Attachment A
(Case Studies)

to

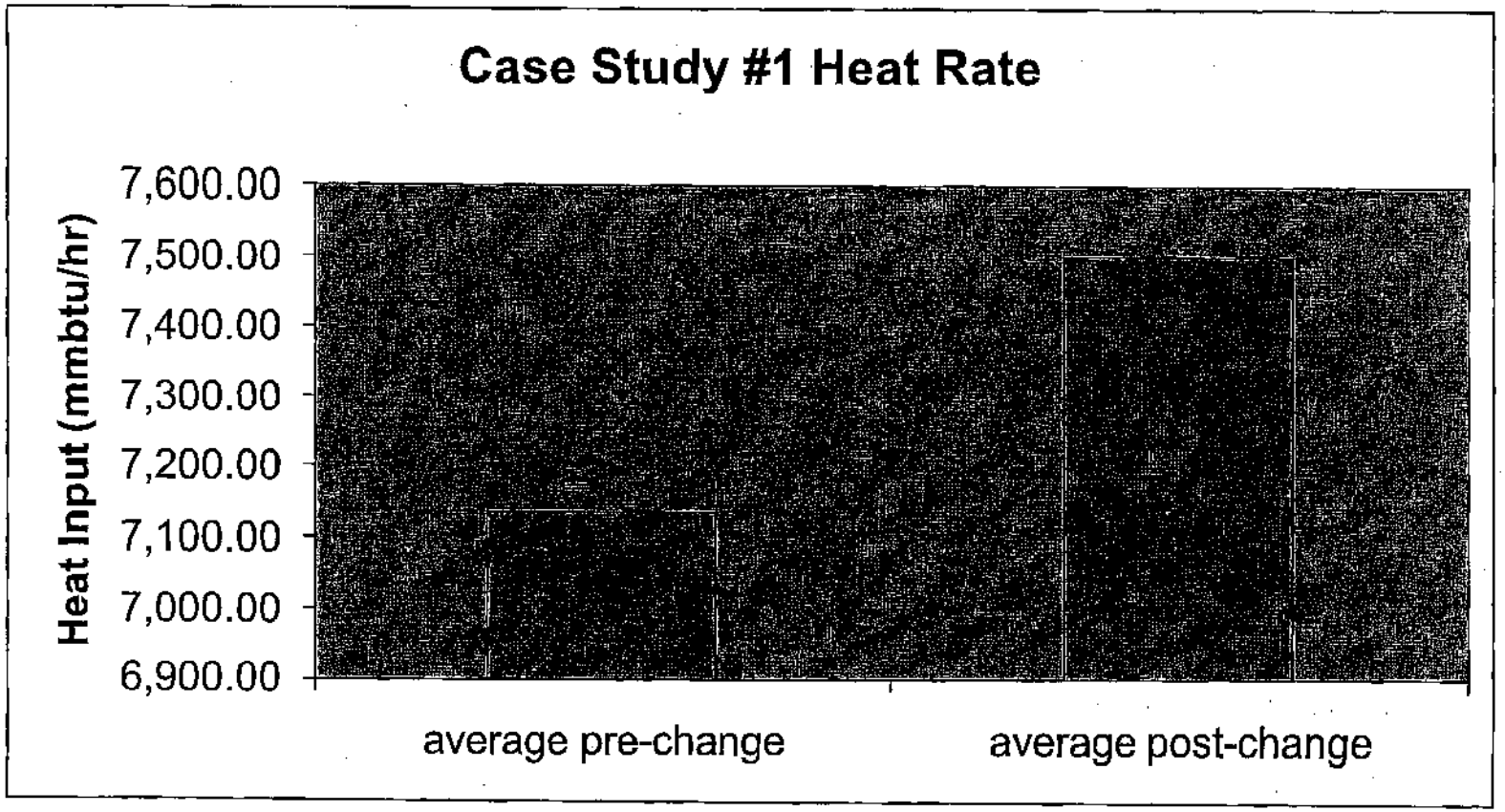
Air Enforcement Division's Comments on the Draft New Source Review Clean Air Interstate Rule (August 24, 2005 draft)

August 30, 2005

Case Study #1

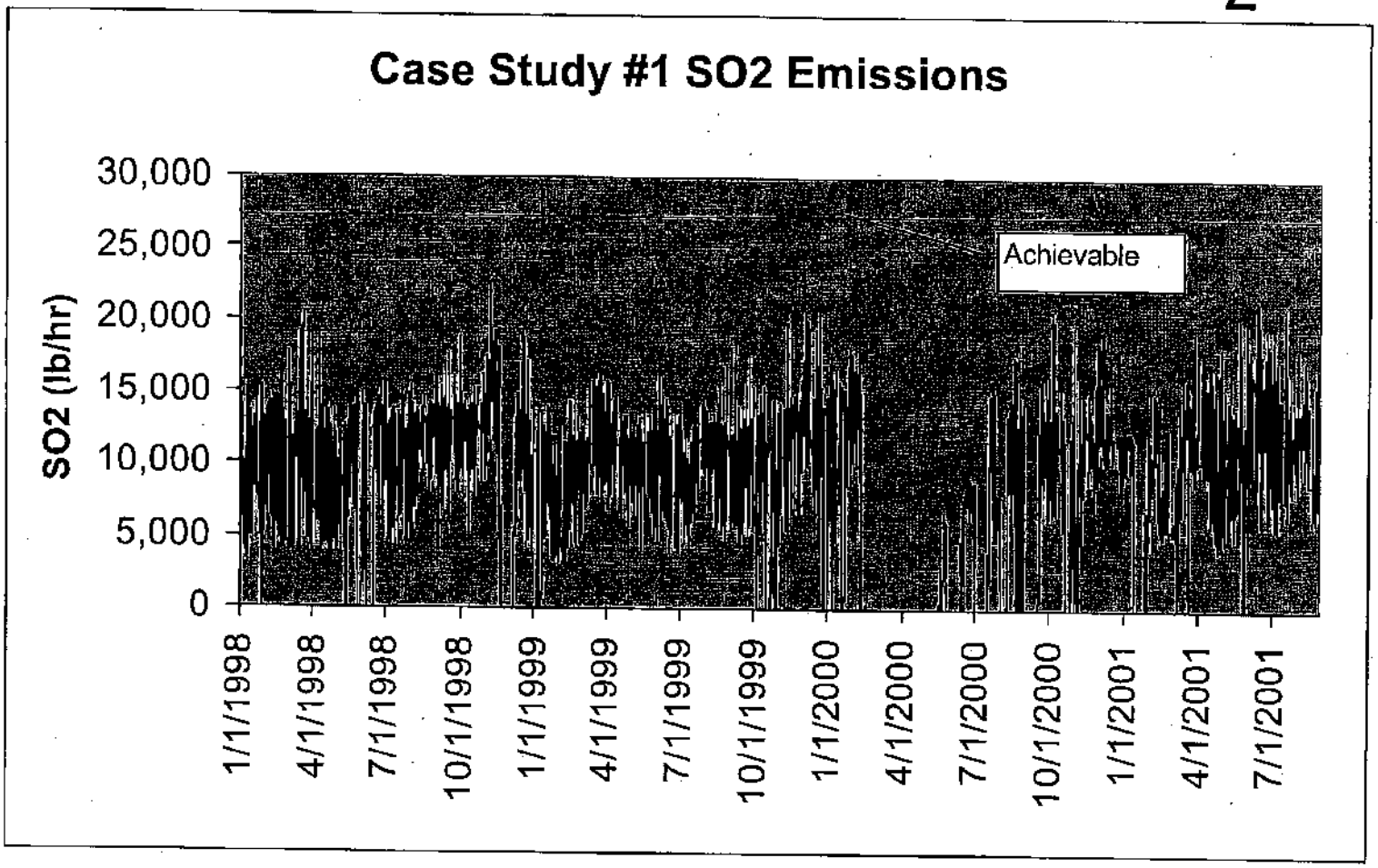
- 1,080 MW Unit.
- 2000 project -- redesign and replace economizer (increased surface area), replaced the horizontal reheater with upgraded material; and, replaced steam path.
- SO_2 emissions increased by 13,096 tons/year.

Was there an increase capacity?



Average Heat Input = Average hourly heat input available data from EPA Clean Air Markets Division (post 1994).

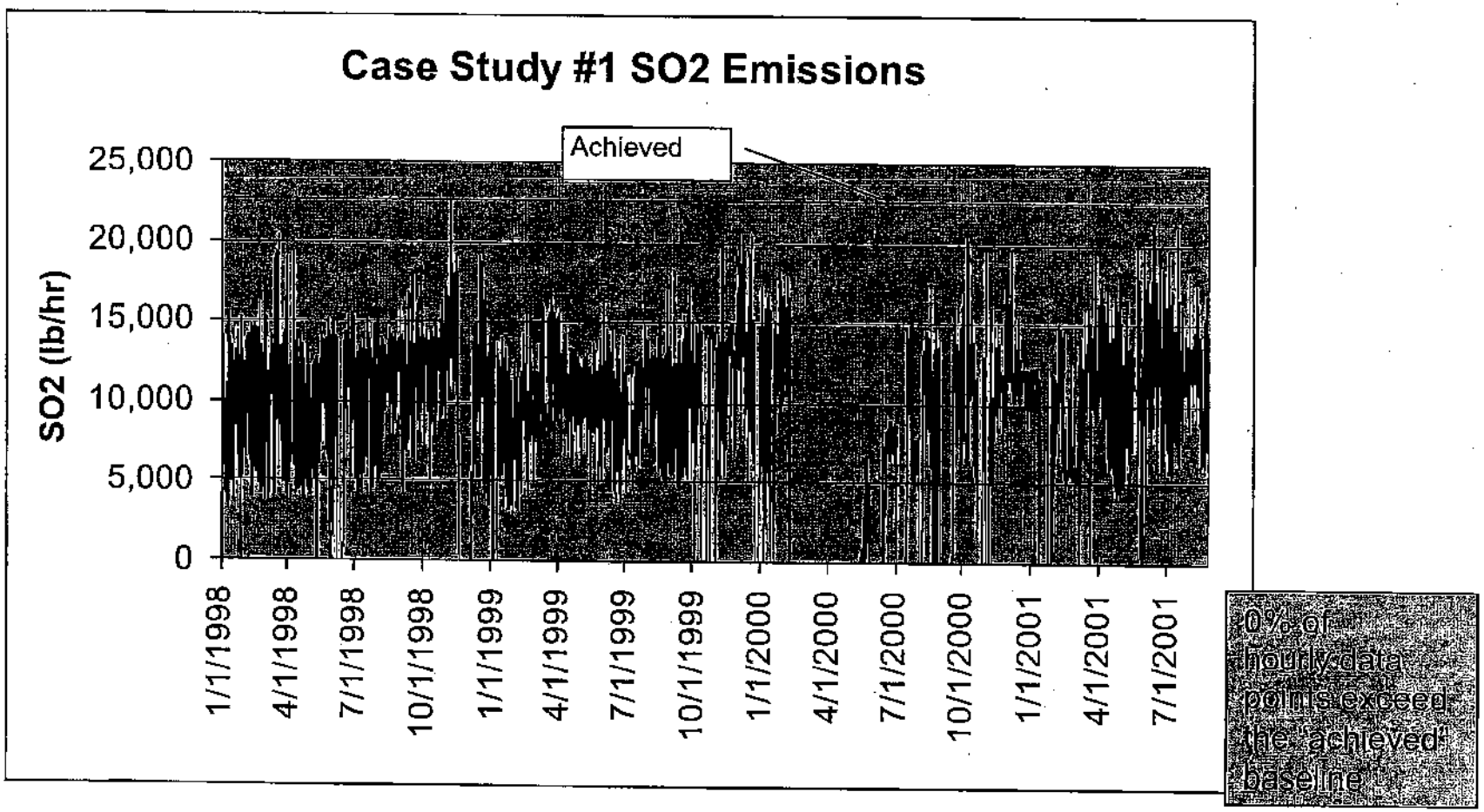
Maximum Achievable – SO_2



Achievable baseline (5 yrs (where available) preceding the change) = maximum emission rate in any hour x maximum heat rate in any hour.

All data (post-1994) was obtained from EPA's Clean Air Markets Division as reported.

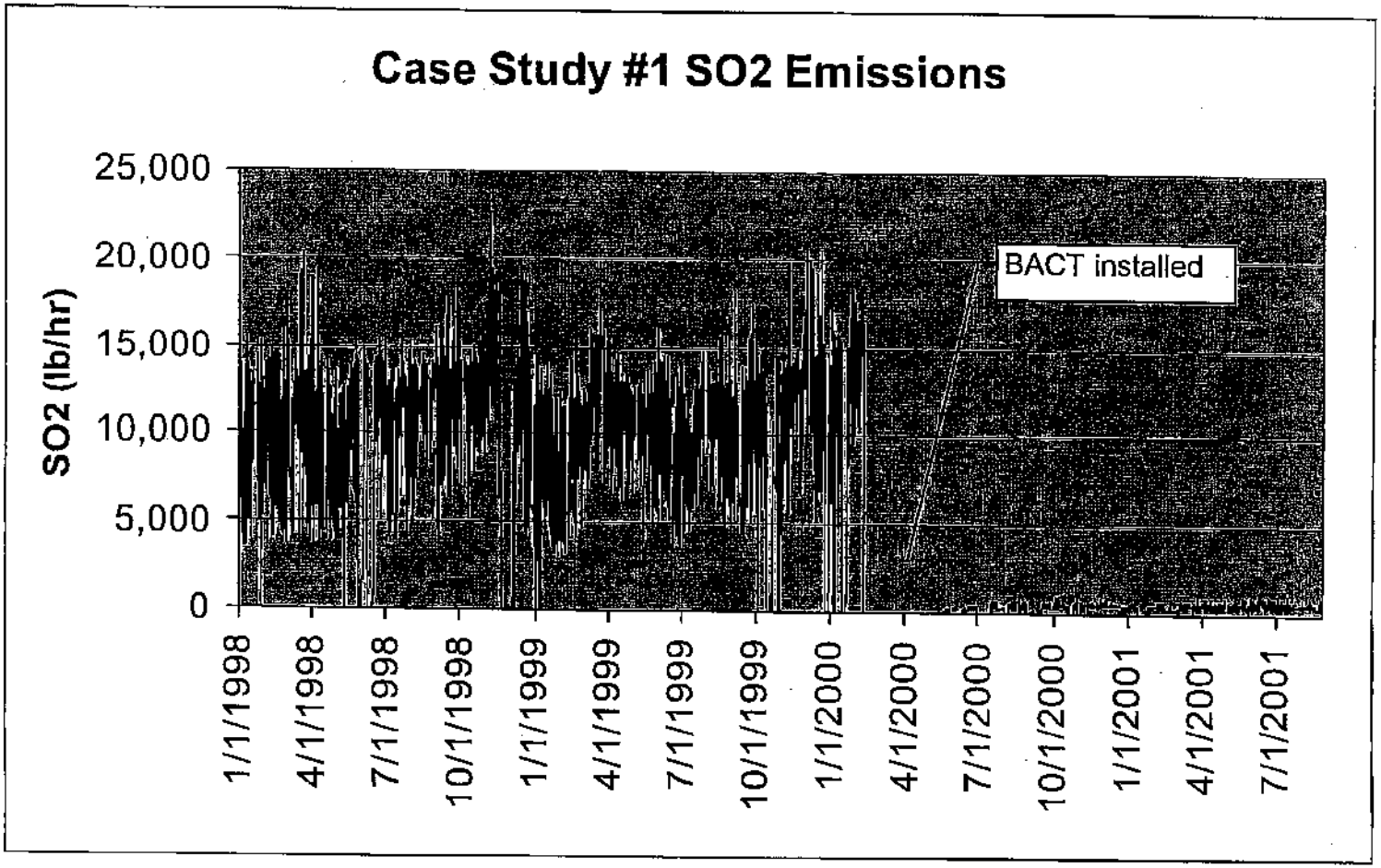
Maximum Achieved – SO_2



Achieved baseline (5 yrs (where available) preceding the change) = maximum hourly emission rate (lbs/hr).

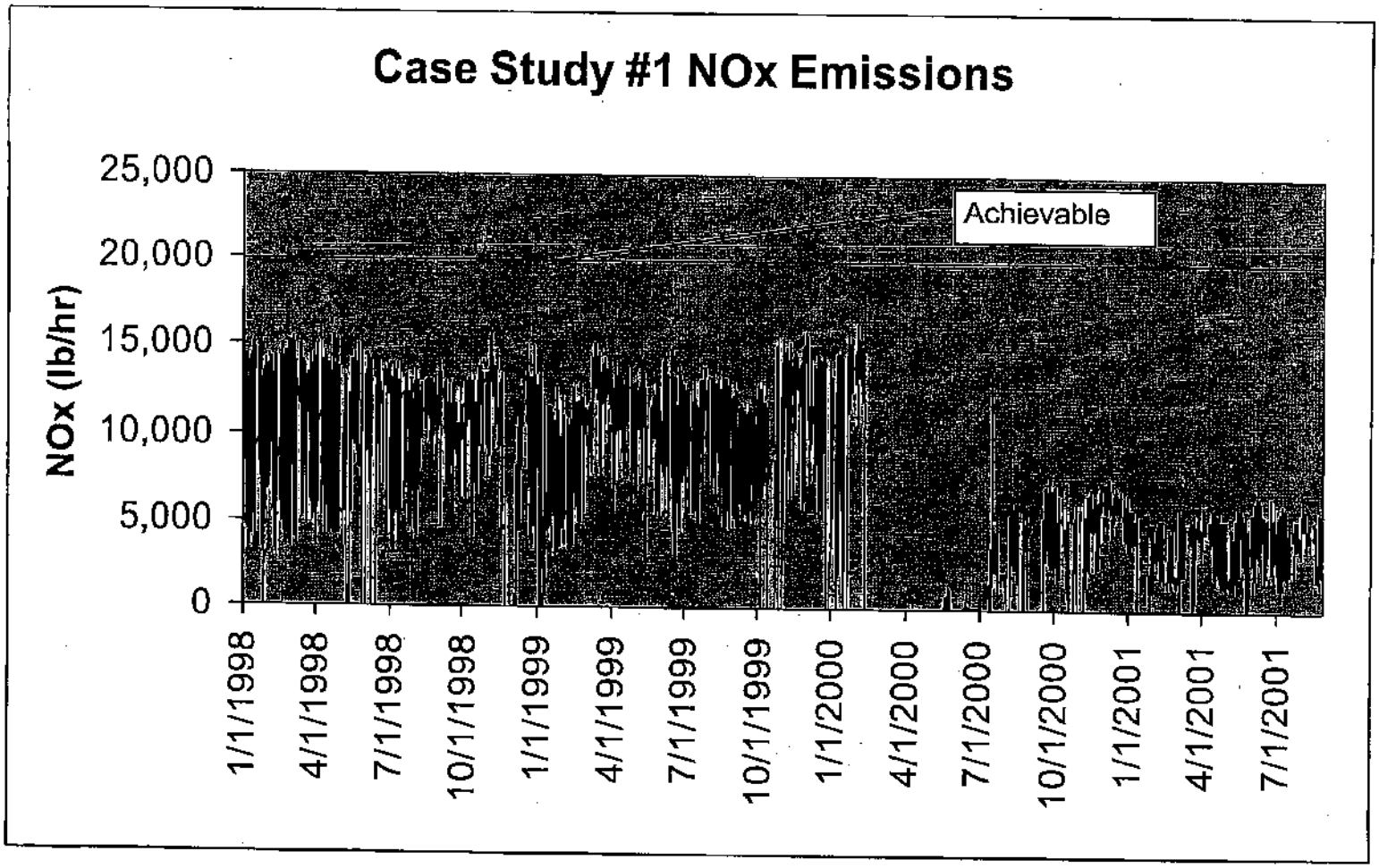
All data (post-1994) is from EPA Clean Air Markets Division as reported.

What if SO_2 controls were installed?



SO_2 BACT assumed 95% emission reductions

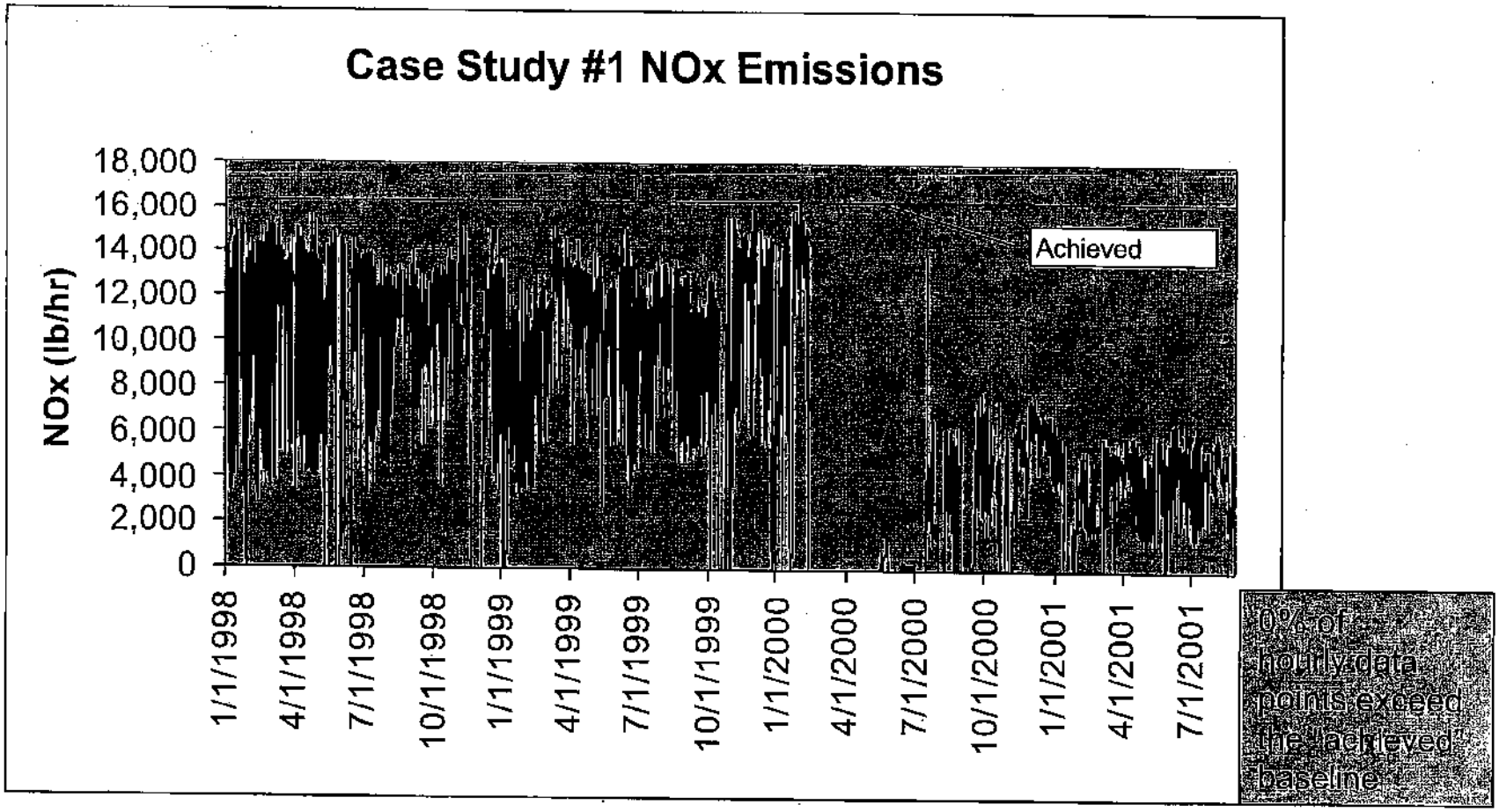
Maximum Achievable - NO_X



Achievable baseline (5 yrs (where available) preceding the change) = maximum emission rate in any hour x maximum heat rate in any hour.

All data (post-1994) was obtained from EPA's Clean Air Markets Division as reported.

Maximum Achieved - NO_x



Achieved baseline (5 yrs (where available) preceding the change) = maximum hourly emission rate (lbs/hr).

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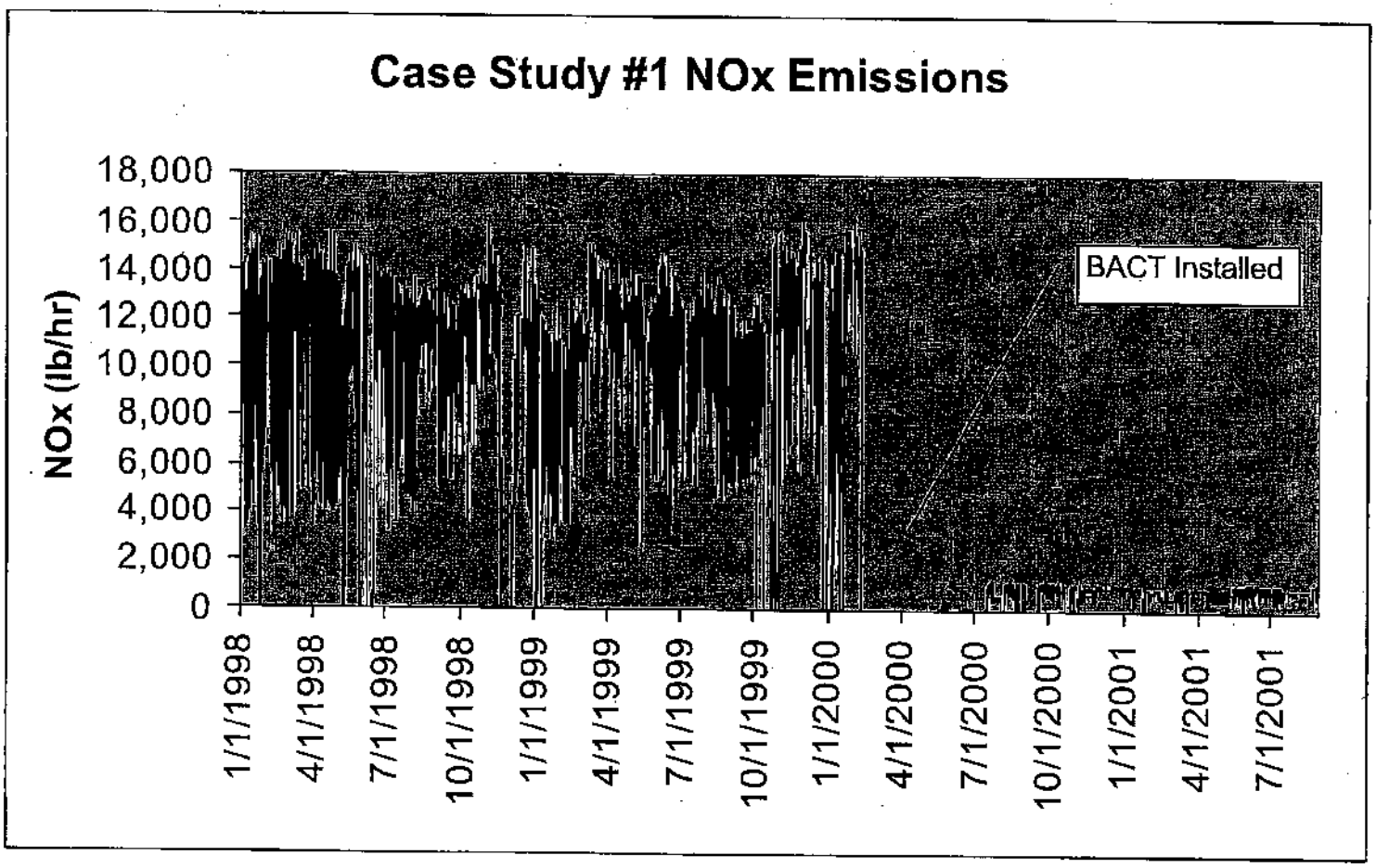
What if NO_X controls were installed?

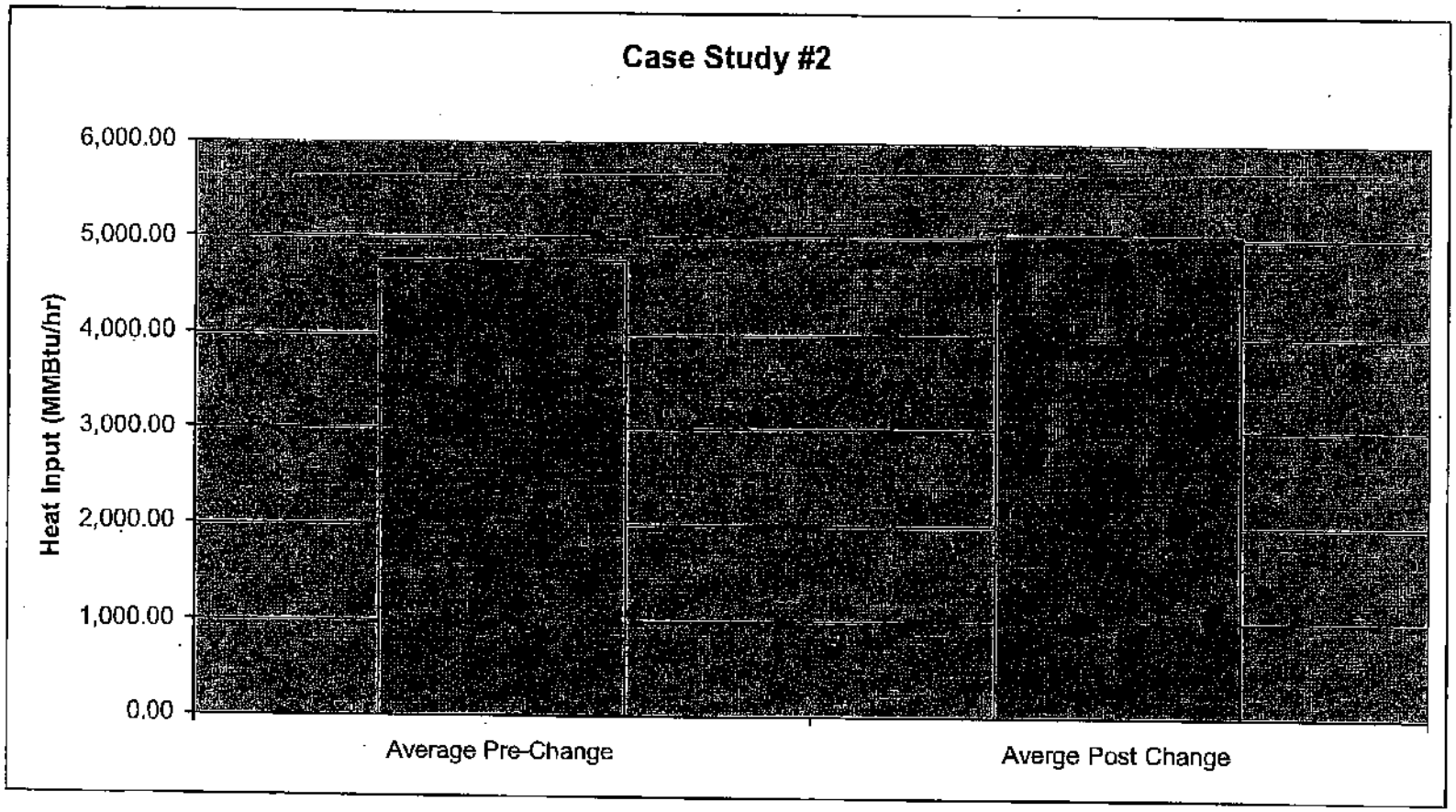


NO_X BACT assumed 0.100 lb/mmbtu

Case Study #2

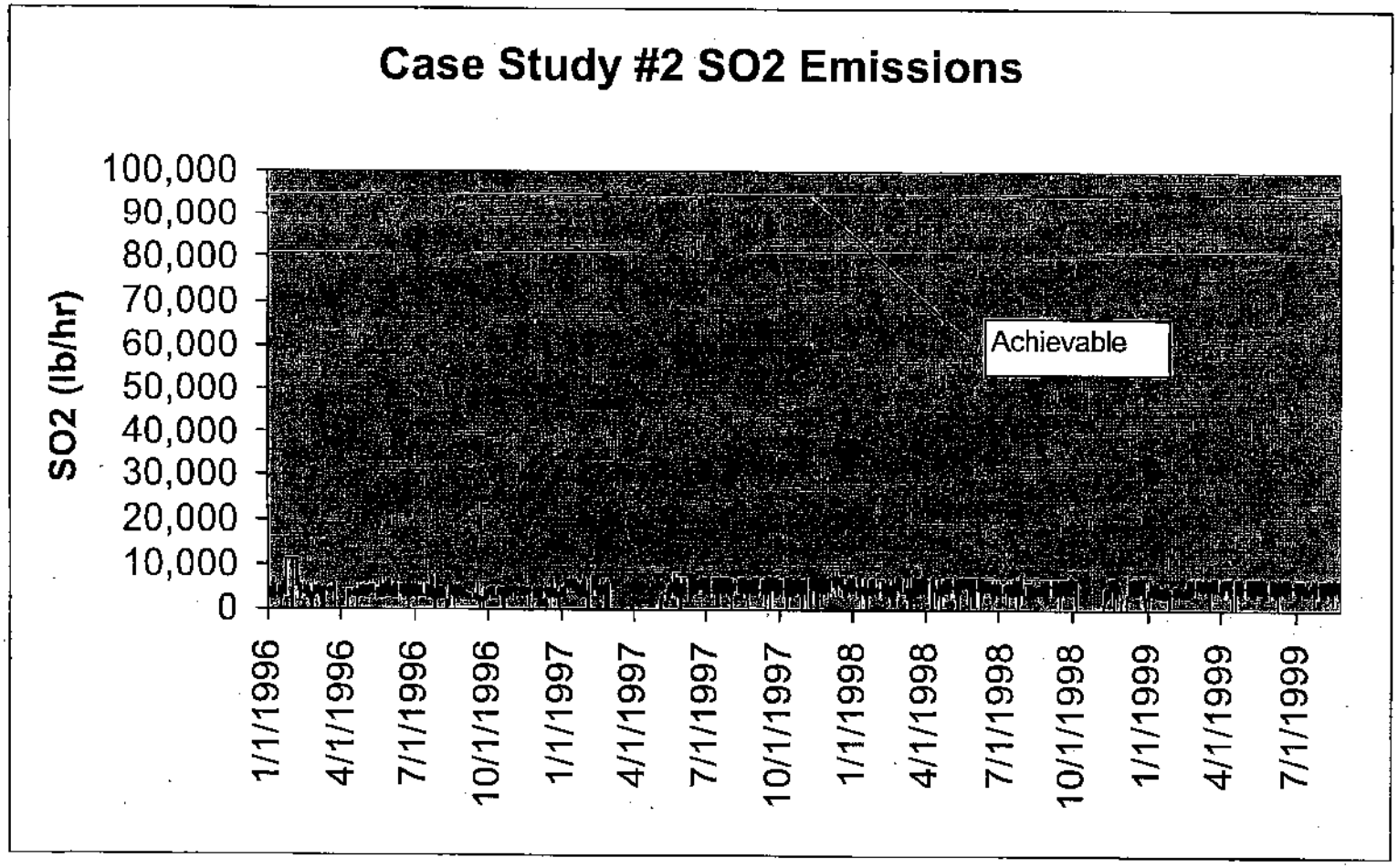
- 638 MW Unit.
- 1998 project -- redesign and replacement of reheater resulting in 10% increase in capacity of the unit.
- SO_2 and NO_X increased by 50 and 978 tons/year, respectively.

Was there an increase capacity?



?Average Heat Input = Average hourly heat input data available from EPA Clean Air Markets Division (post 1994).

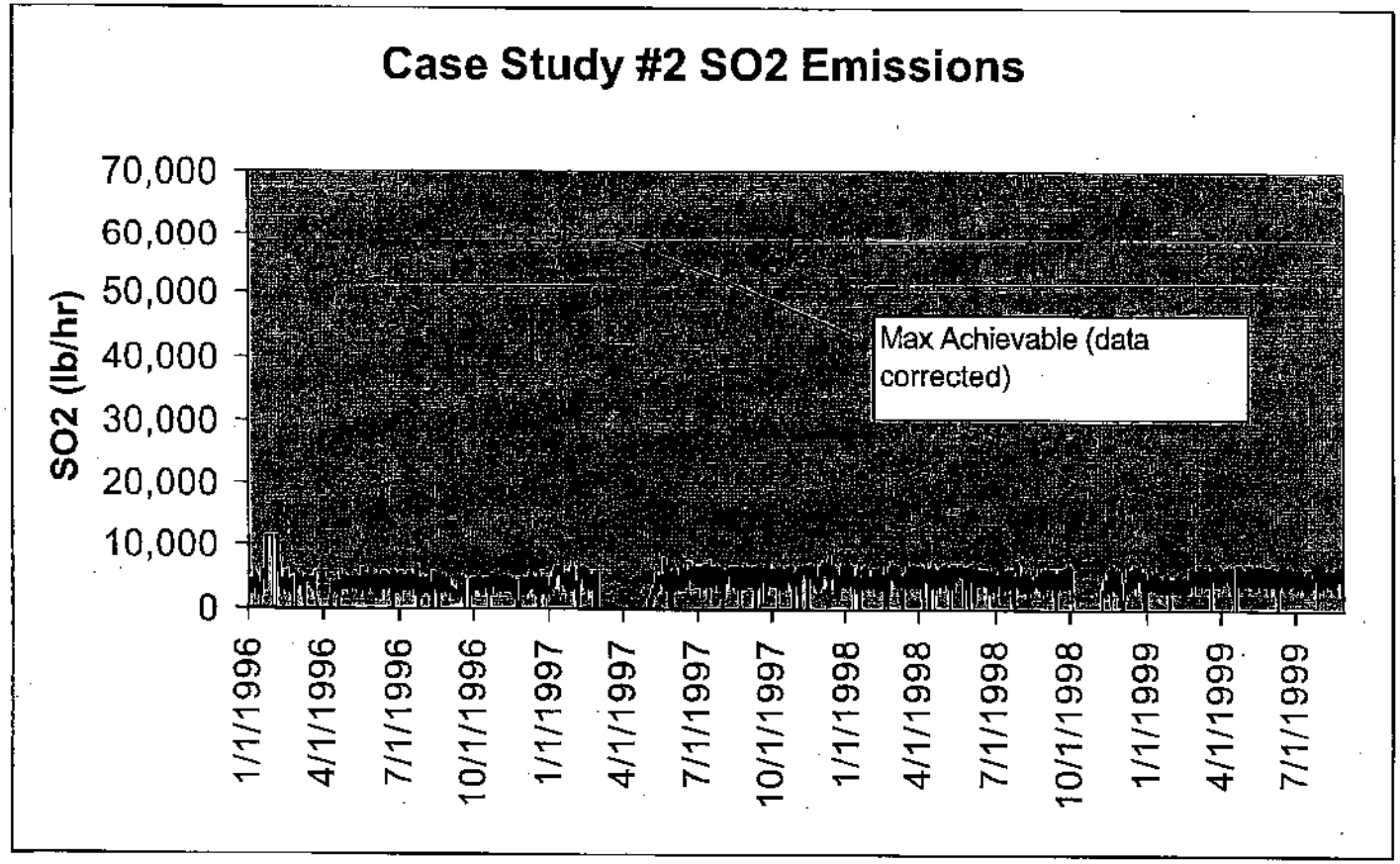
Maximum Achievable – SO_2



Achievable baseline (5 yrs (where available) preceding the change) = maximum emission rate in any hour x maximum heat rate in any hour.

All data (post-1994) was obtained from EPA's Clean Air Markets Division.

Maximum Achievable (Corrected) – SO_2

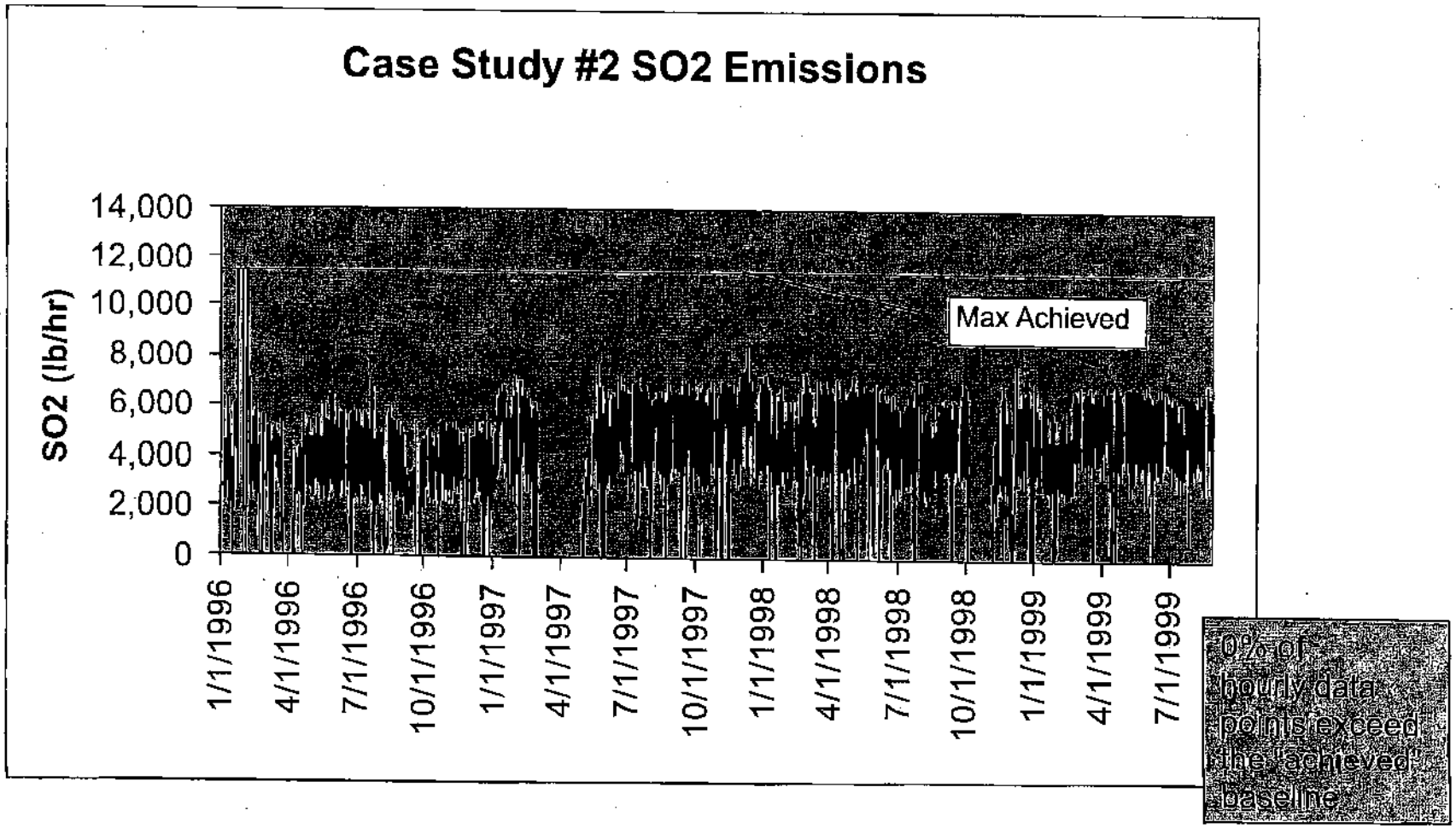


Achievable baseline (5 yrs (where available) preceding the change) = maximum emission rate in any hour x maximum heat rate in any hour.

Achievable baseline is corrected to eliminate 0.1% of outlying data points in the heat rate. Note: Proposed rule does not allow for data correction.

All data (post-1994) was obtained from EPA's Clean Air Markets Division.

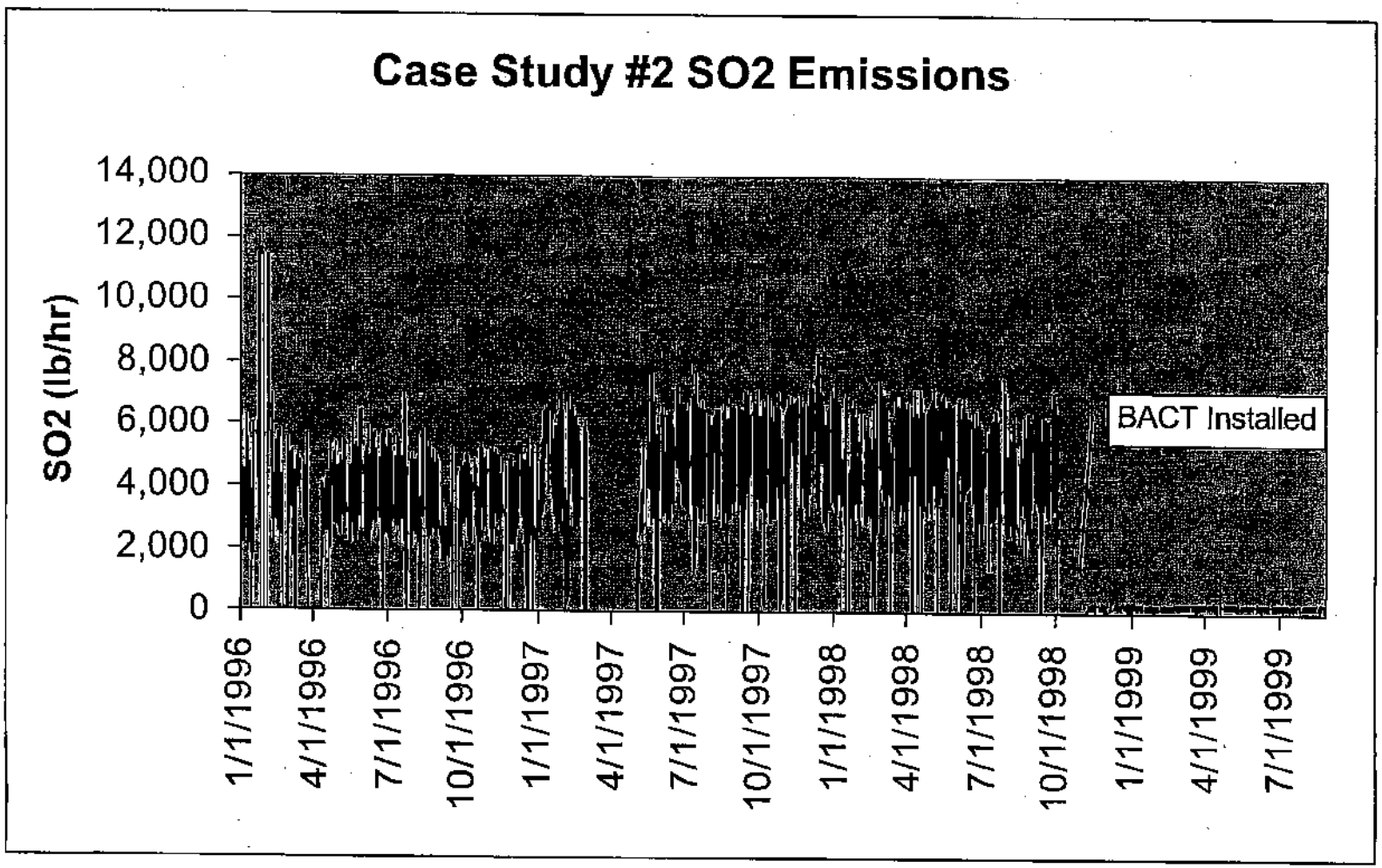
Maximum Achieved – SO_2



Achieved baseline (5 yrs (where available) preceding the change) = maximum hourly emission rate (lbs/hr).

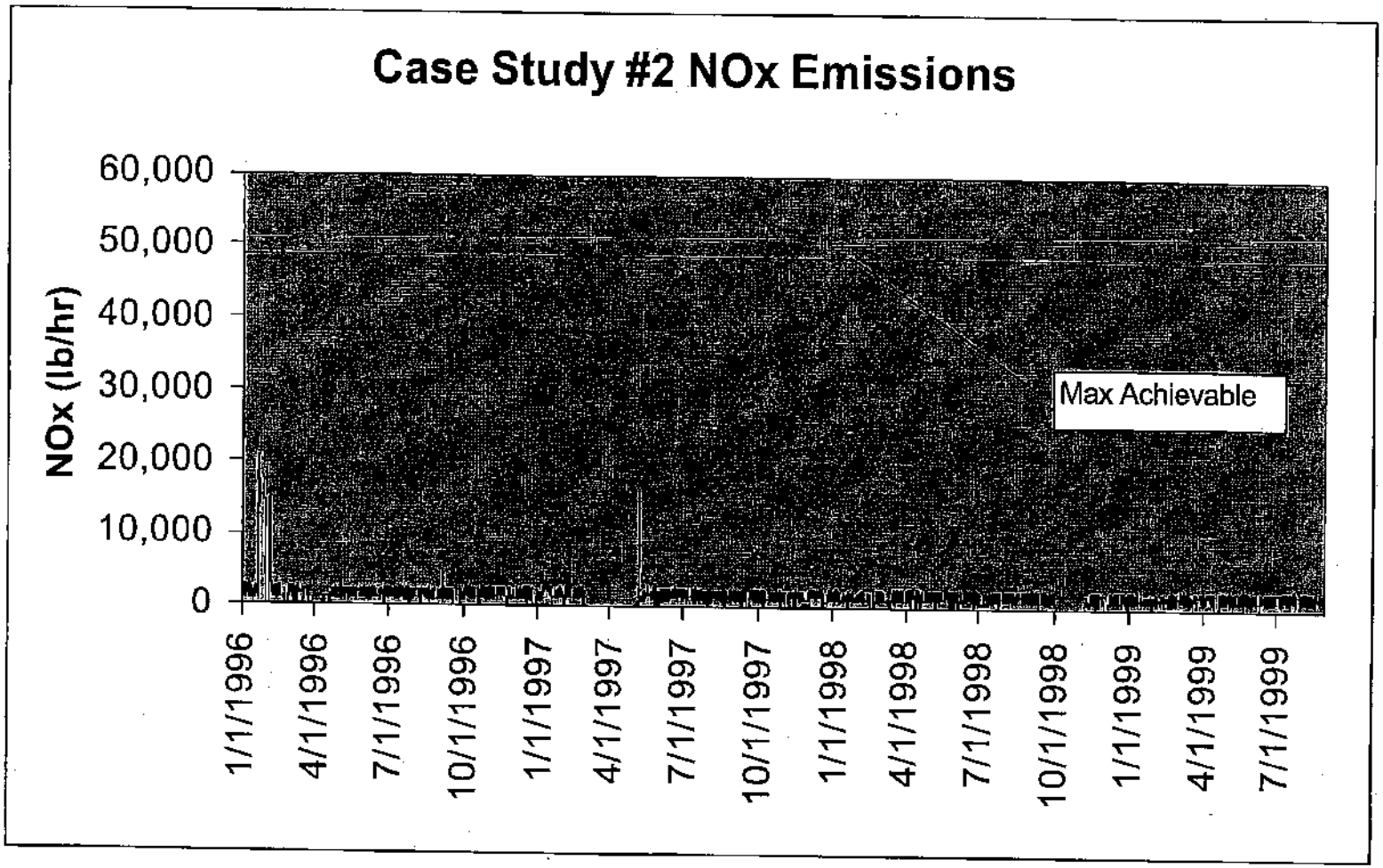
All data (post-1994) is from EPA Clean Air Markets Division as reported.

What if SO_2 controls were installed?



SO_2 BACT assumed 95% emission reductions

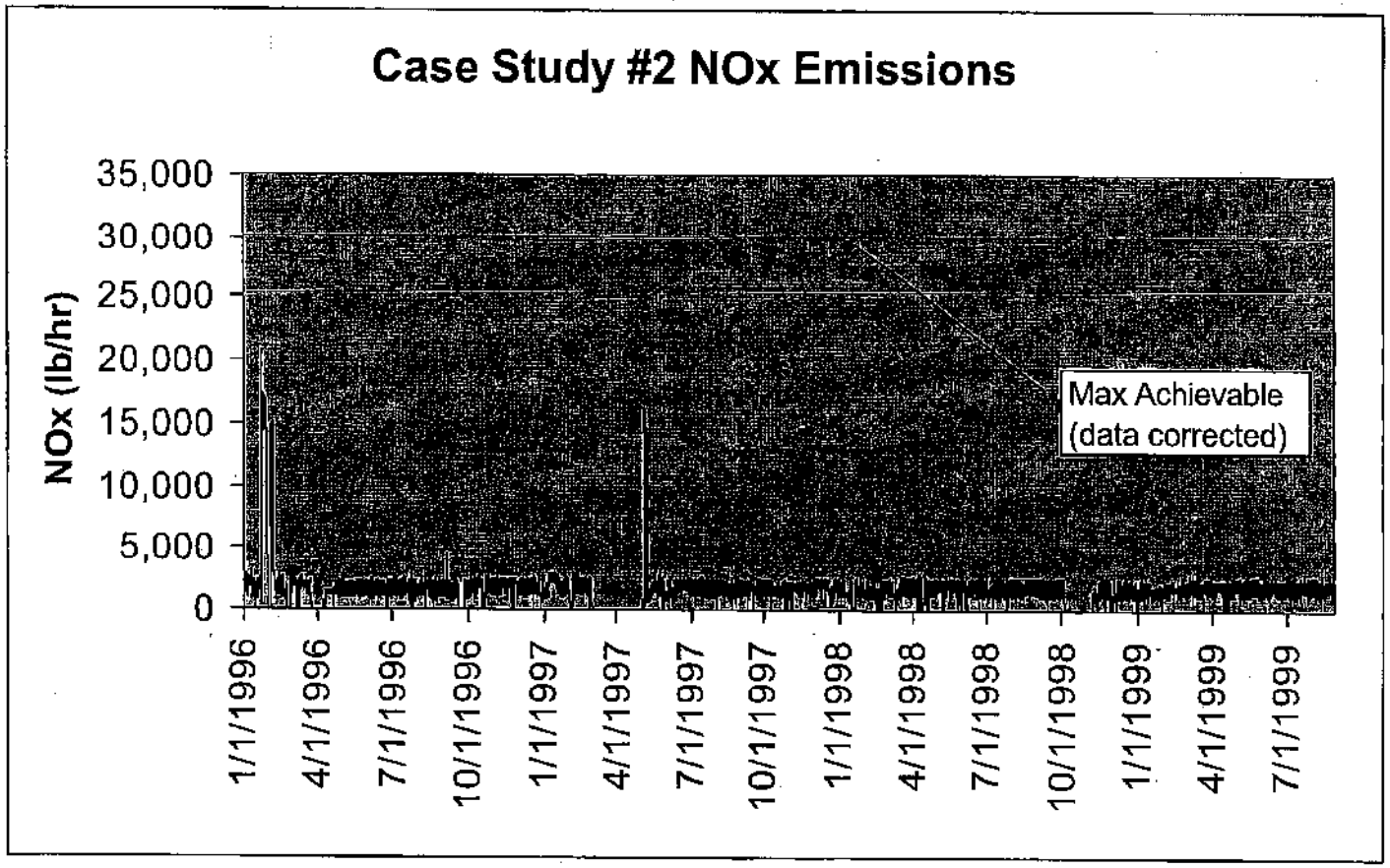
Maximum Achievable - NO_X



Achievable baseline (5 yrs (where available) preceding the change) = maximum emission rate in any hour x maximum heat rate in any hour.

All data (post-1994) was obtained from EPA's Clean Air Markets Division.

Maximum Achievable (Corrected) – NO_X



Achievable baseline (5 yrs (where available) preceding the change) = maximum emission rate in any hour x maximum heat rate in any hour.

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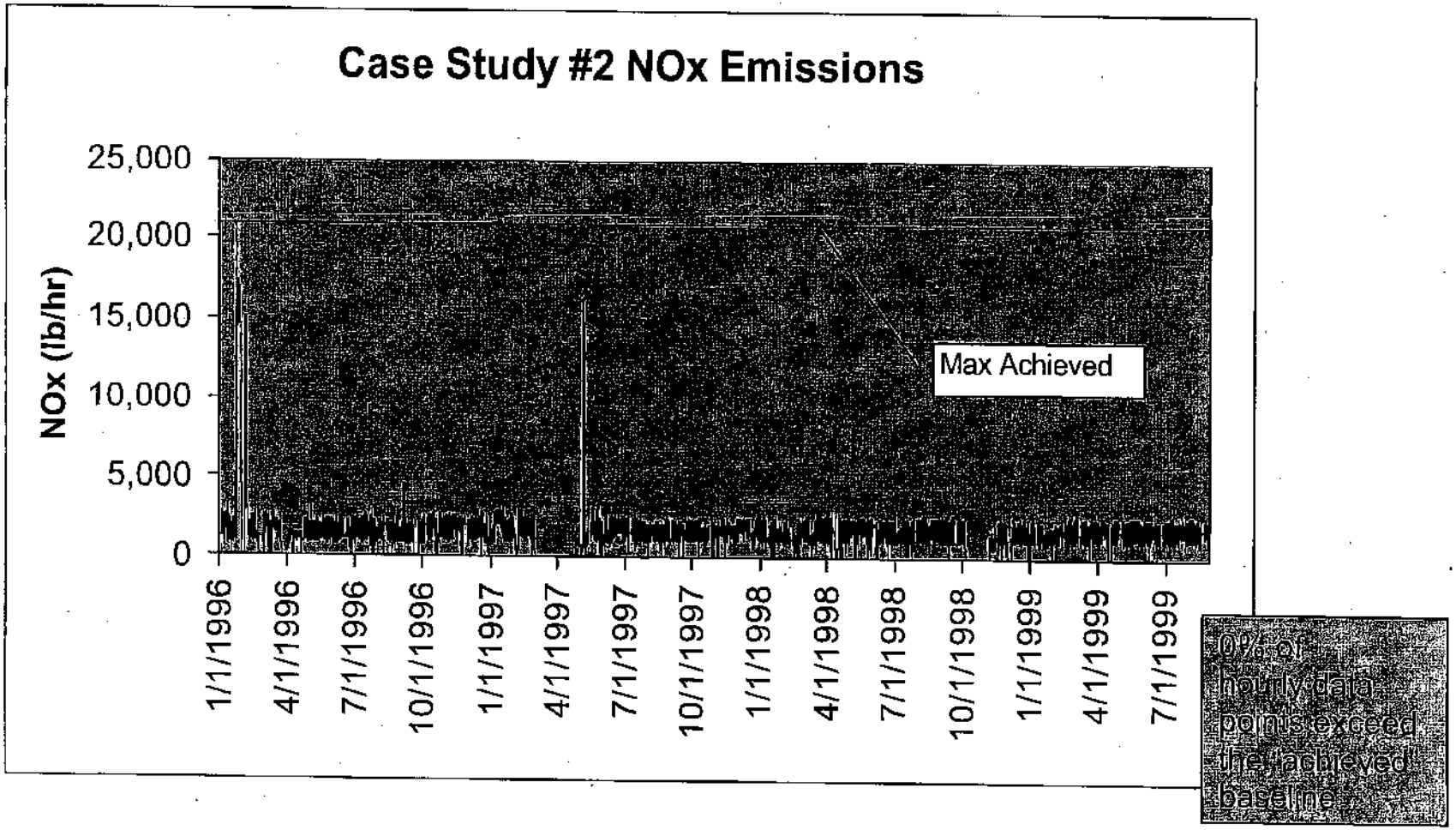
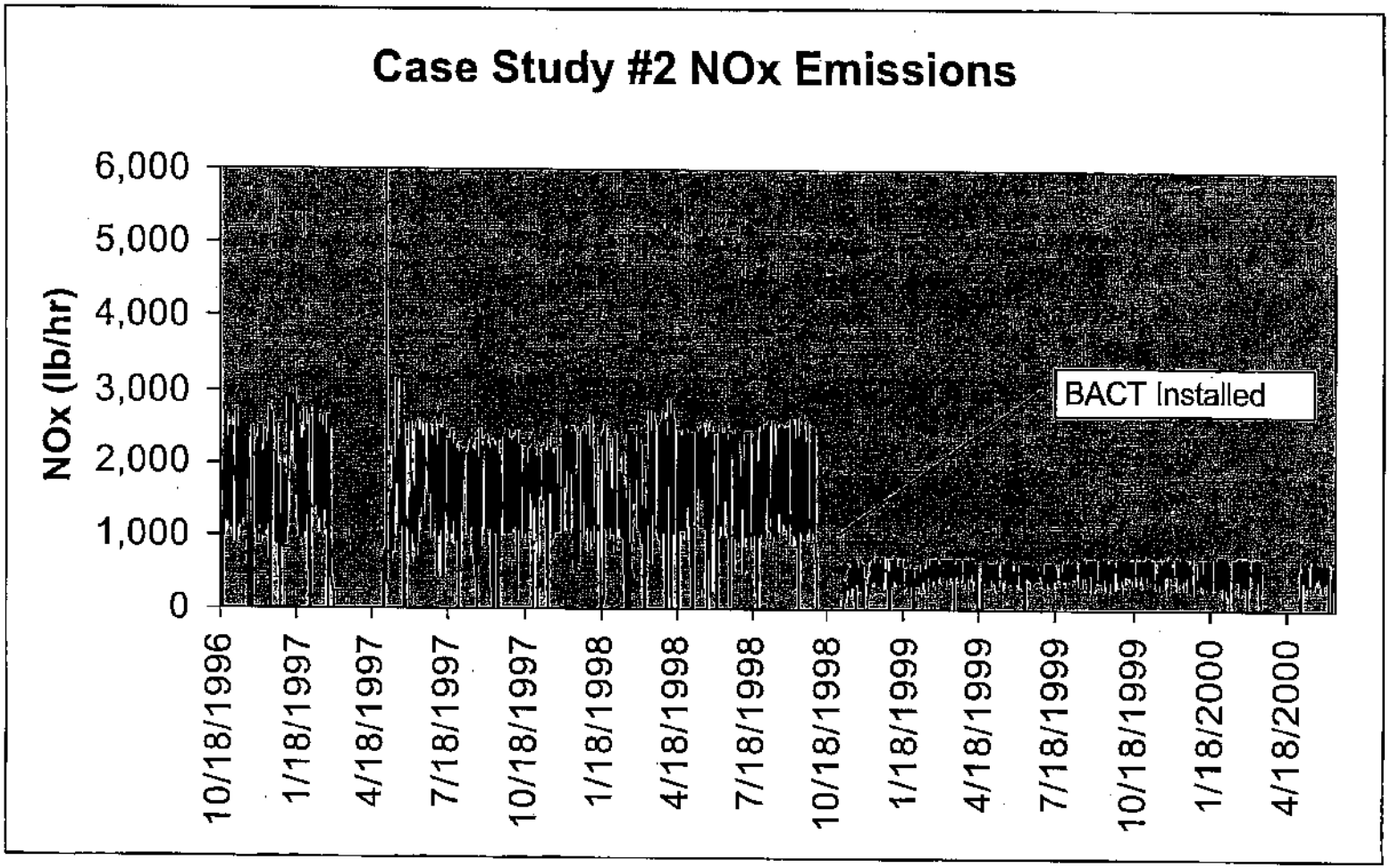
Maximum Achieved - NO_X



Achieved baseline (5 yrs (where available) preceding the change) = maximum hourly emission rate (lbs/hr).

All data (post-1994) is from EPA Clean Air Markets Division as reported.

What if NO_X controls were installed?

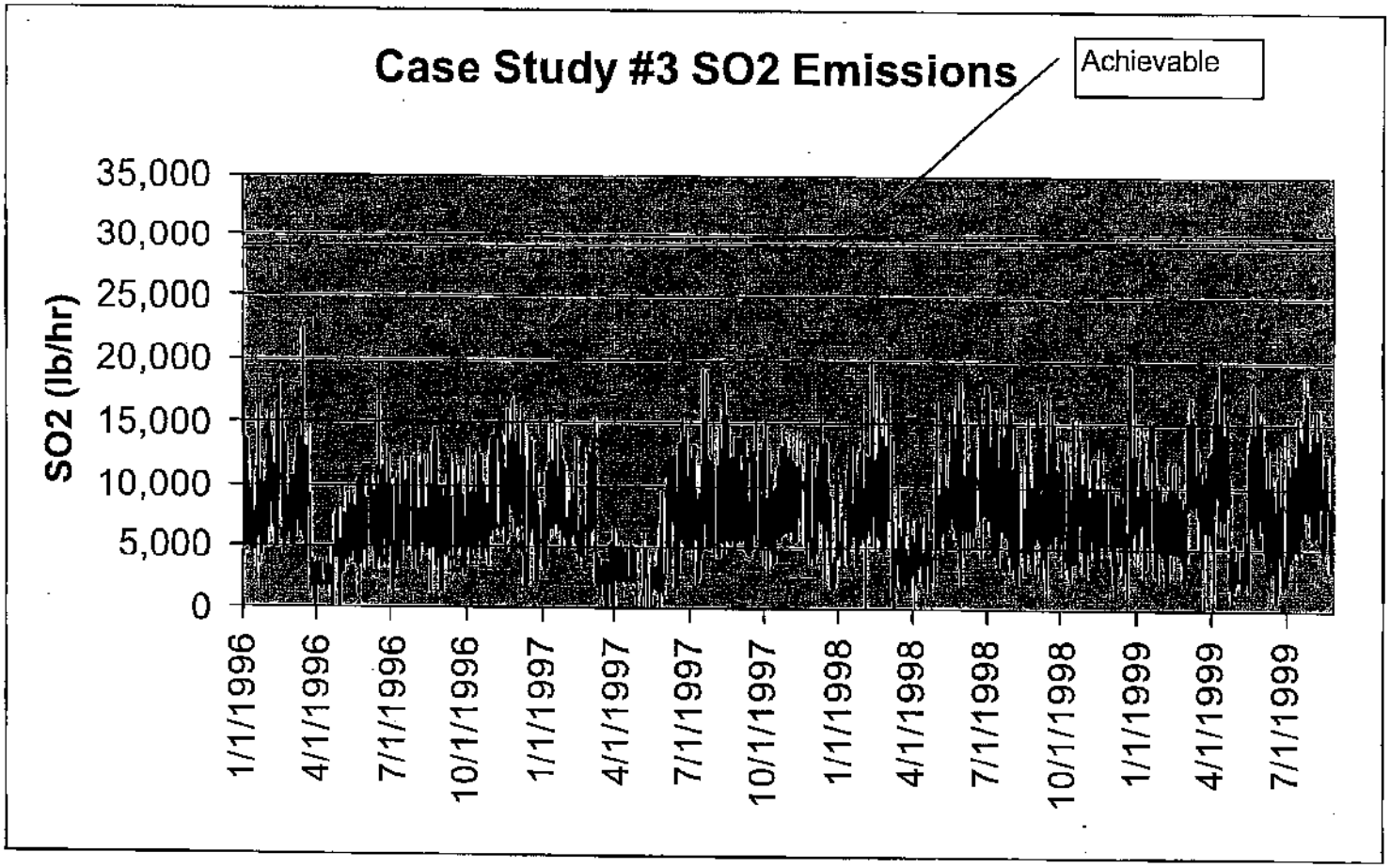


NO_X BACT assumed 0.100 lb/mmbtu

Case Study #3

- 446 MW Unit.
- 1997 -- new, higher capacity turbines; new design reheater with 8% greater surface area; rear arch waterwall replacement; and, pulverizer upgrades.
- Capacity increase of 46 MW (Unit 3 previously rated at 400 MW).
- SO_2 and NO_X increased by 939 and 1,405 tons/year, respectively.

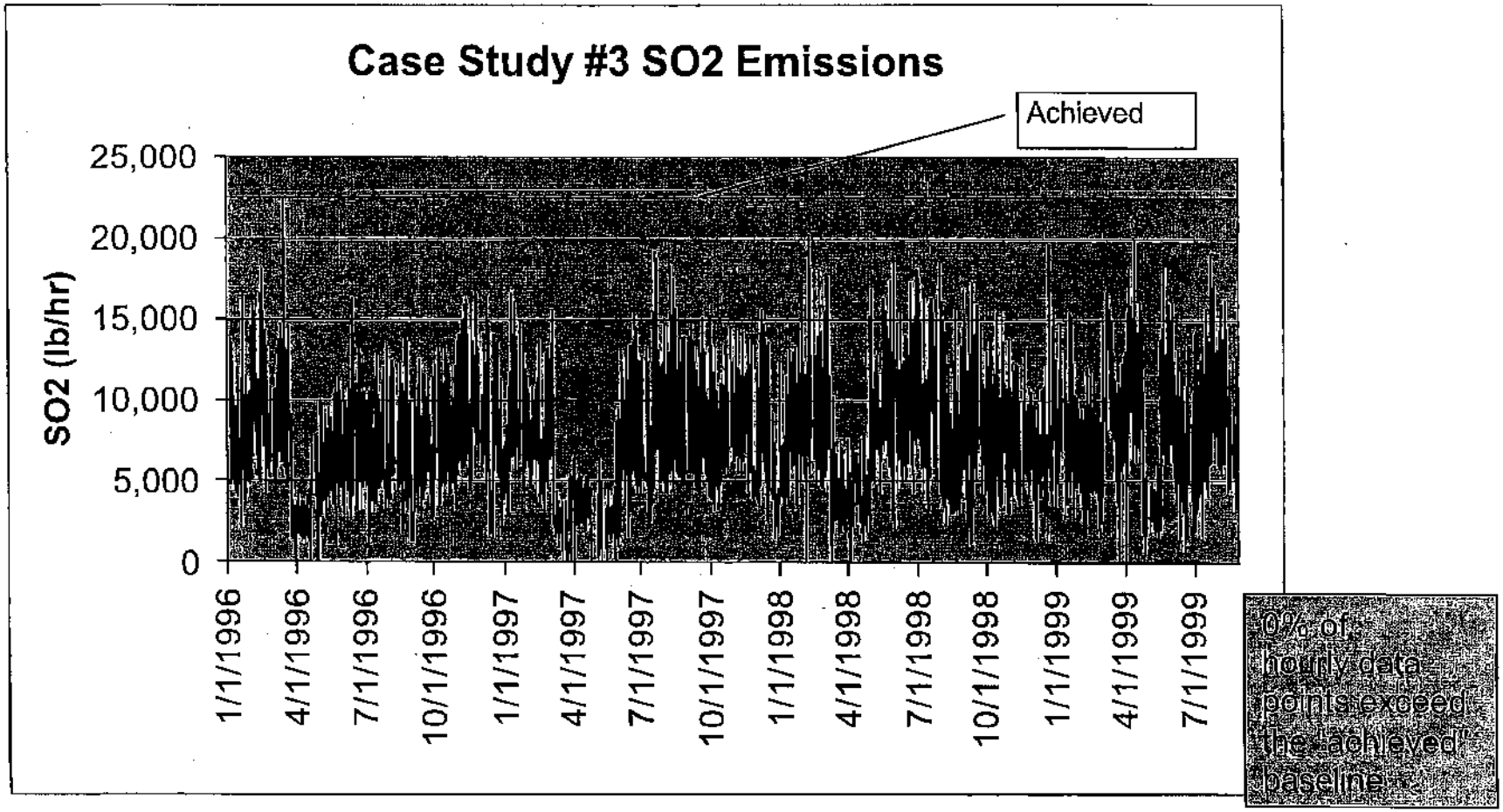
Maximum Achievable Test - SO_2



Achievable baseline (5 yrs (where available) preceding the change) = maximum emission rate in any hour x maximum heat rate in any hour.

All data (post-1994) was obtained from EPA's Clean Air Markets Division.

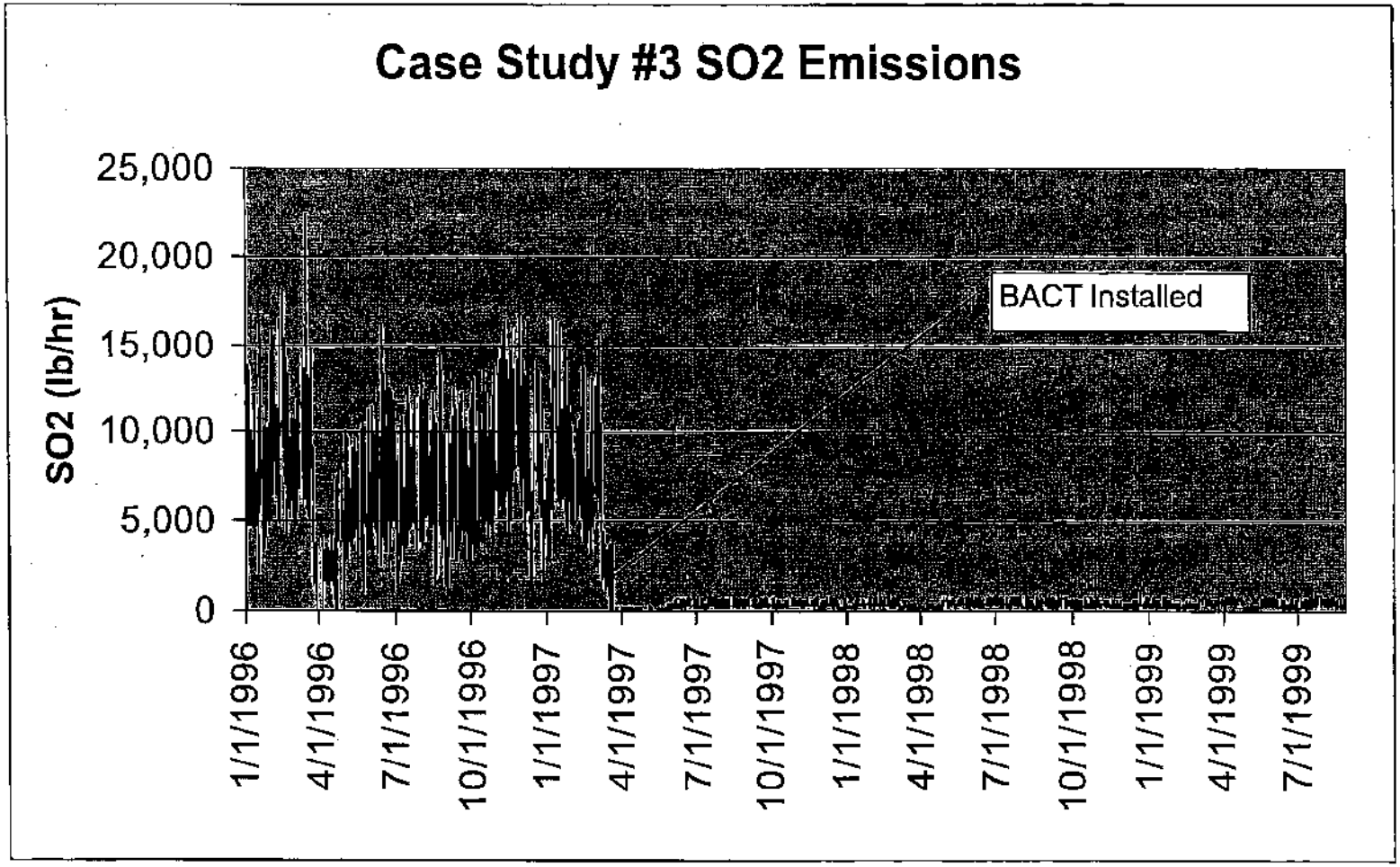
Maximum Achieved Test - SO_2



Achieved baseline (5 yrs (where available) preceding the change) = maximum hourly emission rate (lbs/hr).

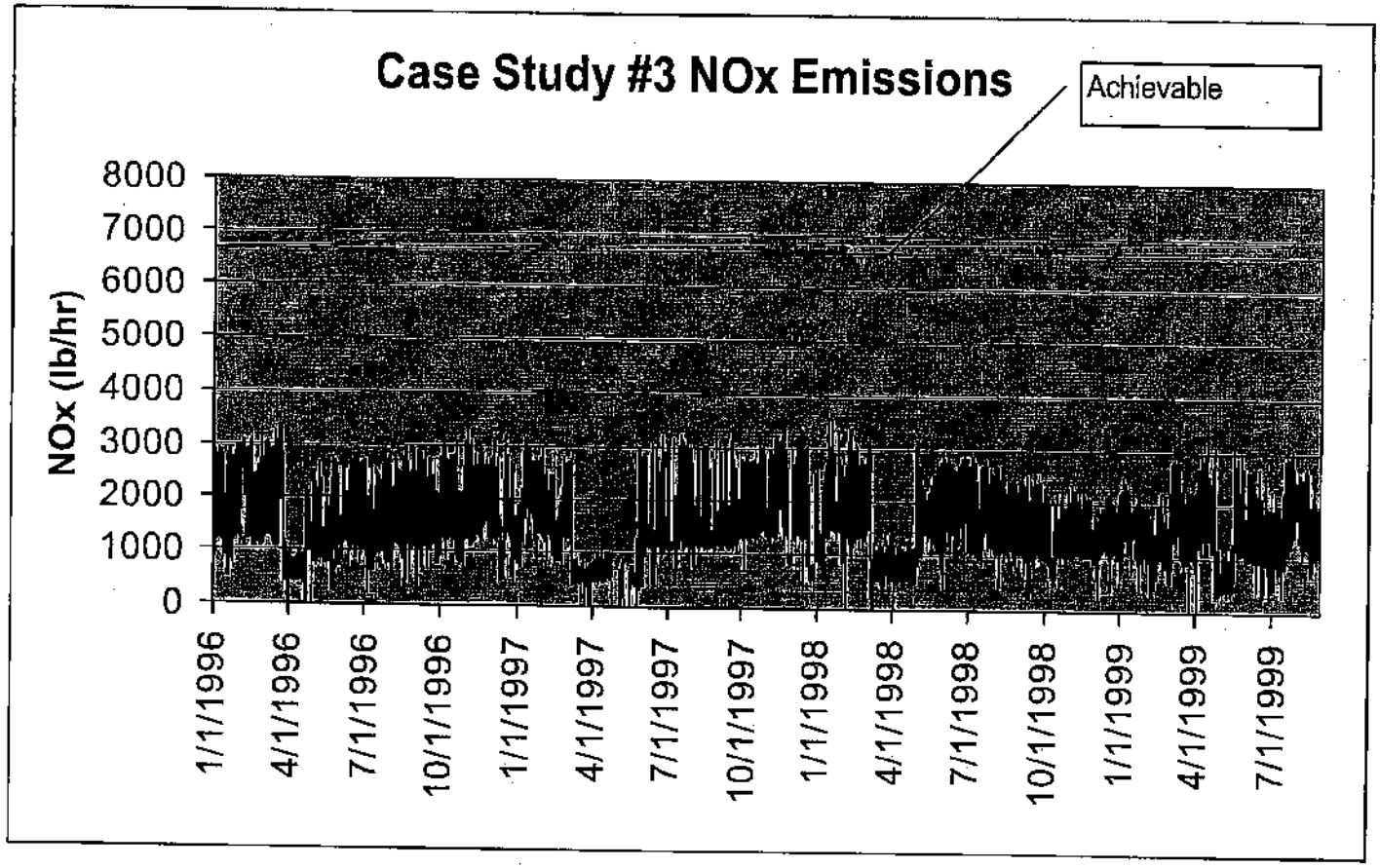
All data (post-1994) is from EPA Clean Air Markets Division as reported.

What if SO_2 controls were installed?



SO_2 BACT assumed 95% emission reductions

Maximum Achievable Test - NO_x



Achievable baseline (5 yrs (where available) preceding the change) = maximum emission rate in any hour x maximum heat rate in any hour.

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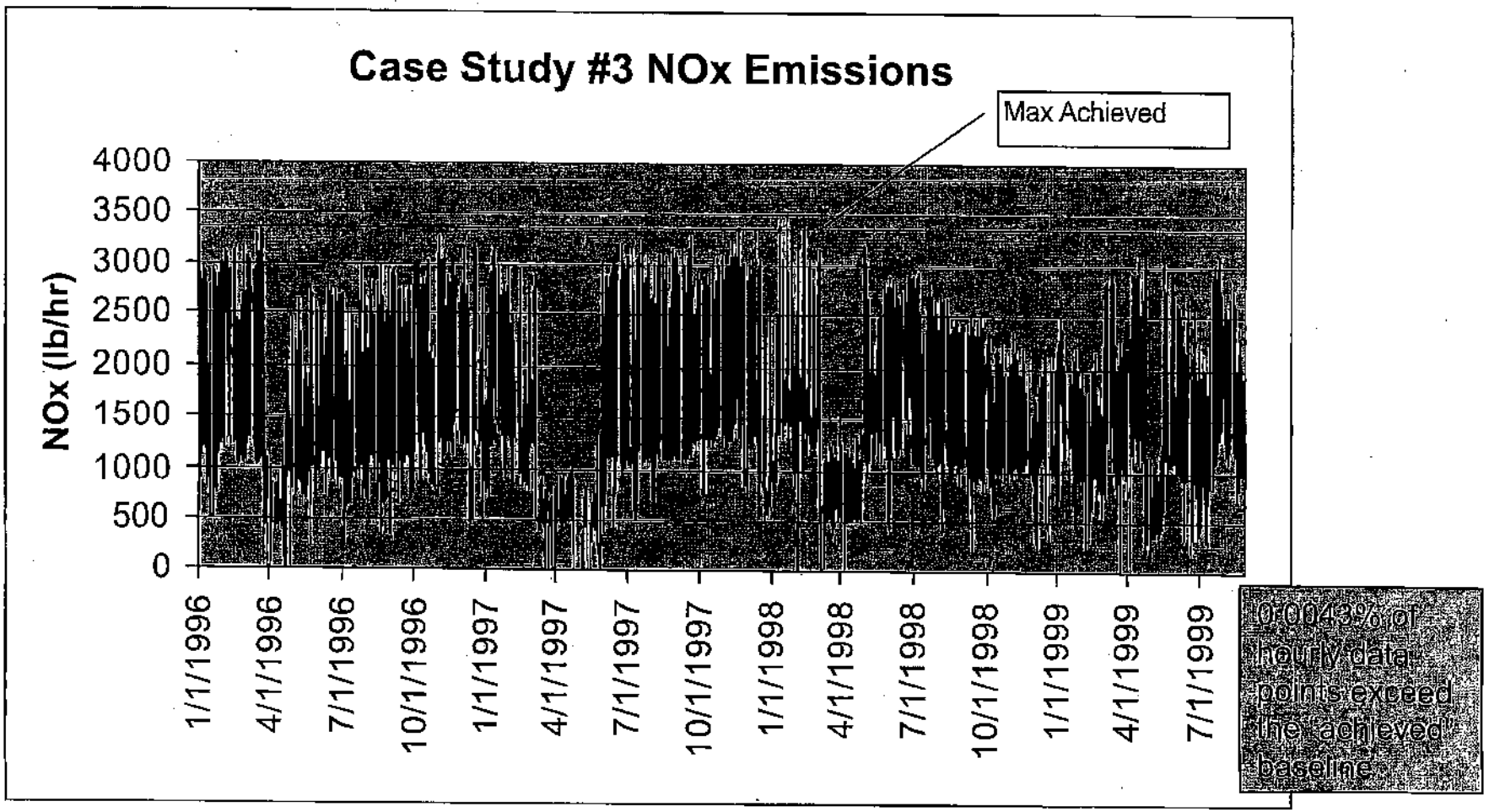
Maximum Achieved Test - NO_x



Achieved baseline (5 yrs (where available) preceding the change) = maximum hourly emission rate (lbs/hr).

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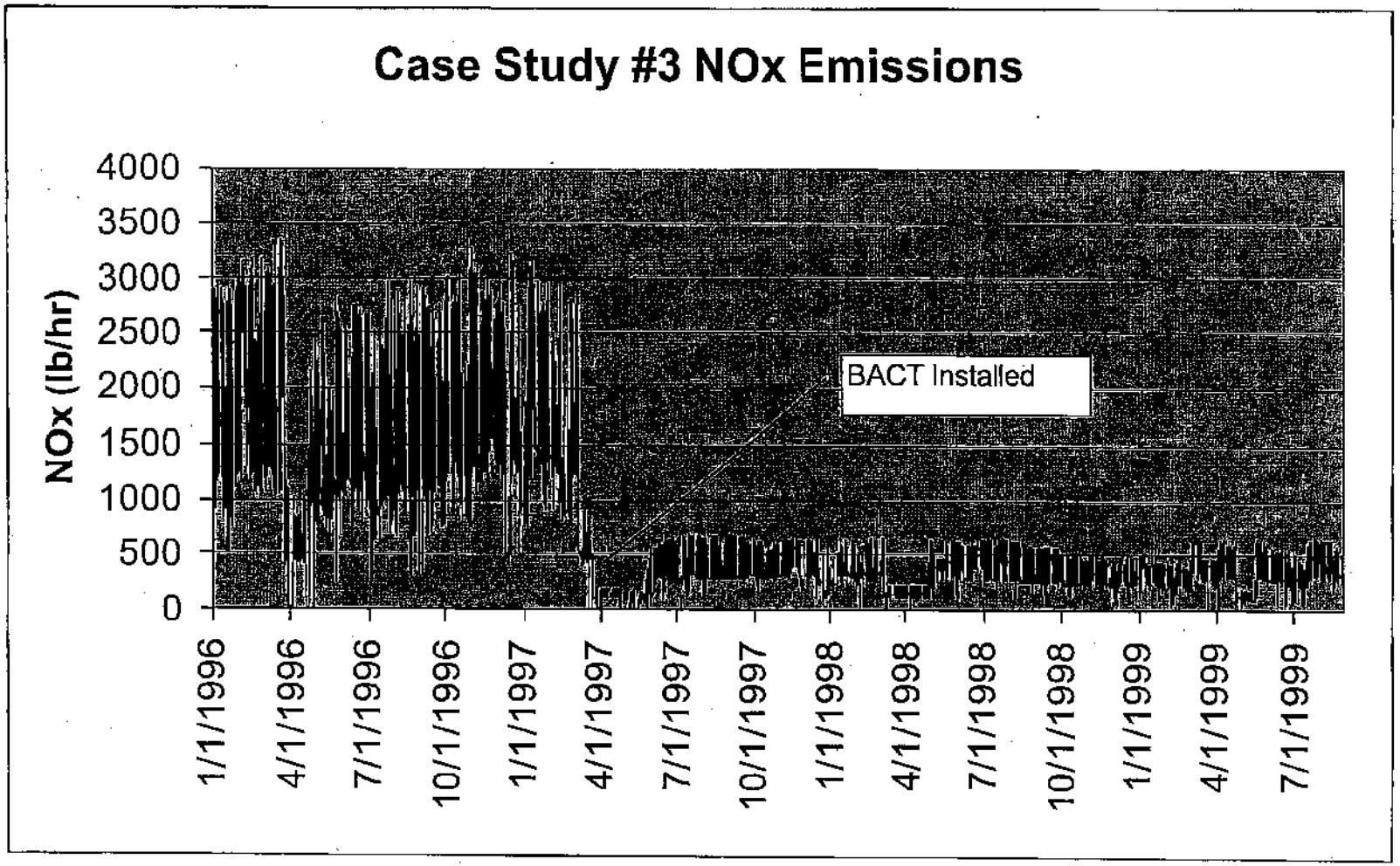
What if NO_X controls were installed?

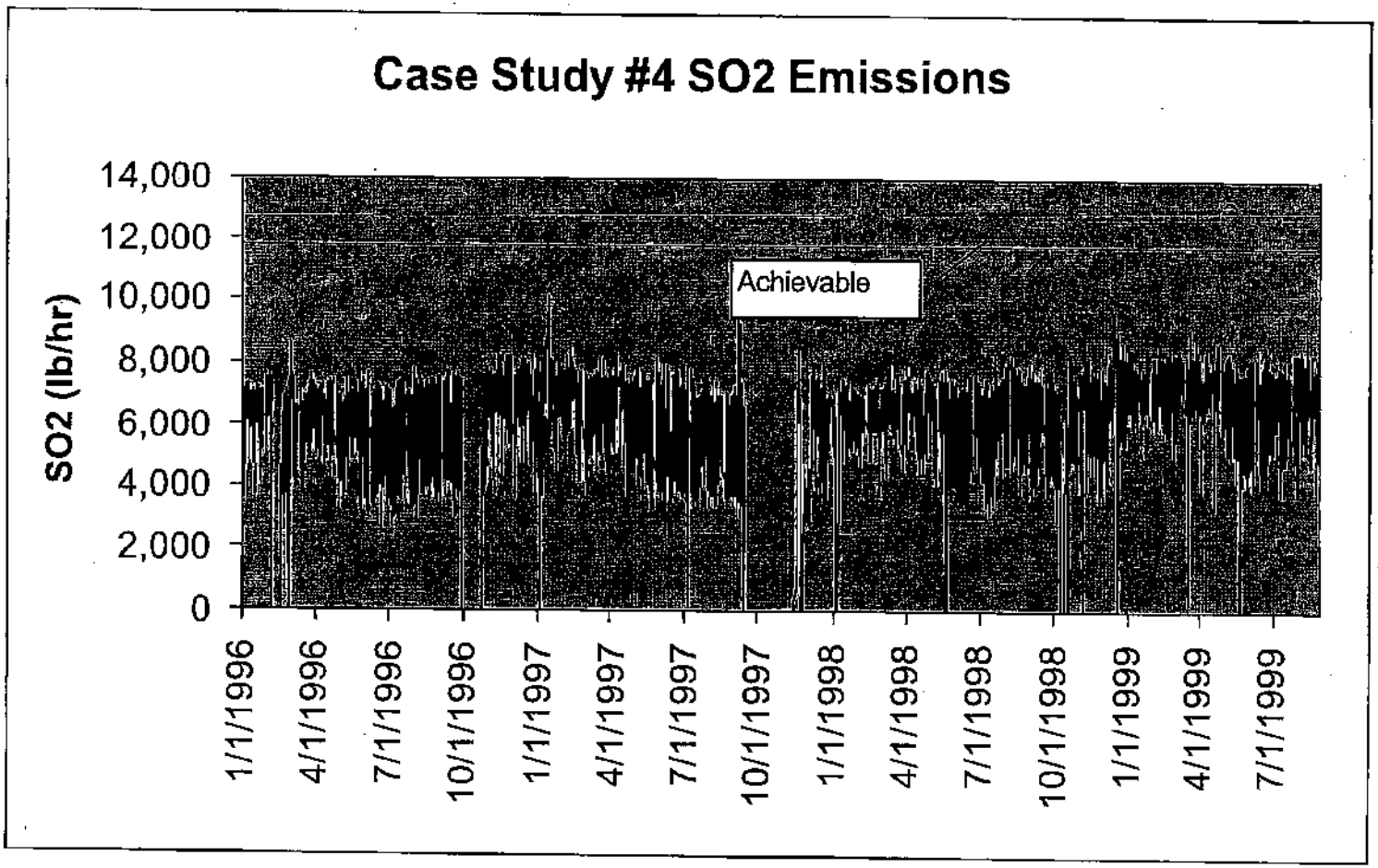


NO_X BACT assumed 0.100 lb/mmbtu

Case Study #4

- 508 MW Unit.
- 1997 project -- Change in method of operation - EKPC installed a newly designed turbine. Increase in capacity of 77 MW (the rated generation of the unit went from 508 to 585 W).
- SO_2 and NO_X increased by 1,700 and 507 tons/year, respectively.

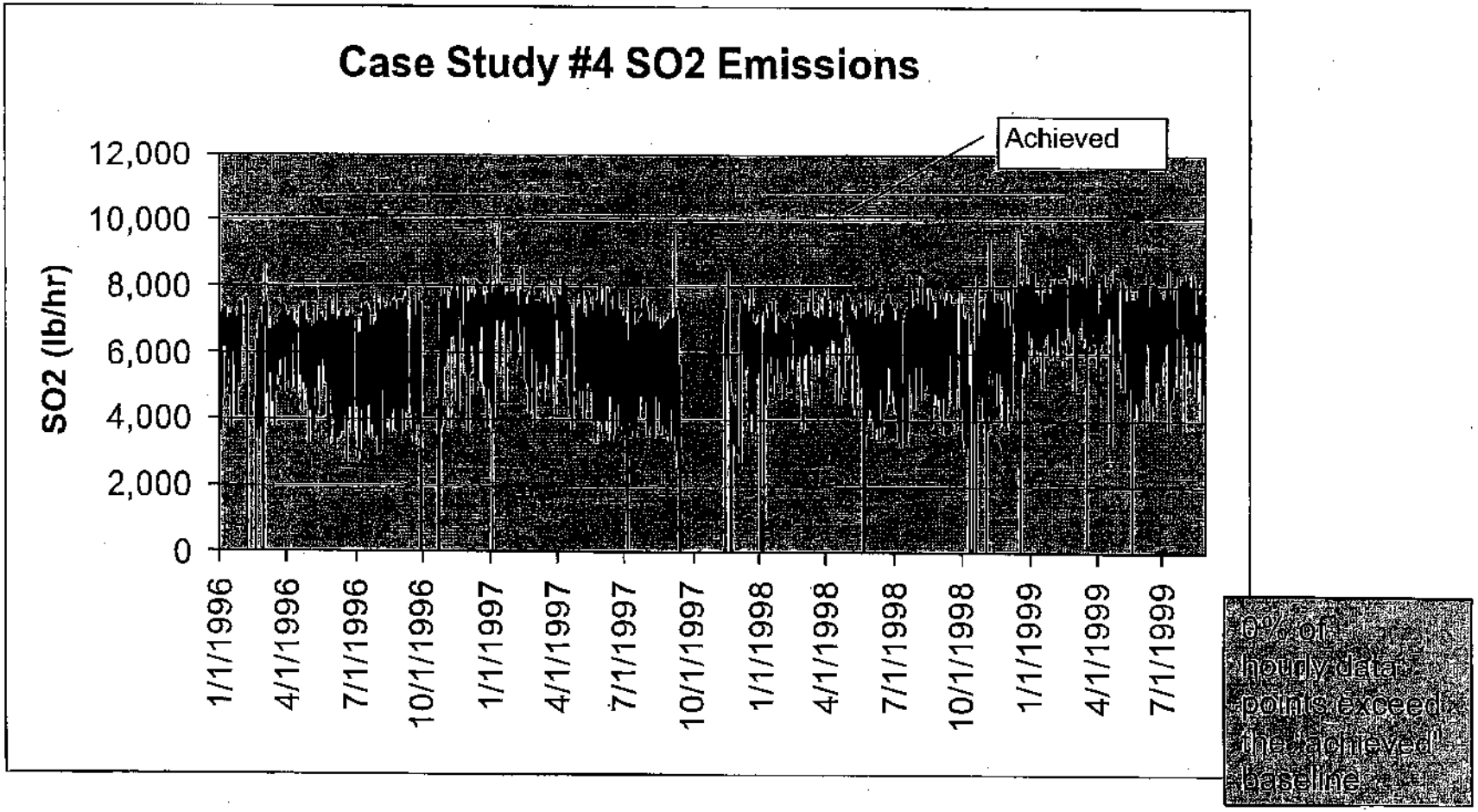
Maximum Achievable – SO_2



Achievable baseline (5 yrs (where available) preceding the change) = maximum emission rate in any hour x maximum heat rate in any hour.

All data (post-1994) was obtained from EPA's Clean Air Markets Division.

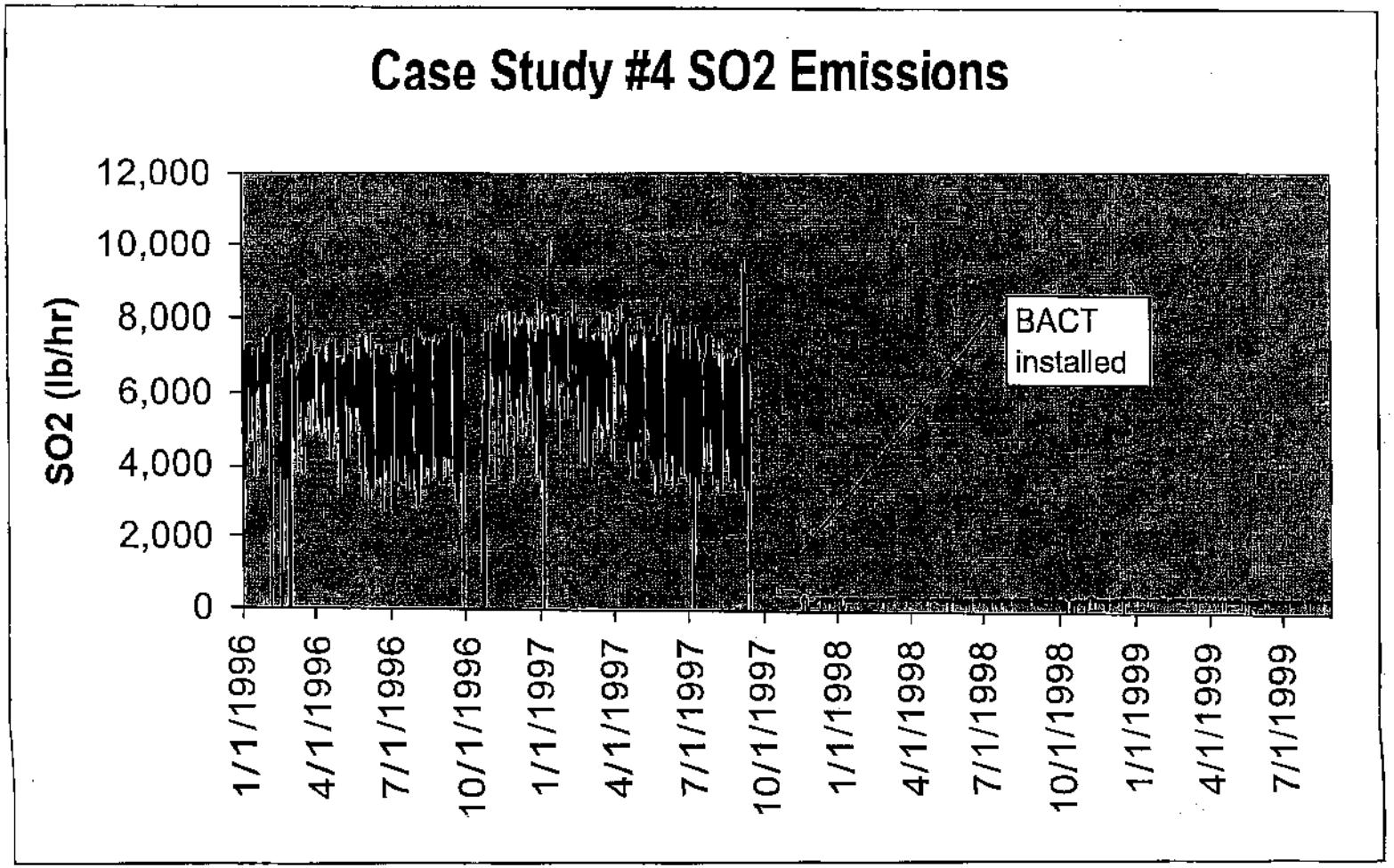
Maximum Achieved – SO_2



Achieved baseline (5 yrs (where available) preceding the change) = maximum hourly emission rate (lbs/hr).

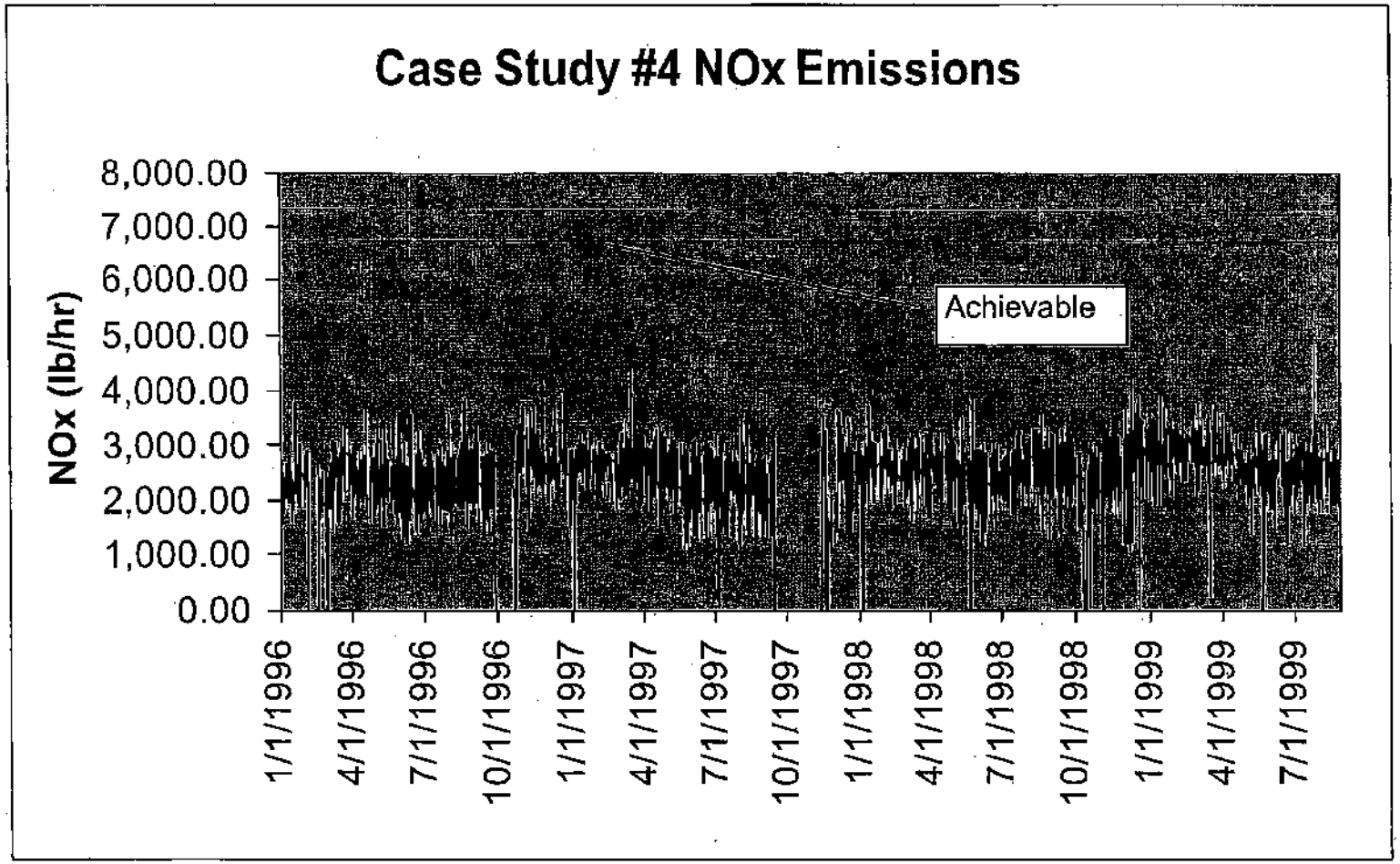
All data (post-1994) is from EPA Clean Air Markets Division as reported.

What if SO_2 controls were installed?



SO_2 BACT assumed 95% emission reductions

Maximum Achievable - NO_x



Achievable baseline (5 yrs (where available) preceding the change) = maximum emission rate in any hour x maximum heat rate in any hour.

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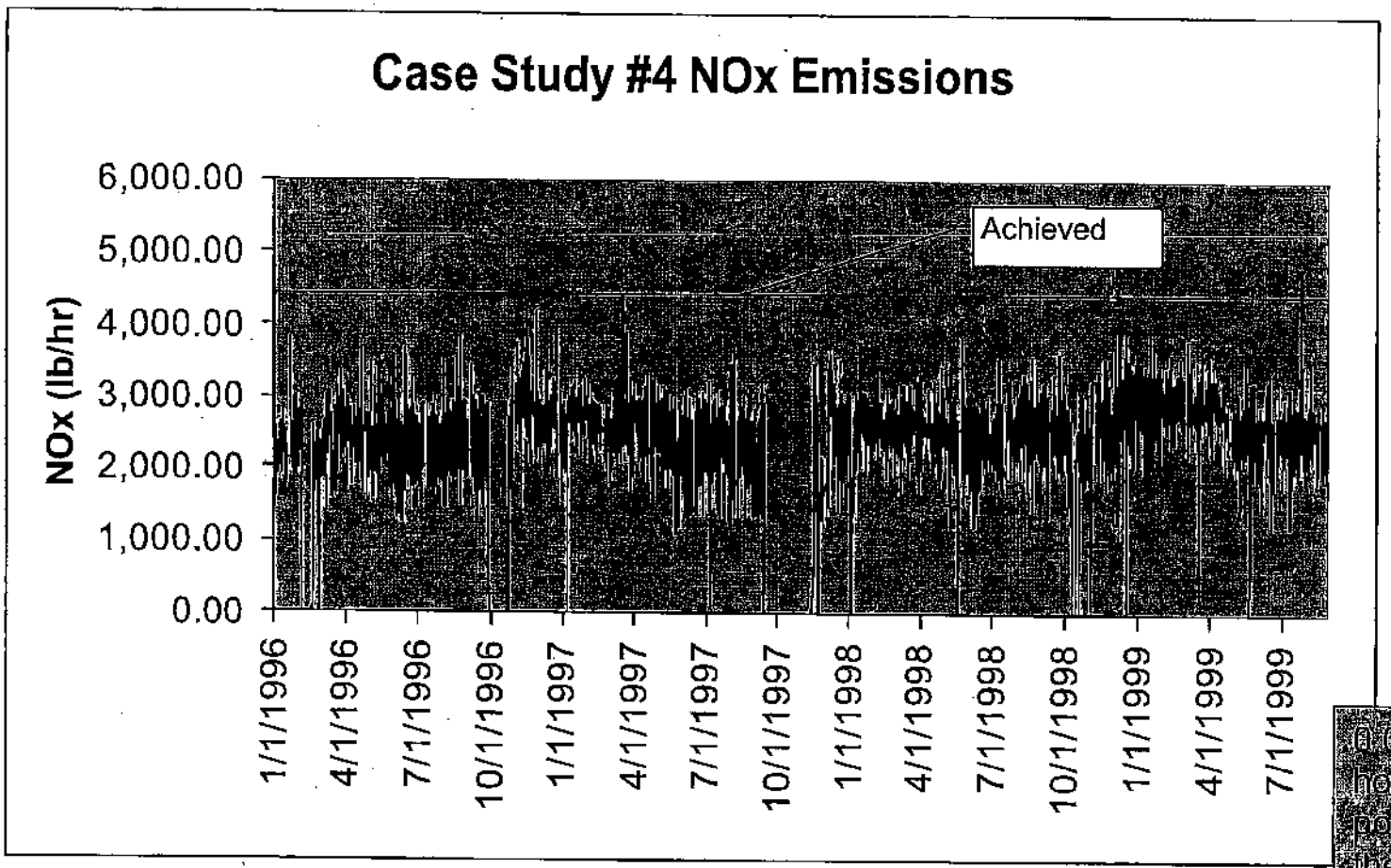
Maximum Achieved - NO_x

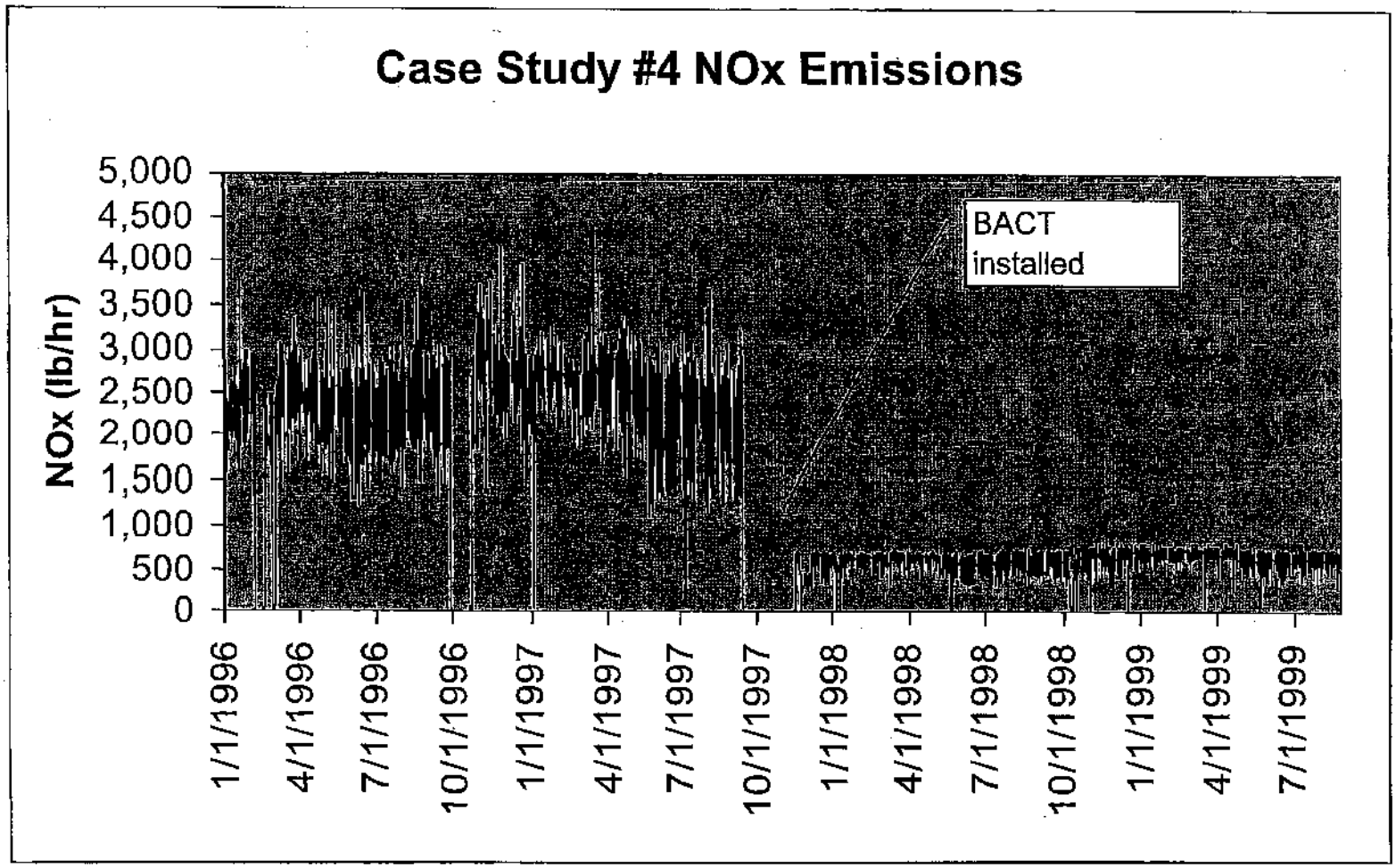


0.005% of hourly data points exceed the achieved baseline

Achieved baseline (5 yrs (where available) preceding the change) = maximum hourly emission rate (lbs/hr).

All data (post-1994) is from EPA Clean Air Markets Division as reported.

What if NO_X controls were installed?



NO_X BACT assumed 0.100 lb/mmbtu

Calculations

- All information calculated using acid rain data (1995-2004).
- "Achievable" baseline calculated using maximum heat rate (mmbtu/hr) multiplied by maximum emission rate (lb/mmbtu) in the 5 years prior (where available) to the change.
- "Achieved" baseline calculated by using the maximum hourly emission rate (lb/hr) in the 5 years prior to the change.
- "Achievable baseline with data corrections" was calculated by eliminating 0.1% of outlying data points in the maximum heat rate and then multiplying the corrected maximum heat rate (mmbtu/hr) by the maximum emission rate (lb/mmbtu).
- Heat rate before and after the change was calculated using the average heat rate within the period before the change and after the change.