DFW Switch Engine Locomotive NO_X Reductions
2007

Dallas-Ft. Worth (DFW) State Implementation Plan (SIP) NO_X reductions for switch engine locomotives is based on several assumptions. The assumptions are 1) a conservative assumed growth rate of 2% a year is forecasted for the inventory fleet (the growth rate is also based on the expansion of the BNSF intermodal facility near Alliance Airport in Ft. Worth which will serve both BNSF and Union Pacific), 2) successful implementation of Tier I and Tier II Federal standards 3) use of a cleaner emission factor of 320/grams NOx per gallon and 4) a constant fuel consumption rate. Locomotives are trending toward more efficient burning of fuel because of idle reduction technologies and use of the latest engines technologies. Therefore, the fuel use will not increase or grow for 2007 but stay constant for the DFW fleet. This information coupled with other inventory DFW fleet data collected from the major railroads operating in the DFW (Burlington Northern, Union Pacific, Kansas City Southern, Ft. Worth Railroad, Dallas Garland Northeastern) area will be used to calculate the emissions and reductions for 2007.

Total fuel consumption of diesel was provided from the major railroad companies. From the total diesel fuel gallons, the total diesel gallons dedicated to idle service was calculated. This calculation was based on guidance from: Locomotive Emission Standards Regulatory Support Document, April 1998. The total idle fuel consumption was developed using an average fuel consumption of 29 lbs/hr (for a 2000 hp engine and a 1500 hp engine) multiplied by the percentage of time in the idle throttle position (assumed 59%). Therefore the fuel consumption for idling time is 17.3 lbs/hr and based on the total fuel demand the estimated percentage of fuel for the idling is 19.7 %.

We now determine that 19.7 % of the fuel is dedicated for idle service.

The total fuel use for idling in the DFW fleet is 2,340,186 idle_ gallons (see **DFW_fleet sheet**)
2,356,460 idle_ gallons * 320 grams per gallon NO_X/907200 grams per ton= 825.46 tpy NO_X

825.46 tons per year NO_X _ idle/260 operating days = 3.17 tons per day NO_X _ idle

Now that we have tons per day figure, we must apply the assigned values of rule effectiveness (RE), rule penetration (RP) and control efficiency (CE) percentages to reflect the impact of regulatory programs. This is done using the formula:

Emissions tpd* [1-(RE*RP*CE)] = Controlled Emissions

Using RE= 90%, RP=75% and CE=75%

3.17 tpd NO_X _ idle* [1-(.90*.75*.75)]
3.17 tpd NO_X _ idle* (1-.50629) = 1.57 tpd controlled NO_X

Therefore the NO_X reduction is 3.17 tpd NO_X - 1.57 tpd = 1.605 or 1.61 tpd NO_X reduced

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