



NGV Commercial Fuel Spec

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1



Proposal

- ▶ Statewide MN80
- ▶ Regional MN73 with criteria
- ▶ Wobbe index TBD
- ▶ C4+ max 1.5 percent
- ▶ Inerts max 4%
- ▶ Other



MN80

- ▶ Relates to knock resistance of fuel
- ▶ Critical criteria for spark ignited natural gas engines
- ▶ Sound rationale for MN80 spec from engine manufacturers
- ▶ Greater flexibility in gas operations without sacrificing engine durability



MN73

- ▶ Appropriate for current HD natural gas lean burn engines
- ▶ Manufacturers advertising engines can operate as low as MN65
- ▶ **Regional exemption** with appropriate station access security provisions has been **shown to work**
- ▶ Provides operational flexibility to utilities

4



Wobbe Index

- ▶ MN defines a very broad spectrum of fuel compositions
- ▶ Superimposing Wobbe Index criteria on top of MN
 - ▶ Specifies smaller range of gas compositions
 - ▶ Adds protection for stationary sources



C4+

- ▶ Unsure why a C4+ spec needed on top of MN spec?
- ▶ NGV industry has never indicated a problem with C4+
- ▶ Concerns always on ethane and propane
- ▶ Can C4+ spec be dropped??

6



Inerts

- ▶ Inert specs defined years ago were based on historical averages in natural gas not by identified problems with limits
- ▶ Inerts did cause problems with first generation lean burn engines with wide range oxygen sensors (for feedback control)
- ▶ Believe oxygen sensor problems resolved years ago
- ▶ Need better rationale for defining inert limits

7



Changes in Engine Technology

- ▶ 2007 engine technology changes to stoichiometric operation with 3-way catalysts
- ▶ Engine manufacturer prior support for lower MN based on development of “world” lean burn engines to be used anywhere in the world
- ▶ Ability to “operate” with low MN fuel does not necessarily mean that performance of engine (HP, torque) will be same for all fuel compositions

8



Changes in Engine Technology

- ▶ While LD vehicles (stoichiometric operation with 3-way catalysts) have very high tolerance for fuel variability – 2007 HD technology may not (untested)
- ▶ Adoption of MN80 spec not viewed as a problem for engine manufacturers
- ▶ Adoption of MN73 spec may cause concerns regarding performance of 2007 technology



Certification Fuel

- ▶ Current CARB certification fuel is better quality than existing CARB commercial fuel spec or MN80
- ▶ All engine development and certification based on CARB certification fuel including 2007 low emission product (0.2 gram NOX)
- ▶ CARB indicates that change in commercial fuel spec would necessitate a change in the certification fuel spec
- ▶ Engine manufacturers don't want to see changes in certification fuel spec in the middle of their product 2007 product development cycle

10



What is Needed

- ▶ Additional dialog with engine manufacturers regarding how gas composition below MN80 will impact engine durability and emissions of “2007” product
- ▶ Discussion of how lower certification fuel spec will have on product emissions



Conclusions

- ▶ See no obstacles of adopting MN80 spec immediately
- ▶ See no problems with regional exemptions
- ▶ Adopting specifications below MN80 will require evaluation of
 - ▶ Current lean burn technology vs “2007” technology
 - ▶ Impact on the industry of potential changes in the certification fuel spec

12



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