New Diesel Engines Lead to Faster Air Permitting

When issuing construction permits for Iowa businesses and industries, the DNR has found companies using older diesel engines may have difficulties meeting newer air quality standards for fine particulates ($PM_{2.5}$) and nitrogen dioxide (NO_2). Small businesses, air quality consultants, and industries may want to consider pollution controls in addition to price when deciding to purchase a new or used diesel engine. The DNR has developed this fact sheet to help companies compare effectiveness of air pollution controls when selecting diesel engines.

Older diesel engines may be cheaper to purchase, but may cost more when trying to meet air quality standards.

Diesel Engine Emissions and Air Quality

- Fine particulates ($PM_{2.5}$) and nitrogen dioxide (NO_2) are among the air pollutants of concern for diesel engines.
- If using engines with poor emissions controls, companies may have to meet strict construction permit conditions (e.g., reduced operating hours) to comply with the National Ambient Air Quality Standards (NAAQS) for $PM_{2.5}$ and NO_2.

Classification of Diesel Engines

- Diesel engines are classified by tiers.
- Each engine tier can include engines of varying sizes based on horsepower (HP) rating. Engine tier ratings are provided by the engine manufacturer.

How to Use this Fact Sheet

- Obtain the tier rating and size from the engine manufacturer for the desired engine.
- Select Table 1 or Table 2 on back of this fact sheet depending on whether the engine will be an intermittent or non-intermittent source, respectively. An intermittent source is a source which operates less than 500 hours per year and on a random schedule. For example, an emergency generator may meet this requirement. Emissions of nitrogen oxides from intermittent sources are not evaluated against the stringent 1-hour NO_2 NAAQS.
- Evaluate the potential impact on air quality relative to other engine tier ratings and sizes. The higher the percentage—highlighted in yellow—the more difficult it may be to meet national standards.

TABLE 1:* INTERMITTENT ENGINES: PERCENTAGE OF APPLICABLE NAAQS

The higher the percentage, the more difficult it may be for air quality standards to be met.

Engine Tier	Engine Horsepower			
	400 - 600	601 - 1100	1101-2000	2001-4000
0	195	155	142	194
1	128	144	133	177
1_FEL	128	144	133	177
2	99	105	101	117
2_FEL	128	144	133	177
3	99	101	NS[4]	NS[4]
3_FEL	128	133	NS[4]	NS[4]
4_Interim	91	94	94	100
4_Interim_gs	91	94	94	100
4_Final	91	92	92	93
4_Final_gs	91	92	92	92
4_FEL	92	93	93	95
4_FEL_gs	92	93	92	94

TABLE 2:* NON-INTERMITTENT ENGINES: PERCENTAGE OF APPLICABLE NAAQS

The higher the percentage, the more difficult it may be for air quality standards to be met.

Engine Tier	Engine Horsepower			
	400 - 600	601 - 1100	1101-2000	2001-4000
0	246	248	241	368
1	155	182	186	254
1_FEL	202	248	241	368
2	134	151	157	201
2_FEL	164	197	199	279
3	112	115	NS[4]	NS[4]
3_FEL	134	139	NS[4]	NS[4]
4_Interim	112	119	121	147
4_Interim_gs	112	119	92	92
4_Final	91	105	121	147
4_Final_gs	91	92	92	92
4_FEL	92	131	153	196
4_FEL_gs	92	93	92	94

*NOTES:

1) These table values are merely a guide to determine if an engine tier and size may be able to meet the NAAQS. The actual air quality impact of a specific engine will vary depending on how and where it is installed.
2) FEL = Family Emission Limit.
3) gs = generator set.
4) The U.S. EPA did not develop tier 3 and tier 3_FEL standards for larger engines (denoted by "NS" in Table 1 and Table 2). In general, larger engines, which might otherwise be classified under tier 3 or tier 3_FEL in Table 1 or Table 2, are subject to the standards of tier 2 or tier 4_Interim, depending on their model year.