

July 17, 2006

Contact – Negib Harfouche and Doug Bruckman

**Workgroup Recommendations and Other Potential Control Measures**  
**Diesel Initiatives Workgroup**

**DI014 – Control Measures for Stationary Diesel Engines**

Control Measure Summary	Emissions (tons/year) in New Jersey	
<b>Stationary Engine Categories:</b> “Currently in-use” and “new” emergency (i.e. standby) and non-emergency stationary diesel engines used for electric power generation, and in a wide variety of applications (e.g. compressors, cranes, generators, pumps, water pumps for fire and flood control).		
<b>Existing State Regulations:</b> <ul style="list-style-type: none"> <li>• New Source Review (NSR)</li> <li>• State Title V Operating Permits</li> <li>• State Reasonably Achievable Control Technologies (NOx-RACT), and</li> <li>• State-Of-The-Art (SOTA).</li> </ul> <i>Implementation Area:</i> New Jersey.	<b>2006 Base PM</b>	
	Uncontrolled:	229 tpy
	<b>2006 Base NOx</b>	
	Uncontrolled	3615 tpy
	Engine Population:	8415
<b>Candidate Measure 1:</b> <b>Applicability:</b> Currently in-use modified <sup>1</sup> or reconstructed <sup>1</sup> non-emergency stationary diesel engines that are greater than or equal to 50 horsepower manufactured prior to 2007 model year (MY). <b>Objective:</b> <ol style="list-style-type: none"> <li>1) <i>Particulate Matter (PM):</i> Reduce PM emissions to 0.01 gm/hp.hr or 85%<sup>2</sup> from an average baseline level of 0.1 gm PM/hp.hr, through the implementation of add-on PM reduction-control technologies.</li> <li>2) <i>Nitrogen Oxides (NOx):</i> Reduce NOx emissions to Pre-2007 MY New Source Performance Standards (NSPS) Federal emission limits of 6.9 gm/hp.hr for all stationary diesel engines including emergency generators (<i>Reference: EPA-NSPS Final Rule: FR/Vol. 71, No. 132/July 11, 2006</i>). Engines that have the potential to emit 5 tons/year or greater have to meet current case-by-case NOx SOTA limit of 0.15 gm/hp.hr. Engines used for generating electricity have to meet current NOx RACT emission standards of 2.3 gm/hp.hr.</li> <li>3) <i>Carbon Monoxide (CO) and Total Hydrocarbons (THC):</i> Limit CO and THC to Pre-2007 MY New Source Performance Standards (NSPS) Federal emission limits (<i>Reference: EPA-NSPS Final Rule: FR/Vol. 71, No. 132/July 11, 2006</i>).  <b>Estimated Emissions Reduction:</b> 80% PM and 60% NOx per engine (from 2006 base levels).  <b>Estimated Control Cost:</b> \$ 750 per ton of NOx and PM removed (for an engine equipped with NOx Adsorber and DPF).  <b>Proposed Timing of Implementation:</b> 2007-2010  <b>Implementation Area:</b> New Jersey.             </li> </ol>	<b>PM:</b>	229 tpy
	2007-2010	
	reduction:	- 143
	2007-2010	
	Remaining:	86 tpy
	<b>NOx:</b>	3615 tpy
	2007-2010	
	Reduction:	-2254 tpy
	2007-2010	
	Remaining:	1361 tpy

<sup>1</sup> Stationary diesel engines that start modification or reconstruction after July 11, 2005.

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<p><b>Candidate Measure 2:</b> <i>Applicability:</i> New<sup>3</sup> 2007 and later model year (MY) non-emergency stationary diesel engines that are greater than or equal to 50 horsepower. <i>Objective:</i> 1) <i>Particulate Matter (PM):</i> Reduce diesel Particulate Matter (PM) emissions to 0.01<sup>4</sup> gm/hp.hr. 2) <i>Nitrogen Oxides (NOx):</i> Reduce NOx emissions to 2007 and later MY New Source Performance Standards (NSPS) Federal emission limits based on engine manufacturer's maximum rated power requirements and model year (<i>Reference: EPA-NSPS Final Rule: FR/Vol. 71, No. 132/July 11, 2006</i>). Engines that have the potential to emit 5 tons/year or greater have to meet current case-by-case NOx SOTA limit of 0.15 gm/hp.hr. Engines used for generating electricity have to meet current NOx RACT emission standards of 2.3 gm/hp.hr. 3) <i>Carbon Monoxide (CO) and Total Hydrocarbons (THC):</i> Limit CO and THC to 2007 and later MY New Source Performance Standards Federal emission limits requirements (<i>Reference: EPA-NSPS Final Rule: FR/Vol. 71, No. 132/July 11, 2006</i>). <i>Estimated Emissions Reduction:</i> 90% PM and 80% NOx per engine (from 2006 base levels). <i>Estimated Control Cost:</i> Annualized cost of \$ 3,200 for an average 480-hp non-emergency engine equipped with a catalyzed DPF. <i>Proposed Timing of Implementation:</i> 2007-2015 <i>Implementation Area:</i> New Jersey</p>	<p><b>PM:</b> 229 tpy 2007-2010 reduction: -148 tpy 2007-2010 Remaining: 81 tpy</p> <p><b>NOx:</b> 3615 tpy 2007-2010 Reduction: -2254 tpy 2007-2010 Remaining: 1361 tpy</p>
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<sup>2</sup> This is beyond the *EPA-NSPS Final Rule: FR/Vol. 71, No. 132/July 11, 2006*, and in accordance with *California Code Rules, Air Toxic Control Measures (CCR-ATCM: September 2005)*.

<sup>3</sup> A new stationary diesel engine is one that is constructed or ordered, after July 11, 2005, the date the proposed standards were published in the Federal Register and manufactured after April 1, 2006.

<sup>4</sup> This is beyond the *EPA-NSPS Final Rule: FR/Vol. 71, No. 132/July 11, 2006*, and in accordance with *California Code Rules, Air Toxic Control Measures (CCR-ATCM: September 2005)*.

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<p><b>Candidate Measure 3:</b> <i>Applicability:</i> Use Ultra Low Sulfur Diesel (ULSD)[15 ppm S] for Currently in-use and 2007 and later MY stationary diesel engines, including emergency generators. <i>Estimated Emissions Reduction:</i> 95% PM and 80% NOx per engine (associated with candidate measure 1 and candidate measure 2 – From 2006 base levels). <i>Estimated Cost:</i> Between 5 and 10 cents/gal (average) more compared to 500 ppm S diesel. <i>Proposed Timing of Implementation:</i> 2007-2008 (Earlier than EPA’s October 2010 deadline) <i>Implementation Area:</i> New Jersey</p>	Estimated ULSD use	~ 10 <sup>8</sup> gal/year or ~ 10,000 barrels per day (average)
<p><b>Policy Recommendation of State/Workgroup Lead:</b></p> <ul style="list-style-type: none"><li>• Develop engine control technology retrofit program associated with an engine compliance certification procedure comparable to California Code Rules.</li><li>• Develop a state implementation program for each proposed candidate measure.</li><li>• Update N.J.A.C. 7:27 Subchapters 4, 8, 9 and 16 and 19, as well as any General Permits associated with stationary diesel engines, to ensure consistency with provisions for ULSD requirement and proposed emissions standards in candidate measures 1 and 2.</li></ul>		
<p><b>Brief Rationale for Recommended Strategy:</b> Current measures in NSR, SOTA and NOx RACT do not enforce monitoring and controlling of all emissions from stationary diesel engines that are less than 100 KW and/or have the potential to emit less than 5-tons/year. Furthermore, the State Title V operating permit addresses only significant stationary sources that are located at major sources. Their emissions are based on a mass rate (i.e. pound/hr or tons/year) and not on engine power-output (i.e. gm/hp. hr). A fairly large number of small engines, roughly between 75 and 400 hp, representing almost 80% of current inventory of diesel stationary engines in the State, are not accounted for. By retrofitting diesel engines greater than 50 hp with add-on controls, combined with the use of ULSD, should reduce PM by 97% and NOx by at least 80% compared to uncontrolled levels. The central objective of each candidate measure is to reduce PM for which the State is in non-attainment in many areas. As a result, emissions of CO will be reduced through the use of add-on controls, especially in achieving Tier 4 standards of NOx and PM. Emissions of SO2 will also be reduced through the use of ULSD, as well as HAP emissions.</p>		

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