South Coast Air Quality Management District
21865 Copley Dr.
Diamond Bar, CA 91765

Office of the Executive Officer
Barry R. Wallerstein, D.Env.
909.396.2100, fax 909.396.3340

March 1, 2005

California Energy Commission
Re: Docket No. 04-IEP-01-D.Electricity and Natural Gas Forecast Options
Docket Unit, MS-4
1516 Ninth St.
Sacramento, CA 95814-5504
E-mail: docket@energy.state.ca.us

Docket Office
California Public Utilities Commission
505 Van Ness Avenue, Room 2001
San Francisco, CA 94102-3298

Re: Joint Workshop on Natural Gas Quality Issues

The South Coast Air Quality Management District (AQMD) staff thanks you for the opportunity we had to present our views at the February 17-18, 2005 Joint Workshop on Natural Gas Quality Issues.

The Notice for the workshop invited responses to any comments submitted to or presentations made at the workshop. AQMD would like to submit the following responses.

Rule 30 Misconceptions

Many LNG proponents recommended that only the California Public Utilities Commission (CPUC) -adopted requirements like Southern California Gas Company's (SoCalGas) Rule 30 should apply to LNG supplied to California. In actuality, there are no CPUC-adopted requirements that apply to all natural gas. The SoCalGas Rule 30 – Transportation of Customer-Owned Gas, which CPUC approved, only applies to gas owned by SoCalGas customers that is transported by SoCalGas through its pipelines. Rule 30 does not apply to gas that SoCalGas purchases and supplies to its core customers. In its contracts with gas suppliers, SoCalGas may require that any gas supplied meet the Rule 30 specifications, but this is a discretionary requirement not a CPUC requirement.

Acceptable Ranges of Heating Values

The only CPUC requirements relating to the quality of all natural gas supplied to utility customers are found in CPUC General Order 58-A. It requires that each gas utility divide its area into districts, have a plan for establishing a range of acceptable heating values for each

district, and to monitor and record the heating values in each district. Gas utilities are not required to publish or report the allowable ranges or problems in maintaining them. We do not know what those allowable ranges are, but we suspect that the ranges are narrower than the 970 to 1150 Btu/scf range allowed by Rule 30. Both SoCalGas and PG&E said that they have in the past had to go into certain areas to retune equipment because of a change in heating value supplied to the area. If the Rule 1130 970 to 1150 Btu/scf range was generally acceptable, this would probably not have happened.

SoCalGas has said that customers in AQMD could be flipping back and forth between low-Btu interstate gas and high-Btu LNG-derived gas. Would the resulting range of heating values comply with General Order 58-A? SoCalGas should make public the acceptable ranges in their General Order 58-A plan. Would combustion equipment in Southern California have to be retuned, as it has in other areas, to accommodate 1150 Btu/scf gas? Is retuning feasible when such large variations in heating value can occur? All of these questions have not been addressed.

PPM Versus Mass

BHP Billiton and SoCalGas were critical of AQMD's graphs of data that showed large increases of NOx emissions as Wobbe Number increases because they focus on the concentration of NOx rather than the mass emissions. For a given fuel, the mass of emissions per million Btus of fuel heating value is directly proportional to the concentration of the pollutant corrected to a constant value of oxygen, which is how the NOx values were expressed. And even with the various compositions of natural gas tested by SoCalGas, there is very little change in this proportionality. Therefore, a graph of lbs of NOx per million Btu versus Wobbe Number would look virtually identical to the graphs AQMD presented.

If one was to focus on mass emissions, then the effect of the hotter gases on thermal efficiency should also be considered. The SoCalGas data show that the hotter gases caused the heat input of the units to increase, but the combustion efficiencies generally declined with the hotter gases. Therefore, more Btus of fuel would have to be burned to provide the same heat output. AQMD did not focus on this additional impact because the effect on emissions is small compared to the increase in large increases of NOx concentrations, but perhaps the Commissions should consider the energy consequences of this.

SoCalGas Maximum Wobbe Number Recommendation

SoCalGas recommended revising Rule 30 to limit maximum Wobbe Number to 1400 Btu/scf (while they are at it perhaps they should require all gas to comply with it, not just customer-owned gas!). While this is a step in the right direction, it isn't clear how SoCalGas came up with this value. Clearly, it is not based on limiting emissions impacts. For the sake of brevity, AQMD presented only one graph from the SoCalGas study at the workshop, but attached are seven graphs of NOx versus heating value and Wobbe Number for sensitive equipment tested by SoCalGas. It is apparent from the data that limiting the Wobbe Number is obviously a good way to limit NOx emissions, but a 1400 Wobbe would still cause significant NOx increases and violations of AQMD NOx rules. Based on these data, NOx emission increases of approximately 117%, 26%, 127%, 37%, 75%, 41% and 20% could still be expected from this sensitive equipment with 1400 Btu/scf Wobbe Number gas, compared to the baseline natural gas that is typical to the AQMD area.

If LNG were required to meet the CARB CNG specifications, including the minimum inerts specification of 1.5%, the maximum Wobbe Number would be a lower 1381 Btu/scf. And if the nitrogen content was increased to the 4% maximum inerts allowed by Rule 30, the Wobbe Number would be further lowered to 1337 Btu/scf, which is comparable to the baseline gas in this area.

CNG Vehicle Emission Impacts

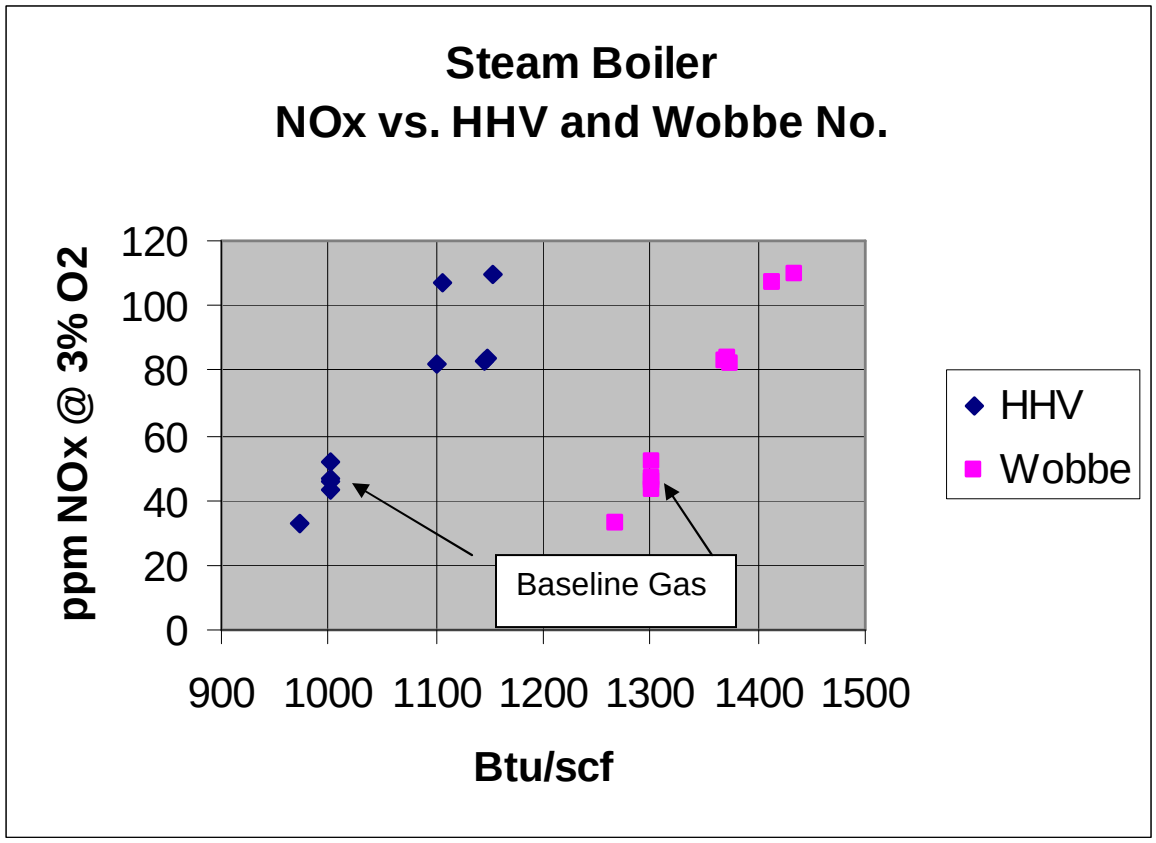
Both SoCalGas and BKI quoted results from emission tests done for CARB and concluded that lowering the methane number (MN) to 73 would have no impact on vehicle emissions. However, both failed to point out that the MN 73 gas that was tested had an unusually high inerts (CO_2 +N_2) content of 5.9% that was much higher than the other gases tested and higher than the 4.0% allowed by Rule 30. LNG typically has near zero inerts. The effect of the high inerts was to reduce the Wobbe Number of the 73 MN gas to moderate levels and significantly reduce the emissions impact of the MN 73 gas. CARB can substantiate this.

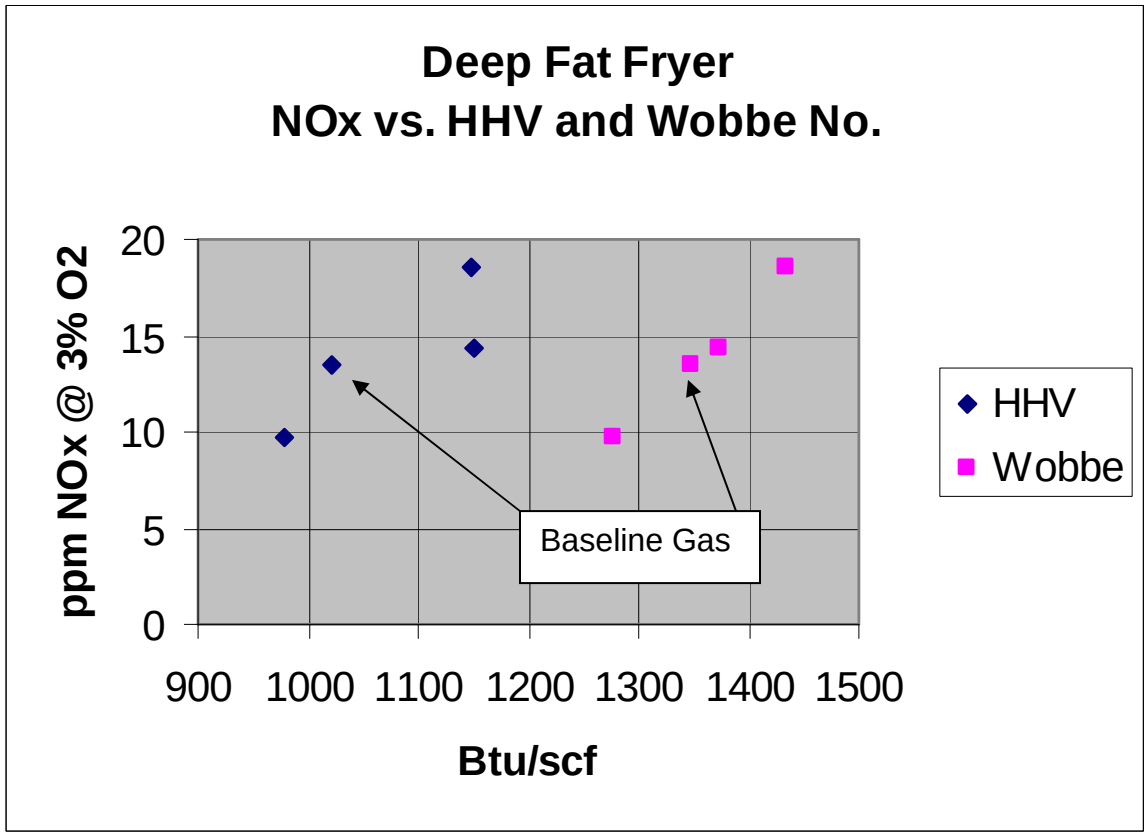
Thank again for the opportunity to present our views on this important issue of natural gas quality.

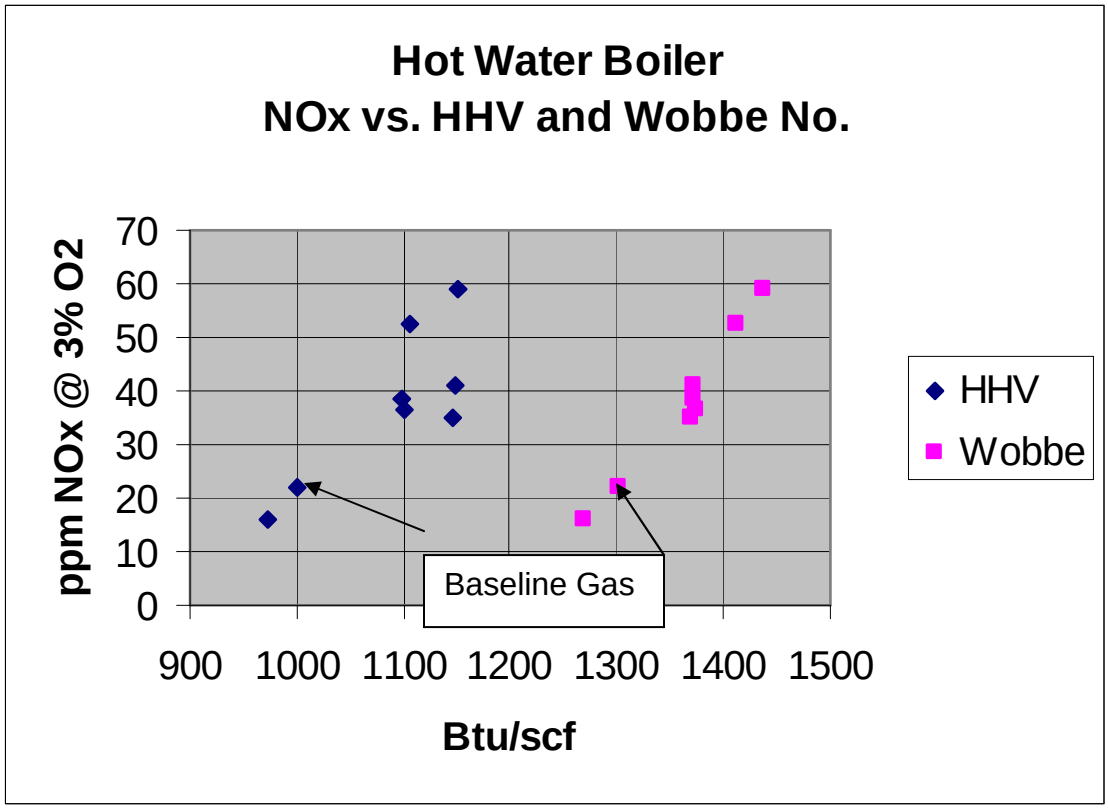
Sincerely yours,

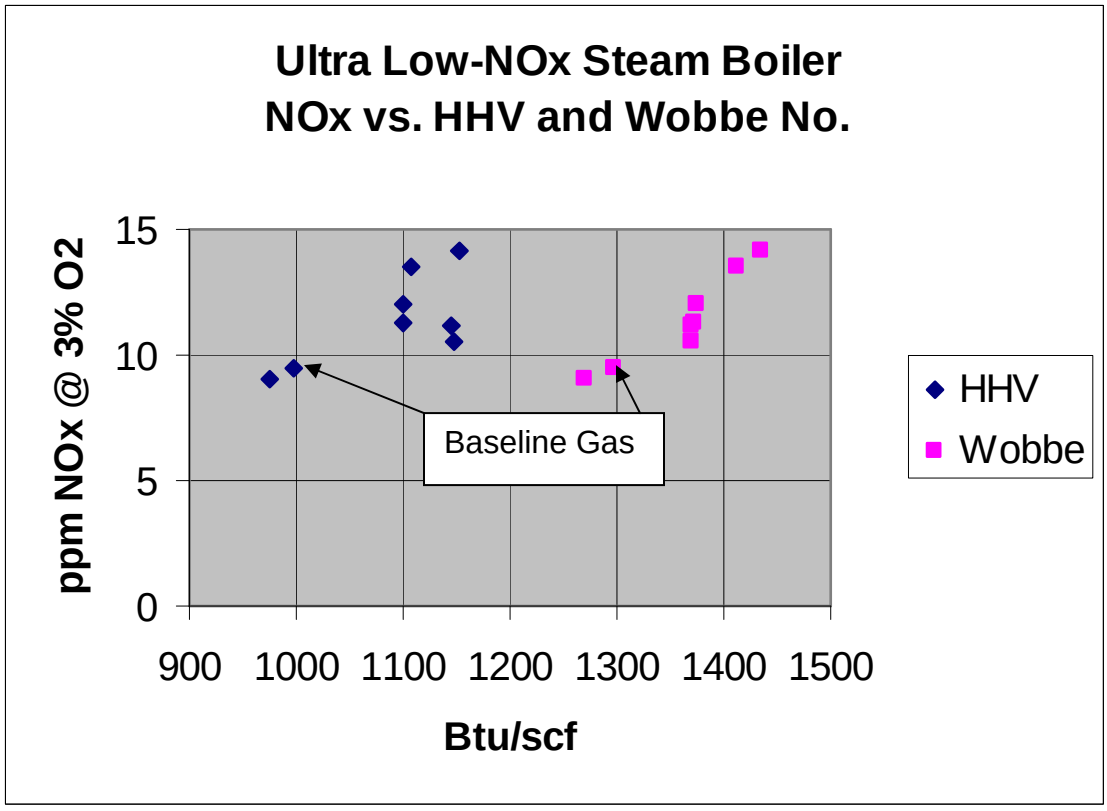
Barry R. Wallerstein, D.Env.
Executive Officer

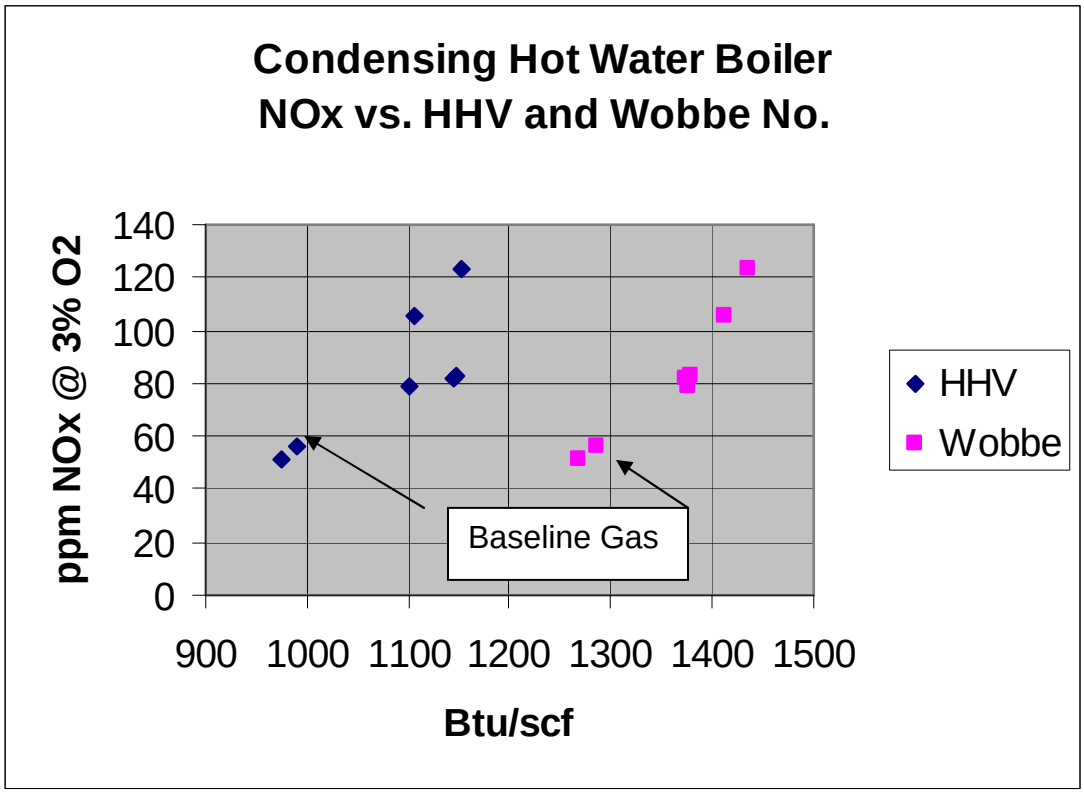
BRW:CSL:MK

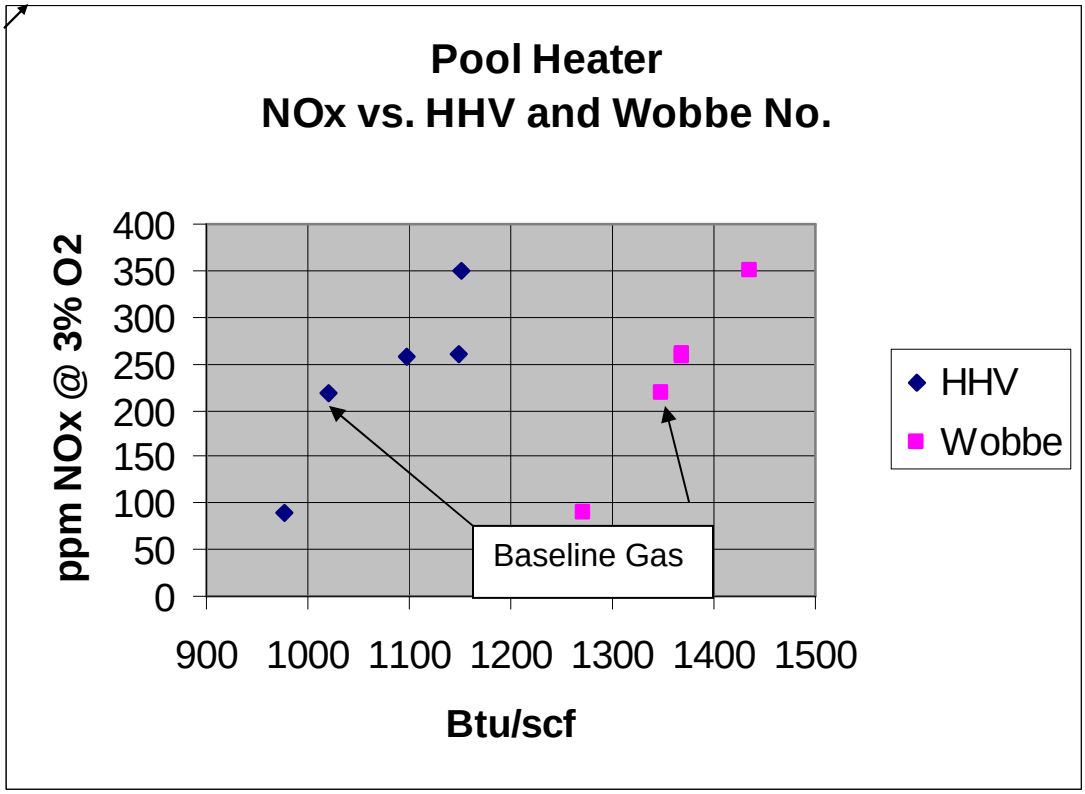

Steam Boiler
NOx vs. HHV and Wobbe No.
ppm NOx @ 3% O2
120
100
80
60
40
20
0
900
1000
1100
1200
1300
1400
1500
Btu/scf
Baseline Gas
HHV
Wobbe

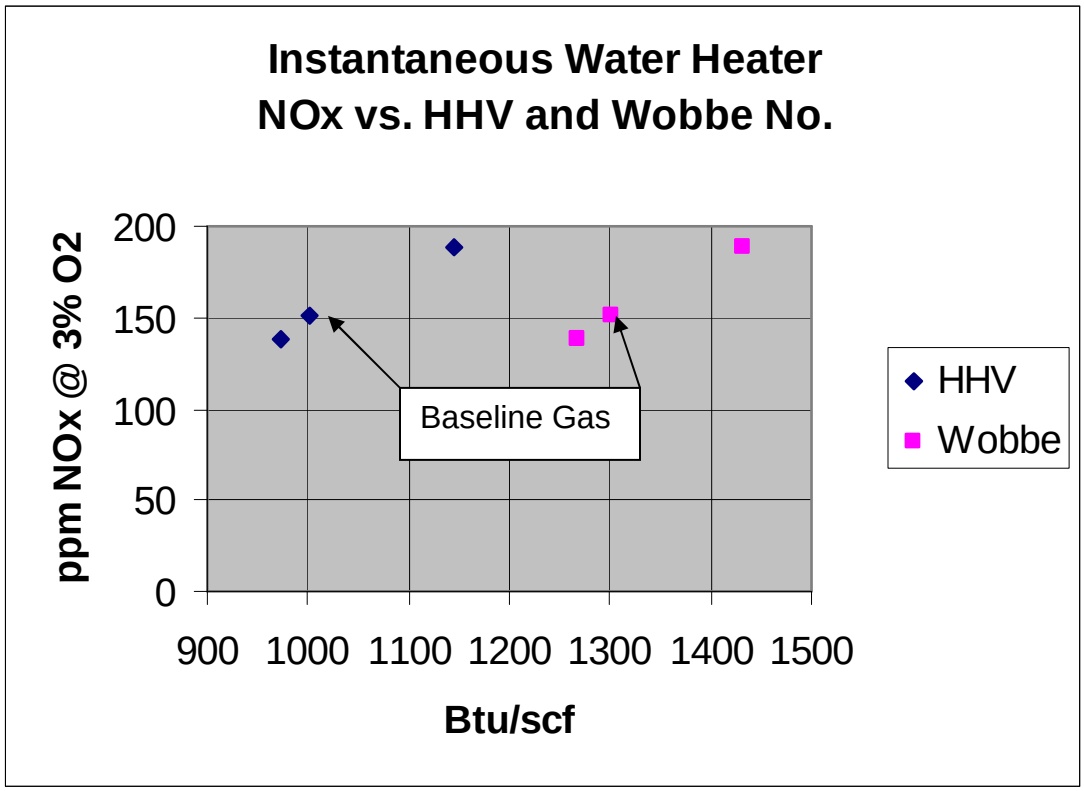

Deep Fat Fryer
NOx vs. HHV and Wobbe No.
ppm NOx @ 3% O2
20
15
10
5
0
900
1000
1100
1200
1300
1400
1500
Btu/scf
Baseline Gas
HHV
Wobbe


Hot Water Boiler
NOx vs. HHV and Wobbe No.
ppm NOx @ 3% O2
70
60
50
40
30
20
10
0
900
1000
1100
1200
1300
1400
1500
Btu/scf
Baseline Gas
HHV
Wobbe


Ultra Low-NOx Steam Boiler
NOx vs. HHV and Wobbe No.
ppm NOx @ 3% O2
15
10
5
0
900
1000
1100
1200
1300
1400
1500
Btu/scf
Baseline Gas
HHV
Wobbe


Condensing Hot Water Boiler
NOx vs. HHV and Wobbe No.
ppm NOx @ 3% O2
140
120
100
80
60
40
20
0
900
1000
1100
1200
1300
1400
1500
Btu/scf
Baseline Gas
HHV
Wobbe


Pool Heater
NOx vs. HHV and Wobbe No.
ppm NOx @ 3% O2
400
350
300
250
200
150
100
50
0
900
1000
1100
1200
1300
1400
1500
Btu/scf
Baseline Gas
HHV
Wobbe


Instantaneous Water Heater
NOx vs. HHV and Wobbe No.
ppm NOx @ 3% O2
200
150
100
50
0
900
1000
1100
1200
1300
1400
1500
Btu/scf
Baseline Gas
HHV
Wobbe