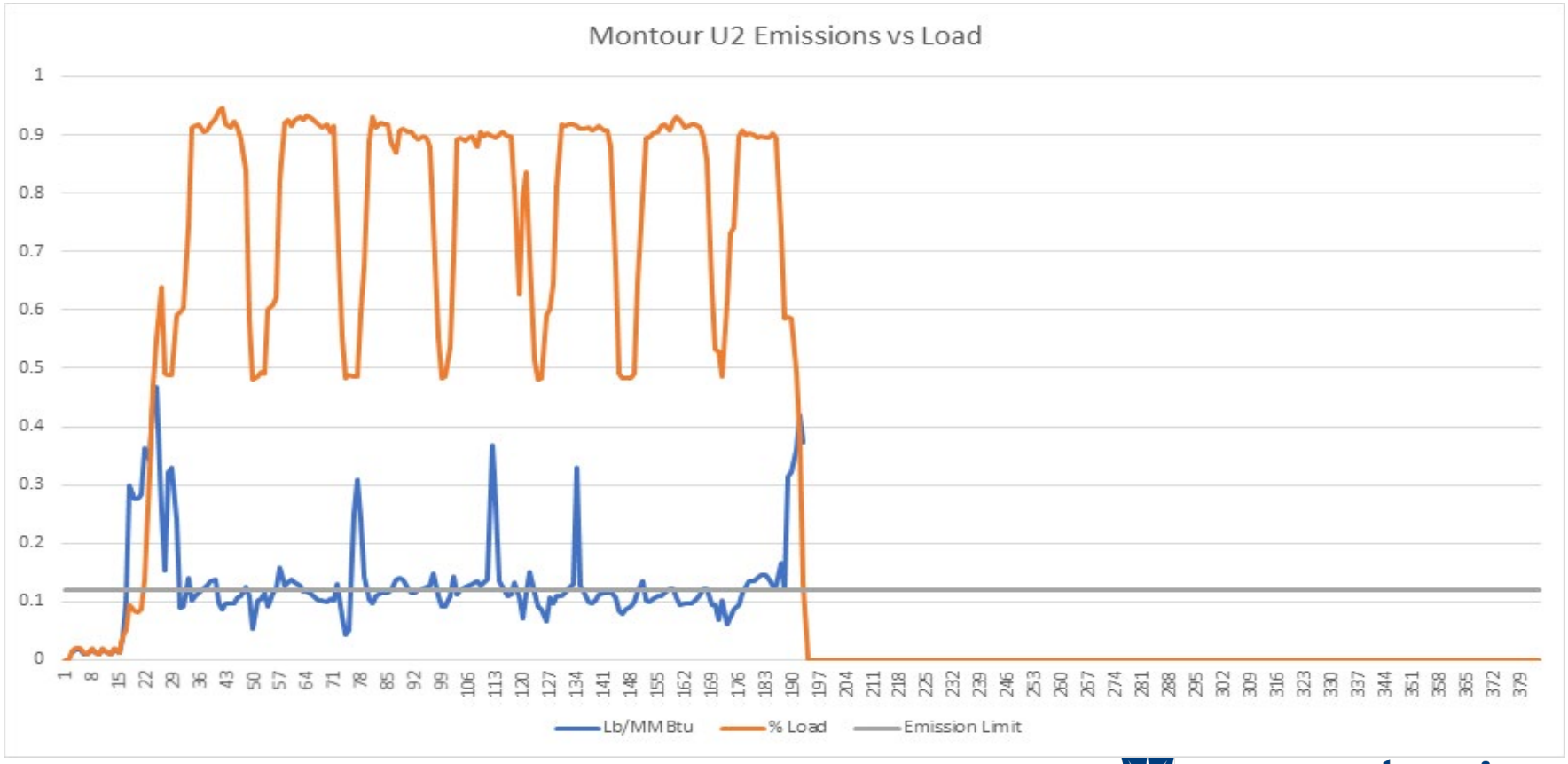
Montour Unit 2

Unit 2 - Installing natural gas pipeline for 2020. Capacity cycles but typically below 0.12 LBS/MMBTU with a few exceptions for capacity transitions and start-up.



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Overview Waste Coal Units

CFB Waste Coal Units – The variations in CFB waste coal emissions are often the result of variations in the type of coal waste and BTU value of coal waste burned and are not necessarily related to the controls on a particular unit. Based upon the data observed, Pennsylvania operators run the units consistently while optimizing unit operations to remain below the RACT II emission rate of 0.16 LBS/MMBTU. However it is important to note that as coal waste changes over time, so can emissions. It is not technically feasible to base optimization on "best achieved rates." A best rate may only be able to be achieved if the waste coal is always consistent with the waste coal burned when the best rates were achieved.

- **Cambria Cogen Units 1 and 2:** Units use SNCR and operate consistently at and below 0.16 LBS/MMBTU. Operate at RACT levels in line with CFBs in other states. Both units were idled as of March 5, 2019.
- **Panther Creek Unit 1:** Not running as a baseload unit. Typical emissions 0.13 LBS/MMBTU with variation of emission rate at startup and shutdown. SNCR controls. This is a 47 MW unit with a recent annual operating capacity factor of 1%.
- **Panther Creek Unit 2:** Operated at less than 0.13 LBS/MMBTU throughout episode. This is not a baseload unit. SNCR controls. This is a 47 MW unit with a recent annual operating capacity factor of 4%.
- **Scrubgrass Unit 1:** Baseload waste coal with SNCR. Variations in capacities likely due to nature of coal waste. Emissions typically remain below 0.15 LBS/MMBTU.
- **Scrubgrass Unit 2:** Baseload waste coal with SNCR. Variations in capacities likely due to nature of coal waste. Emissions typically remain below 0.15 LBS/MMBTU.
- **Seward Unit 1:** Baseload waste coal with SNCR. Variations in capacities likely due to nature of coal waste. Emissions typically remain below 0.14 LBS/MMBTU. BAT NOx Limit is 0.15 LBS/MMBTU.
- **Seward Unit 2:** Baseload waste coal with SNCR. Variations in capacities likely due to nature of coal waste. Emissions typically remain below 0.14 LBS/MMBTU. BAT NOx Limit is 0.15 LBS/MMBTU.

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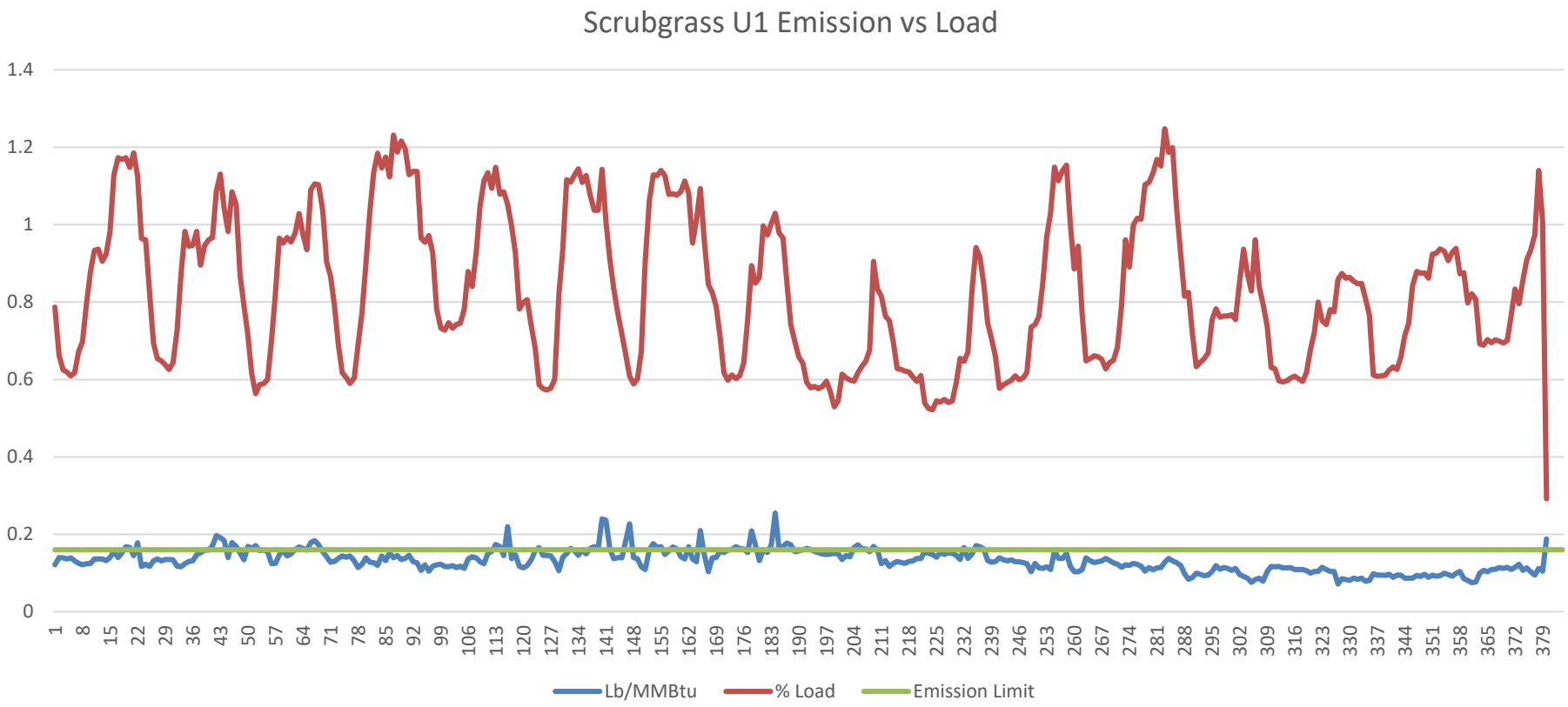
Scrubgrass Unit 1

Unit 1



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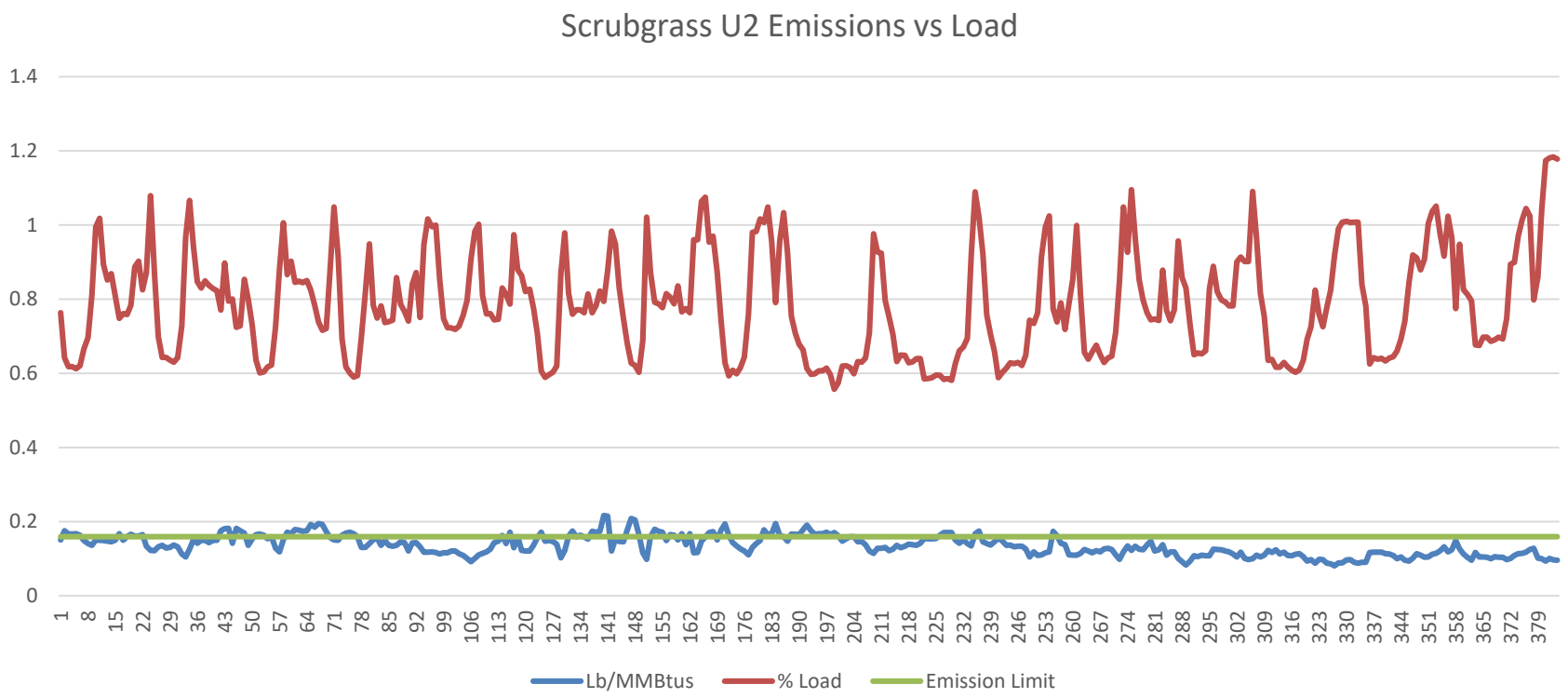
Scrubgrass Unit 2

Unit 2



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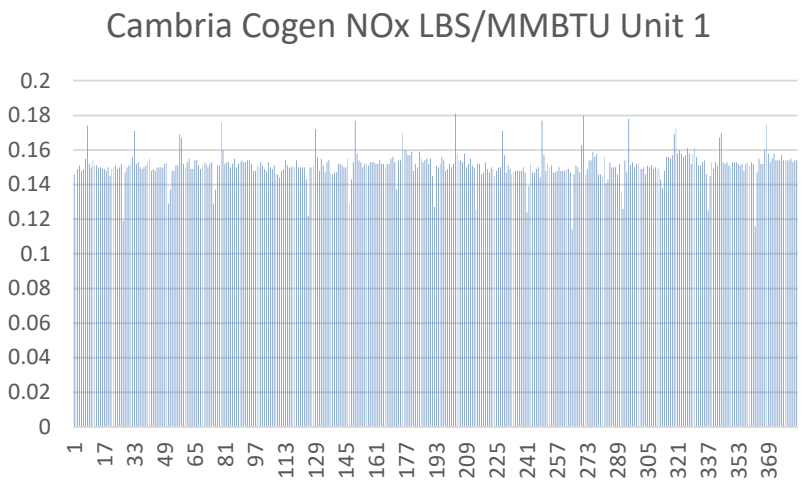
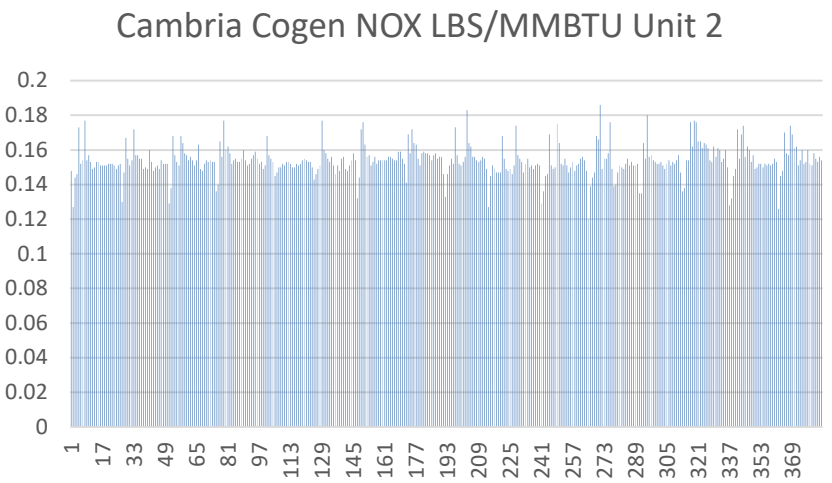
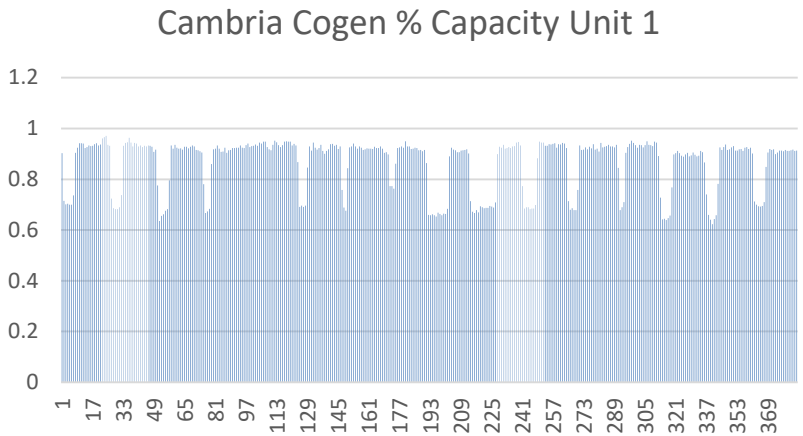
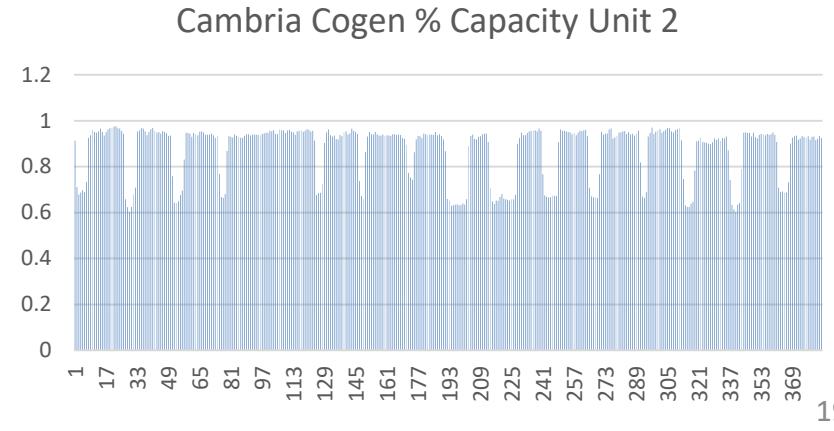
Cambria Cogen

Units 1 and 2



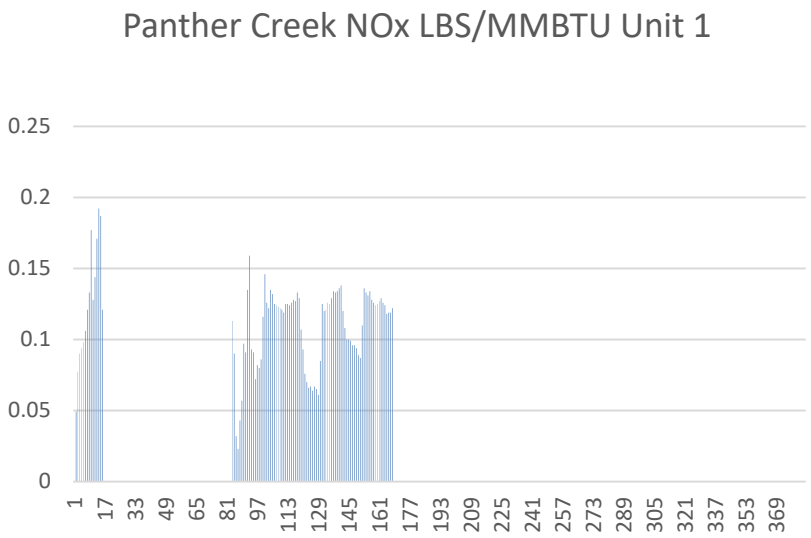


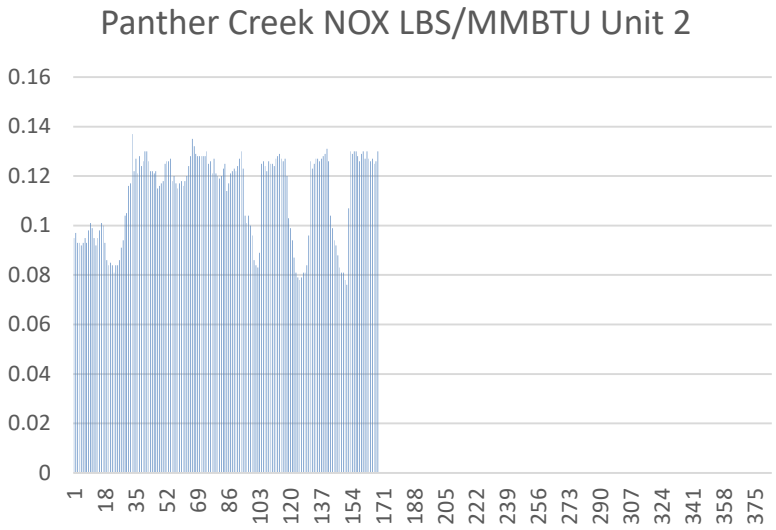


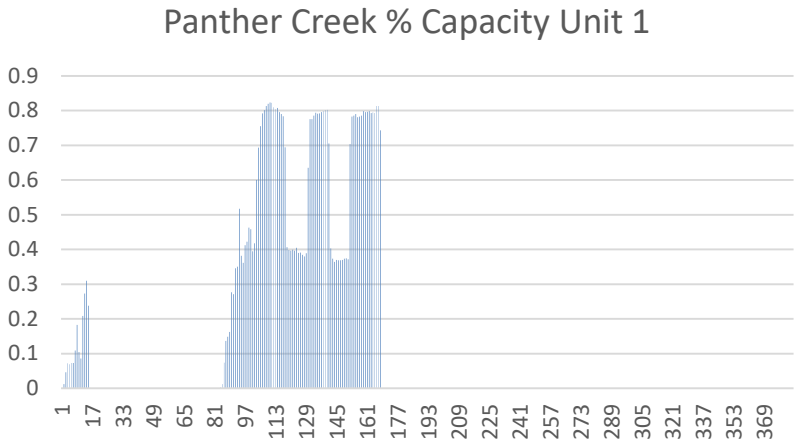


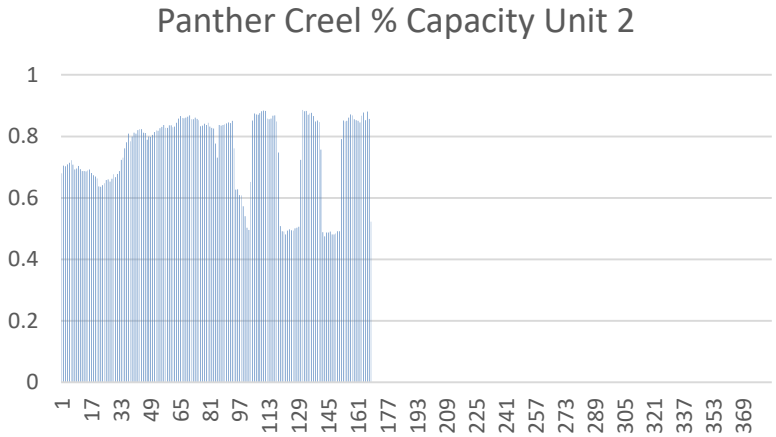
Panther Creek

Units 1 and 2



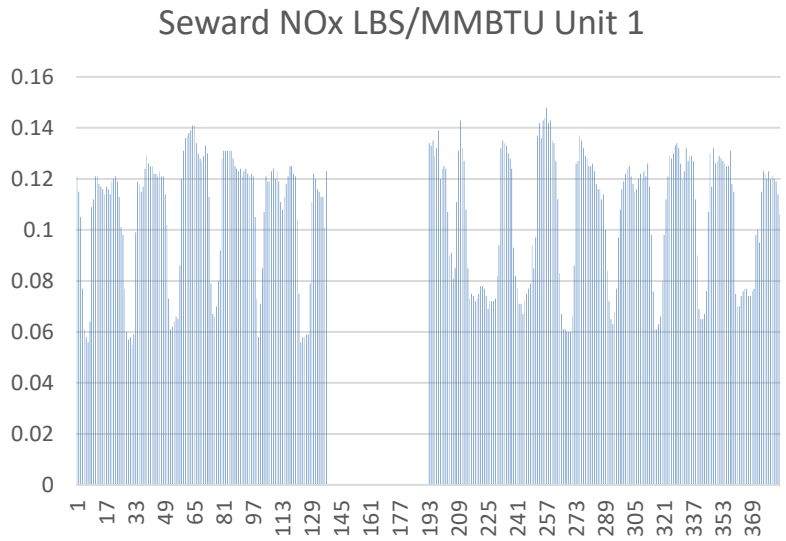


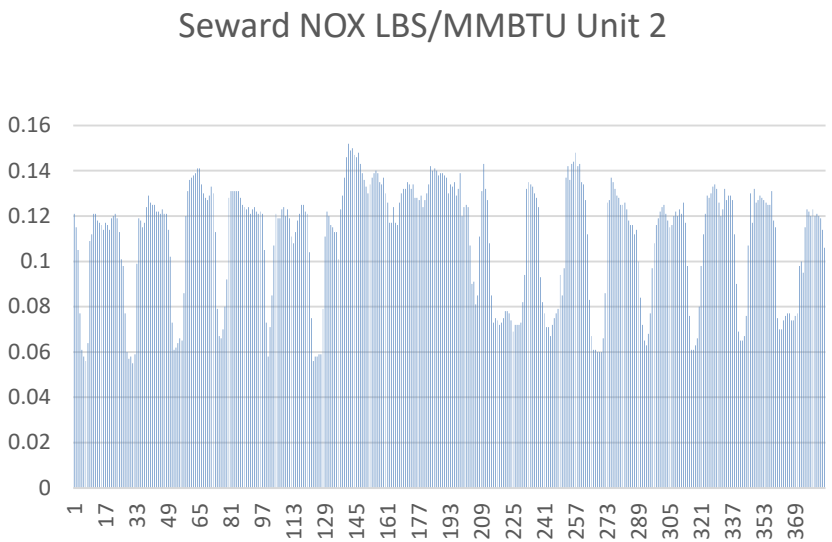


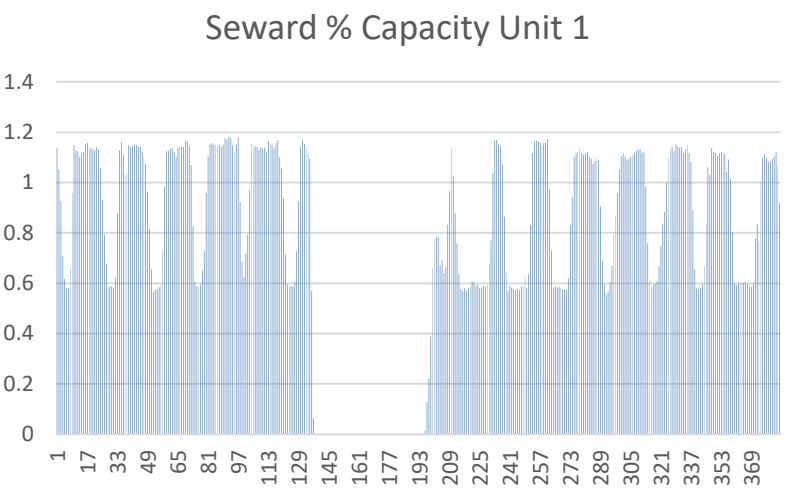


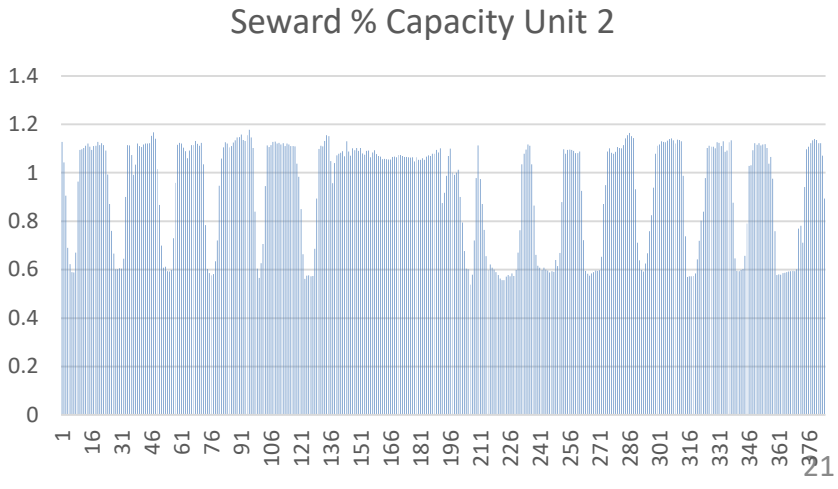
Seward

Units 1 and 2









Conclusion

- Pennsylvania coal units are operating in accordance with the federally approved RACT II rule.
- Emission rates vary based upon changes in operating capacity requirements, which are often based upon market conditions.
- OTC's optimization strategy assumes units operate under baseload conditions all the time, this is not the case.
- OTC assumptions would require PA units to operate beyond RACT in a manner that is not cost-effective and not technically feasible.

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