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17-11-6

Critique of Appendix K

Greetings –

As the Emissions Task Force chairman for the California Groundwater Association (CGA), I have been tasked to evaluate Appendix K and comment on its accuracy. I submitted a letter for comment on October 5, 2017 and followed up with a conference call October 19, 2017. Our analysis of Appendix K is as follows:

1. There are 22 paragraphs in the Appendix
2. 13 contain partially true or true statements
3. Nine contain incorrect information, and of those, six are patently false or contain information that cannot be implemented to mitigate potential risk to our personnel

Unsubstantiated Statements:

1. There are at least 40 Tier 4 rigs and equipment in the Portable program and the Highway program. All have been registered by the DMV or the Portable Division of the California Air Resource Board (CARB). All are represented by CGA. Key Energy and C & J also have multiple rigs and equipment in the Portable and DOORS programs. Key has over 40 Tier 4 engines alone.
2. In 2013, Mr. Corey's letter to the US EPA addressing your (CARB's) concerns with the proposed Final Rule on hardship extensions for Tier 4 compliance was addressed. The final 2014 Rule dismissed your concerns.

3. CARB has never tested Tier 4 engine emission systems in our industry or in the oil and gas industry. Your conclusions on Tier 4 performance are baseless. Offers made by Key Energy, the California Groundwater Association and others have never been acted upon. This is based on your comments that there are no Tier 4 engines in our industry. Mark Maggiora, of Maggiora Brother's Drilling in Watsonville, CA, and a long-time member of the CGA, has registered the following with Tier 4 engines; three test engines, one generator, one drilling rig (portable), and one drilling rig (highway) comments that he 'would not have another Tier 4 engine unless it was forced upon him.'
4. CARB acknowledged load duty cycle operations, yet the recommendations for mediation of sooting and excessive regeneration cycles failed to acknowledge their own research performed by the Southwestern Research Institute (SWRI).
5. SWRI studies show DPS and SCR systems will work properly in ON-highway applications, with 50% duty cycles. They do not work as intended on vocational and off-road applications with much different duty cycles. See comments by Mr. Wong and Chris Sharp in the SWRI studies and the 2016 Diamond Bar presentation.
6. Key Energy has daily problems and shutdowns with their Tier 4 engines. To date, there has been no interaction with CARB to solve these problems. Their mechanics have had to be trained by Cummings and were giving proprietary software. They still have daily problems.

7. Cummings states in their Tier 4 operation manuals that their engines are not compatible with long idle periods, low RPM and low duty cycles. Owner can expect constant regeneration issues. This information can also be found in the SWRI studies.
8. Tier 4 engines can be made to operate by modifying their computers and changing engine operating RPMs. This may lead to unsafe working conditions while drilling and lifting operations are occurring. Even these changes cannot mitigate autoignition potential.
9. Tier 4 engines require more fuel per hour due to higher horsepower required to compensate for regeneration issues. Also, on generator applications load banks do likewise. Tier 4 engines probably create more pollution than they solve and certainly increase daily operational costs.
10. Your remedies for remediation show a complete lack of knowledge of real world operations, environments and equipment construction.
11. CARB's experts on Tier 1, 2 and 3 engines completely ignore the effects of duty cycles on engine heat signatures. Tier 4's in the Highway program as well as Tier 1, 2 and 3 engines can have higher exhaust temperatures on the highway. In the drilling mode, they do not unless an air compressor is engaged. Compressors are not always used on the Highway program rigs. These same rigs, when used for direct or reverse rotary drilling have totally different duty cycles and experience DPF operational problems. Exhaust temperatures in both direct or reverse operations rarely exceed 600 to 700°F. If they exceed those levels, temperatures of 800 to 900°F last for less than 10 to 15 seconds per event.

These events may occur one or two times per hour. The only gas problem at these low temperatures is hydrogen sulfide (H2 S) and this can be detected prior to an event and mitigation measures are readily available.

12. Explosion proof mediation. There are NO class of explosion-proof Highway trucks. We have drilling rigs and support equipment in all three programs. They do identical work, they have identical emission profiles. Of our seven rigs in three programs, the only difference is that five have steering wheels and two are pulled by truck tractors. What sense does this make? All have the same operational issues, and if equipped with Tier 4 engines all are potentially dangerous.

Respectfully,

Larry W. Rottman
Emissions Taskforce Chairman
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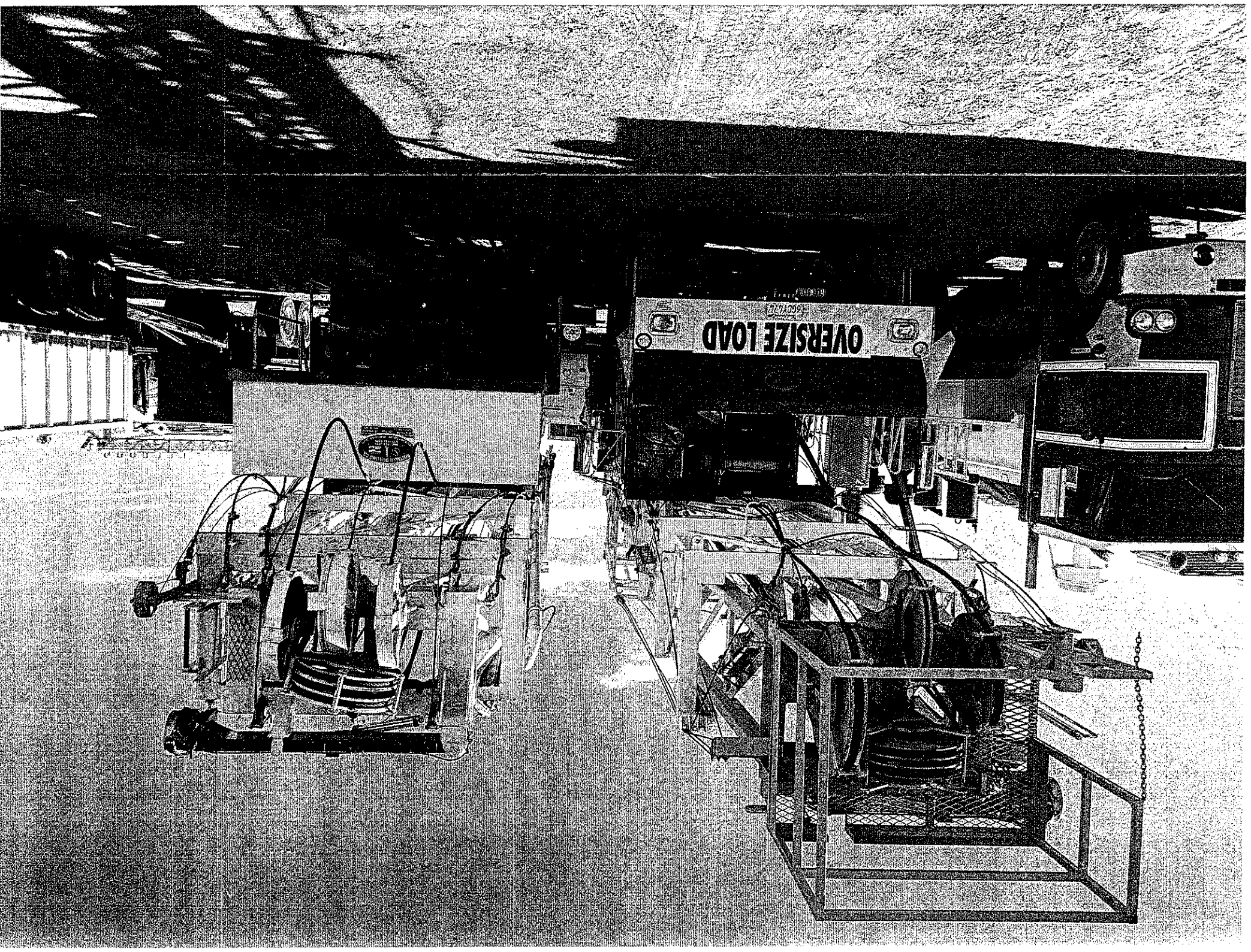
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