Haar Consulting Services, LLC

Special Newsletter – Gas Compression Engines

September 24, 2009

Information contained in this newsletter is a technical summary of the current EPA and NSPS Regulations on NOx Critical Areas. There are solutions available to let customers continue to operate their gas compression units that are unregulated or do not meet the current regulations for these NOx critical areas. These areas are described on the map that is provided on the last page of this newsletter.

References:

1. EPA Small Marine and Spark-Ignited Engine Manager – Washington D.C.
2. NSPS Regulation 2008 – 57 pages
3. EPA Clean Air Act – 437 pages
4. Texas Air Quality Program (TARP) Regulations
5. Colorado NSPS Website with Air Quality Regulations
6. Wyoming Air Quality Regulations
7. Nevada Air Quality Regulations (NRS 445B.210)
8. EPA U.S Map of Non-attainment areas in the U.S. for NOx, which results in Ozone depletion

1. Gas G3500 gas compression engines can be upgraded to benefit from better thermal efficiency, improved control technology, NOx emission not to exceed 1.5 g/bHp-hr. This is done with the addition of ADEM III ECM & NOx control software, Air Fuel Ratio Control and exhaust stack mounted NOx sensor. Specific G3508 engines with twin turbo's (9TG prefix) can also be upgraded to a single turbo that results in 630 hp rating increase to 670 hp rating. No longer have to use the magneto system.
2. Gas G3500 gas compression engines may need to operate in a "not to exceed" 0.5 g/bHp-hr. The engines can be totally reconfigured into what is referred to as an "Ultra Lean Burn" configuration. This does not require any after treatment to

achieve this level of NOx in the exhaust. This does require several major engine components to be changed. Unless this can be done at the time of overhaul, a swing engine process should be considered to complete the fleet.

3. Gas G3600 gas compression engines can be upgraded to ADEM III technology to improve availability, reduce maintenance cost and have latest technology advantage. The ESS system is removed. These engines can also be upgraded from the VTC axial turbo design to the latest TPS radial turbo design for significantly improved resistance to fouling and lower overall turbo maintenance cost.
4. Gas G3300 gas compression engines can be upgraded to not exceed 1.5 g/bHp-hr with the newest ADEM IV control technology and software along with digital ignition control, air fuel ratio control and NOx sensor. There is a three-way catalyst available if the not to exceed 0.5 g/bHp-hr is required for the engine site operations.

When you don't understand or you don't have a marketing strategy to take care of the new opportunity for your parts & service business, contact me for help to make this profit opportunity happen. In addition, I have a contact to do a coverage study that will increase your profit opportunity.

The last page of this newsletter contains the EPA map of the US and the problem areas that exist today. You can see that many of the areas are in high population gas compression sites.

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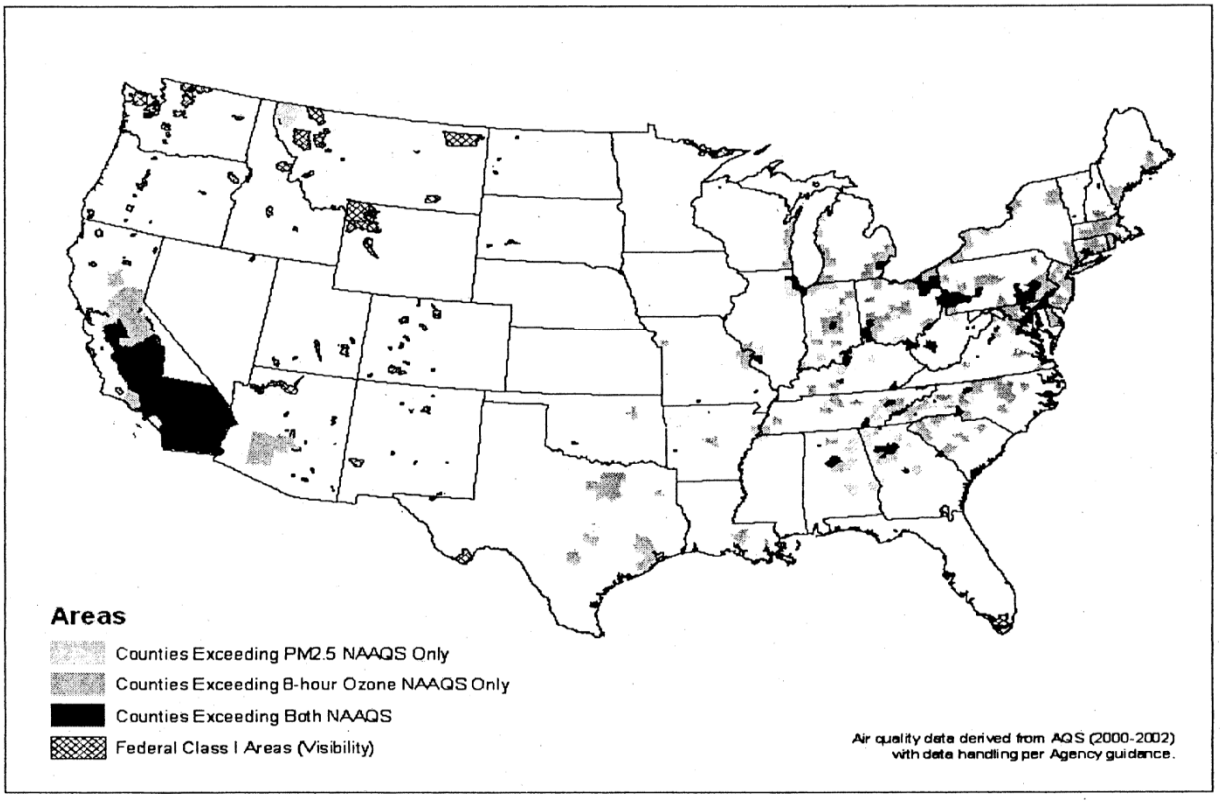
Figure I-1. Air Quality Problems are Widespread



NAAQS is “National Ambient Air Quality Standard”

The 8 hour ozone areas refer to NOx production